From the Mines to the Battlefront, Contributions towards Mechanization and Modern Capitalism

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Introduction

In his book, *Technics and Civilization*, Lewis Mumford discusses the coming of the machine and humankind's preparation for the Industrial Revolution of the nineteenth century. In chapter two, Agents of Mechanization, Mumford emphasizes the structure of society and the development of the mine. He discusses the connection of the mines to the needs of the military and he attempts to prove that warfare, above all else, drove the invention of the machine.

Primitive Castes and the Roots of Mining

Using the analogy of the mountain-and-river system, the primitive caste system is laid out for the reader. In this, we develop a sense of the hierarchical social system where each member of the community contributed to the inventions of mechanization through respective daily tasks. Thus the fishermen brought the boat, the net, and the basket—the boat being most significant and of high importance for a mode of transportation, trade, and communication. With the farmer's lifestyle came tools for plowing and sowing, storage areas such as cellars for preservation, and the permanent dwelling (no longer need for nomadism). The peasants and herdsmen contributed to modern genetic engineering by contributing methods associated with selective breeding of plants and animals. The woodsmen invented the ax, the lathe, and other tools used to collect wood (for fire and construction).

The shift in social power from herdsmen and peasants to hunters and fishermen was seen with the dawn of modern technics. Their natural ability to control a spear or

axe for purpose of killing animals transferred to their talent of killing men to establish hunting rights in territories outside their boundaries. Support for this sort of conflict and challenge led to greater demand for more materials for warfare. Hence the desire for weapons comprised of metals and stone. This demand accelerated the production below Earth in the deep confines of the mine.

What set the miners apart from the other laborers of the land was their position underground. Somehow not connected to the land in the ways that farmers, peasants, herdsmen, and woodsmen are, miners are the exploiters of the land. While farmers sowed and harvested, miners raped and pillaged. Somehow, though ironically at the top of the totem pole (or mountain slope) remained the miner; this is not meant to signify hierarchy, rather demonstrate isolation. Living a horrifically barren and dark life, the miners brought forth many valuable contributions. Stones from the mines served various purposes; these stones birthed weapons and tools of solidness. Most basic needs of the community (food, water, shelter) were met so citizens turned their attention elsewhere to places where they could fulfill other desires. Metals derived from the mine provided pleasure to the eye. Mining gave birth to capitalism as the material items serving no other purpose but to provide pleasure came from the depths of Earth. Mines presented opportunities for immediate wealth whereas farms and fields required time and investment. Mining's history proved one of brutality. Mines were vessels for slaves, prisoners, and criminals. It was after the late Middle Ages only that free labor entered the mines.

Even so, as free labor voluntarily gave time to mines, those who worked in the mines lived lives of desolation and danger. Their personal lives remained attached to

their professional lives. Low standards of living, drinking, and gambling plagued the lives of miners. The brutal practices of the miner underground were present above as well, having detrimental influences on the natural environment outside the mines. Land was devastated by mining. Many objected to its practice due to destruction of fertile fields, vineyards, and fruit groves.

It is interesting to note however, that the products reaped from the mines stood completely disassociated from traits of the miners' lives. Precious metals, gemstones, tools, etc.—all products of the mines, brought connotations of wealth, beauty, health, and wellness. These qualities stand directly antithetical of mining's practices. Those associated with mining in other ways that had contact with the materials of the mine but not the mines itself were molders and smiths who worked on the products of the mine after extraction. Living in more urbanized areas, these professions were looked highly upon and those employed in them enjoyed lifestyles more luxurious and comfortable than those of the miners. Their private lives remained separate from their labors and they enjoyed a peaceful, social lifestyle. Mining boosted the capitalist age like no other occupation. Boats, mills, mine-shafts, docks, and cranes were required to keep the mines productive, thus money was required to produce such machines.

Mining and Modern Capitalism

Mining boosted the capitalist age like no other occupation and was tied in directly with the beginnings of free people working in the mines. These people demanded a higher level of safety and health conditions in the mines. When these improved, the mines could be delved deep and are more ore gotten out. These improvements demanded

more capital than was originally found there. To finance these projects, independent partners, called absentee owners, began putting money into the mines without actually working them. In this way the mines became places to invest money with an almost guaranteed return. The ore in mines was in demand due to an increased need in weaponry and a new thought of value. Value was given to goods depending on their scarcity and difficulty in reaching them; this is directly opposite to true value that should be placed on the power of a good to sustain and enrich life.

