Modern Housing Prototypes

Introduction

This book is presented in the belief that a reexamination of some of the great housing projects of this century is appropriate at a time when the design of housing commands the attention of architects the world around. The buildings offered here as case studies were selected because of their importance as prototypes, projects that set the standards and patterns of much that was, and is, to follow. Other considerations were diversity—so that a wide range of countries, building types, and problems would be represented—and architectural quality. My assumption is that there is no excuse for poor architecture; that housing, like all buildings, to paraphrase Geoffrey Scott, must be convenient to use, soundly built, *and* beautiful.

But why prototypes? One of the essential points of heuristic thought—the process of discovery and invention relating to problem solving—is the awareness that, until a problem is clearly defined, guesses or conjectures must be made to help clarify the problem. During the period of uncertainty, reference to analogous problems can be used to give a new turn to one's thinking. Through the study of solutions to related problems, a fresh conclusion may be reached.

Various writers have suggested that it is never possible to state all the dimensions of a problem, that "truly quantifiable criteria always leave choices for the designer to make."[1] In the absence of clear design determinants, and to avoid purely intuitive guessing, it has been argued that analogous reference might give design insight; that perhaps a paradigm of the problem might be accepted as a provisional solution, or an attack on the problem might be made by adapting the solution to a previous problem; that during the period when many of the variables are unknown, a "typology of forms" might be used as a simulative technique to clarify the problem.

The notion of using an analogous problem as a paradigm for gaining insight into a present problem is not, of course, new. A mathematician typically looks for an auxiliary theorem having the same or a similar conclusion.[2] In architec-

1. Alan Colquhoun, "Typology and Design Method," *Arena,* 1967, pp. 11–14. Karl Popper has perhaps best articulated the notion that logical heuristic process can be stimulated in situations characterized by a lack of quantifiable data by offering tentative solutions and then criticizing these solutions. Popper's book *Conjectures and Refutations* (New York: Basic Books, 1962) is a lengthy justification of this procedure. William Bartley, "How Is the House of Science Built," *Architectural Association Journal,* February 1965, pp. 213–218, summarizes Popper's thesis as follows: "The first job of the man who has a problem must be to become better acquainted with it. The way to do this is by producing an inadequate solution to the problem—a speculation—and by criticizing this. To understand a problem means, in effect, to understand its difficulties; and this cannot be done until we see why the more obvious solutions do not work. Even in those cases where no satisfactory answer turns up we may learn something from this procedure" (p. 216). Max Black also deals with the idea of analogous reference or model in *Models and Metaphors* (Ithaca: Cornell University Press, 1962), especially chapter 13, "Models and Archetypes."

2. See G. Polya, *How to Solve It* (New York: Doubleday, 1957).

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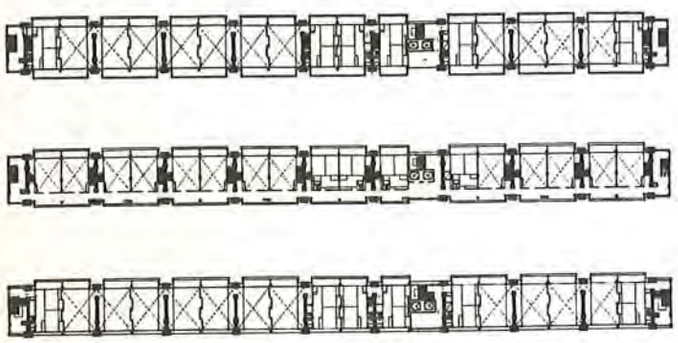
Harumi Apartment House, Tokyo. Kunio Maekawa, 1958.
2
Park Hill, Sheffield. Lewis Womersley, 1959.
3
Housing, Morocco. ATBAT, 1950.



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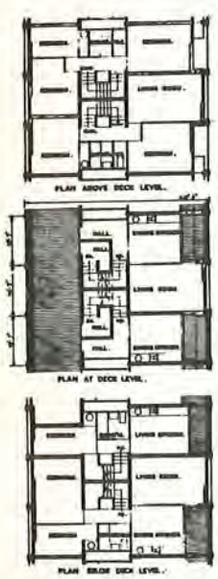

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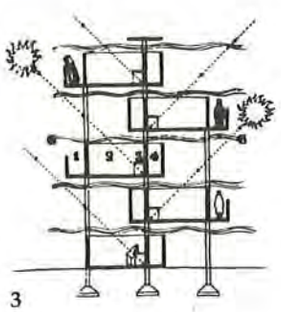

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ture, invention often passes through a phase of groping, where ideas about a projected building form are triggered by exposure to some existing building with a similar program, functional specification, or site condition. The analogous building then becomes in some sense a model or a prototype.

The use of prototypes is especially useful in the design of housing because housing lends itself readily to systematic, typological study. Most building types, such as theaters, schools, factories, or even office buildings, have to respond to different programs and are rarely consistent and repetitive. Housing, because it consists of repeating units with a constant relation to vertical and horizontal circulation, can more logically be studied in terms of its typological variations. Although housing would seem to embrace almost unlimited possible variations, in fact there are not many basic organizational possibilities and each housing type can be categorized fairly easily.

While building regulations, construction techniques, and housing needs have considerable impact on the form that housing may take at any given time in any given culture, still only a few dwelling unit types are plausible, and these units may be collected together in only a few rather limited ways that do not change very much from country to country. An apartment building today in Zagreb—as an organization of living units—is much like an apartment building in Berlin or Tokyo. Even extreme cultural requirements, such as the provisions for a tatami life-style in Maekawa's Harumi slab in Tokyo of 1958 (1), have resulted in an organization that can easily be compared to a Western model; Park Hill in Sheffield of the sixties (2), for example, is organizationally similar. Both have larger and smaller units in the typical section. Entrance to the larger of the two—a two-level unit—is at the corridor level, with rooms above; stairs lead to the smaller unit below. In each, therefore, the corridor occurs at every other level, and stairs lead up and down from there. Although the position of the stairs, kitchen, and bath are different—along parallel walls in Harumi and in a zone parallel to the corridor in Park Hill—and the sitings of the buildings are quite different, nevertheless they are organized fundamentally alike. Even the Arab housing designed in Morocco in the fifties by ATBAT (3), where cultural requirements dictated absolute visual privacy, outdoor cooking, and a lack of the usual room subdivisions and conventional toilets, resulted in a building which, although it has a peculiar checkerboard elevation, is more or less a conventional single-loaded, gallery-access apartment building.

Whatever his cultural, economic, and technical constraints, every architect is confronted with choices and questions about organization. How will the individual apartment be arranged? How will the mix of different apartment types be accommodated? What circulation systems—horizontal and vertical—can service this mix of apartments? What is the best circulation system? Walk-up or single-loaded, double-loaded, or skip-stop corridor system? Where is entrance and access to the vertical circulation system? What building form does this collection of units take: low-rise or high-rise, rowhouse, slab, or tower? These fundamental organizational questions are pertinent to any housing project. *Modern Housing Prototypes* is intended to provide the architect with a set of analogous references to help him solve these basic organizational problems.

Unit Types

Beginning with basic apartments or units, only two are suitable for repetitive use; one other—the 90° double-orientation unit—has limited application. The basic types are:

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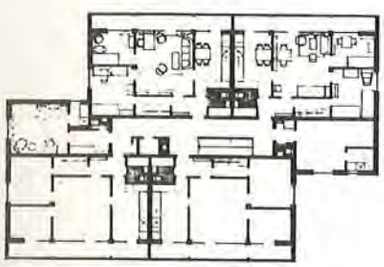
Sorgenfri apartment block, Malmö, Sweden. Jaenecke and Samuelson, 1959.
5
Lincoln Estate, London. Martin, Bennett, and Lewis, 1960.



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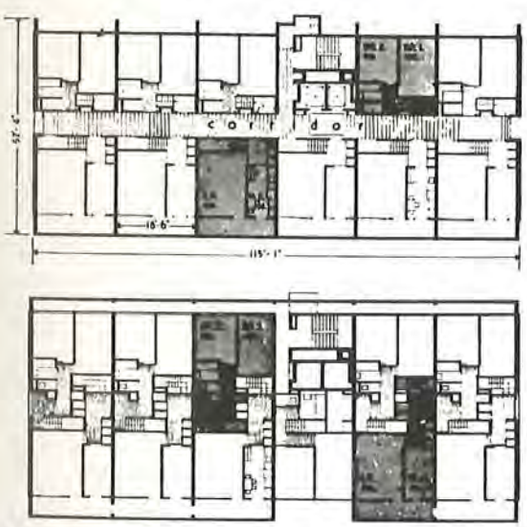

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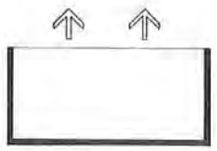
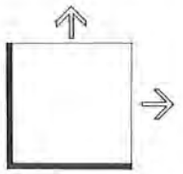


Single-orientation unit



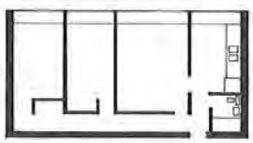
Double-orientation unit, 90°

Double-orientation unit, open-ended

Each of these three unit types has several typical variations, depending upon the positioning of core elements—kitchen, bath, and stairs (when used inside the unit)—the entrance options, and the depths necessary for natural light. Minimum unit dimensions vary from country to country as building regulations and construction practices differ, and the arrangement of core elements, natural light, and ventilation requirements change from place to place.

Single-Orientation Unit

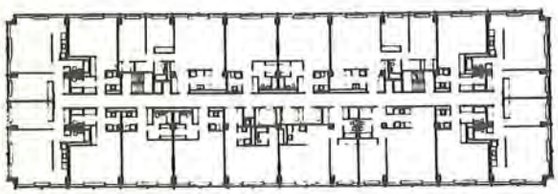
Units that open or face to one side come in two types: with core elements arranged along transverse walls, perpendicular to the corridor, or arranged in an interior zone adjacent and parallel to the corridor. Although these units have a preferred side—they face outward and are most often used where three sides are closed except for the entrance from the corridor (a typical double-loaded corridor arrangement)—some single-loaded, open gallery-access versions may have some minor windows opening to the gallery.



