Technopoly

THE SURRENDER OF CULTURE TO TECHNOLOGY

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Contents

Introduction

In 1959, Sir Charles Snow published *The Two Cultures and the Scientific Revolution,* which was both the title and the subject of the Rede Lecture he had given earlier at Cambridge University. The lecture was intended to illuminate what Sir Charles saw as a great problem of our age—the opposition of art and science, or, more precisely, the implacable hostility between literary intellectuals (sometimes called humanists) and physical scientists. The publication of the book caused a small rumble among academics (let us say, a 2.3 on the Richter Scale), not least because Snow came down so firmly on the side of the scientists, giving humanists ample reason and openings for sharp, funny, and nasty ripostes. But the controversy did not last long, and the book quickly faded from view. For good reason. Sir Charles had posed the wrong question, given the wrong argument, and therefore offered an irrelevant answer. Humanists and scientists have no quarrel, at least none that is of sufficient interest to most people.

Nonetheless, to Snow must go some considerable credit for noticing that there *are* two cultures, that they are in fierce opposition to each other, and that it is necessary for a great debate to ensue about the matter. Had he been attending less to the arcane dissatisfactions of those who dwell in faculty clubs and more to the lives of those who

have never been in one, he would surely have seen that the argument is not between humanists and scientists but between technology and everybody else. This is not to say that "everybody else" recognizes this. In fact, most people believe that technology is a staunch friend. There are two reasons for this. First, technology *is* a friend. It makes life easier, cleaner, and longer. Can anyone ask more of a friend? Second, because of its lengthy, intimate, and inevitable relationship with culture, technology does not invite a close examination of its own consequences. It is the kind of friend that asks for trust and obedience, which most people are inclined to give because its gifts are truly bountiful. But, of course, there is a dark side to this friend. Its gifts are not without a heavy cost. Stated in the most dramatic terms, the accusation can be made that the uncontrolled growth of technology destroys the vital sources of our humanity. It creates a culture without a moral foundation. It undermines certain mental processes and social relations that make human life worth living. Technology, in sum, is both friend and enemy.

This book attempts to describe when, how, and why technology became a particularly dangerous enemy. The case has been argued many times before by authors of great learning and conviction—in our own time by Lewis Mumford, Jacques Ellul, Herbert Read, Arnold Gehlen, Ivan Illich, to name a few. The argument was interrupted only briefly by Snow's irrelevancies and has continued into our own time with a sense of urgency, made even more compelling by America's spectacular display of technological pre-eminence in the Iraqi war. I do not say

here that the war was unjustified or that the technology was misused, only that the American success may serve as a confirmation of the catastrophic idea that in peace as well as war technology will be our savior.

1

The Judgment Of Thamus

You will find in Plato's *Phaedrus* a story about Thamus, the king of a great city of Upper Egypt. For people such as ourselves, who are inclined (in Thoreau's phrase) to be tools of our tools, few legends are more instructive than his. The story, as Socrates tells it to his friend Phaedrus, unfolds in the following way: Thamus once entertained the god Theuth, who was the inventor of many things, including number, calculation, geometry, astronomy, and writing. Theuth exhibited his inventions to King Thamus, claiming that they should be made widely known and available to Egyptians. Socrates continues:

> Thamus inquired into the use of each of them, and as Theuth went through them expressed approval or disapproval, according as he judged Theuth's claims to be well or ill founded. It would take too long to go through all that Thamus is reported to have said for and against each of Theuth's inventions. But when it came to writing, Theuth declared, "Here is an accomplishment, my lord the King, which will improve both the wisdom and the memory of the Egyptians. I have discovered a sure receipt for memory and wisdom." To this, Thamus replied, "Theuth, my paragon of inventors, the discoverer of an art is not the best

judge of the good or harm which will accrue to those who practice it. So it is in this; you, who are the father of writing, have out of fondness for your off-spring attributed to it quite the opposite of its real function. Those who acquire it will cease to exercise their memory and become forgetful; they will rely on writing to bring things to their remembrance by external signs instead of by their own internal resources. What you have discovered is a receipt for recollection, not for memory. And as for wisdom, your pupils will have the reputation for it without the reality: they will receive a quantity of information without proper instruction, and in consequence be thought very knowledgeable when they are for the most part quite ignorant. And because they are filled with the conceit of wisdom instead of real wisdom they will be a burden to society."[1]

