

The Hegemony of Modernity and the Science of the Unknowable

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Andrew Pickering, *The Cybernetic Brain: Sketches of Another Future*. Chicago and London: The University of Chicago Press, 2010.

The Cybernetic Brain: Sketches of Another Future by Andrew Pickering is a book that provides historical, anthropological, and political accounts of British cybernetics from the 1940s to the present. Cybernetics has been commonly perceived as closely related to military sciences of command and control, and many historical studies on cybernetics have focused on U.S. cases such as Norbert Wiener's research on anti-aircraft systems or the Biological Computer Laboratory at the University of Illinois funded by military agencies.¹ In this book, the works of British cyberneticians, including Grey Walter, Ross Ashby, Gregory Bateson, R.D. Laing, Stafford Beer and Gordon Pask, are delineated as lively and sometimes peculiar practices of experimentation involving such diverse fields as neurophysiology, psychiatry, engineering, management, music, politics, architecture, education, and tantric yoga. Unlike the U.S. strand, British cybernetics featured in this book is a science with protean, anti-disciplinary and non-hierarchical qualities.

Throughout the book, Pickering highlights and depicts the differences between the works of cybernetics and of conventional neurophysiology, engineering, or management. In order to understand the relationship between sensory stimulation and electrical activities in the brain, conventional neurophysiologists would first look at components of the brain activated by opening or closing the eyes. Grey Walter, however, built small robots named 'tortoise' as simple simulators of a living organism and watched what tortoise did in search for light. In order to understand the adaptive learning processes of living organisms, Ross Ashby built the homeostat, an electrical device with a needle, to watch how deviations in the position of the needle eventually settle down. Why did cyberneticians opt to watch the homeostat or the tortoise with its three wheels, one photocell and several wires rather than 10^{10} neurons and their interconnections? This choice is related to their vision of the world as an ultimately unknowable place full of Black Boxes, the human brain also being such an obscure object. The objective of cyberneticians is not

¹ Ronald Kline, "Where are the Cyborgs in Cybernetics?" *Social Studies of Science* 39 (2009), 331-62.

to fully understand the inner mechanisms of how Black Boxes work, but to learn how to obtain desired outputs from them. The works of some cyberneticians demonstrate that learning to turn a key to start a car can indeed be achieved without inspecting the inner mechanisms of the engine. Based on his understanding of two homeostats getting stuck in an incapacitating oscillation rather than of neuronal activities, Gregory Bateson formulated his theories on schizophrenia. When Stafford Beer designed an automatic factory that could adapt to changing market environments, MBAs who understood the dynamics of the market were no longer needed. The factory would automatically reconfigure its managerial decisions, for it is coupled to an adaptive system like the homeostat through a machine. The brain, in such cases, is commonly perceived as a performative organ, built for adaptation. In artificial intelligence (AI), a machine is seen to have a brain if it can think; in cybernetics, a machine has a brain if it “gets information and does something about it” in an attempt to somehow adapt to environmental perturbations. Cyberneticians’ interests were not in understanding all the components of the brain but in obtaining the desired outputs, such as finding a way out of schizophrenia or making appropriate managerial decisions by employing a machine with an adaptive brain.

Pickering’s accounts of British cybernetics are historically and anthropologically interesting, since he depicts it as a science of the counterculture of the sixties with its affinity for counter-hierarchical spirits. Influenced by Bateson’s notion of schizophrenia as an adaptive mechanism of the brain, Laing established Kingsley Hall, a commune of the mad, doctors and artists. At Kingsley Hall, Laing and psychotherapists engaged themselves in what they called anti-psychiatry, and did not use drugs or electroshocks to cure the mad. Instead, they lived together with the mentally troubled and supported their inner voyages. Based on Ashby’s ideas on multi-homeostats, Beer designed Cybersyn, a real-time computer managing all the firms and factories in Chile. Rather than a tool for hierarchical command and control, Cybersyn functioned as a machine that processed sets of proposals and counterproposals until a certain equilibrium emerged between the two, between production units and the board of directors, for example. The Musicolour machine developed by Gordon Pask is a rare type of musical instrument in that it could get bored of the performer. The machine basically transforms sounds into a light show, but stops responding to recurring sequences of keystrokes. And because the individual sound frequency to light color configuration varies constantly, there is no way for the performer to fully control the performance. Just as the doctors at Kingsley Hall have to wait for the mad to explore their inner minds before they can respond, the performers have to stop and see what the Musicolour produces and then react to it. Importantly, what hangs together with this spirit of counterculture is the above-mentioned vision of the world as an ultimately unknowable and uncontrollable place. The world is populated by “exceedingly complex systems,” to borrow Beer’s term. According to the vision of cyberneticians, what we know about complex systems such as the brain, the mentally troubled or markets, will continually mutate, and therefore employing such knowledge for command and control cannot, in most cases, lead to productive results. How such an eccentric vision of the world could

thrive roughly from the 1940s to the 1960s will be an interesting question for historians of science and technology. The stories of some cyberneticians interested in psychedelics and Eastern spirituality will also be attractive to anyone interested in the relationship between technology and the sixties counterculture.