The Primitive Engineer

The age of the industrial revolution is the age of metals and concrete, but what prepared us for the sudden use of these materials: wood. Wood has been present for all of man's great inventions and achievements, even the mines that spurred on capitalism would not have succeeded without wood beams to hold up the walls. Wood was the foundation of all buildings until the 19th century; one could not even build a stone arch without the wood scaffolding. Wood has excellent properties for transport; it can be rolled down a hill or floated down a river. In this way, even places far from the forest could use wood in their buildings. It was wood that man first used as a fuel for fire and took his first step towards conquering the dark and cold of Nature. As Mumford describes it, "Take away wood, and one takes away literally the props of modern technics," (Mumford, pg. 79). It was wood that man first used engineering, learning techniques of manipulation that would prepare him for the coming of metals. If not for the great deforestation that occurred, it is possible that wood would still be used today in many more applications.

From Game-Hunt to Man-Hunt

"Perhaps the most positive influence in the development of the machine has been that of the soldier," (Mumford, pg. 81). Warfare, and the development of more high-tech weapons, spurred on the mines and the machine throughout history. Warfare can be traced back to the hunters, whose job it was to kill in order to insure his own survival. Once the human population settled down and took up the practice of agriculture, the game hunters turned to human hunters in order to protect and insure the safety of their own farms. Eventually the protector turned into the conqueror, wishing not only to protect his own lands but to gain lands from others, "he seeks slaves, loot, power, and he founds the political state in order to ensure and regulate the annual tribute," (Mumford, pg. 83). With this evolution from hunter to conquer rose the need for weaponry that bettered the opponent, thus the arms race began and is still going on today.

Warfare and Invention

Unlike many things in life, war does not hold to the ideals of humanity or respect of life. It is to kill or be killed, and the better your weapon, the better chance you have of walking away alive. For this reason weapons have advanced steadily since their first appearance as crude hunting tools. As Mumford stated earlier in his book, weaponry has advanced from peasant with wooden club to bowmen to musketeers to infantrymen and finally to artillery, (Mumford, pg. 83). Artillery is the triumph of mechanical improvement and the cannon can be called the will-to-power much as the clock of Chapter one was named the will-to-order.

Few inventors stopped to contemplate the results of many of their deadly creations. Leonardo De Vinci was one of the few inventors who stopped to think of the consequences, for this reason he did not publicize his idea for the submarine because he felt it “was too satanic to be placed in the hands of unregenerate men," (Mumford, pg. 85). This thought never occurred to physicist Robert Oppenheimer until after the first successful test of the Atomic Bomb took place. He is remembered as quoting the Hindu holy book Bhagarad Gita, "now I am become Death, the destroyer of worlds" and it is true that now humankind possesses the power to destroy the Earth. In this sense of unchecked invention, Mumford wishes to prove that "war has been perhaps the chief propagator of the machine" (Mumford, pg. 86).

Until the artillery and cannons of the fourteenth century, the military drew ideas for weapons from other trades. The cavalry and fleets came from pastoral and fishing trades, trenches from peasants, and rams and scaling ladder from the woodman. However, with the invention of gunpowder and the cannon the military became the driving influence on the machine, setting the pace towards large-scale standardized industry, (Mumford, pg. 87).

With the creation and use of artillery came a new demand for iron. No longer was iron needed solely for the making of weapons but the making of ammunition as well. It was from this point that civilian inventions borrowed from the military instead of visa versa. The workings of a pistol are, after all, nothing more than a single cylinder combustion engine. Coal became the fuel that fed the iron fires, and the military engineer became a new necessity of armies. The military was preparing the world for the coming of the nineteenth century industrial revolution; thus, "At every stage in its modern

development it was war rather than industry and trade that showed in complete outline the main features that characterize the machine," (Mumford, pg. 89).

