Margaret Boden (1990) has proposed that it is useful to distinguish between what she calls H-creativity and P-creativity. H-creativity is that which results in novel and fundamentally new ideas in the history of the world. Thus Einstein's discovery of relativity or the moment when Archimedes leapt from his bath shouting 'Eureka!', are both moments of H-creativity. P-creativity, whilst less glamorous is none the less important to us here. For Margaret Boden rightly points out that an idea which is fundamentally novel to the individual mind is still of great significance, even though it may not necessarily be new to the world. Actually, in design there are often many developments of great significance for which it is quite hard to be sure just who had the H-creative idea and when. History tends to credit such developments to individuals as if they worked in splendid isolation from their colleagues and other designers.

When Alec Issigonis turned the internal combustion engine sideways, compressed the engine compartment, removed the traditional boot and styled the famous Mini, he created more than just another design for a car. By combining a number of new ideas together, he made us look at the car differently. Suddenly a motor car could become almost a fashion accessory, an extension of our clothes that could also transport us around cities. This was surely one of the most creative moments in the history of the automobile. Hundreds, perhaps thousands, of cars have been designed, but only occasionally does a design 'break the mould'. Other designs may be interesting, attractive, even exciting, but only occasionally is a design truly innovative. When Mario Bellini designed the famous Golfball typewriter for Olivetti he enabled us to see fundamentally new possibilities. The design replaced the traditional moving carriage carrying the paper from side to side, and instead kept the paper still, except for its feed, and moved the printing head. The further revolutionary idea of putting all the characters on a ball-shaped device which could rotate enabled the user to replace it and thus change fonts.

Many other examples can be found through the history of design which are innovative and mould breaking, and they often become what are regarded as 'classics' of design having a kind of timeless quality (Forty 1986). What these designs have in common is not just that they brilliantly solved the problems posed, but they changed the world irrevocably. They are the one-way valves of design history equivalent to the great discoveries of science. Once you have the Mini, a whole series of small, highly manoeuvrable, mass-produced city cars are possible. Small is no longer poor, but chic, fashionable and clever. Once you have the Barcelona Pavilion

designed by Mies van der Rohe in 1929 a whole new generation of buildings become possible in which the relationship between walls, the means of supporting the roof and the spaces they define become changed in fundamental ways.

However, let us begin at the beginning, which is something that the creative mind may often not do, but on this occasion it seems necessary!

Some accounts of the creative process

The mathematician Henri Poincaré (1924) reflected on his own considerable creative achievements in mathematical thought and has left us with some insights about the processes involved. Typically he describes a process divided into phases of quite different kinds of thought. First a period of initial investigation of the problem in hand, followed by a more relaxed period of apparent mental rest. Next, an idea for the solution appears almost unbidden by the thinker probably at the most unexpected time and in the most unlikely place. Finally the solution needs elaboration, verification and development. Thus Poincaré describes his work for his first memoir on a series of mathematical functions known as Fuchsian. He talks of working hard for two weeks to prove that such functions could exist. During this period he sat at his desk for at least one or two hours each day trying out combinations without any positive result. However, one evening he unusually drank black coffee and could not sleep and records that 'ideas rose in crowds' (Poincaré 1924). By morning he had established a class of Fuchsian functions which he could then write down. Needing to take his ideas further to understand the relationship between these functions and some others he had discovered, his work was interrupted by a trip away from home on a geological excursion. He records how the travel made him forget his work but that later on the trip he was about to board a bus when 'at the moment I put my foot on the step the idea came to me' (Poincaré 1924).

This 'eureka' moment, as it is often called, seems quite characteristic of great creative moments. We have all heard how Archimedes is supposed to have leapt out of his bath crying 'Eureka' having solved a problem he had been working on for some time. Others such as Helmhotz and Hadamard offer similar descriptions, with the latter claiming to have woken with solutions in mind that were not there before sleep. More well known are the accounts of the