*Documents and Related Materials Associated
with the Contents and the Origin of the
Los Alamos Technical Series and the
National Nuclear Energy Series*

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*Documents and Related Materials Associated
with the Contents and the Origin of the
Los Alamos Technical Series and the
National Nuclear Energy Series*

*Edward F. Hammel**

**LANL Affiliate*

INTRODUCTORY NOTES AND CONTENTS

These materials were obtained primarily from, and with much assistance from, the staff of the Los Alamos National Laboratory's Report Library in connection with the author's preparation of an account of Plutonium Metallurgy Work in D-Building during World War II. Also included are a few papers relating to the National Nuclear Energy Series. A Table of Contents follows:

SECTIONS

1. Pages 78, 150, 151, 163, 256, and 257 from LA-2532-MS, Vol. I, Manhattan District History, Project Y, The Los Alamos Project by David Hawkins
(These pages deal with the early metallurgy and other topics relating to Pu metallurgy work at Los Alamos.)
2. Pages 102, 103, 207, 209, 210, 211, and 212 from LA-2532-MS, Vol. II
(Same subject as entry 1 above)
by Edith C. Truslow and Ralph Carlisle Smith
(These pages deal with the Los Alamos Technical Series and include Appendix 7: A Description of the Technical Series.)
3. LAMD-76. This report is a collection of early memoranda relating to the preparation of the Los Alamos Technical Series
(The pages are already numbered: 1-16.)
4. LAMD-770. A detailed outline of the documents incorporated in the Los Alamos Technical Series (The pages are already numbered: 1-13.)
5. The Los Alamos Technical Series:
A Record of the Publications Which Constitute Each Volume of the Series
by Judy Young, Sept. 30, 1981 (The pages are already numbered: 0-5.)
6. A Partial Listing of the National Nuclear Energy Series Volumes
7. "Essential Reference Documents for All Nuclear Energy Collections"
U.S. Atomic Energy Commission: National Nuclear Energy Series: Divisions I-X
8. A Partial Listing of "Abstracts of Classified Reports," Vol. 14
January 15-December 31, 1958

**DOCUMENTS AND RELATED MATERIALS ASSOCIATED WITH THE
CONTENTS AND THE ORIGIN OF THE LOS ALAMOS TECHNICAL SERIES
AND THE NATIONAL NUCLEAR ENERGY SERIES**

by

Edward F. Hammel

ABSTRACT

The rationale for preparing this document arose from the fact that the author (who worked in D-Building during WWII) was asked to contribute a short article on "Plutonium Metallurgy at Los Alamos During the War" for inclusion in the 50th anniversary book, "Behind Tall Fences," published in 1993 by the J. R. Oppenheimer Memorial Committee. I agreed, believing that all of the source material needed was readily available in the Los Alamos Technical Series, a detailed account of all of the R&D carried out at Los Alamos from 1943 to 1945.

The obvious place to start was the LANL Report Library. As will be seen by the perusing the following memoranda and reports (which were assembled one at a time by following up successive leads), it finally turned out that, of all six chapters of Vol. 10, "Metallurgy," of which Cyril S. Smith was the general editor, the only one "not yet issued" was Chapter I on "Plutonium Metallurgy," which had been assigned to Eric R. Jette, the wartime Group Leader of the Plutonium Metallurgy Group.* Jette left Los Alamos at the end of August 1956 to join the Union Carbide Research Institute in Tarrytown, New York, where he was director until June 1962 when he retired to his valley home in Pojoaque. In February 1963, he was awarded the US Atomic Energy Commission citation for meritorious contributions to the Nuclear Energy Program; shortly thereafter he died.

Before accepting the fact that Chapter I did not exist, the present author undertook to find out as much as possible about the Los Alamos Technical Series, including the circumstances relating to its preparation. The related memos, etc., once retrieved, seemed worth preserving in a single report—hence this document.

*It was later discovered that this chapter was never written.

SECTION 1

Metallurgy

4.29 Another virtue of the hydride program not mentioned in paragraph 4.13 was the interest taken in the preparation and fabrication of this material. Studies were begun, among the first undertaken by the metallurgists, in the art of preparing high density compacts of this material. The result was that although after a year or so it was known that the hydride would not yield an efficient weapon, this material could be easily fabricated, and was used in making experimental reactors.

4.30 The main goal of metallurgical research in this period was the development of techniques for handling the final preparation of active and tamper materials in the large amounts necessary for the bomb. Apart from early work with the hydride, effort was first concentrated on the metallurgy of uranium. This subject was already fairly well developed in other branches of the project. The Los Alamos requirements were, however, somewhat different and more exacting. There was much greater emphasis on maintaining a high chemical purity and on yield. A bomb-reduction technique was developed in the first period and perfected in the second, which admirably satisfied these requirements.

4.31 One of the reasons for the early work on uranium metallurgy was its hoped-for resemblance to that of plutonium, as yet nonexistent in workable amounts. When the first such amounts of plutonium appeared - in March 1944 - techniques for its reduction were already under development; by the end of the first period satisfactory bomb-reduction methods had been perfected.

4.32 The investigation of plutonium metallurgy was one of the principal undertakings of the metallurgical groups. A properly scientific study of the properties of the new element was of necessity limited by the time available and the pressure for usable methods. The standards of usability, moreover, were much harder to meet than in the case of uranium. According to the original purity requirements, all operations would have to be carried out in such a way as to avoid contamination with light elements, even of a few parts per million. This made necessary a large subsidiary program for the development of heavy-element refractories. The substantial relaxation of purity requirements that came with the abandonment of the plutonium gun program at the end of the first period was sufficient to guarantee success. Indeed by this time the original high purity goals had nearly been reached, and some simplification of techniques became possible. In July 1944 experimental proof was obtained of the alpha (room temperature) and beta phases.

of being both dustproof and air-conditioned. It was largely completed and staff members were moving in by December 1943.

8.6 Immediately upon undertaking his duties, Thomas set up a program for the extraction of polonium, either from lead dioxide residues that had been located or from bismuth which could be irradiated in the piles at Clinton or Hanford. Research on the former problem was undertaken at the Monsanto Laboratories and on the latter at Berkeley.

8.7 As already noted, a division of labor in many problems continued under Thomas' direction. For example, in the case of the investigation of plutonium chemistry as distinguished from purification proper, a Berkeley group provided information on the oxidation and valence states of plutonium, while the earliest reports on density and crystal structure of the metal came from the Metallurgical Laboratory. It might be noted, relative to the last mentioned work, that the measurements at the Metallurgical Laboratory were made before it was definitely established by investigations conducted at Los Alamos that there was more than one allotropic form of the metal (8.38). However, it was suggested in February of 1944 that the difference in structure in barium- and calcium-reduced plutonium, reported by Chicago workers, might be caused by the existence of at least two such forms.

8.8 Further instances of co-extensive programs at various sites occurred in the work of the bomb method of plutonium reduction (8.41-8.43) by both the Metallurgical Laboratory and the Los Alamos group, although the work at the former was only on a small scale. The simultaneous development was undertaken at these two laboratories of methods of spectrographic analysis for many elements, in particular the cupferron-chloroform extraction method with copper spark analysis (8.76). As to the latter, work on the method continued at Chicago with the final development being done at Los Alamos.

8.9 Thomas further arranged in the course of the liaison work that the Metallurgical Laboratory should be primarily responsible for the procurement of two groups of materials for the entire project, reagents of much higher purity than those commercially obtainable and refractories for use by the many metallurgical groups. The problem of securing an adequate supply of satisfactory refractories became increasingly important with the expansion of work by the Los Alamos metallurgists. These difficulties had been magnified by the fact that initial arrangements for procurement were not satisfactory. Under Thomas' auspices, however, arrangements for the development and production of these refractories were initiated in January 1944, and it was eventually decided that a group under F. H. Norton at the Massachusetts Institute of Technology was to undertake the research problems

involved. The technical problems considered will be discussed later (8.52). It should be noted that arrangements were also made about this time to carry out research on the use of cerium sulfide, principally at the University of California. Cerium metal was produced at the Iowa State College, with the bulk of the output being sent to M.I.T. Some subsidiary work was also done at Brown University.

8.10 Despite the most careful liaison efforts, work by the Los Alamos metallurgists was sometimes delayed because of the time lag between changes in requirements for refractories and corresponding changes in the output by the fabrication groups at other sites. In order to overcome this time lag, the local refractory research group was enlarged during April 1944, and production of standard refractories undertaken. Subsequently, at a meeting of the chemistry and metallurgy groups at Chicago in June 1944, it was decided to send the production of Berkeley, Ames, and M.I.T. to Los Alamos in an effort to meet the sharp rise in demand for refractories there. Despite all these efforts the problem of procuring a sufficient number of the proper types of refractories continued throughout the period covered by this report.

8.11 With the discovery of Pu^{240} , there was no further need for coordination of purification work. The discovery came at a time when it had become clear that the chemical purification of Pu^{239} could be accomplished, although still with great difficulty. The division of labor between the various sites, moreover, was at that time well worked out.

8.12 The chemistry of U^{235} , and its attendant liaison, presented much simpler questions than plutonium. There were two main problems to be examined by workers at Los Alamos: The processing of the tetrafluoride for experimental work in the laboratory and for the production of weapons; and problems concerning the Water Boiler, such as the decontamination of solutions. The purification of U^{235} to the tolerance limits specified by the Los Alamos Laboratory was undertaken by Tennessee Eastman at Oak Ridge. Los Alamos chemists were interested in knowing the processing which the material had undergone before shipment and the nature of the analysis done at Oak Ridge. They also specified the chemical form in which the material was to be shipped, for example, as the sulfate, nitrate, or tetrafluoride. Other questions which arose were connected with isotopic concentration, mixing of lots with different concentrations, methods of assay and the like. One special item of liaison was the cooperation between Los Alamos and the Clinton Laboratories at Oak Ridge on the production of radiobarium-radio-lanthanum for the implosion studies (17.42). In the course of the work in connection with the Water Boiler and particularly the decontamination of

would have virtually exhausted the country's supply.

8.49 Various methods of obtaining high density were tried, among them impregnation with magnesium fluoride, but the fluoride was undesirable from a nuclear point of view. A method of impregnation with beryllium nitrate followed by ignition proved rather poor. The method finally chosen was a hot pressing technique, somewhat unusual for a refractory material.

