A MUSE OF FIRE

British Trench Warfare Munitions, their Invention, Manufacture and Tactical Employment on the Western Front, 1914–18

Submitted by Anthony James Saunders to the University of Exeter as a thesis for the degree of Doctor of Philosophy in History, September 2008.

I certify that all material in this thesis which is not my own work has been identified and that no material has previously been submitted and approved for the award of a degree by this or any other university.

Anthony Saunders

Abstract

The emergence of static warfare on the Western Front in late 1914 encouraged the reinvention of devices associated with siege warfare and the invention of hitherto unknown munitions. These munitions included hand and rifle grenades and trench mortars and their ammunition. At the outbreak of war, the British effectively possessed none of these devices and lacked an infrastructure by which they could be quickly designed, manufactured and supplied to the British Expeditionary Force (BEF). The British met this challenge with considerable success. The subsequent proliferation of trench warfare munitions had profound consequences for the evolution of British tactics on the Western Front.

This thesis examines the processes by which these devices were invented, developed into manufacturable devices and supplied to the BEF. It considers their novelty in respect to similar devices from the American Civil War and the Russo-Japanese War. It looks at how their technical evolution affected tactical developments. The thesis discusses the relationship between the technical characteristics of these devices and the evolution of their tactical employment. It also considers how the characteristics of certain munitions, such as the Stokes mortar and the Mills grenade, directly affected tactics. It argues that the tactical employment of these munitions was dependent upon their functionality, utility and reliability.

The present thesis provides a different model of trench warfare conducted by the British on the Western Front and, thereby, demonstrates the significance of the novel munitions under discussion and the role they played in changing infantry warfare. This thesis also provides a different view of the Ministry of Munitions from that usually offered. It argues that certain aspects of the Ministry's role in providing the BEF with munitions has been overstated in the standard interpretation of the Ministry's work; the Ministry deliberately underplayed the work of the War Office, while overlooking that conducted by the Royal Engineers in France.

O! for a Muse of fire, that would ascend
The brightest heaven of invention;
A kingdom for a stage, princes to act
And monarchs to behold the swelling scene.
Then should the war-like Harry, like himself,
Assume the port of Mars; and at his heels,
Leash'd in like hounds, should famine, sword, and fire
Crouch for employment.

William Shakespeare, *The Life of Henry the Fifth*, Prologue, lines 1–8

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Acknowledgements

This thesis has its origins in a chance discovery I made in 1978 when working as a Patent Officer in the Principal Directorate of Patents, MoD. While investigating a case concerning Crown use of intellectual property owned by a third-party, I searched the patent abridgements for Class 119, small arms, covering 1915–16. I was surprised to discover patents for grenades and other devices for trench warfare, including the first patents granted to William Mills for the grenade which came to be known as the Mills bomb. In 1997, I set about researching the field of novel munitions invented for trench warfare and, in 1999, *Weapons of the Trench War* was published by Sutton Publishing, followed by its companion, *Dominating the Enemy*, in 2000. My work made it apparent to me that this was an under-researched field and that I had only scratched the surface of the subject. The invention and widespread use of such devices led me to speculate on the nature of their effect on the conduct of trench warfare in the First World War. This ultimately led me to undertake the research which is the subject of this thesis.

Any project of this scale inevitably requires the assistance of others. I would like to thank everyone who has helped me with this project over the years.

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