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Unrivaled in scope and valuable editorial contents, Philosophy of Technology: The Technological Condition remains the most comprehensive anthology of philosophy of technology available. This second edition includes new and updated material on recent developments in the field, along with the editors’ insightful critical introductions to each topic. The combination of seminal essays with a fresh selection of contemporary material reflects changes in the field and in the world since the appearance of the first edition. In addition to its analysis of the familiar political, social, cultural, and engineering contexts affecting the nature of technology, the volume includes a thorough examination of the influence of technology on historical, metaphysical, and epistemological concerns. It moves from readings on traditional concepts of technē, natural knowledge, and human nature to the latest assessments of inherited paradigms, rooted in Enlightenment thinking, concerning science, technology, and the philosophy of technology. A substantial portion of the anthology focuses on Heidegger's writings on technology and their influence, and on a variety of questions animated by his work that interrogate technology’s connection to the current human condition, especially in the developed world. Further essays consider the proper place of technological practice in human life, the apparent autonomy of technological forces, the idea of technology as a social practice and as a medium of political power, and technology's role as a model for contemporary conceptions of intelligence and information.

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Philosophy of Technology
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Introduction to the Second Edition

The first edition of this collection grew out of the editors' experienced needs as teachers of the philosophy of technology. Since its appearance, schools of thought and lines of research have started to differentiate themselves more clearly in this young field, new problems have been identified, and older ones reconceived. Our second edition takes many of these developments into account. Yet in certain basic ways, the original design of our anthology still seems right to us. Although the number of well-stocked anthologies has grown, we continue to believe that our collection best addresses two unfortunately common philosophical lacunae. First, most anthologies contain very little material from classical sources (e.g., Aristotle, Bacon, Kant, Comte, Marx) in terms of which technology, or basic concepts that contribute to our current ways of conceiving technological practices, are already discussed. Second, in many cases, the main focus is on specific technological issues and case studies, with the result – truth be told – that the selections are sometimes philosophically thin. In our view, especially when it comes to the philosophical consideration of technology, structuring an anthology after the familiar model of the applied ethics reader is likely to have unfortunate pedagogical consequences. In the typical application of this model, one starts with familiar, extra-philosophically identifiable “problems,” samples the variety of “values” or “criteria” in terms of which it has been claimed these problems can be handled, and then more or less leaves it up to the instructor to explain how philosophy somehow gets involved in testing the selection and “justification” of these values or criteria.

Regarding the philosophy of technology, however, we believe that this model gets things strategically backwards in important ways. One unintended consequence of its use is that it can leave students, especially those who have not had much previous exposure to philosophy, with the impression that philosophy mostly happens at the level of a “debate” among a smorgasbord of competing sets of values that themselves are somehow simply found, or “given” as logical or sociological options. This serves to confirm the popular non-philosophical conception of philosophy as a “belief system” that one already has or can pick out and thereafter “defend.” The whole idea of philosophy as a process of inquiry, or as critical self-discovery, or as involving a reflective struggle with inherited orientations, is thus muted or occluded. Moreover, as some of the authors below complain, the problems-model also has the effect of privileging one very familiar but perhaps not so innocent outlook regarding technological problems – namely, the idea that technology itself is not a problem, that it simply provides us with a collection of instrumental means, and that the main task is to decide what ends it should serve. To a significant number of philosophers of technology, this allegedly “neutral” interpretation of technology should itself be identified as a topic to be carefully questioned.

The second gap we have found in the available texts is a widespread failure to consider the question of the relation between contemporary technology and modern science. As pressing and immediate as the issues of, say, technology transfer, medical patients’ rights, informatics, and biotechnology clearly are, debates that stay at the level of these issues often silently perpetuate long-standing, deeply held, but now hotly contested assumptions about the nature of science, about the technological applications of science, and even about the proper place of science and technology within the larger scope
of human affairs. For example, is knowledge essentially connected to a drive for power, as Bacon claimed and Foucault still insists? Is technology primarily to be understood as “applied modern science,” or is the ancient human concern for “making” already implicated in the very development of science itself, as (in very different ways) Comte, Marx, Heidegger, Mumford, Arendt, and various sorts of pragmatists maintain? And should we expect, or do we even have a choice about, technological practices increasingly coming to define the nature and axiological direction of human life? Such questions simply cannot be addressed adequately if they are permitted to arise only between the lines of selections focused primarily on issues of how to control, modify, or conceptually clarify this or that specific political, ethical, aesthetic, or engineering problem.

With these concerns in mind, then, we have structured our revised anthology as we did the original—in a way that, with or without sharing our reasoning above, instructors have the option of making historical, metaphysical, and epistemological issues just as prominent as ethical, political, aesthetic, and engineering problems. Because we envision this text as useful for anything from introductory undergraduate courses to graduate seminars, our selections vary considerably in length and difficulty, and we have elected to place most of our introductory material at the beginning of the sections rather than all together in one opening essay. Here, we confine ourselves to a brief explanation of the general plan of the six main parts of the text.

