Climate, Technology, and Society
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1. Introduction: What do we mean by "technology"?
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Readings

Langdon Winner, "Do Artifacts Have Politics?" <u>Daedalus</u> 109, no. 1 (Winter 1980): 121-136.

Cornelia Vismann, "Cultural Techniques and Sovereignty," <u>Theory, Culture & Society</u> 30, no. 6 (2013): 83-93.

Andreas Malm, <u>The Progress of this Storm: Nature and Society in a Warming World</u> (New York: Verso, 2018), Chap. 1, "On the Building of Nature: Against Constructivism," 21-43.

Let us begin by asking not what technology is, but what technology does. In short:

technology changes things, in a manner that is dependent upon, but not entirely limited to,

the actions of its users. Since, among the many things that technology changes are those

users themselves, by separating them from nature and making nature a thing to be

discovered, known, and acted upon. That is, technology builds walls and opens the door,

through which walks a human being, a being separate from nature by virtue of acting upon

it and being affected by it. To explain, I want to have a quick look at several paradigmatic

cases that set the stage for our semester-long study of the interaction of climate,

technology, and society. And, although the focus of this course is on the built environment,

from the design of buildings, or parts of buildings, to the planning (or non-planning, or

unplanning) of cities, landscapes, regions, and territories, I want to begin by thinking about

technology through the example of a humble device from which we might say the built

environment is built: a doorknob.

What is a doorknob? Well, architects' trade catalogues and specification manuals might define a doorknob as a piece of hardware—maybe even a prototypical one, beside faucets, light bulbs, and other items you might find in a hardware store. From there we might compare it to the hardware from which the Internet is made, including personal computing devices like the one on which I've written these notes, or on which you might post on social media. But again, rather than proceeding down the rabbit hole of trying to define "technology" with reference to a specific class of objects, I'd prefer to begin with reference to a specific class of actions. Thinking of our humble doorknob in this way, we might ask: What does the doorknob do? A tricky question, really. Since on its own, a doorknob doesn't do much, except maybe sit there waiting to be used.

Before that even, you don't need an architect or urbanist to tell you that in order to be used, a doorknob first needs to be made. That is, in modern terms, metallic ores need to be mined, refined, transported, and turned into metals, which need in turn to be shaped— designed—into a series of more or less complex parts that fit together to enable a limited series of actions: turning, latching, locking, and the rest. These parts need to be assembled, and then, in today's predominant system, marketed and sold, usually under a brand name, which is sometimes even the name of a person—a designer—which one day could be one of you. By which time the doorknob is not only a piece of hardware, it is a product, one that may have already combined with other products, like locks and keys. After which, if this is a well-designed doorknob destined for greatness, it may be specified by an architect for use in a building, perhaps someone with a well-known name—though if so, the actual

specification (and likely choice) would almost certainly be made by someone with a different name, perhaps (again) someone like you. At which point someone else—a building subcontractor, say—would have to purchase that doorknob and someone else, most likely a construction worker, would have to install it, most likely in a door, which has probably made it to the construction site through different but equally complex channels. All of which requires technologies: mining shovels, smelting pots, forges, milling machines, computers, screwdrivers, and so on. And, deedless to say, everyone involved—all the miners, manufacturers, sellers, designers, and builders—would have to get paid, albeit unequally, so that profits can be made. Not least because each one of these individuals and many more have expended a certain amount of energy—let us call it labor—to make, sell, and install that doorknob, to say nothing of the mechanical energy, most likely fossil fueled, that made the mining, manufacturing, selling, designing, and installing possible in the first place. All of which is a complex way of saying that whatever else "technology" is, it is, in a capitalist society—our society—a product. Technology doesn't fall from the sky, or from the mind of Elon Musk; it is produced—collectively. That's the first action: production, an action that, in the modern sense, implies a whole society of producers, a whole array of other technologies doing the producing, and a whole world of things produced.

Now the second action: use. As we've said, that doorknob is more or less useless just sitting there in a door, without someone who our current lingo calls a "user." So, as its name suggests, just as a doorknob is more or less unintelligible without a door, and a door is more or less unintelligible without a wall and so on, the doorknob-door assembly doesn't make much sense without someone to open and close it. If we call this opener and closer of

doors a "user," we will next want to ask what exactly it means to "use" a doorknob. To do so, we'll need to know a little more about this user. More than likely, that doorknob has been designed to be turned by hand. Now, humans are not the only animals capable of using doorknobs; chimpanzees and other primates have been known to do so, too. But our opposable thumbs and—perhaps—our abstracting brains make us almost uniquely suited to using the technology called a doorknob in a purposeful manner that gives order to our world—that is: opening a door, entering, and closing it. In that sense, like other tools, a simple doorknob does is sorts the world into users and nonusers, meaning in this case, by and large, humans and nonhumans. Your cat may be able to use the door, but not the doorknob.

