

Human systems entail those standards that give form and direction to human activity, particularly, our aesthetic and moral values; they are unique among systems in that they have an axiological dimension. The actions we take and the choices we make reflect our values. They can also be seen in what we do with respect to all three kinds of systems. How we shape or despoil nature, what artifacts we decide to create and how we design and use them, and the ways we treat one another all testify to what we consider worth doing and which ways of doing them we find appealing or desirable. In explaining the form a garden takes we necessarily refer to those values of distinctly human character that have been incorporated into the garden's design: the aesthetic traditions that enable us to distinguish an English garden from a Japanese one, and by which we judge one garden to be modest and another world-class (for a parallel exposition of systems and ethics, see Cook, 2005).

In this sense, a bridge is not merely a static physical object. Just as an understanding of its design must include the affordances of its material, it must also include the values of its designers. Why it is built and located where it is, why it enables some forms of traffic and not others, why public funds are committed to a grand appearance when a more modest bridge could have the same carrying capacity, all these must appeal to the workings of the human systems within which the bridge is conceived, built and maintained. Conversely, no adequate explanation of why the bridge has the particular physical dimensions and properties it does can be given without reference to the values and purposes of the human systems in which it came to be. A bridge, like all artifacts, is the product and the embodiment of natural, artifactual, and human systems.

This distinction among these three kinds of systems finds a reinforcing parallel in the distinctions Hannah Arendt (1998 [orig. 1958]) draws among labor, work and action in her examination of human activity. Indeed, Arendt describes the whole of human activity as made up of those three distinct forms. In each case, I would apply her focused treatment of activity to the broader notion of systems.

Labor for Arendt is that part of human activity that confers to maintaining ourselves as biological beings. "Labor," Arendt says, "is the activity which corresponds to the biological process of the human body, whose spontaneous growth, metabolism, and eventual decay are bound to the vital necessities produced and fed into the life process by labor." (Arendt, 1998, 7) Seemingly, at the individual level this would at minimum include getting food and drink, protecting ourselves from the elements, and dodging predators. On such group levels as a community or even the species, it would include activities like adapting to the local environment and reproducing. All this constitutes a complex of interconnected and interdependent activities, which we share to one degree or another with other species. These activities are part of the biological world, and as such are part of nature. Labor, then, is that aspect of human activity that is given over to maintaining ourselves as natural systems.

Work, as Arendt defines it, is concerned with bringing about and sustaining the "world of things, [that is] distinctly different from all natural surroundings." (Arendt, 1998, 7) That is to say, work brings about the world of artifacts. These artifacts are distinctly human (other species may make things, but they do not make human things), which is to say they are the result of human purposes imposed upon nature.

Together they constitute a network of objects and gadgets within which we increasingly live and whose presence and stability in the modern world are evermore necessary to any form of life we might recognize or find acceptable. Work, therefore, is that aspect of human activity that creates and maintains our artifactual systems.

Action, in Arendt's view, is that aspect of human activity that "goes on directly between men without the intermediary of things or matter ..." (Arendt, 1998, 7). I would make this point a bit more broadly. It is not as though activity necessarily does not involve the mediation of things and matter. Rather, action is that part of human activity which is distinct from such mediation. "Things" are what make up the artifactual world and "matter" is the substance of nature. Both things and matter can provide the means by which humans interact, but neither can constitute the content of that interaction, nor provide the ends that it serves. Action, thus, is that aspect of human activity out of and within which human systems are formed and endure.

All three kinds of systems also interact with one another, and the flourishing of one can depend on the stability of the others. Just as we can see the artifactual system of a garden fail when we ignore its needs as a natural system, so can we see technologies fail when we ignore the requirements of the human systems within which alone they can function. Likewise, the fact that a garden will revert all too quickly to jungle if its needs as an artifactual system are not met has parallels in the case of cities, organizations and technologies, each one of which has its own version of reverting to jungle. The character of our values cannot be obscured or offset by the character of our artifacts.

Human beings live within a network of systems of these three kinds. In the 21st century, the successful functioning of our ordinary daily lives, to say nothing of our prevailing under exceptional circumstances, is utterly dependent upon the flourishing and stability of these interdependent systems (Cook, 1995). In our day, the design and maintenance of this network of systems is, I believe, a prime moral responsibility of humankind, if for no other reason than that our very existence is now utterly dependent upon it.

3 Design and Responsibility

3.1 Mislabeled Systems and the Fallacy of Counterfeit Naturalism

Because different kinds of systems have different properties, including different requirements for sustenance and stability, dealing with one kind as if it were another can be anywhere from impractical to irresponsible. It is a conceptual and practical mistake, for example, to treat an artifactual or human system as if it were a natural one. Yet, this is often done. It is also the most dangerous form of mischaracterization of a system since it tends to occlude the role of values in the workings of artifactual and human systems. For example, I recently heard a noted economist remark that, "jobs, like water, naturally flow downhill to the cheapest provider." Technically