The purpose of Part I is to provide a forum for some familiar voices in the Western philosophical tradition whose views about the relation between knowledge and its applications have played an important role in setting up the inherited context within which contemporary philosophy of technology takes its bearings. Our selections were made in a way that is also designed to encourage consideration of the question of why—in comparison to other philosophical topics—a philosophy specifically of technology is so relatively recent in origin.

Part II contains contemporary readings that especially emphasize and critically assess the basic assumptions handed down to us from the nineteenth century about science, the relation between modern science and technology, and philosophy’s proper treatment of both. We have divided this part into two sections. The first section provides a kind of mini-history of the rise and decline of logical positivist, or Vienna Circle, philosophy of science, together with the emergence of various postpositivist criticisms and alternatives. Our intention is to highlight the ways in which these alternatives all tend to stress the importance of precisely the social, cultural, and historical context of scientific practice that positivistic philosophy of science urges us to ignore. The readings in second section illustrate how stressing or ignoring this context directly affects how one conceives the nature of and the relation between the philosophies of science and of technology.

The readings in Part III illustrate what issues are at stake in trying to define technology, how unsettled and pluralistic are today’s attempts to do so, and the extent to which many recent efforts to define technology still tend, sometimes in spite of themselves, to reflect older, more traditional assumptions about what science is and how philosophy should approach it. In addition, these selections make it plain that, whether deliberately or unintentionally, efforts to define technology tend to take a stand on two controversial topics—namely, whether and how modern science has transformed “prescientific” technologies, and whether technology is essentially “applied science.”

Part IV reprints Martin Heidegger’s essay, “The Question Concerning Technology,” and a sampling of responses to it. Heidegger’s essay presents what is probably the single most influential—though by no means most popular—position in the field. Many of the issues discussed in the sections that follow, especially in Part VI, are framed in a way that reflects some species of agreement or disagreement with his views.

In Part V, the readings raise a cluster of general issues concerning technology’s proper role in mediating our relations with the natural world. One section considers the question of whether human beings are essentially just “tool-users” and thus most themselves when they are engaged in technological activities. A second section raises the issue of whether, as some writers have argued, the influence of technology in our lives is so strong and pervasive that it actually functions as a virtually autonomous force and makes all optimistic talk of “controlling” it seem naïve. The essays in the third section bring the issues of human nature and technological power together in relation to the widely debated ecological question of the legitimacy of the famous (or perhaps infamous and even male-gendered) Baconian imperative that encourages us to think of “knowledge” primarily as giving us the power to control our natural surroundings.

Part VI focuses on issues that arise when technology is viewed, not so much as an expression of human nature
or as an instrument for controlling nature, but rather as defining a specific and (at least in the so-called “developed” parts of the world) increasingly dominant kind of sociocultural practice. The essays in the first section all ask, in the words of one of the authors, what it is like to “be-with” technology, such that it mediates most of our relations not just with nature but also among ourselves. In “Technology and Cyberspace,” the second section, several authors consider the puzzling issue of whether the computer revolution promises to alter, like it or not, our basic notions of who we are, what a “mind” or “consciousness” is, and what it is to experience “reality.” A third section brings into focus a question implicit in numerous other readings, namely, what are the ramifications for the future of political democracy of our ever more predominantly technological forms of social practice?

Finally, we add a note of grateful acknowledgment. We would like to express our thanks to the publishers and other copyright holders who gave us reprint permission, and to the virtual army of persons who have encouraged and advised us in putting both the original and this revised text together. Among them are (with apologies to those we have inadvertently omitted) Thomas Achen, Babette Babich, Robert Crease, Fred Dallmayr, Jan Kyrre Berg Friis, Trish Glazebrook, Gert Goeminne, Donna Haraway, Patrick Heelan, Michael Heim, Don Ihde, David Kolb, Theodore Kisiel, Carolyn Merchant, David Richard Moore, Søren Riis, Robert Rosenberger, Joseph Rouse, Evan Selinger, Hans Siegfried, David Stone, Timm Triplett, Peter-Paul Verbeek, Kenneth Westphal, Michael Zimmerman, and the two sets of anonymous reviewers of each edition for Blackwell Publishers. Special thanks are due also to Andrew Feenberg for volunteering to produce a revised versions of “Democratic [originally, “Subversive”] Rationality: Technology, Power, and Freedom [originally, “Democracy”]; and to John McDermott for writing, on very short notice, a retrospective on his “Technology: The Opiate of the Intellectuals.” We are also grateful for the continuing support and patience of Jeff Dean, our Blackwell editor, who saw both manuscripts through the press, and Jennifer Bray and Janet Moth, our project editors for this edition. Let us add that we are painfully aware that in this rapidly growing field it is impossible for anyone to maintain a working knowledge of “everything important” that might be suitable for a reader such as ours. We therefore continue welcome all criticisms and suggestions about possible sins of omission as well as commission. And, of course, we ask that those we have thanked above be held blameless for this final product.
Part I

The Historical Background
At first glance, it may seem surprising that until recently, philosophers have not devoted much time to the question of technology. One might have thought that greater attention would at least have come to be paid to this phenomenon in the modern period when advances in natural and biological science increasingly and obviously made technology a central and dominant feature of society and culture. Yet the fact is that even today – in the North American and British mainstream of analytic philosophy and to a lesser extent among those influenced by late nineteenth- and twentieth-century postpositivist and Continental European sources – the philosophy of technology is still widely regarded as not much more than a small and not particularly prestigious area of specialization.

