



10 / WORKING ON INTEGRATED WHOLES

If one had to give an exact definition of *making* which distinguishes between “making” (viewed as part of an unfolding process) and “construction” (viewed as part of production), it would perhaps go like this: the operations of making and construction are distinguished by the way they handle the wholes and centers which are being formed. During the process of construction, the operations that are performed must be congruent with the wholes that are being formed. This sounds almost like a tautology, but it is not.

In much 20th-century construction, the building process was torn apart into subspecialties, subcontracts. The plumbing was done by the plumber, the electricity by the electrician. The concrete forms were built by form builders, the steel was placed by steel placers, the concrete then poured under the supervision of the general contractor. All this was done partly because of the influence of Taylor’s ideas on time and motion, from about 1900. It fits, too, the specialization of trades, the power of unions, and it fits with the analytical conception of an efficient contract.

The problem with this approach is that the actual construction process then goes forward as a series of disjointed operations, which have no natural connection with the naturally occurring wholes — centers — in the building. The carpenter does stud work but has no satisfaction in the creation of a wall as a completed thing; the roof framer installs trusses and the roofer lays the roof surface, but neither one of them has the satisfaction in the creation of a roof as a completed whole. A natural process in which new centers appear and are strengthened and elaborated has no relation to these divided specialties. The men and women who do the work have no natural satisfaction when their particular job of work is finished; naturally occurring wholes and centers do not develop smoothly; the building

goes up as a series of fragments. All this makes the appearance of life in the building most unlikely, indeed virtually impossible.

In order to achieve good results in my construction operations I found that I had to take an integrated approach in which — for example — forms, steel, concrete and tile were done (all together) by a single team; or in which carpentry, rough plumbing, and electrical were done by another single team.

The essence of a successful construction process — I have discovered over the years — is that the team working on a given part of a building have the satisfaction of working on a psychological whole and making it complete. When they are finished with a particular phase of work, they have created a visible, palpable whole.

I do not mean by this that they have necessarily reached a completely finished part of a building. Indeed, that is the opposite of what I mean. What I mean is that at each important step, some new whole has been sufficiently delineated, and sufficiently filled in, so that one feels



*Judging the eave detail, during construction.
Gymnasium, Eishin Campus, Tokyo.*



The eave, the end of the truss, plus the windows of the Gymnasium on the Eishin Campus shows an example of such a "whole." The eave was being tested and perfected at the same time as the unusually shaped windows in the long wall. It is the cooperation of these elements together, working together to form a harmonious whole, which reflects a holistic operational step of the kind described in the text.

the new whole and grasps the way in which it contributes to the wholeness of the larger building. It is in this all-important psychological sense that an achieved whole which intensifies a given center is brought far enough along, so that its impact on the entire building, and its successful injection of more life into the building, becomes clear. That is where the team's satisfaction and the craftsmen's satisfaction comes from. They feel satisfaction because they have completed a whole. And they have been able to achieve this because their job description, or craft, gives them the leeway to have impact on the details of what they are doing, are therefore able to control the whole, in all its details, and can therefore create the subtle adaptations between the parts that are *necessary* to create a living whole.

To accomplish this kind of thing, I have had to hire people who understood several disciplines, who knew how to place steel, build forms,

pour concrete, place colored tiles within concrete, were willing to do all these, and were competent to do all this, together.

Often I had to hire teams of people who — from the outside world — looked almost inexperienced, because their ability to integrate these many trades in one holistic operation was more significant to me than their degree of skill in any one operation.

I remember at one time we tried to hire a foundation subcontractor and told him that *we* (not he) would be placing the string lines for his batter boards because we had to control the position of the top edge of the foundation in relation to the ground. He refused to do the work, because he saw placing lines as part of his trade and could not conceive a construction process which was divided up differently. So we finally did the boundary-crossing foundation work ourselves.