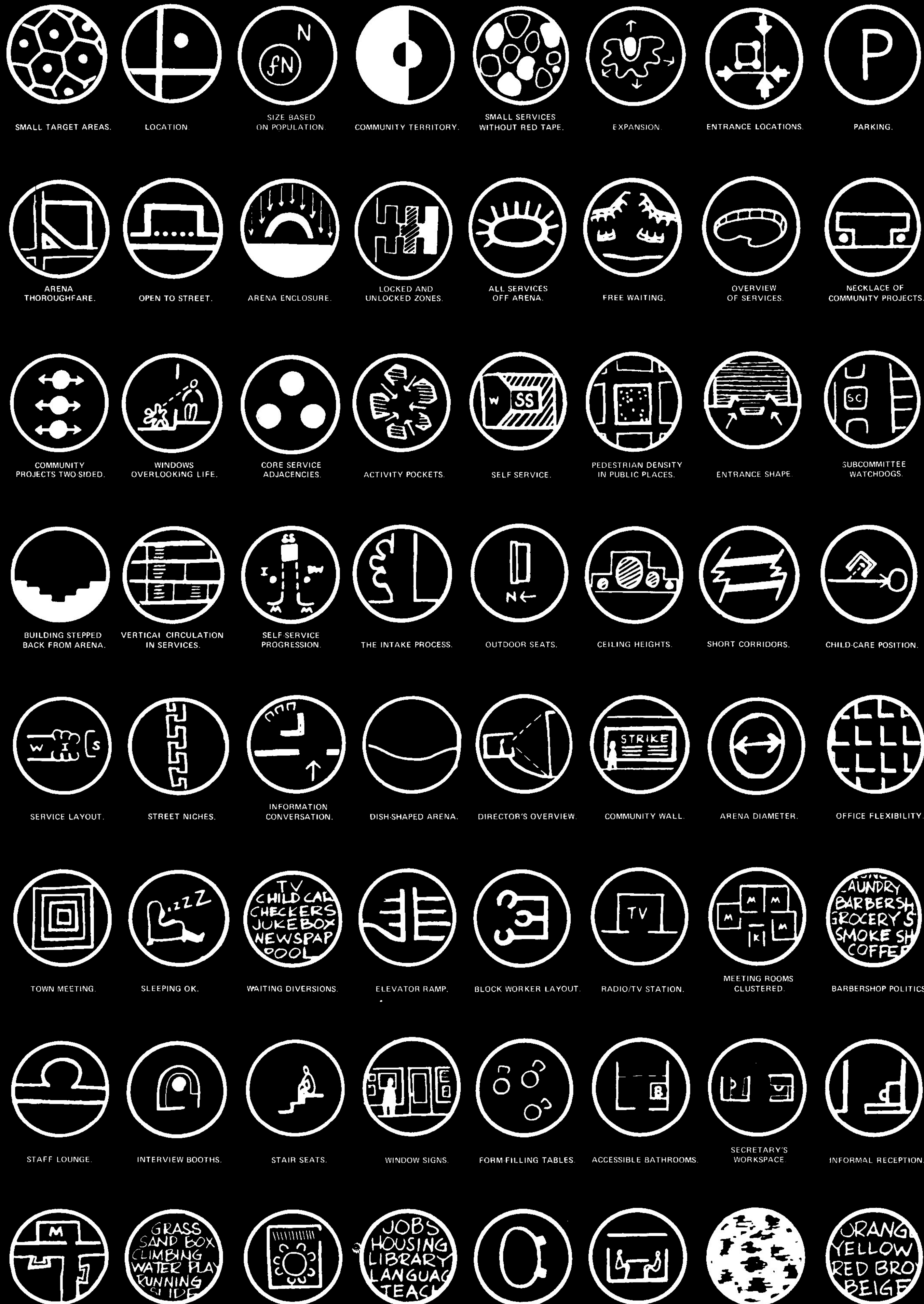


SMALL TARGET AREAS.
LOCATION.
SIZE BASED ON POPULATION.
COMMUNITY TERRITORY.
SMALL SERVICES WITHOUT RED TAPE.
EXPANSION.
ENTRANCE LOCATIONS.
PARKING.

ARENA THOROUGHFARE.
OPEN TO STREET.
ARENA ENCLOSURE.
LOCKED AND UNLOCKED ZONES.
ALL SERVICES OFF ARENA.
FREE WAITING.
OVERVIEW OF SERVICES.
NECKLACE OF COMMUNITY PROJECTS.

COMMUNITY PROJECTS TWO-SIDED.
WINDOWS OVERLOOKING LIFE.
CORE SERVICE ADJACENCIES.
ACTIVITY POCKETS.
SELF SERVICE.
PEDESTRIAN DENSITY IN PUBLIC PLACES.
ENTRANCE SHAPE.
SUBCOMMITTEE WATCHDOGS.

BUILDING STEPPED BACK FROM ARENA.
VERTICAL CIRCULATION IN SERVICES.
SELF-SERVICE PROGRESSION.
THE INTAKE PROCESS.
OUTDOOR SEATS.
CEILING HEIGHTS.
SHORT CORRIDORS.
CHILD-CARE POSITION.

SERVICE LAYOUT.
STREET NICHES.
INFORMATION CONVERSATION.
DISH-SHAPED ARENA.
DIRECTOR'S OVERVIEW.
COMMUNITY WALL.
ARENA DIAMETER.
OFFICE FLEXIBILITY.

TOWN MEETING.
SLEEPING OK.
WAITING DIVERSIONS.
ELEVATOR RAMP.
BLOCK WORKER LAYOUT.
RADIO/TV STATION.
MEETING ROOMS CLUSTERED.
BARBERSHOP POLITICS.

STAFF LOUNGE.
INTERVIEW BOOTHS.
STAIR SEATS.
WINDOW SIGNS.
FORM-FILLING TABLES.
ACCESSIBLE BATHROOMS.
SECRETARY'S WORKSPACE.
INFORMAL RECEPTION.

