

Throwing Fire

Projectile Technology Through History

In *Throwing Fire*, historian Alfred W. Crosby looks at hard, accurate throwing and the manipulation of fire as unique human capabilities. Humans began throwing rocks in prehistory and then progressed to javelins, atlatls, and bows and arrows. We learned to make fire by friction and used it to cook, drive game, burn out rivals, and alter landscapes to our liking. Our exploitation of these two capabilities figured in the extinction of many species, and may have played a role in the demise of Neanderthals. In historic times we invented catapults, trebuchets, and such flammable liquids as Greek Fire, a napalm-like substance that stuck to whatever it hit and could not be extinguished with water. About 1,000 years ago we invented gunpowder, which led to guns and rockets, enabling us to literally throw fire. Gunpowder weaponry accelerated the rise of empires and the advance of European imperialism. In the twentieth century gunpowder weaponry enabled us to achieve unprecedented mayhem – the most destructive wars of all time. This trend peaked at the end of World War II with the V-2 and atomic bomb, at which point species suicide became possible. Faced with possible extinction should we experience World War III, we have turned our projectile talents to space travel. Throwing fire, which might make Earth uninhabitable for humans, may make it possible for our species to migrate to other bodies of our solar system and even other star systems.

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To Allegra and Xander

I shot an arrow into the air,
It fell to earth I knew not where...

Henry Wadsworth Longfellow,
“The Arrow and Song”¹

Every moving thing that liveth shall be meat for you.

Genesis, 9:3

...Believe me, the stars
will fit your pockets.

Bruce Boston, “Interstellar Tract”²

¹ “The Arrow and the Song,” *The Poems of Henry Wadsworth Longfellow*, ed. Louis Untermeyer (New York: Heritage Press, 1943), 140.

² *Technology in American Literature*, eds. Kathleen N. Monahan and James S. Nolan (Lanham, NY: University Press of America, 2000), 264.

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Preface

In early 2001 I finished writing this book about mankind's penchant for, and skill with, projectiles and combustion, and the resulting effects on life on this planet. I wrote this book because I think that historians too often focus on the finest grained and most subtle evidence, and often, after great effort, produce studies so finely grained and subtle as to be quite nearly unintelligible.

I decided to begin with the gross and undeniable fact that humans and, probably, other hominid species effected change at a distance via projectile and fire, and were alone in doing so. We have, by pursuing a love affair with this capability, altered the course of our history and of evolution on earth, and have ventured into space.

One of the manifestations of this capability that intrigued me most was the power it gave us to produce effects out of all proportion to means. A Clovis hunter spears the last mammoth in North America; a Zionist fanatic shoots Yitzhak Rabin; Wernher von Braun hits London with a rocket and later helps send rockets to the moon; and Osama bin Laden dispatches lieutenants to hijack airplanes and on September 11 of 2001 murders thousands in New York City and Washington, D.C.

We are fascinated with explosive projectiles, an obsession that benignly manifests itself in firework displays at holidays, weddings, and other such events; in Mehemed II's giant bombard; in the Vengeance Weapons; and in the atomic bomb of World War II. We

PREFACE

are obsessed with delivering projectiles that produce at a distance loud noises and fireballs. John Milton knew that when he created an alluring Satan and made him a Pre-Adamite inventor of gunpowder and cannon “whose roar Embowell’d with outrageous noise the Air, And all her entrails tore, disgorging foul Their devilish, chain’d Thunderbolts and Hail...”¹

I should have left my copy of *Paradise Lost* on the shelf and waited for the terrorist attacks of September 11 to use for my illustrative example. Osama bin Laden – charismatic and murderous – makes a worthy stand-in for Milton’s Satan, although he was forced to substitute fanaticism for expertise and to parasitize on the technology of enemies in order to procure and direct his projectiles. The effects fell short of Milton’s Satanic artillery, but impressed all of us. The Twin Towers stood “as Rocks, but down they fell” and “Angel on Arch-Angel roll’d...”²

The heaving of projectiles characterizes our species as unequivocally as bipedal locomotion and tool making. On the fateful September 11, 2001, the Mars Odyssey Mission vehicle, launched by rocket in April to determine the content of Mars’ surface and to detect water and therefore the possibility of life there, past or present, was approaching that planet at a speed, relative to the Sun, of 24 kilometers a second. On October 24th, as American missiles fell on Afghanistan, the vehicle started into orbit around the fourth planet from the Sun and began its inspection.³

Whether we end in the pit or space, we will do so while throwing fire.

¹ John Milton, *Paradise Lost, Paradise Regained, and Samson Agonistes* (Garden City, N.Y.: International Collectors Library, 1969), 148.

² Milton, *Paradise Lost*, 148.

³ http://www.jpl.nasa.gov/releases/2001/release_2001_186.html