large, the middle-sized and the very small in a life-supporting unity.

In any building which is whole, the material substance out of which the thing is made is fundamental to its beauty, fundamental to its wholeness. The reason that these "extras" must be just right is that the field of centers simply cannot exist unless the material conditions are appropriate. This is not a new idea beyond the field of centers. It is the same idea. The wholeness still lies in the existence of the field but this field requires very definite conditions in its microstructure simply in order to exist.

The material substances a thing is made of and the detailed procedures of fabrication that control the microstructure, if they are wrongly chosen, can destroy the field. If they are chosen correctly, then the actual substance of the building begins to come to life.

When it is done right, each part of the building begins to take on life as it is formed because each part is, I have suggested elsewhere (Book 4, chapter 4 and throughout), a mirror of the self. Even the columns and beams, hidden or not, are chosen to have this quality. The window sills are chosen so that the actual board, in width, thickness, substantiality of the seat which is created, have "self" in them, remind us of our own person and our wholeness (Book 1, chapter 8).

The individual panes of glass have the same quality. Each one has a shape which is related to the human person. The capitals on columns are shaped, cast, or carved to make a thing that, once again, contains and embodies the human person. Even the glazing on the door has the same quality. The most ordinary bit of concrete forming a path is made to have this quality. A row of stones, with gravel in between, begins to embody the human person, and to have its being in it.

In traditional forms of architecture, the creation of details which put the mirror of the self in every part was commonplace. The photographs presented on these pages show this. Other similar photographs in Books 1 and 2 have shown it repeatedly.

6 / UNFOLDING BUILDING DETAILS FROM THE FUNDAMENTAL PROCESS

Let us now consider, in more detail, why appropriate, beautiful, and self-like building details — though uncommon in the 20th century — must inevitably emerge from any living process.

In a natural unfolding of a building, the configuration of the building — the wholeness of that configuration itself — generates centers at various key points, and these centers break out from the unfolding process itself. This follows from the logic of the unfolding process. Centers which exist in a building configuration start by existing in a weak form. They are at first only latent. During a smooth unfolding with the fundamental process it is these latent centers which get sharpened and intensified and strengthened.

Consider an imaginary process in which a generalized building is conceived, in outline, as a hazy volume, its shape roughly known but not yet considered as a substance of physical material, brick, concrete, wood, plastic, steel and so on.

The hazy volume, even without knowledge of its material substance, already has certain latent centers which exist, just in virtue of the *configuration*. These latent centers occur most typically at the joints of the whole thing, but also in the major lines and planes and volumes which form the building. For instance, if it is a rectangular volume, there are latent centers at the corners. If it has a flat roof, there are latent centers where the roof meets the wall. If it has a pitched roof, there is an additional latent center along the ridge, and at the eave. If the building has columns, these arise as latent centers. Where a line of columns meets the building roof or floor, there is a base, or a capital, all latent. If a wall exists, a low flat wall, then there is a latent center along the top of the wall. A wall, in itself, has latent centers, just by virtue of the wall plane; a roof surface or a ceiling surface, these, too, are latent centers. If a ceiling meets a wall, there are latent centers there.

In most traditional cultures these latent centers become strengthened to form natural "traditional" elements. Thus the latent center in the zone of the eave is intensified by construction detailing which strengthens this center and makes it more alive. Some of this development is function-based (gutter, ventilation, change of slope), other is what we would traditionally call ornament-based (cornice molding, special edge tiles, change of profile or material). But in any case, what is sure is that in almost every traditional culture, patterns evolved for elaborating the latent center of the eave.

In traditional cultures most building elements exist as traditions because they have been elaborated thousands of times in just this way. The particular way these elements are elaborated is what gives rise to the typical character of any one building style. The "style" is a set of details which have typically evolved at some place in time to deal with the further unfolding of the latent centers in the evolving building.