SEATS OUTSIDE MEETING ROOMS.
CHILD CARE CONTENTS.
SQUARE SEMINAR ROOMS.
SELF-SERVICE CONTENTS.
ARENA STORAGE.
WINDOW HEIGHT IN MEETING ROOMS.
POOLS OF LIGHT.
WARM COLORS.

PATTERN LANGUAGE

The contribution of Christopher Alexander's Center for Environmental Structure to the science of design

BY ROGER MONTGOMERY

Symbols (left) representing 64 patterns applicable to multiservice centers. These basic patterns were worked out by Christopher Alexander and CES members Sara Ishikawa and Murray Silverstein. Each one describes a relationship required to solve a problem that occurs in the design of such a center.

The worldwide movement to give design a rational basis belongs in large part to Christopher Alexander. When his *Notes on the Synthesis of Form* exploded into our consciousness, the movement gained a rallying point—its first manifesto. Since then, in a series of shorter publications, among them his greatly acclaimed FORUM article "A City is not a Tree" (April and May '65 issues), he has continued to stimulate thought and give direction to architects and others working to modernize design methods and bring scientific rigor into their ancient craft.

Alexander and a team of associates in his Center for Environmental Structure have created the outlines of a universal design vocabulary and grammar. They call it *pattern language.* It represents a bold extension of the ideas contained in *Notes.* At the same time it signifies a surprising shift, almost a reversal, by emphasizing pre-designed component images and the combinatorial problems of making a design—rather than the decomposition of a problem into a program. Already, in the three years or so that it has been in development, the pattern language has proven effective in practice. At the same time its conceptual basis has been strengthened and enriched by further analysis.

What is a pattern language? Actually nothing mysterious or obstruse bars direct understanding and application of the pattern language. Put more simply, it means just what its name implies: a set of elements or component images called patterns, plus the rules for their combination into complete designs. Just as a verbal language is made up of words and grammatical rules for their combination into sentences, the pattern language is composed of physical or spatial elements and rules for their combination into patterns. Patterns in turn generate buildings and building groups much as sentences generate narratives.

The analogy between pattern language and word or verbal language serves well. Alexander points out that a finite set of words in the English language plus a finite set of grammatical rules can, in the hands of a writer or a poet, produce an infinite number of sentences and poems. So it is with design. Given a finite set of patterns, an infinite set of possible man-made environments can be generated. This is what the pattern language seeks to do. In Alexander's own words: "Where an ordinary language is a system which generates one dimensional strings [of words] called sentences, *a pattern language is a natural generalization of this idea to three dimensions.*"

Mr. Montgomery is professor of urban design in the Department of Architecture and the Department of City and Regional Planning at the University of California, Berkeley. He is the West Coast correspondent for Forum.

Three-part patterns

Patterns are re-usable design ideas, the components from which man-made environments are formed. The language includes as well the rules for their combination, the grammar and syntax which governs their assembly into complete environments. Each pattern consists of an *if-then* statement plus a discussion of the problem and its solution. The if-then statement has the form of the "ensemble comprising [a] form and its context" which Alexander defined first in the *Notes.* For instance:

"IF (the context): Any office chiefly used to conduct interviews, THEN (the form):

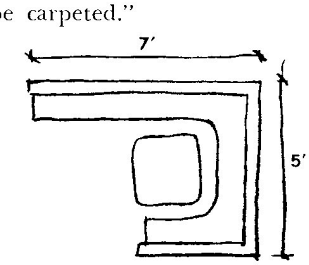
"1. The office is a booth, entirely enclosed, with a ceiling.

"2. The door to the booth is a bit wider than the usual office door; wide enough for two men to enter simultaneously.

"3. The booth contains a table, not a desk, that is either round or roughly square, and a continuous sofa-like seat wrapped around half of this table. The booth walls are immediately behind the seat. The seat is about 12 ft. long, and a part of it extends along the wall away from the table.

"4. The table is never more than 3½ ft. across.

"5. The floor of the booth to be carpeted."



A supporting discussion of the interview office problems *is an integral part of the pattern statement.* It deals at length with the various problems of the interview office, and with the social research and other data on which a correct design solution must be based.

Note that each pattern always contains three distinct components. Each begins with a context or "if" statement that defines precisely the situation in which the pattern applies. Second, each contains the pattern itself, or the "then" statement. The pattern is a physical configuration, a spatially defined image, not a verbal or quantitative performance standard; and it usually requires both verbal and graphic indications to define it. Finally, each one contains the problem statement that gives the background for the pattern and the specific data on which it is based. The "if" statement and the problem discussion make the pattern open to criticism, modification and continual reassessment. The importance of these three fundamental aspects of patterns, which give them a certain formal rigor, stands out sharply in the experience which has been built up in using them, as well as in the intensive theoretical effort carried out over the last few years at the Center for Environmental Structure, CES.

Trying out patterns

The Center, in fact, was established expressly "to develop, and implement, a pattern language." The Center's articles of incorporation state that both the theory of patterns and their content "will be subject to continuous review, change, and improvement . . .;" and that "the Center will actively seek projects which concern themselves with the testing, communication, implementation, and criticism of pattern ideas."

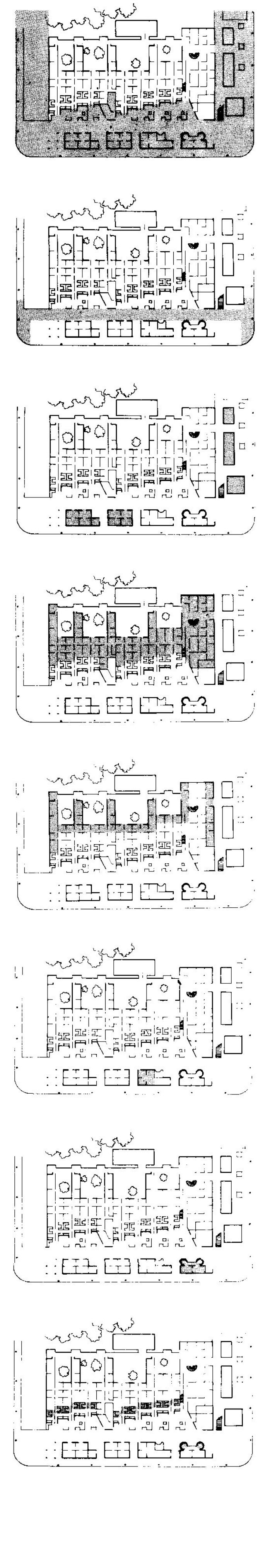
Thus far the Center has taken on three major projects. Also, several of the staff have worked on patterns with groups of architecture graduate students. In their first major pattern language project, the Center acted as consultant to Urban America and Architect Kenneth Simmons who directed the UA Hunts Point office in the Bronx during 1967 and 1968. This association resulted in a publication on patterns reviewed below. A second opportunity to develop and test patterns in practice came about a year ago when the San Francisco office of Skidmore, Owings & Merrill retained the Center for Environmental Structure to work with them on a newfangled educational research facility in Southern California. The most recent and most ambitious project came in the form of an invited design competition for a low-income residential district in Lima, Peru.