Single-orientation unit; transverse core. This type has the advantage of using the transverse structural wall for core elements, so that most plumbing and mechanical stacks are adjacent to structural walls in a back-to-back arrangement between units. The obvious disadvantage with the type is that the kitchen and in some cases the bath are taking up exterior surface which could be better used for living and sleeping areas, since under many building codes the kitchen and bath do not require natural light and ventilation. An awkward plan can result when the kitchen is on one transverse wall and the bath on the other. Also, the blank exterior walls that core elements tend to create (especially with the small windows typically used in a kitchen or bath) generate elevational problems; these blank surfaces also contradict the preferred-side characteristics of the type.

The typical unit may include a scheme where the kitchen and bath are together on one wall with the kitchen to the outside, like the Sorgenfri block in Malmö, Sweden, by Jaenecke and Samuelson (4). Other variations include two-story units such as the Lincoln Estate slab by J. L. Martin (5). Here two units interlock around an interior core of stairs and toilets; the kitchen in each unit is in a zone along the transverse wall on one side of the building. Park Hill (2) has a similar arrangement although it employs an alternate level corri-

6
Apartments, Baltimore. Mies van der Rohe, c. 1965.
7
Lake Shore Drive apartments, Chicago. Mies van der Rohe, 1948.
8
Lamble Street housing, London. Powell and Moya, 1954.
9
Courtyard housing, Espoo, Finland. Korhonen and Laapotti, c. 1968.
10
Neue Vahr Apartments, Bremen. Alvar Aalto, 1958.
11
Preston housing, Lancashire. Stirling and Gowan, 1961.



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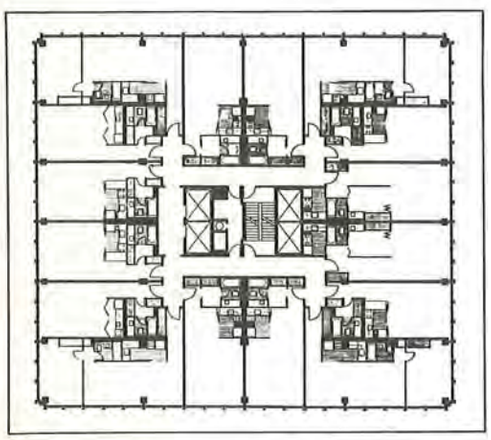

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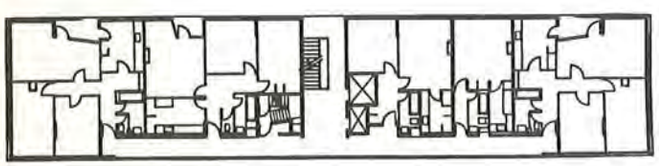

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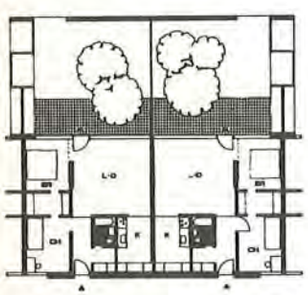

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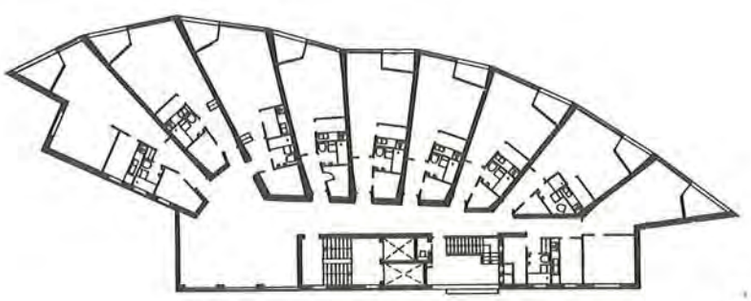

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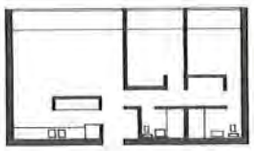
dor; the floors above and below the corridor level are double-orientation unit types (open both front and rear), with the kitchens lining up on one side of the building.



Single-orientation unit; interior core along the corridor. In the more common type of single-orientation unit, the core elements are arranged in a zone parallel and adjacent to the corridor. Entrance is through this zone into the main spaces of the apartment, thus letting the major rooms open to the preferred side of the building. The kitchen and bath are interior spaces with mechanical ventilation. This simpler plan usually features a compact back-to-back kitchen and bath grouping and clear, consistent zoning of spaces. The double-loaded corridor slabs designed by Mies van der Rohe (6) are planned this way. He modifies the idea slightly in the Lake Shore Drive apartments (7), where the bath and kitchen are back-to-back but the kitchen opens to the major spaces on the preferred side. Although more typically a plan for double-loaded corridor buildings (where apartments are located on both sides of the corridor), the type is also used for single-loaded or access-gallery plans. The Lamble Street project by Powell and Moya (8) is an example of this type. Or, for a lower density type, there are the courtyard houses by Korhonen and Laapotti in Finland (9).

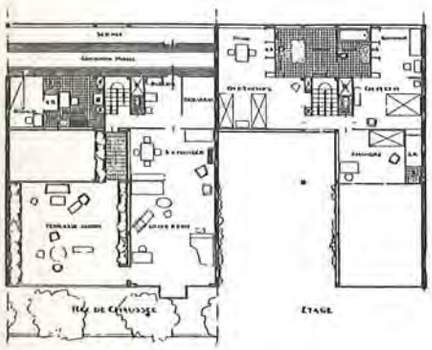
Aalto's apartments at Bremen (10), an unusual variation of the single-orientation type, consist of fan-shaped units opening out to the site. Core elements here, although placed along transverse structural walls, are nevertheless in an interior zone along the corridor. The Preston housing by Stirling and Gowan (11) is a two-story version of the same type. These two are single-loaded corridor examples, but the single-orientation unit type is probably most advantageous where three sides of the unit are closed, implying a double-loaded, corridor-every-floor organization.

A common variation of the singly-oriented unit (applicable to units with either transverse or interior core) works from a strategy of increasing the exterior surface on the open side of the unit so that more rooms can get light and

12
Immeuble Villas project. Le Corbusier, 1922.
13
Bishopsfield and Charters Cross, Harlow, Essex. Michael Neyland, 1960.
14
Hansaviertel apartments, Berlin. Alvar Aalto, 1956.
15
El Pueblo Ribera patio houses, La Jolla. R. M. Schindler, 1923.

air. Le Corbusier's Immeuble Villas projects of the twenties (12) were of this type: L-shaped units around an open terrace. Although the Immeuble Villas are two-story units with minor windows on the corridor side of the upper floor of each unit, implying a double orientation, the zoning of large volumes and terraces to one side contribute to a definite preferred condition. This type can work in a single- or double-loaded situation. Bishopsfield and Charters Cross housing at Harlow by Michael Neyland (13) is another example of a repeating L-plan, in this case, double-loaded with corridor walls containing only minor windows to the kitchens.

Aalto's Hansa apartments in Berlin (14) are basically a singly-oriented type that follows the strategy of increasing exterior surface: its U-plan features dining, living, and bedrooms all around a central terrace. Schindler's El Pueblo Ribera houses at La Jolla (15) are also single-orientation, U-shaped units coupled together in pairs with hedges used to define and enclose the courtyard spaces.



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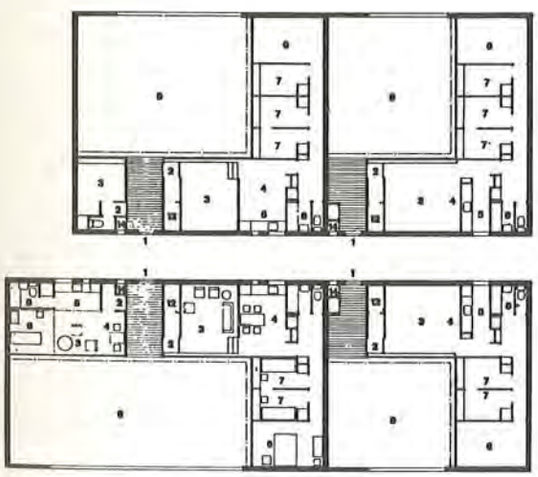

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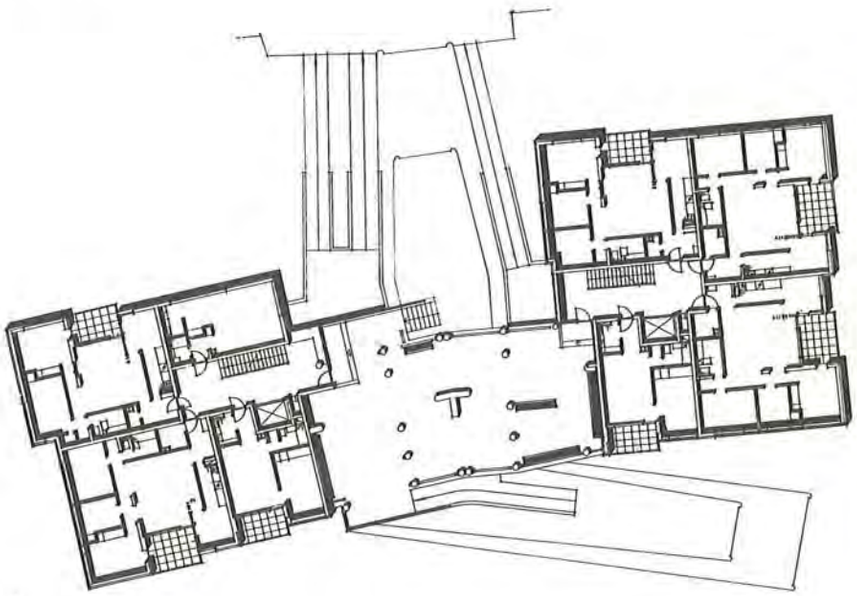

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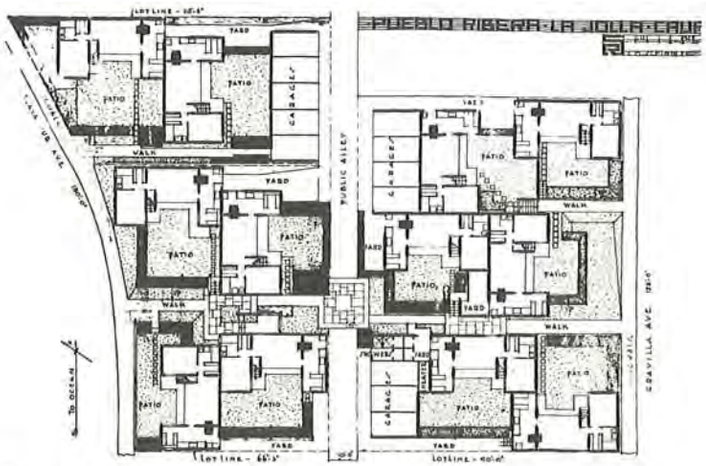

