A History of Technology & the Human Condition

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Introduction

From the dawn of history, according to Jared Diamond, a menacing shadow of hatred has always darkened our human condition. In "Vengeance is Ours" he notes that it is normal for tradition-based societies living outside the controls of state governments to demonize neighboring groups and regularly to engage in war and murder. Ethnographical studies have shown that hatred and war are historically "normal" between tribal societies. In the long view of history, he says, our modern state-governed societies are the exception "because we instead grow up learning a universal code of morality … promulgated every week in our churches and codified in our laws."[1]

Yet today, despite religious teachings and moral codes, national governments still portray other nations as evil, sometimes because of past oppression and sometimes because of a perceived threat of attack. Technology has always played a role in wars by giving the victorious army an advantage through things like steel armor, gunpowder, the airplane, poisonous gas, spy equipment, decoding machines, and nuclear weapons. But it is nuclear technology that presents the human condition with an unprecedented threat—both as a source of energy and as a weapon of war—of poisoning by radioactivity millions of civilians and millions of acres of productive lands.

This is not to say that technology has not benefitted our human condition. Quite the contrary. Technology is improving life and improving it fast. For example, if you were alive when my grandmother was born, you'd have no light bulbs, cars, or planes; no telephones, radios, or recorded music; no steel or plastic or dynamite; no pasteurized milk, sterilized surgical instruments, psychotherapies, rabies vaccination, or vitamins.

At the same time, while nuclear disasters have so far been localized, technologies have already played a key role in damaging our human condition all over the globe. We live with polluted air and water. Suburbs and parking lots are taking over landscapes that provided drainage, shade, and oxygen-producing plants. Industries rely on standardization and specialization, but this also standardizes persons, narrows their skills, and raises their economic value far above the values of their companionship and depth of character.[2]

Technology has also damaged our sense of the beautiful. The simple beauties of nature are more difficult to find. Good art and music—the kinds that touch our desires for order and harmony—are hugely overshadowed by

technologies designed just to excite our nervous systems or trick us into buying something we don't need.

What is the lesson here?

> *Clearly, there are things we have forgotten and things we need to learn.*

To see what we have forgotten, we need to understand the history of how our human condition came to be so tightly tied to technology. The essential insight here is that, beginning from the Stone Age, there have been revolutionary developments in both our human condition and our technologies. So in what follows, I will lay out four developments in our human condition and two in technology. This will bring us up to the present and give us some answers to our second question, namely, What do we need to learn?

Four Developments in the Human Condition

The four revolutionary developments in the human condition that I have in mind are the emergence of new ways of *thinking.*[3]

1. Image & Symbols

   The pre-historic emergence of language, art, literature, and religion. Thinking was mainly through *image and symbols*.

2. Universal Order & Theory

   The emergence of philosophy and monotheistic religions in 800-200 BC. Thinking now asks about the order of the entire universe, created and divine, and it develops beliefs and theories that focus on *truth*.

3. Experiment & Plausibility

   The emergence of modern science in the 1600s.[4] Thinking now includes views that focus on *the most plausible explanations of data*.

4. Praxis & Human Studies

   The emergence in the late 1900s of a "praxis" that take a critical standpoint toward any developments and corresponding changes in human studies. Thinking now includes views that focus on *the best available critiques of error and standards for better living*.

I want to stress that later developments do not replace earlier ones. Today, we can find all four ways of thinking, although not equally prevalent. Everyone is familiar with the first mode—thinking in images and symbols. Most know the second mode—through philosophy and/or religion. Many know the third—especially those who specialize in any of our modern

sciences. A few know the fourth—those who see the need for a method of "praxis" in all human studies that not only discriminates between progress and decline in the past but also promotes what can improve people's well being everywhere in the future.

Two Developments in Technology

Besides these developments in how we think, there are two revolutionary developments in technology:

1. Finding a base in modern science.
2. Becoming fully integrated with the political-economic order.

In what follows, I will weave these two developments in technology in with the four developments in our human condition.

Study Guide

What are the four main developments in how we think?

What are the two main developments in the evolution of technology?

Next: Images and Symbols …

1. Images & Symbols

In the fog of prehistoric times, the main developments were language, art, literature and religion. From these developments, the thought processes of our ancestors were mainly a combination of *technique*, *myth*, and *magic*. Technique includes any practical know-how. Myth includes narratives about group origins and the cosmos. Magic includes all the practices by which incantations and rituals were done to produce physical changes (especially weather, health, fertility, and military victory).[5]

Our earliest "technological" achievements were not "technology" strictly speaking, since there were no underlying theories. Rather, the achievements were a matter of *techniques* for building and for doing work more efficiently:[6] ➔

Loom (4500)
Wheel (3500)
Bronze (3100)
Pyramids (2700)
Silk (2500)
Irrigation (1750)
Paved roads (1200)
Iron (600)
Catapult (400)
Great Wall of China (210)

Our ancestors' world-views were mythical narratives about the origins of their own tribes, often involving the sun and stars, tigers and bears, ocean deeps and storms. These world-views included divine beings, but, prior to about 1000 BC, most involved magical, superstitious beliefs about practical matters—how to be successful in hunting, farming, warring, and conceiving children.