The multiservice center

At Hunts Point, Simmons and his staff were called upon to design an unprecedented social service facility which would bring together activities never before carried on together under the same roof. The Hunts Point Multi-service Center was to be a pilot scheme. The agreement with the New York City Human Resources Administration, which had put up the money, included developing general planning policy for such facilities. Simmons brought in the Center for Environmental Structure as a third party to the contract between HRA and Urban America. CES in turn brought in the Berkeley architects Hirshen and Van der Ryn, and, as New York associates, Gruzen & Partners.

During the winter of 1967-68 Alexander and Center members Sara Ishikawa and Murray Silverstein, hammered out 64 basic patterns applicable to multiservice centers, developed some outlines for combining them into complete designs, and generated preliminary schemes for eight centers including one on the site selected by the Hunts Point group. Concurrently with this effort, Simmons began putting together the application for federal financing under the HUD 702 Neighborhood Centers Program. The actual design developed by Simmons for submission with the application incorporates many of the patterns; others had to be abandoned because Simmons felt they posed operating difficulties, or ran counter to the expressed community preferences. Others were vetoed by one or another of the government agencies. But the pattern ideas were important in managing this unprecedented project. Simmons called them "the grains around which the building accreted."

Unfortunately the Hunts Point Center has yet to get underway. Local problems and federal red tape have effectively stalled it. But in another sense the project has already paid off handsomely. It provided the proving ground for assembling



Plan diagrams (near right) show how eight of the 64 patterns that generated the design of the multiservice center (opposite) were incorporated into the building. The corresponding pattern statements (opposite) have been drastically edited for publication; the original statements, with full argument and substantiating evidence, would have been far too long to present here. Incorporation of the other 56 patterns was carried out in a similar way. The design is the work of Eric Adlercreutz, a graduate student at the University of California at Berkeley under Ron Walkey, lecturer in the Department of Architecture and member of the CES staff. Photographs: Jeremiah O. Bragstad.

Community territory. The multiservice center has two main parts: an area devoted to the services themselves, and an area called community territory which contains an arena for public meetings and discussion, and space for community projects. The community territory is yours—it belongs to you—you can be there when you want, and do what you want.

Arena thoroughfare. The arena is placed to form a shortcut through the building; its surface is the same as that of the surrounding sidewalks, the entrances are large and inviting, and, along the shortcut itself, there are various things to do, so that you feel free to drift in and linger there.

Necklace of community projects. The outside of the building is surrounded by a continuous chain of community projects, broken only by the entrances to the building, so that the people who live nearby don't feel that the neighborhood is violated by a bureaucratic monster, and everyone who comes in contact with the building sees, from the very outset, that it is run and owned by the community.

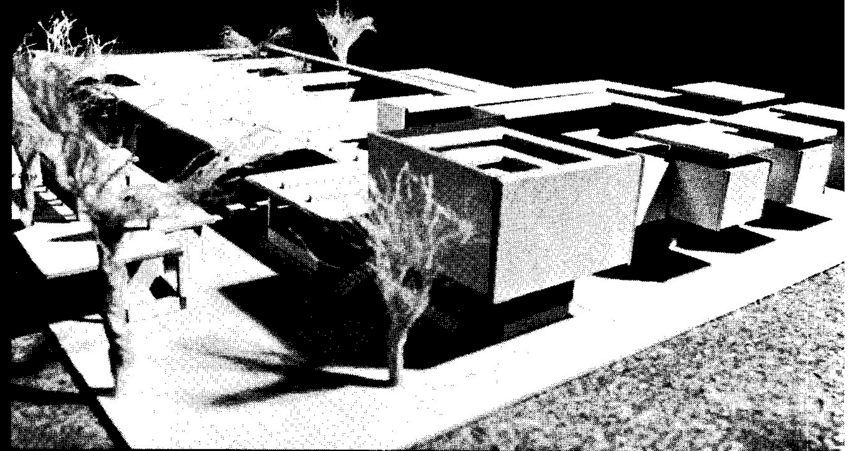
Office flexibility. The office area contains a large number of small, interconnecting offices, so that as your work groups change, you can easily create new groupings of work space.

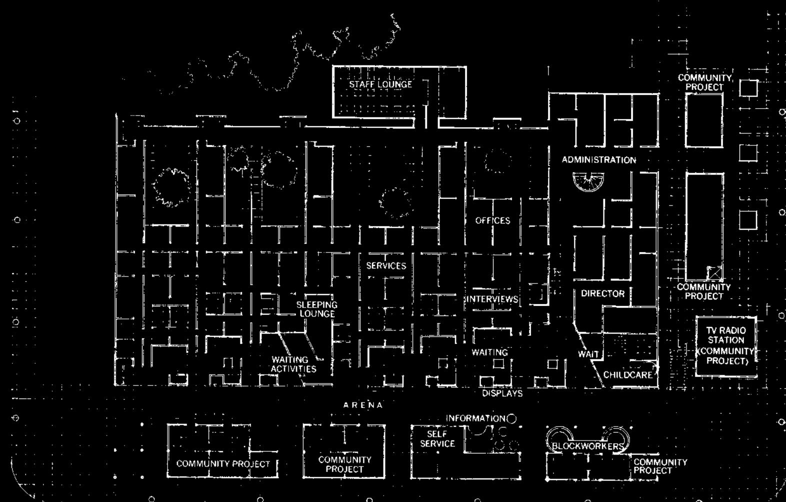
Windows overlooking life. Each office has windows looking onto some kind of life, as different as possible from the life inside—a chance to refresh your thoughts as you work.