I begin my book with this legend because in Thamus' response there are several sound principles from which we may begin to learn how to think with wise circumspection about a technological society. In fact, there is even one error in the judgment of Thamus, from which we may also learn something of importance. The error is not in his claim that writing will damage memory and create false wisdom. It is demonstrable that writing has had such an effect. Thamus' error is in his believing that writing will be a burden to society and *nothing but a burden*. For all his wisdom, he fails to imagine what writing's benefits might be, which, as we know, have been considerable. We may learn from this that it is a mistake to suppose that any technological innovation has a one-sided effect. Every technology is both a burden and a blessing; not either-or,

but this-and-that.

Nothing could be more obvious, of course, especially to those who have given more than two minutes of thought to the matter. Nonetheless, we are currently surrounded by throngs of zealous Theuths, one-eyed prophets who see only what new technologies can do and are incapable of imagining what they will *undo*. We might call such people Technophiles. They gaze on technology as a lover does on his beloved, seeing it as without blemish and entertaining no apprehension for the future. They are therefore dangerous and are to be approached cautiously. On the other hand, some one-eyed prophets, such as I (or so I am accused), are inclined to speak only of burdens (in the manner of Thamus) and are silent about the opportunities that new technologies make possible. The Technophiles must speak for themselves, and do so all over the place. My defense is that a dissenting voice is sometimes needed to moderate the din made by the enthusiastic multitudes. If one is to err, it is better to err on the side of Thamusian skepticism. But it is an error nonetheless. And I might note that, with the exception of his judgment on writing, Thamus does not repeat this error. You might notice on rereading the legend that he gives arguments *for* and *against* each of Theuth's inventions. For it is inescapable that every culture must negotiate with technology, whether it does so intelligently or not. A bargain is struck in which technology giveth and technology taketh away. The wise know this well, and are rarely impressed by dramatic technological changes, and never overjoyed. Here, for example, is Freud on the matter, from his doleful

Civilization and Its Discontents:

> One would like to ask: is there, then, no positive gain in pleasure, no unequivocal increase in my feeling of happiness, if I can, as often as I please, hear the voice of a child of mine who is living hundreds of miles away or if I can learn in the shortest possible time after a friend has reached his destination that he has come through the long and difficult voyage unharmed? Does it mean nothing that medicine has succeeded in enormously reducing infant mortality and the danger of infection for women in childbirth, and, indeed, in considerably lengthening the average life of a civilized man?

Freud knew full well that technical and scientific advances are not to be taken lightly, which is why he begins this passage by acknowledging them. But he ends it by reminding us of what they have undone:

> If there had been no railway to conquer distances, my child would never have left his native town and I should need no telephone to hear his voice; if travelling across the ocean by ship had not been introduced, my friend would not have embarked on his sea-voyage and I should not need a cable to relieve my anxiety about him. What is the use of reducing infantile mortality when it is precisely that reduction which imposes the greatest restraint on us in the begetting of children, so that, taken all round, we nevertheless rear no more children than in the days before the reign of hygiene, while at the same time we have created difficult conditions for our sexual life in marriage…. And, finally, what good to us is a long life if it is difficult and barren of joys, and if it is so full of misery that we can only welcome

death as a deliverer?[2]

In tabulating the cost of technological progress, Freud takes a rather depressing line, that of a man who agrees with Thoreau's remark that our inventions are but improved means to an unimproved end. The Technophile would surely answer Freud by saying that life has always been barren of joys and full of misery but that the telephone, ocean liners, and especially the reign of hygiene have not only lengthened life but made it a more agreeable proposition. That is certainly an argument I would make (thus proving I am no one-eyed Technophobe), but it is not necessary at this point to pursue it. I have brought Freud into the conversation only to show that a wise man—even one of such a woeful countenance—must begin his critique of technology by acknowledging its successes. Had King Thamus been as wise as reputed, he would not have forgotten to include in his judgment a prophecy about the powers that writing would enlarge. There is a calculus of technological change that requires a measure of even-handedness.

