

Epilogue:

A magic machine

Back in 1960 I was wondering what to call my thesis. I finally gave it the title, "A Three-Dimensional Modular Building System". That proved to be an important decision. I didn't think of it as a building. By talking of building systems I implied a departure from the concept of "The Building" as I understood it as a student.

I think it is important to keep emphasizing that there are two issues, not just one: the technical problem and the environmental problem. My intention at Habitat was to organize the building into small repetitive components that lent themselves to industrialization and then to unite them by a formal language of permutations and combinations, rhythms and variations, that would provide the sense of place people need and allow them to retain and develop their sense of identity.

I would say again, that ideally each house should be different from every other house, as each person is different from every other person, and that communities should differ from each other as much as their inhabitants do. The Habitat space cell was only a crude start on the development of this ideal.

Then there is another scale of variations, what the individual can handle once he gets a house: Can he move the walls? Can he change the floor? Can he adapt the space to put books where he wants them? Can he, in short, adapt the house to his habits? The problem is to build adaptability into a house that is mass-produced out of modular components and has standard plumbing and electrical circuits and standard structural components.

Now those people living in Habitat are, to put it simply, happy. But at another level, I feel a shortcoming of Habitat is that even though there are twenty house-types with a variety of internal arrangements the spatial characteristics of the box are so strong that they feel very similar. I have subsequently explored the possibility of greater variation. I designed a system that was basically a cube measuring twenty-one feet on each side, subdivided into nine cubes each

measuring seven feet on each side, and assumed that it would be technically possible for the tenant to place walls, floors and ceilings on any grid line in the box. He could have a three-storey house with seven-foot ceilings or a one-storey house with a twenty-one-foot ceiling, he could have the walls anywhere he wanted, he could rearrange it at any time. There are several million different permutations possible with this system – and yet with all that variety there is no real mathematical differentiation. Each permutation feels the same. All those variations are essentially rectangular and are dominated by the specific rectangular nature of the space matrix. There is a difference between variety in the mathematical sense and variety in the psychic sense.

I set out on another exercise, coming at the problem from the other end. Could you design a system made up of a five or six component assembly that combines its elements to form different houses whose spatial characteristics will be so varied that the man who lives in one will feel that it is totally different from his neighbor's, so different that he will consider it as different in nature, of a different geometric order? I developed a system based on a cube and five additional components, a semi-circle, a hemisphere, a prism, a semi-prism, and a half cube, and put them together, each of the sub-components attaching to the cube. It was obvious that a whole family of different forms could be generated out of this simple repetitive system. If one took that a step further and said that the tenant could change or rearrange these sub-components at any time then it was theoretically possible to devise a system of infinite possibilities. And that means that you can have mass production, you can have repetition, and still you can give the individual great control over his own environment.

Working on the San Francisco Students' Union I became aware of the other dimension of the word *system*. Here was a building with many complex spaces of different sizes and different requirements and nevertheless you could find some common denominator which I called "space-maker." It wasn't just technology that made me want to find a common denominator. It was that the space-maker could be put together by the students and the building they would make, while not exactly the same as mine, would have been the same environment. The problem was generalized. I did not permit it to be specific, I tried to find the essence of the general, a common denominator that I later came to realize had the generic essence. I could let this space-maker loose and it could design itself according to the laws or rules I had given it, its own laws of arrangement. If the space-maker is a musical note, then the building system is a repetitive theme and the building is a fugue.

The San Francisco Union was not a composed building in the traditional sense. There was a form-making process in establishing the system and then there was another process in putting it together, but at no time did I compose in the sense that I thought it would look better this way or that way, at no time did I draw an elevation and think what proportion would look nice. This is also true of Habitat. I didn't design the space under the houses in the plaza. No one

could compose such a complex space. It would be like trying to compose the kind of environment you experience when you're under a tree in sunlight. The branches and leaves come together in certain ways, the sun shines through morning clouds, the tree moves in the wind, the result is unique at each moment.