8.50 Experimentally, the bricks were prepressed in a steel mold, then hot pressed in graphite at 1700°C at pressures in the neighborhood of 1000 pounds per square inch for 5 to 20 minutes. Fifty-three bricks were made for the Water Boiler tamper, shaped to fit around the 12-1/16 inch sphere of the boiler. For this production job the method was a variation of the method described above. The density averaged 2.76.

CRUCIBLE AND REFRACTORY RESEARCH

8.51 The purpose of this important work was to find materials for crucibles and liners which would not introduce contaminants into purified uranium and plutonium. Wetting, sticking, and thermal sensitivity had also to be considered. In this program a great many substances were investigated including cerium sulfides, calcium oxide, magnesium oxide, tantalum, graphite, a tantalum-thorium nitride mixture, zirconium nitride, thorium sulfides, beryllia, uranium nitride, thoria, tungsten carbide, tantalum carbide, titanium nitride, and many others. Cerium sulfide was one of the really hopeful materials found during this period and effort was concentrated on trying to improve the fabricated material's resistance to thermal shock, its main weakness.

MISCELLANEOUS SERVICE ACTIVITIES

8.52 The metallurgists prepared a great variety of materials for physics and ordnance experiments. These involved machining, heat treating, metallographic studies, casting of various metals, electroplating, miscellaneous plastic preparations, and powder metallurgy. Metallographic methods for uranium and plutonium studies were essentially new. This work was done mainly by the Heat Treating and Metallography Group, and the Miscellaneous Metallurgy Group.

in the recovery operations. The need to vary procedures to fit the type of contamination involved made the development of enclosed apparatus difficult. Such apparatus was, in fact, not developed until after the period covered by this history (November 1945 at DP Site). The main safety effort was to enforce the careful monitoring of personnel; those who showed exposure in excess of body tolerances were taken away from further exposure until counts returned to normal (9.30).

Plutonium Metallurgy

17.24 When the new purity tolerances were established, all metal reduction methods were eliminated except the stationary bomb reduction of the tetrafluoride. Work continued as before in the field of crucible research for remelting. It became possible, however, to use magnesia since with increased tolerances the danger of magnesium impurities was less serious. A good deal of research was done on the physical properties of plutonium metal, since more than two allotropic phases were suspected, and this was of primary importance in forming operations. Work began on alloys, with the purpose of finding one that would keep a high temperature phase stable at room temperature. The stable room temperature phase, called the alpha phase, is brittle and difficult to work with. Fabrication operations were investigated, as were methods of surface cleaning and protection. Because plutonium is highly susceptible to corrosion, these were far more important topics than in the case of uranium.

17.25 The techniques of metal reduction and remelting were well established by August 1944. This work, of course, was on a very small scale, and the techniques had to be adapted to large scale operation as more plutonium became available.

17.26 Within the limited time available to them, the metallurgists made rather extensive studies of the physical properties of plutonium. The first transuranic element manufactured in kilogram amounts proved to have a remarkable physical structure. It exists in five distinct allotropic forms between room temperature and the melting point, labeled in the order of temperatures at which they are stable α , β , γ , δ , ϵ . It is very electropositive, but had the highest electrical resistivity of any metal. It is very corrosive in water and air.

17.27 Of all the phases the α , or room temperature phase, is the densest. Because this phase is brittle, and the δ and ϵ phases malleable, the material was pressed at δ phase temperatures. When a series of hemispheres

were cast by this method for multiplication studies, warpage and cracks appeared after the metal stood a day or so at room temperature. Evidently higher temperature phases were being retained for a time at room temperature, the warping and cracks being caused by a delayed transition to the denser phase.

17.28 While cleaning and etching plutonium surfaces caused no serious problems, that of protective coating did. A large number of electroplated and evaporated metal coatings were tried, and electrodeposited silver was decided upon for the Trinity hemispheres. At the last minute, however, small pinholes were discovered in the coat as well as blistering caused by the retention of small amounts of plating solution under the coat. Since the scheduled test was only a few days away, it was decided to use the material in this condition, with the blisters polished down to restore the fit of the hemispheres.

Miscellaneous Metallurgy

17.29 The principal metallurgical work of this period, other than uranium and plutonium metallurgy, was that of the Miscellaneous Metallurgy Group in fabricating the gun tamper, beryllium crucibles and refractories, and some boron compacts.

17.30 In crucible research cerium sulfide continued in use for some time after the lowering of purity standards. The material finally adopted for all plutonium and uranium crucibles and liners was a vitrified magnesia developed by the Miscellaneous Metallurgy Group and manufactured at Los Alamos, at the Massachusetts Institute of Technology, and at Ames.

Radiochemistry

17.31 The principal developments in radiochemistry after August 1944 were the following: The implosion initiator program was gotten under way, and the staff of men in this program engaged in polonium research was increased. Radiolanthanum work, in collaboration with the RaLa Group, was carried out at the Bayo Canyon Laboratory. These two groups were formally separated from the Radiochemistry Group in April 1945. Work began with the high-power Water Boiler, with its consequent problem of decontaminating highly irradiated uranium. Foil chemistry was continued. A new sensitive

SECTION 2

THE TECHNICAL SERIES*

9.7 In conformity with other sections of the Manhattan Project, a program was initiated to record, in accessible and edited form, the technical knowledge and gains of the Laboratory. In principle, it was proposed to prepare a "Handbuch der Los Alamos" in analogy with the famous Handbuch der Physik. Titles for seventeen volumes were established in August 1945, as well as volume, and, in some cases, chapter and section editors. Difficulty in establishing a title for the over-all work arose. The original name "Handbuch der Los Alamos" was misleading in its English translation, so the title Los Alamos Encyclopedia was substituted. But inasmuch as it was decided that "encyclopedia" implied an alphabetical arrangement, that too was discarded and the "Los Alamos Technical Series" was finally chosen (Appendix 7).

9.8 Dr. Hans Bethe and Dr. David Inglis were originally responsible for this compilation with the following staff of volume editors

Volume No.	Title	Editor	Termination Date
0	"Relation Between the Various Activities of the Laboratory"	S. K. Allison	
1	"Experimental Techniques"	Darol K. Froman	
2	"Numerical Methods"	Eldred C. Nelson	1/46
3	"Nuclear Physics"	R. R. Wilson	2/8/46
4	"Neutron Diffusion Theory"	George Placzek	5/46
5	"Critical Assemblies"	O. R. Frisch	8/45
6	"Efficiency"	V. F. Weisskopf	2/46
7	"Blast Wave"	Hans A. Bethe	12/45
8	"Chemistry of Uranium and Plutonium"	Joseph Kennedy	12/29/45
10	"Metallurgy"	Cyril S. Smith	1/2/46
11	"Explosives"	G. B. Kistiakowsky	1/17/46
12	"Implosion"	R. F. Bacher	1/15/46
13	"Theory of Implosion"	R. E. Peierls	1/46
21	"The Gun"	F. Birch	
22	"Fuzes"	R. R. Brode	
23	"Engineering and Delivery"	N. F. Ramsey	
24	"Trinity"	K. T. Bainbridge	

*See editor's note, Appendix 7.

9.9 Only Volumes 1 and 2 have been considered completely declassifiable under the existing standards. However, a substantial portion of the information in some of the others will eventually be declassifiable and, with the exception of the weapon data, the remainder was to be distributable throughout the Manhattan Project for its general benefit.

9.10 Shortly after the initiation of the program, Dr. David Hawkins and Robert R. Davis were assigned the responsibilities of the Technical Series because of the imminent departure from Los Alamos of both Dr. Bethe and Dr. Inglis. When Dr. Hawkins left the project in the late summer of 1946, Robert R. Davis took over the detail as a group leader in D-Division.

9.11 The Technical Series compilation has proceeded at a slow rate since the time of its inception. Exceptional delays resulted because many individuals were reluctant or unable to continue obligations, taken on while at Los Alamos, after their departure. A more understandable difficulty was experienced by active project personnel who were faced with the problem of conducting an active technical program while writing about one accomplished in the past.

9.12 By January 1947, Volume 0 and 22 were completed and issued, and two-thirds of Volume 1 had been issued.

APPENDIX NUMBER 7

DESCRIPTION OF TECHNICAL SERIES

Title and brief description of each volume being written for the Los Alamos Technical Series. (See par. 27.)

Editor's Note, 1961. This series has not been made available for outside distribution except for Vol. I, published by McGraw-Hill Book Company, Inc., in the National Nuclear Energy Series; Vol. IV, published by the Government Printing Office; and Vol. VII, a portion of which was issued as LA-2000 (Unclassified), available from the Office of Technical Services, Department of Commerce.

CONTENTS OF THE LOS ALAMOS TECHNICAL SERIES

Volume No.	Title and Description	Editor
0	"Relation Between the Various Activities of the Laboratory" (A general survey of the work of the Los Alamos Laboratory during the war years, with particular emphasis upon the problems of the critical mass and of the efficiency. In addition to a discussion of the gun and implosion type bombs, the volume contains a section dealing with other methods of attaining the explosive release of nuclear energy.)	S. K. Allison
I	"Experimental Techniques" (A description of the experimental physics equipment used by the Los Alamos Laboratory. The volume has three parts: the first dealing with electronics; the second with ionization chambers and counters; and the third with miscellaneous techniques used in obtaining physical measurements.)	Darol K. Froman
II	"Numerical Methods" (A survey of the methods used in performing numerical calculations of various types of equations by hand computation and with the use of International Business Machines.)	Eldred C. Nelson
III	"Nuclear Physics" (A comprehensive report of nuclear physics measurements made by the Los Alamos	R. R. Wilson

Volume No.	Title and Description	Editor
	Laboratory, together with theoretical evaluations of results and a detailed discussion of the fission process.)	
IV	"Neutron Diffusion Theory" (The theory of diffusion with and without a change in velocity, including a discussion of statistical fluctuations.)	George Placzek
V	"Critical Assemblies" (A report of critical mass experiments made at Los Alamos with uranium-238 and plutonium assemblies for various tampers. A theoretical discussion is included.)	O. R. Frisch
VI	"Efficiency" (A theoretical method for calculating the energy release of a nuclear explosion.)	V. F. Weisskopf
VII	"Blast Wave" (A study of blast wave phenomenon, both from a theoretical and an experimental point of view. Particular emphasis is placed upon the behavior of the blast wave in large explosions, and an effort has been made to interpret blast data from studies made at Trinity, Hiroshima and Nagasaki.)	Hans A. Bethe
VIII	"Chemistry of Uranium and Plutonium" (A survey of the problems concerned with the chemical purification and recovery of uranium and plutonium, together with a discussion of the preparation of their various compounds and of the analytical methods used in their study.)	Joseph Kennedy
IX	Not assigned.	