The window, the head of the window, the doorstep, the eave of the building, the ridge of the roof, the ends of the ridge — these are all places which have emerged as latent centers during conception of the building and its construction. As structure is preserved through unfolding, these weak latent centers were made into strong centers, one by one.

These centers which I speak about exist merely because of the configuration. They are there, whether we like it or not, latent in the geometry of any building's preliminary form. If we now apply the fundamental process to any of these latent centers, the corner of the building gets reinforced by a column, by a mass of strong material, by a buttress. The eave of a flat roof gets embellished to form a nicely shaped, strongly shaped, parapet; the eave of a sloped roof gets embellished and strengthened to form a coherent cornice or a coherent eave.

Thus we get a strong base to a column, where the column meets the ground. We get a pronounced ridge where the roof planes meet; we get a strong edge, or eave, where the roof meets the wall. We get a strong, often striking, head to the window, where the top of the window and its structural treatment are resolved. At the base of the window we get a sill, again, made strong, as a strong center, in order to carry out a structure-preserving, unfolding process. We may get reveals on the windows where the window meets the wall and then this place, too, is developed as a strong center.

In this fashion, all the typical elements of traditional architecture will get built — must be built — as a direct consequence of the repetitions of the fundamental process which make up every living process.

In a building formed under the impact of living process, we shall therefore find all these elements made beautiful. When I say beautiful, I mean that each of these elements becomes a substantial living entity in its own right — it really does become a living center.

So as a direct result of an unfolding process, each of these major categories of latency in building form will get a coherent type of living center associated with it.

In the following nineteen pages, I show examples of living centers made in the buildings and experiments of my construction company, during the last thirty years.

UNFOLDED CONCRETE CORNER ON A BUILDING: *A concrete building with a strengthened corner formed in concrete, marked and shaped so that the corner becomes a beautiful center. The technique of making this building is so fluid, and each step follows from the previous ones so smoothly, that the strong, marked, shaped corner has unfolded merely from the existence of a latent center at the corner, and the capacity of the building process to intensify this latent center.*

Formation of the corner on a gunite house. The latent center at the corner, is made into a major structural and visual center, which holds the building emotionally and visually as well. Martinez House, California, 1984.

UNFOLDED STAIRCASE, MOLDED TO A COMPLEX SHAPE: *A wooden stair, made in fir and pine boards, cut and fitted to complete and fill the complex shape, so that light, position, and gradients all play their role in making it a perfect thing. The shape is unfolded because each board is cut, at the time of its making, to fit the positioning and character of the previously placed boards.*

The technique allows the wholeness of the previously existing frame to pervade the details, shaping them, forming gradients and echoes which then reflect the play of light. Upham House, 1994.

UNFOLDED STRUCTURAL PANELING IN A WALL: *A paneled wall of brick and stone and concrete. The individual panel separators are made in limestone; the bricks inset in herringbone are two-inch bricks, fired scarlet: the whole thing set in a mass concrete conglomerate with elements interlocking structurally in three dimensions, so that flints, bricks, and stones are united by concrete poured above and between them, over a concrete base. There is a real interlock in construction so that the flints and bricks are unified with concrete poured below and between.*

Stone and brickwork on the entrance porch of West Dean: the stones are cut in thin lines, and together with the panels and herringbone bricks, have been chosen to make the porch wall of STRONG CENTERS *with* GRADIENTS, ALTERNATING REPETITION, STRONG CENTERS, LOCAL SYMMETRIES, CONTRAST.

TWO UNFOLDED COMPOUND WALLS: *In the upper illustration, a wall made of massive concrete columns with recessed bays and tiled surface walls above. The unfolding was from bays, to columns, to capitals, to windows, to tilework alternating with a concrete plaster. In the lower illustration is a wall in an early experimental stage: it was made of large, cast, nearly black concrete blocks with white marble inlays. Each of these blocks has life in its own right as a center; here we were testing the ways these blocks could be used to form the wall integral with the marble inlays.*

Wall surface of the Julian Street Inn, a continuous waterproof surface of cast concrete columns and heavy frame walls, forming centers that are latent in the structure of the undifferentiated plane and of the bays.