I can illustrate this point by comparing it to a building I love – Le Corbusier's courthouse in Chandigarh. It has the soul of a courthouse, it is shaped by the movement of people and it has a sense of place. But it is a composed building, a finite solution to a specific problem at one given point in time. Le Corbusier fixed it as a specific structure – the proportions, the grille, the patterns, the ramps – composing it step by step from its various elements. You could not change the building, you could not add to it. Only Le Corbusier could put it down, only he could modify it to make another courthouse.

The courthouse is an individual specific building. It's fixed, finite. In San Francisco, while I was trying to capture and understand the spirit of a students' union and give it physical form, I tried to arrive at it by breaking it down, going a step further back. The students' union has offices, dining halls, libraries, and so on, but in that respect the courthouse is exactly the same. It has offices for clerks, waiting rooms, courtrooms, laboratories. There's a difference in the spirit of students' social gatherings and of a place of law, but not in their basic natures, both of which the system must acknowledge. Instead of finite solutions we must try to find the genetic code of a particular environment. The genetic code produces an infinite number of adaptations, each in itself not finite – not buildings with beginnings and ends, but continuums capable of growth and change.

This is exactly what happened in the vernacular village. There is a certain similarity between the San Francisco union building and the village that a group of peasants building their houses with an evolved formal vocabulary might create. That's where I feel my work is vernacular and not an extension of the Renaissance tradition in architecture. It's not a solution for all things. In each case I search for a solution that is organically valid for that particular problem. It's very specific, in fact. If I were given the problem of designing a city for Frobisher Bay, I would evolve a system solution that was specific to the spirit of Frobisher Bay, the cold north, a very specific problem. I am quite sure that I would draw on the geometric experience of my previous work, just as I am able to find common geometric experiences between a housing problem in Puerto Rico and a social building in San Francisco. But each particular problem generates a particular adaptation.

Trying to find an architectural DNA molecule – or, as a friend suggested, abandoning the *act of creation* and seeking to make the *means of creating* – is an ambitious act. But, I am sure that if solutions are worked out by architects in this way, if each is true to the laws of human nature and environment, the results must have unity. This is where my hope lies for a true contemporary vernacular, which is the diametric opposite of a world where style and fashion

are the dictating motivations. That is so arbitrary, so irrational, that no vernacular can result from it, only chaos.

Each architect would use, adapt, and add to the totality of environment. I have faith that, thus, many men's efforts and solutions could fit into the macro-matrix of the whole environment in harmony. Each is governed by enough of the same laws of nature and of the physical environment of man that they should have unity. No man's expression can supersede the laws of human nature and environment.

Our problem is always to combine order and freedom: freedom without chaos and order without sterility. Heretofore we have thought of building in terms of the technology of today – the stamping machine, repetition. But the technology of building will become all-capable, like a computer punch card with millions of possibilities extended in four dimensions or fluids capable of limitless forming. Ultimately, I would like to design a magic housing machine to do just that. Conceive of a huge pipe behind which is a reservoir of magic plastic. A range of air-pressure nozzles around the opening, control this material as it is forced through the edges of the pipe. By varying the air pressure at each nozzle one could theoretically extrude any conceivable shape, complex free forms, mathematically non-defined forms. People could go and push the buttons to design their own dwellings. One restriction built into the machine would be that it would have to make sure that all its extrusions interlocked to form one building by insuring that all designs included certain fixed points of contact.

This is a very exciting idea, indeed, because it suggests that in the ultimate evolution of technology in the building process, we may find that the highest form of organization means the least standardization, that technology can make industry as flexible as nature.

I haven't yet been able to translate this into a buildable solution any more than I have technically solved the six-component assembly. But I am convinced that in Habitat there is the seed that will eventually grow to the point where the individual has much greater ability to shape and change his living space so as to produce something that corresponds much more closely to his feelings of what his whole environment should be. And that is the idea of the vernacular, which is made by men for themselves – and the architect is their instrument.

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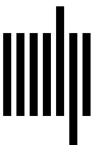
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