In part, the reasons for this secondary status for the philosophy of technology are reflected in the general features of modern intellectual history. In the Anglo-American empiricist, French Enlightenment, and European positivist traditions, technology is widely depicted as an unproblematically beneficial force for human progress. For these traditions, technology needs only the proper association with modern science to fulfill its promise; hence the genuinely philosophical issues lie primarily in the epistemology of science, which explains how genuine knowledge is to be obtained, and in ethics, which determines what that knowledge is for. With epistemology and ethics thus focused on the two central issues of what we can know and what we should do, technology falls through the cracks, understood as just the relatively neutral means for employing scientific knowledge to bring about the ideal relations in the natural and social world that ethical decisions prescribe. It is true that for the Romantic and post-Hegelian “Continental” traditions, this judgment must be qualified slightly, for in these traditions there is less inclination to conceive all knowledge according to the model of science or to conceive of science as an essentially progressive force. Yet science itself (especially natural science) is just as often viewed by them also in strictly instrumentalist terms, and technology is widely understood as simply applied science – with the difference being that the cultural implications of all this are more likely to be conceived in critical and pessimistic terms, not in the progressive or even utopian terms characteristic of the empiricist and positivist traditions.

To fully understand the philosophical neglect of technology, however, one must go back to ancient Greek thought and to the manner in which figures like Plato and Aristotle drew their distinctions between theoretical and practical understanding. There is no question, of course, that the ancients took the distinction seriously. It is known, for instance, that Plato’s teacher, Socrates (c. 470–399 BCE), often discussed this distinction. He insisted that the “craft” knowledge of farmers, shoemakers, and bakers, as well as physicians, is genuine knowledge. Socrates’ point, however, is one of criticism rather than defense. Craft knowledge consists primarily in a kind of technical understanding, limited to its concern with the pursuit of particular trades or practices. Unfortunately, those who possess such knowledge (and especially those...
who achieve worldly success because of it) are often misled into thinking they possess wisdom about life in general. Socrates is thus at pains to argue that practically oriented craft knowledge is in fact quite different from the knowledge of the good life that has always been the concern of the religious seers and poets. Plato (c.429–c.347 BCE), too, employs this general Socratic distinction of craft knowledge vs. knowledge of life; moreover, his dialogues are full of images of actual technological devices. The water clock, the astronomical orrery, and the mechanical puppet show all figure prominently as metaphors and models for several of his myths – for example, of cosmic creation in the Timaeus, the last judgment in the Republic, the history of the cosmos in the Statesman, and the shadow play of puppet-objects in the myth of the cave in the Republic’s account of the triumph of reason over sensual experience in genuine philosophical learning.

What Plato also makes explicit, however, is that the Socratic distinction between technical or craft knowledge, on the one hand, and knowledge of the good life, on the other, is fundamentally a distinction between two unequal phenomena. Craft knowledge is ordinary, lower, sense-experientially based understanding focused on practical affairs. Knowledge of the good life and of the ultimate nature of things – that is, the “wisdom” that philosophers “love” – is a higher, theoretical, and genuinely rational knowledge to which the former kind of knowledge is rightfully and ultimately beholden. Thus, for example, in the Republic, Plato envisions the education of the philosopher king as involving extensive training in pure mathematics (including theoretical astronomy and music theory) as the proper background for further and still higher training in philosophical dialectics. And in the Gorgias he shows how technical understanding (e.g., of rhetoric) is useless, or worse, when cut off from the deeper knowledge of what rhetoric is truly “good” for.

It is this higher, genuinely rational understanding of the essential nature of things that Plato identifies as the concern of the philosophers; and it is this hierarchical conception of theoretical over practical understanding that he (and, in a somewhat differently interpreted way, Aristotle) bequeathed to the Western tradition. Moreover, in their enthusiastic preference for the rational and theoretical over the practical and sense-dependent, many later Platonists, Neoplatonists, and some say even Plato himself (in the controversial reports of his allegedly “unwritten” doctrines and “Lecture on the Good” given at his Academy) came to identify numbers with the ideal, timeless form of philosophical knowledge. The distinction between mathematical knowledge and philosophical knowledge thereby came to be blurred, and it is perhaps not too much of a stretch to suggest that one can hear an echo of this ancient preference for mathematical metaphor in the later Western conceptions of technocracy, or rule by scientists and technologists. In any case, Plato did advocate the rule of the “wise,” by which he meant those trained in philosophy, where philosophy is understood as the love of a knowledge that is “like” that of the mathematical scientists but with an additional concern for cultivating a rational vision of the ultimate principles of all things.

