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Summary of "Engineering and Mining"

In Dr. Eldred Harrington's book, "An Engineer Writes about People and Places and Projects", he describes the interconnectedness of mining practices, agriculture, and engineering in the story "Engineering and Mining". The importance of mining is evaluated to be equal to agriculture in advancing civilization. The effect of agriculture was a clear change from a hunter-gatherer society to a settled civilization of sustainability, whereas mining gave rise to weaponry, tools, and metallic keepsakes. Both predate written language, and together gave rise to technological advances and other areas of expertise from blacksmithing to carpentry. Engineering principles have been applied to mining for thousands of years from heating techniques to various rock pulverizing tools.

Continuing in the history of mining, the roots of metalworking and the impact they had on society was further investigated. As far back as the ancient Egyptians, burial practices included metalworking in the form of jewelry and decorations. The smelting of ores dates back before written language, as evident in the depictions of the Babylonians, Assyrians, Hebrews, Egyptians, and Greeks showing men working at the forge. The history of mining perceptibly precedes the smelting of ore for the creation of adornment and tools. The origins of mining start with the rudimentary pick ranging from sharp sticks, deer horns, Egyptian "beating balls", stone hammers, and eventually to iron and bronze picks. The Romans created a primitive drilling machine that acted as a battering ram, which was a type of "bruising machine". Other techniques used in the beginning of mining included utilizing fires to heat the rock face and hammering the shattered rock. The collection of the ore was revolutionized with the invention of the engine. Before the engine, miners would excavate the mining material using rudimentary means, such as buckets, sacks, animal powered hoists, and water wheels. Mine pumps have evolved similarly to the cultivation of the ore out of the mines; before water pumps, buckets were used followed by windlasses, piston pumps, et cetera. The linear process of mining involves engineering practices for breaking the rock face, to excavation and hauling, to draining and purifying contaminated water in mine shafts.

Mining can be a dangerous endeavor due to poor ventilation, tunnel collapse, risk of explosions from methane gas, faulting equipment, and a great deal of other factors. In regard to maintaining optimum air quality, ventilation methods were employed by directing wind down the shaft and then creating an updraft with a fire and a man-made pipe. The ores themselves can also cause health problems; arsenic, mercury, and lead poisoning were common ailments even through the nineteenth century. With miners experiencing strange illnesses of their time, mining was said to be a spiritual phenomenon with demons being the root cause of the foul air and sickness. Mining has always been considered an unhealthy occupation because of these risks, but it is fundamental as to not be reduced to a primitive society.

After the fall of the Roman Empire, mining practices declined, and it remained underdeveloped through the Dark Ages. Like most other industries of the time, mining saw a resurgence during the Renaissance. Through the ages, mining has seen significant improvements in engineering including steel drilling tools, gun-powder mine blasting, nitroglycerine, dynamite, and the steam pumping engine. Steam engine technology was especially significant in power drilling, water pumping, hoisting and hauling, ventilation, and pulverizing. Dr. Harrington estimates that more than ninety percent of all mining production has been accomplished since the beginning of the 1900s to the present day. The rate of production has exponentially increased as new methods arise, and efficiency is increased. The standard for ore collected today is far less pure in the desired material, but it can yield vast quantities because of the rate of production and the efficiency of the methods. The profit from coal and iron each year surpasses that of gold and diamond and other ornamental materials. Mining is a Big Business, and it is a staple in the United States economy along with other countries worldwide. Engineering has opened the doors for this industry to be a leading operation, as it will be for years to come.