their own mental space can be seen from the observations made by several well-known architects. During the normal working day, single principals such as Herman Hertzberger, Eva Jiricna, John Outram, Ian Ritchie and Ken Yeang can be seen to move around the office or be sitting in the main drawing office space. This is clearly done to engineer maximum contact with the design team staff. However many make particular mention of their need to retire home to do their own design thinking, perhaps in the evening.

How a practice principal intervenes in the design team activity then becomes a matter of critical importance to the way ideas develop and the process is controlled. Richard MacCormac specifically refers to his role as 'making a series of interventions at different stages of the design process'. To manage this successfully requires not only design skill but a sense of timing and an understanding of the psychology of the group. Richard MacCormac talks of deliberately 'creating a crisis' and of finding 'someone in the design team who understands that crisis'. Other designers describe their relationship with their teams in a less confrontational manner. Michael Wilford likens his role to that of a newspaper editor who receives copy from his journalists and then suggests how it might be altered or the emphasis changed.

How design groups understand their collective goals

Design practices are intensely social compared with, for example, legal or medical practices where the partners and junior members work more in isolation. The design practice is most likely to be able to perform effectively once it has 'formed'. We have seen how this often implies the 'storming' or arguing stage, but also the development of group norms. These norms seem to be further reinforced in design groups by the development of a shared language and common admiration for previous design work. It is not unusual for design practices to hold regular meetings to which they invite speakers who are in turn often designers who talk about their work. Similarly trips to exhibitions and places of interest may be used to reinforce the group and develop the common view of good design precedent. This relies heavily on the sharing of concepts and agreed use of words which act as a shorthand for those concepts. The intensity of the design process is such, as we have seen, that

this shorthand is frequently needed during conversations about the emerging design. I have noticed how, when visiting a design practice to interview the members, certain words which might normally be thought rather esoteric may crop up quite frequently. In one afternoon at one practice, for example, the rather unusual word 'belvedere' was used by three different people independently whilst quite different issues were under discussion. Similarly, references to other designers, or well-known pieces of design, are likely to be made by way of explanation of what the designers are trying to do.

In a study of how design groups come to develop and share a common set of design ideas, Peng has identified two main patterns of communication, which he calls 'structuralist' and 'metaphorist' (Peng 1994). Peng's study was limited to a very small number of case studies, however an interesting feature of his two patterns seems to confirm my interviews with significant architects (Lawson 1994).

In Peng's structuralist approach, the design team work under the influence of a major set of rules which are known before the project begins and which serve to generate form while nevertheless allowing for a fair degree of interpretation by the group. His example of this is the development by the famous Spanish architect Antonio Gaudi of his design for the Colonia Guell in Barcelona completed at the turn of the century. It is well known that Gaudi was fascinated by the idea of funicular structural modelling. In simple terms this involves building the structure upside down using cords and weights thus allowing the main structural components to take their own logical configuration. Peng points out that the design team, including not only Gaudi but also his structural engineer and a sculptor engaged to provide the decoration, built a funicular model early in the design process which each could refer to for their own purposes. By contrast in Peng's metaphorist approach, the participants introduce their own ideas and attempt to find ideas which can then be used to embrace these, order them and give them coherence.

Earlier in this book we introduced the ideas of 'guiding principles' and 'primary generators' (see Chapters 10 and 11). In Peng's study, we see for the first time, a suggestion as to how these primary generators appear and are understood, not by an individual, but by a whole group. Some designers such as Ken Yeang have written down their guiding principles to form a set of rules which so dominate the design process as to be seen as 'structuralist' in Peng's terminology. Similarly, John Outram has published what he describes as a set of seven stages or rites through which his design