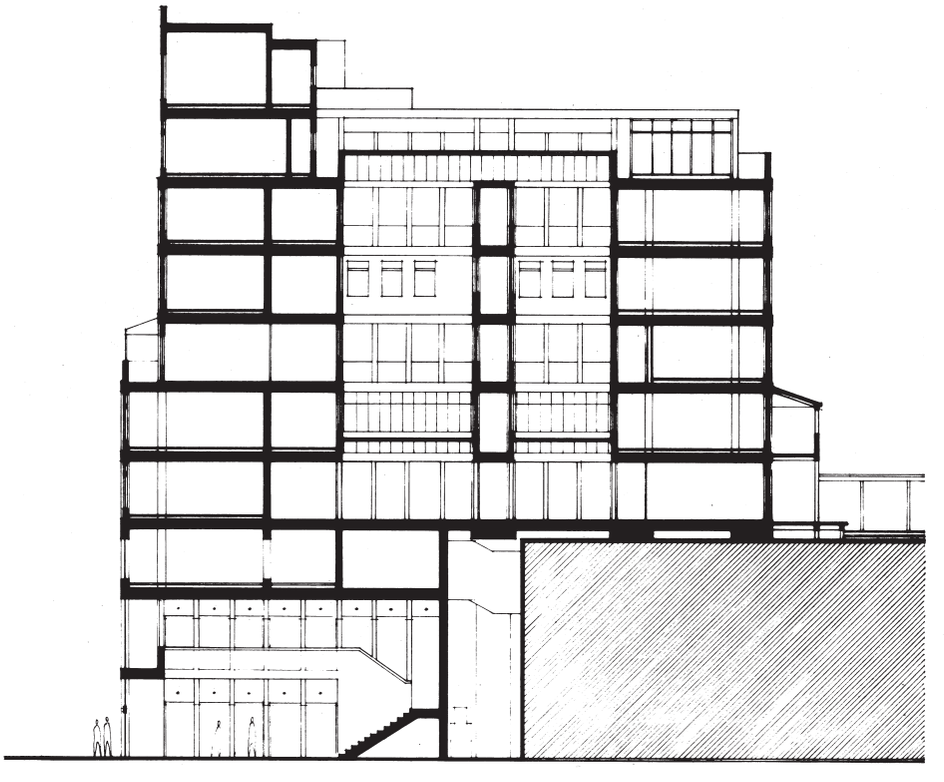
pass these spaces, unchanged, making allowance for all the variations of scale. The largest space in the middle, the small spaces on either side, the syncopated alternation of large and small — all of these happening in both directions, of course, making a design almost like a Scottish tartan.

At that moment the order is essentially fixed. We have only to place columns at all the grid positions, recognizing that to some extent beams and columns will vary from floor to floor: The structural order of the three-story building is all but complete. The formal beauty of the interior is now almost assured, and comes in very large part from this array.