Aristotle (384–322 BCE) makes just as strong a distinction between higher and lower understanding and is just as convinced as Plato that the highest kind of human life is one of rational contemplation of the “highest things.” Against Plato, however, Aristotle argues that the distinction between practical-technical-artistic understanding, on the one hand, and scientific-philosophical understanding, on the other, really cannot be a distinction involving possession of two kinds of “theories.” Plato’s Socrates appears to claim that moral virtue is a kind of knowledge; but this, counters Aristotle, must be wrong – if for no other reason than that this idea of moral virtue is unable to account for our familiar experience of the weakness of the will. Too obviously, it is possible to have knowledge of what to do but fail to do it. For Aristotle, moral virtue must therefore be conceived as a kind of practical reasoning (φρόνησις, phronēsis) achieved through exposure to experienced teachers, the building of good character, and the formation of the proper habits of activity.

Aristotle also objects to Plato’s tendency to overuse mathematical imagery in depicting not only philosophical and scientific knowledge but practical and political reasoning as well. In the Republic, for example, Plato presents abstract mathematical knowledge as a preliminary to political practice. His Philebus even entertains the notion of a “science of normative measure” (perhaps inspired by the mathematical theory of utility of the leading mathematician Eudoxus, who had joined the Academy). In contrast, Aristotle claims that different disciplines have different degrees of rigor that are appropriate to them. It is wrong to demand mathematical exactness in, say, ethics or politics. The largely implicit practical wisdom required of the citizen or politician, as well as the expertise of the artist and craftsman,
concerned with generalizing about particular situations and individual things; and this sort of expertise must be carefully distinguished from the explicit theoretical knowledge of the scientist or philosopher, who is concerned with the truly universal and essential in all situations and all things.

For all their differences, however, Plato and Aristotle both developed hierarchical conceptions of knowledge that make philosophical or scientific understanding of the universal and essential superior. Evidence of this line of thinking can be seen in the fact that the ancients did not conceive of technological change and economic production in the modern terms of efficiency and progress. As Schadewaldt explains, our whole modern cluster of terms—nature, knowledge, technique, practical activity—have a very different ontological cast from that of the ancients. Above all, the Greeks did not understand their surroundings as what we call “nature”—that is, as a kind of external reality regarded as the object of our drive toward knowledge. For the Greeks, the cosmos is first of all ψυχή (physis, from which our word “physics” comes)−the whole of things, with all of its motion, changes of shape and, size, and physical development and growth, and generation and degeneration—and we are part of it, placed in it, and the human spirit thus seeks to understand it as that with which we are in any case involved. Hence, it would make no sense to Plato or Aristotle to think of any kind of knowledge as something freely fashioned by us to give us control over something apart from us. Scientific understanding and practical techniques were both judged as analogous to the dynamic processes of the cosmos. The Roman aqueducts, for example, may seem “overbuilt” by modern standards, but that is because they are designed not just to carry water but to do so in perpetuity, to “be” as if things of the cosmos, like rivers and streams. Hence, where we might distinguish between “merely” aesthetic considerations and utility or efficiency in our crafts and practical productions, the ancients would consider both together as inseparable and as receiving their sanction from ψυχή and our understanding of it. (We might note in passing that, in keeping with the supposed natural order of things, the “higher” arts of economic production as well as architecture and sculpture were regarded as best suited to men, whereas manual labor and hands-on crafts were widely considered to be lowly activities fit mostly for women and slaves.)

Through this Greek-pagan orientation, then, there runs a pervasive sense of our being destined to live in harmony with an awesomely comprehensive cosmos to which we are never closer than when we strive to contemplate its first principles. In contrast, Christianity tends to encourage an outlook that fosters the idea of our separation from and superiority over nature. The Christian conception of the material universe as created from nothing by an all-knowing, rational God seems somehow to make that universe both less mysterious than Greek cosmology (see Mesthene’s “The Social Impact of Technological Change,” Chapter 56) and more remote from our true being. The theological interpretation of history as a progress toward our salvation paved the way for the later notions of linear scientific and technological progress. At the same time, the struggle for self-purification against the natural and material forces (introduced in the monastic orders) implicitly increased the dignity of the idea of work, and this imagery would later suggest the possibility of technological and scientific revolutions. All such developments, however, had to await the transfer of these views to a non-religious context (see Lynn White’s essay, Chapter 44). Only in the early modern period did the human control of nature and the essential beneficence of applying scientific knowledge to technology become ruling ideals. The remaining selections in Part I provide a sample of some of the major variations on these modern themes.

Francis Bacon (1561–1626) famously claims that knowledge is power—that is, that through knowledge of nature and its technological applications, humans can achieve a purity of mind and behavior that was lost after the Fall in the Garden of Eden. Thus, in The New Atlantis, Bacon envisages a utopia in which the workers at “Saloman’s House” study the resources of the island and the world to improve the health and welfare of the inhabitants. Here, Plato’s philosopher kings have been transformed into proto-scientists and technologists who guide the nation. Further selections reveal Bacon’s colorful and (as discussed later by Carolyn Merchant, Chapter 40) sometimes disturbingly gendered ways of depicting the acquisition of scientific knowledge and what sort of power it is that such knowledge allegedly gives us. Perhaps most famous of all, there is his Myth of the Sphinx, in which Bacon likens science itself to a seeming monster (to those ignorant of its nature), with wings (for the rapid dissemination of its discoveries), sharp claws (which grip the mind with its clear axioms and telling arguments), mountaintop abode (as befits something so lofty), and apparent riddles (which, when solved, reward beyond measure in the power over ignorance conquered and technologies gained). It is worth
contrasting the image of “nature” that must lie behind this conception of knowledge and its acquisition with that of the ancients.