Militarily Inspiring the Machine

The growing importance of a nation's military and their success on the battlefield during the seventeenth century and beyond played a definitive role in the creation and management of the future machine. Mass production through division of labor first became relevant and useful when the demand for stronger, deadly swords came to be in the late 1700's, (Mumford, pg. 90). Prior to such demand, craftsmanship was the main method of production; each artisan created weapons of different durability. By the end of the eighteenth century, the production of muskets with interchangeable parts was a phenomenal innovation. Such standardization not only became the convention of weaponry, but of the entire military. First brought upon by Louis XIV, total standardization of the soldier was important not only because it was important that regimentation be implanted into the military minds, but because it made soldiers entirely replaceable. This same attitude is still used today. The machine has been standardized as to have total replace ability if failure were to occur. In this case, the goal is more important than the individual.

It would be an understatement to claim that the machine was modeled around the life of the soldier. The soldier has again and again become the chief victim of his own simplification and short cuts; in machine-like precision and regularity, he has lost the capacity for intelligent response and adaptation, (Mumford, pg. 96). Hence, the modeling of the machine after the soldier was rather obtuse. The standardization of the individual

creates a scenario where if one fails, all fails. It was unfortunate for society at large that a power-organization like the army, rather than the more humane and cooperative craft guild, presided over the birth of the modern forms of the machine, (Mumford, pg. 96). Instead of the creation of an ever-changing individual, the ideals of the military set the limits to which evolution towards a higher standard could prevail.

Not only was the machine modeled after the soldier, but the soldier forced the creation of the necessity for the machine. In war, moreover, the army is not merely a pure consumer, but a negative producer: that is to say, it produces filth, instead of wealth, (Mumford, pg. 93). The term 'negative producer' can also be applied in another fashion; not only were the men, who were soldiers, exploiting their nation's supplies, but they were also away from home unable to produce the very goods they were using. Hence, the machine became most useful during war-time. The fact that products could be created with little man power, through the use of machines, was an extremely valuable asset of the machine. Mumford clearly sums up this conjecture with the statement, "War is not only the health of the state; it is the health of the machine too," (Mumford, pg. 94).

Interestingly, post-war times also gave much purpose to the machine. After men came back from war, the 'Mars and Venus' idealism overtook much of the populous. Not only were women supposed to give their bodies up to their men who were gone for a long period of time fighting a war, but men, in return, were to glorify the women; bringing them luxurious items. Since the majority of men did not have the funds to purchase such expensive objects, the need for cheap, mass-produced items came to fruition. Every man could then offer their woman at least something that seemed to have some value. Machines were the answer to making these items. They produced them inexpensively and

in little time. Such a convenience is still popular today. Such exploration of what the machine could possibly be useful for, especially during peace times, was still at a rather primitive stage during the eighteenth and nineteenth centuries.

Productive Drive and Fantasy

While the military created the means and ideals of making products by machine, civilians carried out the process of dreaming and inventing new machines. The perfect example of civilian invention is the steam engine; there was no use for the steam engine in a military sense at the time. The steam engine was first used to power an organ; an entertainment musical instrument. Overall, fantasy was an important aspect of machine invention. The helicopter, for example, was invented as a toy in 1796. Overall, the spirit of play enfranchised the mechanical imagination, (Mumford, pg. 101). It was necessary for civilians to take on such feats as the military was preoccupied with regimentation and standardization. The artistic mind has always been the machine's closest friend. One only has to look back in history back to Leonardo De Vince to see that the most playful and childish of characters are those who bring the machine to the surface to where it can be worshipped as something new, unconventional, yet quite possibly useful.

As the machine gained respect, the court lost reverence. The commoner, though viewing the majesty's palace as Heaven, began to crave for the luxuries and excessive consumption that the upper classes maintained. The machine, for the merchant and manufacturing classes, was the only means that they could raise to a higher social order. To escape the lean restrictions of poverty became a sacred duty, (Mumford, pg. 104). This productive drive or greed in its purest of forms is one major aspect of the machine's

success and placement in society. It was not a tool of the commoner, but rather a means of a better life.

Conclusion

The links between mining and warfare are easily seen with comparisons between soldiers and miners. Thus the transition and growth of warfare from the products of the mines is drawn from this Chapter. Miners lived lives of solitude, isolation, and destruction; soldiers remained inhuman vessels for purposes of domination and destruction. Mining gave birth to modern capitalism with the excuse of providing materials for war. Weapons were produced by the raw goods extracted from the confines of Earth and placed in soldier's hands to destroy. War times provided an absence of men and a need for luxuries upon return thus breeding the desire for gold and jewelry for lovers. Mining helped boost consumption and war provided a means by which to do it.