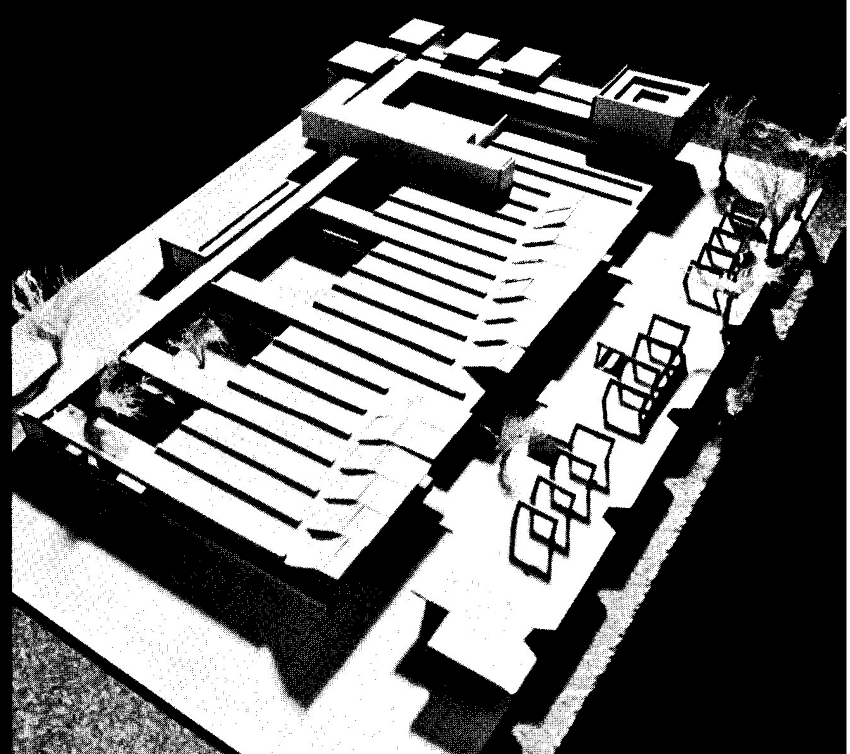
Self service. In the waiting area, there is a self service facility that lets you look up welfare rights information, job listings, and other help-yourself-items, without having to be helped by an agency.

Block worker layout. In the block workers lounge, there are two or three large alcoves, where you can talk to your block worker. The block workers' desks are in a room which opens right off this lounge, so that, as a block worker, you can keep up with your paper work, and yet still be near the lounge when a client comes looking for you.

Interview booth. In the interview area of a service, each interviewer has a private booth, rather like the high backed booths found in restaurants—so that interviews are informal, and you feel more like talking about your personal problems, than you would over someone's desk.







and testing the first set of patterns. These have been carefully documented in a new publication, *A Pattern Language which Generates Multi-Service Centers*, by Christopher Alexander, Sara Ishikawa and Murray Silverstein.*

The book begins with one-sentence summaries of the 64 patterns developed for use in designing multiservice centers. (Eight of these appear in the captions of the diagrams illustrating a student multiservice center design, preceding page.) Following this comes a very brief discussion of the pattern idea, then eight examples of multiservice centers for different communities all generated by the pattern language. (One of these designs is illustrated at right.) The main part of the book ends with a discussion of the assembly problem and suggests a system for combining patterns called a "cascade."

A long appendix, 226 pages in all, details each of the patterns one by one. This is really the meat of the book. To the designer of a multiservice facility this is the part he must digest and internalize so that he can work intuitively in generating a design. And to the person who wants to understand and use the general concept of pattern language, this appendix also holds the chief interest—for it is in the careful study of the *if-then* statements, and the detailed problem statements with their wealth of behavioral data on user needs, that the richness in the ideas becomes manifest.

Testing in the classroom

Some of the most interesting evidence on the potential of the pattern language comes from the classroom. Ron Walkey, of CES, taught last year in the Department of Architecture at University of California in Berkeley. He chose a site for a possible multiservice center, then gave his design classes the 64 patterns instead of the usual program. Good things came out of this.

In a post-mortem on one of Walkey's classes a student wrote: *"The patterns provided a fast comprehensive method of design. From the beginning, many criteria were provided by which to judge the success of preliminary schemes. Consideration for users of the building was incorporated into the design automatically. The design process was faster and easier and more satisfying than is generally the case during a three-month period."*

Other students gave similar testimonials. They expressed an increased confidence in dealing with complex user requirements while suffering no curtailment in the opportunity to make form creatively. This educational experiment may be one of the most important tests of the pattern language at this point in time. With the publication of the book, perhaps other schools will take a turn at it. Some work has already been done at the University of Washington where CES member Murray Silverstein taught for a while last year. This year another experiment is underway at the Berkeley department where Sara Ishikawa is introducing a large group of students to the patterns developed for housing in Peru.