Volume No.	Title and Description	Editor
X	"Metallurgy" (A report on the metallurgy of uranium, plutonium and all other metals fabricated by the CMR Division.)	Cyril S. Smith
XI	"Explosives" (A survey of the experimental work done by the Los Alamos Laboratory on the behavior of explosives and on the techniques of explosive casting.)	G. B. Kistiakowsky
XII	"Implosion" (A report on the experimental implosion program from the early tests to the development of the Trinity bomb. The volume covers work done on polonium, radio-barium and radio-lanthanum.)	R. F. Bacher
XIII	"Theory of Implosion" (A theoretical survey of the implosion process. The volume contains discussions of shock hydrodynamics, equations of state and various implosion designs.)	R. E. Peierls
XXI	"The Gun" (A survey of the experimental gun program from the early tests to the development of the Hiroshima bomb. This volume includes design specifications and a discussion of the interior ballistics of the gun.)	F. Birch
XXII	"Fuzes" (A study of work done by the Los Alamos Laboratory in designing detonating fuze assemblies for the implosion and gun type bombs.)	R. B. Brode

Volume No.	Title and Description	Editor
XXIII	"Engineering and Delivery" (The history of Project "A" together with a discussion of engineering problems encountered in the delivery program. Particular attention has been given to the mechanical design and assembly of the Model 1561 implosion bomb.)	N. F. Ramsey
XIV	"Trinity" (A complete report on the 100 ton TNT calibration and rehearsal shot and the July 16, 1945 atomic bomb test at the Alamogordo Air Base. The volume includes both experimental and theoretical discussions of the various phases of the test. A large appendix contains all pertinent Trinity memoranda and all LA and LAMS reports concerning the Trinity explosion.)	K. T. Bainbridge

SECTION 3

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December 31, 1947

TO : All Division Leaders
FROM : R. L. Davis
SUBJECT : THE LOS ALAMOS TECHNICAL SERIES
REFERENCE : LAB-G-TS

This memorandum is intended as a report to the various divisions of the laboratory summarizing the present condition of the Los Alamos Technical Series. For the information of those who were not in some manner involved in the early planning of this work, a brief history of the Technical Series is presented in the following, together with descriptive paragraphs and vital statistics for each of the several volumes which are now available for distribution and for those which are forthcoming.

1. The Origin and Subsequent History of the Los Alamos Technical Series.

In conformity with the documentation activities of other installations connected with the Manhattan Project, a series of discussions was initiated during the summer of 1945 by several members of the Los Alamos laboratory relative to the writing and issuing of a comprehensive survey of the wartime accomplishments of the laboratory. A list of seventeen volume titles was compiled which distributed the subject matter as evenly as was thought to be practicable. Originally, it was contemplated that the work should be patterned after the Handbuch der Physik and for a time the title, The Los Alamos Handbook, was in fact used; however, it was felt that the word "handbook" was misleading and it was therefore abandoned in favor of "encyclopedia", which was intended to describe the comprehensive nature of the work. Finally, because "encyclopedia" incorrectly implied an alphabetical arrangement of material, it was agreed that the compilation should be known as The Los Alamos Technical Series.

In the original listing of volumes for the "Handbook", one volume was considered sufficient to contain all engineering information, including a section on fusing. It was later decided to split the volume into two sections one dealing with the fusing program, the other with the general engineering and delivery program, and to issue each as a separate volume. This raised the total number of volumes to eighteen. It again became seventeen upon a decision to eliminate the volume dealing with miscellaneous chemistry (which had by this time been designated as Volume IX) and to distribute its material among various other volumes. Since this occurred after the writing program was well under way, no attempt was made to revise the outline other than to delete all references to Volume IX.

During the early period, moreover, the original ordering of volume titles underwent considerable juggling, and in late August of 1945 a final sequence was adopted which, in retrospect, might seem peculiar to anyone unfamiliar with opinions commonly held by laboratory personnel at that time. The reasons for such concern with the order in which volumes were to appear

* See early memoranda appended to this report.

UNCLASSIFIED

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had to do with a prevalent notion that it would prove possible simply to obtain security releases for a large number of volumes and have them published by a commercial publishing house. A programmatic history of the laboratory was to be written by S. K. Allison, and while it was not anticipated that this work might be declassified, it was recognized that it rightly should precede the other volumes as an introduction to the whole; it therefore was given the volume number "0". Volumes I through XIII were considered possibly or even probably declassifiable, and therefore were listed in the order it was imagined they might be released for publication. The last four volumes were felt to be in a more doubtful category, and since it seemed that they might never be released, they were given the numbers XXI through XXIV. A blank space of seven numbers, XIV through XX, was left to provide space for any additional volumes which might be contemplated.

During the months which followed, it became increasingly apparent that early estimates of the quantity of material which might be published were considerably in error since only a small portion of the total Series could be released under the officially approved declassification policy. In addition to an evident miscalculation on the part of the Series planners, this was a result of the quite general feeling of individual authors and editors that the writing of a complete and detailed survey of the laboratory's work was of paramount importance, that questions concerning eventual declassification and publication necessarily were matters of secondary consideration. Consequently, as the writing program progressed, the Series assumed more and more the character of a highly classified compilation of working handbooks.

As matters now stand, ten of the seventeen volumes of the Series have been issued, and of these only one (Volume I) has been prepared in such a manner that it has seemed hopeful, without major revision, to submit it for declassification. Of the seven unissued volumes, only one (Volume II) seems promising as a possibly declassifiable report, although in this case it is probable that considerable revision will be necessary.

2. Descriptive Survey of Volumes Issued as of December 31, 1947

Volume 0, "Relation Between the Various Activities of the Laboratory"
Written by S. K. Allison, 119 pages.

Chapter 1 through 4 LA-1006

(A general survey of the work of the Los Alamos Laboratory during the war years, with particular emphasis upon the problem of the critical mass and of the efficiency. In addition to a discussion of the gun and implosion type bombs, the volume contains a section dealing with other methods of attaining the explosive release of nuclear energy.)

Volume I, "Experimental Techniques",
Edited by E. K. Prodan, 1318 pages.

Chapter <u>1</u>	through <u>3</u>	LA-1001
Chapter <u>4</u>	through <u>7</u>	LA-1002
Chapter <u>8</u>	through <u>12</u>	LA-1003
Chapter <u>13</u>	through <u>16</u>	LA-1004
Chapter <u>17</u>	through <u>18</u>	LA-1005
Chapter <u>19</u>	through <u>20</u>	LA-1006
Chapter <u>21</u>	through <u>23</u>	LA-1007

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~~SECRET~~

(A description of the experimental physics equipment used by the Los Alamos Laboratory. The volume has three parts: The first dealing with electronics; the second with ionization chambers and counters; and the third with miscellaneous techniques used in obtaining physical measurements.)

Volume III , "Nuclear Physics"

Edited by R. R. Wilson, 446 pages.

Chapter <u>1</u>	through <u>3</u>	<u>LA-1009</u>
Chapter <u>4</u>	through <u>6</u>	<u>LA-1010</u>
Chapter <u>7</u>	through <u>9</u>	<u>LA-1011</u>

(A comprehensive report of nuclear physics measurements made by the Los Alamos Laboratory, together with theoretical evaluations of results and a detailed discussion of the fission process.)

Volume V , "Critical Assemblies"

Edited by O. R. Frisch, 373 pages.

Chapter <u>1</u>	through <u>3</u>	<u>LA-1053</u>
Chapter <u>4</u>		<u>LA-1054</u>
Chapter <u>5</u>	through <u>7</u>	<u>LA-1055</u>
Chapter <u>8</u>	through <u>10</u>	<u>LA-1056</u>

(A report of critical mass experiments made at Los Alamos with uranium-235 and plutonium assemblies for various tampers. A theoretical discussion is included.)

Volume VI , "Efficiency"

Edited by V. F. Weisskopf, 364 pages.

Chapter <u>1</u>	through <u>4</u>	<u>LA-1028</u>
Chapter <u>5</u>	through <u>6</u>	<u>LA-1029</u>

(A theoretical method for calculating the energy release of a nuclear explosion.)

Volume VII , "Blast Wave"

Edited by Hans A. Bethe, 797 pages.

Chapter <u>1</u>	through <u>4</u>	<u>LA-1020</u>
Chapter <u>5</u>	through <u>10</u>	<u>LA-1021</u>
Chapter <u>11</u>	through <u>14</u>	<u>LA-1022</u>
Chapter <u>15</u>	through <u>19</u>	<u>LA-1023</u>

(A study of blast wave phenomenon, both from a theoretical and an experimental point of view. Particular emphasis is placed upon the behavior of the blast wave in large explosions, and an effort has been made to interpret blast data from studies made at Trinity, Hiroshima and Nagasaki.)

Volume VIII , "Chemistry of Uranium and Plutonium"

Edited by Joseph Kennedy, 579 pages.

Chapter <u>1</u>	through <u>4</u>	<u>LA-1016</u>
Chapter <u>5</u>	through <u>7</u>	<u>LA-1017</u>
Chapter <u>8</u>	through <u>9</u>	<u>LA-1018</u>

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(A survey of the problems concerned with the chemical purification and recovery of uranium and plutonium, together with a discussion of the preparation of their various compounds and of the analytical methods used in their study.)

Volume XXI , "The Gun"

Edited by P. Birch, 410 pages.

Chapter 1 through 7 LA-1007
Appendix LA-1008

(A survey of the experimental gun program from the early tests to the development of the Hiroshima bomb. This volume includes design specifications and a discussion of the interior ballistics of the gun.)

Volume XXII , "Pezes"

Edited by R. B. Brode, 174 pages.

Chapter 1 through 8 app. LA-1005

(A study of work done by the Los Alamos Laboratory in designing detonating fuse assemblies for the implosion and gun type bombs.)

Volume XIV , "Trinity"

Edited by K. T. Bainbridge, 1825 pages.

