Chapter 3
Architects and Engineers

ABSTRACT

As designers, architects, and engineers are united by their commitment to technological thinking with the ultimate end of their productions being determined, not by the architects and engineers themselves, but by the consumers and users of the products that they visualize. Thus, prudential and practical considerations distinguish architects from artists and engineers from scientists, but the purely formal intellectual values of beauty and truth, enjoyed by artists and scientists respectively, tend to haunt architects and engineers and inform their personalities and dreams. Equally important is the fact that the ideals of beauty and truth tend to separate architects from engineers. A typology of contrast is evident here. Yet, because both these occupations share an identity as designers, it is necessary for scholars to merge architects and engineers conceptually. The first architectural theorist, Vitruvius in ancient Rome, argued that architects need to possess both theoretical knowledge and practical knowledge – that is, art or science and technology – and it is clear that Vitruvius's definition of an architect would include what we call an engineer. Vitruvius had an immense influence on architectural thinking, which for many centuries emphasized his ideals of beauty at the expense of practicality. This tendency is evident in both the works of the Italian Renaissance in the fifteenth century and later the Beaux Arts tradition in France that lasted until the twentieth century when function replaced form as the core value of architecture. At the same time in the modern age, engineers split apart from architects and established an independent profession.

INTRODUCTION

Marco Frascari (1988) argues that architects should employ a distinct epistemology based on the language of universal images advocated by Giambattista Vico in the eighteenth century. That

seems reasonable, but a question then arises: Is there a comparable language of universal images available to engineers that could serve as their epistemology? There probably is, but this possibility still needs to be investigated. So too does the possibility that there is a common language of universal images shared by all designers.

Designers create with a purpose by using technology to fulfill a social need. As we have already seen in Chapter 2, the rational end of creativity is creation – regardless of social demand – and this defines art, but not design. The trouble is, architects often conceive themselves as artists, whereas engineers almost always conceive themselves as technical scientists. In other words, the designation "designer" seems to fit engineers better than it does architects, and yet the core activity of both architects and engineers is usually identified as design.

In this chapter we will examine the architect *qua* architect and the engineer *qua* engineer for the purpose of establishing a typology for each of these occupations. The object is not merely to differentiate the architect and the engineer, in terms of work and temperament, but also to consider the act of designing as the essential similarity that these professionals share. Increasingly, as the 21st century unfolds, designing is going to be done through the expert use of ever-more-sophisticated information and communication technologies (ICTs). One important implication of this fact is that engineers, being technically oriented, will probably "take to the future" more readily than architects, being, as they traditionally have been, artistically oriented. It would therefore seem that the longstanding struggle between art and technology is destined to be played out dramatically in the field of architecture where the creative potential of computers is already being put to the test.

ARCHITECTS

In his comprehensive history of architectural theory Hanno-Walter Kruft (1994) recalls what the ancient Roman architect Vitruvius, the only surviving architectural theorist from the classical age, has to say about the typical architect in his masterwork *De Architectura*:

In the first chapter of Book I Vitruvius builds up a detailed profile of the professional architect. The architect must be a master of fabrica (craft) and ratiocinatio (theory). Ratiocinatio is a concept characterized by scientific content. Vitruvius demands a broadly ranging education for architects, on the ground that architecture makes varied demands upon its practitioner. The architect must be skilled in writing, in order "to be able to render his memory more reliable by the use of notes;" he must be a good draughtsman and have a command of geometry, in order to make correct perspective drawings and plans. A knowledge of the laws of optics is necessary for the correct use of light. Arithmetic is necessary for the calculation of costs and also for proportions. Historical knowledge is required if the architect is to understand ornament and its meaning. Philosophy should set its stamp on his character. An understanding of music is desirable for its application to tensions in siege machines and the building of theatres. Medical knowledge is called for in order to take account of the requirements of climate and of health in building. Vitruvius further stipulates a basic knowledge of building law and astronomy.

This portrait of the architect is still as true as ever, even after two thousand years. The first thing to note here is that Vitruvius states that the architect is a master of both craft and theory. This suggests that the work of the architect is grounded in knowledge, and it proceeds according to ideas that may be assumed to direct the technical ability that is also required in an architect. In terms of epistemology, *ratiocinatio* is abstract conceptual knowledge, the equivalent of Aristotle's *epistēmē*, in contrast to *fabrica*, (or *ars*) the equivalent of Aristotle's *technē*. Another way to look at this is to say that *ratiocinatio* is knowing by thinking, while *fabrica* is knowing by doing. Either way, knowing is primary. Architecture is surely an intelligent occupation, and the intelligence of

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