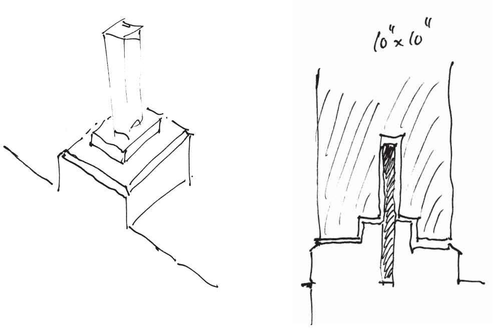
Massive stones being checked for the Hodgson house, California. The stones are cast concrete. Each one has a dark surface; the surface is cast, then washed with a light water wash. Inset, or inlaid next to the stone, is a chase to receive a fine line of white marble.

UNFOLDED ORNAMENTED CONCRETE SURFACES: *These designs were unfolded from an endless plane, starting from the most basic repetition of symmetries inherent in the plane, then elaborating the formation of repeating forms. The two surfaces show different methods which allowed the design to be unfolded in material substance from the actual casting and working of the concrete.*

Ornamented concrete wall panel, cast, with layers of diamonds cast into the panel in the vertical position. Christopher Alexander, 1986.

Ornamented concrete slab in the Fresno Farmer's Market, made by precasting 1/2 inch thick light blue fishtails, then dropping them into the slab while the slab was wet and still being worked, floated and troweled. Christopher Alexander et al., 1984.

UNFOLDED COLUMN BASES: *Free-standing heavy timber columns, 11 inches by 11 inches, and about 11 feet long. Each column is machined so that a steel plug and concrete shaft go into a deep mortise in the column forming a beautiful connection, which, though invisible, gives the building its emotional weight.*



Left: The concrete base and square steel pin that receive the base of the wooden column, mortised out as shown
Right: Cross section of the same detail

Shaped cast bases on the columns from the Julian Street Inn, San Jose, precast and formed in our Martinez yard.

Heavy timber columns, beautifully precut with a base mortise, cut with a hand-held plunging mortiser I brought back to the US from Japan. Martinez Carpentry Shop, Martinez, California, Christopher Alexander, Gary Black, and Seth Wachtel, 1986.

UNFOLDED LOW-BUDGET COLONNADE: *Free-standing columns made to be entities which have some significance because the columns are large enough and well-shaped. Those on the opposite page have received careful shaping through the use of low-cost guidework and a concrete gun. Those shown on this page are cheaply made from special cylindrical earth-cement blocks, fabricated in our own molds.*

Columns with substance, made from specially manufactured cylindrical blocks of soil-cement, cast and pressed on our own modified Rosa-Cometa block-making machine, Mexicali. Christopher Alexander, Julio Martinez, Donald Corner and Howard Davis, 1976.

UNFOLDED COLUMN-SHAFTS AND BEAMS: *In the case shown below, the column and the beam and the point of intersection of the two all form coherent centers. The sections of beam between the columns have a good shape, yet the beam is structurally continuous from column to column and within the columns.*

These columns and beams are able to unfold from the situation and take the necessary shape, replete with centers, bcause they are made by shooting gunite into lightweight, low-cost, open formwork.

A sample gunite column, shaped to be beautiful and easily formed by the open-form technique.

In the shaping of the beam, column, column capital, we see the beginnings of powerful centers being formed —in this case with the cheapest formwork and with a very crude concrete shoot that nevertheless goes a long way to bring this inert piece of concrete to life. Martinez House, California.

UNFOLDED CONFIGURATION OF A WINDOW AND SURROUNDING WALL: *A window as a center. The window itself, beautifully shaped and specially made with curved sash. The window surround, cast concrete. Beyond the cast concrete is the herringbone brickwork. Below the window, emphasizing the center even further, are bands of alternating flint and stone and concrete and brick.*

This wall segment, part of the construction of the West Dean Visitor's Centre, West Sussex, England, shows a fully integrated masonry structure in which brick, stone, concrete, tile, and wood cooperate structurally, and in a way that permits individual shaping and sizing of all the elements without compromising structural integrity. 1996.