As far as we can tell, their thinking was mainly through images and stories of how ordinary life should be lived and through symbols of beings and forces that affect daily lives. Any distinctions they made about the world were based, not on the much later distinction between a natural and a supernatural order, but on *visible images* and *invisible forces*, where the invisible included the forces of wind, deep water, storms, gods and angels without distinction. Also, different groups each had its own unique images and symbols about the world. What mattered was "what *we* believe;" the question of what *everyone* should believe had yet to be raised.

Technology, then, was essentially technique, or practical know-how. But this know-how included not only techniques in crafts and engineering but also techniques in magic for causing rain and fertility.

Study Guide

What is the main difference between technique and technology?

If early humans did not distinguish between "natural" and "supernatural," how did they divide up the world?

In what sense did early humans believe in "magic"?

Next: Universal Order & Theory …

2. Universal Order & Theory

A Universal Human Condition

The philosopher of history, Karl Jaspers (d. 1969), published a highly influential account of the origins of how we worship and how we think about the world up to the present time. In his *Origin and Goal of History,*[7] he proposed that over what he calls an "axial period" from about 800 to 200 BC, the leading cultures of the world underwent a revolutionary awakening regarding what may be *universal* about both the physical world and the individual person.[8]

He found that a number of different cultures, with no evidence of mutual influences, became aware that humans everywhere have both a deeper inner self and a loftier human destiny than had ever been imagined. In his words,

> "The new element of this age is that man everywhere became aware of being as a whole, of himself and his limits... He experienced the Absolute in the depth of selfhood and in the clarity of transcendence."[9]

By "transcendence" is meant not some other-worldly fantasy but rather a very familiar experience: Each person can make the personal discovery of a persistent desire to transcend his or her self by learning more, doing better, and loving widely.

For evidence, he points to such diverse cultures as Chinese, Hindu, Buddhist, Greek, Hebrew, and Persian. As it happens, each of these cultures included many small states or groups regularly engaged in civil and inter-state warfare. The question of how to rise above wars and vengeance found answers in the idea that the entire world is one place, and every person in it has a self-transcending core in common with every other.

This idea of a single universe and a single core to each person's calling was expressed in two quite different forms—one in religion and one in philosophy.

> The Hebrews represent a prominent example in religion. Around 1000-800 BC, they moved from believing that their god was simply the one who is highest of all the gods (henotheism) to believing that there really is only one God who created everything and whose will about right and wrong falls equally on humans everywhere (monotheism). The belief that one God reigns over all creation implies that there is a universal standard of behaviors to be found in the transcendent wisdom and will of God.

> Socrates (d. 399 BC) represents a prominent example in philosophy. As recorded for us by Plato (d. 347), Socrates raised the question whether right and wrong depended exclusively on the customs of local groups or might there be a right and wrong that belong to all humans "by nature." To put this another way, is morality a matter of social convention or are there notions of "right" that are universal? If morality is something universal—something that transcends group customs—then one culture can and should criticize other cultures where they see behaviors that violate these "natural rights."

Deductive Thinking

If Socrates mastered the art of raising questions, Aristotle (d. 322 BC), a student of Plato, provided answers by developing philosophical systems that laid out this inner "nature" of things. He covered a wide range of human phenomena—phenomena that today fall under the auspices of physics, chemistry, biology, and botany, as well as human psychology, logic, rhetoric, political theory, and ethics.

Today, we refer to these disciplines as "sciences," but Aristotle's notion of science was quite unlike our own. To him, scientific method is based on making logical deductions from self-evident principles. This type of thinking is referred to as "deductive." The goal is to reach certainty. And certain knowledge occurs when we know the causes of things.[10] To get a flavor of how deeply logical Aristotle's science is, consider this passage from his *Physics:*

> When the objects of an inquiry, in any department, have principles, conditions, or elements, it is through acquaintance with these that scientific knowledge is attained….
>
> The principles in question must be either (a) one or (b) more than one. If (a) one, it must be either (i) motionless, … or (ii) in motion, …. If (b) more than one, then either (i) a finite or (ii) an infinite plurality. If (i) finite (but more than one), then either two or three or four or some other number. If (ii) infinite, then either … one in kind, but differing in shape or form; or different in kind and even contrary.[11]

This view of science as aiming for certain knowledge through logical deductions from principles dominated Western and Islamic "science" until the 1600s.

Technology

Aristotle's science has had no direct effects on technology. It was still practical know-how that produced these more prominent technological developments: ↘

As you can see, technological inventions like these are not "deduced" from principles. It is true that some early principles of math and mechanics may have played a role,[12] but these inventions were mainly "induced" from experimenting with materials. Still, it does seem likely that these inventions gradually shifted people's confidence toward technology and away from magical incantations and rites.

Energy: waterwheel (85 BC), windmill (1120).

Manufacturing: iron ore smelting (1350), cotton manufacturing (1620).

Communications: paper (105), block printing (510), printing press (1450), lead pencil (1550).

Navigation: compass (1190), Navigational charts and astrolabe (1270), telescope (1608).

War: the stirrup (700), gunpowder (800), cannon (1362).

