Design and Responsibility

The Interdependence of Natural, Artifactual, and Human Systems

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This essay explores design as the imposition of human purpose onto nature. It argues that understanding design requires that we be able to distinguish among three different kinds of systems: natural, artifactual and human. Each kind has its own distinct requirements for stability and sustenance, yet each is also dependent upon the stability and sustenance of the other two. Design entails crafting artifactual systems by imposing aims and values from human systems onto the raw materials of natural ones. Effective and responsible design, moreover, is undermined when distinctions among systems are ignored or when one kind is treated as another. Life as we now live it is increasingly dependent upon the stability of our artifactual systems; this, in turn, is increasingly dependent upon our ability to make the value judgments by which alone we can determine that a design is worth making and how best to realize it.

1 Introduction

Design is the imposition of human purposes onto nature. What results is neither human nor natural, but something that exists in a world of its own, where form and function cannot be explained solely in human or natural terms. In modern times, this world of artifacts, equally alien from us as from the earth out of which it was made, is nonetheless our primary home. We depend on its presence and stability for our daily lives to transpire unproblematically, and we more often than not turn to it when life's problems send us in search of remedy. Although we live in this world – not so much given as made, and increasingly the product of our own artifice – we now often live as though we were scarcely aware of its unique character as an object of design. The admixture of human purposes with the stuff of nature that constitutes that character includes particular requirements for sustenance and stability, and demands of us an astonishing measure of responsibility in choosing what artifacts should exist, how they should function, and how long they should endure.

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P. E. Vermaas et al. (eds.), *Philosophy and Design*.

None of the artifacts that make up this world function in isolation. Whether it is a tool or building, computer application or ballpoint pen, every artifact is suspended in a network of social relations that brought it about, see to its use, compass its ultimate disposal and, importantly, link it to other artifacts. The specifics of an artifact's design also arise in social contexts and it is only within such contexts that its various functions can be deployed. Light does not issue from a lamp alone, but from the interaction of the lamp with someone who turns it on and makes use of the illumination. More complex undertakings, such as the mining of coal, the manufacture of automobiles, or the irrigation of extensive farmlands, entail even greater and more subtle networking of technical and social elements. Along with the modern expansion of such enterprises, there has been a growing effort to understand this world of artifacts not as individual technologies but as "socio-technical systems."

The idea of socio-technical systems has its roots in the middle of the 20th century. Cybernetics (Wiener, 1962 [orig. 1948]), operational research (March and Simon, 1993), and systems theory (Bertalanffy, 1968), each of which came of age during the Second World War, made seminal contributions to treating in singular terms a collection of individual devices functioning together. Occasionally, studies in these areas would also assess the role of the teams that operated those systems. It was, nonetheless, the work of the Tavistock Group, and that of Emery and Trist (1960) in particular, that in the late-1950s began to address explicitly what they called "socio-technical systems" (indeed, Emery and Trist most likely coined the term). Here the key idea was, for a given task, to see both devices and people as a functioning unit, and to apply this perspective to the conception, design, application and assessment of what was then taken to be a socio-technical system. In recent years, both the practice of and the need for this perspective has been recognized in numerous areas.

All artifacts are also embedded in the social world in a simple but fundamental sense. That is, all artifacts, to one degree or another, are socio-technical systems because they are, to one degree or another, prosthetic: they are extensions of us. What our artifacts do is always in some way a matter of what we do with them. Accordingly, they must be understood not only in terms of their "built-in" functions but also with respect to the human activities in which those functions are deployed and the human purposes, or their lack, which they serve. Even the simple case of an alarm clock reflects this prosthetic character. It is often observed that an alarm clock once set and turned on can function autonomously, that is, without our immediate intervention. This does not mean that it is totally autonomous, however. No technology ever has been. If I were to attach the alarm clock to a bomb, it is I, not the device, who would be held responsible for the explosion. In this sense at least, our artifacts are inescapably prosthetic in character, both instrumentally and morally. Indeed, even when we design our technologies to have a degree of instrumental autonomy, they remain always morally prosthetic.

There is another important sense in which artifacts are connected to human affairs, in this case to human values. No design can be explained solely by appeal to its functions, intended or otherwise, because a given set of functions can always be achieved by more than one design. This is why all lamps are not alike, nor are