So much for Thamus' error of omission. There is another omission worthy of note, but it is no error. Thamus simply takes for granted—and therefore does not feel it necessary to say—that writing is not a neutral technology whose good or harm depends on the uses made of it. He knows that the uses made of any technology are largely determined by the structure of the technology itself—that is, that its functions follow from its form. This is why Thamus is concerned not with *what*

people will write; he is concerned *that* people will write. It is absurd to imagine Thamus advising, in the manner of today's standard-brand Technophiles, that, if only writing would be used for the production of certain kinds of texts and not others (let us say, for dramatic literature but not for history or philosophy), its disruptions could be minimized. He would regard such counsel as extreme naïveté. He would allow, I imagine, that a technology may be barred entry to a culture. But we may learn from Thamus the following: once a technology is admitted, it plays out its hand; it does what it is designed to do. Our task is to understand what that design is—that is to say, when we admit a new technology to the culture, we must do so with our eyes wide open.

All of this we may infer from Thamus' silence. But we may learn even more from what he does say than from what he doesn't. He points out, for example, that writing will change what is meant by the words "memory" and "wisdom." He fears that memory will be confused with what he disdainfully calls "recollection," and he worries that wisdom will become indistinguishable from mere knowledge. This judgment we must take to heart, for it is a certainty that radical technologies create new definitions of old terms, and that this process takes place without our being fully conscious of it. Thus, it is insidious and dangerous, quite different from the process whereby new technologies introduce new terms to the language. In our own time, we have consciously added to our language thousands of new words and phrases having to do with new technologies—"VCR," "binary digit,"

"software," "front-wheel drive," "window of opportunity," "Walkman," etc. We are not taken by surprise at this. New things require new words. But new things also modify old words, words that have deep-rooted meanings. The telegraph and the penny press changed what we once meant by "information." Television changes what we once meant by the terms "political debate," "news," and "public opinion." The computer changes "information" once again. Writing changed what we once meant by "truth" and "law"; printing changed them again, and now television and the computer change them once more. Such changes occur quickly, surely, and, in a sense, silently. Lexicographers hold no plebiscites on the matter. No manuals are written to explain what is happening, and the schools are oblivious to it. The old words still look the same, are still used in the same kinds of sentences. But they do not have the same meanings; in some cases, they have opposite meanings. And this is what Thamus wishes to teach us—that technology imperiously commandeers our most important terminology. It redefines "freedom," "truth," "intelligence," "fact," "wisdom," "memory," "history"—all the words we live by. And it does not pause to tell us. And we do not pause to ask.

This fact about technological change requires some elaboration, and I will return to the matter in a later chapter. Here, there are several more principles to be mined from the judgment of Thamus that require mentioning because they presage all I will write about. For instance, Thamus warns that the pupils of Theuth will develop an undeserved reputation for wisdom. He means

to say that those who cultivate competence in the use of a new technology become an elite group that are granted undeserved authority and prestige by those who have no such competence. There are different ways of expressing the interesting implications of this fact. Harold Innis, the father of modern communication studies, repeatedly spoke of the "knowledge monopolies" created by important technologies. He meant precisely what Thamus had in mind: those who have control over the workings of a particular technology accumulate power and inevitably form a kind of conspiracy against those who have no access to the specialized knowledge made available by the technology. In his book *The Bias of Communication*, Innis provides many historical examples of how a new technology "busted up" a traditional knowledge monopoly and created a new one presided over by a different group. Another way of saying this is that the benefits and deficits of a new technology are not distributed equally. There are, as it were, winners and losers. It is both puzzling and poignant that on many occasions the losers, out of ignorance, have actually cheered the winners, and some still do.

Let us take as an example the case of television. In the United States, where television has taken hold more deeply than anywhere else, many people find it a blessing, not least those who have achieved high-paying, gratifying careers in television as executives, technicians, newscasters, and entertainers. It should surprise no one that such people, forming as they do a new knowledge monopoly, should cheer themselves and defend and

promote television technology. On the other hand and in the long run, television may bring a gradual end to the careers of schoolteachers, since school was an invention of the printing press and must stand or fall on the issue of how much importance the printed word has. For four hundred years, schoolteachers have been part of the knowledge monopoly created by printing, and they are now witnessing the breakup of that monopoly. It appears as if they can do little to prevent that breakup, but surely there is something perverse about schoolteachers' being enthusiastic about what is happening. Such enthusiasm always calls to my mind an image of some turn-of-the-century blacksmith who not only sings the praises of the automobile but also believes that his business will be enhanced by it. We know now that his business was not enhanced by it; it was rendered obsolete by it, as perhaps the clearheaded blacksmiths knew. What could they have done? Weep, if nothing else.