Study Guide

When was the "Axial Age" and what happened during it?

What is the "experience of transcendence"?

Where did Socrates find universal moral norms?

Where did the Hebrews find universal moral norms?

What is the goal of "deductive" science?

How long did thinkers rely mainly on deductive science to understand the world?

Next: Experiment & Plausibility …

3. Experiment & Plausibility

Inductive Thinking

We jump now to the scientific revolution that began in the 1600s. Herbert Butterfield (d. 1979), in his *The Origins of Modern Science*, asserts that from the perspective of world history, the scientific revolution, "outshines everything since the rise of Christianity and reduces the Renaissance and Reformation to the rank of mere episodes, mere internal displacements, within the system of medieval Christendom."[13]

This revolution was carried out by thinkers who sought knowledge more in experimentation and in a reaction against an unquestioning acceptance of authorities like Aristotle and the Church. Francis Bacon (d. 1626) led the charge. Compare, for example, Aristotle's "deductive" thinking that we cited above to Bacon's proposal about "inductive" thinking:

> … all true and fruitful natural philosophy hath a double scale or ladder, ascendant and descendent; ascending from experiments to the invention of causes, and descending from causes to the invention of new experiments…[14];
>
> Those who have handled sciences have been either men of experiment or men of dogmas. The men of experiment are like the ant, they only collect and use. The reasoners resemble spiders, who make cobwebs out of their own substance. But the bee takes a middle course: it gathers its material from the flowers of the garden and of the field, but transforms and digests it by a power of its own.
>
> Not unlike this is the true business of philosophy; for it neither relies solely or chiefly on the powers of the mind, nor does it take the matter which it gathers from natural history and mechanical experiments and lay it up in the memory whole, as it finds it, but lays it up in the understanding altered and digested. Therefore from a closer and purer league between these two faculties, the *experimental* and the *rational* (such as has never yet been made), much may be hoped.[15]

The experimental ideal of thinking was taking over, an ideal that represents what we now call "modern science." Where Aristotle's views aimed at *truth and certitude*, modern science aims at the *most plausible explanations of experimental data*. Currently, for example, we have theories about gravitation and evolution that are widely accepted, not as "true" but as "best

available explanations" of data. As "best available," they remain open to more comprehensive explanations that may arise.[16]

Technology

Over the next 300 years, a spirit of experimentation released a torrent of inventions flowing into every dimension of society:[17] ➔

Energy: steam engine (1720), electric battery (1800), Light bulb (1879)

Materials: cement (1824), steel (1864), cellophane (1912)

Transportation: accurate clocks for determining longitude at sea (1763), iron bridge (1779), balloon flight (1783), steam locomotive (1803), automobile (1885), airplane (1903)

Communications: telegraph (1883), photography (1839), typewriter (1868), telephone (1876), phonograph (1877), wireless radio (1896)

War: machine gun (1862), dynamite (1867), automatic and chemical weapons (1914)

This spirit of experimentation was greatly promoted by the work of the Royal Society in London, which was established by a group of natural philosophers in 1660, after 20 years of discussing Bacon's ideas of an empirical science. One of its principles was to exclude from discussion any question that could not be settled by observation or experiment. Its agenda included ways to improve navigation and mapmaking, the promotion of new industries based on scientific discoveries, and a search for the mineral resources needed by these new industries.[18]

Technology Relies on Science

But the more fundamental change in technology—indeed, the most fundamental so far, and the first truly revolutionary development— came about by connecting practical know-how and technique to newly emerging scientific theories. We might say that mere "technique" evolved into three interrelated disciplines—scientific research, applied science, and technology as we know it today.

Scientific Discoveries

How did science affect technology? Here, we can mention only the major scientific discoveries that spawned countless applications in technology:

Math: Newton and Leibnitz develop the Calculus (1665-1675), which measures infinitesimal changes and gross accumulations. Laplace (1812) develops the Theory of Probability, which measures aggregates of events that fall outside of physical laws.

Physics: Newton (1687) proposes that motion everywhere in the universe follows the same laws we now refer to as "gravity." This arouses expectations in scientists everywhere that there are "scientific laws" that govern all of nature. Planck (1900) develops Quantum Theory, which explains how subatomic particles are neither particles nor waves. Watson and Crick (1953) discover DNA.

Chemistry: Mendeleyev (1869) proposes that all elements can be classified by atomic weight of their protons and the energy level of their electrons. His "Periodic Table of Elements" still dominates chemistry today.

Biology: Darwin (1839 and 1847) proposes his theory of Evolution, which explains the origins of biological species and has been extended to explain the origins of everything from viruses to galaxies.

Enchantment with Science

The flood of discoveries in science and inventions in technology that followed on Bacon's views led many to think that history itself might be automatically progressive. That is, wars and disease may be only temporary setbacks in what will eventually prove to be continuous progress in the human condition.[19]

A symbol of society's enchantment with progress through science and technology appeared in London's *Great Exhibition* in 1851, where new inventions were housed on the magnificent "Crystal Palace."

Disenchantment with Science

But by the 1920s, disenchantment with science and disillusionment about progress set in. It began with World War I, continued through World War II and the atom bomb.