UNFOLDED BEAUTY OF WINDOWS: *The window, its shape, its internal organization and glazing bars, all made to be things of beauty in their own right.*

Windows in one of the largest classrooms, College building #1 on the Eishin campus. Christopher Alexander and Hajo Neis, 1987.

The dining room window from the Gioja House, Austin, Texas, 1996.

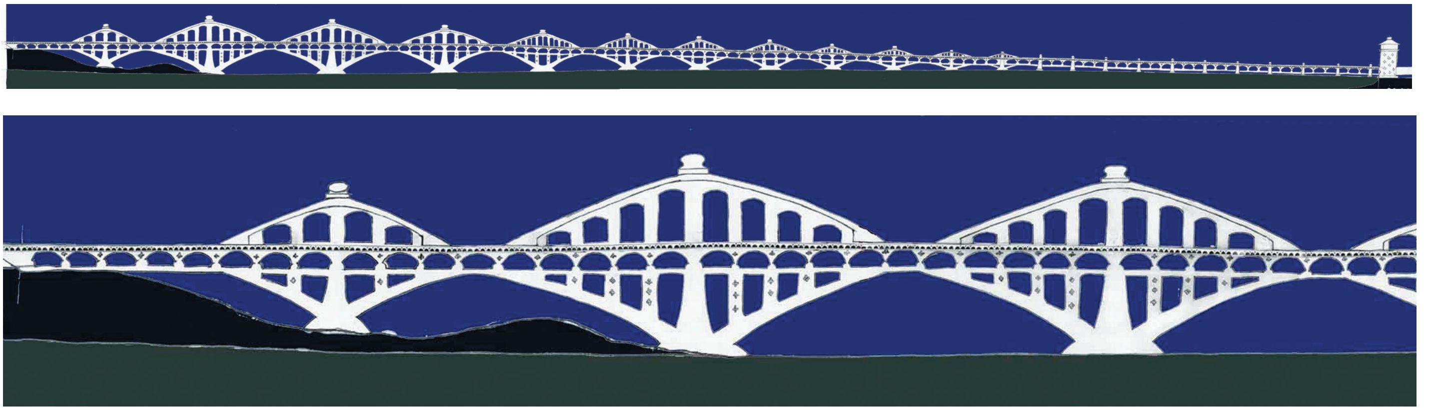
UNFOLDED ROOF EAVES, THREE CASES: *You see how the latent center at the meeting of wall and sloping roof forms, and then requires some substantial center to be formed there by the unfolding process. This principle is expressed diagrammatically, and discussed, with the drawing on page 497. On this page we see three different versions of it: a heavy concrete cornice on a building in Japan, a light rafter and sub-rafter structure in Texas, and steel brackets holding the roof rafters of the gymnasium.*

Shaped rafter tails to form a roof edge and eave. The eave is more complex, and made a better center, by the shape of the tails. Back of the Moon project, Texas.

Example of the eave from one of the classrooms at Eishin.

Orange-painted steel bracket plates on the Gymnasium.

UNFOLDED ELEMENTS OF A GREAT BRIDGE: *A system of prefabricated, precast, thin concrete shell elements, assembled to form the east span of the San Francisco Oakland Bay Bridge. The elements at different sizes — cantilevers, bases, arches, towers, smaller arches of a pedestrian walkway — all follow naturally from the unfolding of the original structural idea — the chain of double cantilevers — which itself unfolded from the weak foundation clay, and the need to avoid long spans and to reduce cost.*



Design for the new east span of the San Francisco-Oakland Bay Bridge, commissioned by the office of the Mayor of Oakland. Christopher Alexander and Randy Schmidt, 1999.