Chapter	<u>1</u>	through	<u>11</u>	<u>LA-1012</u>
Appendix	<u>1</u>	through	<u>19</u>	<u>LA-1013</u>
Appendix	<u>20</u>			<u>LA-1014</u>
Appendix	<u>21</u>	through	<u>30</u>	<u>LA-1015</u>
Appendix	<u>31</u>	through	<u>40</u>	<u>LA-1016</u>
Appendix	<u>41</u>	through	<u>48</u>	<u>LA-1017</u>
Appendix	<u>49</u>			<u>LA-1018</u>
Appendix	<u>50</u>	through	<u>54</u>	<u>LA-1019</u>
Appendix	<u>55</u>	through	<u>71</u>	<u>LA-1020</u>

(A complete report on the 100 Ton TNT calibration and rehearsal shot and the July 16, 1945 atomic bomb test at the Alamogordo Air Base. The volume includes both experimental and theoretical discussions of the various phases of the test. A large appendix contains all pertinent Trinity memoranda and all LA and LAMS reports concerning the Trinity explosion.)

3. Descriptive Survey of Unissued Volumes

Volume II , "Numerical Methods"

Edited by Eldred G. Nelson

(A survey of the methods used in performing numerical calculations of various types of equations by hand computation and with the use of International Business Machines.)

Volume IV , "Neutron Diffusion Theory"

Edited by George Placzek

(The theory of diffusion with and without a change in velocity, including a discussion of statistical fluctuations.)

Volume X , "Metallurgy"

Edited by Cyril S. Smith.

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(A report on the metallurgy of uranium, plutonium and all other metals fabricated by the CMR Division.)

Volume XI , "Explosives"
Edited by G. B. Kistiakowsky

(A survey of the experimental work done by the Los Alamos Laboratory on the behavior of explosives and on the techniques of explosive casting.)

Volume XII , "Implosion"
Edited by R. F. Bacher

(A report on the experimental implosion program from the early tests to the development of the Trinity bomb. The volume covers work done on polonium, radio-barium and radio-lanthanum.)

Volume XIII , "Theory of Implosion"
Edited by R. E. Peierls

(A theoretical survey of the implosion process. The volume contains discussions of shock hydrodynamics, equations of state and various implosion designs.)

Volume XXIII , "Engineering and Delivery"
Edited by W. F. Ramsey

(The history of Project "A" together with a discussion of engineering problems encountered in the delivery program. Particular attention has been given to the mechanical design and assembly of the Model 1501 implosion bomb.)

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APPENDIX 1

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INTER-OFFICE MEMORANDUM

August 21, 1945

TO: All Division Leaders and All Group Leaders
FROM: H. A. Bethe
SUBJECT: LA HANDBOOK

The following is a tentative plan for the comprehensive LA Handbook. Each of the volumes here proposed should presumably have an editor and contain of the order of five to ten contributions describing various phases of the work. I should expect this list to be incomplete and to have too much emphasis on physics and particularly theoretical physics. I should therefore like to have suggestions of additional topics and also of suitable editors for the various volumes. In some cases, the names would be obvious.

In most instances, I believe it is appropriate to combine experiments and related theory in the same volume. There are some exceptions, such as Volumes 3 and 16.

To give an example, I have sketched the possible subdivisions of Volume 2. Various volumes will obviously be of very different length; some, like Volume 17, will be very short while others, like Volume 12, may possible require splitting into several volumes. I am anxious to get your reaction and criticism on this proposal as soon as possible.

LIST OF VOLUMES

1. General Problems

To discuss the connection between the various activities of the laboratory.

2. Differential Nuclear Physics

Cross-sections and other constants, relation with the theory of the compound nucleus.

3. Diffusion Theory

This might be split into two parts, the first containing generally applicable methods which could be published almost without restriction, the second, special methods such as the theory for many neutron velocities.

4. Critical Assemblies

Mainly experimental, to describe the approach to critical, the behavior of the critical assembly itself, and its use (such as the power water boiler).

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5. Efficiency

Theory of the nuclear explosion, including radiation.

6. Gun

To include also the fabrication of materials for the gun.

7. Engineering

Fuzes, detonators, outer case, ballistics, etc.

8. Chemistry of U and Pu.

9. Metallurgy of U and Pu.

10. Other Chemistry

Such as, Po, preparation of foils, protective coatings, etc. (I am assuming that the metallurgical problems not connected with U and Pu can be treated in connection with the purpose for which they were solved such as the WC metallurgy in connection with the gun. It may, however, be preferable to have a separate volume on non-plutonium metallurgy.)

11. Explosives

Techniques and properties of explosives, castings.

12. Detonation and Shock Waves, Equations of State

Theory of the equation of state of explosives and of solids; relevant experiments. Theory and experiments on detonation and shock waves especially the interaction of several waves.

13. Implosion.

Experimental methods to observe implosion, i.e., work of Division G and Section X-1. Theory of implosion.

14. Blast Wave

Theory of the blast wave from the gadget as compared to TNT explosion. Measurements at Trinity and on combat drops.

15. Trinity Test

16. Experimental Physics methods

17. Numerical Methods

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Proposed subdivisions of Volume 2 are as follows:

2. Differential Nuclear Physics

Cross-sections at High Energy
Cross-sections velocity selector

Spontaneous Fission
Scattering
Evaluation of Scattering
Relation of results with General Nuclear Theory

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APPENDIX 2

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INTER OFFICE MEMORANDUM

August 28, 1945

To All Division and Group Leaders
FROM H. A. Bethe and D. R. Inglis
SUBJECT LOS ALAMOS ENCYCLOPAEDIA

The plans for the comprehensive books on the work of this project have somewhat progressed. It was suggested not to call this a "Handbook" because this title would be misleading.

The arrangement of the volumes has been changed considerably from the first proposal as you will see from the list below. It has been suggested to put the volumes approximately in the order in which they might be released for publication, at least as far as this order does not conflict with the logical connection of the volumes. Several volumes may never be released and have mainly the purpose of recording the work of the project for future use. To leave flexibility in the arrangement, these volumes have been numbered beginning with "21".

It is our opinion that this encyclopaedia should be comprehensive and that the contributions should be so written that the reader gets a complete account of the important facts without consulting separate reports. For details, references to separate reports should be made and it would be helpful at the end of each article to have a bibliography of all LA reports on the subject. The encyclopaedia articles should contain tables and figures showing the relevant data, drawings of the important apparatus, etc. In many cases, these may be taken from reports previously issued.

The purpose of this encyclopaedia is two-fold. It is to make available to scientists at large the results and methods developed here and it is also to keep on record the techniques of making a nuclear bomb, to be useful to our prospective successors.

We have asked one or two men to take charge of each individual volume. The volume editors have been asked to prepare a list of the chapters to be included in their volume and of the prospective authors for each chapter. We have asked that these outlines come to our hands by September 4. You may, therefore, be approached by the editor of the volume containing your subject in the next few days with the request that you write an article on your subject. We should like to ask your cooperation in this because we believe it important that this comprehensive account of our work be written and be reasonably complete.

Assurance has been requested from the editor of the PHYSICAL REVIEW that publication of material in this book will not preclude its publication in the PHYSICAL REVIEW. We expect, in any case, that articles which are contributed both to the PHYSICAL REVIEW and to this book (probably in somewhat different form) would very likely appear in the PHYSICAL REVIEW before the LA encyclopaedia could come out. We believe that similar agreements should

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be obtained from other journals in which members of the laboratory would contemplate publishing their results if and when security regulations permit. Suggestions of journals with which such an agreement is desired would be welcome.

We have set as a tentative goal a completion date of January 1, 1946. This date was chosen because it was our opinion that the staff of the laboratory would be reasonably complete up to that time. Obviously, some of the contributions will be longer and will take longer to write than others so that we can not hope to have all of them complete at the same time.

It is our belief that reasonable priority should be given to writing these articles and that in general they should take precedence over new research but should not interfere too much with production requirements.

We are planning to issue a memorandum containing the complete list of chapters as soon as this is available. However, we hope that the writing of the individual articles can be started before the plan of the entire work is completed. Concerning individual volumes, it has been decided to omit the volume on the Trinity test whose material might be included in the volume on the blast wave, the efficiency, and the nuclear physics volume. Some volumes have been combined in different ways especially those connected with explosives and implosion; other volumes have been split. In a few cases, it has not yet been possible to secure definitely a volume editor.

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Los Alamos Encyclopedia

LIST OF VOLUMES

- 0.* Relation between the Various Activities of the Laboratory (Allison)
1. Experimental Physics Equipment (Froman). A memorandum on this volume was sent to you by Dr. Froman (previously Volume 16.)
 2. Numerical Methods (Nelson). IBM methods for solving differential equations and for other calculations, methods for numerical integration by hand, integration along characteristics, etc.
 3. Nuclear Physics (R. R. Wilson). Measurements of cross sections and other nuclear constants, spontaneous fission, theoretical evaluation and interpretation.
 4. Diffusion Theory (Placzek). Theory of neutron diffusion.
 5. Critical Assemblies (O. Frisch). All critical assemblies made at Los Alamos, probably with elementary theory.
 6. Efficiency (Weiskopf). Theory of the efficiency, methods for measuring the efficiency excluding blast wave.
 7. Blast Wave (Bethe). Theory of the blast wave and measurements. Problem of water delivery.
 8. Chemistry of U and Pu (Kennedy)*
 9. Chemistry of other Materials (Dodson).* All service chemistry such as preparation of initiators, of foils, and various materials required in other parts of the laboratory, etc.
 10. Metallurgy (C. S. Smith). Metallurgy of U, Pu, and all other metals fabricated by the Metallurgy Division (the fabrication of such materials will not be included in the volume describing their use.)
 11. Explosives and Detonation Waves (Kistiakowsky). Experimental work on the property of explosives and techniques of explosives casting.
 12. Implosion (Bacher). Experimental observations of implosion such as velocities and densities.

* This volume should obviously come at the beginning. On the other hand, it is presumably not possible to release it in the near future. We therefore did not wish to give it the number "1".

* These persons are proposed for volume editors but could not yet be approached.

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Los Alamos Encyclopaedia

- 13. Theory of Implosion (Peierls). Theory of shock and detonation waves and of the hydrodynamics of implosion.
- 21. Gun (Birch). (This is the first of the volumes which are mainly for the record and will presumably not be released.)
- 22. Fuses (Brode).
- 23. Engineering and Delivery. (Volume editor not yet determined). Firing circuit, outer case, ballistics, etc.