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16
Patio housing, Frankfurt. Egon Eiermann, 1966.
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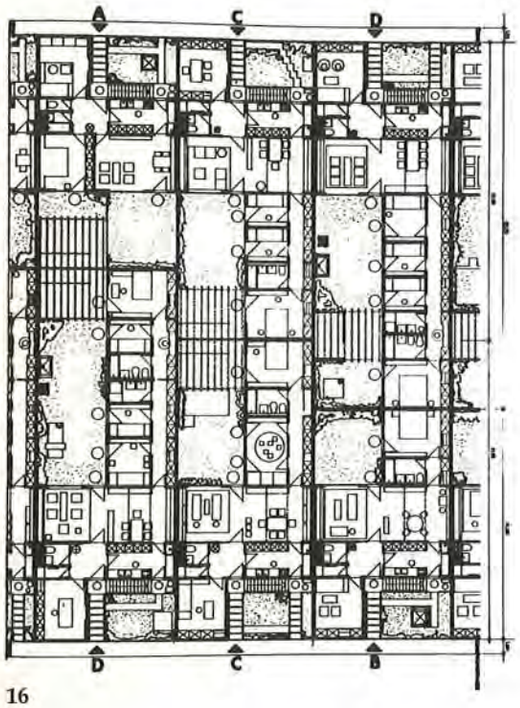
Cloverleaf project. Frank Lloyd Wright, 1939.
18
St. Mark's Tower, project. Wright, 1929.
19
Atrium houses, Schwerzenback, Switzerland. Fred Kunz, 1967.



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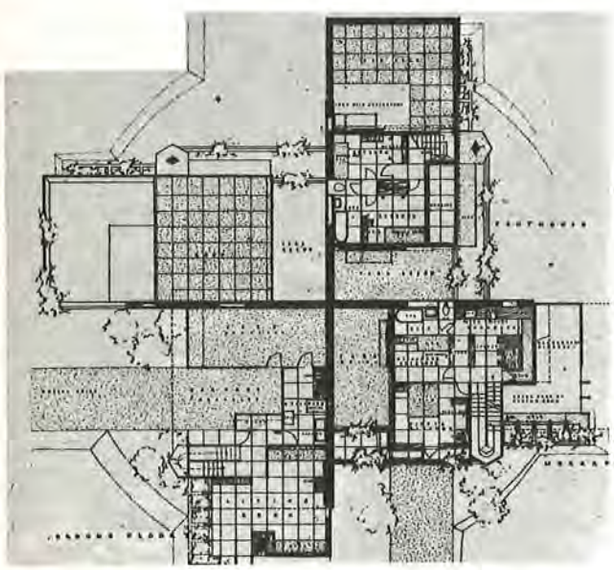
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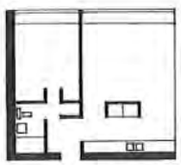
A possible variation of the single-orientation type is the matte housing scheme, where a matrix of walls is built with each unit inside a walled-in area. Access requirements limit the number of collective arrangements possible, but Egon Eiermann's matte housing in Frankfurt of 1966 (16) is an example of this type. Although there are small private gardens on the entrance side of each apartment, most major spaces open to a private garden to the rear, establishing the single orientation.

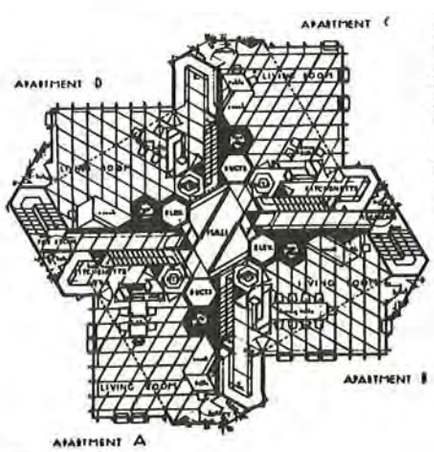


Double-Orientation Unit, 90°

Double-orientation unit types come in many variations and can be collected together in many different ways. The corner type or 90° double-orientation unit may be seen simply as a singly-oriented unit in which one of the three closed walls has been opened up. This limits the strategies of collecting units together, since each needs a corner, and the use of this type seems to be limited to towers, smaller freestanding buildings, and to certain kinds of terrace housing.

Frank Lloyd Wright's Suntop Homes are a good example of this type: four units within crossed party walls, each three stories high opening at the corner. Wright's earlier versions like the Cloverleaf development (17) introduced an internal courtyard. St. Mark's Tower (18) and the built version of it, the Bartlesville Price Tower, adopt the same parti of four corner units with core elements on the interior. Buildings employing this kind of unit necessarily must be freestanding, with private entrance required for projects like Suntop and common lobbies for towers like Bartlesville.

Other examples of one- or two-story corner units include the atrium houses at Schwerzenback in Switzerland by Kunz (19) and the Candilis, Josic, and Woods projects, which often consist of buildings planned to gain the corner advantage even to the extent of creating site arrangements consisting of many staggered-plan buildings in an overall system designed to maximize peripheral



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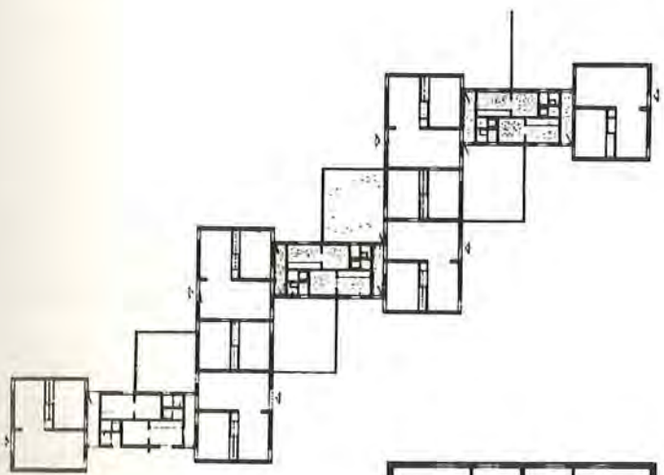
20
Cluster housing project. Candilis, Josic, and Woods, 1959.
21
Tower, Vallingby, Sweden. Ancker and Gate, 1953.
22
Nirwana Apartments, Den Haag. Johannes Duiker, 1927.
23
Hansaviertel tower, Berlin. Luciano Baldessari, 1956.
24
The Albany Houses, New York. Fellheimer, Wagner, and Vollmer, 1950.

surface (20). Most compact towers use this type: for example, the Vallingby tower by Ancker and Gate (21) or the Nirwana apartment buildings by Duiker (22), which have a much larger area in plan but are organized with an apartment in each corner.

Various permutations of the tower use a strategy of creating more exterior surface and hence more corner conditions. While many of these are not strictly 90° units, they are versions of the corner unit in that they cannot be repeated in linear fashion like the singly-oriented types. The Baldessari tower in the Hansa project in Berlin (23) or the Albany Houses in Brooklyn by Fellheimer, Wagner, and Vollmer, done for the New York City Housing Authority (24), are examples of this variation. Pinwheel plans such as the Candilis, Josic, and



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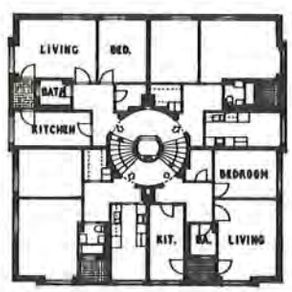

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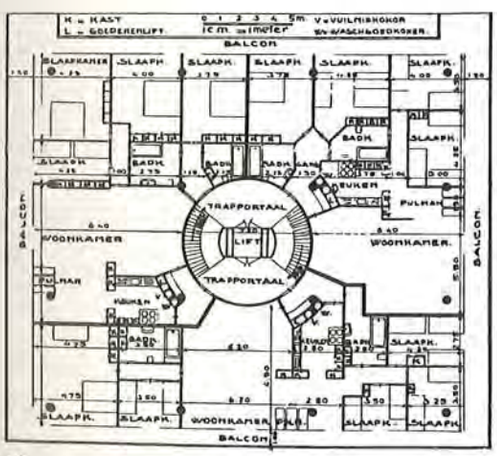

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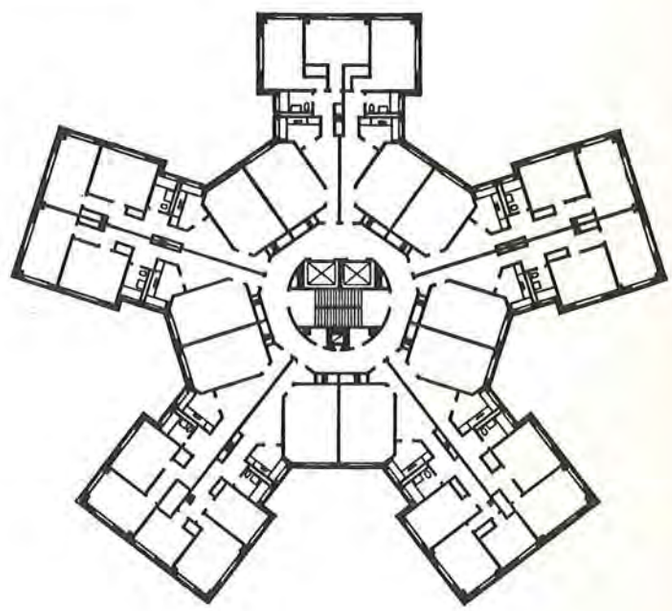

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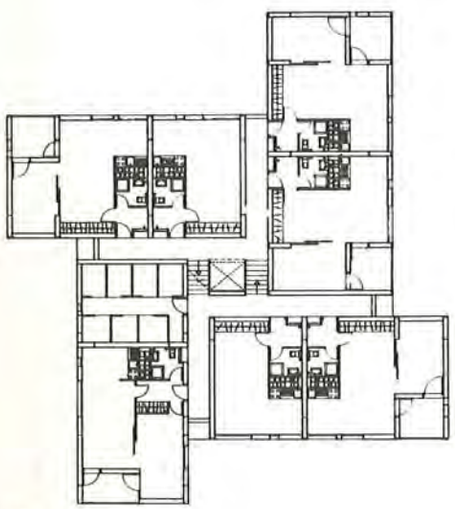
25
Apartment block, Bagnols sur Ceze, France. Candilis, Josic, and Woods, 1957.
26
Märkischesviertel, Berlin, floor plan. O. M. Ungers, 1962.
27
Märkischesviertel, Berlin, site plan. O. M. Ungers, 1962.
28
Housing block, Clos d'Orville, Nîmes. Candilis, Josic, and Woods, 1961.
29
Tower, Copenhagen. A/S Dominia, c. 1960.