A sophisticated and nuanced version of the secularized doctrine of linear historical progress is found in “The Idea for a Universal History from a Cosmopolitan Point of View,” by Immanuel Kant (1724–1804). All “animals,” Kant suggests, are destined to fulfill their natural purposes, and in the case of human beings this means the development of scientific and ethical rationality. The idea of human progress toward world government and perpetual peace that Rousseau ridiculed is presented here as empowered by the “unsociable sociability” of humans. Though written in an admittedly somewhat speculative vein, Kant’s essay nevertheless expresses the modern outlook of many who suppose its truth even when they are silent about it. For Kant’s portrayal of rational progress seems to justify the Enlightenment doctrines about our elevation above and over against nature. At the same time, it points forward to the less qualified historical claims of Hegel, Comte, and Marx.

The theme of what would later be called technocracy truly came into its own in the early 1800s with the writings of Henri de Saint-Simon (1760–1825) and Auguste Comte (1798–1857). Comte began his career as Saint-Simon’s assistant, and he came to exert a powerful if often unacknowledged influence over a wide and diverse range of other thinkers by clarifying and extending Saint-Simon’s often sketchy and disorganized ideas into a “System of Positive Philosophy.” The first half of his system focuses on the epistemology of science (his Cours de philosophie positive); the last half develops his ideas on the social and political organization that Comte assumes successful science will make possible (his Système de politique positive). At the heart of his system lies Comte’s philosophy of history and its Law of Three Stages. This law depicts humanity as moving (first intellectually and then in action) through three phases of development, utilizing three “methods” of philosophizing – namely, the theological (or fictive), metaphysical (or abstractly speculative), and scientific (or “positive”). Comte founded and named sociology as the science of society, and his later work is quite explicit about the need to replace traditional religion with a “Religion of Humanity,” so that natural and social scientists and those who apply their knowledge, not the priests of the Catholic Church, would rule. A few positivist churches were actually founded, and some still exist in England and Latin America (Brazil’s flag contains Comte’s slogan, “Order and Progress”). More importantly, however, Comte’s notion of the “priestly” role of scientists and technologists possesses – albeit in a less explicit form – a much greater worldwide significance in twenty-first-century industrial societies, East and West.

Karl Marx (1818–83) ridiculed the Saint-Simonian and Comtean blueprints for a technocratic utopia, calling them “recipes for the cookshops of the future.” Yet Marx’s collaborator, Engels, displayed much greater sympathy toward their doctrines, and through him, Saint-Simonian phrases – for example, “the administration of things, not of men,” “society as one vast factory,” and “artists as engineers of the soul” – found their way into the Soviet Marxism of both Lenin and Stalin. (Is it mere coincidence that the planners of Disney World are called “Imagineers”?)

In his Discourse on the Sciences and the Arts, Jean-Jacques Rousseau (1712–78) opposes the prevalent Enlightenment optimism concerning science and its applications. He shocked his contemporaries by challenging their complacent progressivism. Where they saw only scientific progress and the promise of what Comte called “social reorganization” leading to world peace and human happiness, Rousseau perceived progress of the sciences and the arts as leading instead to decline and decadence. Where philosophes such as Voltaire, d’Alembert, and Condorcet anticipated Saint-Simon and Comte in assuming that scientific progress of necessity leads to moral and political progress, Rousseau claims instead that the virtue and vigor of the barbarian nations is destroyed by the spread of civilization. Rousseau’s sensational anti-Baconian manifesto presaged and nourished the Romantic critique of the industrial revolution in subsequent generations in Germany and England.

