

Books

A Canticle for Leibowitz

by Walter M. Miller, Jr.

J. P. Lippincott Company . . . \$4.95

Reviewed by Harvey Eagleson,
professor of English

This novel, I suspect, will not receive the attention that it should, because it will be erroneously classified as "science-fiction" and will therefore be ignored by "serious" critics and readers. It is not science-fiction. On one level it is extrapolated history, but on another it is a symbolical and philosophical novel. *A Canticle for Leibowitz* is one of the most brilliant pieces of imaginative writing this reviewer has ever read.

Four years ago I received, as an advertisement, a copy of the magazine *Fantasy and Science Fiction*. Most of the issue was devoted to the publication of a long story entitled "And the Light is Risen" by Walter M. Miller, Jr. I glanced at the story, having no intention of "wasting my time on it," and was immediately engrossed. That story, much revised, now forms the central section of *A Canticle for Leibowitz*.

The novel, leaping over many centuries in its three parts, centers around the Abbey of the Albertian Order of Saint Leibowitz located vaguely in the New Mexican desert. It begins six centuries after the coming atomic war. What is now the United States is a sparsely inhabited area divided under the jurisdiction of barbaric kings and chieftains and having a cultural level similar to that of Europe in the first centuries after the fall of Rome.

The abbey contains all that is left of the scientific knowledge of our time, saved by a Jewish engineer before he was martyred by the mob during the Simplification, a period after the atomic war when the masses rose and destroyed the intellectuals and all their works as being the cause of man's plight. Now learning once again begins to stir. The novel sweeps on through time until man has again reached a period of technological advance slightly beyond where we now are and again prepares to destroy himself. This narrative is told

with such verisimilitude of detail, character, and situation that one feels while reading it that it is indeed not fiction but, as I have said, extrapolated history.

Though this story is the first interest, the second (and by all means the most important) interest is the moral and philosophical aspect of the novel — the presentation of modern man's dilemma. What should his values be? An excerpt from a dialogue between Dom Paulo, the abbot of the monastery, and Thon Taddeo, the scholar whose learning is to inaugurate the new renaissance, suggests in part the theme of the whole.

"But you promise to begin restoring Man's control over Nature. But who will govern the use of the power to control natural forces? Who will use it? To what end? How will you hold him in check? Such decisions can still be made. But if you and your group don't make them now, others will soon make them for you. Mankind will profit you say. By whose sufferance? The sufferance of a prince who signs his letters X? Or do you really believe that your collegium can stay aloof from his ambitions when he begins to find out that you're valuable to him?"

"What you really suggest," said the scholar, "is that we wait a little while. That we dissolve the collegium, or move it to the desert, and somehow — with no gold and silver of our own — revive an experimental and theoretical science in some slow hard way, and tell nobody. That we save it all up for the day when Man is good and pure and holy and wise."

"That is not what I meant . . ."

"That is not what you meant to say, but it is what your saying means. Keep science cloistered, don't try to apply it, don't try to do anything about it until men are holy. Well, it won't work . . . If you try to save wisdom until the world is wise, Father, the world will never have it."

This review has only indicated the theme of this brilliant and unusual novel. I urge the reading of it to anyone who wishes a new experience in fiction and at the same time a shock to his "think-cells," which we are all too inclined to use too infrequently.

Project Sherwood—The U. S. Program in Controlled Fusion

by Amasa S. Bishop

Doubleday-Anchor Books . . . \$1.25

Reviewed by William A. Fowler,
professor of physics

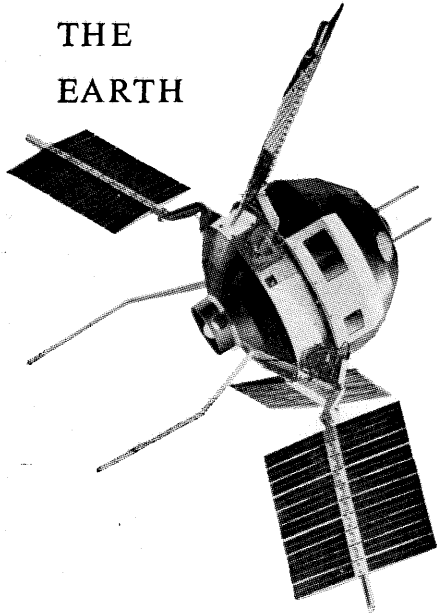
Amasa S. Bishop, BS '43, former Chief of the Controlled Thermonuclear Branch of the Atomic Energy Commission, has written a frank and lucid history of Project Sherwood—the U. S. program in controlled fusion. It is a story of failure. The ups and downs, the hopes and frustrations, the alarms and excursions are all here, and it all makes interesting reading. The book was prepared at the request of the U.S. Atomic Energy Commission's Division of Information Services, so it would not be expected to be a critical appraisal — and indeed it is not.

