no 'neighbours across the way to look at. Many of the 'streets' did indeed connect with the ground as the architects claimed but only at the out of town end of the scheme, leaving most residents still needing to use the lifts to get to work or go shopping. So isolated visually were these 'streets' that residents did not feel inhibited in throwing broken household goods such as television sets off them to the considerable concern of those who walked below!

Such images, of course, are vital parts of the designer's process. In the last chapter we saw how many designers like to tell stories and build quite sophisticated images. Without this the ideas cannot be explored and developed. The image trap, however, is never very far away when the design begins to assume the physical and social reality of the images which are being used. They must be regarded as possible hypotheses rather than accepted as developed theses.

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14

Designing with others

For better or for worse, the individual is always and forever a member of groups. It would appear that no matter how 'autonomous' and how 'strong' his personality, the commonly shared norms, beliefs, and practices of his group bend and shape and mould the individual.
Krech, Crutchfield and Ballachey, *The Individual in Society*

Everyone is doomed to be the one he wants to be seen by the others: that is the price the individual pays to society in order to remain an insider, by which he is simultaneously possessor of and possessed by a collective pattern of behaviour. Even if people built their houses themselves, they could not escape from this, but instead of having to accept the fact that there is only one place to put the dining table, everyone would at least be enabled to interpret the collective pattern in his own personal way.
Herman Hertzberger, *Looking for the Beach under the Pavement*

Individuality and teams

Throughout this book we have seen that design involves a tremendously wide range of human endeavour. It requires problem finding, and problem solving, deduction and the drawing of inferences, induction and the creating of new ideas, analysis and synthesis. Above all design requires the making of judgements and the taking of balanced decisions often in an ethical and moral context. Designers usually possess highly developed graphical communication skills, and acquire the language of art criticism. Thus it is easy for us to imagine that graphical expression lies at the very heart of design. We have seen how designers' drawings can be viewed as art objects, intended to be exhibited and admired in their own right as objects of beauty. In the next chapter we shall see that designers converse with their drawings. All of this tends to distance designers from the rest of us in a way that can be misleading.

Design can be seen as a very special kind of activity practised by a curious breed of highly creative individuals. In the cinema and theatre, designers are often portrayed in a similar way to artists. These dramatic characters are temperamental and difficult to get on with, and seem consumed and driven by some inner passion which separates them from the rest of society. Sadly many designers seem to want to widen rather than bridge the gap between themselves and others. Their dress, demeanour and behaviour may be unusual and eccentric. In a way this is understandable since it offers a way of claiming authority. What else is a designer selling if it is not his or her creativity? We have come, rather falsely, to associate creativity with originality, so it follows that designers selling their skills want to seem original in as many ways as possible. Design magazines, newspaper reviews and television programmes all tend to reinforce this cult of the individual. As much as anything this probably demonstrates a journalistic response to our need for heroes. The media have recently used the term 'designer' to imply exclusiveness and out of the ordinary, as in 'designer-jeans'. Probably so far, this book has implicitly suggested that design is an entirely personal and individual process. However this need not be so and actually rarely is!

The reality that lies behind the dramatist's simple image and the advertiser's hype is much more prosaic. Designers are not actually special people at all, since we are all designers to a greater or lesser extent. We all design our appearance every morning as we dress. We all design the insides of our own homes, and personalise our places of work. Even planning and organising our time can be seen as a kind of design activity. Professional designers who actually earn their living by designing for others, often work in teams, hammering out, rather than easily conceiving their ideas. It is the team activity which is so often characteristic of the design process which we will study in this chapter. A very important member of that team is the client, and the relationship between client and designer will also come under scrutiny here.

Design as a natural activity

We all develop design skills, but for most of us this is a relatively unconscious process in which we are heavily influenced by those around us. We select, buy and then combine clothes and

furniture and in this sense cannot avoid being fashion designers and interior designers. We work in our gardens and become amateur landscape architects. In all these activities we are not only satisfying ourselves but also communicating with others and sending out signals about ourselves. Over the years I have acquired a substantial collection of photographs of the way people modify and decorate their houses to express not only individual but also group identities (Lawson 2001). Often this 'customising' has clearly been expensive and may have involved many hours of work. The non-functioning, decorative shutters which can sometimes spread through a housing estate like some kind of infectious disease are an obvious example. Here both time and money have been spent without gaining any strictly functional benefit, but purely to identify and individualise. This action can be seen as part of the process of taking possession of the house, and in many ways distinguishes the 'house' from 'home', by creating a sense of belonging. Too often our creative, professional designers feel such humble efforts to be an insult to their designs.

Of all the designers we have considered in this book, perhaps none understands and accommodates this so well as Herman Hertzberger. The involvement of users in the design process is a dominating feature of Hertzberger's whole attitude towards design. One might therefore expect him to consider this very deeply in the design of houses. Certainly this is true, but Hertzberger reminds us that this process of involvement in place extends from individuals to families and then out into larger communities. Hertzberger (1971) does not, however, see the designer's role as purely passive but as an active facilitator of the process:

> Just as a carcass house can be finished by its occupants and made their personal familiar environment, so also the street can be taken over by its residents. The opportunity to complete one's own house is of importance for self realisation as an introvert process: outside it, the other component manifests itself in the individual's belonging to others. For this reason, a prime concern in the street is to offer provocation and at the same time the tools to stimulate communal decisions. The street becomes the possession of its residents, who, through their concern and the marks they make on it, turn it into their own communal territory – after the privacy of the house, the second prerequisite for self realisation.

Cedric Green has suggested that it is important to recognise the natural way in which we pick up an ability to design (Green 1971).

This fact is often forgotten in schools of design. For Green, the development of design skills is more like the acquisition of language, in that it is a continual process beginning in early childhood. Certainly young children love arranging and rearranging their possessions. This activity is itself part of the process through which we learn not only to classify and categorise, but also to express ourselves. Just as we acquire larger vocabularies and become more fluent in our use of language, so Green argues, do we develop in design.

Although in the UK we have research councils for engineering, physical and social science, the natural environment, medicine, and even an Arts Council, we have no organisation for funding work which might benefit design. Whilst the learning and use of language has long been a field of study, relatively little has been done to understand our development as designers. Indeed design is generally taken for granted in our society and design skills are perhaps rather undervalued. As we grow up, language is taught in a formal and structured way and the study of language is legitimised by its place in our school curricula. Until recently, design was hardly taught at all in schools in the UK. Bits of activity in art, craft, music, drama and other subjects could be said to encourage design abilities, but there was no integrated approach to the teaching of design. At last, the syllabus for the fourteen-year-old child has begun at least optionally, to include design subjects, but there are still blank years from the start of schooling at about aged five when design is hardly taught at all. Perhaps this is another reason why ordinary people sometimes feel a little intimidated by professional designers.

Design games

So it is important to recognise that design is a natural activity and that design students come to their courses prepared through childhood to design. Many have therefore argued that design education should in some way continue this process as well as professionalising it. For some, this implies the use of games. It is through play that children acquire so many of the skills vital to adult life, but the formal use of games as educational tools is a relatively recent phenomenon. This sort of educational game is usually intended not only to develop an appreciation of a problem, but also to explore it in a social context in which the roles of

the players are seen as a legitimate field of study (Taylor and Walford 1972):

> The behaviour and the interaction of players in a game can possibly involve competition co-operation, conflict or even collusion, but it is usually limited or partially prescribed. An initial situation is identified and some direction given about the way the simulation is expected to work. Some games nevertheless are still primarily concerned with the desire to 'understand the decision making process', as in role-play; others, however, may be moving towards a prime desire to 'understand the model' or examine the process which the game itself represents.