Marx may have ridiculed the Saint-Simonian and Comtean conceptions of scientific and technological progress. Yet he was, after Bacon, the modern philosopher who made technology most central to his system. Marx’s vision of human history combines elements of the Baconians and Enlightenment philosophes with elements of the German and British Romantics. Like Bacon and the Enlightenment thinkers, Marx is optimistic concerning the development of science and technology as well as about their benefit for humanity in the long run, with the eventual establishment of communism. He shares, however, the pessimism of Rousseau and the Romantics concerning the oppression and alienation produced by science and technology, especially in relation to private property, in the present and short run.
Marx’s account of the role of technology in social change varies from writing to writing. *The Poverty of Philosophy* contains his famous quip, “the hand-mill gives you society with the feudal lord; the steam-mill, society with the industrial capitalist.” His brief and highly influential “Preface to a Contribution to a Critique of Political Economy” identifies the “base” of society as constituted by technological forces and social power relations of production. Many orthodox Marxists have interpreted these passages as proposing a technological determinism. (Ironically, there are many technocrats today who are strongly anti-Marxist but espouse a conception of contemporary post-industrial society that is just as technologically deterministic. For contributions to the non-Marxist debate concerning technological determinism and autonomy, see the later selections by Ellul (Chapters 19 and 36), Heilbronner (Chapter 37), Wyatt (Chapter 39), and Winner (Chapter 55). In the much more detailed discussions of *Capital*, however, Marx claims that class structure and class struggle control what sort of technology is developed. In these passages, some readers have seen a social determinism that can be used to criticize of technological determinism. Many twentieth- and twenty-first-century non-Soviet Marxists – from Chinese Maoists to European Marxist humanists – have gone on to argue that the very idea of technological determinism is a product of a technocratic capitalist ideology (see, e.g., Marcuse, Chapter 38). One key issue in this dispute over whether technology determines social relations or social power determines technological developments is the question of the relative weight of the technological division of labor (i.e., job roles determined by technology) vs. the social division of labor (i.e., job roles and technology determined by the desire of owners and managers to control workers). That Marx and Engels embrace the latter view can be seen, for example, in *The German Ideology*, where they describe a communist utopia in which one could be at once fisherman, hunter, and intellectual; or in Engels’ later writings, where he rejects the anarchists’ claim that labor discipline and hierarchy can be eliminated. Engels argues that technology by itself enforces certain types of labor discipline and hierarchy.

In any case, through all of these Marx–Engels selections there runs another theme that has also become a major topic of debate. According to Marx, human beings modify their environment with tools because this is our nature, and insofar as we do so, we exhibit our difference from other animals (see, e.g., *The German Ideology*). In his lifelong collaboration with Engels, Marx developed this conception of the human species into a full-blown account of human evolution from the apes (see “The Part Played by Labor in the Transition from Ape to Man.”) This evolutionary conception of humans as essentially tool-making animals has been vigorously criticized by later philosophers of technology, including even humanistic Marxists (see Mumford and Arendt, Chapters 32 and 33). Arendt’s argument is especially challenging, for it contains an immanent criticism, namely, that Marx’s concept of labor displays a deep ambivalence between understanding technological labor as, on the one hand, involving creative world-construction and, on the other, as inseparably linked to degrading oppression.
On Dialectic and “Technē”

Plato

From the Republic

[...] Next, I said, compare the effect of education and of the lack of it on our nature to an experience like this: Imagine human beings living in an underground, cave-like dwelling, with an entrance a long way up, which is both open to the light and as wide as the cave itself. They’ve been there since childhood, fixed in the same place, with their necks and legs fettered, able to see only in front of them, because their bonds prevent them from turning their heads around. Light is provided by a fire burning far above and behind them. Also behind them, but on higher ground, there is a path stretching between them and the fire. Imagine that along this path a low wall has been built, like the screen in front of puppeteers above which they show their puppets.

I’m imagining it.

Then also imagine that there are people along the wall, carrying all kinds of artifacts that project above it – statues of people and other animals, made out of stone, wood, and every material. And, as you’d expect, some of the carriers are talking, and some are silent.

It’s a strange image you’re describing, and strange prisoners.

They’re like us. Do you suppose, first of all, that these prisoners see anything of themselves and one another besides the shadows that the fire casts on the wall in front of them?

How could they, if they have to keep their heads motionless throughout life?

What about the things being carried along the wall? Isn’t the same true of them?

Of course.

And if they could talk to one another, don’t you think they’d suppose that the names they used applied to the things they see passing before them?

They’d have to.

And what if their prison also had an echo from the wall facing them? Don’t you think they’d believe that the shadows passing in front of them were talking whenever one of the carriers passing along the wall was doing so?

I certainly do.

Then the prisoners would in every way believe that the truth is nothing other than the shadows of those artifacts.

They must surely believe that.

Consider, then, what being released from their bonds and cured of their ignorance would naturally be like. When one of them was freed and suddenly compelled to stand up, turn his head, walk, and look up toward the light, he’d be pained and dazzled and unable to see the things whose shadows he’d seen before. What do you think he’d say, if we told him that what he’d seen before...
was inconsequential, but that now – because he is a bit closer to the things that are and is turned towards things that are more – he sees more correctly? Or, to put it another way, if we pointed to each of the things passing by, asked him what each of them is, and compelled him to answer, don’t you think he’d be at a loss and that he’d believe that the things he saw earlier were truer than the ones he was now being shown?

Much truer.

And if someone compelled him to look at the light itself, wouldn’t his eyes hurt, and wouldn’t he turn around and flee towards the things he’s able to see, believing that they’re really clearer than the ones he’s being shown?

He would.

And if someone dragged him away from there by force, up the rough, steep path, and didn’t let him go until he had dragged him into the sunlight, wouldn’t he be pained and irritated at being treated that way? And when he came into the light, with the sun filling his eyes, wouldn’t he be unable to see a single one of the things now said to be true?

He would be unable to see them, at least at first.