This reviewer served as a member of the ill-fated Sherwood Steering Committee, the "civilian" members of which resigned in a body over policy disagreements last year. The dim view of our prospects held by the reviewer and his colleagues cannot becloud the devoted and ceaseless labor of those down the line whose story is told by Bishop. After all, the Russians and the British haven't been able to do it either! Why be down-hearted; another 100 million dollars and we may still be able to do it without a good idea! Hope springs eternal; even a good idea may come along!

Starting with the basic principles underlying self-sustained, controlled fusion, the book comes very soon to the problem of confinement of the nuclear fuel — deuterium and/or tritium. Magnetic confinement of the hot plasma — ionized but neutral gas — is treated as "the most promising (if not the only) solution" of the problem. The early work on the three major lines of experimental effort is then delineated. Chapters are devoted to the pinch research at Los Alamos, Livermore, and Berkeley; the stellarator research at Princeton; and the magnetic mirror research at Livermore, Los Alamos, Oak Ridge, and

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EXPLORER VI
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ORBITING
THE
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the Naval Research Laboratory. Then comes the discussion of the gloomy question of stability which in October 1954 brought "the whole of the Sherwood program face to face with a problem which threatened its very existence."

The intermediate chapters are devoted to the major research programs, and others, after stability had raised its ugly head in Nottingham and the men of Sherwood doggedly attacked this most galling nemesis. Early 1955 brought the false hope of "instability neutrons" which were shown by brilliant diagnostic techniques to be of non-thermonuclear origin. Thermonuclear neutrons may now be just around the corner, but that corner is far distant from the eventual goal — thermonuclear energy.

In 1956, Oak Ridge started a new approach. A beam of particles, produced in a conventional accelerator at energies already in excess of that needed for thermonuclear reactions, is injected and trapped in a confined region in the hope of igniting the plasma and initiating a self-sustaining

thermonuclear reaction. Oak Ridge is still at it.

The final chapters cover the controversial decisions to go to larger geometries in some devices in the hope that bigness would solve some of the problems. The exponentially rising cost and scientific man-hours required for Project Sherwood from 1952 to 1958 are shown forthrightly in a graph in one of these chapters. There is an addendum on "Progress, June 1958 to June 1959," by Arthur E. Ruark, who succeeded Bishop as Chief of the Controlled Thermonuclear Branch, and there are five appendices including a comprehensive glossary of technical terms.

In one sense the judgment that *Project Sherwood* is a tale of failure is perhaps wrong. Plasma physics has become a flourishing branch of science in the quest for easy energy. Perhaps it is best that the book does not play this theme too hard. The message comes through without the need for embellishment. For scientists and laymen, for different reasons, the book is worth reading.

Science Study Series

Doubleday-Anchor Books

Four new titles in the series initiated by the Physical Science Study Committee, set up to revise the teaching and study of high-school physics.

The Birth of a New Physics
by I. Bernard Cohen . . . \$.95

I. Bernard Cohen, professor of the history of science at Harvard, traces the evolution of modern physics from Aristotle through Copernicus, Galileo, and Kepler to Newton. Dr. Cohen's purpose, as he explains, is not to present a popular history of science, but to "explore one aspect of that great scientific revolution which occurred during the sixteenth and seventeenth centuries, to clarify certain fundamental aspects of the development of modern science."

The Physics of Television
by Donald O. Fink and
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The Physics of Television concentrates on the principles of physics that are applied in television, rather than on circuitry — which makes it pretty much of a rarity. Donald Fink is director of research of the Philco Corporation; David Luytens is science editor for Penguin Books.

Waves and the Ear
by Willem A. van Bergeijk, John R.
Pierce and Edward E. David, Jr. \$.95

This is a brightly written book on the physics of sound and the physiology of the ear — or, to use the book's own subtitle, *What We Hear and How*. Of the three authors (all of whom work for the Bell Telephone Laboratories), Willem van Bergeijk is a zoologist, Edward David is an acoustics engineer and Caltech Alumnus. John R. Pierce is an electronics engineer.

Crystals and Crystal Growing
by Alan Holden and Phylis Singer \$1.45

Crystals and Crystal Growing is not only an introduction to crystallography, but an invitation to scientific experimentation as well. Several chapters of the book are devoted to methods and recipes for growing crystals. Alan Holden is a physical chemist at the Bell Labs; Phylis Singer teaches mathematics and art at the Far Brook School in Short Hills, N.J.

Engineering and Science