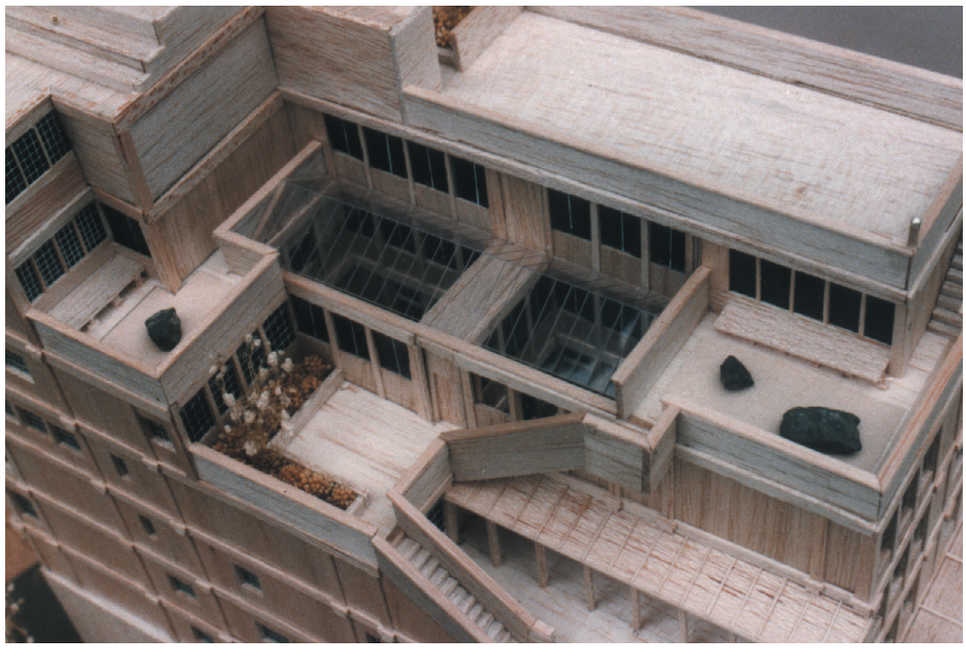
5 / THE SAPPORO BUILDING

Look here, at the example of Sapporo, a ten-story building which was to have been built in downtown Sapporo, on the northern island of Japan. This building, of concrete-encased steel, was to be built over an existing clinic. Because the existing clinic was hard to remove, and needed to stay in operation, I conceived the idea that the back part of the whole building would stand on massive legs, straddling the old clinic. These massive legs gave rise in my mind to a structural conception in which twenty truly enormous column clusters (see pages 415–16) ran all the way through the building from top to bottom. At the bottom they are indeed solid and massive, and visible as legs. Higher up, they are pierced — indeed they are so large that they con-



Sapporo ten-story apartment building, Longitudinal section, Christopher Alexander and Ingrid King, 1984

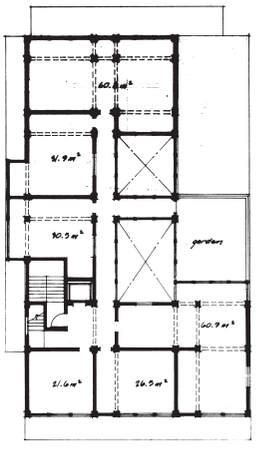
Model of the Sapporo building

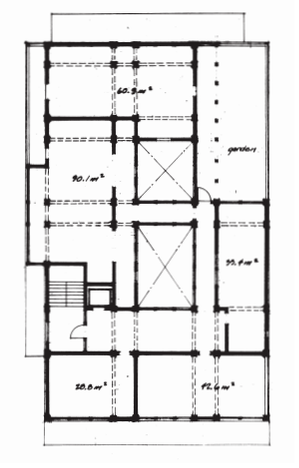


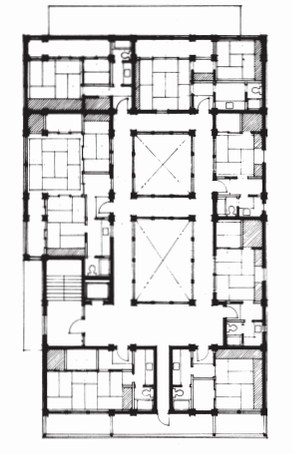
Model of the Sapporo building, looking down into the light wells from above

tain arches, and each one splits into four smaller columns, and these four columns then become the crossings where the circulation and passages of the upper floors all meet.

