What is the Machine:

A Review of the Themes of Chapter 1

Technics and Civilization

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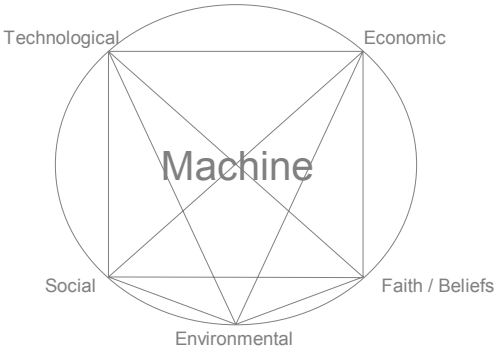
Making sense of the world. That has always been the underlying desire of science. However, making sense is a dual-edged sword. The act both describes and bounds the rational universe. The bounds of the Cartesian universe are discretized and fundamentally reduced to linearity while asserting their own all encompassing character. The scientist is trained to believe that the universe can be described through the mechanical principles of form and matter. He is taught to ignore qualitative and subjective judgments, to rely on reduction and scientific method to define reality. This replacement of God and His infinite quality with Science and its finite quantities relies on the infallibility of Man's intellect, that eventually it can all be reduced.

The reliance on the perfection of man's intellect, on his ability to grasp the world and quantify it through the logical framework of rational thought bounds the "real" to that which can be described. Feng Shui may be someday described with the equations and mathematical language of the science of engineering. However, if we deny the value of the ideas of the practitioner of Feng shui as superstition because of its lack of precision and scientific principle then we are like the scientists of the day of Galileo laughing haughtily at the superstitions of another equally if not more valid reality. The hubris of our method is that it places as secondary all thoughts and experiences, all knowledge who's bounds are beyond the realm of the mechanical universe (which itself is bounded only by the limits of human science). The limits of this world-view aside, the machine has been an incredible gift to the material abilities and comforts of man's life. But what have we lost? What have we ignored?

Reevaluation of the fundamentals forces us back to our original axioms of progress and improvement. We must look at how we understand value and valuation.

The machine must be evaluated with respect to all its qualities rather than the reduced set of current quantifiables. The compulsive desire of scientists to reduce all the machine and indeed the universe to a set of quantifiable principles ignores the bulk of the effects the machine has on man and the universe of relations in which he exists. To guide the discussion, we will focus on five themes. Specifically, those technical, economic, beliefs, environmental, and social aspects of the machine will be discussed and the way in which these qualities interact in a *nexus of relations* rather than in a reduced environment of linear thought.



Technical Interpretation of the Machine

A definition of a machine is an apparatus consisting of interrelated parts with separate functions used in the performance of work. To understand the definition, it is best to break it down; an apparatus is a tool or device, interrelated parts implies that each part has a particular task to perform, and when combined, work is produced. Machines, such as a clock or an engine, surround everyone. We are familiar with what they look like, and at the least loosely how they work; however, we are not so familiar with their beginnings.

The first step toward creating a machine is to build bounds around that which is measured or quantified. Every culture considers themselves as the center. Cultures would approximate time and space based on the "true" time and space they live in (Mumford, 1963). As maps were introduced, cartographers would arbitrarily portray

"land" as a tree with no depiction of what the area being mapped looked liked. Between the 14th and 17th centuries, perspective and depth began to play a role in space and place. Artists began illustrating a foreground and a background, with images in the picture drawn to scale. Soon maps were shown with correct distribution and size of land. This led to the desire to explore, and to go "there" simply because it wasn't "here".

The world was so enthralled with machines and technics that it became a "mechanical universe". It has been a tidal wave of human ingenuity and resource, so stupendous in its magnitude, so complex in its diversity, so profound in its thought, so fruitful in its wealth, so beneficent in its results, that the mind is strained and embarrassed in its effort to expand to a full appreciation of it (Hughes, 1975). At the end of the 17th century most scholars began to equate technics to every aspect of the world. The physical sciences became a basis for technics, and it followed three standards. First, "qualities" were removed and complex was reduced to simple, through only paying attention to the measurable elements. Second, there must be an emotional separation between the datum and the scientist. And finally, the field of study must be limited to only the characteristics that lead to the observation. This method is the root of the scientific method employed today. We see the first step of observing and describing the measured data, then the elimination of unnecessary results, and last a conclusion.

