

## Facilitating Imperialism through Advanced Technologies

The role of technology in facilitating the growth of European empires during the nineteenth century has been widely discussed by historians. At the very least, many argue that advanced technology was a key component of the worldwide spread of European imperialism. As many historians have noted, however, we must be careful not to ascribe too much value to technology in and of itself in predicting the nineteenth-century expansion of European empires. The *use* of technology is what is key; how did Europeans use it to achieve their aims? The following section will examine some of the ways in which Europeans used technological advancements to champion their imperialist zeal.<sup>1</sup>

### *Transportation*

The development of steam-powered ships greatly assisted European powers that sought to extend their empires in Africa and Asia. Europeans had enjoyed a virtual monopoly on sea travel since the first imperial expansion began in the 1500s, but this only extended to the coasts. European ships were too awkward to travel inland via the river systems in their empires. Therefore, even great seafaring nations like the Portuguese were often limited to coastal colonial possessions in Africa.

Improvements in steam power in the early nineteenth century enabled such river travel, helping Europeans travel inland to expand their empires. Smaller, more powerful engines allowed smaller boats to travel against the current with more success. Soon, European empires – chiefly the British – launched steamships in the direction of Asia. The British East India Company, for instance, used steam ships in their war against the Kingdom of Burma in 1824, which was fought chiefly along the rivers.

The new steam engines were heavy, however, and they required stronger ships that could withstand their effects. Shortly after the emergence of the steam engine as a viable method of transportation, British shipbuilders began experimenting with iron ships, which proved to be longer lasting than the wooden models previously used. Quickly, ships were made in different shapes and sizes and for purposes as varied as transatlantic travel and taking goods upriver on a flat barge. These advancements helped Europeans extend their empire inland and aided in maintaining their new imperial possessions.

The British first began to use the new shipping technologies to their advantage in East Asia in the 1830s. (The new steamships had performed admirably in British commercial and evangelical missions in Africa around the same time, but as most of the British people soon died from malaria, the ventures could hardly be called successful.) The arrival of British steamships on the coast of China around 1830 began more than a decade of tensions between the two powers. The British wanted Chinese tea, and the Chinese wanted opium, which the British could provide; but neither side trusted the other.

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<sup>1</sup> This section relies in particular on the work of Daniel Headrick, “The Tools of Imperialism: Technology and the Expansion of European Colonial Empires in the Nineteenth Century,” *Journal of Modern History* 51, no. 2 (1979): 231–63.

The eventual result was the Opium War of 1842, in which the British East India Company employed iron steamships, including the *Nemesis*, which was the biggest iron steamship in the world to that point, against the Chinese. The outdated Chinese junk ships were quickly defeated as the sleek, powerful British ships decimated them. The British imposed a humiliating peace on the Chinese; China was forced to trade with the British at a low tariff and to cede Hong Kong to Britain. This venture is perhaps the most striking example of European imperial power, but not the only one; it closely resembles Commodore Matthew Perry's mission to Japan in the 1850s, which you read about in Section 2.2.2.

### *Science and Medicine*

Before the mid-nineteenth century, Africa was a deadly place for Europeans. The reason was malaria; the strain of malaria found in Africa decimated Europeans who were posted there. However, entrepreneurs dreamed of the potential for great profits in Africa if one could avoid malaria and thus sidestep the African middlemen who controlled the trade on the coast. While steamships and weapons were sufficient to ensure European imperial dominance in Asia, it was only when the threat of malaria was dealt with that Europeans could begin the Scramble for Africa in earnest.

The solution that Europeans used reflected not so much a triumph of medicine as of experimentation. When two French chemists isolated quinine from cinchona bark, common in South America, they stumbled upon what soon became a popular drug for Europeans to use against malaria. By the 1850s, quinine was in widespread use, and the Scramble for Africa began. Several British men who explored the interior of Africa contracted malaria and survived because they had quinine with them. Quinine became so popular that European powers, beginning with the Dutch, began to grow it outside of South America so it could be more easily accessed. This example is one of many in which the European empires experimented with growing plants from different continents.

Indeed, the expansion of European imperialism led to the widespread development of botanical gardens as places to preserve and experiment with plant specimens from across the world. Like the cinchona discussed above, when Europeans found interesting or useful plants in their travels, they sought to discover new places where the plants could grow. To this end, the Royal Botanical Gardens were established at Kew, outside London, in 1762, as one of the first repositories for plant life around the world. Further, British colonies themselves quickly established their own botanical gardens in the decades that followed, with several being founded in Australia in the early nineteenth century. Such gardens attempted to grow plants of many types and uses, ranging from cinchona for quinine to the cacao plant so that chocolate could be locally produced and more readily available.

The case of rubber is one of the most interesting developments in the history of science and imperialism. The rubber tree was indigenous to the Amazon rainforest, and by the middle of the nineteenth century it was in great demand. While the rubber trade enriched the Brazilians, the British found that it was too expensive and time-consuming to buy rubber from the Brazilians. In the 1870s, British scientists made several attempts

to smuggle seeds from the rubber tree out of Brazil, and by the end of the decade they successfully cultivated the rubber tree at their colony in Ceylon (today's Sri Lanka). By the end of the century, the British had established a major rubber production in Malaysia and bypassed the Brazilians entirely. This imperial effort has had a lasting effect; today most rubber comes from South and Southeast Asia.