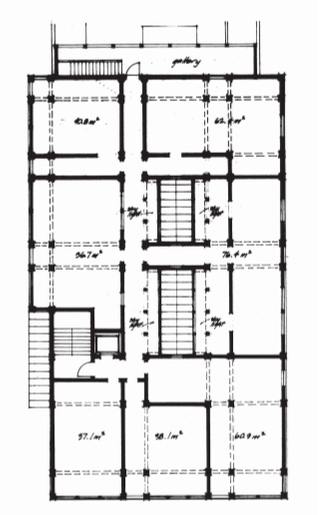
In order to achieve this discipline, a very strict geometrical order had to be created. The overall structural idea is that of several frames, each made of columns, at different plan posi-

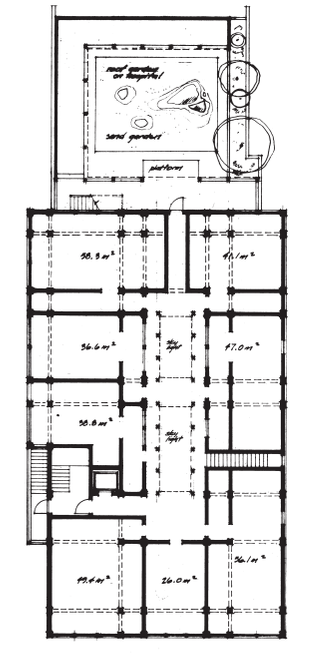




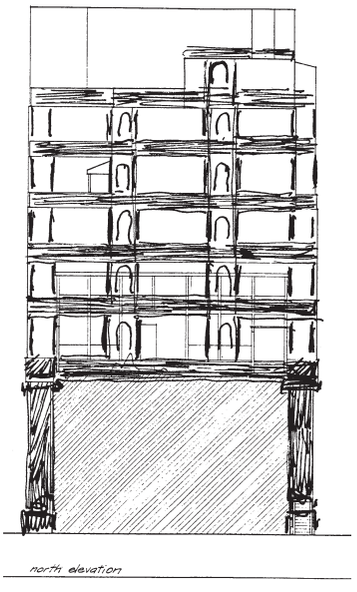


Sixth, seventh, and eighth stories of the Sapporo building

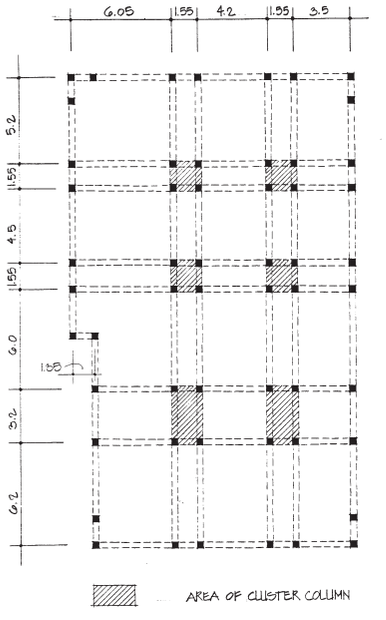




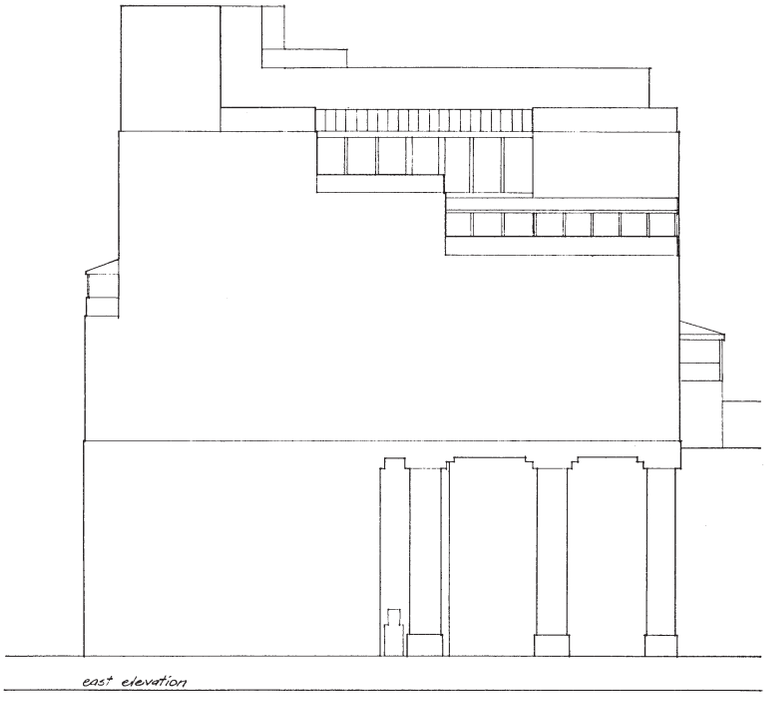
Fourth and fifth stories of the Sapporo building