Pickering, however, emphasizes a political dimension in his stories and gives an implication for the future. According to him, cybernetics should not just be viewed as a form of science and engineering relevant to the past, but more as an alternative to modernity. The modern way of doing science, according to Pickering, is based on a dualistic thinking of humans and nonhumans. Modernity is a premise on which humans are thought of as those who calculate and rationally predict how things will act in the world. Consequently, the material world is to be subjugated by human agency. Along with Ulrich Beck and James Scott, Pickering considers modern projects premised on rational human calculation to be prone to have unintended consequences. Yet the real problem is this: modern projects such as large-scale civil engineering will continue despite high possibilities of ecological catastrophes as long as the modern vision of the world as ultimately knowable and controllable is universally taken for granted. Pickering's suggestion is to at least problematize, if not overthrow, modernity by pulling in cybernetic visions, devices and projects into the arena of mainstream discussion. People can still make plans to fully understand and control the environment, the economies or the insane; the suggestion is simply that people do not always have to. Instead, people can try to adapt to the complex system while leaving Black Boxes as they are known – or unknown – only in terms of their inputs and outputs. This is not to propose that people should try going back to pre-modern times and live without science and engineering. By adopting the cybernetic approach and leaving some things as unknowable, scientists and engineers can still make impressive findings and progress, as seen in the above examples. For a recent example of a cybernetic project, look at the cockroach-controlled robot introduced in chapter 6 (for your information, it is on YouTube as well). Garnet Hertz could build this robot with almost no knowledge about cockroaches, whereas most robot engineers need to know everything about electronic circuits, valves and chips in order to make their machines work. The name of Hertz's project, 'Control and Communication in the Animal and the Machine,' shows historical continuities, for it is the subtitle of Norbert Wiener's book, *Cybernetics*. In Pickering's accounts, cybernetics is not a forgotten science. It is a viable form of living with the potential to proliferate more democratic and less anthropomorphic kinds of sciences and engineering. This book, after all, intends to provide a sketch of another possible future.

Pickering's political suggestion to problematize the universal hegemony of modernity with an attention to cybernetics is unique and thought-provoking. Although sharing the concern for the dark side of modernity, Pickering's message differs from Bruno Latour's proposal to "bring the sciences into democracy", as elaborated in his *Politics of Nature*.² Below I will try to illustrate the difference between

² Bruno Latour, *Politics of Nature: How to Bring the Sciences into Democracy* (Cambridge,

these two powerful philosophical/political positions in STS. But beforehand, elaboration on social constructivism and actor-network theory (ANT) is required.

Social constructivists, mostly advocates of the Strong Programme, EPOR (Empirical Programme of Relativism) and SCOT (Social Construction of Technology), have demonstrated that scientific knowledge has social dimensions. According to their perspectives, knowledge, for instance, on which parts of the brain are activated when speaking a foreign language is related to certain social attributes of its producers and users. Apparently, social constructivists do not see knowledge as being determined by the real structure of the world, which would correspond to realism. However, social constructivists differ from realists in that they do not consider scientific knowledge as existing entirely independently from the material world, either. According to David Bloor, “there has never been any need, or any tendency, within the Strong Programme to deny the subtle and detailed character of what scientists observe, or to deny that it plays a role in prompting and sustaining belief.”³ Evidently, social constructivists see the material and the social world as the two vectors that drive the trajectories of scientific knowledge. Yet here, the influence of the material is bound to be filtered through the scientists’ perception, which is not that of the individual scientist, but one that is constructed in their professional practices, habits and routines. Thus, no influence of the material world upon scientific knowledge can be free from the social attributes of those who observe the material world. In this sense, social constructivism puts an emphasis on the ‘social’ in order to explain the relationship between scientific knowledge and the society.

Actor-network theory (ANT) embraces some aspects of social constructivism as it also conceptualizes the material as being mediated by the social, while influencing both the producers and users of knowledge. ANT, however, clearly distinguishes itself from social constructivism. Through empirical and philosophical discussion, ANT has so far argued that the social attributes of the producers and users do not exist *a priori*, but are constructed through their interaction with materials. The influence of the material world on knowledge producers or users cannot be directed by their social attributes, as if their social attributes existed without being influenced by the material. Without Pasteur’s practices inside and outside of his laboratories, microbes alone could not have had its influence upon the French society. Yet without Pasteur’s microbes functioning as the focal point, hygienists’ social positions to sanitize or physicians’ interests in serotherapy as we now know it could not have been formed either. This symmetric understanding of the material and the social does not bring ANT closer to the traditional realism than to social constructivism. Latour considers himself a realist rather than a relativist in the sense that the real is always a process of construction through socio-material interactions. Neither the material free from human perception nor the social

MA: Harvard University Press, 2004).