We have a similar situation in the development and spread of computer technology, for here too there are winners and losers. There can be no disputing that the computer has increased the power of large-scale organizations like the armed forces, or airline companies or banks or tax-collecting agencies. And it is equally clear that the computer is now indispensable to high-level researchers in physics and other natural sciences. But to what extent has computer technology been an advantage to the masses of people? To steelworkers, vegetable-store owners, teachers, garage mechanics, musicians, bricklayers, dentists, and most of the rest into whose lives

the computer now intrudes? Their private matters have been made more accessible to powerful institutions. They are more easily tracked and controlled; are subjected to more examinations; are increasingly mystified by the decisions made about them; are often reduced to mere numerical objects. They are inundated by junk mail. They are easy targets for advertising agencies and political organizations. The schools teach their children to operate computerized systems instead of teaching things that are more valuable to children. In a word, almost nothing that they need happens to the losers. Which is why they are losers.

It is to be expected that the winners will encourage the losers to be enthusiastic about computer technology. That is the way of winners, and so they sometimes tell the losers that with personal computers the average person can balance a checkbook more neatly, keep better track of recipes, and make more logical shopping lists. They also tell them that their lives will be conducted more efficiently. But discreetly they neglect to say from whose point of view the efficiency is warranted or what might be its costs. Should the losers grow skeptical, the winners dazzle them with the wondrous feats of computers, almost all of which have only marginal relevance to the quality of the losers' lives but which are nonetheless impressive. Eventually, the losers succumb, in part because they believe, as Thamus prophesied, that the specialized knowledge of the masters of a new technology is a form of wisdom. The masters come to believe this as well, as Thamus also prophesied. The result is that certain

questions do not arise. For example, to whom will the technology give greater power and freedom? And whose power and freedom will be reduced by it?

I have perhaps made all of this sound like a well-planned conspiracy, as if the winners know all too well what is being won and what lost. But this is not quite how it happens. For one thing, in cultures that have a democratic ethos, relatively weak traditions, and a high receptivity to new technologies, everyone is inclined to be enthusiastic about technological change, believing that its benefits will eventually spread evenly among the entire population. Especially in the United States, where the lust for what is new has no bounds, do we find this childlike conviction most widely held. Indeed, in America, social change of any kind is rarely seen as resulting in winners and losers, a condition that stems in part from Americans' much-documented optimism. As for change brought on by technology, this native optimism is exploited by entrepreneurs, who work hard to infuse the population with a unity of improbable hope, for they know that it is economically unwise to reveal the price to be paid for technological change. One might say, then, that, if there is a conspiracy of any kind, it is that of a culture conspiring against itself.

In addition to this, and more important, it is not always clear, at least in the early stages of a technology's intrusion into a culture, who will gain most by it and who will lose most. This is because the changes wrought by technology are subtle if not downright mysterious, one might even say wildly unpredictable. Among the most

unpredictable are those that might be labeled ideological. This is the sort of change Thamus had in mind when he warned that writers will come to rely on external signs instead of their own internal resources, and that they will receive quantities of information without proper instruction. He meant that new technologies change what we mean by "knowing" and "truth"; they alter those deeply embedded habits of thought which give to a culture its sense of what the world is like—a sense of what is the natural order of things, of what is reasonable, of what is necessary, of what is inevitable, of what is real. Since such changes are expressed in changed meanings of old words, I will hold off until later discussing the massive ideological transformation now occurring in the United States. Here, I should like to give only one example of how technology creates new conceptions of what is real and, in the process, undermines older conceptions. I refer to the seemingly harmless practice of assigning marks or grades to the answers students give on examinations. This procedure seems so natural to most of us that we are hardly aware of its significance. We may even find it difficult to imagine that the number or letter is a tool or, if you will, a technology; still less that, when we use such a technology to judge someone's behavior, we have done something peculiar. In point of fact, the first instance of grading students' papers occurred at Cambridge University in 1792 at the suggestion of a tutor named William Farish.[3] No one knows much about William Farish; not more than a handful have ever heard of him. And yet his idea that a quantitative value should be

aphorism "The medium is the message." This is what Marx meant when he said, "Technology discloses man's mode of dealing with nature" and creates the "conditions of intercourse" by which we relate to each other. It is what Wittgenstein meant when, in referring to our most fundamental technology, he said that language is not merely a vehicle of thought but also the driver. And it is what Thamus wished the inventor Theuth to see. This is, in short, an ancient and persistent piece of wisdom, perhaps most simply expressed in the old adage that, to a man with a hammer, everything looks like a nail. Without being too literal, we may extend the truism: To a man with a pencil, everything looks like a list. To a man with a camera, everything looks like an image. To a man with a computer, everything looks like data. And to a man with a grade sheet, everything looks like a number.