I suppose, then, that he’d need time to get adjusted before he could see things in the world above. At first, he’d see shadows most easily, then images of men and other things in water, then the things themselves. Of these, he’d be able to study the things in the sky and the sky itself more easily at night, looking at the light of the stars and the moon, than during the day, looking at the sun and the light of the sun.

Of course.

Finally, I suppose, he’d be able to see the sun, not images of it in water or some alien place, but the sun itself, in its own place, and be able to study it.

Necessarily so.

And at this point he would infer and conclude that the sun provides the seasons and the years, governs everything in the visible world, and is in some way the cause of all the things that he used to see.

It’s clear that would be his next step.

What about when he reminds himself of his first dwelling place, his fellow prisoners, and what passed for wisdom there? Don’t you think that he’d count himself happy for the change and pity the others?

Certainly.

And if there had been any honors, praises, or prizes among them for the one who was sharpest at identifying the shadows as they passed by and who best remembered which usually came earlier, which later, and which simultaneously, and who could thus best divine the d future, do you think that our man would desire these rewards or envy those among the prisoners who were honored and held power? Instead, wouldn’t he feel, with Homer, that he’d much prefer to “work the earth as a serf to another, one without possessions,” and go through any sufferings, rather than share their opinions and live as they do?

I suppose he would rather suffer anything than live like that.

Consider this too. If this man went down into the cave again and sat down in his same seat, wouldn’t his eyes – coming suddenly out of the sun like that – be filled with darkness?

They certainly would.

And before his eyes had recovered – and the adjustment would not be quick – while his vision was still dim, if he had to compete again with the perpetual prisoners in recognizing the shadows, wouldn’t he invite ridicule? Wouldn’t it be said of him that he’d returned from his upward journey with his eyesight ruined and that it isn’t worthwhile even to try to travel upward? And, as for anyone who tried to free them and lead them upward, if they could somehow get their hands on him, wouldn’t they kill him?

They certainly would.

This whole image, Glaucon, must be fitted together with what we said before. The visible realm should be likened to the prison dwelling, and the light of the fire inside it to the power of the sun. And if you interpret the upward journey and the study of things above as the upward journey of the soul to the intelligible realm, you’ll grasp what I hope to convey, since that is what you wanted to hear about. Whether it’s true or not, only the god knows. But this is how I see it: In the knowable realm, the form of the good is the last thing to be seen, and it is reached only with difficulty. Once one has seen it, however, one must conclude that it is the cause of all that is correct and beautiful in anything, that it produces both light and its source in the visible realm, and that in the intelligible realm it controls and provides truth and understanding, so that anyone who is to act sensibly in private or public must see it.

I have the same thought, at least as far as I’m able.

Come, then, share with me this thought also: It isn’t surprising that the ones who get to this point are unwilling to occupy themselves with human affairs and that their souls are always pressing upwards, eager to spend
their time above, for, after all, this is surely what we’d expect, if indeed things fit the image I described before.

It is.

What about what happens when someone turns from divine study to the evils of human life? Do you think it’s surprising, since his sight is still dim, and he hasn’t yet become accustomed to the darkness around him, that he behaves awkwardly and appears completely ridiculous if he’s compelled, either in the courts or elsewhere, to contend about the shadows of justice or the statues of which they are the shadows and to dispute about the way these things are understood by people who have never seen justice itself?

That’s not surprising at all.

No, it isn’t. But anyone with any understanding would remember that the eyes may be confused in two ways and from two causes, namely, when they’ve come from the light into the darkness and when they’ve come from the darkness into the light. Realizing that the same applies to the soul, when someone sees a soul disturbed and unable to see something, he won’t laugh mindlessly, but he’ll take into consideration whether it has come from a brighter life and is dimmed through not having yet become accustomed to the dark or whether it has come from greater ignorance into greater light and is dazzled by the increased brilliance. Then he’ll declare the first soul happy in its experience and life, and he’ll pity the latter – but even if he chose to make fun of it, at least he’d be less ridiculous than if he laughed at a soul that has come from the light above.

What you say is very reasonable.

If that’s true, then here’s what we must think about these matters: Education isn’t what some people declare it to be, namely, putting knowledge into souls that lack it, like putting sight into blind eyes.

They do say that.

But our present discussion, on the other hand, shows that the power to learn is present in everyone’s soul and that the instrument with which each learns is like an eye that cannot be turned around from darkness to light without turning the whole body. This instrument cannot be turned around from that which is coming into being without turning the whole soul until it is able to study that which is and the brightest thing that is, namely, the one we call the good. Isn’t that right?

Yes.

Then education is the craft concerned with doing this very thing, this turning around, and with how the soul can most easily and effectively be made to do it. It isn’t the craft of putting sight into the soul. Education takes for granted that sight is there but that it isn’t turned the right way or looking where it ought to look, and it tries to redirect it appropriately.

So it seems.