Today we are much more skeptical about what science and technology can do for the human condition. We now must live with The Bomb, which is becoming available to more nations throughout the world. And we have yet to solve the technological problem of de-radiating the waste from nuclear power plants. On more everyday levels, we are bombarded with economic pressures to buy whatever technology has produced—despite higher risks to our health and to the environment.

Political Economy Governs Technology

A second fundamental development in technology followed quickly. As modern scientific methods greatly accelerate the flow of new technologies, what these technologies can actually provide for society is almost completely determined by the political economy. The term "political economy" refers to the fact that decisions about the flows of money are highly affected by the political order. Political economies govern technology because they open and close the gates of money that technology depends on for both research and sales.

> For example: We have the technology to reduce pollution to livable levels everywhere. But reversing global warming and controlling pollution is not a technological problem. It is an economic and political problem. Economically, pollution-reversing technologies are extremely expensive—expenses that would bring a steep rise in costs of living. Politically, the problem is global, because there is simply no economic return on such an investment by any single nation.

Notice, by the way, that the word *economy* today unfortunately focuses mainly on money and jobs, without bringing political orders into the picture.

Enchantment with the Political Economy

Of course, political leaders promoting communism, or socialism, or capitalism sell their ideas in enchanting economic terms. It takes history itself to test these ideas, and the guinea pigs are people. Currently, capitalism is the dominant enchanting political-economic idea in the West. It began with Adam Smith's (1776) theory of an "invisible hand" of automatic market corrections that will occur as long as governments keep there visible hands off.[20] It is evident today in the dominant laissez-faire ("let them be") economics that resists any sort of governmental control.

The political economy in developed countries also enchants people into believing that material comforts will provide happiness. This job of enchantment, like an extension of ancient reliance on magical rites and incantations, falls to advertising firms.

Disenchantment with the Political Economy

Today, the test of history shows that benefits of technology come to the few while the risks are borne by the many. The sad fact of our human condition is that the well-being of a minority is paid for by the poverty and drudgery of the majority. Purely laissez-faire economic theories are welcomed by large corporations because it frees them from governmental regulations. In fact, the David of economics often knocks down the Goliath of governments: when these corporations have a global economic reach,[21] it is they who force national governments to pass laws favoring profits for foreign owners at the expense of indigenous workers.

In the meantime, even among those who do benefit from technology, the material goods promoted by advertisers seldom bring anything like a happiness that is deeply satisfying to the human spirit. Advertisers certainly distract from and often suppress the ordinary person's attention to ways to live more deeply.

Summary

So what has the development of modern science done to the role of technology within our human condition? We can summarize these changes in three points.

1. Modern science gives technology fundamental theories for unprecedented developments across many dimensions of our lives—especially in the areas of energy, food production, transportation, and communications.
2. Modern political economies determine who will benefit from these developments.
3. History attests to the inability of science, technology, and political economies to provide global improvements in people's well-being.

Study Guide

What is the goal of inductive thinking?

What did modern science lead some people to believe about history itself?

What disenchanted people about modern science?

How does technology relate to modern science?

How did Adam Smith see the relationship between an economy and government?

How do political economies in developed countries continue to "enchant" people?

What disenchanted people about political economies?

How does technology relate to political economies?

Next: Praxis & Human Studies …

4. Praxis & Human Studies

We saw that the emergence of inductive thinking had revolutionary effects on science, technology, the economy, and politics. We might label these our "social" institutions, because they gather people into collaborative groups for these ends.[22] What these institutions have in common is a single goal:

To produce goods and services more efficiently and effectively.

We also saw that these social institutions are worsening the human condition for millions of people, and, left without any regulatory controls, will continue to make life worse for most people across the globe.

But we have another set of institutions that are often labeled "cultural." Some of the main ones are the arts, a judiciary, religion, and humanities. ("Humanities" includes education in literature, history, political science, economics, philosophy, and theology.) These cultural institutions share a single goal of their own:

To improve the human condition.

So where science and technology tell us what we *can* do, and political economies tell us what we *will* do, our cultural institutions tell us what we *should* do.

The role of our cultural institutions regarding technology and its associated social institutions is obvious: *Align their goals toward improving the human condition.* What we *can* do regarding industry, chemistry, space exploration, medicine, war, and so on, is not always what we *ought* to do. Besides producing goods and services *efficiently* and *effectively*, we need to produce them *ethically*. So we look to our cultural institutions to give guidance to our social institutions.

Secularism vs. Transcendence

A major way to find the guidance we need is to first see there is anything we may have forgotten. One oversight stands out above all others: We forgot what our ancestors in the axial period discovered, namely, that our human condition is about transcendence. That is, to be human is to experience, in the depths of our hearts, a persistent desire for the ultimate meaning of everything and the goodness of humanity itself. Philosophers who look to Socrates, Plato, and Aristotle find our transcendent condition in our common nature to want to learn, to practice virtue, to deepen friendships. Religious faithful who look to the Hebrews find our transcendence in a God who created everything as a gift of unconditional love and who gave humans commands for living virtuously.

