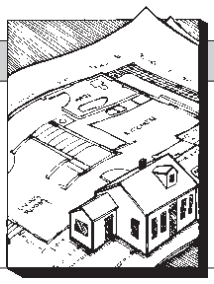


The Role of Asymmetry in Building Design

by Gordon F. Tully

Last month's column, the first installment in a series on the basics of house design, focused on reading and understanding architectural plans. One question that emerged from that discussion is: Why are plans so much more descriptive of our world than other types of sections? The answer: Simply because we humans and the world in which we live are asymmetrical in ways that make plans and maps tell most of the story about our environment.

Our Asymmetrical Environment

The first asymmetry is a natural one caused by the force of gravity. If we ignore the sun's north-south asymmetry (and most houses do, regrettably), our everyday world is basically symmetrical in all directions except up and down. People have vertically asymmetrical structures—heads on top, feet on the bottom—in response to the force of gravity. So do trees, mountains, lakes and buildings. Gravity requires us to live on horizontal surfaces arranged in stacks as we struggle against its pull to form indoor space.

Furniture is largely a response to gravity—a fact made startlingly clear when we watch astronauts cavort about their environment in zero gravity. We eat, work, store things, sit and sleep on raised, level horizontal platforms. On boats, where the foundation won't stay level, we put the tables on gimbals. Our horizontal surfaces occur in only a few layers and therefore are easy to describe in plan views.

Making things stand up against the force of gravity is hard work, and our plans reflect the effort. Floor plans show the columns, walls, beams and joists needed to keep the building from collapsing.

Good designers try to break spatial monotony by playing with the up-down dimension—using cathedral ceilings, double-height spaces, interesting stairways, skylights, dropped floors and ceilings, light coves and other devices.

The arrangement and size of spaces in the plan also are limited by these antigravity elements. Big spaces require expansive roofs, which can be turned into wonderful design elements—such as vaulting over the nave of a cathedral. Except for rooms under a truss roof, rooms in houses seldom are wider than 16 feet because that is the limit using ordinary framing lumber. (Floor trusses, in principle, allow wider rooms on all levels.)

Our Asymmetrical Selves

The second asymmetry that makes plans important is a characteristic of human beings themselves. Like all animals and unlike most plants, we humans are asymmetrical from front to back. We always are facing something, and something is behind us and to our right and left. We also move along paths in particular directions rather than the random patterns of one-celled organisms viewed through a microscope.

Floor plans reflect the way we face and move about in complex and subtle ways. For example, it might be very efficient to arrange a dining room with the tables along the walls (like the counters in a kitchen), but we never consider this possibility because people need to face each other during meals. We arrange living rooms so that occupants can face the fireplace, the television or a pleasant view. A plan clearly shows how things face each other and, as a result, it accurately describes this important design issue.

Plans also are the best way to show the paths of our movement through the spaces in a building. Analogous to the human body, the system of movement paths in a building is called the "circulation system" (or simply "circulation"). In its simplest interpretation, circulation is the network of lobbies, corridors and stairs that connects rooms with each other and with the entrances and exits, as in the guest wing of a hotel.

In an ideal plan, we enter utility elements such as lavatories, entries and stairs from the circulation spaces instead of the main rooms. In most cases, important rooms used by everyone, and private rooms such as bedrooms, open off connecting halls. In certain cases, one room opens directly off another, such as a private bath off a bedroom, a private study off a living area or a family room off a kitchen.

Great houses typically have a generous circulation system: a central hall, a series of antechambers leading to important rooms, galleries and courtyards. As a house becomes smaller, circulation begins to look like "wasted space"; all too often there is barely enough money for essential spaces such as bedrooms, and the luxuries must go.

But we should not give up the circulation spaces in a small plan—they are what make a small house livable and convenient. Yes, it does make sense to trim everything down to the essentials. But circulation should be included among those essentials.

Great houses typically have a generous circulation system. As a house becomes smaller, circulation begins to look like 'wasted space.' But we should not give up the circulation spaces in a small plan—they are what make a small house livable and convenient.

Solar Asymmetry

It never would do to omit the natural asymmetry that results from our planet's path through space. The earth spins on an axis approximately perpendicular to its path around the sun, from which spring several great asymmetries: night and day, the changing seasons, and (for those of us in the north temperate zone) the sun in the southern sky.

In an earlier column about site planning, I noted that it is easy to see the influence of the wind, which blows horizontally across the ground plane, and the sun, which shines from the south. Plans not only allow us to cope with these matters, but to define where we want to plant and where we need walls and terraces to level the ground.