Building plan repatterned

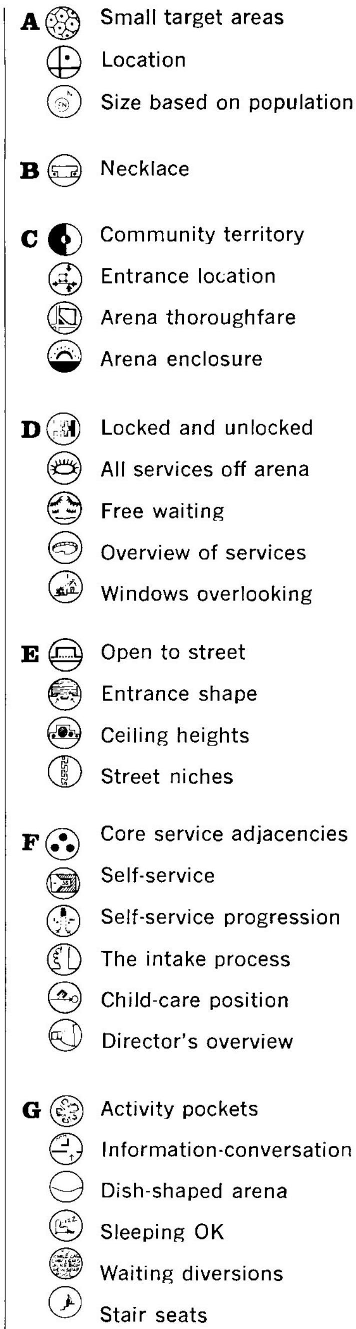
Shortly after the publication of the work on multiservice facilities, Skidmore, Owings & Merrill asked the Center for Environmental Structure to work with them on the schematic development of a facility for the Southwest Regional Laboratory for Educational Research and Development, SWRL for short, to be constructed in Orange County in Southern California. The job was peculiar from two standpoints. Nobody had any very clear idea what form an R&D facility in this field ought to take. Yet whatever that form might be, the fact that it was to be built by a long-term investor and leased back to SWRL meant that it had to be shoehorned into the typical two-story speculative office building envelope.

A team from CES—Barbara Schreiner, Ron Walkey, Denny Abrams, and Jim Smith—developed more than a hundred patterns for SOM to use in designing the SWRL facility. A great many of these were developed in an intensive field study effort. Walkey and his associates went into the present SWRL establishment. There, using typical social research techniques like interviewing and disciplined observation, they built up a detailed stock of knowledge on its unique user needs. This material was supplemented by information drawn from the growing pattern library at CES. As the results were formed into provisional patterns, they were subjected to criticism by all three parties, CES, SOM, and SWRL. As patterns emerged from this review process, they were furnished to the designers in the architectural firm for use in developing the schematics.

Because time demands pressed for early solutions, the architects began their work even before the Center began the background study which produced the patterns. However, they largely scrapped this preliminary work when they got the patterns. The comparison of before and after plans (opposite page, bottom) demonstrates the effectiveness of the patterns. The patterns which dealt with the research workers' immediate environment had a profound effect on the design. Instead of providing endless equal little cells as in SOM's first scheme, a rich mixture of various sized offices were grouped together and served by clerical and researcher workspaces identified with each of the groups.

Some of the contributions made by the Center staff were rejected by the architects. These mainly included patterns which sought to produce a special "child's world" in that part of the SWRL facility where real children would test the educational hardware devised by the researchers. Here the patterns implied a very special, child-scaled environment. SOM rejected this because they felt the special economics of a lease-back facility prevented such special treatment and because the change in scale would be hard to handle "architecturally" in the sense of creating a strongly unified building design.

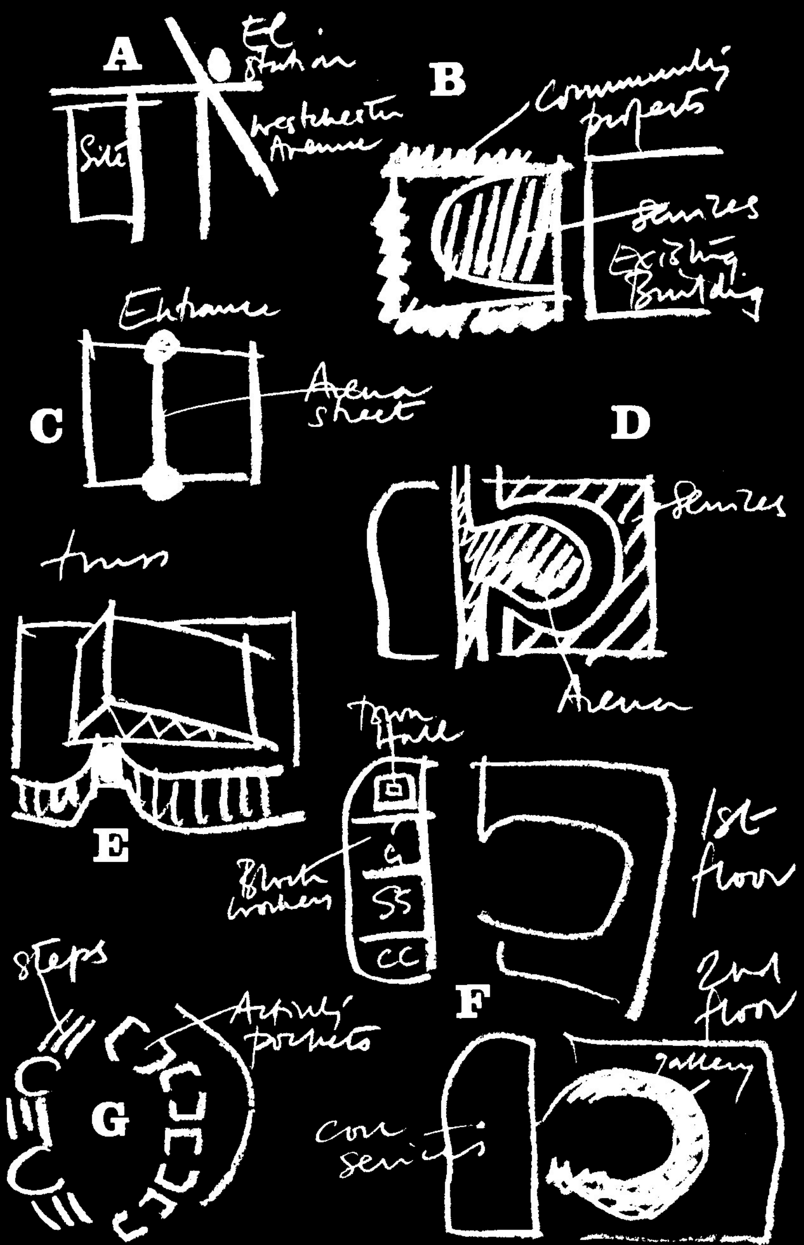
The most interesting result of the CES-SOM experience lies in the response of a team of sophisticated practitioners to the pattern language. One senior SOM associate observed: "the usefulness of patterns was in direct proportion to the unusualness of the project." John Woodbridge, who was in charge of the SWRL work for the architects, offered a number of observations. He felt the "if-then construction overdrawn"; the value lay in "taking apart the things that go on in a building and looking at them one by one." This was a "valuable thing."