Woods project at Bagnols sur Ceze of 1957 (25) try to maximize the corner situation. O. M. Ungers employed this idea with a slightly different variation in the Märkischesviertel project in Berlin in 1962 (26). Here bedrooms are put into the corners, which are solid except for small windows; the leftover void is designated as living space. Essentially, it is a corner, pinwheel parti that generates—when used in combination—a distinctive staggered site plan (27). This was a popular idea at Märkischesviertel, and many architects besides Ungers used it. All these projects are perhaps derived from various Candilis, Josic, and Woods schemes for cluster housing in the mid-fifties, where pinwheel blocks or towers hook up with each other to make a kind of continuous building (28).

Still other strategies to increase peripheral surface and mulitply corners are the slipped-slab schemes such as this by A/S Dominia in Copenhagen (29).



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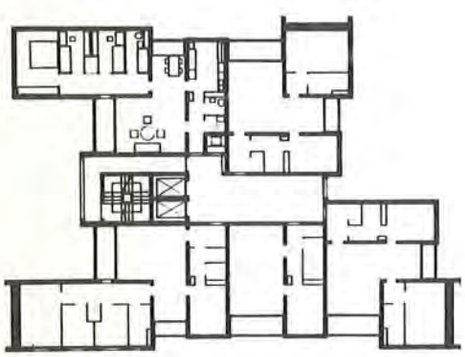

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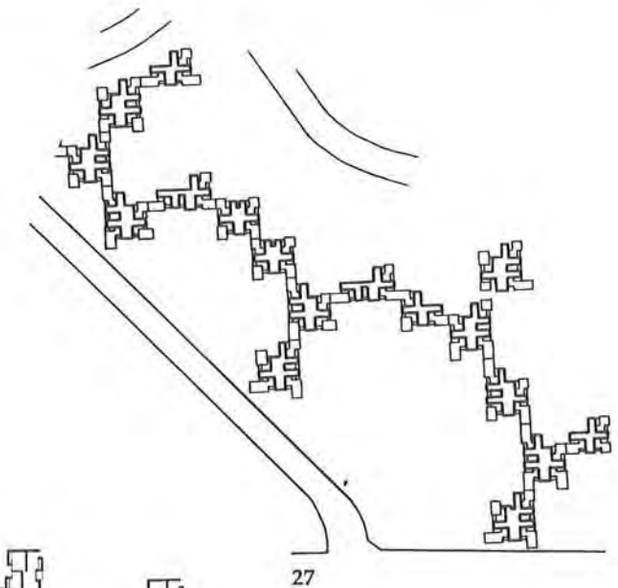

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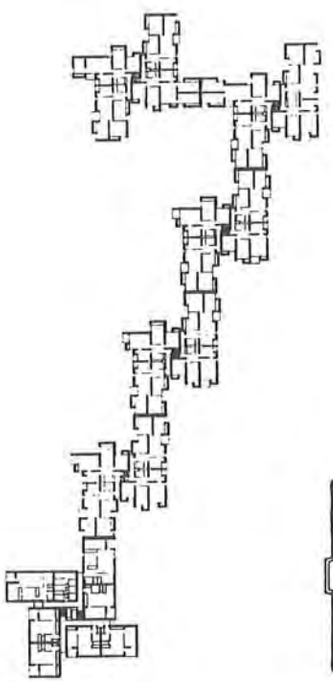

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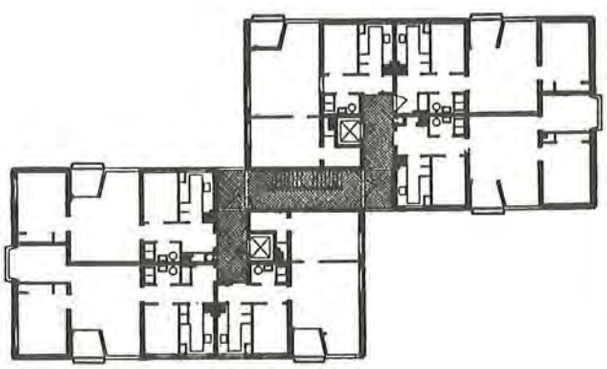
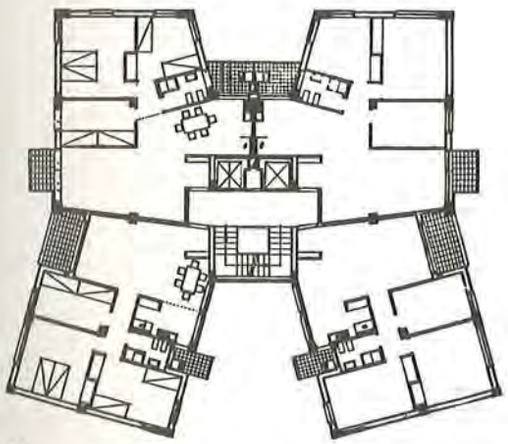


29

30
Bethnal Green towers, London. Denys Lasdun, 1960.
31
Zollikerberg terrace housing, Zurich. Marti and Kast, 1964.
32
Terrace housing, Zug, Switzerland. Stucky and Meuli, c. 1960.
33
Terrace housing, Kauttua, Finland. Alvar Aalto, 1938.
34
Apartment tower, St. James Place, London. Denys Lasdun, 1960.

Lasdun in the Bethnal Green towers (30) uses the same idea, as does Aalto with the Hansa block in Berlin (14).

Some terrace housing projects utilize a more complex version of the 90° or corner unit. The Zollikerberg project in Zurich by Marti and Kast (31) is an example of this. Here two-story L-shaped atrium units are placed on top of one another and stepped up a slope, with a retaining wall against the slope. Side walls are punctured only with small windows. There is a preferred condition toward the garden, but the living room becomes the dominant void at one corner. The Stucky and Meuli units also in Switzerland (32) step up a slope, again with the windowless retaining wall against the slope and with essentially closed walls on the two sides. All major rooms open to a continuous terrace, and the living room, which is the main space, opens to two sides at the corner. The above examples are not, strictly speaking, just 90° units because each apartment has openings to three sides and does not attach horizontally to other units; however, the positioning of the living room as a large volume at the corner emphasizes the corner condition. The drawing of the Aalto terrace houses at Kauttua (33) shows this condition three-dimensionally with openings to three sides. But this is only suitable on very narrow sites, and a more typical condition perhaps would be side-by-side Kauttuas with each unit more literally a corner type. Denys Lasdun's beautiful apartment block at St. James Place in London of 1960 (34) is a high-rise example of the same condition. Although it is a tower backed up to an existing party wall on one side with open space on the other three sides, it is spatially a 90° type. By use of an ingenious split-level section, Lasdun has been able to further accentuate the corner orientation of the living room, which is one and one-half floors high and opens to a park on the preferred side of the building.



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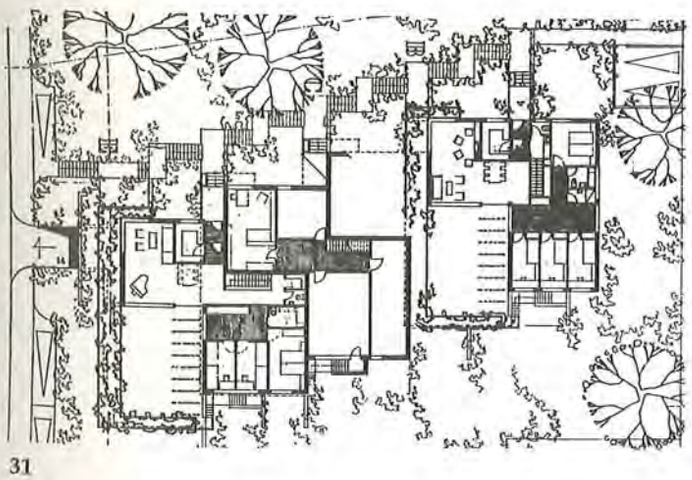

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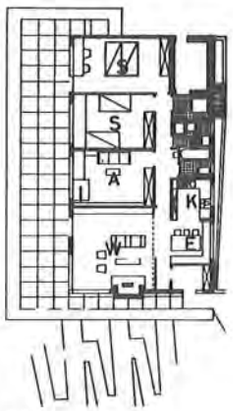

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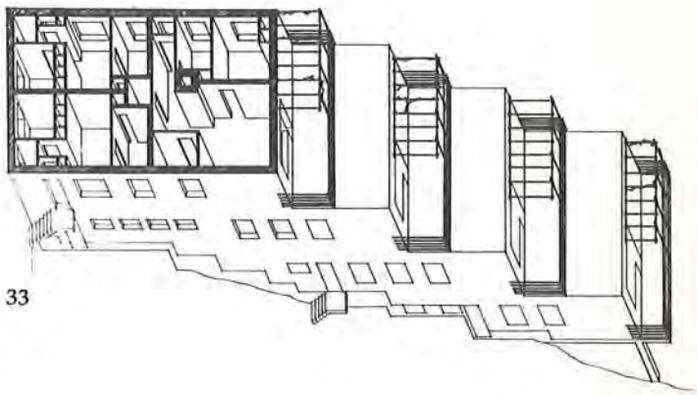

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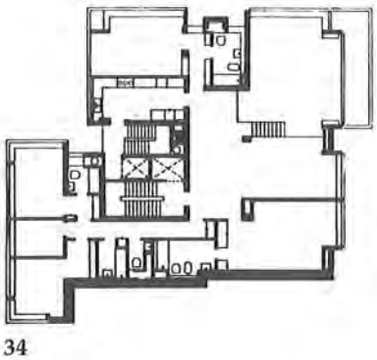

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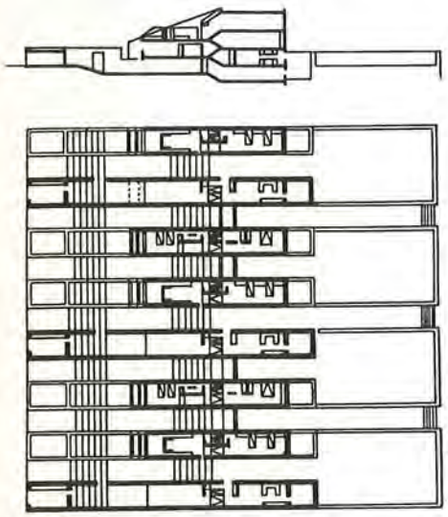
35
Green Belt South housing, Zollstock, Germany. O. M. Ungers, 1965.
36
Patio housing, Tustin, California. Backen, Arrigoni, and Ross, 1969.
37
Rowhouses, Werkbund Exhibition, Vienna. André Lurçat, 1932.
38
Siemensstadt housing, Berlin. Fred Forbat, 1930.



