philosophers come to a more integrated understanding of the phenomenon of design. Despite its diverse manifestations in engineering and architecture all design can increasingly be seen as aimed at the same goal: production of our material environment and the way in which we are designed to live in that environment. In the next two sections we will defend this proposition more fully.

2 Engineering and Architecture

Our promise to provide an integrated understanding of the philosophy and ethics of engineering and architectural design trades in part on the current view that these two practices are quite different. Articulating this view and analyzing the nature of the assumed differences is complicated by the fact that there are competing accounts of how these differences arose. As with any historical relationship, contemporary practitioners of both disciplines tell different stories of their estrangement. But professional affiliation is not the only filter of history. In this section we will briefly outline two competing narratives that are thought to separate these two disciplines through differing attitudes toward authorship and organizational structure. What we offer is far from comprehensive but should help to understand better how engineers and architects have positioned themselves within the societies they serve.

2.1 The Dominant Narrative

It is often assumed that engineering and architecture share some conditions of practice but remain inherently different in nature. On this view, engineers make things that work and architects order space, giving visual expression to the built environment. What is common is that both engineers and architects design for material production by others, in response to assignments originating from a third party. Particularly in large projects the third party, or "client," is actually a collection of parties with distinct interests, owners, users, and those who finance, regulate, or insure the products created. However, whether designing large or small artifacts, engineers and architects typically produce designs to meet the goals and requirements of that third party. Unlike fine artists, who generally initiate works in isolation from surrounding social and economic conditions, architects and engineers rarely do so.

As there are disciplinary similarities, so there are clear differences. Obvious differences concern the products designed and, consequently, the types of knowledge involved in production. Engineers typically design things such as consumer goods, machinery, public utilities, and other useful products. Architects design the buildings we live and work in and the public environments created by these buildings. Another marked difference, which we will initially focus on here, is how authorship in engineering and architecture is understood.

In the traditional view architects are taken to be the authors of the products they design. Even when architects, as they must, meet the goals and requirements set by

those who commission them, there is ample interpretive flexibility within the design problem for them to create unique spatial and material compositions. Clients generally expect such an expansive interpretation of the stated design problem. Under certain circumstances buildings and landscapes are commissioned to reflect the architect's personal style and vision as evidenced in prior work. In this context architecture is perceived to be similar to the fine arts. Building owners may seek to enhance their own social position through association with the artistic authority of the architect. Such an understanding of the social context of architectural production is aided by a traditional philosophy of art whereby paintings, sculptures, or other products are designated by a single author. To the philosopher of technology, however, a single author of an architectural product may seem naïve. The client, let alone the many draftsmen, engineers, suppliers, and contractors who contribute skill and knowledge to a project's realization, also contribute to the design process. But whether one prefers the lens of single or multiple authors, the traditional view tempts us toward a vision of the architect as author, either producing a unique vision alone or directing a panoply of other actors assisting in the production of that vision. Such a view may also beg the question of whether architects are responsible for the consequences of their designs in a more substantive way, but this is an issue we will take up later.

Engineers are traditionally viewed as operating in a less publicly recognizable manner. The products they design are characterized by the technological possibilities of their era, and may include decorations peculiar to their period, but nonetheless engineers are typically more anonymous as authors of their work. They may advise those that commission their work about adjusting their expectations, or bring to a project a specific method of designing. But their products are generally oriented by a reductive, rather than expansive, interpretation of the design problem at hand. This is to say that the specific goals and requirements agreed upon at the beginning of the design process tend to limit engineers to coming up with efficient technical solutions to problems. Some pioneering engineers may be known more publicly for their inventions, and countries may even have a few heroic engineers known for public works of national grandeur. But the average technical product will not be recognizable as designed by a particular engineer. A full explanation of the roots of this traditional difference between authorship in engineering and architecture is complex, but we can say here that, on the whole, engineers tend to interpret design problems reductively using quantitative criteria, and architects tend to interpret design problems expansively and to employ qualitative criteria.

A related phenomenon is that the cultures of engineering and architecture have produced different organizational structures that reflect differing values. Architects typically work within firms that are recognizable as architectural firms. This also holds for some engineers, but engineering has also been integrated into larger commercial enterprises that subsume the identity of engineers into the company's identity. Under such conditions large companies have taken over the role of authors of the products designed, such is the case with consumer goods like cars, cellular phones, and sports wear. The relative anonymity of the engineer is related both to the issue of authorship and organizational structure. If one accepts the