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APPENDIX 3

TO: VOLUME EDITORS AND AUTHORS IN THE LOS ALAMOS TECHNICAL SERIES

FROM: H. Bethe and D. Inglis

SUBJECT: Minutes of Meeting held Friday, October 12, 1945

A meeting of the volume editors was held Friday, October 12. On several subjects the opinions of the various editors seemed to differ considerably. I shall try, in the following, to summarize the opinions presented, to record those matters which were definitely decided, and also to bring to your attention some developments not mentioned in the meeting.

(1) The name of the work is to be changed from "Los Alamos Encyclopedia" to "Los Alamos Technical Series." This seems to be indicated also by the fact that probably only a few volumes can be released for publication in the near future.

(2) It was generally agreed that the writing of the volumes, with the exception of volumes 1 and 2, should proceed without regard to the problem of future declassification. Every volume should be written such as to present the material in the most coherent and scientifically appropriate way. An exception should be made for volumes 1 and 2, which we hope to get declassified before everything else. In these two volumes care should be taken to avoid reference to such things as the values of nuclear cross-sections, the implosion, or similar subjects.

(3) Every manuscript that is released for publication must be cleared, both by security and by Major Smith's Patent Office. The latter clearance is required by our contract, which provides that the government has a right to take out patents on all inventions made on this project. It is, therefore, strongly recommended that every chapter of volumes 1 and 2 be submitted as soon as it is finished to Major Smith and to the Security Office, for clearance.

(4) The number of copies to be made for the use of the project itself before publication was discussed. It was suggested by various people in the meeting that between 5 and 100 copies be made for the project. It seems to me that in order to be useful at least 10 copies should be made of every volume, except those which may have to be classified "top secret". It seems most reasonable to let the number of copies vary from one volume to another but it is highly desirable that a conclusion on the number of copies be reached before any given volume is reproduced in order to decide on the method of reproduction for the text (mimeograph or hectograph) and for the illustrations.

(5) It is requested that every volume editor submit an estimate of the length of his volume in terms of number of typewritten pages or of words. It seems desirable that the approximate length of the individual chapters be agreed upon by the chapter authors and volume editors. Even more desirable is an estimate of number of illustrations - both full and half page.

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(6) The cooperation with the Chicago Metallurgical Laboratory was discussed. It was the general feeling that the volume editors most concerned should go to Chicago and discuss the problem with the corresponding volume editors there. The purpose of these discussions would be to avoid, as much as possible, duplication between the two series; but some duplication will be unavoidable in the interest of making each series a coherent whole. It was felt that we should not attempt to write joint volumes with the Chicago Laboratory but that we should offer, in special cases, to let members of our laboratory write chapters for the Chicago series, and that likewise we should be entitled to ask members of the Chicago Laboratory to contribute to our series, if this is indicated.

(7) Inquiries have been made from four publishers of whom two, McGraw-Hill and Interscience Publishers, showed definite interest in publishing the series when released by security; while the other two, MacMillan Company and Prentice-Hall, seemed more doubtful. It is proposed that the first two be considered in more detail for our publication. It is planned to have Cpl. Warshaw travel East to negotiate with the publishers. Cpl. Warshaw has had some experience in publication work.

(8) It was the general opinion that royalties should be waived for the publication. The two publishers mentioned above both indicated that they would reduce the price of the volume accordingly, if royalties were waived.

(9) Considerable discussion took place on the problem of references. The prevalent opinion was that references should be made to the names of all people who participated in any particular experiment or development. It was suggested that each reference be given a number, and that only the number be quoted in the text, while the names belonging to the reference would be found at the end of the chapter. It was the majority opinion that rather too many than too few names should be included under each reference.

In addition to these references on specific subjects, the need was felt for references to large groups of people, such as the groups engaged in casting of H.E. charges. In this case it was suggested to have a reference attached to the entire chapter and to name everybody at the end of the chapter (or of the volume) who was concerned in that particular work.

Disagreement existed as to the extent to which each of these two types of references should be used. It is my opinion that they should both be used at the discretion of the author of the chapter and the volume editor.

(10) The format of the final publication was discussed. Arguments were given both in favor of large size (Physical Review) and of normal book size, also, of one column and of two columns in the case of large format. There was some sentiment that not all volumes need to have the same format. For the time being figures should probably be prepared so as to fit our own mimeographed edition; but in such a way as to make redrawing unnecessary for future publication in book form when this is not too much extra work. Cpl. Warshaw should be consulted on this question.

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(11) Several authors have expressed the desire to publish some of their results in scientific journals in addition to the Los Alamos Series. We have assurance from the Physical Review that they will accept papers even if they duplicate material in the Los Alamos Series. They requested, however, that the material be sent to them not all at once, if possible. They also pointed out that they have only limited funds for publication so that if they had an

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excess amount of material for publication, they would favor unpublished material as compared with that published in a series. In general, however, authors can be confident that their publication in the Physical Review will not be prejudiced by writing on the same subject in the series.

Attempts will be made to get similar assurances from other scientific journals.

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SECTION 4

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OUTLINE - LOS ALAMOS TECH SERIES - 2 July 1947

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LOS ALAMOS TECHNICAL SERIES

September 10, 1951

Volume 0 _____ LA-1006

Volume 1

Part 1, Section A (Chapters 1-3) _____ LA-1001

Section B (Chapters 4-7) _____ LA-1002

Part 2, Section A (Chapters 8-12) _____ LA-1003R

Section B (Chapters 13-16) _____ LA-1004R

Part 3, Section A (Chapters 17-18) _____ LA-1030

Section B (Chapters 19-20) _____ LA-1031

Section C (Chapters 21-23) _____ LA-1032

Volume 2

Part 1, (Chapters 1-5) _____ LA-1057

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Volume 3

Section A (Chapters 1-3) _____ LA-1009

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Part 2 (Chapters 4) _____ LA-1034

Part 3 (Chapters 5-7) _____ LA-1035

Part 4 (Chapters 8-10) _____ LA-1036

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Part 2 (Chapters 5-6) _____ LA-1029

June 7

Part 1 (Chapters 1-4) _____ LA-1020

Part 2 (Chapters 5-10) _____ LA-1021

Part 3 (Chapters 11-14) _____ LA-1022

Part 4 (Chapters 15-19) _____ LA-1023

Volume 8

Section A (Chapters 1-4) _____ LA-1016 ✓

Section B (Chapters 5-7) _____ LA-1017 ✓

Section C (Chapters 8-9) _____ LA-1018 ✓

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Volume 10

(Chapter 1) _____ Not Yet Issued

(Chapter 2) _____ LA-1223

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(Chapter 5) _____ LA-1259

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(Chapters 7-8) _____ Not Yet Issued LA-1051

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<u>Volume 13</u>	
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(Appendices 55-71)	LA-1027

TECHNICAL SERIES

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<u>Volume Number</u>	<u>Volume Editor</u>	<u>Volume Title</u>
0	Allison	Relation between the various activities of the laboratory.
1	Froman	Experimental Physics Equipment
2	Nelson	Numerical Methods
3	Wilson	Nuclear Physics
4	Placzek	Diffusion Theory
5	Frisch	Critical Assemblies
6	Weisskopf	Efficiency
7	Bethe	Blast Wave
8	Kennedy	Chemistry of U and Pu
10	Smith	Metallurgy
11	Kistiakowsky	Explosives and Detonation Waves
12	Bacher	Implosion
13	Peierls	Theory of Implosion
21	Birch	Gun
22	Brode	Fuzes
23	Ramsey	Engineering and Delivery
24	Bainbridge	Trinity

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OUTLINE OF THE LOS ALAMOS TECHNICAL SERIES

VOLUME 0

Relation Between the Various Activities of the Laboratory

LA-1006 Secret

<u>Chapter No.</u>	<u>Chapter Author</u>	<u>Chapter Title</u>
Introduction	Allison	Contents and Forward ^{e0}
1	Allison	The Problem of the Critical Mass
2	Allison	The Problem of Efficiency
3	Allison	Other Methods of Attaining the Explosive Release of Nuclear Energy
4	Allison	The Fission Bomb as a Military Weapon

VOLUME 1

Experimental Techniques

Preface (Froman)

Part I - Electronic Circuits

1	Elmore, Sands	Components and Construction Practice
2	Elmore, Sands	Circuit Elements
3	Elmore, Sands	Voltage Amplifiers
4	Elmore, Sands	Electronic Counters
5	Elmore, Sands	Oscillographs and Associated Equipment
6	Elmore, Sands	Test and Calibration Equipment
7	Elmore, Sands	Power Supplies and Control Circuits

Part II - Ionization Chambers and Counters and Associated Techniques

8	Rossi, Staub	Behavior of Free Electrons and Ions in Gases
9	Rossi, Staub	Operation of Ionization Chambers with Constant Ionization
10	Rossi, Staub	Operation of Ionization Chambers with Variable Ionization

OUTLINE OF LOS ALAMOS TECHNICAL SERIES

Part II - Ionization Chambers and Counters and Associated Techniques (continued)

<u>Chapter No.</u>	<u>Chapter Author</u>	<u>Chapter Title</u>
11	Rossi, Staub	Gas Multiplication <i>LA-1003 Dec 1</i>
12	Rossi, Staub	Beta-Ray, γ -Ray, and X-Ray Detectors
13	Rossi, Staub	Alpha Particle Detectors <i>LA-1004 Dec 1</i>
14	Rossi, Staub	Detectors for Neutron Recoils
15	Rossi, Staub	Detectors of n- α and n-p Reactions
16	Rossi, Staub	Fission Detectors
Appendix	Rossi, Staub	Appendix to Part II
Table of Contents	Rossi, Staub	Table of Contents to Part II

17	Graves, Weinstock Helmholz, Dodson	Counting of Elementary Particles <i>LA-1030 uncl</i>
18	Graves, Walker Taschek, Agnew	Neutron Sources and Their Calibration
19	Kerst	The Modulated Betatron <i>LA-1031 uncl</i>
20	McDaniel, McKibben and Hane	Modulation and Other Techniques Used with Ion Accelerators
21	Snyder, Lipkin	Vacuum Techniques
22	Mack	Photographic Methods <i>LA-1032 uncl</i>
23	Abersold, Hinch Hoffman, Molloy	Health Precautions and Monitors

