who became architects as opposed to psychologists or did they reflect the different nature of their jobs?

A series of experimental situations was therefore devised in which the subjects would solve design-like problems under laboratory conditions with no other distractions (Lawson 1972). It was, of course, vital that no specialist technical knowledge was necessary to solve the problems to avoid giving any advantage to the architect subjects over the others. In one experiment the subjects had to complete a design using a number of modular coloured wooden blocks. They were given more blocks than they actually needed, and the design problem required a single storey arrangement of three modular bays by four bays. The vertical faces of the blocks were coloured red and blue and, on each occasion the subject was required to make the perimeter wall of the final arrangement either as red or as blue as possible (Fig. 3.5).

The task was made more complex by the introduction of some 'hidden' rules governing allowed relationships between some of the blocks. This meant that some combinations of blocks would be allowed whilst others would not. These rules were changed for each problem, and the subjects knew that some rules were in operation but were not told what they were. Thus this abstract problem is in reality a very simplified design situation where a physical three-dimensional solution has to achieve certain stated performance objectives while obeying a relational structure which is not entirely explicit at the outset.

In order not to intimidate the subjects, they were left alone to solve the problems with a computer setting each problem and

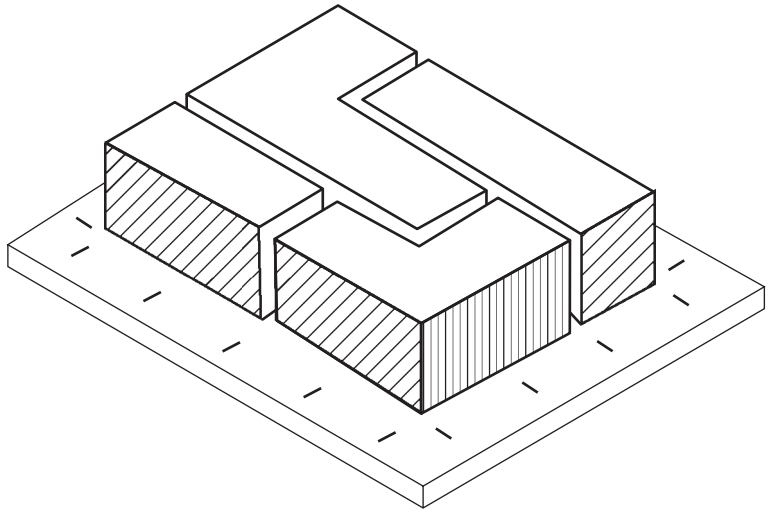

Figure 3.5
A laboratory experiment to investigate the design process

telling them, when they asked, whether their proposed solution was an allowed combination or not. In addition, unknown to the subjects the computer was able to record and analyse their problem-solving strategy. Initially two groups of subjects were used comprising final year students of architecture and postgraduate science students (Lawson 1979b).

The two groups showed quite consistent and strikingly different strategies. Although this problem is simple compared with most real design problems there are still over 6000 possible answers. Clearly the immediate task facing the subjects was how to narrow this number down and search for a good solution. The scientists adopted a technique of trying out a series of designs which used as many different blocks and combinations of blocks as possible as quickly as possible. Thus they tried to maximise the information available to them about the allowed combinations. If they could discover the rule governing which combinations of blocks were allowed they could then search for an arrangement which would optimise the required colour around the design. By contrast, the architects selected their blocks in order to achieve the appropriately coloured perimeter. If this proved not to be an acceptable combination, then the next most favourably coloured block combination would be substituted and so on until an acceptable solution was discovered.

The essential difference between these two strategies is that while the scientists focused their attention on understanding the underlying rules, the architects were obsessed with achieving the desired result. Thus we might describe the scientists as having a problem-focused strategy and the architects as having a solution-focused strategy.

Thus we had the beginnings of an answer to our first question. It does indeed look as if the cognitive style of the architects and the scientists was consistently different. To address the second question a further run of the experiment was necessary. Here the subjects were school pupils at the end of their study immediately before going to university, and university students at the very beginning of the first year of a degree in architecture. Both these groups were much less good at solving all the problems and neither group showed any consistent common strategy. The answer, then, to the second question appeared to be that it is the educational experience of their respective degree courses which makes the science and architecture students think the way they do, rather than some inherent cognitive style.

The behaviour of the architect and scientist groups seems sensible when related to the educational style of their respected