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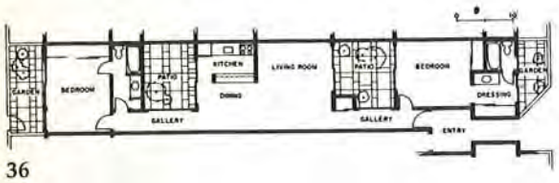

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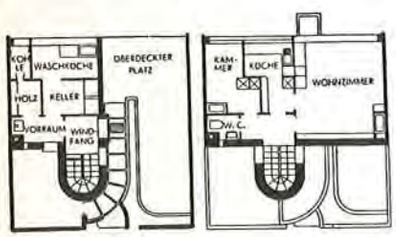

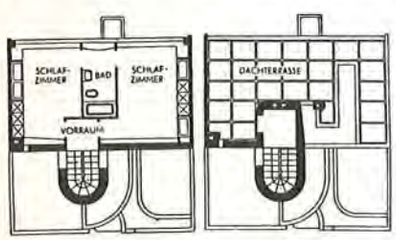

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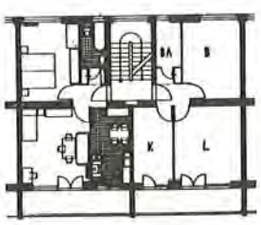


38

Double-Orientation Unit, Open-Ended

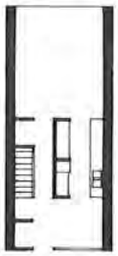
While single-orientation units are suitable for buildings with double-loaded corridors that open to each side and for hillside housing or single-loaded corridor buildings that turn their backs upon some undesirable site condition such as a highway or a northern exposure, housing units with a double orientation are far more common. Probably stemming from the common sense advantage of repeating units while still maintaining maximum exterior surface, this system of placing open-ended units side by side is perhaps the oldest form of collective urban housing. A dwelling unit that is open at each end has many organizational options. If the unit is very deep, light is minimal and the open ends are not much of an advantage. O. M. Ungers' Green Belt South housing of 1965 (35) or the Backen, Arrigoni, and Ross project in Tustin (36) are good examples of very deep units. In each, the unit is so long that some auxiliary means of lighting the interior has been used. With Ungers, a parallel open slot lets light into the four-story building, while in the Tustin project a system of interior courtyards is used, resulting in a one-story building.

By comparison, units such as Lurçat's rowhouses at the Vienna Werkbund Exposition (37) do not have a light problem because they are so shallow. But because the rooms are small, core elements come to an outside wall and the stairs are actually attached to the exterior as a separate element. So there are general criteria for optimum depth: shallower units could very well become single-orientation types, deeper units have to find some other means of introducing light, such as interior courtyards (which are unsuitable for high-rise buildings). Optimum widths and depths are also a function of building requirements: room sizes, stairs, and so on.

The open-ended slot requires open space outside the unit at each end and usually some means of providing privacy—a garden wall, for example—except where the unit is well off the ground. Access to this type can be from either end or, in the case of multistory buildings, from within, making internal skip-stop corridor systems mandatory. Walk-up units, which were especially popular in Europe before the postwar proliferation of high-rise building—Siemensstadt, for example (38)—also give access at an interior point.

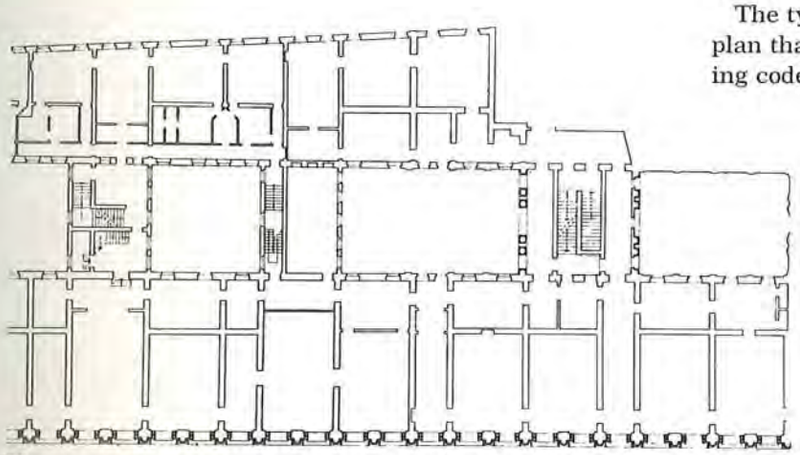
Generally, the double-orientation type is at least a two-story unit, so the architect must consider where the stair, kitchen, and bath can be put. Basically, the types may be classified as either transverse (stair perpendicular to the long axis of the unit) or longitudinal (stair parallel to the long axis). Following are a few examples of the double-orientation types.

39
Procuratie Nuove, Venice. Vincenzo Scamozzi, seventeenth century.
40
Typical townhouse, Baltimore. Nineteenth century.
41
Rowhouses, Reston, Virginia. Whittlesey and Conklin, 1964.
42
Rowhouses, Roehampton. London County Council, 1952.



Double-orientation unit, open-ended; interior stair and core, longitudinal stair. Sometimes called a "dumbbell" plan because of its form—a void at each end and a concentration of parts in the middle—this type positions the major living spaces to the outside, where an opening to private outdoor space is a possibility, and keeps the core elements, including the stairs, on the interior. The dumbbell plan rowhouse has a tradition dating back to medieval times and in most Western cities was probably the most common form of housing until the invention of the rigid structural frame. Historic examples are wide-ranging: Scamozzi's Procuratie Nuove of the seventeenth century in Venice (39) is entered from an interior courtyard via stairs, with major living spaces facing the Piazza San Marco and sleeping spaces opening to the garden and the Grand Canal—palatial quarters ingeniously planned, of incredible beauty. On the other hand one may find a rowhouse from Baltimore of the nineteenth century, which is typical of urban housing in the eastern part of the United States prior to 1920 or so (40). The dumbbell plan is popular in the United States because building codes allow interior kitchens and baths. Other examples include the rowhouses at Reston (41) and those at Roehampton by the London County Council (42).

The typical early twentieth-century walk-up housing consisted of a dumbbell plan that was entered from an interior hallway. Even though European building codes tend to require that kitchens have exterior windows, a dumbbell type



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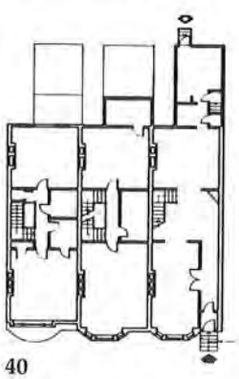

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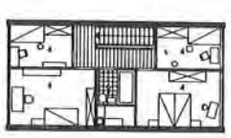

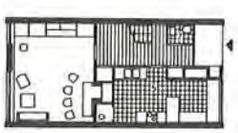

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43
Peabody Terrace, Cambridge, Massachusetts. Sert, Jackson, and Gourley, 1964.
44
Weissenhof exhibition housing, Stuttgart. Mies van der Rohe, 1927.
45
King Street housing, London. Morton, Lupton, and Smith, 1967.
46
Unité d'Habitation, Marseilles. Le Corbusier, 1952.

of plan usually results. Examples are Sert's Peabody Terrace at Harvard (43) and Siemensstadt (38), the huge project outside Berlin of the 1930s. There one finds many different buildings done by many different architects, but all are just minor variations of the same unit type—a situation probably encouraged, in Germany at least, by Mies van der Rohe's block at the Stuttgart Weissenhof exhibition of 1927 (44). This is the type of walk-up unit that was used in Germany to the practical exclusion of all else for almost two decades. The walk-up unit with a dumbbell plan is also popular in England, the King Street project by Morton, Lupton, and Smith (45) perhaps being representative of recent rowhousing there.

The dumbbell plan is not restricted to use in rowhouses or walk-up situations. It also has wide application in high-rise buildings, particularly slabs. Le Corbusier's Unité d'Habitation (46), a building that has been repeated in

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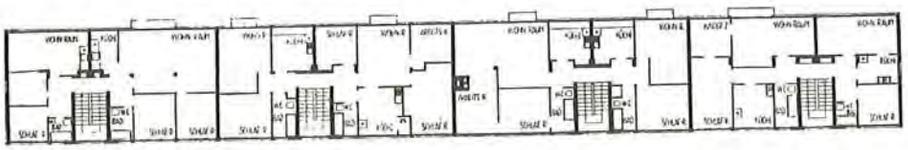

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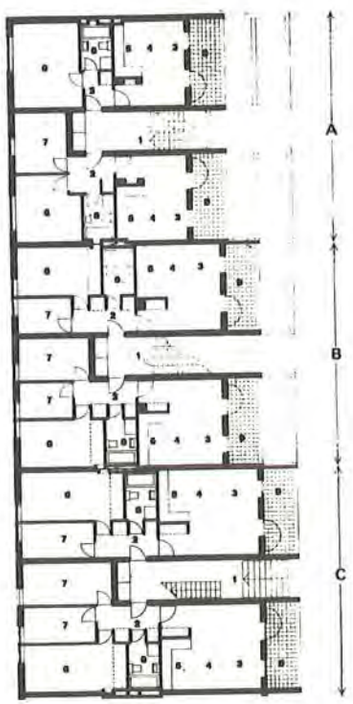

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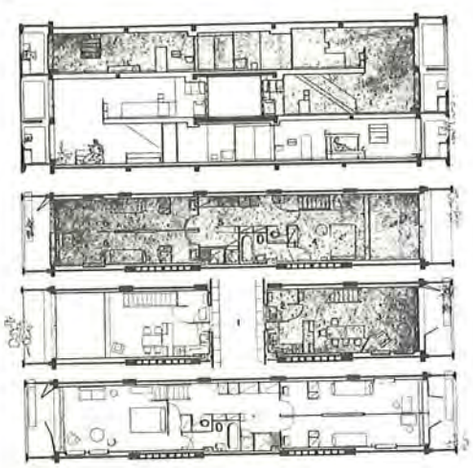

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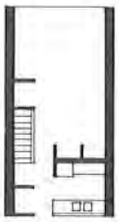
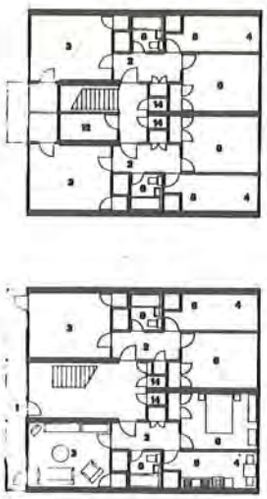
47
Milton Road rowhouses, London. District of Haringey, 1967.
48
Siedlung Halen, Bern. Atelier 5, 1959.

slightly differing versions in France and Germany and has been widely copied almost everywhere, is the perfect example of a multistory dumbbell plan. A double-loaded, skip-stop corridor gives access to a two-level unit with kitchen, dining, and living area at entry level and bedrooms and bath above. Here the core elements, including the stair, are interior, although the stair rises from a double-height living room.