As we have seen throughout this book, design cannot be practised in a social vacuum. Indeed it is the very existence of the other players such as clients, users and legislators which makes design so challenging. Merely working for yourself can be seen more as an act of creating art in a self-expressionist manner. So design itself must be seen to include the whole gamut of social skills that enable us either to negotiate a consensus, or to give a lead. This in turn implies the existence of tension and even conflict. There is no point denying the effect of such interpersonal role-based conflicts on design.

Designers seek to impose their own order and express their own feelings through design. This is not just pure wilfulness, as some would have it, but a necessary process of self-development through each project, and in many cases a need to maintain an identifiable image to prospective clients. The client, however, is often ambivalent here. Certainly the client is in control in the sense that the commission originates from, and the payment is made by, the client, but in every other respect the designer takes the initiative. The more famous and celebrated the designer, the greater the client's risk, for such designers live in the glare of publicity and are unlikely to wish to compromise their stance. Client/designer tension then is inevitable and an integral part of the problem. In those forms of design where clients are not users, an added element of tension is likely not only between the client body and the users, but also between user groups. Indeed in this case it is actually the designer's job to uncover this tension; a process which can make for an uncomfortable life. I remember only too well working hard to resolve the deep underlying tensions between doctors, nurses and administrators when designing hospitals. Probably one of the most recorded and romantic design processes of the twentieth century was that of the Sydney Opera House. The fact that the architect walked out of the project, that the client had to raise huge additional funds, that a major contractor went financially

unstable, that the whole thing took many times longer to build than was envisaged, all contribute to the scene of continuous and substantial conflict. And yet the final outcome is one of the most recognisable and celebrated pieces of modern design anywhere in the world.

The legislator role introduces yet more potential conflict, which can take surprising forms. Conventionally we have the image of the designer and legislator locked in battle, with the designer often representing the unstoppable force and the legislator the immovable obstacle. Richard Rogers' description of his problems with the Parisian fire department, which we saw in Chapter 6, is a dramatic example. However, it is not always so. Sometimes, for example, planning authorities can provide a brake to restrict the client's commercial drive, and the architect, taking a wider urban view, may have considerable sympathy with such restrictions.

This then introduces us to a complication which any student of social relationships would already have recognised as inevitable. Where groups are involved in decision making, not only may tensions exist, but also coalitions and thus factions. Designers then, frequently need social skills to carry through their ideas. Users, clients, legislators and builders or manufacturers must all be persuaded and convinced if the design is really to come to fruition. On the whole the larger the scale of design the more central and vital these skills become. It is therefore not surprising that simulation and gaming techniques have been used in the education and development particularly of town planners, urban designers, and to a lesser extent architects. This is noted by Taylor and Walford (1972) in their study of the educational use of gaming and simulation techniques:

> Urban development gaming has also expanded at a remarkable rate as planning has become more of a total science and less exclusively concerned with the technological aspects of bricks and mortar. Hence planners have built upon the games developed by business analysts, economists, political scientists, organisational psychologists and sociologists to present a more balanced synoptic view of selected aspects of human settlement; they describe, simply, the milieu within which the planner works.

Interestingly, Taylor and Walford, who illustrate their thesis with a number of games, give the details of a game which they call the 'Conservation Game'. In fact this game simulates the final deliberations of the Roskill Commission Inquiry into the third London Airport which was discussed in Chapter 5 of this book. Here, however, the participants of the game are allocated roles in

order to bring out the conflicts between the potential gainers and losers at each site. In order to give the game a fresh impetus, sites may be selected for examination other than the four dealt with by the real inquiry. Such a game can simulate and bring to life the social elements of the design process, which this book can only describe. The relationships which exist between people, the ideas for which they stand, and their perception of each other, all contribute to decisions along with the logic and passion of the arguments.

So far we have been concerned with the effect on the design process of the various roles played by the participants in relation to the designer, and the designer has been implicitly seen in the singular. However, this is by no means the only way to design. Large projects such as buildings usually involve a whole design team, and those teams are normally comprised of smaller teams of specialists. A building of any size will need not only architects, but also quantity surveyors, structural and service engineers, and more complex buildings may involve many other even more specialised consultants. Both the individual specialist teams and the overall project team can be seen to exhibit group dynamics, and to behave not just as a collection of individuals. Whilst some architects prefer to be independent, others have deliberately chosen an integrated form of practice in which the various skills are combined into project teams. An examination of professional diaries is likely to show that most architects spend more time interacting with other specialist consultants and with fellow architects, than working in isolation, and yet this is hardly reflected in the curricula of most schools of architecture.

Cedric Green explored the problems of co-operation between architects with a clever adaptation of a children's competitive game called Connect created by the graphic designer Ken Garland for Galt Toys. Garland co-operated with psychologists in the design of symbols in the workplace and this clearly lead him to develop a minimalist approach to graphics which seems ideally suited to the naturally inventive and imaginative world in which children live. He has since used this expertise to develop many other much loved graphical games for children, but would probably have been both surprised and interested to see his game in a school of architecture! Connect consists of a series of tiles with coloured tracks running across them in either straight lines or curves, and sometimes these tracks split or simply stop. In the original game the tiles are dealt out to players who must lay them down in turn following the logic of the tracks, so as to be the first to use up their allocation.

Essentially then this is a kind of graphical dominoes, where the end product can be as visually fascinating as the playing. Green, however, bent the rules in order to produce a game in which a team had to co-operate to produce a design which had to meet various physical and cost requirements.

This idea was extended into a more realistic game, Gambit, by using special magnetic tiles which represented building elements which could be arranged on a grid to create diagrammatic architecture (Green 1977). These designs could be 'costed' according to simple formulae to evaluate capital cost, heating cost, structural efficiency and so on. The members of the teams played out the various specialist roles to be found in the real world building design team. While this technique is unlikely to produce great architecture it does provide a superb vehicle to explore the group dynamics of these teams. The follow-up discussions show how tensions develop and how teams able to deal with these tensions could outplay teams with those seen as 'highly talented designers'.

This illustrates the message of this chapter, that design is often a collective process in which the rapport between group members can be as significant as their ideas. These ideas had already been demonstrated by Rae who had used highly formalised games with design students at the Hornsey College of Art, not intended to model the design process, but specifically to emphasise the significance of group dynamics and the adoption of either competitive or co-operative roles in group performance (Rae 1969). Of course, students also learned about the building design problems themselves, and were forced by the format of the game to confront their own implicit prejudices about what was important in architecture.

Green also developed games for use at the urban scale. In this case students first studied a complete local area in which they were later to design buildings. Arising from this study the students were able to identify key players in the area such as residents, landowners and employers as well as architects, planners and developers. The game began with a Lego model of the area as it stood and the students, playing the roles already identified, began a process of negotiation to explore the future of the area. The enthusiasm with which architecture students adopted roles of which they were normally highly critical, for example highway engineers, was remarkable, and the result was often a rather heated and protracted argument. It seems highly unlikely that such an in-depth analysis could be achieved by individuals, who

inevitably find it difficult to represent conflicting points of view in their own mind. Green has also suggested that such a game might profitably be played by players from the real world as a way of 'anticipating and neutralising conflicts which in reality are extremely damaging and usually caused by difficulties of communication and understanding of values' (Green 1971). It would be a brave planning authority indeed which took up Green's suggestion!