To forget our transcendent human condition is to become "worldly" or "secular." Over the 600 years beginning in the 1300s, four great historical movements represent the phases of a gradual secularization of our views about the human condition: the Renaissance, the Reformation, the Enlightenment, and Marxism. Proponents regarded their respective movements as a victory of human reason over religious superstition and a liberation of cultures from authoritarianism in kings and popes.

Today, forgetfulness of transcendence shows largely in *relativism* and *agnosticism*.[23] It shows in relativism as the belief that whatever moral ideals you hold is your business, as long as no one else gets hurt. It shows in agnosticism as the belief that God is just an idea, and we have no way of knowing whether God really exists. Notice how relativism reverses the ancient Greek belief that there are universal moral principles. Likewise, notice how agnosticism reverses the ancient Hebrew belief that God is not only real but deeply engaged in history.

Praxis Thinking

Still, the blade of truth, sharpened in the axial period, cannot excise the tumors of relativism and agnosticism. This is because relativism denies the validity of any universal truth, and agnosticism denies the validity of any truth based on religious belief. Nor is it enough to remember the discoveries of Greek philosophers and Hebrew worshippers. In their day, truth was needed to replace falsehood regarding our human condition, just as in the Middle Ages, Christianity promoted dogma to replace heresy. But since the rise of the empirical-mindedness of modern science, the question that bothers people is not whether anyone's views about life are true or false; it is whether or not they make sense of their actual life experiences.

In the last 50 years, various philosophers looked to what we may call "praxis" as this new way of thinking.[24] Briefly, praxis is a method that attends to what happens in our minds that makes us seek beauty, creativity, and love, while we often behave in ways that are ugly, stupid, and hateful. The "method" has three phases:

> It highlights the fact that human wonder and the search for meaning, harmony, and companionship is exactly what it means to be transcendent.
>
> At the same time, it expects to find that our wonder is wounded by bias, hatred, and willfulness.
>
> Finally, it proposes ways to heal these wounds and to recover what represents genuine transcendence.

Praxis today also meets inductive thinking on its own ground by relying, not only on observable data, but also on the data of our consciousness—data that validates the self-transcending nature of humans everywhere.

We can cite three recent philosophers who pioneered this work somewhat independently of one another: Paul Ricoeur (d. 2005), in his studies of Freud, aimed to expose unquestioned assumptions and agenda while preserving what is authentic and reliable.[25] Eric Voegelin (d. 1985), in his five-volume work, *Order in History,* outlined all historical developments as evidence of a transcendent search for order.[26] Bernard Lonergan (d. 1984) proposed that all human studies begin from examining what we do when we learn, make decisions, and love.[27] He also proposed a theory of a political economy that is based on acknowledgement of our common dignity in a transcendent nature.[28]

Praxis and Human Studies

As a new way of thinking, praxis today is in position to improve all human studies. Just as the natural sciences take their stand on the data of sense, human studies take their stand also on the data of human consciousness. There it finds that some sort of bias, hatred and willfulness are never far from any situation. But it also finds a persistent desire to be fully open to learning, doing better, and loving widely. So praxis thinking promotes positive programs for recovering our natural openness to live in self-transcending ways. Here, we can give a few examples of how praxis thinking can improve human studies:

> **Psychology**: Therapists will still use *analytical* techniques for identifying causes of neuroses but will also use *healing* techniques for reversing neuroses, egotism, loyalism, hatred, and naiveté.
>
> **Economics**: Policy experts and global financial institutions (e.g., the World Bank and the International Monetary Fund) will not only report on how money is flowing but also propose moral principles that specify where money *should* flow. Using ongoing analyses of current conditions, they will continually recommend rebalancing the flow—now toward capital investments, now toward higher wages—to ensure equitable distribution of the benefits of technology across the globe.
>
> **History**: Historians will not only describe the emerging trends of a particular group but also assess which trends are better and which are worse.
>
> **The Arts:** (Painting, music, sculpture, dance, architecture, landscaping, poetry, fiction, etc.) Creativity will highlight and evoke transcendent desires in audiences/viewers. Critics will not only spell out the effects of art works on people; they will also assess how

deeply artists are wonder-struck by the mystery in human affairs and how well they elicit that wonder in their publics.

Education: A humanities education will teach students how to think in a praxis mode in their homes and at work. Students will regard themselves not only as critical thinkers but also as critical healers.

Theology: Theologians will not only state religious doctrines; they will also point to the experience of self-transcendence to explain what they mean. By recognizing the transcendent dignity of each individual, they will counteract hatred of foreigners and desertion of the unborn and the dying.

Technology and Praxis

In the meantime, as praxis thinking transforms human studies, we can expect technology to continue its rapid growth: ↓

We have no reason to expect things to slow down, as is indicated in "Current Research" here. Nor have we any reason to expect that our current political economies will relinquish their control over who benefits from technology. There is simply no backing away from the two transformative developments in technology—its foundation in modern science and its implementation through a political economy.