VOLUME II

Numerical Methods

IBM Volume Editor (Nelson)

1	IBM Staff	Description of the IBM Machines
2	Flanders, Whitman Hamming	Interpolation A. General Interpolation Formulae B. Interpolation on IBM Machines
3	Flanders, Whitman Hamming	Numerical Integration A. General Methods B. Numerical Integration on IBM Machines

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OUTLINE OF LOS ALAMOS TECHNICAL SERIES

Volume II (continued)

4	Flanders, Heller
Kemeny	4.5-7
Determinants and Matrices
A. Numerical Computations Involving
Determinants
B. Matrix Multiplication on IBM Machines
5	Flander, Whitman
Ashkin, Feynman
Hamming	4.5-7
Numerical Solution of Ordinary Differential
Equations
A. General Methods
B. Numerical Method for Integrating Half
A Time
C. An Iterative Method for IBM Machines
6	Skyrme, Nelson
Peierls	4.5-7
Numerical Solution of Partial Differential
Equations
A. Introduction and Equations
B. Boundary Conditions
C. Integration Along Characteristics
D. Solution of the Hydrodynamic Equation
on IBM Machines
E. Von Neumann's Method of Treating Shocks
7	Goldberg, Kemeny	4.5-7
Solution of the Time Dependent Diffusion
Equation
8	Flanders, Whitman	4.5-7
Miscellaneous Problems in Numerical Calculations

VOLUME IIINuclear Physics

Volume Editor (R. R. Wilson)

1	Wilson	LA 1009 Dec 1
Introduction
2	Manley, Barschall	Fast Neutron Scattering
3	Williams, J. H.	Fission and Capture Cross Sections for
Fast Neutron Absorption and Fission Cross
Sections - Fast Neutrons.
4	McDaniel	LA 1010 Sept
Slow Neutron Absorption and Fission Cross
Sections
5	Inglis	Experiments Related to the Fission Process
6	Segre	Spontaneous Nuclear Fission
7	Inglis	Interpretation of the Fission Process
8	Chapter 8 - The Theory of Neutron Reactions with
Heavy Nuclei. V. Wiesskopf.	
9	Chapter 9 - The Reactions of Very Light Nuclei
with Deuterons in the Low Energy Region.
E. Bretcher and E. Konopinski.	

OUTLINE OF LOS ALAMOS TECHNICAL SERIESVOLUME IVNeutron Diffusion Theory

Volume Editor (Placzek).

- 1 One Velocity Theory: I General Principles
 - A. Streaming with Absorption
 - B. Transport Equation and Integral Equation
 - C. Elementary Diffusion Theory
 - D. Asymptotic Solutions of Transport Equation. Determination of Boundary Conditions in Elementary Cases
 - E. Greens Function for Infinite Medium
- 2 Plane Standard Problems
 - A. General Theorems for Plane Problems
 - B. Milne Problem
 - C. Inhomogeneous Milne Equation
 - D. Two Adjoining Media
 - E. Laminated Media
- 3 Approximation Methods
 - A. Variational Methods
 - B. Iteration Methods
 - C. Harmonics Methods
 - D. Serber Method
- 4 Spherical Problems
 - A. Bare Sphere
 - B. Sphere in Tamper
 - C. Absorbing Sphere in Medium
 - D. Hole Effects
 - E. Multi-medium Problems
- 5 Other Shapes
 - A. Cylinders
 - B. Cut Cylinders
 - C. Odd Shapes
 - D. Perturbation Problems

VOLUME V

Volume Editor (O. R. Frisch)

Critical Assemblies

1	1A-1033
(inc.)	Frisch	Introduction
2		Frisch	Theory
3		Hanson, Anderson	Neutron Multiplication in Subcritical Spheres
4		King	Waterboilers : A-1034, inc 1.

OUTLINE OF LOS ALAMOS TECHNICAL SERIESVOLUME V (continued)

5	Holloway	Hydrides
6	Baker	"25" Metal
7	Slotin	"49" Metal and Composite Spheres
8	Baker	Time Scale Experiments
9	Frisch	Dragon
10	Feld	Nuclear Safety

VOLUME VI

Volume Editor (V. Weisskopf)

Efficiency

1	Weisskopf	Introduction
2	Bethe	Efficiency for Small Sub-critical Gadgets
3	Feynman	Calculation of Efficiency According to Bethe and Feynman
4	Ulam, Smith Cohen, Bowers	General Efficiency Calculations
5	Weisskopf	Problems of Instability and Turbulence
6	Marshak	Effect of Radiation

VOLUME VII

Volume Editor (Bethe)

1	Bethe	Introduction - Blast Wave
2	Von Neumann	Taylor Solution. The Point of Source Solution
3	Fuchs, Peierls	Equation of State of Air
4	Mages	Radiation Phenomena in Air Blast of Gadget
5	Bethe	Asymptotic Theory for Small $\gamma - 1$
6	Fuchs	Effect of Variable Density on the Propagation of the Blast Wave.
7	Fuchs	IBM SOLUTION OF THE BLAST WAVE PROBLEM.
8	Bethe, Fuchs	Asymptotic Theory for Small Blast Pressure.

OUTLINE OF LOS ALAMOS TECHNICAL SERIES

VOLUME VII (continued)

9	Fuchs	Effect of Altitude	LA 1014 Uncl.
10	Reines, ^{Det. Neumann}	The Mach Effect and the Height of Burst	
11	G. I. Taylor	Ball of Fire	
12	Reines	Humidity and Cloud Formation	LA 1012 Uncl.
13	Fennel, Fuchs	Prediction of Blast Damage	
14	Shapiro ^{Det. Neumann}	Underwater Explosion of a Nuclear Bomb.	
15	Shapiro	Underwater Explosion of a Nuclear Gadget	
16	Shapiro	Gravity Waves Generated by Underwater and Surface Explosions in Shallow Water	
17	Manley	Blast Measurements	LA-1623 Uncl.
18	Mack	Photographic Observations	
19	Agnew	Airborne Measurements	
20	Fuchs	Damage Results	
21		Summary and Comparison	

VOLUME VIII LA 1106 Uncl.

Volume Editor (Joe Kennedy)

Chemistry of U and Pu

1	Kennedy	Introduction	LA-1016 Secret
2	Wichers, Harmon	Chemistry Purification of Pu	
3	Walsh	Chemical Purification of Pu	
4	Garner	Tetrafluoride and Other Dry Compounds of Pu	
5	Pittman	Special Reactions for Recovery of Pu	LA-1017
6	Duffield	Plant for Routine Chemical Processing of Pu	LA-1018
7	Helmholz	Chemical Problems of the Water Boiler	
8	Potrats	Analytical Methods for U, Pu and Associated Matter	LA-1019 Uncl.
9	Hinch	Control Measures for Radioactive Hazards	
Insert B	Weissman, Perlman Lipkin, Kolodney	Protective Coatings	

OUTLINE OF LOS ALAMOS TECHNICAL SERIESVOLUME VIII (continued) *LA*

Insert C

Potraz, Nachtrieb Special Analytical Procedures

VOLUME IX

Volume Editor (Cyril Smith, Chicago)

Metallurgy

1	Jette	Metallurgy of Plutonium	<i>Never written</i>
2	Marshall	Metallurgy of Uranium and U-235	<i>LA-1223 cont</i>
3	Seybolt	Tamper Materials	<i>LA-1236 cont.</i>
4	Seybolt	Tamper Materials	<i>LA-1255 cont.</i>
5	Mullen	Refractories	<i>LA-1259 cont.</i>
6	Kirby	Plastics	
7	Kamm	Boron	<i>LA-1254 Secret</i>
8	Taub	Beryllium	
9	Arnold	Miscellaneous Foundry Work	
10	Kehl	Heat Treatment of Steel	
11	Taub	Miscellaneous Metals	

VOLUME XI

Volume Editor (G. B. Kistiakowsky)

Explosives

✓	Kistiakowsky	Preface to Chapter I	
Intro. Chap. 2	Kistiakowsky	Explosives	
Intro. Chap. 3	Kistiakowsky	The Operating Mechanism of Implosion	
Intro. Chap. 4	Kistiakowsky	Organizational History	
Part II Initiation of Detonation			
Introduction	Kistiakowsky	Introduction	<i>LA-1044 Secret</i>
1 ✓	Greisen	Asimultaneity Measuring Techniques	
2 ✓	Greisen	Statistical Interpretation of Asimultaneity Data	

OUTLINE OF LOS ALAMOS TECHNICAL SERIES

VOLUME XI (continued)

3 ✓	Greisen	Initiation by Primacord	LA-10441 Secret
4 ✓	Greisen	Transmission of Detonation Between Explosives	
5 ✓	Bradner, Greisen
L. Fisher	Electrical Initiation of PETN	
6 ✓	Kauzmann, Greisen	Electrical Initiation of PETN	
7 ✓	L. B. Seely	Lead Azide Detonators: Description and Manufacture	
8 ✓	L. B. Seely	Lead Azide Detonators: Experimental Investigations	
9 ✓	Greisen, Seely	Manufacture of PETN Detonators	
10 ✓	Kauzmann, Greisen
Lebourveau, Meyers	Manufacture of PETN Detonators, continued	
11 ✓	J. C. Anderson
Greisen	Manufacture of PETN Detonators, continued	
12 ✓	Fussell, Hornig
Buchanan	Detonator Firing Circuits	

Part III Detonation

1	Linschits, Campbell
Martin	Experimental Techniques, Measurements of Detonation Wave Velocity and Shape	
2	Hoffman, Koski
Linschits, Bancroft
Goranson	Experimental Techniques; Measurements of Pressure, Impulse, Mass Velocity, etc. in Detonation Wave	
3 ✓	Goranson, Tuck
Bancroft	The Structure of Detonation Waves	
4 ✓	Koski, Linschits	The Behavior of Divergent Waves in Implosion Systems	
5 ✓	Linschits, Koski	Attempts to Improve Implosions without Lenses	
6 ✓	Linschits	Design Criteria for Explosive Lenses	
7	Linschits, Marley
Campbell, Martin	The Behavior of Explosive Lenses	
8	Linschits, Koski	Behavior of Convergent Waves in Implosion Systems	

OUTLINE OF LOS ALAMOS TECHNICAL SERIESVOLUME XI (continued)