UNFOLDING OF A ROOF SURFACE: *Consider a sloping roof. It is a uniform surface. But it contains some structure; the ridge and the eave are defined. These centers then induce a system of latent centers within the wholeness, and these latent centers may be thought of as lines running down the roof slope, parallel to one another. What, then, is the most direct way of intensifying this latent structure? It is to create a system of alternating elements which run the water off the slope. I show here an example of the "Russian" roof which I have used several times. There are two layers of long boards running from ridge to eave. In each layer, each board is milled to contain two grooves. The grooves lie in such a way that a drop which falls between the grooves gets into one groove and flows to the eave. A drop that falls outside the two grooves in the top layer flows to a point between the two grooves in the bottom layer, again then flowing to the eave. Mathematically, the uniform system of centers that is latent in the roof is replaced by a system of* ALTERNATING REPETITION *in the boards. Each board, by virtue of its two grooves, is made a* STRONG CENTER*; and what we see is a system of wide boards, with* BOUNDARIES*, and just visible, a narrow bit of the lower board, between each two boards. The pattern of boards which forms the roof is a direct, uncomplicated, embellishment of the structure of centers already latent in the situation.*

The Russian roof on the Martinez building, California.

Detail of the outer layer of lapped boards in the Russian roof.

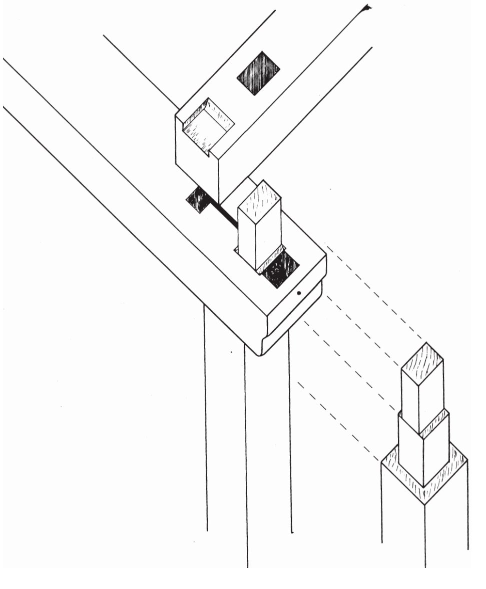
UNFOLDED FLOOR SURFACES: *In this floor, we made each tile in the shape of a fleurs de lys so that the tiles fit together and yet give you the luminous impression of a floor made of beings. The red color of the tiles, against the gray stone, is remarkable.*

Floor tiles, made to our design, forming centers over the floor surface of the West Dean building.

Left: Other paving at West Dean, stone paving on the terrace. Right: Small stair indoors, limestone steps & apple wood paneling.

UNFOLDED CONNECTION BETWEEN WOODEN COLUMNS AND BEAMS: *On this page, two types of capital that we used. Both are made of the same heavy material as the columns and beams: bolted through, to take the weight and to take shear forces, keeping a beautiful and positive shape, which intensifies the connection of the members.*

Capital where braces, beam and column meet, Martinez Carpentry Shop, Christopher Alexander, Gary Black, Seth Wachtel, 1986.