Not only did the European imperial powers use their colonies as bases for specific botanical purposes but also for more broad scientific research in general. As with so many imperialist efforts, these colonial centers of science often intended to enrich the imperial metropolis. British, French, and German colonies all had some form of scientific academy or university. In India, for instance, the British established technical schools to help Indians gain scientific knowledge; but the real purpose of these "schools" was to provide assistants for British scientists who were undertaking study there. Interestingly, science became one area in which the colonized could affect their imperial power. Of the Indian scientists who helped the British, some used their own traditional knowledge to make discoveries that assisted British scientists. Being able to make such discoveries made Indian scientists feel as though they were no less civilized than their British superiors; this realization fed Indian nationalism.

## *Weapons*

American historian Jared Diamond famously coined the phrase "Guns, Germs, and Steel" to explain why European civilizations conquered the Amerindian peoples in the sixteenth and seventeenth centuries. Steel steamships (and other technologies) helped European empires expand inland in Africa and Asia; and once quinine had been discovered, exploration of the former continent was made much easier. Nonetheless, it cannot be forgotten that much of this exploration was done at the point of a gun; and once Europeans had staked their claims to territory, their advanced weaponry helped to secure the land for decades to come.

The chief improvement in weaponry that affected European imperial ventures was the refinement of the gun. Guns were not new to Africans, as they had been used in North Africa since the sixteenth century. In Algeria, for instance, the people often made their own guns, while the rich traders on the sub-Saharan coast bought cheap – but easily repaired – European weapons. Yet, as Europeans moved further inland in Africa, they encountered fewer people with guns. Their opponents were more likely to carry swords and shields and charge out from castles than to employ guns and ammunition. Even so, around the turn of the nineteenth century, most European soldiers still fought with a musket, which was notoriously inaccurate and took a long time to reload. It was often more effective to use the musket as a pike than as a gun. This handicap was overcome through several new technologies developed over the course of the nineteenth century.

First, since the late eighteenth century, a few soldiers and marksmen owned guns that employed "rifling," which spun a bullet on its axis and, therefore, straighter and for longer distances. Nonetheless, soldiers initially disdained the new technology because such guns were difficult to load and required a lot of attention to keep in good

working order. By the 1830s, however, the structure of rifles had been improved, and the new rifling technology became widely used. In the 1840s, moreover, new bullet technology meant that bullets could fly 400 yards and were much more accurate as well. Finally, the development of the percussion cap made it much easier to fire a gun in wet weather.

These initial changes in weaponry were significant, but they were not sufficient for European imperial expansion. The French, for instance, fought for two decades in Algeria, often with significantly larger armies, until finally wresting control of the country. The Boers of South Africa, meanwhile, could not parlay their superior weaponry into a victory over the locals, who were much greater in numbers. It was not until the development of the breechloading gun that European imperialists were truly able to expand their empires.

The invention of the breechloading gun in the 1850s was primarily for use on the battlefields in Europe, but the European powers eventually used them in Africa as they sought to increase their territories there. Put simply, a breechloading gun allowed guns to be loaded quickly and from a kneeling position. Previous guns had to be loaded in a more cumbersome manner, and a soldier who was standing to load his gun was an easy target. The breechloading gun was complemented in the 1880s by the invention of smokeless gunpowder, which meant that soldiers did not have to deal with constant clouds of smoke when firing at the enemy. In addition, the repeating rifle allowed bullets to be fired much more quickly; and the machine gun, which debuted around the turn of the century, allowed bullets to be fired faster still. By this time, Europeans could fire one round per second undetected in any weather with devastating accuracy from a long distance. This meant that when Europeans drew the borders of Africa in the 1860s and 1870s, they were subsequently able to conquer those territories with ease.

### *Technology and the Civilizing Mission*

As European powers took control of Africa at the end of the nineteenth century, they carried out a series of terrible massacres. Stories of lopsided victories abound from this period. One of the most infamous examples comes from 1898, when a British force of hundreds massacred 11,000 Dervishes while sustaining only 48 dead. European technological superiority permitted such victories, but it did not compel imperialists to kill their opponents on such a scale. You have read about the ideologies of empire that made this palatable to Europeans, especially Social Darwinism. It will suffice to say a little here, however, about how technology played into this ideology.

To the people of the nineteenth century empires, such technological superiority seemed like Providence. Especially for the British, who controlled perhaps one-quarter of the earth at the end of the nineteenth century, the idea that technological progress had helped their country to control the world was heady and gave rise to fanciful ideas: European overlordship was not merely the result of luck – it was preordained and right. This belief was shared by many imperialists, inventors, and businessmen and helps to explain the rapacity of European expansion throughout the century.

The “civilizing mission” thus played into the idea that European mastery over Africa and Asia was natural and preordained. As European powers had the blessings of

advanced technology, people at the time assumed that it was their God-given mission to extend those blessings to the rest of the world. This belief in European superiority acted as a justification for imperialism, with both positive and disastrous consequences. At its best, advanced technology did bring benefits to the people of the world, as it has since as well. It also destroyed civilizations and left Europeans a terrible legacy.

### *Summary*

- The development of the steamship furthered European naval supremacy as smaller steam engines and steel ships allowed imperial forces to penetrate inland using the rivers that had previously been unnavigable.
- The steamship aided European mastery over much of Asia; but in Africa, Europeans were still stymied by malaria. The discovery that quinine could be used to combat malaria ushered in an age in which Europeans explored and then conquered the continent.
- When Europeans travelled the globe they encountered new plants, some of which proved very useful. Cinchona (for quinine) and rubber trees, both originally from South America, were so useful that Europeans transplanted them thousands of miles so that they could be grown more economically. Many other plants travelled similar distances to reside in botanical gardens.
- A series of advances in weaponry gave Europeans a major advantage over the peoples of Asia and Africa, most of whom had limited access to guns that were quickly out of date.
- European technological superiority fed into an imperial ideology, exemplified by Social Darwinism, which stated that Europeans were inherently superior to the people of the rest of the world.