The Story Of... Steel

Prososki, Lisa. "The Story Of… Steel." *Guns, Germs, and Steel*. PBS, 2005. Web. 27 Oct 2013.

Humans' ability to transform **mineral ores** into useful materials has shaped the course of human history. Those civilizations that have been armed with a greater range of metal technologies have always defeated their rivals.

A special rock with elements that make steel

In particular, steel has governed the destiny of **ambitious** Europeans. The conquistadors who swept through the New World were armed with steel swords forged in the Spanish city of Toledo. Settler communities in North America and the Cape of Good Hope were able to capitalize on European-invented steel rails, steel locomotives and steel ships to transform their model European economies. From its creation in the forges of medieval Europe, through its key role in the Industrial Revolution, to the triumph of modern technologies, steel has always been one of the greatest agents of conquest of human history.

Determination

Steel is an almost uniquely European technology. It would not have been possible without the earliest experiments with fire and minerals, conducted by **Neolithic** hunters and farmers over ten thousand years ago. Thanks to the dry environment of the Fertile Crescent, fire pits could be kept ablaze for several days, raising a temperature sufficient to transform limestone into plaster. Before long, this technology was applied to other mineral ores — copper technology brought forth the Bronze Age and iron technology the Iron Age. Once iron ore had been **smelted**, steel was only a matter of time.

The Stone Age, when stone tools were used

Taking metal from ore

Those parts of the world that were too wet to keep an open furnace ablaze for several days could never make the leap to even the simplest **pyrotechnology**. The tropical jungles of Papua New Guinea, for example, could never sustain an open fire for more than a few hours. Lacking sufficient conditions to allow them to even begin to experiment, the hunters of the New Guinean lowlands were trapped by their geography in a perpetual Stone Age — until the arrival of metal-bearing Europeans.

Technology centered around fire

The right conditions alone were not enough — budding **ironmongers** and steel-smiths also needed the right raw materials. Europe struck lucky. Steel's complex manufacture requires large quantities of iron ore and plentiful, carbon-rich forests, plus access to fast-flowing water for power and transport. All of which were readily available in Europe.

Manufacturing iron goods

From the earliest days of European civilization, the forests of Germany and northern Italy became the home to iron technology. The products they created were unique throughout the world — single plates of armor hammered from one sheet of metal; lightweight longswords with heavy counterweight **pommels**; and, delicate rapiers designed for popular duel.

Rounded knob on the handle of a sword

These swords, from the Spanish espada robera, or sword of the robe, were invented in the late fifteenth century as an ultra-modern, ultra-chic dress-sword for the upwardly mobile. It was the pride of Toledo, a Spanish city that by the late Middle Ages rivaled any Italian or German city for sword manufacture. Toledo steel was famous throughout the Old World — and soon became infamous throughout the New World.

Geography gave European **metallurgy** another precious advantage. Thanks to what has become known as the 'optimal fragmentation principal,' the physical environment of Europe allowed a significant interplay of political independence, economic competition and technological collaboration. In other words, the geography of the European continent destined it to host thousands of communities, all **jostling** for power and **prestige.**

Field of Science dealing with purification of metals

Competing

Power

By the mid-fifteenth century, the latest forging techniques were used to create the strongest, sturdiest, lightest and most flexible armor and swords. Geography had made it **inevitable** that this precious technology would be used by Europeans to perfect the art of war.

Certain to happen

Iron and bronze technologies were also common in the Far East; but without the competitive **incentive** of Europe, the applications of these materials remained fairly limited. Armor never developed the unique and versatile qualities of European plate armour. Swords remained relatively uniform in style, and thanks to the ease with which technologies could spread from east to west**, innovative** Asian inventions, such as gunpowder were rapidly snapped up by the **voracious** European war machine.

Motivation

New methods/ideas

Eager

It has long been known that agricultural civilizations in Africa were producing iron long before the arrival of Europeans — the deadly, lightweight, Zulu Assegai was testament to the skill of native African ironmongers. But recent studies have also confirmed the independent production of steel in Africa as well — a technology previously believed to be uniquely European. Nevertheless, indigenous Africans were about 1,000 years behind their European rivals — and we will never know what they might have gone on to achieve, had the trajectory of African culture not been interrupted by colonialization.

Civilizations in the Americas lacked **equivalent** iron resources — but were rich beyond imagination in copper, tin, and precious metals like silver and gold. This, after all, had been the incentive for European exploration — the search for El Dorado, the quest to seize a paradise made of gold. The invaders were not disappointed. Gold was so common in the land of the Incas, it was used purely for decoration and bore no inherent monetary value. Protected solely by bronze weapons and knives carved from stone, the Inca Empire fell easily to deadly Spanish steel.

The same

The Industrial Revolution **catapulted** Europe into a position of unprecedented global domination over the course of the nineteenth century. Building on colonial conquest **accrued** over the previous 200 years, industrialization transformed the lands of the Americas, Africa and Asia into **economic satellites** of Europe — producing and consuming raw materials and manufactured goods to fuel imperial economies, spawning 'European' cities thousands of miles away from home. The British, French, Belgian, Dutch and German Empires of the late 19th and early 20th centuries would have been unthinkable without the awesome power of steel.

Launched

Increasing amounts

Unattached, money making enterprises