Now, it looks as though the other so-called virtues of the soul are akin to those of the body, for they really aren’t there beforehand but are added later by habit and practice. However, the virtue of reason seems to belong above all to something more divine, which never loses its power but is either useful and beneficial or useless and harmful, depending on the way it is turned. Or have you never noticed this about people who are said to be vicious but clever, how keen the vision of their little souls is and how sharply it distinguishes the things it is turned towards? This shows that its sight isn’t inferior but rather is forced to serve evil ends, so that the sharper it sees, the more evil it accomplishes.

Absolutely.

However, if a nature of this sort had been hammered at from childhood and freed from the bonds of kinship with becoming, which have been fastened to it by feasting, greed, and other such pleasures and which, like leaden weights, pull its vision downwards – if, being rid of these, it turned to look at true things, then I say that the same soul of the same person would see these most sharply, just as it now does the things it is presently turned towards.

Probably so.

And what about the uneducated who have no experience of truth? Isn’t it likely – indeed, doesn’t it follow necessarily from what was said before – that they will never adequately govern a city? But neither would those who’ve been allowed to spend their whole lives being educated. The former would fail because they don’t have a single goal at which all their actions, public and private, inevitably aim; the latter would fail because they’d refuse to act, thinking that they had settled while still alive in the faraway Isles of the Blessed.

That’s true.

It is our task as founders, then, to compel the best natures to reach the study we said before is the most important, namely, to make the ascent and see the good. But when they’ve made it and looked sufficiently, we mustn’t allow them to do what they’re allowed to do today.

What’s that?

To stay there and refuse to go down again to the prisoners in the cave and share their labors and honors, whether they are of less worth or of greater.
Then are we to do them an injustice by making them live a worse life when they could live a better one?

You are forgetting again that it isn’t the law’s concern to make any one class in the city outstandingly happy but to contrive to spread happiness throughout the city by bringing the citizens into harmony with each other through persuasion or compulsion and by making them share with each other the benefits that each class can confer on the community. The law produces such people in the city, not in order to allow them to turn in whatever direction they want, but to make use of them to bind the city together.

That’s true, I had forgotten.

Observe, then, Glaucon, that we won’t be doing an injustice to those who’ve become philosophers in our city and that what we’ll say to them, when we compel them to guard and care for the others, will be just. We’ll say: “When people like you come to be in other cities, they’re justified in not sharing in their city’s labors, for they’ve grown there spontaneously, against the will of the constitution. And what grows of its own accord and owes no debt for its upbringing has justice on its side when it isn’t keen to pay anyone for that upbringing. But we’ve made you kings in our city and leaders of the swarm, as it were, both for yourselves and for the rest of the city. You’re better and more completely educated than the others and are better able to share in both types of life.

Therefore each of you in turn must go to live in the common dwelling place of the others and grow accustomed to seeing in the dark. When you are used to it, you’ll see vastly better than the people there. And because you’ve seen the truth about fine, just, and good things, you’ll know each image for what it is and also that of which it is the image. Thus, for you and for us, the city will be governed, not like the majority of cities nowadays, by people who fight over shadows and struggle against one another in order to rule – as if that were a great good – but by people who are awake rather than dreaming, for the truth is surely this: A city whose prospective rulers are least eager to rule must of necessity be most free from civil war, whereas a city with the opposite kind of rulers is governed in the opposite way.”

Absolutely.

Then do you think that those we’ve nurtured will disobey us and refuse to share the labors of the city, each in turn, while living the greater part of their time with one another in the pure realm?

It isn’t possible, for we’ll be giving just orders to just people. Each of them will certainly go to rule as to something compulsory, however, which is exactly the opposite of what’s done by those who now rule in each city. This is how it is. If you can find a way of life that’s better than ruling for the prospective rulers, your well-governed city will become a possibility, for only in it will the truly rich rule – not those who are rich in gold but those who are rich in the wealth that the happy must have, namely, a good and rational life. But if beggars hungry for private goods go into public life, thinking that the good is there for the seizing, then the well-governed city is impossible, for then ruling is something fought over, and this civil and domestic war destroys these people and the rest of the city as well.

That’s very true.

Can you name any life that despises political rule besides that of the true philosopher?

No, by god, I can’t.

But surely it is those who are not lovers of ruling who must rule, for if they don’t, the lovers of it, who are rivals, will fight over it.

Of course.

Then who will you compel to become guardians of the city, if not those who have the best understanding of what matters for good government and who have other honors than political ones, and a better life as well?

No one.

Do you want us to consider now how such people will come to be in our city and how – just as some are said to have gone up from Hades to the gods – we’ll lead them up to the light?

[...]

Then it would be appropriate, Glaucon, to legislate this subject for those who are going to share in the highest offices in the city and to persuade them to turn to calculation and take it up, not as laymen do, but staying with it until they reach the study of the natures of the numbers by means of understanding itself, nor like tradesmen and retailers, for the sake of buying and selling, but for the sake of war and for ease in turning the soul around, away from becoming and towards truth and being.

Well put.

Moreover, it strikes me, now that it has been mentioned, how sophisticated the subject of calculation is and in how many ways it is useful for our purposes, provided that one practices it for the sake of knowing rather than trading.

How is it useful?

In the very way we were talking about. It leads the soul forcibly upward and compels it to discuss the