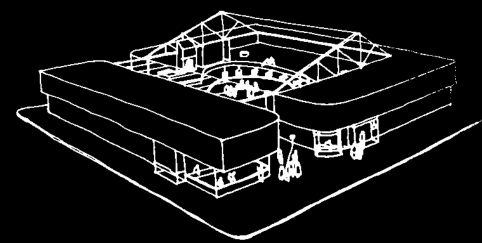


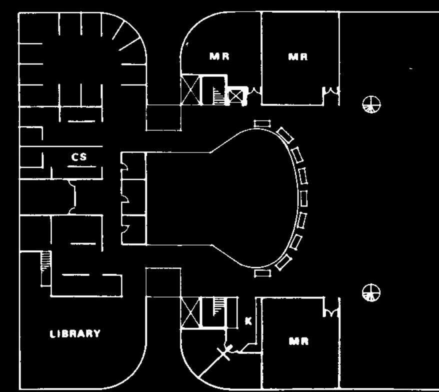
Design of a multiservice center for the Hunt's Point site (Bronx, N.Y.), one of eight hypothetical examples from the CES book, *A Pattern Language Which Generates Multi-Service Centers*. Related patterns are grouped and arranged in sequence (A, B, C, above). Each group of patterns then determines some part of the building design (opposite, top).

Plans of a facility for the Southwest Regional Laboratory for Educational Research and Development, designed by Skidmore, Owings & Merrill. Earlier plan (near right) was drawn up by SOM before CES was called in. Revised plan (far right), after CES team had worked out the necessary patterns and reviewed them with architects and client.

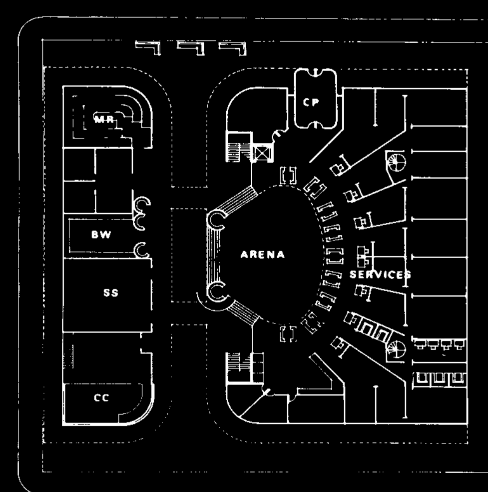
*Published by the Center for Environmental Structure, 2531 Etna St., Berkeley, Calif. 94705. 283 pp. $7.50.



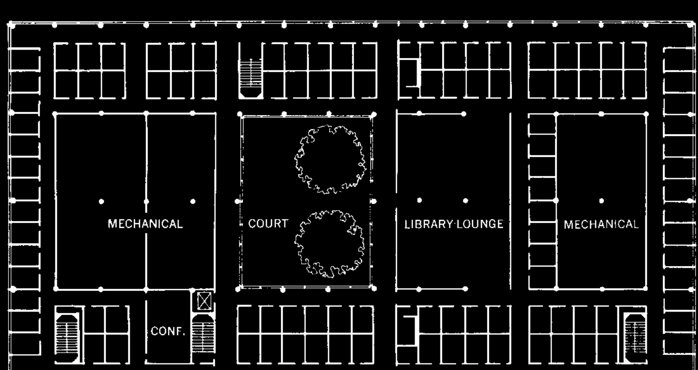




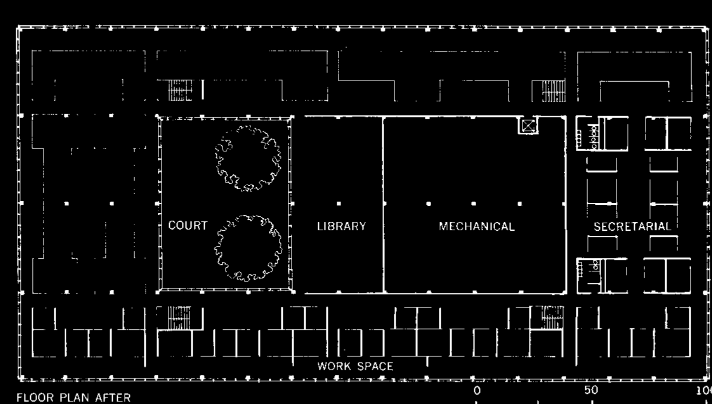
FL 2



FL 1



FLOOR PLAN BEFORE



FLOOR PLAN AFTER

The chief designer on the project, Paul Bartlett, perhaps worked more closely with the patterns and the developers than anyone else on the SOM staff. He found them helpful and not confining. Since the "patterns were not hierarchically presented, it was our job to decide which were most important." Bartlett feels that in a facility like an audio-visual center the patterns at the present time do not include much of the stuff that is determinative such as the technical problems of equipment, acoustical, optical and mechanical requirements. So far the patterns have concentrated on behavioral-oriented user requirements, and SOM partner John Fisher-Smith somewhat cynically observes, "User requirements are not controlling in most projects." CES is currently expanding the language to include some of these other design issues.

Patterns for Peruvians

The latest project based on patterns differed from the earlier two: it took place entirely in the Center for Environmental Structure, so there was no split between pattern builder and designer. Early this year Alexander was invited to participate in a closed, international architectural competition to design a neighborhood of new houses for low-income families in Lima, Peru. Alexander, Sara Ishikawa, Sanford Hirshen, Shlomo Angel, and Christie Coffin of the Center immediately went to Peru. There they each lived with a Peruvian family of the same social strata for which the project was intended. Using the classical fieldwork techniques of the social anthropologist, in a few weeks the Center team developed the behavioral evidence on which to base a pattern language for low-cost housing in Peru.