Part IV The Making of Explosive Charges

Introduction	Ackermann	Introduction
1	Carlson, Fearing	Physical Properties and Analysis of Some Explosives
2	Gurinsky	Development of Casting Procedures
3	Hopper, Stout	Low Density Slow Explosives
4	Henderson, Stout A. Gurney	Explosive Charge Molds LA-1053 Secret
5	Ackerman, Wilder	Plant Design and Operation
6	L. M. Foster	The Casting of Full Scale Charges
7	C. F. Quest	The Casting of Small Scale Charges
8	W. A. Wilson	The Machining of Castings
9	Tenney	The X-Ray and Gamma Ray Examination of Charges
10	Russell	Physical Inspection of Castings
11	Wilder, Schaffer	Assembly of Full Scale Charges

VOLUME XII

Volume Editor (Bacher)

Implosion

Introduction	* Bacher	Introduction
1	* Farratt, Tuck	Flash X-Ray and Early Implosion Tests
2	* Koski	Photographic Observations
3	* Linschits	Terminal Observations
4	* Froman, Graves	Electric Observations
5	* Fowler, Joseph	Magnetic Observations
6	* Rossi	Radiation Observations
7	* Meddermeyer, et al	Betatron Observations
8	* Critchfield, Tuck * Johns	Initiators History of Polonium

LA-1368 Secret

OUTLINE OF LOS ALAMOS TECHNICAL SERIESVOLUME XII (continued)

9	✓ Holloway	Overall Design
10	✓ Friedlander	Radio-Barium, Radio-Lanthanum

VOLUME XIII

Volume Editor (Peierls)

Theory of Implosion

1	Bethe	Introduction
2	Peierls	Hydrodynamic Methods
3	Fuchs	Reflection, Transmission, Interaction of Shock Waves, Free Surfaces
4	Roberts	Stability of Shocks
5	Keller	Equations of State
6	Fuchs, Skyrme	Detonation Waves LA-1039 uncl.
7	Fuchs, Skyrme	Effect of Detonation Waves on Solids
8	Keller	Equations of State of High Explosives
9	Skyrme	Reaction Zone
10	Fuchs	Jets LA-1041 Secret
11	Keller	Convergent Detonation Waves
12	Christy	Implosion of Solid Gadget
13	Christy, Roberts	Acceleration of Shell Stability of Shell Choice of Geometry
14	Baroody, Christy	Hollow and Levitated Core Gadget
15	Calkin	Similarity Theory
16	Christy, Skyrme	Miscellaneous Designs

CLASSIFIED

OUTLINE OF LOS ALAMOS TECHNICAL SERIESVOLUME XXI

Volume Editor (Birch)

The Gun

UNCLASSIFIED

LA-1667 Secret

1	McMillan, Langer Birch	Early Gun Development
2	Wood	20 Millimeter Scale Experiments
3	Birch	25 Gun Assembly: Components Developments
4	Birch	Design and Tests as Airborne Bomb
5	Langer	Initiator
6	Schiff	Expected Performance
7	Birch	Details Concerning the Hiroshima Unit
Ins. A	Hirschfelder, Magee	Interior Ballistics

VOLUME XXII

Volume Editor (Brode)

LA-1665 Conf.

Fuses

1	Brode	Philosophy of Fusing
2		Discussion of Alternative Devices
3		Basic Components
4		The Fuse Unit
5		Field Tests
6		Destination and Combat
7		Counter Measures
8		Procurement, Production and Shipping
Appendix		Summary and Future Program Personnel as of August, 1946 Reports on File

UNCLASSIFIED

~~UNCLASSIFIED~~OUTLINE OF LOS ALAMOS TECHNICAL SERIESVOLUME XXIII

Volume Editor (Ramsey)

Engineering and Delivery

LA-1161 Secret

1	Ramsey	History in the U. S.
2		
3	A. H. Machen	Mechanical Design of Model 1561 Fat Man
4	V. A. Miller	Assembly of Model 1561 Fat Man
5		
65	S. H. Dike	Atomic Bomb Project Aircraft
76	Ramsey	History in Mariannas

VOLUME XXIV

Volume Editor (K. Bainbridge)

TrinityLA-1012 Secret
" Delet U

Insert A	Sugarman	Radiochemical Determination of the Efficiency of Nuclear Explosions
1	Bainbridge	Initial Preparations for the Test
2	Bainbridge	100 Ton TNT Calibration and Rehearsal Shot
	Tolman	Report of First Trinity Test
	Bainbridge	Post 100 Ton Suggestions for Improved Facilities
3	Bainbridge	Preparations for the July 16 Test
4	Bainbridge	Final Preparations for Rehearsals and Test
	Bainbridge	Trinity Schedule Assembly Runs
	Warren, Hempelmann	Directions for Personnel at Base Camp at Time of Shot
	Hempelmann	Health & Monitoring Organizations & Preparations.
5	Schaffer	Work Preceding and Including Assembly at Trinity
	Bradbury	Trinity Hot Run
6	Weisskopf	The Radial Distribution of Gamma-Ray, Neutron and Heat Irradiation in the July 16, 1945 Test

UNCLASSIFIED

UNCLASSIFIED

OUTLINE OF LOS ALAMOS TECHNICAL SERIES

~~CONFIDENTIAL~~

LA-1612 Secret

VOLUME XXIV (continued)

7	Wilson	Summary of Physics Measurements
8	Manley	Summary of Mechanical Effects
9	Mack	Summary of Photographic and Spectrographic Measurements
10	Bainbridge	Summary of Trinity Experiments and Index of Reports
11	Bainbridge	Recommendations for Future Operations

UNCLASSIFIED

~~CONFIDENTIAL~~

SECTION 5

THE LOS ALAMOS TECHNICAL SERIES: A RECORD OF
THE PUBLICATIONS WHICH CONSTITUTE EACH VOLUME
OF THE SERIES

P.O

by

12/30/81

Judy Young

TO: list

Attached is an updated sheet one for the brief descriptive information on the Los Alamos Technical Series. Information obtained from Leslie M. Redman indicates that there is a closer link between the 1953 Case, deHoffmann, and Placzek "Introduction to the Theory of Neutron Diffusion" and the never published volume IV of the Technical Series than could be determined from inspecting the above mentioned document. A note to this effect has been added to the bottom of this new sheet.

Judy Young
Report Library, MS 364

September 30, 1981 f.la

Judy Young

unc. Jan 10/8/81

LOS ALAMOS TECHNICAL SERIES
A RECORD OF THE PUBLICATIONS WHICH CONSTITUTE EACH
VOLUME IN THE SERIES^o

Vol. 0

LA-100b chap. 1-4

Vol. I

LA-1001 (Pt. I, Sec. A) chap. 1-3
LA-1002 (Pt. I, Sec. B) chap. 4-7
LA-1003R (Pt. II, Sec. A) chap. 8-12
LA-1004R (Pt. II, Sec. B) chap. 13-16
LA-1030 (Pt. III, Sec. A) chap. 17-18
LA-1031 (Pt. III, Sec. B) chap. 19-20
LA-1032 (Pt. III, Sec. C) chap. 21-23

Vol. II

LA-1057 (Pt. I) chap. 1-5
LA-1058 (Pt. II) chap. 6-8

Vol. III

LA-1009 (Sec. A) chap. 1-3
LA-1010 (Sec. B) chap. 4-6
LA-1011 (Sec. C) chap. 7-9

Vol. IV • No record of this being issued. This volume was projected to be "Neutron Diffusion Theory". George Placzek was to be the editor. (LAMD-76)

Vol. V

LA-1033 (Pt. I) chap. 1-3
LA-1034 (Pt. II) chap. 4
LA-1035 (Pt. III) chap. 5-7
LA-1036 (Pt. IV) chap. 8-10

Vol. VI

LA-1028 (Pt. I) chap. 1-4
LA-1029 (Pt. II) chap. 5-6

^oFor the current classification of each publication please consult the Report Library shelf list.

• It is interesting to note that in the 1950's Placzek ^{authored} a report entitled "Introduction to the Theory of Neutron Diffusion" which was based on his lectures presented at the Rand Corporation in 1949. This report contains no indication of any link to the Los Alamos Technical Series.

September 30, 1961

Judy Young

p. 16

LOS ALAMOS TECHNICAL SERIES
A RECORD OF THE PUBLICATIONS WHICH CONSTITUTE EACH
VOLUME IN THE SERIES

Unc. JFY 10/8/81

- Vol. 0 *Relation Between The Various Activities of the Laboratory*
LA-1006 chap. 1-4 *Secret*
- Vol. I *Experimental Techniques*
LA-1001 (Pt. I, Sec. A) chap. 1-3 *Decl.*
LA-1002 (Pt. I, Sec. B) chap. 4-7 *Decl.*
LA-1003R (Pt. II, Sec. A) chap. 8-12 *unclass.*
LA-1004R (Pt. II, Sec. B) chap. 13-16 *unclass.*
LA-1030 (Pt. III, Sec. A) chap. 17-18 *unclass.*
LA-1031 (Pt. III, Sec. B) chap. 19-20 *unclass.*
LA-1032 (Pt. III, Sec. C) chap. 21-23 *unclass.*
- Vol. II *Numerical Methods*
LA-1057 (Pt. I) chap. 1-5 *unclass.*
LA-1058 (Pt. II) chap. 6-8 *unclass.*
- Vol. III *Nuclear Physics*
LA-1009 (Sec. A) chap. 1-3 *unclass.*
LA-1010 (Sec. B) chap. 4-6 *Secret*
LA-1011 (Sec. C) chap. 7-9 *unclass.*
- Vol. IV *No record of this being issued. This volume was projected to be "Neutron Diffusion Theory". George Placzek was to be the editor. (LAMD-76)
- Vol. V *Critical Assemblies*
LA-1033 (Pt. I) chap. 1-3 *Confidential*
LA-1034 (Pt. II) chap. 4 *unclass.*
LA-1035 (Pt. III) chap. 5-7 *Secret*
LA-1036 (Pt. IV) chap. 8-10 *unclass.*
- Vol. VI *Efficiency*
LA-1028 (Pt. I) chap. 1-4 *Secret*
LA-1029 (Pt. II) chap. 5-6 *Secret*

^oFor the current classification of each publication please consult the Report Library shelf list.