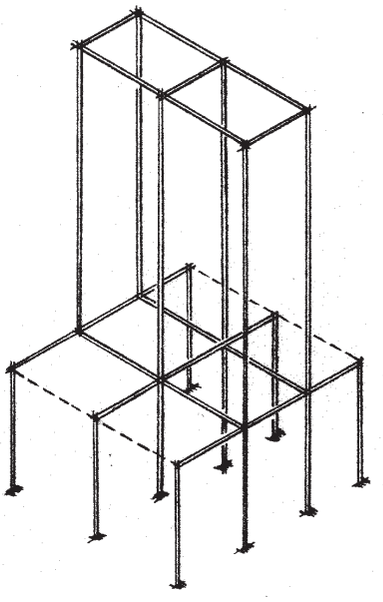
Cross section of load-bearing structure in the Sapporo building



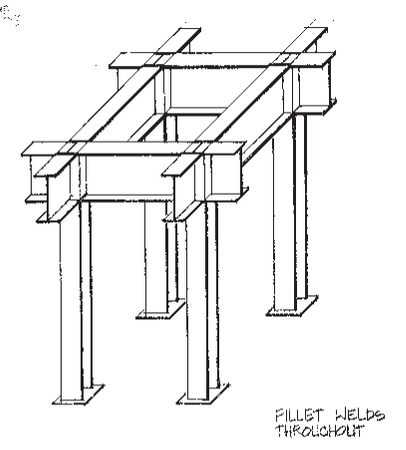
Plan of column layout. The column clusters where four small columns make one massive column, are shaded.



Side view of the Sapporo building showing massive legs



Overall axonometric sketch showing the whole building arrangement in diagrammatic form to illustrate how the vertical loads, from the central rectangular zone of steelwork, send their loads through massive beams, to the outer legs.



Detail of steel fabrication in one of the four-column clusters which appear repeatedly within the frame: structural engineering by James Axley and Gary Black.

tions, allowing and forming a core of two lightwells in the building, with the apartments grouped around the outside, and the passages and movement going around these inner lightwells. At each frame position, there are four sets of columns, each of these columns itself formed by four small columns with an archway passing through the opening, while maintaining structural rigidity. And the load from these inner columns is transferred to the outer legs, by massive beams passing across the building, above the arches at each floor. In the diagrams illustrated we see how highly determined the order has to be in order to work this way; and we see that even the column-connections, making possible a division of the "big" column into four smaller columns, requires rigid organization of steelwork to make it possible, itself again demanding a rigid and almost tyrannical geometry.

The four-column grid is caused partly by the passages and galleries typical of Japanese traditional space: They surround apartments to create an intimate scale in the interiors. Thus the geometric order is highly organized, independent of site and people's preferences. This is what I mean by "brutal." Yet it is also conceived to be flexible, to have variety from floor to floor, to allow each apartment at each level to be unique, and to cope with the changing circumstances, as light, floor layout, terraces, and symmetry all change systematically as one goes higher in the building. Perhaps even more important, more exciting, is the fact that the same structural scheme goes through every floor, while the floors themselves are all different: Ten different floors one on top of the other, each specific to its circumstance as far as light, and view, and arrangements of apartments or shops is concerned — yet all held together by the repeating structural order that runs through the lot of them.

Thus the building is rigid in the definiteness of its geometrical conception, yet loose and subtle in the way the different floors are able to adapt to different conditions at the different levels. And it is also flexible with regard to grid spacing, which varies from bay to bay in each direction.[2]