Peter Ahrends, Richard Burton and Paul Koralek have not only built a reputation as creative architects but seem to have built some deliberate methods of carrying Green's message into practice. Richard Burton tells us how the three partners adopt roles during a design project in order to represent views to the others (Burton et al. 1971):

> At this stage, and in the conventional way, one or two of us begin a relationship with a client and the same participants continue for the scheme's life. We have observed that the member of the group who deals with the client unconsciously represents the client in the group and acts as a sounding board for the others. He also tends to balance the freer movements of the other two. The difficulties for our group stem, at this stage, from a tendency to have premature ideas based on one aspect of an undigested brief. The advantages stem from the lack of total involvement of two members of the group, one of whom is likely to be detached enough to see some twist in the changes of the direction of the inquiry.

Burton goes on enunciate the value of group dynamics in holding creative ideas in perspective.

> At this point, the group has a distinct advantage over the individual, because ideas can become personal property or one's own intellectual territory. The strength of that territory is considerable, and the difficulty of working alone is often in the breaking of the bonds caused by it. With a group the bonds are broken more easily, because the critical faculty is depersonalised.

Some years later Richard Burton was to demonstrate the power of the group in a remarkable process used for the design of his acclaimed St Mary's Hospital on the Isle of Wight. He assembled a group from the three client bodies representing the various health authorities, members of his ABK team and their consultants. During a three-day period of intensive design activity this group agreed the main headings of the brief, identified three basic design strategies and selected one for further development including rough costings (Fig. 14.1). In fact the final scheme as built was essentially a working up of this final idea (Fig. 14.2).

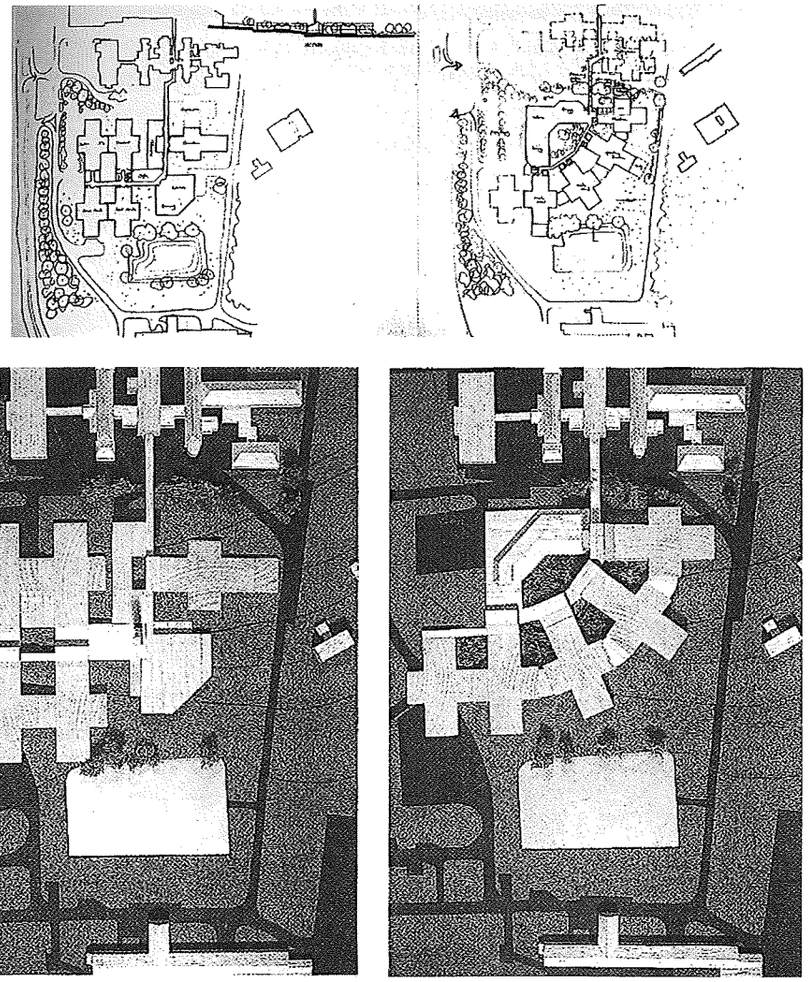

Figure 14.1
Two of three alternative schemes developed by a team of clients and designers over a three-day period for St Mary's Hospital in the Isle of Wight

Group dynamics

All these ideas in some way depend on the concept of a group, which acts not just as a collection of individuals, but also in a manner somehow beyond the abilities of the collective individual talents. This concept resembles the Gestalt psychologists' view as 'the whole being different from the sum of the parts', although in this case it is clearly the relationships between the parts which

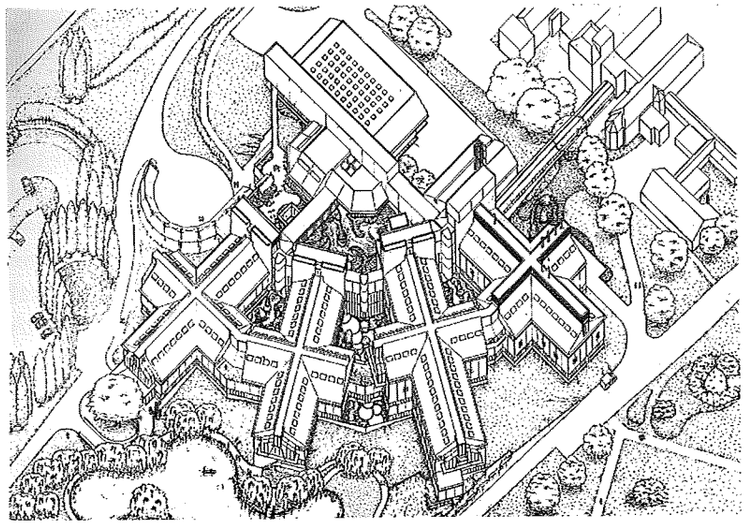

Figure 14.2
The selected scheme worked up later in the design process

contribute most to that difference. Groups as social and psychological phenomena have been studied and written about perhaps as much as any aspect of human behaviour, and there are too many perspectives on the group for us to deal with such an idea more than very briefly here. However, from what has already been discussed in this chapter, it seems at least sensible that designers should be aware of the way their thinking might be affected by group behaviour, and of the way in which they can influence the thinking of other members of groups within which they work.

Much effort has been expended, in the literature on groups, on attempts to define the word itself. As a consequence we are probably more confused now than ever before, but Hare's (1962) description of why a group is not just a collection of individuals will probably serve our purpose here.

> There are then in sum, five characteristics which distinguish the group from a collection of individuals. The members of the group are in interaction with one another. They share a common goal and set of norms, which give direction and limits to their activity. They also develop a set of roles and a network of interpersonal attraction, which serve to differentiate themselves from other groups.

This introduces us to a number of notions which are central to the understanding of group behaviour, the perception of goals, the development of norms, and the characteristics of interpersonal relationships. These ideas are in reality all so interwoven as to be impossible to separate sensibly other than for the purposes of

initial analysis. Such analysis is however fairly common now in areas in which groups must perform, although regrettably little has yet been written explicitly about design groups.

