BOOKS

FROM FISH TO PHILOSOPHER
by Homer W. Smith
Little, Brown and Co., Boston, $4.00

Reviewed by A. H. Sturtevant
Professor of Genetics

THIS IS AN ACCOUNT of the evolution of the vertebrates, as the title indicates. The background of physical geology is sketched for each period, and the record, so far as it can be made out from fossils, is described. But the author is a physiologist, whose special interest is the kidney and its function; and it is this fact that gives the book its special character.

The account is that of living, functioning animals—not of dry bones. To Smith, evolution is the story of the way in which animals solved the physico-chemical problems presented by changes in their environment—in particular, how they met the osmotic problems arising from changing from a fresh- water habitat to living in the sea or on land.

The discussion will be interesting and stimulating to geologists, biologists, anthropologists, and chemists. And the last chapter, on Consciousness, will be worth the attention of psychologists and philosophers.

This may seem a large order; but the book is so well written and so clear that one does not feel that it is diffuse or over-popularized. In fact, it's the very best kind of popular science writing.

GENERAL CHEMISTRY
Second Edition
by Linus Pauling
W. H. Freeman & Co.,
San Francisco $6.00

MORE DIFFICULT than most chemistry texts but also more stimulating and rewarding, this new edition of an excellent book emphasizes even more than the first edition the application of fundamental principles, and the development of a background of physical and structural chemistry. As before, less importance is attached to purely descriptive chemistry.

Much of the new material in this edition explains the modern chemist's debt to the new physics, and includes discussions of the properties of the photon, electron, and other basic particles; the photoelectric effect; the Bohr atom; and the quantum theory and its application to chemical problems. A section on X-rays and crystal structure has been added, as well as chapters on biochemistry, and metals and alloys; relatively recent work on the structure of proteins, and the nature of the metallic bond are described here.

Roger Hayward has added many more of his excellent illustrations to the new edition, including two color plates.

CONQUEST OF THE MOON
by Wernher von Braun, Fred L. Whipple and Willy Ley
Edited by Cornelius Ryan
Viking Press, New York $4.50

Reviewed by Howard S. Seifert
Staff Engineer,
Jet Propulsion Laboratory

UNDER THE AUSPICES and editorship of *Collier's* Magazine, the authors have written another speculative opus similar to their book *Across the Space Frontier.* In 36,000 words and 16 handsome illustrations, they discuss the satellite base, the assembly of a fleet of three moon ships, the orbital takeoff and landing on the moon, the lunar base and its vicissitudes, and the return trip.

As the embodiment of a space ship becomes more sharply focused with advancing technology, the story of the moon flight takes on added excitement and plausibility. Only the very sophisticated reader could find reasons to criticize this book, which documents its assertions with numbers and which violates no physical principles.

The authors take the position that all the elements necessary for space flight are at hand and that indeed such flight can be considered more probable than were radio communication and airplane flight only 40 years ago. They maintain that, given a strongly motivated and carefully planned effort (plus a few billion dollars), a satellite is possible in 15 years and a lunar flight in 25 years.

Opposition to this point of view is felt by some guided-missile engineers, who are unable to display all the evidence behind their conclusions because of security restrictions. These engineers feel that the time

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scale, the technical difficulties, and the monetary cost of the project have been underestimated by perhaps an order of magnitude.

They agree that in the natural course of events space flight will be attempted but that some motivation other than scholarly curiosity will be needed to accomplish it in the brief period of a decade or two. In this respect space travel differs from the development of the A-bomb, which was motivated by no less than the desire for survival.

This reviewer enjoyed the book and felt a strong sense of identification and "escape" while reading it. It should certainly turn a profit for its publisher. However, though most of what it says is correct, or at least possible, what is left unsaid is also important. For example, on page 54, a discussion as to how a ship could return to its orbital base in the event of a guidance failure on takeoff glosses over a multitude of difficulties and has a certain fairy-tale atmosphere of unreality. This same attitude of dedicated optimism permeates much of the book. It is not likely, however, that such a carefully written and stimulating book will in the long run do anything but good for the cause of rocketry.

ATOMIC WEAPONS IN LAND COMBAT
by Col. G. C. Reinhardt and Lt. Col. W. R. Kintner
Military Publishing Co., Harrisburg, Pa. $3.95

Reviewed by George K. Tanham
Assistant Professor of History

ATOMIC WEAPONS IN LAND COMBAT, the first book to appear on tactics for ground forces armed with atomic weapons, is full of new tactics for the land forces.

The authors feel that atomic weapons, while extremely powerful, and thus part of the natural technological development from the simple rifle, are in no sense absolute weapons.

The key to their use, as they see it, is pithily stated: "No stockpile (in the near future) can stand the drain of attempting to destroy a major foe with unexploited explosions."

For use on the offense, they feel it is best to hit the enemy at his strongest point because of the great destructive power of atomic weapons, and then at once rush exploiting troops through the breach.

In the defense, the commander must by some means make the enemy mass, without concentrating his own forces too much, then use his atomic weapons, and finally, in an active and mobile defense, exploit the weakness created.

The need for better trained troops who have had intensive instruction on the effects of atomic explosions and careful psychological preparation is rightly stressed. The colonels state: "A division unprepared for an atomic blast could be rendered unfit for combat for months by a strike which would not cripple a well-trained division."

The final chapter considers the difficulties of command in an atomic war, but also ranges over a variety of other subjects. It does stress some stark facts which—atomic weapons or no—the United States must recognize; that we cannot afford the "logistical prolificacy" we enjoyed in World War II and that, being numerically inferior, we will have greater manpower problems than ever faced before.

In this book the authors merely explore the possibilities of the use of atomic weapons on land and warn where the dangers lie in conducting warfare along conventional lines. This approach is understandable, but the development of more positive and constructive ideas would have started more thinking about the necessary tactics, which is what the authors hoped for. The book is, however, a helpful antidote to the idea that atomic weapons are absolute weapons, and a good starting point for a discussion of tactics in an atomic war.