Double-orientation unit, open-ended; exterior kitchen, longitudinal stair. Perhaps a more common version of the longitudinal stair arrangement, and one popular in Europe, brings the kitchen to the outside; either the bath for the bedrooms is above the kitchen or another core or service wall is introduced on the interior. Examples of this include the Milton Road project (47) and Siedlung Halen by Atelier 5 (48), both self-contained rowhouses or terrace houses, or a walk-up situation also from the Milton Road project by the Borough of Haringey (47). This unit type is also used in high-rise slabs but again, because it is a two-story unit, it is limited to skip-stop corridor arrangements. Single-



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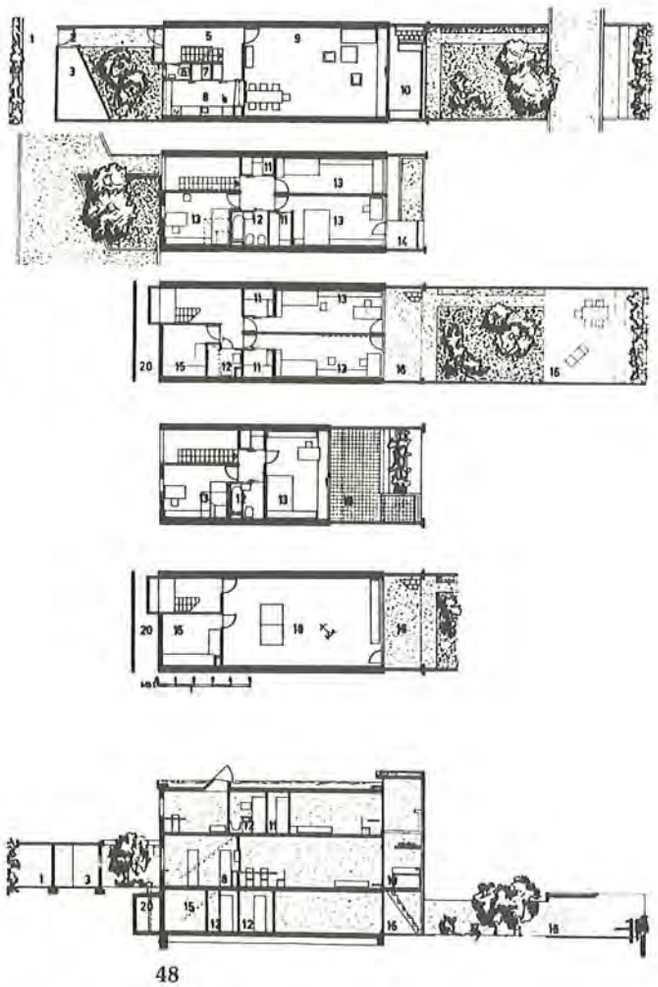

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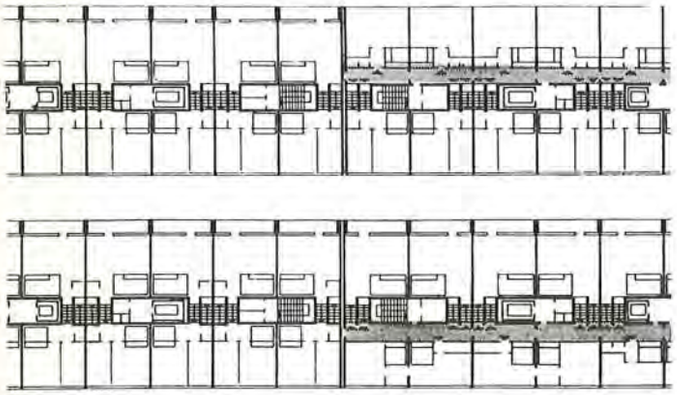
49
Apartments, Germany. Schmiedel and Zumpe, 1960.
50
Hansaviertel tower, Berlin. Van den Broek and Bakema, 1956.
51
L'Aero Habitat, Algiers. Bourlier and Ferrier, 1950.
52
Hillside housing, Ithaca, New York. Werner Seligmann, 1972.
53
Swiss Cottage, London. Douglas Stephen, 1960.



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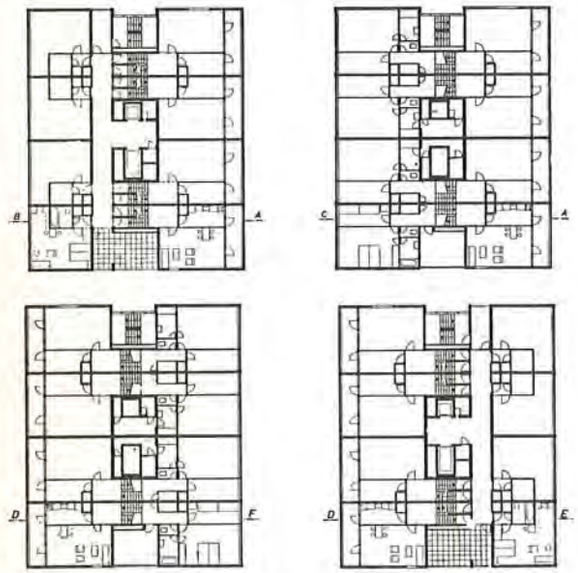

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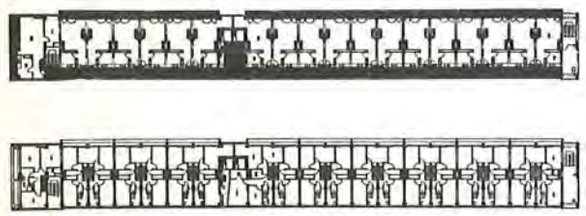

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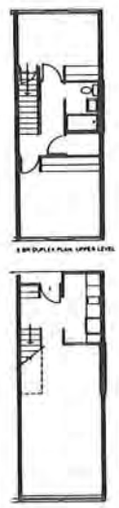
loaded and double-loaded corridor arrangements are feasible, with the kitchen usually at the entrance level; in the case of the single-loaded type with access gallery, the kitchen gets light from the gallery. Examples of the double-loaded type include Schmiedel's apartments in Germany (49) and the van den Broek and Bakema Hansa block in Berlin (50).

Single-loaded versions include the L'Aero Habitat development by Bourlier and Ferrier in Algiers of 1950 (51), Werner Seligmann's hillside housing in Ithaca, New York, of 1972 (52), and Swiss Cottage in London by Douglas Stephen with Koulermos and Forrest (53).

Double-orientation unit, open-ended; exterior kitchen, transverse stair. This is the most common open-ended unit. Although usually wider than a unit with a longitudinal stair, several advantages result. First, a clear circulation zone along one wall is defined by the stairs and other core functions along the opposite wall. Circulation in the living room is now along the side of the space, and from the entrance one can see down the hallway into the living area, which gives the impression of one continuous space throughout the floor. If the stair is pulled back slightly from each side wall, allowing enough space to move past the stair, the kitchen can serve the living and dining area past the stair without using the main hallway. This unit satisfies the European preference for exterior-fronting kitchens and forms a larger space in the living and dining area where it is most useful. Upstairs, unless the plumbing stack can be manipulated so that the bathroom is on the interior, valuable exterior surface is taken up with a space requiring only minimal light and air. Either single-run or return stairs can be used, and different minimum unit widths, of course, re-



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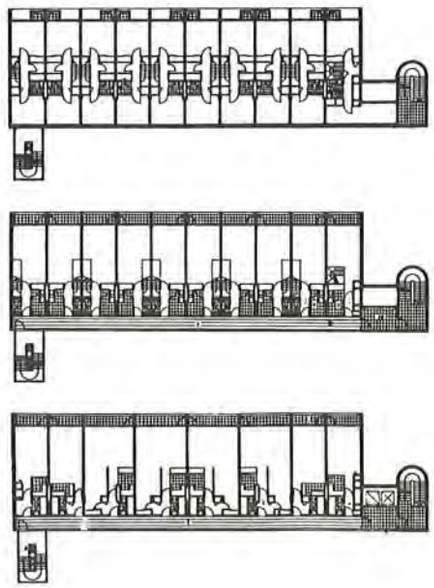

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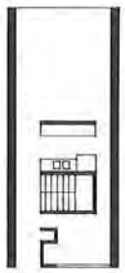
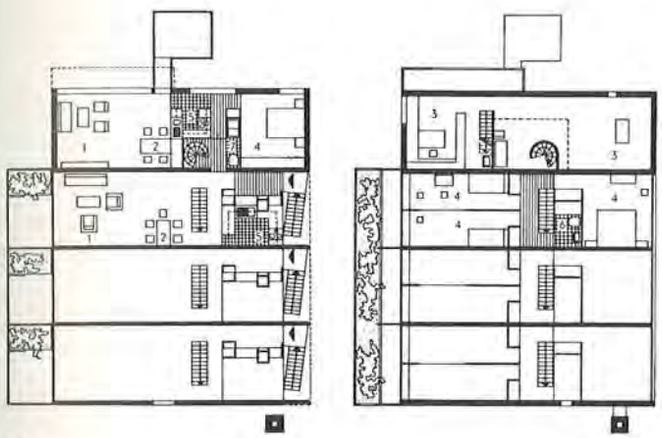
54
Flamatt terrace housing, Bern. Atelier 5, 1960.
55
Pedregulho housing, Rio de Janeiro. Affonso Reidy, 1950.
56
Unité Billardon, Dijon. Pierre Beck, 1954.
57
Terrace apartments, Germany. Schroder and Frey, 1959.

sult. Low-rise examples include the Flamatt terrace houses in Bern by Atelier 5 (54) and their famous Siedlung Halen, also in Bern (48).