It is now not uncommon for competitive teams to employ sports psychologists, not just to develop personal skills but to weld the team together into a more effective unit. It is well known that teams playing away from home are generally less likely to win than those playing at home. By studying football results in the UK and abroad both past and present, Desmond Morris has calculated that in general away teams find it roughly twice as difficult to win as home teams (Morris 1981). There are some obvious disadvantages suffered by the away team which include the journey, unfamiliarity with surroundings and conditions, a hostile crowd and so on. However, all these afflictions are also suffered by touring international teams, and in particularly large measure. In general, however, these teams seem to be able to offset these disadvantages by the social cohesion which develops from the extended contact which is enforced by the tour. It is no accident that touring teams usually play minor opponents they would be expected to beat before the international series begins. Clearly then the performance of a group can be significantly influenced by such factors as group morale, whatever that might be.

Group norms

One of the most significant factors in the formation of effective groups seems to be the development of group norms. Such norms may include conventions of dress, speech and general behaviour and serve to suppress the individuality of members in favour of an expression of attachment to the group. That such a movement towards conformity should be a force for good in a group devoted to creative work seems at first rather strange, and indeed here we find one of the fundamental problems in the life of such groups. However, we shall return to this a little later. It is beyond dispute that in general groups develop norms. Certainly this can be seen very clearly in sporting groups or teams, where uniforms, running jokes, and habitual gestures and terminology abound. Of course, in such cases the supporters also develop such norms, but the behaviour of large crowds is hardly relevant here.

One of the characteristics of group norms is that they often involve some form of regressive behaviour. Standards of behaviour

which would, in other social contexts, be seen as rather questionable can become quite normal in small groups. This can be true even though the individual members would also find their own behaviour odd outside the group. I was once concerned with the development of a large open plan headquarters office for a very large nation-wide company. This company had previously been housed in a variety of separate smaller buildings of differing ages and types scattered around the town. The architects department, however, had been familiar with open plan accommodation through their large drawing offices and they had developed such group norms over an extended period. Once relocated in the new office they quickly became regarded as a nuisance by members of other departments due to the rather regressive nature of their group behaviour which involved such things as community singing, rehearsing scenes from the previous night's television comedy programmes, flying paper aeroplanes, and very casual dress.

Tracy Kidder's account of the design of a new Data General computer is rich in material illustrating the importance of group dynamics and interpersonal relationships in the performance of a design team. Kidder (1982) describes how groups sprang up within the team and gained identities through their behavioural norms. In particular the young graduates who joined the team and were regarded as 'kids' by the older hands, were to split into those who designed hardware and were known as 'Hardy Boys' and those who designed microcode and were known as 'Microkids':

> Some of the recruits said they liked the atmosphere. Microkid Dave Keating, for instance, had looked at other companies, where de facto dress codes were in force. He liked the 'casual' look of the basement of Westborough. The jeans and so on. Several talked of their 'flexible hours' . . . There was an intensity in the air. 'I kinda liked the fervour and wanted to be part of it'.

Kidder describes how members of these groups were seduced into them by the atmosphere created by the norms, even though an extremely important norm seemed to be one of very long hours and hard work.

> He was essentially offered the chance for some gruelling work, and he accepted with alacrity . . . There was, it appeared, a mysterious rite of initiation through which, in one way or another, almost every member of the team passed. The term that the old hands used for this rite . . . was 'signing up'. By signing up for the project you agreed to do whatever was necessary for success . . . From a manager's point of view, the practical virtues of the ritual were manifold. The labour was no longer coerced.

The results of this astonishing team were that Data General developed one of the most famous series of computers to be designed, and in the face of powerful opposition from larger and much more established companies such as IBM and DEC. There can be no doubt that this group was indeed greater than the sum of its individuals. The documentation of how such creative groups work is rather poor. Possibly this is partly a result of the cult of the individual designer, which seems to be a more misleading than helpful image, and effective groups are probably therefore far more common than the literature might suggest. We have already made mention of the Ahrends, Burton and Koralek partnership who also seem to have built a remarkably creative group described by Richard Burton.

> Over the years we have developed what might be called 'group territory': that is, a pool of common word associations, experience, ideas, and behaviour. We are agile in such territory.

Norms are often not developed without some pain. It is sometimes said that groups go through phases of 'forming', 'storming' and 'norming' before 'performing'. This is because norms to some extent must grow out of the collection of individuals. As each tries to impose his or her character on the group, conflicts are likely to arise before common perceptions of the group's goals and accepted norms develop. During this phase individuals often begin to acquire roles which appear from the outside as caricatures. It can be a strange experience to talk to a member of a group which also contains a fairly close friend. The group may well collectively see your friend in a very different light to you because of the role that has been established for that person in the group. These roles simultaneously often help to facilitate the business of the group and become part of the folklore which binds the group together. Thus a member may quite unjustifiably acquire a reputation as a heavy drinker, giving the group both a running joke and a ready-made excuse to adjourn, ostensibly on his demand to a place of informality.

'Leaders' are obviously valuable in a group which from time to time needs a direction imposed upon it. The dictatorial leader, who directs without consensus, or a multiplicity of leaders, can equally be quite damaging to the performance of the group. The 'clown', who apparently never takes matters too seriously, can be useful in defusing conflicts which otherwise might escalate into permanent rifts within the group. The 'lawyer' who prefers to study the rule book rather than develop the main creative thrust,

can paradoxically be most useful in design groups. In such groups the behavioural norms are unlikely to encourage great respect for conformity, regulation and bureaucracy. In general therefore the members are unlikely to be particularly interested in procedure or rules within which they must work. Group members who are so minded, therefore, can be useful in keeping a group on the road, although they are likely to be considerably undervalued by their colleagues. Some roles serve to flatter other group members: the 'dunce' for example, who is in reality much brighter than it appears but who makes others feel they contribute good ideas, or have outstanding talents.

Of course not all roles are productive all of the time, and the skill of managing such groups often lies in recognising the roles members are playing. I have used games to illustrate this to design students, who are likely eventually to become group leaders. In these games, mock meetings were held at which each participant was given a secret 'hidden agenda', and a suggested role through which this could be expressed. Another member was then charged with chairing the meeting whilst uncovering these hidden issues, to attempt to bring them out into the open, and at the end of the game to articulate the roles being played.

One of the problems with group norms is that they can become too powerful and too habitual, and as a result serve to suppress deviance and originality which, when combined with their tendency to encourage regression, can cause groups to lose their grip on reality. Richard Burton seems aware of this when he tells us that it is 'essential that the group should not become a small closed community' and warns that 'we see closed communities as seed-beds of fantasy'. Burton suggests two remedies for this can be found by either changing the group membership, or returning to the idea of deliberate role playing discussed earlier in this chapter.

> We short-circuit many explanations within the group, and this makes it difficult for us to work with anyone who hasn't some working knowledge of group territory. To rely continually on common assumptions can be dangerous, not least because it can lead to stagnation, and so we welcome intervention, which can be either external or from within the group (in which case one partner acts as 'devil's advocate').