But such prejudices are not always apparent at the start of a technology's journey, which is why no one can safely conspire to be a winner in technological change. Who would have imagined, for example, whose interests and what world-view would be ultimately advanced by the invention of the mechanical clock? The clock had its origin in the Benedictine monasteries of the twelfth and thirteenth centuries. The impetus behind the invention was to provide a more or less precise regularity to the routines of the monasteries, which required, among other things, seven periods of devotion during the course of the day. The bells of the monastery were to be rung to signal the canonical hours; the mechanical clock was the technology that could provide precision to these rituals of

devotion. And indeed it did. But what the monks did not foresee was that the clock is a means not merely of keeping track of the hours but also of synchronizing and controlling the actions of men. And thus, by the middle of the fourteenth century, the clock had moved outside the walls of the monastery, and brought a new and precise regularity to the life of the workman and the merchant. "The mechanical clock," as Lewis Mumford wrote, "made possible the idea of regular production, regular working hours and a standardized product." In short, without the clock, capitalism would have been quite impossible.[4] The paradox, the surprise, and the wonder are that the clock was invented by men who wanted to devote themselves more rigorously to God; it ended as the technology of greatest use to men who wished to devote themselves to the accumulation of money. In the eternal struggle between God and Mammon, the clock quite unpredictably favored the latter.

Unforeseen consequences stand in the way of all those who think they see clearly the direction in which a new technology will take us. Not even those who invent a technology can be assumed to be reliable prophets, as Thamus warned. Gutenberg, for example, was by all accounts a devout Catholic who would have been horrified to hear that accursed heretic Luther describe printing as "God's highest act of grace, whereby the business of the Gospel is driven forward." Luther understood, as Gutenberg did not, that the mass-produced book, by placing the Word of God on every kitchen table, makes each Christian his own theologian—one might even

considered a success. The type who is now successful may be regarded as a handicapped learner—slow to respond, far too detached, lacking in emotion, inadequate in creating mental pictures of reality. Consider: what Thamus called the "conceit of wisdom"—the unreal knowledge acquired through the written word— eventually became the pre-eminent form of knowledge valued by the schools. There is no reason to suppose that such a form of knowledge must always remain so highly valued.

To take another example: In introducing the personal computer to the classroom, we shall be breaking a four-hundred-year-old truce between the gregariousness and openness fostered by orality and the introspection and isolation fostered by the printed word. Orality stresses group learning, cooperation, and a sense of social responsibility, which is the context within which Thamus believed proper instruction and real knowledge must be communicated. Print stresses individualized learning, competition, and personal autonomy. Over four centuries, teachers, while emphasizing print, have allowed orality its place in the classroom, and have therefore achieved a kind of pedagogical peace between these two forms of learning, so that what is valuable in each can be maximized. Now comes the computer, carrying anew the banner of private learning and individual problem-solving. Will the widespread use of computers in the classroom defeat once and for all the claims of communal speech? Will the computer raise egocentrism to the status of a virtue?

These are the kinds of questions that technological change brings to mind when one grasps, as Thamus did, that technological competition ignites total war, which means it is not possible to contain the effects of a new technology to a limited sphere of human activity. If this metaphor puts the matter too brutally, we may try a gentler, kinder one: Technological change is neither additive nor subtractive. It is ecological. I mean "ecological" in the same sense as the word is used by environmental scientists. One significant change generates total change. If you remove the caterpillars from a given habitat, you are not left with the same environment minus caterpillars: you have a new environment, and you have reconstituted the conditions of survival; the same is true if you add caterpillars to an environment that has had none. This is how the ecology of media works as well. A new technology does not add or subtract something. It changes everything. In the year 1500, fifty years after the printing press was invented, we did not have old Europe plus the printing press. We had a different Europe. After television, the United States was not America plus television; television gave a new coloration to every political campaign, to every home, to every school, to every church, to every industry. And that is why the competition among media is so fierce. Surrounding every technology are institutions whose organization—not to mention their reason for being—reflects the world-view promoted by the technology. Therefore, when an old technology is assaulted by a new one, institutions are threatened. When institutions are threatened, a culture

singing and the telling and the muse cease; that is, the conditions for epic poetry disappear?"[1]