At this point the scene of action moved back to Berkeley where, during the spring and summer of this year, an intensive, crash effort simultaneously developed the patterns and the designs. This permitted an ideal two-way flow: effective patterns need refinement through feedback from design. The result was the Proyecto Experimental (excerpts, opposite page). The Center has published this design, its most sophisticated work to date, in the book *Houses Generated by Patterns.** Both the patterns and the design for the Peruvian housing deal with the whole range of considerations from community facility planning at the neighborhood scale to the construction detailing of the individual dwelling. Esthetically the results achieve a beautiful fit between the conservative tradition of the country and sensitive response to modern planning, management and construction technology.

What do the Hunts Point, SOM/SWRL, and Proyecto Experimental pattern language trials add up to? For one thing, they confirm Alexander's carefully intended shift away from the methods outlined in *Notes.* He had observed four kinds of inadequacies in using them: 1) Shortcuts appeared in practice which bypassed the need for painstaking decomposition and tree-like recomposition; 2) operationally it cost too much to go back to ground zero on each job, so many components were repeated, and many sub-assemblies were usually at hand; 3) the *Notes* approach seemed not to represent adequately the "gigantic, interlocking tapestry of the metro area," with all its collective, mutually supporting design elements; and 4) the often widespread diffusion and participation in design decisions made imagery a more powerful tool than analysis; analysis might produce images but in the act of design only patterns operated. So far the evidence looks promising. Perhaps most promising are the benefits from formalization of the pattern material, a necessary instrumental step in going on with the language.

Reusable patterns

Alexander has lumped the benefits of formalization under the concept of being *re-usable,* a quality that depends upon realizing four conditions: 1) abstractness or generality; 2) direct applicability as contrasted in this case with planning and performance standards which produce no directly useable images; 3) the quality of being criticizable so that users will continuously ask questions and make improvements; and 4) communicability so that, in Alexander's words, "anyone who wants to take the trouble can understand it." The pattern language has these qualities. Jerry Goldberg, one of the SOM users, in evaluating his experience with it observed: "The potential of this thing as a communication device in a firm of our size seems to be immense."

New tool for research

Another, perhaps unanticipated, benefit from formalization appears in its potential for effective structuring of much of the rapidly growing architectural research effort. Almost without further examination each statement of a pattern, however provisional, defines a research task. Furthermore, viewed from the opposite end, simple insistence that research produce patterns would bring instant relevance to an area too often marked by academic withdrawal from a meaningful relationship to the affairs of environment building.

The very formality of the pattern language may mask some important things and some negative aspects of the experience on the three projects. For one thing the patterns exhibit a disturbing narrowness, even a certain tendency to defend the narrowness as a good thing. The patterns singlemindedly emphasize user needs. The needs of non-users, economic and institutional factors, esthetics, aspects of designs which have to do with the legitimate concerns of artists, bankers, construction men, and engineers get little attention. Simmons, for instance, complains that the format of patterns does not leave room for urban design considerations growing from the character of place. The Proyecto Experimental indicates this problem can be solved. When certain kinds of user requirements embodied in the patterns are disregarded (as were the children's world patterns in the SOM/SWRL project), the fault may in part lie in the failure of the patterns to embody the needs of the speculative developer. Certainly no conceptual reason exists for such onesidedness. The pattern language could be easily broadened; only the intentions of the pattern authors, and the necessary man-hour commitment, limit it.

The passage of time should naturally resolve the man-hour problem. The intentions of Alexander and his co-workers present another kind of issue. So far development of the pattern language has taken on a certain style, characteristically architectural, which emphasizes the use of pattern language as a private language. Granted that there must be a bit of the true believer in any innovator, and that it takes some myth-making to realize innovation, this tendency holds dangers for the pattern language. It tends to vitiate its potential power. Anyone can see that the patterns, with their formal layout, richer imagery, and explicit, integral, arguable back-up data, represent a significant departure from old fashioned performance and planning standards. But anyone can see the family resemblance too.

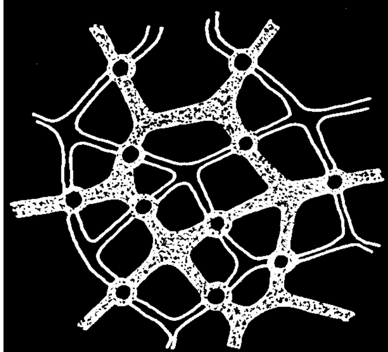
They fit into a natural evolution of architectural design material which extends from Vitruvius to Sleeper, from Gaudet to Ehrenkrantz. The most sophisticated work of other innovators in design methodology, for instance Hermann Field and his system of design directives for the Tufts-New England Medical Center, or the student work of Brolin and Zeisel (July/Aug. '68 issue), point in the same direction as the work at the Center.

In three years Christopher Alexander and the Center for Environmental Structure have done a lot. If the next three years prove as productive, designers will have gained an effective new tool with which to face the ever increasing complexity of environment building. If it is to work, the pattern language will have to become as ubiquitous and impersonalized as the ancient motives in anonymous architecture. That is a tall order in a world which tends to encapsulate individual effort in sterile packages on the one hand, and on the other hand tends to homogenize people and ideas bureaucratically into a featureless syrup. However it works out in the long run, the patterns represent a significant jump forward in the practical power of Alexander's ideas.

*Published by the Center for Environmental Structure, 2531 Etna St., Berkeley, Calif. 94705. 219 pp. $7.50.

Three patterns (opposite) reproduced from *Houses Generated by Patterns,* based on CES submissions for Proyecto Experimental, a design competition for low-cost housing in Peru. These patterns were developed in large part on the site by CES staff members who lived with local families. Each pattern is accompanied in the book by a detailed statement of the problem it answers, in terms of Peruvian living habits.