³ David Bloor, “Anti-Latour,” *Studies in History and Philosophy of Science* 30 (1999), 81-112, esp. p. 90.

determining our knowledge of the material can exist in the processes of representing the real.

ANT has distinctive political implications differentiated from those of social constructivism. Suppose a scientist claims that it is to scientific reasoning that the four-river projects will prevent floods and drought damages. The reaction position of naïve realists to this finding would be that this conclusion is drawn on the basis of the immutable material characteristics of the four-river *per se*. The critical position rooted in social constructivism would be to debunk the realist viewpoint that such conclusion is irreplaceable; it would attempt to pinpoint social habits or interests, which somehow shaped scientific interpretations. ANT, on the other hand, would describe a long series of material-social interactions through which the justification for the four-river projects is converted as an acceptable conclusion for more people with more apparatuses. Because of this typical mode of writing that is focused on description, ANT is often accused of being indifferent at providing critiques against power structures and the way the structures are enforced in the processes of scientific knowledge construction. Yet the critical position rooted in ANT cannot be to selectively discredit the yes-to-four-river-conclusion, as if a different conclusion could be a fact based upon more materiality and less social attributes. Instead, what ANT attempts to criticize is naïve realism altogether. By describing which material-social works are actually needed to construct a claim as a fact, ANT denaturalizes the factuality of the yes-to-four-river conclusion, which would be unchangeable from the realists' points of view. Furthermore, ANT attempts to compose an alternative network in which the whole concept of scientific facts being purely separable from the social looks unnatural. That is what Latour has been doing with his propositions of "parliaments of things," Dingpolitic, or object-oriented politics.⁴ In Latour's parliament of things, "natures are present, but with their representatives." While urging to recognize things as what is politically represented in parliaments, Latour denaturalizes modern ways of separating the material and the social, the objective and the political, or the factual and the disputable. In parliaments of things, scientific conclusion is not a terminator but an initiator of more negotiation, reflection and open discussion. Through the work of representatives of things, a scientific conclusion such as yes-to-four-river, is supposed to lead us to deliberative democracy rather than to swift decisions legitimized by what seems to be immutable facts derived from the purely material realm.

Then how does Pickering, with his suggestion to bring the work of cybernetics into mainstream discussion, policy-making, design enterprises and education, differ from Latour? According to Pickering, Latour's parliament essentially provides a site to "slow down the hectic pace of modernity." On one hand, Pickering expresses his agreement with Latour's thought. Hopefully, understanding the material world as inseparable from messy politics or "slowing down" modernity might pre-

⁴ Bruno Latour, *We Have Never Been Modern* (Cambridge, MA: Harvard University Press, 1993); Latour, *Politics of Nature*.

vent some unintended consequences of modern technoscientific projects from haunting us in the form of disasters. On the other hand, Pickering attempts to go beyond Latour's goal to denaturalize the modern mode of *representing* things as immutable. In Latour's Parliaments, people basically gather to speak in the name of or represent things as actors in social controversies. With the strength of language, representatives are to demonstrate a non-modern way of understanding and interpreting things as mutable. Scientists and engineers with the cybernetic vision of the world as unknowable, however, do not speak so much. Their difference from conventional scientists is best revealed in their ways of *acting* or *doing* things around nonhumans. Bringing more cybernetic into science and engineering, according to Pickering, is a more practical proposition than mixing sciences with parliament democracy. Lisa Asplen's story of environmental scientists learning what the Colorado River can do instead of enforcing plans to control the ecosystem works as an attractive example of actually combining the cybernetic mode of science with modern engineering and environmental policy-making.⁵ Modern projects such as dam construction might still continue. Yet we can also choose to have science and engineering to be carried out on the premise that the river is ultimately an unknowable system. Inspired by Pickering's sketch of another future, perhaps Korean scientists could come up with new ideas on how to adapt to, rather than control flood or dry streams. To realize this future, Pickering suggests we put fun cybernetic devices, such as the tortoise and the Musicolour, in ordinary places such as schools and universities. It is a simple suggestion with high ambitions. We might actually end up acting and living differently with nonhumans by adopting these devices and visions of the world as unknowable.

⁵ Lisa Asplen, "Going with the Flow: Living the Mangle through Acting in an Open-Ended World: Nature, Culture, and Becoming in Environmental Management Practice," in A. Pickering and K. Guzik (eds.), *The Mangle in Practice: Science, Society and Becoming* (Durham, NC: Duke University Press, 2008), pp. 163-84.