By connecting technological conditions to symbolic life and psychic habits, Marx was doing nothing unusual. Before him, scholars found it useful to invent taxonomies of culture based on the technological character of an age. And they do it still, for the practice is something of a persistent scholarly industry. We think at once of the best-known classification: the Stone Age, the Bronze Age, the Iron Age, the Steel Age. We speak easily of the Industrial Revolution, a term popularized by Arnold Toynbee, and, more recently, of the Post-Industrial Revolution, so named by Daniel Bell. Oswald Spengler wrote of the Age of Machine Technics, and C. S. Peirce called the nineteenth century the Railway Age. Lewis Mumford, looking at matters from a longer perspective, gave us the Eotechnic, the Paleotechnic, and the Neotechnic Ages. With equally telescopic perspective, José Ortega y Gasset wrote of three stages in the development of technology: the age of technology of chance, the age of technology of the artisan, the age of technology of the technician. Walter Ong has written about Oral cultures, Chirographic cultures, Typographic cultures, and Electronic cultures. McLuhan himself introduced the phrase "the Age of Gutenberg" (which, he believed, is now replaced by the Age of Electronic Communication).

I find it necessary, for the purpose of clarifying our present situation and indicating what dangers lie ahead, to create still another taxonomy. Cultures may be classified into three types: tool-using cultures,

technocracies, and technopolies. At the present time, each type may be found somewhere on the planet, although the first is rapidly disappearing: we must travel to exotic places to find a tool-using culture.[2] If we do, it is well to go armed with the knowledge that, until the seventeenth century, all cultures were tool-users. There was, of course, considerable variation from one culture to another in the tools that were available. Some had only spears and cooking utensils. Some had water mills and coal- and horsepower. But the main characteristic of all tool-using cultures is that their tools were largely invented to do two things: to solve specific and urgent problems of physical life, such as in the use of waterpower, windmills, and the heavy-wheeled plow; or to serve the symbolic world of art, politics, myth, ritual, and religion, as in the construction of castles and cathedrals and the development of the mechanical clock. In either case, tools did not attack (or, more precisely, were not intended to attack) the dignity and integrity of the culture into which they were introduced. With some exceptions, tools did not prevent people from believing in their traditions, in their God, in their politics, in their methods of education, or in the legitimacy of their social organization. These beliefs, in fact, *directed* the invention of tools and limited the uses to which they were put. Even in the case of military technology, spiritual ideas and social customs acted as controlling forces. It is well known, for example, that the uses of the sword by samurai warriors were meticulously governed by a set of ideals known as Bushido, or the Way of the Warrior. The rules and rituals specifying when,

where, and how the warrior must use either of his two swords (the *katana*, or long sword, and the *wakizashi*, or short sword) were precise, tied closely to the concept of honor, and included the requirement that the warrior commit seppuku or hara-kiri should his honor be compromised. This sort of governance of military technology was not unknown in the Western world. The use of the lethal crossbow was prohibited, under threat of anathema, by Pope Innocent II in the early twelfth century. The weapon was judged to be "hateful to God" and therefore could not be used against Christians. That it could be used against Muslims and other infidels does not invalidate the point that in a tool-using culture technology is not seen as autonomous, and is subject to the jurisdiction of some binding social or religious system.

Having defined tool-using cultures in this manner, I must add two points so as to avoid excessive oversimplification. First, the quantity of technologies available to a tool-using culture is not its defining characteristic. Even a superficial study of the Roman Empire, for example, reveals the extent to which it relied on roads, bridges, aqueducts, tunnels, and sewers for both its economic vitality and its military conquests. Or, to take another example, we know that, between the tenth and thirteenth centuries, Europe underwent a technological boom: medieval man was surrounded by machines.[3] One may even go as far as Lynn White, Jr., who said that the Middle Ages gave us for the first time in history "a complex civilization which rested not on the backs of sweating slaves or coolies but primarily on non-human