Burton's mature perspective on the way his group works is probably rather unusual, and it is more likely that many creative groups are rather less conscious of their performance and of ways of managing and optimising it. For this reason it seems likely that design teams or groups may have a natural life span. It is not surprising

that many creative partnerships eventually break up. A highly individual talent may be nurtured and initially nourished by a group, but, rather like a child growing up, such an individual seems to find a moment when it seems inevitable that he or she must leave. Alternatively such a member may continue in the group, but by departing from its norms, eventually become rejected by the group. This can often puzzle those of us outside the group who admire what it has done. At its most extreme such a phenomenon can be seen in the very public splitting of pop music groups such as the Beatles. For years their admirers may totally fail to understand how they could apparently throw away such a productive relationship, and hope they will team up again. Such groups rarely form again, for the conditions which brought them together can never really be recreated. Design partnerships often seem to split up over the most apparently trivial issue and, rather like marital divorcees, become quite antagonistic and publicly critical of each other. Such is human nature, and whilst we can often describe it and sometimes explain it, we can less often control it. Occasionally we can harness it, possibly only for limited periods, to generate what is perhaps the greatest satisfaction we can achieve: creative and productive group work.

Design practices

Design groups are special in a number of ways. They are usually purposive, committed and have pre-defined leadership. Indeed one of the jobs that the principle of a design practice must undertake is to decide how to construct the social organisation of the practice. In a study of the design practices of a number of leading architects, several quite different patterns of organisational structure were observed (Lawson 1994). Perhaps one of the most important issues here is the relationship between the most senior level in the practice and the individual project teams. Of course some design practices have only one single principal while others have three or even many more and may become very large organisations. Where the practice has more than one principal the basic structure can take a number of quite different forms. The principals can effectively operate as semi-autonomous but federated practices each served by their own set of staff. ABK seem to operate generally this way with Peter Ahrends, Paul Koralek and Richard Burton each working with their own groups and on their own projects. Obviously the partners

here will still share the infrastructure and discuss and exchange ideas, but they act in a fairly independent way. At the other extreme can be found the famous architectural practice of Stirling and Wilford. Until the untimely and tragic death of James Stirling, he and Michael Wilford shared a room, which in turn looked onto the general office through a large and normally open doorway. These two partners both worked on the same projects and hardly divided at all, even overhearing each other's telephone conversations and discussions with other staff. The practice of MacCormac, Jamieson and Prichard displays yet another structure, which we might think of as a corporate model. Here each of the partners plays a particular role, with Richard MacCormac 'initiating the design process', Peter Jamieson looking after 'technical and contractual matters', and David Prichard being 'very much a job runner'.

All of these practices are highly successful and produce much admired architecture, so all the organisational structures that they represent appear to work. It seems therefore to be largely a matter of personal management style which determines the overall pattern of the design practice. Virtually all the architects in the study knew how big their ideal practice was. The numbers varied but there remained little doubt in the minds of those asked. It almost seems that most designers have their own feeling for how many people they want to be responsible for and to manage. Ian Ritchie advanced the argument that design teams need to be 'about the number of people who can basically communicate well together'. He favours design teams of about five people, and has an ideal practice size of five of these groups.

The principal and the design team

Clearly design depends upon both individual talents and creativity and the group sharing and supporting common ideals. Controlling the balance between individual thought and group work is likely to be crucial. We can see the design team as having both individual and a group 'work space'. In particular there is also the individual work space of the practice principal most concerned with the project. The relationship between the principal and the design team seems at its most critical in the single principal design practice. Here the practice is quite likely to be named after the principal and it is his or her personal reputation which must be defended. The need that this individual titular principal has to find

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

process must pass. Outram himself is quite explicit about the impact this has on the design group when discussing the way his own staff respond.

> The staff who get on best are the ones who regard it like another aspect of the game that they are expected to play, you know. There is the district surveyor, there's the quantity surveyor, there's the structural engineer and there's John Outram.

By contrast, other designers confess to not even being able to remember how their group developed the main idea for a design. Richard Burton records that 'at times we have tried to remember who had a particular idea, and have usually found we can't'. This phenomenon is also described by Bob Maguire (1971) who tells us that in his practice ideas can suddenly appear without being the obvious property of any one member of the group:

> It is no one person's idea. We have no clear memory of it except of an experience analogous to doing a jigsaw puzzle very fast.

The architect Richard MacCormac was also quite explicit about this when describing work on the design for his much acclaimed Headquarters and Training Building for Cable and Wireless (Figs. 14.3 and 14.4) (Lawson 1994).

> I can't quite remember what happened and either Dorian or I said 'it's a wall, it's not just a lot of houses, it's a great wall 200 metres long and three storeys high . . . we'll make a high wall and then we'll punch the residential elements through that wall as a series of glazed bays which come through and stand on legs.

We also saw in Chapter 11 the phenomenon at work in another project for the chapel at Fitzwilliam College in Cambridge. The worship space on the first floor eventually became described by the group as a 'vessel'. This was then to inform the way the upper floor was constructed and 'floated free' from, whilst still supported by, the lower floor walls.

While Peng does not envisage this in his own analysis, it seems highly likely that what he calls structuralist and metaphorist patterns of group communication may well coexist in any one design process. Where strong guiding principles are held by the design practice, these are likely to influence each project and suggest a structuralist approach. However, even here the project specific characteristics of the particular combination of constraints may still provide enough novelty which may well encourage an element of metaphorist group thinking.

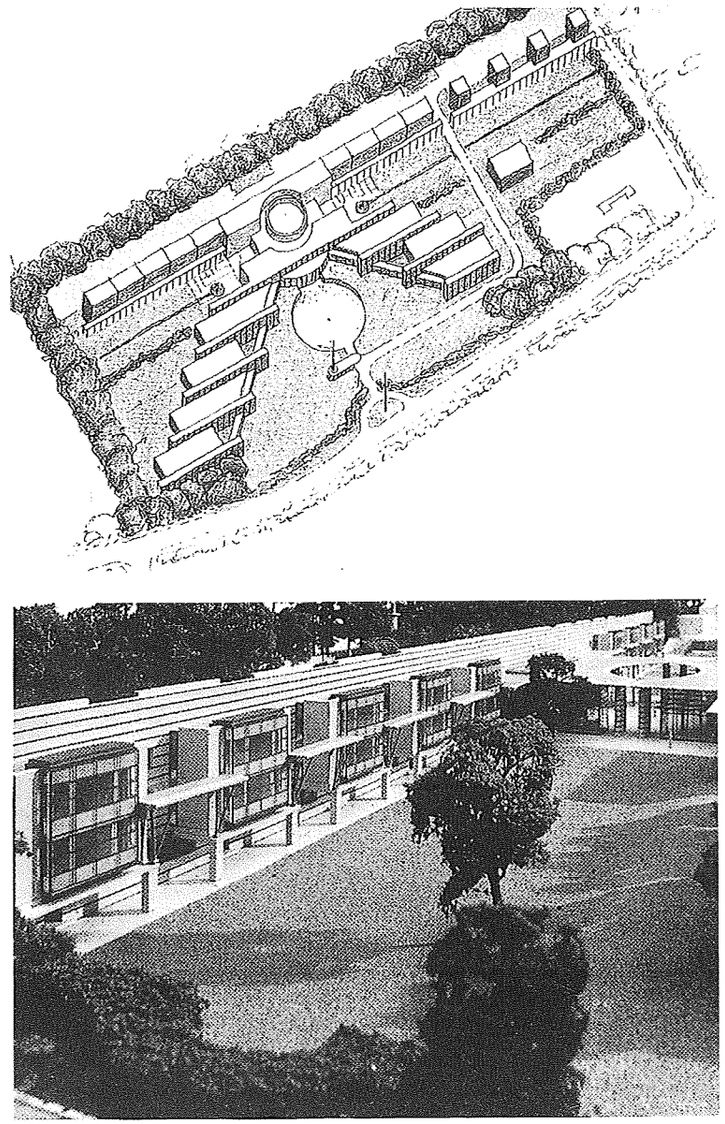

Figure 14.3
A design sketch of Richard MacCormac's design for the Cable and Wireless Training Centre and a later model showing the 'great wall'

The role of the client

Although we cannot help but see the designer at the centre of the design process, we must take care not to neglect the importance of the roles played by others, most notably the client. We have seen how design problems and design solutions tend to emerge together rather than the one necessarily preceding the other.

