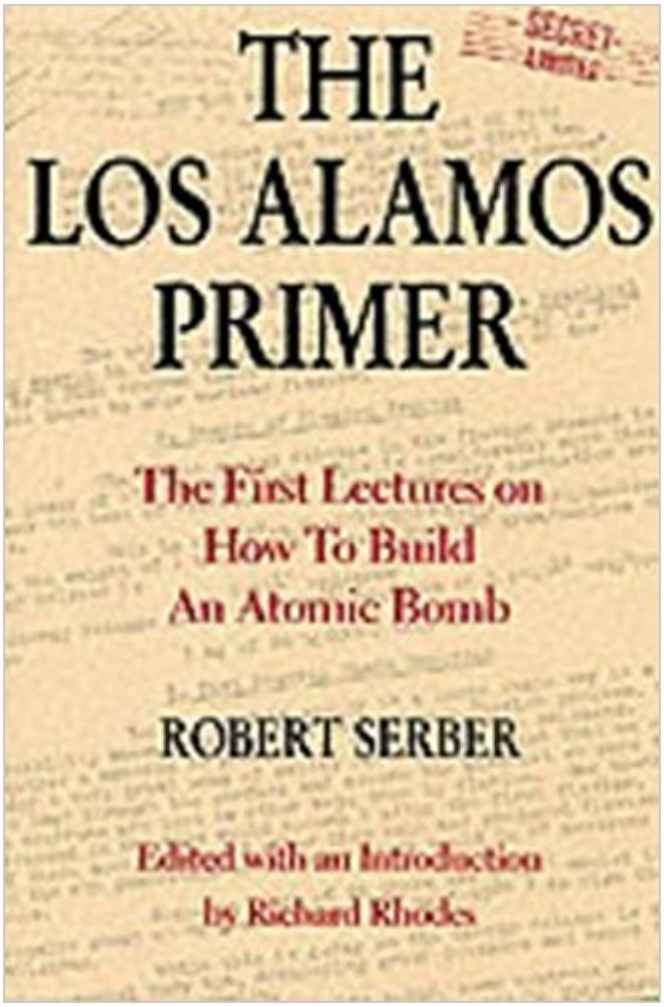
The Los Alamos Primer: The First Lectures On How To Build An Atomic Bomb



Synopsis

The classified lectures that galvanized the Manhattan Project scientists—with annotations for the nonspecialist reader and an introduction by a Pulitzer Prize-winning historian.In March 1943 a group of young scientists, sequestered on a mesa near Santa Fe, attended a crash course in the new atomic physics. The lecturer was Robert Serber, J. Robert Oppenheimer's protÃƒÂ©gÃƒÂ©, and they learned that their job was to invent the world's first atomic bomb.Serber's lecture notes, nicknamed the "Los Alamos Primer," were mimeographed and passed from hand to hand, remaining classified for many years. They are published here for the first time, and now contemporary readers can see just how much was known and how terrifyingly much was unknown when the Manhattan Project began. Could this "gadget," based on the newly discovered principles of nuclear fission, really be designed and built? Could it be small enough and light enough for an airplane to carry? If it could be built, could it be controlled?Working with Richard Rhodes, Pulitzer Prize-winning historian of the development of the atomic bomb, Professor Serber has annotated original lecture notes with explanations of the physics terms for the nonspecialist. His preface, an informal memoir, vividly conveys the mingled excitement, uncertainty, and intensity felt by the Manhattan Project scientists. Rhodes's introduction provides a brief history of the development of atomic physics up to the day that Serber stood before his blackboard at Los Alamos. In this edition, The Los Alamos Primer finally emerges from the archives to give a new understanding of the very beginning of nuclear weapons. No seminar anywhere has had greater historical consequences.

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Customer Reviews

In April 1943, a young physicist named Robert Serber stood up before a small group of fellow scientists in a laboratory in Los Alamos, New Mexico, and, as one attendee later recalled, began to speak in "a hazy, uncertain voice" about the project on which they would all be working. "The object," he said, "is to produce a practical military weapon in the form of a bomb in which the energy is released by a fast neutron chain reaction in one or more of the materials known to show nuclear fission." That mechanism, of course, was the atomic bomb, which a little more than two years later would be used against Japan. In the following weeks, Serber touched on many themes, racing to an array of chalkboards to scribble complex formulas and equations. Among other things, he addressed how big a bomb would need to be in order to achieve critical mass--between 13.5 centimeters and 9 centimeters, he calculated--and what the probability of premature detonation might be. (It was, he concluded, always a danger.) At the end of the series, his lecture notes, classified as top secret, were gathered and printed for distribution to later cadres of scientists who came to work at Los Alamos. Years after the war they were declassified, and Serber, who died in May of 1997, took the opportunity to reflect on his work and the strange culture of the laboratory, adding postscripts and other commentary reproduced in the present edition. Serber’s book is an important document in the history of science, and remains one of the most accessible introductions to nuclear physics ever written. (On that note, those who worry that it is all too easy to find bomb-building instructions in the library or on the Web should rest assured: these lectures were tough for the greatest theoretical physicists of the time to follow.) It all makes for provocative reading. --Gregory McNamee