Navigation: airplane (1903), liquid fuel rocket (1926), space shuttle (1981)

War: automatic and chemical weapons (1914), nuclear bomb (1945)

Communications: transistor (1947), satellite (1957), computer (1959), personal computer (1977), cell phone (2002), nanotechnology (2004)

Medicine/Genetics: penicillin (1928), *in-vitro* fertilization (1976), DNA "fingerprinting" (1984), human genome project (1990),

Current Research: zero electronic resistance, lightweight batteries, genetic medicine, nuclear waste disposal, high-resolution satellite pictures everywhere on the globe, high-fidelity remote listening devices.

Currently, the greatest danger that technology presents to our human condition lies in the combination of unregulated economies and political loyalism. That is, the current state of multinational corporations and political hatreds is a lethal affair. Unregulated economies secure profits from technologies that benefit owners at the expense of workers. They escape oversight of our cultural institutions that would put a higher priority on global improvements to the human condition over the material well-being of the wealthy. Political loyalisms thrive on fear and hatred. Specifically, as rich

economies grow richer at the expense of poorer economies, the spirit of group loyalism renders the rich economies fearful and the poor economies hateful. Add nuclear weapons to the mix, and the extreme danger to both sides becomes obvious. One political economy hates, the other fears, and both have The Bomb.

At the same time, there are all sorts of everyday misuses of technology: ➔

The arts: Uses of technology merely to excite our nerves or sell things we don't need. Reducing physical beauty to sexual attraction.

Communications: Technologies used for spying, identity theft, plagiarism, unregulated publication of pornography, nonsense, and hate.

Medicine/Genetics: Medical technologies that facilitate abortion, sexual activity among youngsters, and withdrawal of food and water from the terminally ill, all in the absence of moral standards.

Environment: Pollution of air, water, light (night sky). Loss of "nature" and wilderness.

We can write laws to regulate these misuses. And we can offer courses in the humanities about our true dignity. But who will write these laws and teach these courses? Indeed, who will *obey* these laws and *take* these courses? Ultimately it comes down to individuals who live in a praxis mode. These are people who are naturally open, naturally suspicious about how easy it is for anyone to become self-enclosed, yet naturally loving enough to reach out with a healing word and touch.

Well, ultimately, it comes down to just one individual, correct?

Study Guide

How do the goals of our social institutions differ from those of our cultural institutions?

What Axial Age discovery did we forget?

In what two forms does this forgetfulness show today?

What are the three phases of "praxis" thinking?

Is praxis thinking more inductive or more deductive?

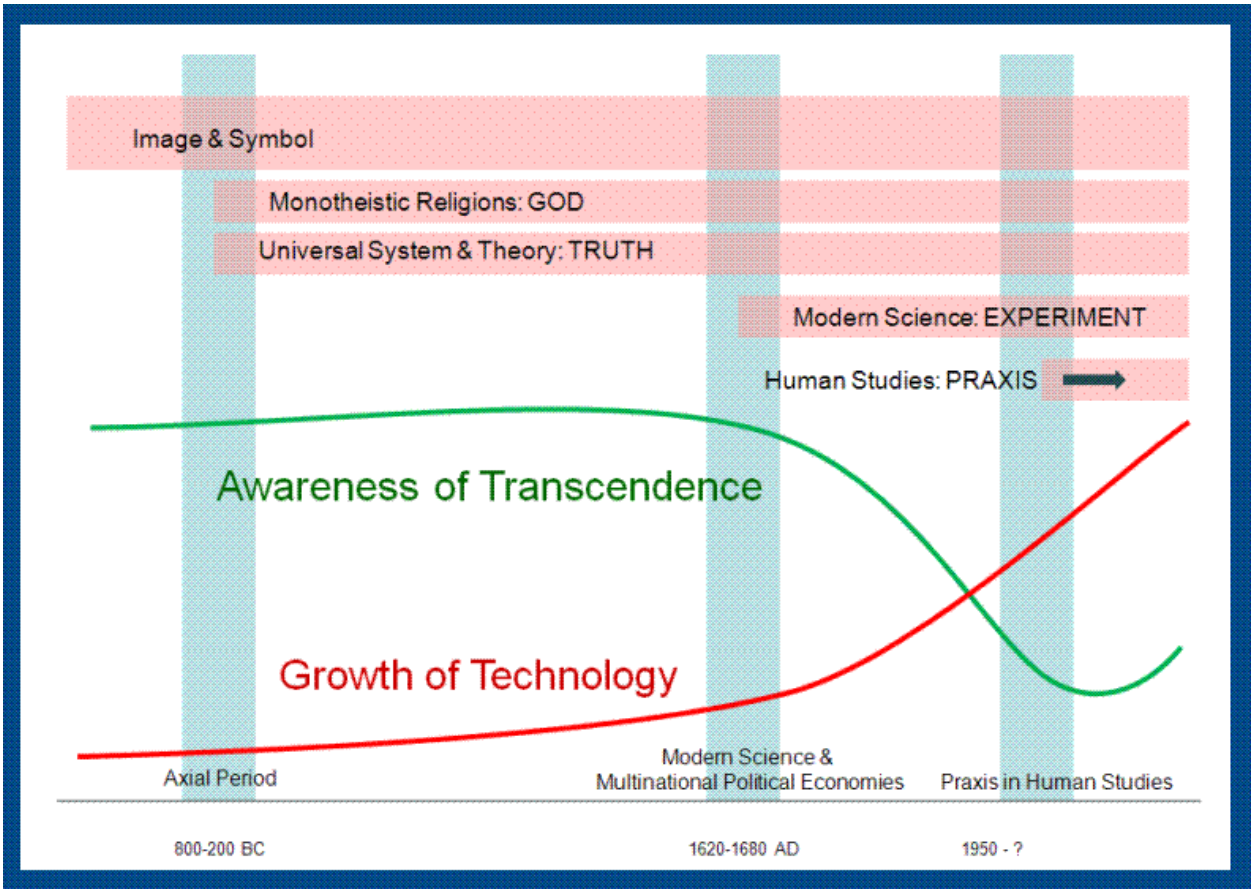
Give one example of how praxis thinking affects human studies.