This is a common type for use in high-rise buildings. The serpentine slab of Affonso Reidy in the Pedregulho development in Rio de Janeiro (55), the Billardon slab at Dijon by Beck (56), and Womersley's Park Hill project (2) are three examples.



Double-orientation unit, open-ended; interior kitchen, transverse stair. This version of the dumbbell type, with stair and other core elements on the interior, comes in many variations, some with stair, kitchen, and bath on the same side, some with the kitchen opposite the stair. Examples of the latter arrangement include the terraced walk-up flats of Schroder and Frey (57). Sometimes



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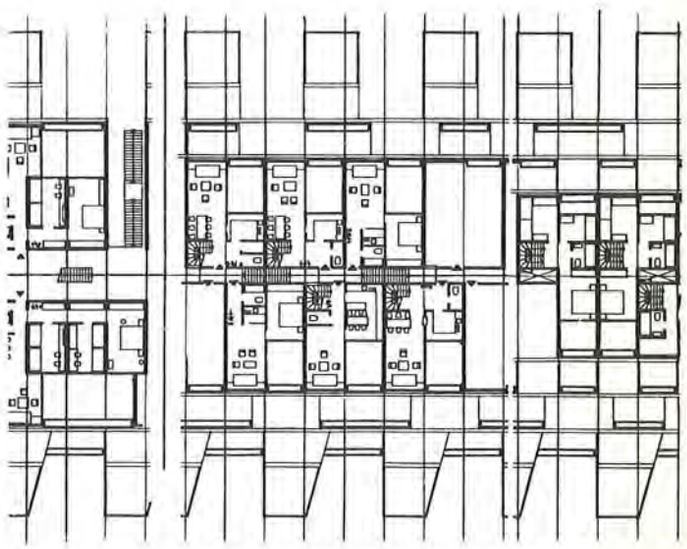

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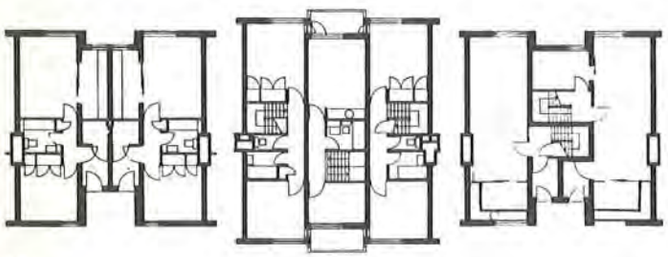
58
Edith Avenue housing, Durham, England. Napper, Errington, Collerton, Barnett, and Allot, 1961.
59
Rowhouses, Hampstead. Amis and Howell, 1956.
60
Quinta Normal, Santiago. Carlos Bresciani, 1960.
61
Fleet Road terrace housing, London. Neave Brown, 1968.
62
Apartment block, Lausanne. Decoppet, Veuve, Aubry, and Miéville, 1959.

the transverse stair and the kitchen are together, a type common in rowhouse applications—for example, the Edith Avenue housing project of 1961 in Durham (58), and the Amis and Howell houses in Hampstead of 1956 (59).

Few high-rise buildings seem to use this type. However, the Bresciani project, Quinta Normal in Santiago, Chile (60), uses an interlocking system with living and dining areas and kitchen taking up two bays to one side of the corridor at the lower floor and the bedrooms in an open-ended arrangement above but in just one bay. This system would be applicable for high-rise slabs as well.

The double-orientation, dumbbell unit plan is impractical for very shallow buildings where there is seldom room for the interior core. In Lurcat's Vienna project (37), for example, the core has to come to the outside, although here each unit is three floors high. With Neave Brown's Fleet Road project (61), a similar situation occurs: a three-bedroom maisonette has kitchen and bath fronting the gallery, but, because of the limited area on any one floor, a peculiar mix of spaces results in which the dining area is separated from the living room, bedrooms are on both floors, and toilet facilities are of necessity duplicated. For high-rise building, this type is probably not suitable: a very narrow building would be structurally unstable if higher than a few floors unless the building were warped for added lateral support. The Smithsons' curved slab project of the 1950s (page 132) was presumably developed just for this reason.

Another double-orientation, open-ended unit type that is widely used expands laterally; bedrooms, rather than being upstairs, take over the adjacent bay, so that the entire apartment is on one floor but in two bays. In a two-story unit, there is an overlapping of bays so that bedrooms above would be over the living rooms of both units below. The single-floor version is typical of most walk-up housing or noncorridor types of high-rise buildings. The Decoppet, Veuve, Aubry, and Mieville project in Lausanne, Switzerland (62), is a good example of this type.



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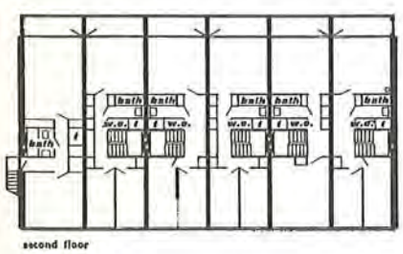

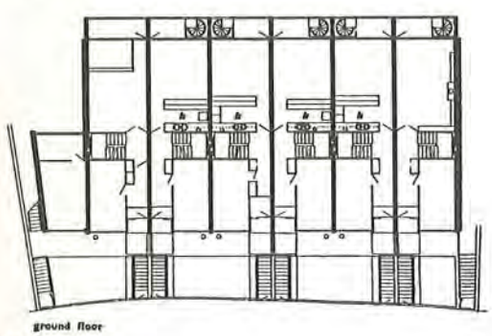

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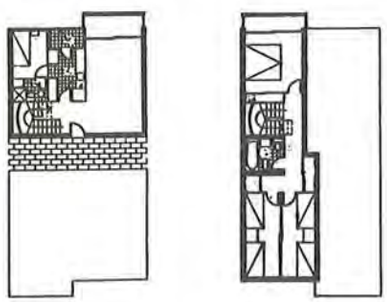

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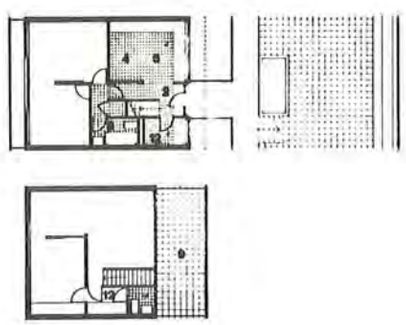

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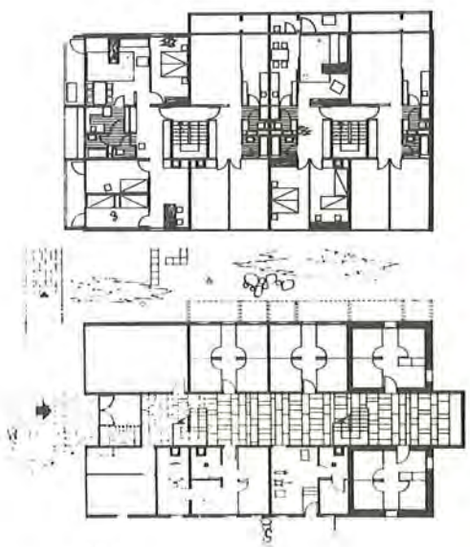

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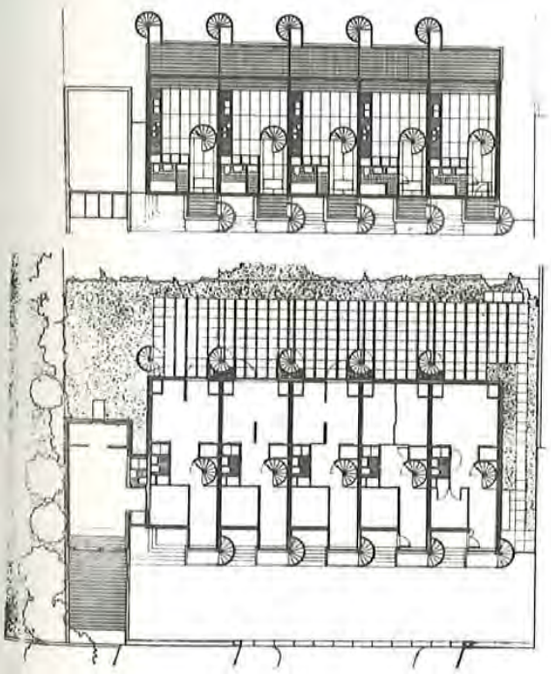
63
Winscombe Street houses, London. Neave Brown, 1968.

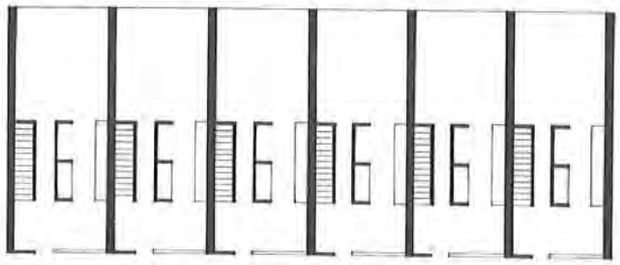


63

Building Types

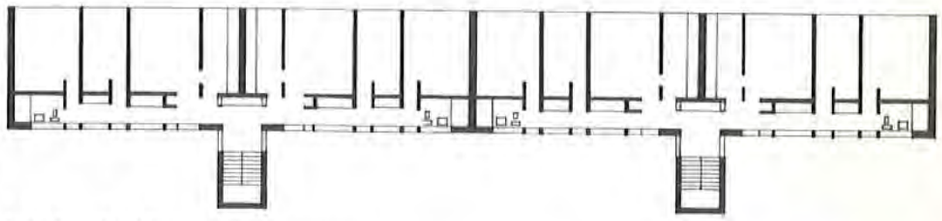
The ways in which the various dwelling units can be combined into different building forms are a function of the special characteristics of the building—site, orientation, height, and so on—and the circulation system used. Because the ways in which units may be collected together are limited by building regulations, construction practices, and cultural preferences, different housing types occur in some countries while not in others. For example, United States fire codes, until very recently, required an exit from each floor of an apartment and so eliminated skip-stop sections like the typical Unité of Le Corbusier. In some countries, such as France and Brazil, multiple fire stairs are not required; and in Chile five-story walk-ups are allowed. Sometimes a particular housing form may result from a tradition of similar housing: the widespread construction of four-story walk-up buildings in Germany, the gallery-access maisonette in England, or hillside housing in Switzerland. Although absolute comparison of housing from country to country would have to take into consideration the differences in building regulations, construction practices, and national traditions, comparison is possible on the basis of unit and building types. It is not necessary to understand all about building in a particular place to be able to analyze a particular building, to classify it organizationally, and to identify its unique features and concepts. Without a comprehensive understanding of building practices in every country—an unlikely knowledge—comparison on any other basis seems all but impossible.