CAR – PEDESTRIAN SYMBIOSIS



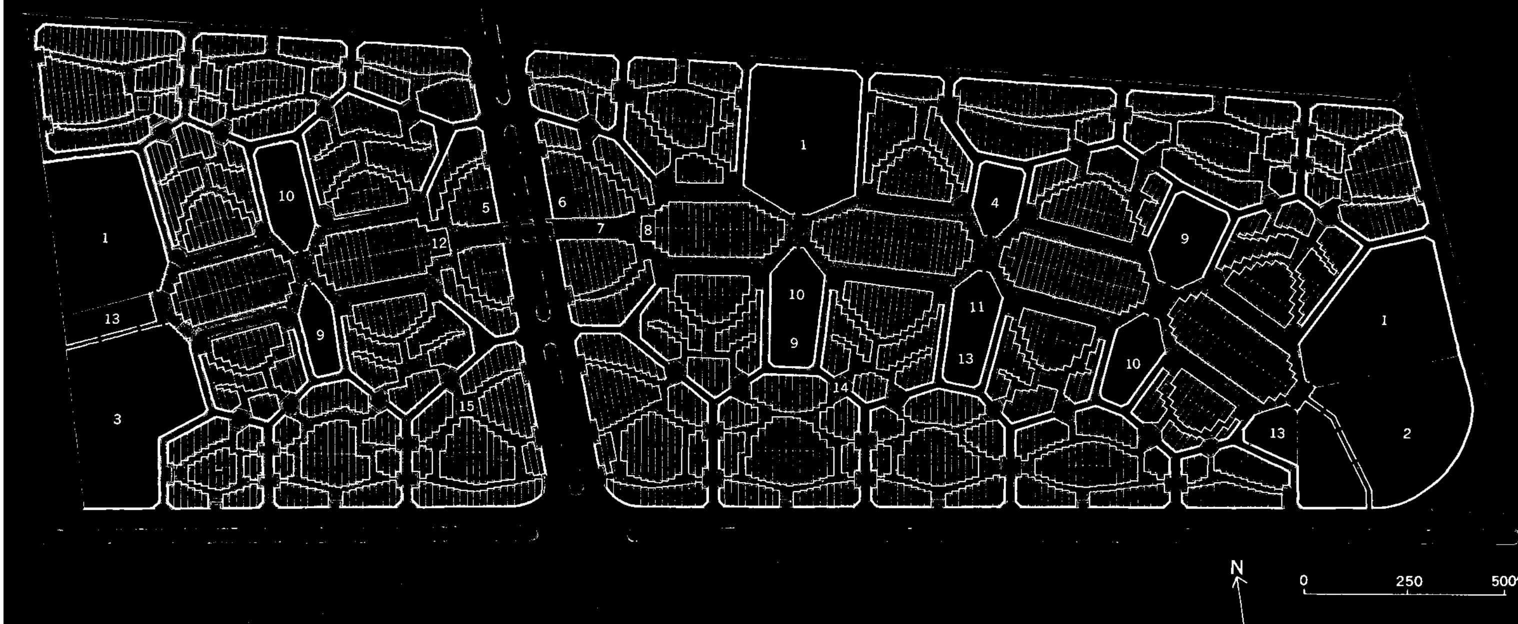
In the Proyecto Experimental, the car roads form loops, and the pedestrian paths form a diagonal network which crosses these loops at right angles. Where they cross, there are parking lots, cell gateways, and space for pedestrian activity. The two systems form a double gradient: car densities dominate towards the outside of the site, pedestrian densities dominate towards the inside of the site, and there is a smooth gradient between the center and the edge.

THE GENERAL PATTERN

Context: Any area which contains pedestrian paths and local car roads.

Solution: The system of pedestrian paths and the system of roads are two entirely distinct orthogonal systems. They cross frequently; so that no point on either system is more than about 50 meters from a crossing. Every time they cross, both paths and roads swell out, making room for pedestrian activity and for parking and standing.

1. Primary School
2. Secondary School
3. Technical Secondary School
4. Church
5. Cinema
6. Supermarket
7. Market
8. Municipal Offices
9. Grove of Trees
10. Kindergarten
11. Clinic
12. Dance Hall
13. Sports Center
14. Parking
15. Outdoor Room



INTIMACY GRADIENT

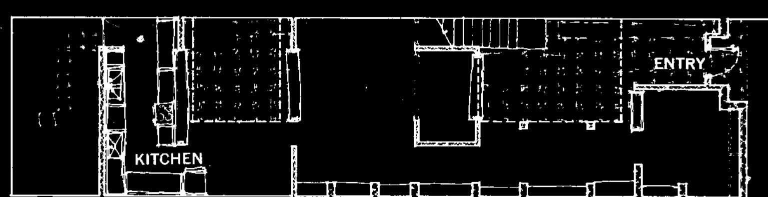
In the Proyecto Experimental, there is a strict gradient from formal to informal, front to back. Each house contains entry, sala, family room-kitchen in that order. Those houses too small to have a proper sala, have a small receiving alcove, just inside the front door, which functions as a sala.

THE GENERAL PATTERN

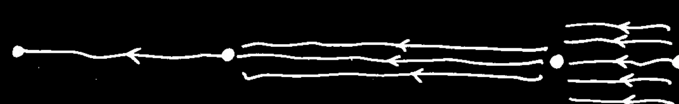
Context: A house in Peru, or any other Latin country.

Solution: There is a gradient from front to back, from the most formal at the front, to most intimate and private at the back. This gradient requires the following sequence: Entry, sala, family room, kitchen, bedrooms.

The most important element in this sequence is the sala (parlor). It is essential that the house contain a sala. If the house is so small that cost rules this out, the house should *at least* contain a tiny receiving alcove just inside the front door.



FIRST FLOOR



BED CLUSTERS

In the Proyecto Experimental House, there are two clusters of bed alcoves —one around the front patio, the other around the second patio. Each may have up to five beds in it.

THE GENERAL PATTERN

Context: The sleeping areas of a Peruvian house.

Solution: The children's beds are arranged around common areas, to form strongly inward looking clusters. There are at least two distinct clusters, one for boys and one for girls.

SECOND FLOOR