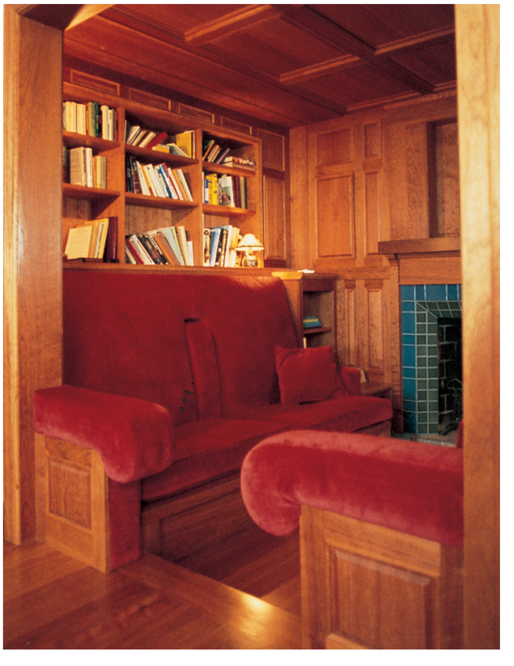


Left: Three wooden corbels, cut from six-by-six stock. Although simple, these corbels do perhaps have some of the mirror of the self quality, and begin to approach some of the value of traditional living centers. Sala House, California, Christopher Alexander and Gary Black, 1983. Right: Wood to wood connections, Martinez Carpentry Shop.

MISCELLANEOUS UNFOLDED DETAILS: A WINDOW OPENING, A DRAINAGE CHANNEL IN A PATH, AND AN ARMREST IN A BUILT-IN SOFA: *The window shows its centeredness rather clearly and was specially made: the curved glazing bars were drawn on a full-size drawing of the arch and came naturally from watching how the lines fell. The gutter in the path — gravel, brick, stone, easily made — was composed to be a living center just by judging the relative proportions of the areas of brick and gravel and stone.*

Curved window with specially made arched head and curved glazing bars. Christopher Alexander and Derek Bonner, 1995

The edge of a path — gravel, brick, stone, grass — made to be a living center; it works because of the mix of material, and the proportions.



A wood-paneled fireplace nook, where upholstery is built into the hardwood arms of the physical structure. Sullivan house, Christopher Alexander and David Soffa, 1995.

UNFOLDED ELEMENTS OF FURNITURE DESIGNED FOR HERMAN MILLER: *Each element shaped to be a living center, both a practical and efficient thing, and also something which will nourish the person using it just by virtue of its shape*

Desk made of plywood, automobile lacquer, and leather.

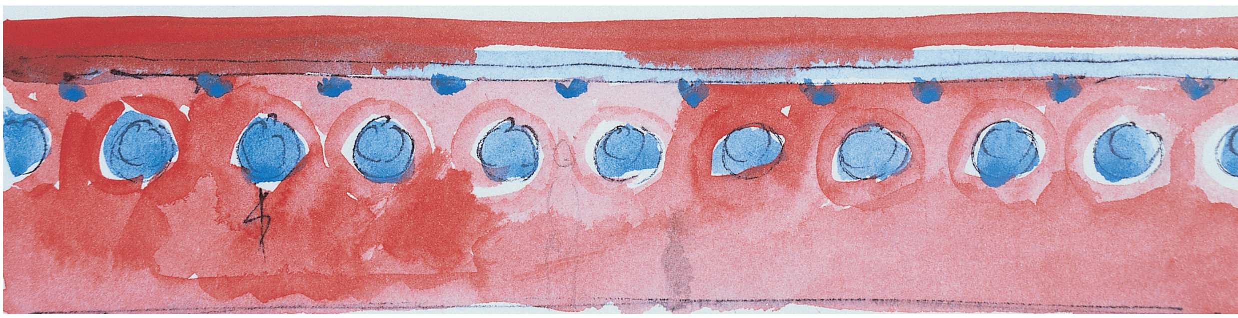
Left: Lighting fixture in an office with a reflective board, pin board, and ceiling and curtain. Right: Rolling table of black plastic.

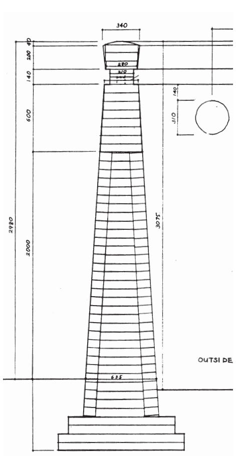
UNFOLDED OUTDOOR WALLS AND BALUSTRADES: *These walls and balustrades are themselves living entities, simply made. The wall is even rather rough.*

