

wrote eccentrically about their work. In this country those architects who were unhappy about the growing influence of the Royal Institute of British Architects in the late nineteenth century argued that architecture was an individual art and should not be regularised and controlled. Kaye (1960) argued that this period of professionalisation did actually coincide with a period of rigidity of architectural style.

Design by drawing

The separation of the designer from making also results in a central role for the drawing. If the designer is no longer a craftsman actually making the object, then he or she must instead communicate instructions to those who will make it. Primarily and traditionally the drawing has been the most popular way of giving such instructions. In such a process the client no longer buys the finished article but rather is delivered of a design, again usually primarily described through drawings. Such drawings are generally known as 'presentation drawings' as opposed to the 'production drawings' done for the purposes of construction.

However, in the context of this book, an even more important drawing is the 'design drawing'. Such a drawing is done by the designer not to communicate with others but rather as part of the very thinking process itself which we call design. In a most felicitous phrase Donald Schön (1983) has described the designer as 'having a conversation with the drawing'. So central is the role of the drawing in this design process that Jones (1970) describes the whole process as 'design by drawing'. Jones goes on to discuss both the strengths and weakness of a design process so reliant on the drawing. Compared with the vernacular process, the designer working in this way has great manipulative freedom. Parts of the proposed solution can be adjusted and the implications immediately investigated without incurring the time and cost of constructing the final product. The process of drawing and redrawing could continue until all the problems the designer could see were resolved. This vastly greater 'perceptual span', as Jones called it, enables designers to make much more fundamental changes and innovations within one design than would have ever been possible in the vernacular process, and solves the problems posed by the increasing rate of change in technology and society. Such a design process then encourages experimentation and liberates the designer's creative

imagination in a quite revolutionary way, making the process almost unrecognisable to the vernacular craftsman.

Whilst design by drawing clearly has many advantages over the vernacular process, it is not without some disadvantages. The drawing is in some ways a very limited model of the final end product of design, and yet in a world increasingly dependent on visual communication it seems authoritative. The designer can see from a drawing how the final design will look but, unfortunately, not necessarily how it will work. The drawing offers a reasonably accurate and reliable model of appearance but not necessarily of performance. Architects could thus design quite new forms of housing never previously constructed once new technology enabled the high-rise block. What they could not necessarily see from their drawings were the social problems which were to appear so obvious years later when these buildings were in use.

Even the appearance of designs can be misleadingly presented by design drawings. The drawings which a designer chooses to make whilst designing tend to be highly codified and rarely connect with our direct experience of the final design. Architects, for example, probably design most frequently with the plan, which is a very poor representation of the experience of moving around in a building. For all these reasons we devote a whole chapter to the role of drawing in the design process later in this book.

Design by science

As designs became more revolutionary and progressive, so the failures of the design by drawing process became more obvious, particularly in the field of architecture. It became apparent that if we were to continue separating designing from making, and also to continue the rapid rate of change and innovation, then new forms of modelling the final design were urgently required.

It was precisely this concern that led Alexander to write his famous work *Notes on the Synthesis of Form* in 1964. He argued that we were far too optimistic in expecting anything like satisfactory results from a drawing-board based design process. How could a few hours or days of effort on the part of a designer replace the result of centuries of adaptation and evolution embodied in the vernacular product? Alexander proposed a method of structuring design problems that would allow designers to see a graphical representation of the structure of non-visual problems.