Having recognized the user as a human, we further note that using a doorknob means in some sense distinguishing what is on one side of the door-wall assembly from what is on the other. Broadly speaking, our languages—another set of technologies, in the sense I'm using the term—refer to such a distinction as that between an inside and an outside. These insides and outside can be nested or otherwise doubled up; but in their simplest form, they depend on a distinction between something like society and nature; that is, between what goes on inside technologies like houses, campuses, or cities, or other enclosures secured by things like gates, toll booths, and passport controls—as well as doors and doorknobs—and what is outside, above, or below.. In one sense, in our urbanized world, what is on one side of a door is just as socially constructed, just as unnatural, as what's on the other. But at some point, at every one of these scales and everything in between, there will also be something that has not been produced, purchased, and assembled in the way the doorknob

has, simply by virtue of being on the other side of the door. That outside, to which our lowly doorknob grants theoretical access, is what we call nature.

Now, of course you will be thinking that nature is not just outdoors. It's also in the house, in the air in the room, the water in the pipes, and the oil in the furnace. To which we can add that we've already found nature in the metallic ores from which our doorknob is made, and the opposable thumbs by and for which it has been designed. As climate change reminds us, nature is not eternal; like society, it too changes. That is, nature, too, is historical, in ways that are both independent of and, under specific circumstances, dependent upon, human activity, human will, and human design. We, as humans, do not design or construct the sun. But what makes us human is our capacity to design, construct, and use technologies—like doorknobs—that let the sun in or out. Through the semester, we'll have ample time to discuss how all of this complicates matters. For the time being, let me explain a little about how thinking like this relates to how others have thought about technology, lest you think I'm pulling it all from thin air.

For this, I have three concluding examples, with images, all of which are historical in different ways. Like the doorknob, all relate to familiar understandings of architecture, landscape, and urban planning. None relate directly to the climate crisis, but all help us to think about how climate, technology, and society relate—in ways that are more concrete than what is usually discussed in most design studios or engineering classrooms.

The first example is from Medieval Europe, from an argument among historians about when and how feudalism began, and what distinguishes this type of society from what came before. You can think about this as a loose conceptual analogue to today's debates about the recent emergence of a new historical epoch, the Anthropocene, due to technologically-mediated human action. The argument began in the 1960s, when the historian Lynn White argued that what really inaugurated the new, Medieval period, was the introduction to Europe, from China by way of India and Persia, of the stirrup. Yes, the stirrup—the simple, metal-and-leather device that allowed a mounted horseman—known to us as a Medieval knight, a knight in shining armor—to lean into the horse with his legs and feet, driving his full weight into the horse's as the two became a single unit charging at another, with the knight's spear—a long, heavy lance—aimed directly at the target and braced squarely against the knight's shoulder, thus transferring the full force of the galloping horse to the tip of the lance and into the body of the helpless adversary. By providing lateral support the stirrup, White says, "effectively welded horse and rider into a single fighting unit capable of a violence without precedent" (2). This was important not only because it provided the Frankish knights with military superiority but because, according to White, it connected with a whole series of other changes—"a social revolution" (13), White says. As he put it, "a new device [like the stirrup] merely opens a door; it does not compel one to enter" (28). The revolution consisted in the reorganization of society into what historians recognize as feudalism: the seizure of Church lands by the nobility, the consolidation and training of a chivalrous warrior class, beneath whom grew legions of vassals and serfs whose material support was necessary for this highly specialized combat. But White's account does not stop there; the social revolution enabled

by the stirrup was, according to White, followed by an agricultural revolution enabled by the plough. This entailed the replacement of the ==ancient scratch plough== pulled by two oxen with the "heavy" plough, made up of a vertical iron knife (a coulter), a horizontal ploughshare, and angled mouldboard, drawn by up to eight oxen and later, two stronger, more efficient horses. Where the simple scratch plough only cut into the earth lightly, necessitating crosshatched plowing patterns, the heavy plough turned the earth, allowed ==more efficient plowing patterns==, and made cultivation of fertile, damp alluvial plains possible. This labor-saving system also increased food production, leading to the accumulation of surplus food which, according to White, made urbanization and eventually mechanization possible, as generations of peasants, no longer needed on the farms, gradually moved to towns and much later to urban factories. Meanwhile, the horses, sources of what became known as "horsepower"—so necessary for both combat and agriculture—needed feeding, the provision of which was made possible by crop rotation made possible by the plowing, which yielded a supply of oats for the horses, who were much-needed for the plowing, and so on. I'm simplifying, but you get the idea.

This argument, while perhaps esoteric and seemingly a far cry from the causes of climate change and its possible solutions, seems on the surface a classic example of what is called technological determinism. In answer to the implicit question of what technologies like stirrups and ploughs do, White seems to say that they cause things to happen. In this crude, misleading sense, feudalism was effectively "caused" by the stirrup, supported by the plough. Then as now, such interpretations were heavily criticized, and rightly so. After all, our lowly doorknob doesn't cause the opening and closing of doors, let along the separation

or mixing of nature and society. It just sits there, waiting to be used. We might say the same for the Medieval stirrup-horse-plow complex. In that sense, the critics are right; on its own, the stirrup doesn't determine anything. But it does do two things. As a necessary but not sufficient condition, in combination with horse, armor, and lance, and the vassals, serfs, and ploughs supporting them, it shapes and is shaped by the institution of knighthood, just as the doorknob in combination with the door defines—and is in turn defined by—inside and outside and their correlates: nature and society, and nature and culture.