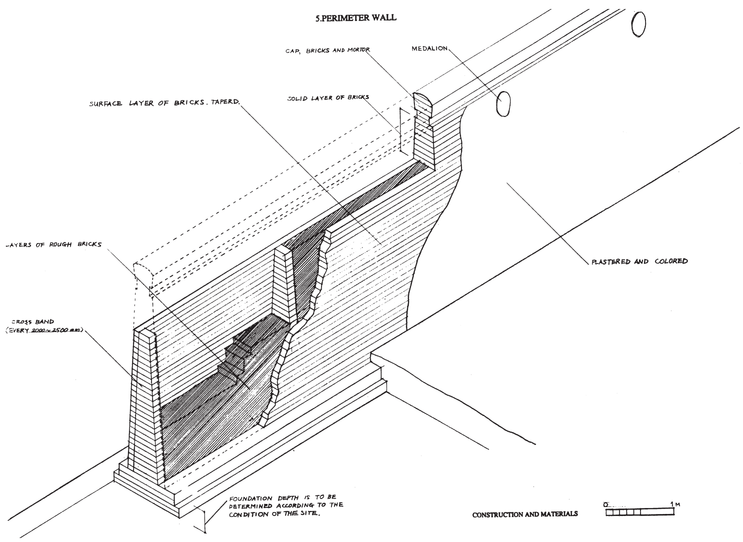
Very robust garden wall made from old hardened-up cement sacks, with a poured concrete cap; the surface of the bags was shot in low-budget shotcrete. *See discussion in Book 4, pages 130–31.*

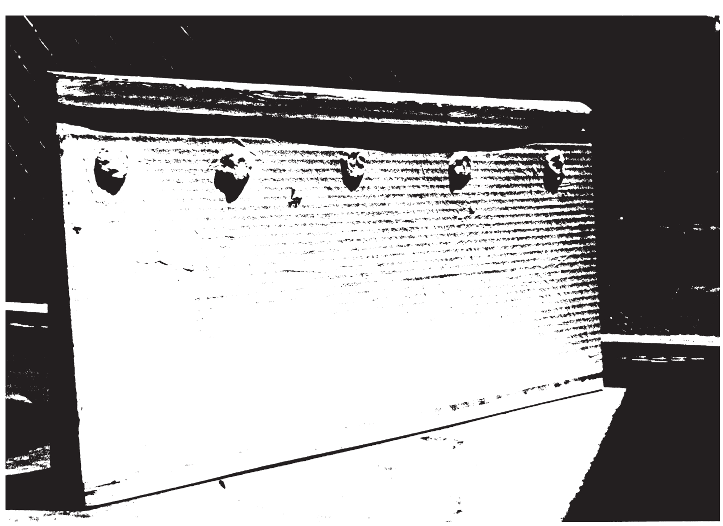
Balustrade in which arches, columns, and flowers are formed with cheap foam inserts, pinned onto a sheetrock backing, and shot with gunite. Christopher Alexander and David Dacus, 1980.

AN UNFOLDED WALL FOR A TEMPLE COMPOUND SURROUND: *Ten foot high, the wall started from a vision of giant eyes along the top of the wall: that vision led to a sense of the height of the wall; that, in turn, to the battered shape; and that to the details of its practical construction.*









A ten-foot compound wall to enclose the Nyingma Monastery, Katmandu, Nepal.
Christopher Alexander with Keiko Inoue and Ismet Khambatta, 1990.

UNFOLDED BOWL OF A DRINKING GLASS: *In this instance the glass itself, only tiny, embodies the same principles. The glass, even the thick wall of the blue glass, and its clumsy foot, all embody the quality of living centers so that here, even the rim of the glass, the part you drink from, fills you with its presence; you can even feel the centers with your lips. This glass embodies the character of living, building elements, even though it is but a tiny detail.*

A drinking glass: here even the glass is a being-like living center. I include it because the heavy colored glass shows, in its attitude, the approach which all living centers in the building need to have. Christopher Alexander with Katalin Bende, Henk Werveg. One of a series of drinking glasses made for the Royal Dutch Glassworks, 1997.