Next: Conclusion …

Conclusion

A Graphical Overview

First, here is a graph that gives an overview of this history of technology and our human condition:



- The pink horizontal bars represent four major developments in our "human condition"—developments mainly in how we *think.*
- The blue vertical bars represent the three revolutions that launched the latter four new ways of thinking.
- The green curve represents a general global awareness of a transcendent dimension to our human condition—where the drop in this awareness represents a "secularism" in thinking.
- The red curve represents the growth in technology.

Concluding Summary

We began by asking, What have we forgotten and what do we need to learn? Here is a summary of what we found:

1. We forgot that the nobility of our human condition lies in our self-transcending nature. This means that the best parts of our nature involve learning more, doing better, and loving widely.
2. We need to learn how to recover our sense of transcendence in an age of modern science and political economies.

Never before in history has technology been so promising and yet so threatening for our human condition. But it is not technology that is the source of either the promise or the threat. The source is, as always, the human heart, for which technology is merely an instrument. The glowing promises of technology can be realized and its dire threats reduced only by a realization that the full dignity of our human condition lies in being self-transcending rather than being self-absorbed. Today, we aim to realize that self-transcendence in three ways:

By learning more about science, technology, and political economies

By doing better in distributing the benefits of technology fairly

By widening our love to include every individual on the globe, to dissolve all types of loyalism and hatred, and to engage at least the question of a loving God if not the reality

Appendix: Complete Study Guide

Introduction

What are the four main developments in how we think?

What are the two main developments in the evolution of technology?

1. Images and Symbols

What is the main difference between technique and technology?

If early humans did not distinguish between "natural" and "supernatural," how did they divide up the world?

In what sense did early humans believe in "magic"?

2. Universal Order & Theory

When was the "axial period" and what happened during it?

What is the "experience of transcendence"?

Where did Socrates find universal moral norms?

Where did the Hebrews find universal moral norms?

What is the goal of "deductive" science?

How long did thinkers rely mainly on deductive science to understand the world?

3. Experiment & Plausibility

What is the goal of inductive thinking?

What did modern science lead some people to believe about history itself?

What disenchanted people about modern science?

How does technology relate to modern science?

How did Adam Smith see the relationship between an economy and government?

How do political economies in developed countries continue to "enchant" people?

What disenchanted people about political economies?

How does technology relate to political economies?

4. Praxis & Human Studies

How do the goals of our social institutions differ from those of our cultural institutions?

What "axial period" discovery did we forget?

In what two forms does this forgetfulness show today?

What are the three phases of "praxis" thinking?

Is praxis thinking more inductive or more deductive?

Give one example of how praxis thinking affects human studies.

Notes

[1] Diamond, Jared. "Vengeance is Ours," *The New Yorker,* April 21, 2008, pp. 74-87, at 77.

[2] "…the production of standardized things by persons also demands the production of standardized persons." Van den Haage, Ernest, "Of Happiness and of Despair We Have No Measure," *Man Alone: Alienation in Modern Society,* eds. Eric and Mary Josephson (Dell Laurel Paperback, 1971)*,* p. 184.

[3] See Lonergan, Bernard, "Sacralization and Secularization," *Philosophical and Theological Papers: 1965-1980,* v. 17 of the Collected Works of Bernard Lonergan, eds. R. Doran and R. Croken (Toronto: University of Toronto Press, 2004), 259-281, at 278. Originally delivered at Trinity College, Toronto, November 1973. I have abbreviated the terminology for the developments in modes of thought.

[4] In the late 1800s, a similar revolution occurred in the scholarly disciplines of history, literature, and biography, namely, accounts that represent best available opinions based on evidence.

[5] See Malinowski, B., *Magic, Science and Religion (*New York: Doubleday, Anchor, 1954), pp. 17 ff. For early developments of meaning, see, Lonergan, B., *Method in Theology* (New York: Herder and Herder, 1972)*,* pp. 85-93. For early views on religion, see Dawson, Christopher, *Age of the Gods* (New York: Sheed & Ward, 1933).

[6] These and later dates of technological developments are taken from "technology, history of." *Encyclopædia Britannica*. Standard Edition (Chicago: Encyclopædia Britannica, 2008).