Now, before moving on briefly to two final examples, let me distinguish between these two distinctions: nature and society versus nature and culture. Though they overlap considerably, let us provisionally define "society" as a system of relations among human beings, mediated by technological things like doorknobs, stirrups, and ploughs. And let us define "culture" as a system of meaning shared among human beings, mediated by technological things like doorknobs, stirrups, and ploughs. Where, in each case, the mediations extend to distinctions between humans and nonhumans—those with and without tools like doorknobs or language, for example. To refer to one of the readings for this week, this is what the media theorist Cornelia Vismann and others mean by "cultural techniques": practices comparable to the ancient Roman practice of founding a city by dragging a plough around its perimeter, an act that is at once social, insofar as it establishes a social body (the city), and cultural, insofar as it gives meaning to that body through a symbolic ritual, one that, we might say, plows or cultivates a line between inside and outside, city and countryside, society and nature. In a Medieval castle, that line might even be a moat, spanned by a bridge.

But, to paraphrase the historian of technology Langdon Winner, do bridges have politics? If we follow Vismann, yes, since the founding of a city—the placing of walls, gates, and bridges, beginning with a furrow in the ground—is an inherently political act. But would it not be more accurate to assign political agency, the one who plows the furrow or forces open the door? For this, Winner sets the stage. ==Here is a bridge== over the Southern State Parkway, designed and built under the supervision of New York City Parks Commissioner and president of the Long Island State Park Commission, Robert Moses. The parkway leads from the city to Jones Beach, one of Moses's most notable planning achievements: an elegant public beach on Long Island's south shore available for the recreation of the urban—and increasingly suburban—masses. The bridge is, in that sense, a gate that allows the parkway and anyone driving on it to pass under it. But who drives on a parkway? Unlike a highway, mostly automobiles, not trucks, by law and by design. Hence the bridge's low height. Citing Moses's biographer, Robert Caro, Winner notes that the Southern state's low-slung bridges also prevented buses, which we can specifically recognize as school buses, from passing under it. Who rides a school bus on a parkway? Most likely, children on a trip, traveling a greater distance than to and from school. That is, schoolchildren from inside the city—the "inner city"—meaning, again quite likely, Black and Hispanic children, members of the impoverished classes, an excluded public for whom Jones Beach, a public beach, was implicitly not designed.

According to Winner, Robert Moses's bridges over the Southern State Parkway had a specifically racial politics, which we could compare to the redlining practiced by banks and

the segregation practiced by schools. Again this argument, which Winner made in 1980, was quickly criticized for it's apparent technological determinism. Of course artifacts don't have politics; people do. Still, although the restrooms were not marked "Whites Only," in a certain sense the parkways were. That is, even if, as critics have pointed out, buses could theoretically pass under the bridges, and in any case there were other routes to the beach, Winner's point still stands. As components in a technological or infrastructural system, which was really an ecosystem that included state parks, beaches, and the great Atlantic Ocean itself, those bridges were signs and gates that conveyed the message: "Whites only."

Did the bridges cause racial segregation? No, not directly, but Winner shows persuasively how, when linked up with other weapons in Robert Moses's planning arsenal, they made a different kind of sense. Causality, in the way I am speaking of it, brings change, as in: the accumulation of atmospheric carbon causes global warming. But what causes the cause? We will have many occasions to discuss such questions, along with how those causes might be mitigated. But to conclude, I want to mention one more example that speaks to two related meanings of the English work "power," one social and political, the other military, which takes us back to horses and stirrups.

One of the most controversial alternatives to fossil fuels, nuclear energy, is a fairly direct product of military needs and wartime research. The nuclear power plants and warheads that began proliferating on both sides of the Iron Curtain in the 1950s are very much still with us, today more than ever. How did this happen? This is a historian's question, well beyond the scope of this course. But asking it reminds us that very often, technological

systems designed for one purpose—in this case, warfare—can be used for another. When it comes to climate change, nuclear power is no silver bullet. But in the US and Soviet cases at least, these power plants may not have existed if not for the military need for fissile material, much like the oats feeding the knights' horses of old. Where does causality lie here? And what about change? We are accustomed today to speaking warily of the "end" of the Cold War, even though the missiles are still in their siloes. What might it mean, then, to speak of the "end" of climate change? What would need to change for the climate to stop changing, or at least stop changing so rapidly? These questions about the future are also historical questions. They concern the interrelation of climate, technology, and society. Asking them for real, rather than pretending to know the answers, is as difficult as asking about the kinds of changes that would need to occur for the infrastructures of war—from stirrups to nuclear reactors to missiles—to disappear. I have tried to set up our virtual classroom in a manner best suited to discussing such questions, and so I hope that you agree that it's time to turn the knob and walk through the door.