

## MOULTON ON EXTERIOR BALLISTICS

*New Methods in Exterior Ballistics.* By F. R. Moulton. Chicago, University Press, 1926. vi+257 pp.

This book is the outgrowth of Professor Moulton's work for the Ordnance Department of the U. S. Army during the World War and, to some extent at least, the result of his teaching the subject since that time.

The importance of the book is not questioned and an effort will be made properly to evaluate it in this review, with the definite understanding that statements made are merely opinions. But I wish to point out two aspects of work on ballistics in this country, pertaining to this book and its contents, that are somewhat disappointing.

Toward the close of the World War, and even during the period of hostilities, every person who made any pretense of being interested in contributions to mathematics longed to secure a book on ballistics from which he could compute a trajectory; not by the old antiquated methods which, he had heard, had been entirely discarded, but by the methods that had been devised by American mathematicians who had patriotically devoted their talents to the solution of these important problems. Except for a very few who were in one way or another officially connected with the Army, those who desired such a book at that time or even now have been doomed to disappointment. After two books have been published on the subject, one by R. S. (then Captain) Hoar in 1922, and the book under review by Professor Moulton, the student and the professor of mathematics have at their disposal no book from which a trajectory can be actually computed. Both books are devoid of tables, and without tables, a trajectory can no more be computed by the methods they have devised than a spherical triangle could be solved without the proper tables. From the standpoint of interesting persons in the subject of ballistics this is to be regretted. Such tables are regarded as confidential information by the U. S. Army. Regarding the propriety of this attitude the reviewer has no comment to make and no opinion to express. But it is proper, I think, to warn the reader that this withholding of the tables from not only public examination (to which there may be objections) but from the perusal and use of mathematicians, physicists, and engineers might give to such tables an importance that the facts do not justify.

The second disappointing feature, in the opinion of the reviewer, is of a more serious character. There has been a failure on the part of some properly to appraise the work done in this country during the War by our mathematical men who were interested in ballistics. The contributions that they made to the subject were advertised in most complimentary terms at meetings of the national mathematical organizations and elsewhere. No one was disposed to question them; no one was in a position to question them. It came to be usual to say certain things about these researches in ballistics. The failure adequately and fairly to appreciate the exact