[7] Jaspers, Karl; Bullock, Michael (Tr.) (1953). *The Origin and Goal of History* (1st English ed.). London: Routledge and Keegan Paul. LCCN 53001441. Originally published as Jaspers, Karl (1949). *Vom Ursprung und Ziel der Geschichte* (1st ed.). München: Piper Verlag. LCCN 49057321.

8 For an overview of Jasper's theory of an Axial Period, see http://www.bartleby.com/67/68.html

[9.] *Way to Wisdom: Introduction to Philosophy*, 2nd ed. (New Haven: Yale University Press, 2003). p. 100. Cited by Peter von Sivers, "All and Nothing: Reflections on Experience and Transcendence in the Eurasian Axial Age, c. 800-200 BCE." Retrieved on April 24, 2008 from www.artsci.lsu.edu/voegelin/EVS/2006%20Papers/Peter%20Sivers.htm

[10] Aristotle identified four kinds of causes—material, efficient, formal and final. For example of Aristotle's four causes, consider a hammer. The material cause is wood and stone; the efficient cause is the person who made the hammer. The formal cause is the idea of an instrument for pounding. The final cause is the purpose—to pound nails or smash wood.

[11] This quotation from Aristotle was retried from http://classics.mit.edu/Aristotle/physics.1.i.html.

[12] In particular, Euclid's (d. 320 BC) principles of mathematics, and Archimedes' (d. 270 BC) principles of mathematics, hydraulics, and mechanics.

[13] Butterfield, Herbert, *The Origins of Modern Science 1300-1800,* Revised edition (New York, 1966) p. 7. Cited by Bernard Lonergan in "The Absence of God in Modern Culture," *A Second Collection,* eds. W.F.J Ryan and B.J. Tyrrell, (London: Darton, Longman & Todd, 1974) p. 103

[14] From Bacon's *The Advancement of Learning.* Book 2, Section 7, #1. *See* http://darkwing.uoregon.edu/~rbear/adv2.htm.

[15] *Ibid.* Aphorism XCV.

[16] Newton's laws of gravity do not explain subatomic movements, so there are efforts to propose theories that explain everything, from subatomic to astronomic levels. Darwin's theory of evolution explains why less fit species become extinct, but not how highly complex neural systems arise in apparent defiance of statistical odds.

[17] For a fascinating account of these times and specific breakthroughs, see Richard Holmes, *The Age of Wonder: How the Romantic Generation Discovered the Beauty and Terror of Science* (New York: Pantheon, 2008).

[18] "Historically, then, modern science grew out of an opposition to Aristotle. Further, its development and its success are to a great extent due to the ground rule of the Royal Society that excluded from consideration questions that could not be settled by an appeal to observation or experiment." See Bernard Lonergan, "Absence of God in Modern Culture," *A Second Collection,* eds. W.F.J. Ryan and B.J. Tyrrell (London: Darton, Longman & Todd, 1974), pp. 101-118, at p. 106. Also, see historical materials on the website of the Royal Society at http://royalsociety.org/page.asp?id=1058

[19] The idea of automatic progress met with strong resistance. See "Quarrel between the Ancients and the Moderns," about the debate, beginning in the late 1600s, whether we should look to past giants for knowledge (such as Aristotle and Homer) or to scientific experiments leading to future knowledge. See www.phil.unt.edu/resources/syllabi/fall05/ErinDaly.pdf. See also, Morris Ginsbert, "Progress in the Modern Era," *Dictionary of the History of Ideas, III,* (1973), 638-40.

[20] For an overview of Adam Smith's economic theory, see http://plus.maths.org/issue14/features/smith/.

[21] The expression, "global reach" was brought to public awareness by Richard J. Barnet and Ronald E. Miller, in their book, *Global Reach: The Power of the Multinational Corporations* (New York: Simon and Schuster, 1974).

[22] These effects of modern science effected similar transformations on the social institutions of laws, financing, and marketing, but these are beyond the scope of this paper.

[23] By stressing agnosticism, I don't mean to rule out an atheism that explicitly denies God's existence. I just see more hope in leading agnostics to discover the question of God in their personal experience than in any debate about truth and falsehood regarding God's existence.

[24] See Bernard Lonergan, "Theology and Praxis" in *A Third Collection,* ed. F.E. Crowe (New York: Paulist Press, 1984), pp. 184-201.

[25] Ricoeur's approach is often referred to as a "hermeneutics of suspicion and recovery." See Paul Ricoeur, *Freud and Philosophy: An Essay on Interpretation,* tr. Denis Savage (New Haven: Yale University Press, 1970).

[26] Eric Voegelin, *Order and History,* vv 1-5 (Louisiana State University Press, 1956-1985). A more compendious view of his philosophy can be found in his *The New Science of Politics* (Chicago: University of Chicago Press, 1952).

[27] For a brief synopsis of Lonergan's work, see my article, "Bernard Lonergan (1904-1984" in *The Internet Encyclopedia of Philosophy:* www.iep.utm.edu/l/lonergan.htm.

[28] See Bernard Lonergan, *For a New Political Economy,* and *Macroeconomic Dynamics: An Essay in Circulation Analysis,* vols. 21 and 15, respectively, of The Collected Works of Bernard Lonergan (Toronto: University of Toronto Press, 1998 and 1999).