

appropriate for a given situation. So we wince when we see them because in this case, too, we can feel the wrongness of the symmetry structure at once.

Making a thing whose symmetries are ex

actly right is extraordinarily hard. It means, that we have to be so simple that all the necessities are in perfect balance. Simplicity is the state in which all structure is removed, except exactly that structure which is required.



7 / THE IDEA OF A NATURAL SYSTEM OF SYMMETRIES

To understand the idea of “only what is required” further, let us consider what we might call a natural system of symmetries.

Here, for instance, is a Chinese brush painting of bamboo. The twigs and branches hanging down form symmetries. But the symmetry we

see in the tree is very gentle. The leaves are not perfectly symmetrical. They are approximately symmetrical. The clusters of twigs and leaves hanging down form local bundles which are almost, but not perfectly, symmetrical. The tree itself is not perfectly symmetrical. Yet it has a



Branches of a bamboo tree: depicted in a Chinese brush painting: natural symmetries.



Two buildings, the utmost simplicity. Eishin campus, Christopher Alexander, Hajo Neis and others, 1985.

rough overall symmetry, which produces order. Thus we see systems of symmetries, which are roughly symmetrical locally and are all nested, forming a hierarchy of approximate symmetries.

This natural system of symmetries is one of the defining marks of all living structure. I cannot for the moment define what I mean by call-

ing this natural structure a “balanced” and comfortable system of symmetries. I only draw attention to it. Look at the character of the symmetries, and pay attention to the way they work.

Look at the courtyard of the house in Copenhagen (page 478). In this courtyard we also see the phenomenon I call a natural system of



Courtyard house, Copenhagen. Here uneven, syncopated, local symmetries form a perfectly harmonious whole.

symmetries. There are various local symmetries in the arch, the windows, the individual pieces of wood which form the windows, the local portions of the structure. There are also approximate larger-scale symmetries in the courtyard, in the building mass. None of the symmetries are perfect. They are syncopated, uneven, comfortable, relaxed. That is because the symmetries only occur where they are *generated*, where they *have* to be.

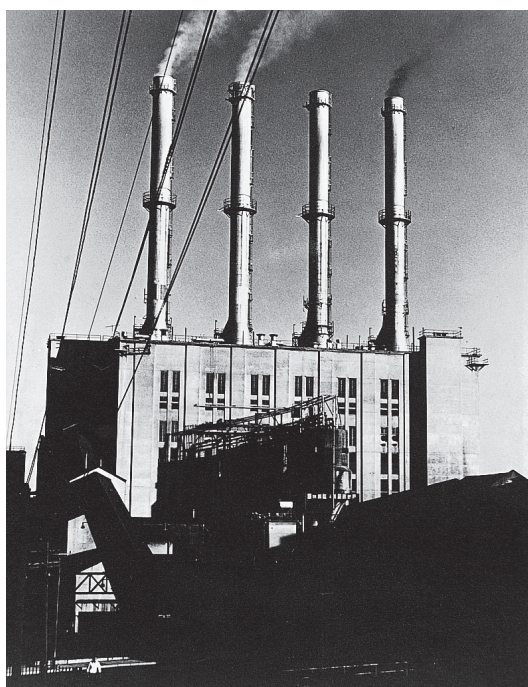
On the other hand, look at the lobby of an office building shown on the right. Here, too, we see symmetries. Some are small, some large. But overall, there is an *uncomfortable* feeling about these symmetries. The building looks too perfect to be true. It is *over-simplified*. The symmetries we see are perfect, very rigid, one might say almost obsessive in their perfection. The loose comfortable balance of symmetries which was visible in the drawing of the bamboo tree, bopping here and there within the structure, is not visible here. This is a building which lacks a natural system of symmetries.



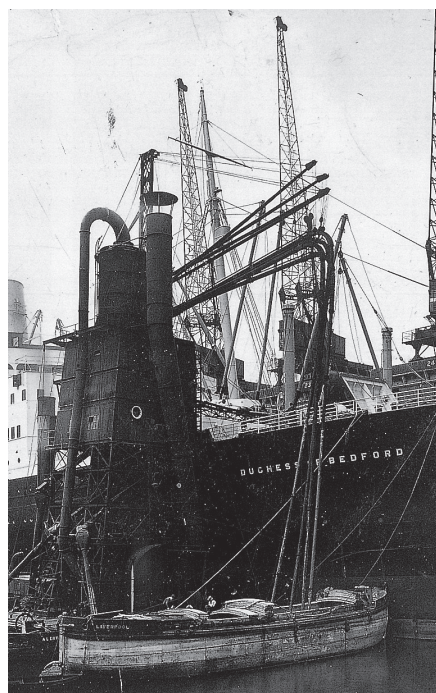
Office building, Dallas. Here there is an uncomfortable feeling about the symmetries: too gross, too dominant, they destroy the ease.

To contrast with the over-technical perfection of the symmetries in this last building, please look at two typical industrial sites (opposite). In these industrial sites we tend to see more loose systems of symmetries. That is because the lack of need for “image,” again makes it possible for people to do just what is required, and nothing else. There are local symmetries where they are needed and nowhere else. Some of the elements are symmetrical. Large scale symmetries are visible. On the other hand, wherever the symmetries need to be interrupted, they are interrupted. They do not suffer from an image of a controlled overall plan, which tries to tie the symmetries down. They exist where they please — that means, only where they *need* to exist. Again, this is comfortable.

Making a building which has life is essentially a problem of creating such a balanced system of symmetries. Whenever we manage to create a great work of art, we manage it only because we manage to discover a natural and comfortable system of balanced, nested, symmetries.



*Power station
Here there is a more natural balance of symmetries.*



Thousands of local symmetries in every bolt, crane, stanchion, handrail, funnel, bucket.

It is not an overpowering, overall symmetry. The system of symmetries have the same balance and easiness which we observe in nature. We may typically see a natural system of symmetries in an ancient farmhouse. We may see it in an ancient palace. We even see it to some degree in the early skyscrapers built in Chicago (Burnham and Root, for instance)— though we rarely see it in the more recently built skyscrapers.

The point which I am making is that this particular balance of symmetries, which seems like an almost accidental pleasantness or easiness, is in fact *a highly specific structure*. This highly specific structure must be present in order for something to have life, and it takes very precise form because this is the structure something has when it is true.

We may summarize the relation between life and symmetry by saying simply this: Life requires a natural system of symmetries. Or, in dynamic terms we may say this: A living process must generate a natural system of symmetries in order to make something whole. This rule is di-

rectly related to the theory of structure-preserving transformations in which we produce living structure by unfolding the wholeness (field of centers) step by step. *The unfolding of the field of centers may be considered as a process in which we introduce one symmetry at a time.* The wholeness is the end-result of this dynamic process; it is the trace left by a process which produces one symmetry at a time.

Successful life which creates unity in a building and holds it together is generated by the balanced, syncopated, off-beat quality that the natural system of symmetries creates. “Balanced” and “offbeat” seem to be opposites. But the idea that a structure exists which has both these attributes at the same time is precisely one of the most important attributes of living structure. At first sight, being tight in terms of symmetry, and being loose seem opposite. One is orderly, one is disordered. But the real unity is precisely that quality which is generated by the balance in which both exactness and looseness exist together.