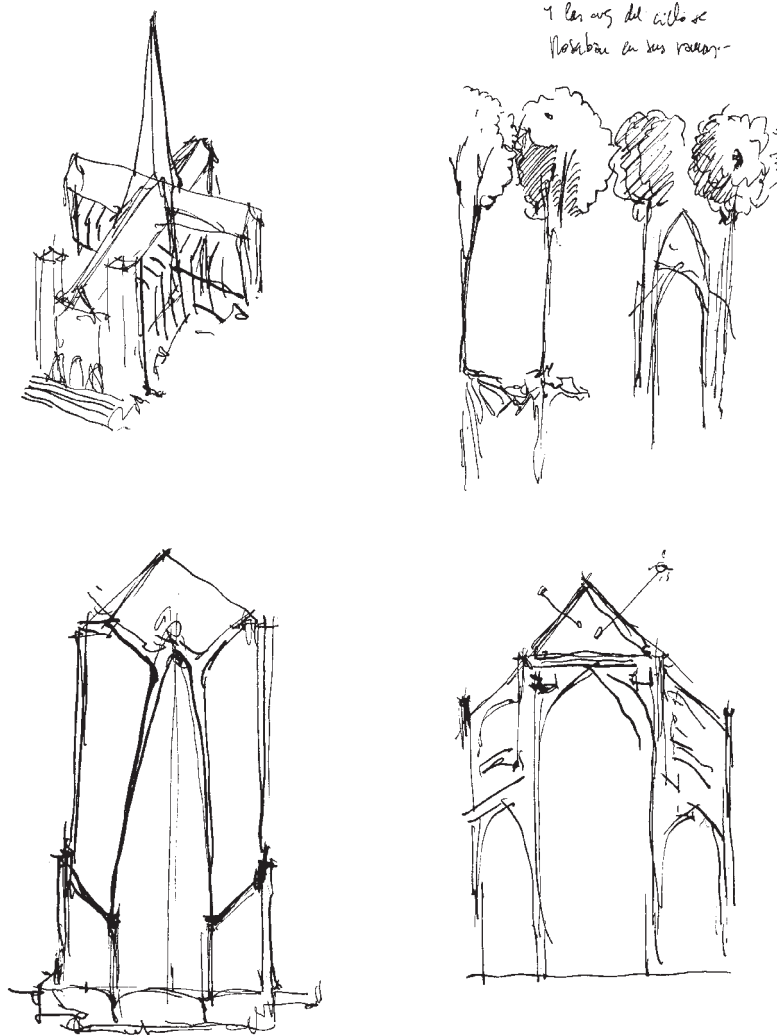


the completion of the Cathedral of St John the Divine in New York which was presented for an invited competition. The sketches are in their original sequence but with many gaps since Calatrava is a prolific drawer in addition to relying heavily on models. In the first sketchbook we can clearly see Calatrava drawing mainly cross-sections of the building to develop a structural system. A drawing of the human form shows one of his guiding principles at work as he gains inspiration from this before returning to refine the section of the building (Fig 14.3 p. 253). In the second set of sketches, however, we see more of an emphasis on the building as envelope including concerns about the penetration of sunlight and the relationship of internal spaces to the external ground level (Fig 12.7).



**Figure 12.7**

A sequence of design sketches by Santiago Calatrava for the cathedral of St John the Divine in New York

In all these drawings and protocols there are areas of vagueness as well as penetrating exploration. This indicates that good designers are able to sustain several 'conversations' with their drawings, each with slightly different terms of reference, without worrying that the whole does not yet make sense. This important ability shows a willingness to live with uncertainty, consider alternative and perhaps even conflicting notions, defer judgement, and yet eventually almost ruthlessly resolve and hang on to the central idea. This suggests that perhaps a particular personality is helpful here and that design education needs to inculcate these vital skills. Amongst other things it also raises some difficult questions about whether computer-aided design systems help or hinder such a process, and we shall return to these, but only after we have explored the role of drawing in more detail. It seems that a common and important characteristic of such design processes is the sustaining of parallel lines of thought.

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