This method was a first step toward quantifying everything. As Mumford quoted Galileo, "as soon as a conception of material is formed, it is given a boundary or shape…I do not believe that there exists anything in external bodies for exciting tastes, smells and sounds except size, shape, quantity and motion" (Mumford, 1963). The mechanical universe concentrated on primary qualities, or those that could be measured,

and it did not include the secondary qualities, or those that contain smells, sounds tastes, etc. The benefit was that the experimenter could easily separate himself from the subject he was studying. Giving everything a quantity formed the beginnings of thinking in terms of values, and that eventually led to thinking in terms of money.

Economic Interpretation of the Machine

In the fourteenth century, people were doing exactly that: thinking in terms of money. Once people started to explore the world, they found that unique things came from far away places, and thus international trade became more popular. It became burdensome to have to rationalize values of objects during barter, and thus the idea that everything should be worth a specified amount of money came about, and this money would be the means of exchange. This was the beginning of capitalism.

The world happened to give birth to the machine age at a time when capitalism was on the rise. Machines presented people with an extension of themselves; the cold metal machine was a small piece of a human designed to execute a specific task. These machines made life much easier. More work could be accomplished in less time and thus there was a high demand for this easier way of living. Therefore, the potential to become wealthy by inventing them also became highly possible. By supporting the machine, capitalism quickened its pace, and gave a special incentive to preoccupation with mechanical improvements: though it often failed to reward the inventor it succeeded by blandishments and promises in stimulating him to further effort. In many departments the pace was over-accelerated, and the stimulus was over-applied (Mumford 1963). Capitalism favored science and machines so much that even when a new invention was a failure, it was looked upon more highly than the thing it was attempting to replace.

The imposition of a selfish attitude upon people, one to strive for personal wealth, not for your city and the good of all man, was the direct result of capitalism. This irrational and careless thinking brought about the exploitation of mechanical invention and used it as a pathway towards personal wealth. No one cared about the side effects of mass production and mass use of the machine; only what was going to be their individual benefice from the process. Because of this, and the involuntary exploitation of the machine, the blame for its detrimental effects on our society have often fell on the machine itself and not capitalism. But when one rationalizes, they see that the machine itself is not at fault. In fact, a single machine is a beautiful creation designed by man to do exactly what the human mind designed it to do. It is the creators and the programmed mindset we have created them in which is to blame: capitalism itself.

Social Relations of the Machine

Resistance to the adoption of mechanized culture has always been strongest in craftspeople. In a real sense, when a new machine is put in the place of crafts, those craftspeople feel that their entire livelihood is in jeopardy. Craftspeople react so violently because they feel this replacement implies that the value of the craft is only in the product. The modern economic discourse is so dominant in our social understanding that this seems like a trivial point to make. However, this is the core of the issue. If the value of the craft is not derived from the craftspeople then the craftspeople can only be valued by their product. Thus, the machine, rather than challenging the livelihood of the craftspeople, challenges and bounds their value as human beings. The question being asked in economics is, what is the marginal value of having a thing being produced by a person vs. being produced by a machine? But, this empowerment of economic principles

as having primary importance even over humanistic values such as family and community, is a painful valuation to make.

Ralph Waldo Emerson in his essay on Self Reliance (Emerson, 1983) talked about the difference between a man on a farm and a farmer. The man on the farm was a man first. The primary role in his community and in his life was his humanity. It is not the task that makes the man but man that makes the task. The farmer however is limited to his task. It is the value of his task that provides the farmer with his value.

Our bias in the application of science and the evaluation of the machine is intrinsic to the scientific process. It relies on quantifiables. However, quantitative valuation cannot embrace the complexity of the organic. It is the finishing, not performing, the task that is important. But can I truly say that the value of my neighbor the baker is bounded by the value of the bread they bake? If so then why not replace them with a bread machine? The replacement of man by machine relies on separating the thing from the man that produces it.

In this way, social status and our value to those around us becomes reduced to the value of our task. Not age nor wisdom, skill nor honor, but our ability with machines and our ability to extract value from them has become the defining factor in social society. The deleterious as well as beneficial effects of the creation of time, of the streamlining of labor, of all the machine has offered to our society carry certain axiomatic understandings of the world. Socially, the effect of the machine has been divisive because it so often the most obvious representation of the devaluing of men and the captivation of their freedoms and desires for the exploitation and abuse by the forces of the society at large. So to answer the original question: what are the social aspects of the machine? The

machine is the avenue by which man's value is reduced to the value of his products, the creation of social status through wealth, and the biasing of discrete and quantifiable over the indescribable.