In April 1943, at a new secret laboratory on a mesa in the high New Mexican desert, a crowd of the most brilliant young scientists in America heard five stunning lectures that summed up everything the world knew about how to build an atomic bomb. The lecturer was Robert Serber, a theoretical physicist and protege of J. Robert Oppenheimer; the laboratory was Los Alamos. Serber’s lectures, assembled in note form and mimeographed, became the legendary LA-1, the Los Alamos Primer, the first document passed out to new recruits to the wartime enterprise, classified Secret Limited for twenty years after the Second World War and published here for the first time. Now contemporary readers can see just how much was known and how much remained to be learned when the Manhattan Project began. Would the "gadget", the atomic bomb, really work? How powerful would it be? Could it be made small enough and light enough to carry in a bomber? Could its explosive nuclear reaction be controlled? Working with Richard Rhodes, Pulitzer Prize-winning historian of the

development of the atomic bomb, Professor Serber has annotated the Primer for the nonscientist. His preface, a lively informal memoir, vividly conveys the mingled excitement, uncertainty, and intensity the Manhattan Project scientists felt. Rhodes's introduction reviews the development of nuclear physics up to the day that Serber stood before his blackboard at Los Alamos and summarizes the work that followed. In this first published edition, the Los Alamos Primer finally emerges from the archives. No lectures anywhere have had greater historical consequences.

Excellent read. I majored in engineering but that was 25 years ago. To say that I'm rusty with math & physics is an understatement, yet I was still able to understand this book. When the Manhattan Project started, Robert Serber (author) had to compile what was known about nuclear physics into lectures in order to bring other key scientists up to speed. I don't know how else to sum it up other than Serber is an OUTSTANDING teacher. (I only wish that my professors were as good at teaching as Serber).

This little book is great for anyone interested in the history of the Manhattan Project. It describes the theoretical challenges in learning how to do something that had never been done before. What's more they (the scientists at Los Alamos) had very little on none of the active material on which to test their theories. There is mathematics in the book but for the reader who is not mathematically inclined it can be passed over as a demonstration that it was done and is correct without the reader having to verify it. The Introduction by Richard Rhodes is great - written after the fact - he gives an overview of the Project which had established the need for the Primer.

The annotations cover some of what was learned later, corrections to the math, and the human context. This makes more interesting reading than the original handouts.The biographic appendix in this edition of the primer is a nice Who's Who of the Los Alamos community.The site nuclearweaponarchive.org discusses the engineering design of nuclear weapons in more detail, based on later testing.This shows where they were at the start of the process. The basic facts of the physics involved are now in the public record, which as Serber says, is not the same knowing as the engineering details.If you just skim the equations and read the conclusions in this book, I think you could understand the basics with today's high school math and physics. It takes more math and physics to derive some of the formulas.For more of the human dimension I'd refer you to the biography of SerberÃ Â Peace and War, still available as a used book, and to Richard Rhodes' books. The biography describes his trip to Japan to assess the bomb effects, and his post-war

career. He was not treated as badly as Oppenheimer, but he did face some questioning in the McCarthy Era.

This is a fascinating insight into what physicists were thinking at the time of building the bomb, together with a sometimes amusing retrospective by Robert Serber. Although it is technical in places the lectures were originally simplified to present the essential physics, which is perfectly accessible to any high-school graduate.The Frisch-Peierls memorandum is a nice touch; after reading Serber's lectures it gives and idea of what others were thinking and where the major uncertainties lay.The electronic version of the book loses a star due to the execrable editing; despite the steep price the publishers evidently decided none was necessary. The display equations are simply copy and paste images interspersed with improperly typeset inline math littered with errors. The original lecture extracts and Serber's commentary are in the same font and it's not always easy to tell which is which. A shoddy job, UCP.

It was a total surprise to realize each and everyone of the Los Alamos team was handed the mimeographed primer prior to commencing their work in the lab. The amount of info that was already understood, the insightful, intelligent guesses are just spellbinding. You get a true sense of the absolute conviction that the bomb will be built, it will be dropped and it will work. Concurrent projects of uranium separation at Oakridge and the manufacture of plutonium at Hanford Washington...proceeded with total conviction even though the explosive power of fission, while calculated had never been observed. In today's world where everything is miniaturized and communication is at the speed of light, nonetheless, both the uranium bomb and the plutonium bomb were only a few pounds in weight as necessitated by 1945 technology. With higher quality nuclear materials and infintely better tampers and higher neutron efficiency, you can only guess the small size of today's devastating nuclear devises.

I loved the book. Fascinating how early physicists from 1938 to 1945 imagined the fission and fusion process.Like dancing with the Devil developing the Uranium gun bomb and fusion Plutonium bomb, not knowing ifpre-detonation was an uncertainty. One gram of enriched Plutonium, a third the weight of a U. S. penny, couldyield about 40,000,000 lbs of TNT!? Read the book and appreciate the Manhatten Project's genius scientistscarefully structuring their mathematics for a nuclear unknown that could end the war with Japan.

This book was a new addition to my library on 'Special Weapons'. I've had a long term interest in all things dealing with them. The Los Alamos Primer would have been a great purchase if it had simply consisted of the original lectures. The 4 men who contribute to this work have produced an important book. Richard Rhodes introduced and edited (conducted) this book. I believe any book with his name attached, is worth a buy. I find his writing to be very clear and interesting. Robert Serber, who gave the original lectures, does an excellent job of a literary 'voice over' on them. He explains, expounds, and fills out the basic lectures. On top of what those 2 guys have made, this box of Cracker Jacks came with a very nice surprise. Included in this book are 2 old (1940-41) memorandums by Rudolf Peierls and Otto Frisch. These were instrumental in the notification of the Atomic potentials to the US/British governments. I have read about them, but never expected to read them. In 3 words- BUY THIS BOOK!

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