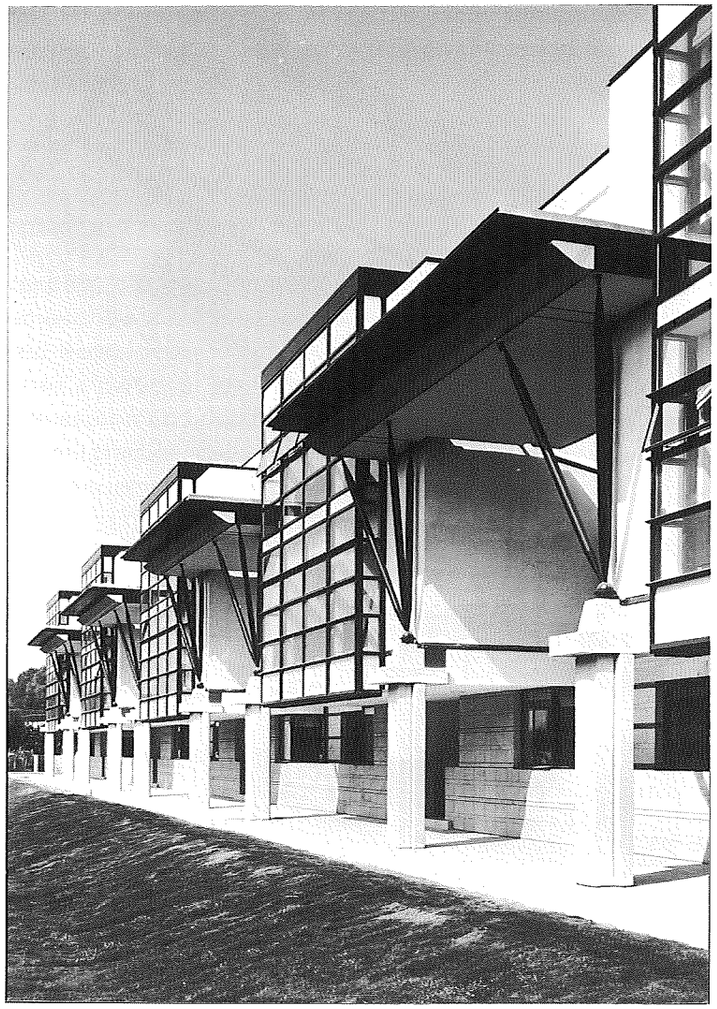

Figure 14.4
The 'great wall' of residential accommodation as actually built

Michael Wilford describes this as 'gradually embellishing' the brief with the client as the process develops. Eva Jiricna feels that 'the worst client is the person who tells you to get on with it and give me the final product'. Michael Wilford (1991) also sees the client's role as much more active:

> Behind every distinctive building is an equally distinctive client.

This suggests that the client plays more than just a peripheral role. Obviously, the client will probably be extensively involved in the process of drawing up the brief, but many designers seem to prefer the continuing involvement of the client throughout the process.

In contrast with the image of the designer so often portrayed by the magazines and journals, many designers do indeed enjoy close working relationships with their clients.

We use the word 'client' to refer to those who commission designs rather than the word 'customer'. This suggests that the designer is to be considered a 'professional' and thus to owe a greater duty of care to the employer than might be expected by 'customers'. In essence a client has the right to expect to be protected from his or her own ignorance by such a professional. This is in sharp contrast with the notion of 'caveat emptor', or 'buyer beware' considered the norm in commercial contracts. Such a relationship then must clearly depend upon trust, and good designers can be seen to go about building this trust in a number of ways. Herman Hertzberger tells us that his design process cannot work unless this trust is established and explains this with a catering analogy (Lawson 1994):

> If you have not got a good relationship in the human sense with your client, forget it because they'll never trust you. They trust you as long as they have seen things they have eaten before, but as soon as you offer them a dish they have not eaten before you can forget it.

This important lesson for designers reminds us that if we really want to be creative and innovative, then we must first establish confidence in our clients. Perhaps behaving too outlandishly and effecting too eccentric a position may not work after all. Of course this trust has to be a reciprocal relationship to work and the client must offer their trust in order to get the best from their designer. In today's litigious world when the idea of the professions is under attack from government, this may seem an old-fashioned notion. Clients and designers, however, generally seem to agree that some of the very best design comes from these kinds of relationships. Robert Venturi and Denise Scott Brown talk of their need to have the client 'let the architect be on their side'. In our contemporary world we seem to be encouraged at every turn not to offer trust, so the building client employs a project manager to oversee and protect the client's interests in dealings with the architect. More often than not this serves only to make communication complex and remote, and consequently increases the likelihood of misunderstanding and lack of insight into the real issues by the designer.

Just as the designer works in a team, so often does the client. Few major pieces of design are commissioned by a single individual but more usually by a committee of some kind. When the design and construction processes are lengthy, as can often be the case with architecture, the client committee frequently changes its

membership during the commission. Michael Wilford points out that sometimes the changes in personnel in a client body can result in the architect being the only one who has followed a project right through and can remember why decisions were taken. As client personnel change there may also be a temporarily diminished level of commitment to the project which the architect must survive.

> As a result of that you can sense the project languishing on the back burner with nobody agitating it.

Design as a group activity

Critics and commentators will probably continue to present design as the product of highly talented individuals. There is certainly a little truth in this image, for our studies of creativity have suggested that a relatively small number of people are highly creative. However the day-to-day reality of design practice is much more one of team work. Even the enormously talented and creative individual owes much to those who must work to realise the design. Barnes Wallis is quite sure that 'good design is entirely the matter of one single brain' (Whitfield 1975) and this may be true for some people and some projects. It may also be the case that a combination of team and individual work may be more powerful. Moulton, the designer of the famous bicycle, values group working in commercial product design, but only after a technical concept has been originated by an individual. On the other hand Robert Opron, the designer of Citroen and Renault cars, believes in team work from the outset. Opron (1976) however also recognises the inevitable tensions here between the creative individual and the group.

> The real problem is to find executives who are prepared to accept discipline and to subordinate themselves to the interests of the final product.

The great architect and engineer Santiago Calatrava must surely rank as one of the most powerful minds at work in architecture in our time, and yet he finds no frustration in having to work in a team. In fact it seems that it is precisely the need to communicate and co-operate which makes designing so rewarding for him. He explains this by telling a joke about the great painter Raphael. If Raphael had lost both his arms, says Calatrava, he might not have been able to paint but he could still have been a great architect. 'The working instrument of the architect is not the hand, but the order, or transmitting a vision of something' (Lawson 1994). It seems that we take a great

deal of satisfaction from successful collaboration whether it is on the sports field, in the musical ensemble or the design practice. Sharing and understanding a set of design ideas and then realising them together can be extremely frustrating, but is also ultimately extraordinarily rewarding. This is reflected by the engineer, John Baker, who developed the design and build organisation IDC, who tells us that 'working in this completely integrated team is as thrilling as any experience I have ever had'.

