what we might fancifully describe as their collective consciousness. In this respect their behaviour bears a much greater resemblance to the Eskimo way of providing shelter than to the role of architect for which they were all being trained. Actually the common image of an igloo which these students shared and successfully realised was not entirely accurate in detail, for with their western preconceptions they built up the walls in horizontal courses whereas the Eskimo form of construction is usually a continuous rising spiral ramp (Fig. 2.3).

As the igloo was completed the students' theoretical education began to take over again. There was much discussion about the compressive and tensile strength of compacted snow. The difficulties of building arches and vaulting with a material weak in tension were recognised. It was also realised that snow, even though it may be cold to touch, can be a very effective thermal insulator. You would be very unlikely indeed to overhear such a discussion amongst Eskimos. Under normal conditions igloos are built in a vernacular manner. For the Eskimo there is no design problem but rather a traditional form of solution with variations to suit different circumstances which are selected and constructed without a thought of the principles involved.

In the past many objects have been consistently made to very sophisticated designs with a similar lack of understanding of the theoretical background. This procedure is often referred to as

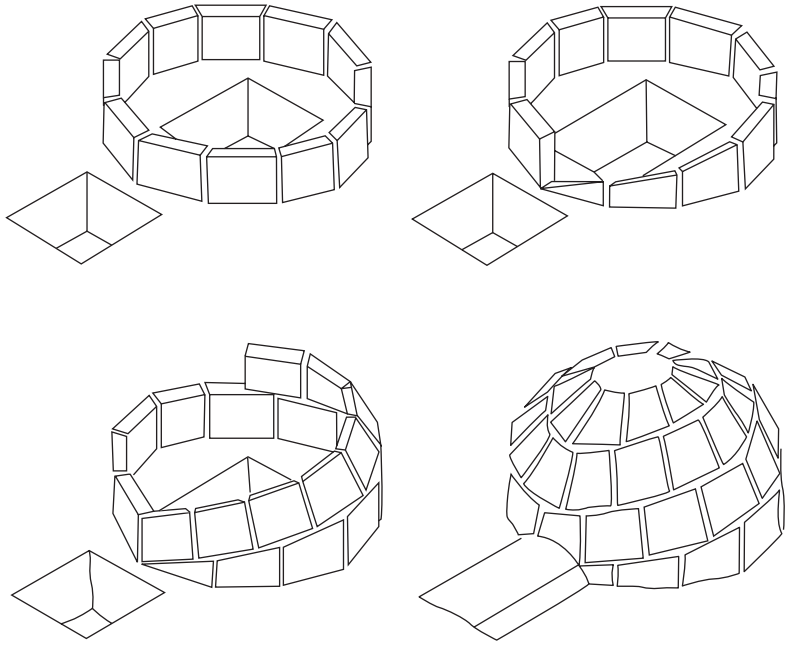

Figure 2.3
The traditional method of igloo construction

'blacksmith design' after the craftsman who traditionally designed objects as he made them, working to undrawn traditional patterns handed down from generation to generation. There is a fascinating account of this kind of design to be found in George Sturt's book *The Wheelwright's Shop* (Sturt 1923). Sturt suddenly found himself in charge of a wheelwright's shop in 1884 on the death of his father. In his book he recalls his struggle to understand what he describes as 'a folk industry carried on in a folk method'.

Of particular interest here is the difficulty which Sturt found with the dishing of cartwheels. He quickly realised that wheels for horse-drawn vehicles were always constructed in a rather elaborate dished shape like that of a saucer, but the reason for this eluded Sturt. (Fig. 2.4) From his description we can see how Sturt's wheelwrights worked all their lives with the curious combination of constructional skill and theoretical ignorance that is so characteristic of such craftsmen. So Sturt continued the tradition of building such wheels for many years without really understanding why. He realised that the dished wheel itself must be much more complex to make than a flat one. However the design necessitated even further complexities resulting in the wheel being tilted outwards and angled in towards the front (Fig. 2.5). Not surprisingly then, he was not content to remain in ignorance of the reasons behind the design.

Sturt first suspected that the dish was to give the wheel a direction in which to distort when the hot iron tyre was tightened on by cooling, but Jenkins (1972) has shown that dishing preceded the introduction of iron tyres. One other reason that occurred to Sturt

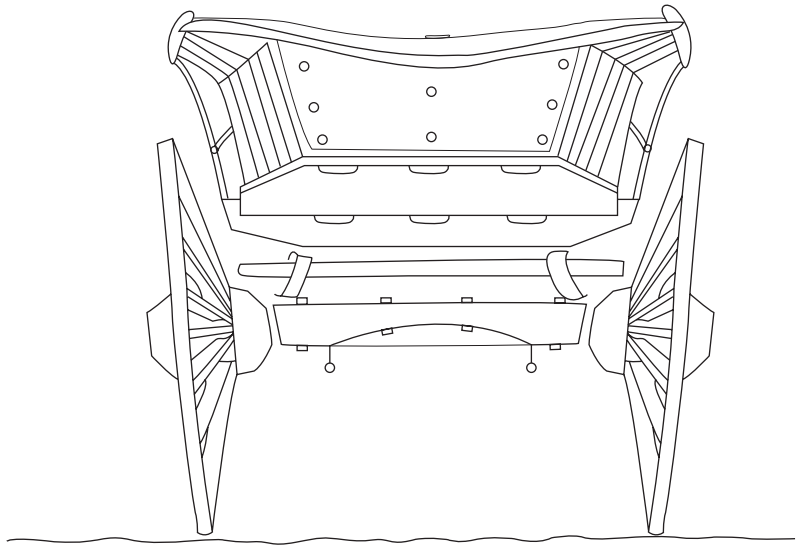

Figure 2.4
The cartwheel for horse-drawn vehicles was constructed in a complex dished shape