listic trajectories, including error analysis and ballistic recovery from space. A longish chapter considers satellite orbits around the earth extending well out toward the moon's orbit as well as close in to the earth. This involves a discussion of the various types of perturbation, especially atmospheric drag, and those due to the earth's oblateness. One chapter is devoted to orbit change and orbit transfer in a central force field; all possible orbit maneuvers are included as well as an analysis of errors. Another considers the escape or capture maneuvers in a field produced by two central forces, again with an extended discussion of error analysis for the orbits.

Powered trajectories of all types are treated in the next three chapters; the one on low-thrust space flight being especially complete. Up to this point the discussion has been quantitative with the derivations of all pertinent equations very complete. The next chapter, on lunar flight, is less so, only the results of apparently long, tedious calculations being presented in graphical form. Actually most of the theory needed was presented in the chapter on perturbations in Volume 1. Similarly the last chapter on interplanetary flight, one of the longest in the book, assumes by now that the reader is able to perform the detailed calculations and presents most of the information on transfer orbits in graphical form.

Since this volume like the first one contains many typographical errors, indicating a poor job of proof reading, there may or may not be some doubt as to whether all of the figures are correctly drawn. Checking equations and sentences does not take as much time as replotting graphs so this reviewer only attempted the former, here and there. In the first 228 pages for instance, there are at least 40 errors and probably more. Consequently the reader should check everything as he goes and the publisher ought to issue lists of errata for both volumes as soon as possible.

Where the first volume contained mostly material which could be found elsewhere (although point of view and style were plainly those of the author), this volume is unique for there just is no other such exhaustive treatment of the problem of space flight. Since a third volume is promised, the three volumes should, if reprintings correct the numerous irritating errors, constitute the most complete theoretical presentation of the subject of space flight from the dynamical point of view as now understood.

Statistical Physics. By G. E. Uhlenbeck, N. Rosenzweig, A. J. F. Siegert, E. T. Jaynes, S. Fujita. Vol. 3 in 1962 Brandeis University Summer Institute Lectures in Theoretical Physics, edited by K. W. Ford. 252 pp. Benjamin, New York, 1963. Cloth $8.00, paper $4.95.

Reviewed by ***Nandor L. Balazs,*** *State University of New York at Stony Brook, Stony Brook, L. I., New York.*

Statistical mechanics as we now know it is very nearly a hundred years old. (Maxwell's paper on the Maxwell distribution was published in 1859; Boltzmann's paper on the same subject appeared in 1868, while his great memoir on the relation between entropy and probability dates from 1877.) Notwithstanding this, the discipline shows no sign of age and continues to exert great fascination. A sampling of the topics which are of current interest are brought together in this volume. During the last thirty years, a recurrent problem has been the existence and description of phase transition within the framework of statistical mechanics. The first paper by G. E. Uhlenbeck provides the clearest and *easiest* exposition of these matters. He first discusses the nature of the problem and some general theorems concerning phase transitions. Finally, he gives an exposition of the recent results based on the one-dimensional model invented by M. Kac, and further developed by Kac, Uhlenbeck, and Hemmer. This model exhibits phase transition, is physically quite realistic, and is mathematically so tractable that all thermodynamical and statistical properties can be explicitly computed. During recent years increasing attention is being paid to the use of functional integrations in statistical mechanics. Siegert describes the use of these techniques in the evaluation of partition functions. In particular he develops an approximation scheme for the Ising lattice problem and for the partition function of a fully ionized gas. Recently, Van Hove with his school and Prigogine with his school have developed general methods to deal with the statistical description of irreversibility. Fujita reviews the method of each school and the relationships between them. In particular, he discusses the assumptions which go into the derivation of the master equation and the initial conditions associated with it. Jaynes returns to one of the oldest problems of statistical mechanics, the relation between entropy and probability. Instead of utilizing the old Boltzmannian approach, using an ensemble, he prefers the notion of subjective probability and the use of the theory of statistical estimations. The energy spectrum of a nucleus is notoriously complicated. In 1956 E. P. Wigner conjectured that although the density of levels at a given energy will depend on the particular nucleus under consideration, the fluctuations in the precise position of the levels can be interpreted as if they were following definite and simple probabilistic laws. This idea led to the invention of a statistical mechanics, in which not the levels of a Hamiltonian are subject to probabilistic laws, but the Hamiltonians themselves. The mathematical treatment of these matters forms the content of Rosenzweig's lectures.

Each contribution is clear and explicit and serves as a good introduction; the literature references are well chosen. The printing is clear, and the book is well bound.

The Mathematical Theory of Viscous Incompressible Flow. By O. A. Ladyzhenskaya. Revised English ed. transl. from Russian by Richard A. Silverman. Vol. 2 of Mathematics and its Applications, edited by Jacob T. Schwartz. 184 pp. Gordon and Breach, New York, 1963. $9.50.

Reviewed by ***Jacques E. Romain,*** *Centre de Recherches Routières, Sterrebeek, Belgium.*

Although it may seem inappropriate to mention the translator before the author of a book, let a breach in usage be made in the present case. The translation is so clear and well written, and it is so rare a pleasure to come across a genuine counterexample to the Italian saying "Traduttore, traditore", that it is well worth mentioning.

The book is a highly mathematical