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978-0-521-11650-3 - Ballistics in the Seventeenth Century: A Study in the  
Relations of Science and War with Reference Principally to England

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BALLISTICS IN THE  
SEVENTEENTH CENTURY

A STUDY IN THE RELATIONS OF SCIENCE AND WAR  
WITH REFERENCE PRINCIPALLY TO ENGLAND

BY

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## LIST OF PLATES

Plates I, III and IV are reproduced by permission of the Syndics of the University Library, Cambridge. Plate II is a photograph of instruments in the Whipple Museum of the History of Science, Cambridge.

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## PREFACE

This essay was written with two purposes. The first was comparatively simple, to relate the foundation in the seventeenth century of the science of ballistics as a mathematical interpretation of some physical problems upon a basis of exact experimental investigation. This field is limited, both because a scientific analysis of these problems must rest upon a certain level of knowledge in pure mathematics, and because although references to the 'theory of projectiles' in contemporary works are frequent, the number of important contributions to its study is small. Secondly an attempt was made to relate this series of researches in applied mathematics to its background, social, economic and scientific, as a contribution to the history of science in society. Ballistics has been taken as a critical example of early science being directed by utilitarian considerations. My aim was to examine the justice of this suggestion more thoroughly, and to see how far such progress as was made could rightly be imputed to governmental interest, to the experience of a warlike age, or to the not uncommon feeling that the fruits of knowledge ought to be useful. In general I have been led to the opinion that the purposeful application of science to the art of war (and, it may be, to any technique or useful art) at any period before the nineteenth century is much less than at first appears from non-professional accounts; the conservative traditions of practical men yielded very slowly to the enthusiasm of inventive amateurs, whether scientists or not.

The work of the French military expert, Prosper Charbonnier, *Essais sur l'Histoire de la Balistique* (Paris, 1928) was of course a natural starting-point; that of Professor H. J. Tallqvist, *Översikt av Ballistikens Historia* (Helsingfors, 1931) was for an obvious reason less accessible to me. Both of these histories summarise briefly the major early treatises, but in a primarily mathematical treatment they ignore many questions of a wider historical interest. Perhaps this may justify a fresh research among the same, and other, materials.

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#### PREFACE

It proved necessary to devote more space to military affairs than would otherwise have been desirable, for the reason that the history of war in the seventeenth century has yet to be written. The serious study of naval history has begun, for example in the publications of the Navy Records Society, but tactics and strategy still dominate military history. Some of the discussion which ranges outside science may therefore need to be modified in an ample consideration of the technical and economic history of war.

In a slightly different form this essay was accepted by the University of Cambridge as a doctoral dissertation. I owe much to the advice of the Provost of Oriel College, Oxford, and to Mr F. P. White of St John's College, who supervised its progress: but are not responsible for its faults; and to Professor Butterfield and others who were kind enough to read and criticise. I wish also to express my obligation to the Royal Society for permission to explore its archives, and to Lord Courthope of Whiligh for placing family papers at my disposal. I am deeply indebted to my College and University for the support which made this work possible, and to the Syndics of the University Press for undertaking its publication.

A.R.H.

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