Beliefs/ Faith in Science vs. Technics

As the world became technologically oriented, there was a transition from thoughts revolving around the church to thoughts revolving around technics. This transition, ironically enough, began within the Church. To immerse their lives into God and His ways, monks in the monasteries followed the repetition of the bell ringing throughout the day to do their tasks. This was one of the first notions of time keeping. The importance of the regularity of the clock was soon seen beyond the monasteries. Humans are irregular with changing heartbeats and breaths; the clock gave then a rhythm, a sequence that could pattern their lives. It was socially and culturally valuable to own a clock. The higher-class citizens owned one because they could afford it, and the lower-class citizens desired one. The clock became so ubiquitous that other machines were modeled after it. It was so ever-present that it began ruling our day--we ate when the clock said lunchtime, not when we were hungry, we slept when the clock said bedtime, not when we were tired. Mumford believes the clock is the foremost machine of the industrial age, more essential than the steam engine or coal.

Technology was more than the introduction of machines; it was the means by which humans could conquer and change what might happen. Magic was the shortcut to this other worldly knowledge and it became the science with mystery. Magic provided a public demonstration of the eminence of its masters and even if nothing beneficial came out of it, the attempt was praised. Manipulation of the natural world could be performed

through the use of magic and machines. Magic's habit of manipulation by crushing, grinding, and dissolving – valuable apparatus for real science, became the source of authority for magicians rather than Aristotle and the Fathers of the Church (Mumford, 1963).

The thoughts behind God and Christianity never had a precise definition. God could not be measured and heaven could not be defined, but with the use of machines, we saw a shift from faith in God to a faith in science. The battle between science and God parallels one of the battles that is frequently approached today, evolution versus creation. It is a scientifically observable process, it is not a philosophical concept, it can't be believed, it is true and real, and transitional fossils exist. Transitional fossils are a sequence of fossils both morphologically and chronologically intermediate between earlier and later species. Creationists might respond with: you can't logically prove anything- I may have been created yesterday, there is no proof that matter exists or the Big Bang occurred, people shouldn't just agree with higher authorities. Authorities can be as easily misled by their beliefs as believers in religious mystery. God, once the Divine Mystery was transformed to the Eternal Clockmaker and the goal of life became simply working out what made the world tick.

Environmental Interpretation of the Machine

In this time of revolutionary thought, we directed our attention towards animals because animals could accomplish things we could not. We wanted to run like a cheetah, fly like a bird, and swim like a duck (team swanboat –***represent-***). It became an obsessive and compulsive love affair with species we would never be, and their qualities

which we would never possess. We became envious when we saw in nature our limitations and our flaws. This spurred the attitude that if we could never do it ourselves, we would create something that could. In order to accomplish this, we needed to overcome the obstacle of animistic thought. Hitherto, we associated each animal's individualistic function with its soul. We believed that each animal was on earth to accomplish its function and no other animal could achieve that function. In order to overcome animism, we had to separate the souls of objects from the functions they served in nature. We needed to see life in a different way: the *inorganic* way.

The original bias of natural philosophy was to discard organic complexes and to seek isolates which could be described, *for practical purposes*, as if they completely represented the "physical world" from which they had been extracted. These isolates were the primary qualities of nature (Mumford, 1963).

When we overcame the belief of animism, we saw the world as a tangible entity. The bird wasn't soaring through the air because its wings were magical; it's wings created a difference in pressure and thus caused lift. The swan wasn't magically floating on top of the water either; its feathers were waterproof and hollow-stemmed thus causing the bird to be buoyant. Once these scientific realizations came into perspective, we set out to try to emulate them in our machines. Machines-and machines alone-completely met the requirements of the new scientific method and point of view. They fulfilled the definition of "reality" far more perfectly than living organisms (Mumford 1963). Our obsessions could now be fulfilled, and through machines we could achieve the once thought to be unachievable.

Conclusion

The invention of the clock and the shift in thinking from the organic to inorganic were the ultimate premises of the first technical revolution. The invention of the clock was the most important. It captured time and made everyone conscious of it. Consciousness of time resulted in consciousness of people's work and this resulted in the consciousness and desire for improved work efficiency. The abandonment of the organic paved the way for us to achieve that improved work efficiency in making mechanical machines. In hindsight, it was only natural that we would try to understand why things were the way they were. We are homo sapiens, the most intelligent animals on earth. Science is not our creation, but our discovery. And with its laws and rules we have found that we can manipulate it to create a spectrum of tools, from machines that emulate ourselves to life itself.

It is very important that we recognize however, just how powerful science and the capitalism that exploits it are. The environmental problems in our country are growing every day; most all of them attributable to man's apathetic use of the machine. If we don't start taking control of our own power now, we will ultimately soon be powerless and inevitably become that which is characterized by our inorganic thought: **dead**.

References

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