Design process maps revisited

It is time now to return to the maps of the design process that we explored much earlier in the book, but this time in terms of how the process works not inside a single head but when teams and organisations are involved. In Chapter 3 we saw some of the tricky methodological problems that inevitably arise when we try to study the design process. First we looked at prescriptive views of the process in the RIBA and Markus/Maver maps. These apparently quite logical maps suggest we should be able to see clearly defined phases of work at quite different tasks such as briefing, problem analysis and solution synthesis. We have seen empirical evidence that suggests such maps turn out to be unrealistic in practice. We looked at quite abstract laboratory studies of the design process. Then we found that senior design students adopted a strategy that differed from novices and students who studied other subjects. More realistic experiments tended to confirm these results and suggested that designers do not separate out the activities of analysis and synthesis into discrete stages as we would expect from the logical steps that we would predict based on the prescriptive views of the process. Then we found from interviews with designers that even briefing may not be a discrete stage but an activity carried on throughout the whole process.

So which of these pieces of evidence should we find most convincing? In general it seems preferable to have empirical data rather than supposition. However such a view tends to drive us into a more controlled laboratory situation which in turn distorts the process we are trying to observe. Perhaps the interviews are more reliable since such a research method leaves the process untouched and examines it in retrospect. Of course this simply exchanges one distortion for another. How do we know if the memory of the designers we interview is accurate? Perhaps they

even have reasons for convincing themselves that they work in particular ways and thus almost deliberately distort their account.

The answer to this conundrum is of course that a good researcher takes all this evidence into account and tries to understand the whole picture. It is also the case that as a research field matures and its participants grow more confident about their subject, the methods they use tend to change. Thus very early design methods research was based on assertion, then on very carefully controlled laboratory work, then on observation of more realistic but still controlled conditions. More recently interviews and longer term investigations of real practice have become more popular. Such investigations also tend to recognise that design is more often than not carried out as a result of actions by many people rather than solely by individuals.

The nature of design organisations

This emphasis on the team has brought with it an entirely understandable wish to return to the idea of clearly defined maps of the design process. One particular set of enthusiasts for this view summarises the argument very succinctly. 'These researchers believe that a shared understanding can be achieved if all of the team members can agree on a shared design strategy' (Macmillan et al. 2001). They argue that in multi-disciplinary design such as construction the benefits of such a shared strategy are that the 'design teams can work in a synchronised and efficient manner'. This argument fails to identify two major problems with such a notion. First the argument assumes that efficiency of process equates with better design and absolutely no evidence is given to support such a position. Everything that we know about the creative process sadly would suggest this is unlikely to be the case. Second the argument assumes that all the participants would actually stick to the process map rather than detour from it should their own design expertise suggest this might be desirable. As we shall see in the next section, what evidence we have again suggests this is unlikely without some form of heavy policing.

So in spite of all the evidence that suggests that design strategies are extremely varied and highly personal, this group of researchers then set out to define yet another version of the process map. Interestingly they conclude that there are probably three levels at which such a map can be drawn which they call 'project specific', 'global' and 'categorical'. The 'project specific' map is rejected effectively on the grounds that it allows too much

freedom and variation. The 'global' map is rejected on the grounds that it is practically impossible to achieve. This leaves the 'categorical' process map which is a sort of half-way house in which there is a standard framework imposed which has a series of defined phases but allows for non-generic processes to occur within each phase. Such a position is justified on the basis of some interviews with designers. In these interviews it was found that designers could not clearly remember iterations of their process across the boundaries between the phases defined in the standard map, but they could remember clearly moving from one phase to another. The map is not tested but the validation relies upon interviews with designers in which they are asked if they could work with such a map. As the authors themselves admit, such recollection of the detail of a process sequence is unlikely to be reliable.

One way in which such process maps can be introduced is through some powerful controlling agent operating within the situation. We have seen the growth of increasingly powerful clients in the design world. In construction for example there are banks, transport organisations, retail companies, public authorities and many others who depend for their core business on constructing buildings through which to ply their trade. Such organisations are far from naïve clients and many of them employ architects specifically to brief the architects who design their buildings. Not surprisingly such organisations tend to seek to standardise procedures and impose some control on the design process. For this reason we have seen the renaissance in the popularity of design process maps. In the UK alone there are now many of these published. Some of them are developed by academics working with the supply side of the industry such as the Process Protocol developed by Salford University and Alfred MacAlpine Construction Ltd (Kagioglou et al. 1998). Others are designed specifically to describe design activities for a particular organisation such as the British Airports Authority Project Process (BAA 1995).

Three views of the design process

In a recent project we were able to study the design process by taking several different kinds of data into account (Lawson et al. 2003). We studied a number of client and construction organisations over a four-year period to see how these process maps worked and how realistic they were. In general our data suggested that a shared

view of the design process is more myth than reality. This work gave rise to a realisation that there are in fact three views of the design process. The first view is that which is represented by documentation of policies and procedures either by individual organisations or by large groupings such as the RIBA map apparently representing a whole profession. We can also look at the web-sites and brochures of individual design practices which appear to describe their processes. This view of the design process we might call the 'Intentions' view. It tells us what individuals, practices, large organisations and even whole professions intend should happen when design is done. The 'Intentions' view thus tells us what is supposed to happen (Fig. 14.5).

Next we can study what actually happens in practice. That can be done through real-time observation but this is both a lengthy and potentially interventionist process that many commercial organisations find too intrusive. We worked retrospectively looking at six major design projects that had recently been completed by examining all the documentary evidence, interviewing participants and holding focus groups to talk through and draw out a balanced communal view of the actual practice. This gives rise to a view of the design process which we might call the 'Practices' view. The 'Practices' view thus tells us what actually happens in practice.

Obviously we can now study the relationship between the 'Intentions' and 'Practices' views of the design process and learn a great deal more about designing in the real world. However such research immediately throws up a third and, in its own way, even more intriguing view of the design process. Discussion with the participants of large and complex projects often draws out a set of comments not about what they were supposed to do or even what they actually did,

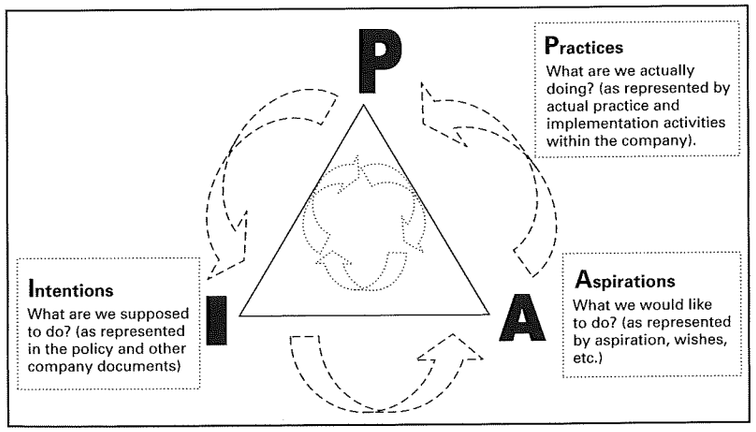

Figure 14.5
Three views of the design process

but rather about what they would really like to do. We might call this the 'Aspirations' view of the design process. Of course those who talk aspirationally can usually also describe, often quite convincingly, what would be preferable about their process. Those who have many years of experience may even reflect on why their aspirational process is not actually realised. The 'Aspirations' view thus tells us what participants in design processes would like to happen.