*It is interesting to note that in the 1950's Placzek ^{authored} a report entitled "Introduction to the Theory of Neutron Diffusion" which was based on his lectures presented at the Rand Corporation in 1949. This report contains no indication of any link to the Los Alamos Technical Series.

Per information obtained from Leslie M. Redman on 12/30/81, much of the information intended to be included in Vol. VI of the Technical Series was finally incorporated in "Introduction to the Theory of Neutron Diffusion," Vol. I. This Los Alamos publication was authored by K. M. Case, F. deHoffmann, and G. Placzek. It is dated 1953. It has no report number assigned; however, copies are available from the Report Library. There was no volume two or any subsequent volumes.

THE ALAMOS TECHNICAL SERIES (Cont.)

Vol. VII** *Blat Wars*

LA-1020 (Pt. I) chap. 1-4 *unclass*
 LA-1021 (Pt. II) chap. 5-10 *unclass*
 LA-1022 (Pt. III) chap. 11-14 *conf.*
 LA-1023 (Pt. IV) chap. 15-19 *secret*

Vol. VIII*** *Chemistry of Uranium and Plutonium*

LA-1016 (Sec. A) chap. 1-4 *secret*
 LA-1017 (Sec. B) chap. 5-7 *secret*
 LA-1018 (Sec. C) chap. 8-9 *unclass.*

Vol. IX This volume cancelled in 1949. The miscellaneous chemistry which was to be covered in this work was dispersed among various other volumes in the series.

Vol. X *Metallurgy*

No record of chapter 1 being issued

LA-1223 (Chap. 2) *conf.*
 LA-1236 (Chap. 3) *unclass*
 LA-1255 (Chap. 4) *conf.*
 LA-1259 (Chap. 5) *unclass*
 LA-1254 (Chap. 6) *conf.*

Vol. XI *Explosives and Detonation Waves*

LA-1043 (Pt. I) *secret*
 LA-1044 (Pt. II, Sec. A) Introduction, chap. 1-3 *secret*
 LA-1045 (Pt. II, Sec. B) chap. 4-5 *secret*
 LA-1046 (Pt. II, Sec. C) chap. 6-8 *secret*
 LA-1047 (Pt. II, Sec. D) chap. 9-11 *secret*
 LA-1048 (Pt. III) chap. 1-2 *secret*
 LA-1049 (Pt. III, Sec. B) chap. 3-4 *secret*
 LA-1050 (Pt. III, Sec. C) chap. 5-6 *secret*
 LA-1051 (Pt. III) chap. 7-8 *secret*
 LA-1052 (Pt. IV, Sec. A) chap. 1-3 *secret*
 LA-1053 (Pt. IV, Sec. B) chap. 4-5 *secret*
 LA-1054 (Pt. IV, Sec. C) chap. 6-8 *secret*
 LA-1055 (Pt. IV, Sec. D) chap. 9-11 *secret*

** LA-2000 which is unclassified supercedes LA-1020 and part of LA-1021.

*** This volume has been revised and the various parts of volume VII have been incorporated into LA-1100. LA-1100 contains chapters 1-9.

Los Alamos Technical Series

Vol. VII** Blast Wave

LA-1020 (Pt. I) chap. 1-4 unclass
 LA-1021 (Pt. II) chap. 5-10 unclass
 LA-1022 (Pt. III) chap. 11-14 comb
 LA-1023 (Pt. IV) chap. 15-19 secret

Vol. VIII*** Chemistry of Uranium and Plutonium

LA-1016 (Sec. A) chap. 1-4 secret
 LA-1017 (Sec. B) chap. 5-7 secret
 LA-1018 (Sec. C) chap. 8-9 unclass.

Vol. IX This volume cancelled in 1949. The miscellaneous chemistry which was to be covered in this work was dispersed among various other volumes in the series.

Vol. X Metallurgy

No record of chapter 1 being issued Plutonium Metallurgy (LAMD-)

Check This out.

LA-1223 (Chap. 2) conf CS Smith Uranium Metallurgy 3/31/51

LA-1236 (Chap. 3) unclass BeO C.S. Smith

LA-1255 (Chap. 4) conf. WC

LA-1259 (Chap. 5) unclass Refractories:

LA-1254 (Chap. 6) conf. B

{ into C.S. Smith
 Raw Mat. Multia/Taub
 Red Liner Agg.
 Rammed Fr.
 Mold Parts
 Misc Carbons }

Vol. XI Explosives and Detonation Waves

LA-1043 (Pt. I) secret

LA-1044 (Pt. II, Sec. A) Introduction, chap. 1-3 secret

LA-1045 (Pt. II, Sec. B) chap. 4-5 secret

LA-1046 (Pt. II, Sec. C) chap. 6-8 secret

LA-1047 (Pt. II, Sec. D) chap. 9-11 secret

LA-1048 (Pt. III) chap. 1-2 secret

LA-1049 (Pt. III, Sec. B) chap. 3-4 secret

LA-1050 (Pt. III, Sec. C) chap. 5-6 secret

LA-1051 (Pt. III) chap. 7-8 secret

LA-1052 (Pt. IV, Sec. A) chap. 1-3 secret

LA-1053 (Pt. IV, Sec. B) chap. 4-5 secret

LA-1054 (Pt. IV, Sec. C) chap. 6-8 secret

LA-1055 (Pt. IV, Sec. D) chap. 9-11 secret

** LA-2000 which is unclassified supercedes LA-1020 and part of LA-1021.

*** This volume has been revised and the various parts of volume VIII have been incorporated into LA-1100. LA-1100 contains chapters 1-9.

Vol. XII [#] *Chap. 1-7*
 Chapters 1-7 No record of these being issued
 LA-1368 (Chap. 8) *Secret*
 Chapters 9-10 No record of these being issued

Vol. XIII *Theory of Implosion*
 LA-1037 (Pt. I) chap. 1-3 *Secret*
 LA-1038 (Pt. II) chap. 4-5 *Secret*
 LA-1039 (Pt. III) chap. 6 *Unclass.*
 LA-1040 (Pt. IV) chap. 7-9 *Secret*
 LA-1041 (Pt. V) chap. 10 *Secret*
 LA-1042 (Pt. VI) chap. 11-16 *Secret*

Vol. XIV ^{##}
 No record of this being issued

Vol. XV ^{##}
 No record of this being issued

Vol. XVI ^{##}
 No record of this being issued

Vol. XVII ^{##}
 No record of this being issued

Vol. XVIII ^{##}
 No record of this being issued

Vol. XIX ^{##}
 No record of this being issued

Vol. XX ^{##}
 No record of this being issued

Vol. XXI *The Gun*
 LA-1007 (Sec. A) chap. 1-7 *Secret*
 LA-1008 (Sec. B) appendix *Secret*

[#] The proposed content of the chapters not issued are listed below.

Chap.	Author/Editor	Title
Intro.	Bacher	Introduction
1	Parratt, Tuck	Flash X-Ray and Early Implosion Tests
2	Koski	Photographic Observations
3	Linschitz	Terminal Observations
4	Froman, Graves	Electric Observations
5	Fowler, Joseph	Magnetic Observations
6	Rossi	RaLa Observations
7	Neddermeyer, et al	Betatron Observations
9	Holloway	Over-all Design
10	Friedlander	Radio-Barium, Radio-Lanthanum (LAMD 770)

LOS ALAMOS TECHNICAL SERIES (cont.)

Vol. XXII *Fuzes*LA-1005 chap. 1-8 and appendix *Conf.*Vol. XXIII *Nuclear Weapons Engineering and Delivery*LA-1161 chap. 1-6 *Secret*Vol. XXIV *Trinity*LA-1012 chap 1-11 *Secret*LA-1013 (Sec. A) appendices 1-19 *Secret*LA-1014 (Sec. B) appendix 20 *Secret*LA-1015 (Sec. C) appendices 21-30 *Secret*LA-1019 (Sec. D) appendices 31-40 *Secret*LA-1024 (Sec. E) appendices 41-48 *unclass*LA-1025 (Sec. F) appendix 49 *unclass*LA-1026 (Sec. G) appendices 50-54 *unclass*LA-1027 (Sec. H) appendices 55-71 *Secret*

LA-6300-H
unclassified
version of Trinity

Volumes XIII - XX were reserved for future volumes in the series. There is no indication that topics or authors were assigned to these. (LAMD-76)

Miscellaneous documents related to the Los Alamos Technical Series

- ✓ LAMD-76 "The Los-Alamos Technical Series" dated Dec. 31, 1947.

This contains a useful brief description of the purpose of the series and a listing of proposed volumes, subjects, and authors.

LAMS-688 "Status Report on Los Alamos Tech Series" dated Feb. 5, 1948.

Despite the later publication date, the information contained here is virtually identical with LAMD-76.

- ✓ LAMD-770 "Outline of the Los Alamos Technical Series (1945)" cover memo dated, July 3, 1952

This is a complete accounting of all volumes in the series except IX. Attached to the report are two different summaries of the series. These are invaluable.

SECTION 6

A Partial Listing of the
National Nuclear
Energy Series Volumes

XEROGRAPHED
8/13/93
LMS per JTH
USG

① NNES-III-3

Atomic Energy Commission
Chemical separation of the
uranium isotopes.
G. A. Hutchison, Jr. 1952 197 pp

Secret

NNES-III-3
Atomic Energy
Commission
National Nuclear
Energy Series
Hutchison, Clyde
A, Jr.
Murphy, Geo. M
(Editor)

② NNES IV-6A

AEC. National Nuclear Energy
Series
Coatings and corrosion.
Howe et al 1951 314 pp

Secret

NNES IV-6A
AEC. National
Nuclear Energy
Series
Howe, J P
Jones, T O
Allen, A O
Burgman, E W
Chapin, J H
Foots, F O
Greninger, A B
Hoxang, R B
Kittredge, W R
Ohlinger, L A

NNES IV-6A

Plott, R F
Whermann, R F
Wohlberg, C
Gurinsky, D H

(3) NNES-III-4E

AEC. National Nuclear Energy Series
Commercial production of heavy
water.
Maloney and Ray n. d. 224 pp

Secret

NNES-III-4E
AEC. National
Nuclear Energy
Series
Maloney, James O
Ray, Harold S
Title

(4) NNES-I-13

National Nuclear Energy Series
Determination of the isotopic
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NNES-IV-17B PAPER 7-3	8-1400	NP-13	1-208
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