Chapter 6
Reviewing Engineers and Introducing Industrial Designers

ABSTRACT

Much of the analysis and argument in the first half of the book has focused more on architects than on engineers, simply because architects, with their fondness for art and imagination, often seem closer to the core of design activity and education than engineers, with their fondness for science and rationality. Moreover, industrial designers have not entered the discussion at all. Therefore, a review of the argument with a focus on both engineering and industrial design seems useful at this point. It is also time to look more closely at the relationship between imagination and rationality, since a full illumination of that relationship in regard to design is the ultimate aim of this entire project, culminating in Chapter 10. The key to achieving this understanding is Aristotle, who, it must be remembered, offered the first definition of design as technē, or knowledge gained by doing – as opposed to epistēmē, or knowledge gained by thinking. Aristotle also called this distinction practical knowledge as opposed to theoretical knowledge. It should be remembered too that Aristotle regarded theoretical knowledge – of which the beauty sought by artists and the truth sought by scientists are perfect examples – as "higher" than practical knowledge, because they are manifested as universal ideas and they exist as ends in themselves. Design, as we have seen repeatedly, is concerned with physical particulars, and it is mainly utilitarian. Just the same, Aristotle stated that the practical knowledge of technē, like the theoretical knowledge of epistēmē, is achieved through rationality. This is where the problem occurs, as far as design is concerned.

INTRODUCTION

As we saw in Chapter 2, the activity of design is believed to be primarily the mysterious and ineffable work of imagination – what Aristotle called *phantasia* – not the transparent and logical work of rationality. For Aristotle, as for Plato, imagination is a lower faculty than rationality because it cannot directly apprehend being, or ultimate reality. But where Aristotle differed from Plato is that he believed that imagination can embody ideas of ultimate reality, serving as a link between sensa-

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tion and reason. Thus Aristotle explains how the artistic imagination of architects and the scientific rationality of engineers can – and do! – meet in the activity of design. As far as engineering is concerned, it could benefit by regarding design as its core activity, developing a language of universal images, in the manner of Vico, and placing more emphasis on imagination as a fundamental feature of its professional culture. Although Ivar Holm (2006) has written extensively, and compellingly, that industrial design shares more with architecture than with engineering because of its concern for values more than knowledge, this does not seem to be quite right. Aristotle argued that *technē* is an activity of the practical intellect that is only concerned with perfecting the work of *making*, unlike prudence, the other activity of the practical intellect, which is only concerned with *doing* morally right actions. Designers are all more concerned with making new things than they are with doing right actions.

So far our discussion has focused on design pedagogy in both architectural and engineering studies, but it must be admitted that the information depicted by the discourse has displayed the education of architects more than it has the education of engineers. This imbalance was not deliberate, but it was, perhaps, inevitable. Design seems to be more related to art than it does to science, just as architecture seems to be artistic, whereas engineering seems to be scientific. Therefore, the discussion of design always tends to find architecture – which for many centuries has been recognized as a fine art – to be the best source of exemplars and models of "designerly" thinking. Added to this is the fact that architects freely discuss their work by using such terms as "beauty" and "imagination," while engineers appear to be reticent about using the vocabulary of aesthetics when discussing their work. Instead, engineers are likely to describe what they do in terms of finding ingenious technical solutions to difficult problems, and they tend to speak via mathematical equations more than through poetic language, although they do possess just as vivid a visual culture of design drawings as architects exhibit.

It seems to be time, then, to redress any imbalance in the chapters of this book between the discussion of architectural design education and the discussion of engineering design education. Toward that end the present chapter will begin with a summation of the argument to date, reviewing here, at the mid-point of the book, what we might safely say we have observed about design pedagogy and its relation to creativity, technology, and social conscience. Once this summation has been established, complete with a number of afterthoughts or loops intended to enhance and develop the previous examination, we will proceed to construct a firmer and more detailed explication of the ways that engineering students learn the theory and practice of designing.

This chapter also introduces another discipline and practice that we have not looked at so far. Industrial design is placed on view, not only because it is important, and perhaps even more socially and culturally prominent than either architecture or engineering design, but also because industrial design is especially significant in relation to the question of how design does and should (or should not) concern itself with a promulgation of values. Ivar Holm (2006) argues that it is precisely a strong reliance on values – in fact, on political thinking – instead of a reliance on knowledge, that aligns the practice of industrial design with the practice of architecture, but that argument is dubious and must be examined. To do so this chapter concludes with an appeal to Aristotle to demonstrate that what actually aligns industrial design with architecture – and both of these disciplines with engineering design – is that all these occupations are centered on making rather than doing, *technē* rather than prudence, and therefore none of them is inherently political, thus explaining their resistance to recent efforts to make them more socially and culturally and environmentally sensitive.

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