He found his creative architects to be poised and confident, though not especially sociable. They were also characteristically intelligent, self-centred, outspoken and, even, aggressive and held a very high opinion of themselves (Mackinnon 1976). Disturbingly it was the group of architects judged as less creative who saw themselves as more responsible and having a greater sympathetic concern for others!

Intelligence does seem to play some part in creative talent. Mackinnon recorded that while 'no feeble-minded subjects have shown up in any of our creative groups', this does not mean that very intelligent people are naturally highly creative. The kinds of tests used by psychologists to measure creativity normally differ from the traditional intelligence test. The typical intelligence test question asks the subject to find a correct answer, usually through logical thought, whereas the creativity test question is more likely to have many acceptable answers.

Getzels and Jackson in a famous and rather controversial study, compared groups of children who scored highly on creativity tests with those who performed well at the more conventional intelligence tests. They claimed to have identified many differences between these two groups of gifted children, not least of which was the image the children had of themselves which was largely shared by their teachers (Getzels and Jackson 1962). The so-called 'intelligent' children were seen as conforming and compliant and tending to seek the approval of their elders, while the 'creative' children were more independent and tended to set their own standards. The so-called 'creative' children were less well liked by their teachers than the 'intelligent' children. This, together, with Mackinnon's descriptions of creative architects tends to confirm the often held view that highly creative people may not be easiest to get on with, and are not generally bothered by this.

More recently, the differences between the 'intelligent' and 'creative' groups has been seen as a tendency to excel in either convergent or divergent thinking. Hudson has conducted a whole series of studies of groups of schoolboys measured to have high performance at these two types of thinking skills. He has shown that, generally, high convergent ability schoolboys tend to be drawn to the sciences while their more divergent counterparts show a preference for the arts (Hudson 1966). In fact, science is no more a matter of purely convergent production than the arts are exclusively a matter of divergent thought (Hudson 1968). This concentration on convergent or divergent thought may therefore prove something of a red herring in developing our understanding of creativity.

This rather popular tendency to regard divergent thinking as the core skill in the arts does not stand up to examination. A visit to the Clore Gallery at the Tate in London will reveal just how persistent and single-minded was the great British painter J. M. W. Turner. Painting after painting reveals an obsession with the problem of portraying light on the solid canvas. There is no great flight of ideas here, but rather a lifetime of trying to perfect a technique. A glorious and wonderfully expressive technique.

Conversely, we have already seen how successful scientists may be regarded as highly creative and how their ideas generate a complete shift in the way we see things. A dramatic demonstration of this can be found in a most revealing account of the work of James Watson and Francis Crick who discovered the beautiful double helical geometry of DNA (Watson 1968). The structure of DNA as we know it today simply could not be logically deduced from the evidence available to Watson and Crick. They had to make a leap into the unknown, a demonstration of divergent thought *par excellence*!

Creativity in design

Whilst we have seen that both convergent and divergent thought are needed by both scientists and artists, it is probably the designer who needs the two skills in the most equal proportions. Designers must solve externally imposed problems, satisfy the needs of others and create beautiful objects. Herman Hertzberger points this out when he describes what creativity means to him in architecture. He was discussing the problem of designing an entrance stair for a school:

> For me creativity is, you know, finding solutions for all these things that are contrary, and the wrong type of creativity is that you just forget about the fact that sometimes it rains, you forget that sometimes there are many people, and you just make beautiful stairs from the one idea you have in your head. This is not creativity, it is fake creativity.
>
> (Lawson 1994a)

These comments from Hertzberger suggests that we must be careful to draw the distinction between originality and creativity in design. In the competitive and sometimes rather commercial world of design, the novel and startlingly different can sometimes stand out and be acclaimed purely for that reason. But being creative in design is not purely or even necessarily a matter of being original.