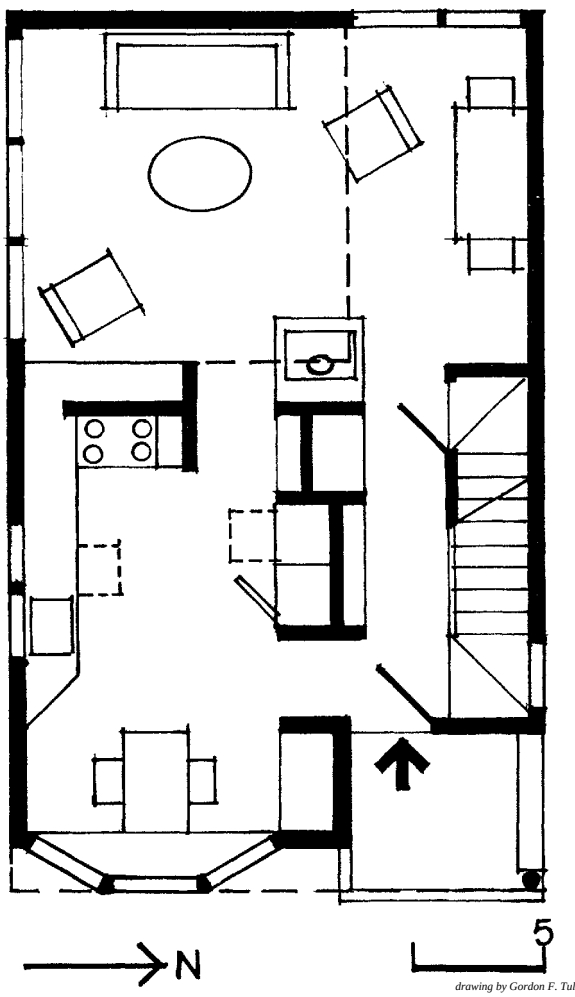
Playing with Asymmetry

We experience buildings as extensions of our own body. Vertical elements such as columns and walls are treated like standing people—and thus are given feet, bodies and heads. Rooms face in certain directions, usually defined by a primary axis of movement, as in a church. (The plans of most Christian churches deliberately imitate the plan of a person lying down.)

When we enter a room, we define a front-to-back axis in the room based on our entering direction. If the room is longer in the perpendicular direction, we feel as if we have entered the *side* of the room. To experience the satisfaction of aligning our axis of movement with that of the room, we must turn to the right or left.

Classical architects used symmetry and axes to control and dramatize one's movement through the spaces. In classical rooms, the symmetrical paneling makes a wall face into the space, as if the wall were an outside wall and the room a kind of inside courtyard.

Modern houses, with their complex utilitarian requirements and smaller spaces, require a completely different approach to planning. Spaces seldom have clearly defined axes, and they flow from one to the other to create an illusion of large space out of small ones. Plans in modern houses tend to emphasize fluid



drawing by Gordon F. Tully

The first-floor plan of this small solar-heated house by architect Jeremiah Eck contains fewer than 700 square feet of space, yet it is beautifully organized and playful. The circulation is compact but separate, and each space is clearly defined. In addition, the living-room ceiling is raised about three feet to provide relief in the vertical direction from the limits of the horizontal plan and to bring in more sun from the south.

movement rather than static frontality.

In the vertical direction, we are excited and sometimes scared by heights, either looking up at skylights or a ceiling far overhead, or looking down from galleries or the tops of buildings. People don't build skyscrapers because the structures are economical, but because they stand tall and proud, like a strong person.

Because gravity presses us so hard, it is exciting and liberating to deny it. Our lives indoors mostly are spent sandwiched between two horizontal planes about eight or nine feet apart. Good designers try to break this spatial monotony by playing with the up-down dimension-using cathedral ceilings, double-height spaces, interesting stairways, skylights, dropped floors and ceilings, light coves and other spatial devices.

Standards

You might think there are precise rules for determining the sizes and relationships of things in plan; to some extent, there are. A valuable contribution of the Modern movement in architecture and industrial design is "ergonomics" (biotechnology), which defines ideal dimensions for everyday objects and the ideal relationships between those objects and human beings. Without such studies, small cars would be impossible. But the application of these rules is not a simple matter.

Consider the width of a corridor. One can be crowded in a 30-foot-wide corridor in a museum, yet comfortable in one only three feet wide leading to a bedroom or tolerant of one 20 inches wide in an airplane. Spelunkers enjoy slithering through very skinny crevices in caves. The "minimum" corridor width varies a lot depending upon expectations, budget, the number of people, and many other factors.

All designers use their own set of rules for corridors and other elements in a building, but in the end there is an element of art that cannot be quantified. Frank Lloyd Wright, a very short man, was famous for designing impossibly low ceilings in his corridors—would you believe 75 inches?—to maximize the contrast when people emerged into a higher-ceilinged room.

Big spaces require expansive roofs, which can be turned into wonderful design elements such as vaulting over the nave of a cathedral.

People can adjust to almost any plan, and in the name of art, great designers often create bizarre plans that do not meet their clients' perceived needs. I gladly would duck my head in the corridors to live in a Wright house, but all people have their limits.

Except for a few geniuses like Wright, then, designers must pay close attention to the requirements of the user and to the real dimensions of ordinary people and things. Good design is a rich mixture of science and art, and that is what makes it so interesting.■

Gordon F. Tully is president of Tully & Ingersoll/Massdesign Architects in Cambridge, Mass.