Such data lead us to the inevitable conclusion that there is no one process map of the design process. This book accepts that pluralist view and we shall not argue here that any one process map is more accurate. It is clear that there is a multitude of ways of linking activities together to make a process map. Some might suit particular individuals or organisations for reasons of personality or management and policy.

The three views related

However before leaving this investigation of design process maps it is worth exploring one other consequence of identifying these three views of the design process. This has to do with the relationship between the three views at any one time and in any one organisation. It must be obvious that these three views or 'Intentions', 'Practices' and 'Aspirations' can be aligned or not (Fig. 14.6). It might at first sight seem that a virtuous design organisation would indeed have them aligned. In such an organisation the participants would actually carry out their process as described in their documentation and indeed would feel happy and content with this way of doing things. What could be better?

Before answering this question let us imagine a different state. This organisation has a clearly described set of intended processes but actually in practice fails to observe these. However many if not all of the participants feel they could improve their performance by working in yet a third way. Such an organisation is what we might call 'totally unsynchronised'. It hardly seems a recipe for success. However there are also three intermediate states in which an organisation can have one of the three views of the design process unsynchronised, with the other two aligned. Each of these organisational states will create different problems for those working inside them and those in other organisations relating to them. Just how all this works is still a matter for investigation but we can already see some of the more obvious implications.

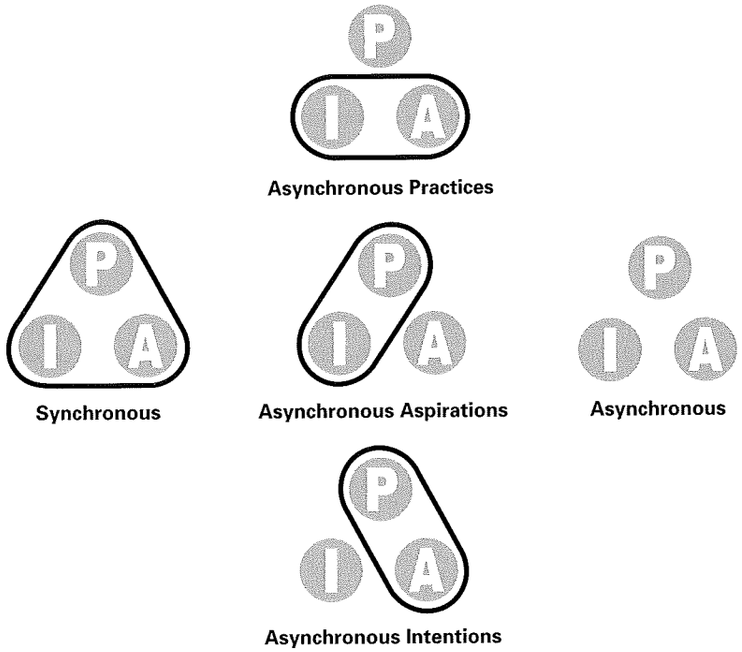

Figure 14.6
Possible relationships between the three views of the design process

For example the unsynchronised practices or aspirations states make an organisation difficult to collaborate with. When practices are unsynchronised other design team members are trying to relate to the published intentions but finding actual practice does not match this. By contrast an unsynchronised aspirations state leaves an organisation in internal difficulty with staff constantly unhappy with practice which may be slavishly following intentions. Such a state suggests a top-down management out of touch with its workforce. Our work suggests such a state to be disturbingly common in large organisations. Again by contrast the unsynchronised intentions state suggests an organisation that is happy with its practice but publishing information likely to mislead those who would collaborate with it. Preliminary studies suggest that the values of the members of organisations in turn influence these states. Designers seem in general themselves not to be too worried about having unsynchronised intentions. Indeed it seems quite common, perhaps almost normal, to find members of architectural offices explicitly recognising that they work in what they would regard as more relaxed and flexible ways than their own published conditions of engagement specify. By contrast, large client organisations more often tolerate unsynchronised aspirations. Again it is common to find staff in such organisations bemoaning the rigid way in which

practice is made to follow intention and how this leads to unimaginative or inappropriate solutions.

So what state represents a virtuous design organisation? Again it is unlikely that any one state is always the best for all organisations at all times. Logically it would seem sensible for any organisation to be aiming to be totally synchronised. However is it virtuous to remain totally synchronised? In a changing world, such an organisation might be seen to be complacent, resistant to change and unable to adapt. As conditions change it may well be that those closest to the action tend to see the need for change first. If so then an organisation is likely to move from a totally synchronised state to have unsynchronised aspirations. Probably a good organisation would recognise this and attempt some change.

One course of action here might well be to try to persuade those whose aspirations do not reflect the organisational intentions to change their views or leave. John Outram's comments earlier in this chapter about the need for his staff to understand 'the game they are expected to play' suggests this position. However the management of a more responsive organisation may try to learn from the asynchronous aspirations of the staff and change either the intentions or practices of the organisation. Whether it is important to change the intentions or practices first may depend on the situation. Research is needed into how design and design-related organisations actually behave and change. We know from our work that some are highly adaptable and some are not, some learn much more than others and can transfer knowledge more easily from project to project. The field of design research is now maturing and beginning to be able to deal not just with processes but with the management of those processes in complex organisations.

One other lesson to be drawn from all this is that developing a learning design organisation demands that some effort be put into the sort of reflection we have begun to indulge in here. That is to say a design organisation should try to transfer knowledge gained from the projects it completes in order to develop its processes. Such an effort, it transpires, also offers the opportunity to transfer knowledge about problems and solutions from one project to another. Our research suggests that although this would seem very obvious it often happens far less than seems sensible in actual practice. The ideas discussed earlier in this chapter used by the architects Ahrends, Koralek and Burton represent one possible way of achieving this more effectively. There is a rather delightful paradox here. Many other kinds of organisations have recently been studying the 'project' as an extremely effective management tool. It offers a

wonderful focus and intensity of activity that brings people together extremely effectively and nowhere is this more powerfully demonstrated than in the design project. Much recent mid-career management training has been based around the 'away-day' and the project as ways of building teams and collaborative practices. However in the design office the danger seems to be the reverse. The design team has become such an obvious organisational structure that most design offices put nearly all their resource into these teams. This leaves little effort for the conscious reflective thinking that might more easily enable knowledge to be transferred between projects.

Thus the group or team in design can be both a force for enhancing creative thinking within the project and yet also a force for separating out projects and thus an obstacle to learning and developing the organisation as a whole.

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15

Design as conversation and perception

Language can become a screen that stands between the thinker and reality. That is the reason why true creativity starts where language ends.

Arthur Koestler

a reflective conversation with the situation

Donald Schön

In this chapter we shall look at design as a process based on conversation and perception. In essence this means how designers come to understand problems and get ideas about solutions through a process that is conversation-like. A process that involves changing the way the situation is perceived by 'talking it through'. As the designer Kenneth Grange put it 'you do have to ferret around . . . to find that which is then suddenly obvious to you' (Cross 2001a).

In a professional context design is very often progressed by teams or groups as we saw in the previous chapter. Sometimes there are teams of designers from the same professional background usually because a job is too large or complex to be handled by one person. Sometimes the nature of the object being created involves many specialist areas and requires a multi-professional design team. In both such cases the design progresses at least partly through the conversations that take place between these team members. Normally such conversations are not recorded and so their importance as part of the process has consequently been rather underestimated in much design research. That these conversations are indeed important