Building forms resulting from the collecting together of many units into a single building are closely tied to a few possible circulation options. If a community of dwellings is seen as simply many individual houses, each hooking on to an access system, then only a few systems emerge.



Private Access

Here there is private entrance and private internal vertical circulation. Height is limited by most building codes to two or three stories. Units cannot be stacked vertically and the idea is restricted to rowhouses, detached houses, or terrace houses. Neave Brown's five houses on Winscombe Street in London (63) are examples of this type.



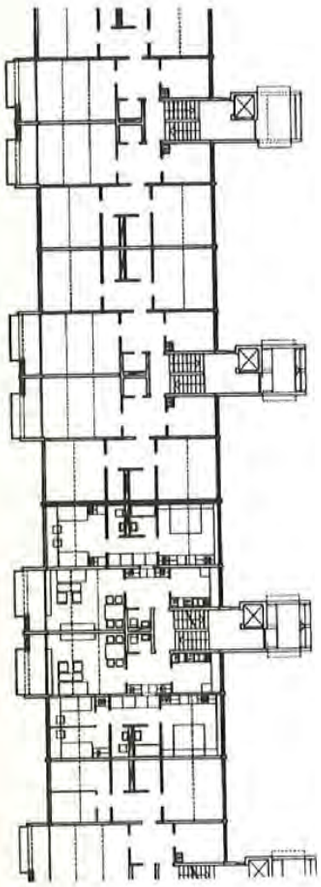
Multiple Vertical Access

This type can be built up to five stories without elevators in some countries, but more often three stories is the limit for walk-up multiple-access buildings. Taller buildings can be developed with the use of elevators, but the expense of

64
Apartment block, Hamburg. Georg and Michael Wellhausen, 1967.

65
Towers, Vallingby, Sweden. Ancker and Gate, 1953.

66
Apartment blocks, Britz-Buckow-Rudow, Germany. Hannskarl Bandel, 1967.



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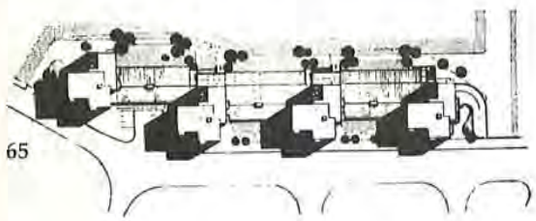

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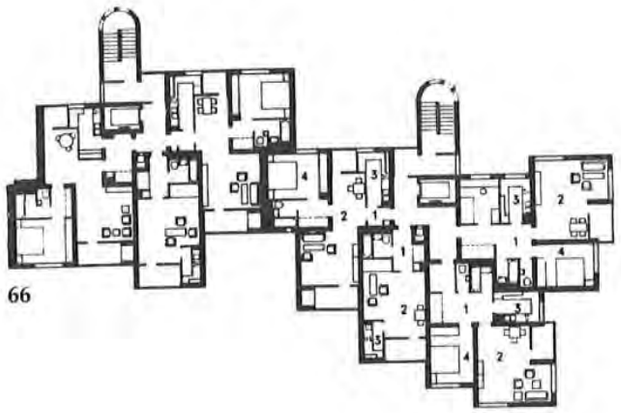
repeating elevators is an obvious limitation. Multiple vertical access buildings were very common in Europe before World War II and the subsequent rapid construction of high-rise buildings. Usually, each access stair serves two to four units per floor with semiprivate entrance to each apartment. Since the system permits vertical stacking, it becomes a kind of vertical rowhouse, or rowhouses stacked upon rowhouses. In the United States, where multiple fire exits are required in housing over two floors, this type has never developed. Typical European examples include the Wellhausen project in Hamburg of 1967 (64), where the access core is treated as a separate, external element consisting of a stair for the three-story block and a stair and elevator for the six-story block, and the Candilis, Josic, and Woods walk-ups at Nîmes of 1961 (28), where the stair for a five-story walk-up is the connecting element between apartment blocks, generating a kind of continuous, repetitive building. In the typical housing in Germany of the 1920s and 1930s—Siemensstadt, for example (38)—the access stairs are internal, between units, with only minor articulation indicating the position of the stair on the exterior.

If the vertical access core is greatly extended and centralized, the result is a tower, which may be described as a group of units hooked together along a vertical street. There are countless variations to the tower plan, but it usually consists of several units per floor. Because normally light is required from all sides, a freestanding building (point block) usually results, such as Mies' Lake Shore Drive apartments in Chicago, a twenty-nine story building (7). Sometimes, however, the tower connects to other, lower buildings like the four Ancker and Gate towers at Vallingby (65). At other times the tower is simply multiplied and connected together to form the continuous building type like the Bandel blocks of 1967 (66). Although different types of units may be used with multiple vertical access buildings, the walk-up situation is probably better suited for the double-orientation type, and in this respect it is like a rowhouse. With the tower, the single-orientation unit type is more typical, with a double-orientation, 90° unit at the corner, although again there are countless possible variations.

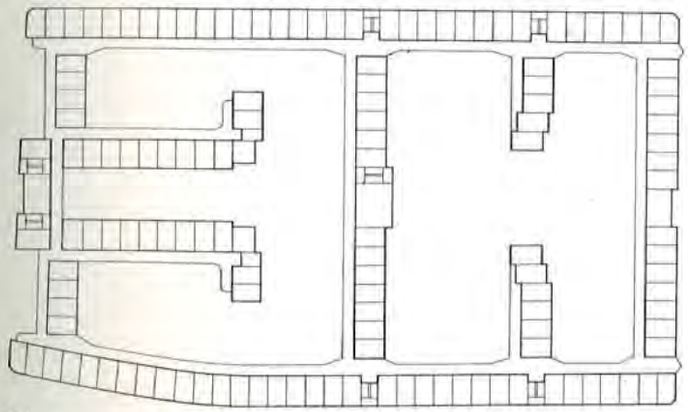
Corridor Buildings

The term "slab," implying a tall, long building, is commonly used to describe corridor buildings, although a corridor system is not limited to high-rise buildings. Dwelling units in a slab simply align along a continuous corridor that has periodic connections to the ground. Building height and vertical access requirements are a function of building regulations and varying economic considerations such as elevator costs and other mechanical services. However, slab heights vary widely and any optimum condition is more the result of local building conditions.



66

67
Spangen Quarter, Rotterdam. Michiel Brinkman, 1919.
68
Narkomfin Apartments, Moscow. Moses Ginzburg and I. Milinis, 1928.
69
Bergpolder apartments, Rotterdam. Van Tijen, Maaskant, J. A. Brinkman, and van der Vlugt, 1933.



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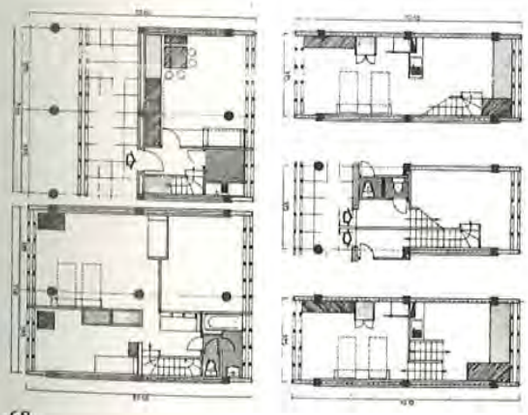

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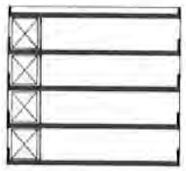
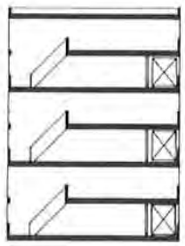
Corridor buildings come in two basic types, single-loaded and double-loaded, and there are many variations of each. Some have corridors every floor, others have corridors every second, third, or even fourth floor. Some have corridors occurring at different positions in the section at different levels.

Single-Loaded Corridor Systems

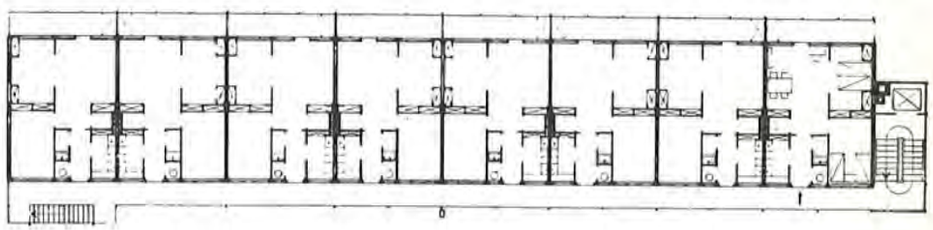
Buildings of this type generally open to the side away from the corridor and hence are commonly used where there may be a preferred view or orientation or some undesirable site condition that the unit can, in effect, turn its back to. A corridor-every-floor system usually results in a building made up of single-orientation units; an alternating corridor system often results in two-level or maisonette unit types, with both single and double orientation. Where the climate permits, the corridor can remain open (gallery access) and becomes a kind of street in the air, a concept evolved in 1919 by Brinkman in the Spangen Quarter in Rotterdam (67) and employed in postwar English housing such as Park Hill (2). The Narkomfin collective housing project in Moscow by Ginzburg of 1928 (68) is an enclosed version of an alternate-level gallery-access system.



Single-loaded system; corridor every floor. Examples of this type include the Bergpolder slab in Rotterdam of 1933 by the team of van Tijen, Maaskant, J. A. Brinkman, and van der Vlugt (69), a very early experiment in high-high-rise housing; the Billardon slab at Dijon by Beck of 1954 (56); and Alvar Aalto's apartments at Bremen of 1958 (10).



Single-loaded system; corridor every second floor. This popular type was frequently used in postwar, low-rise housing. It consists of maisonettes off an access gallery with bedrooms above, often over the corridor. Stirling and Gowan's Preston housing at Lancashire of 1961 (11) demonstrates the type: three-story buildings with private entrance to a lower level and an access gal-



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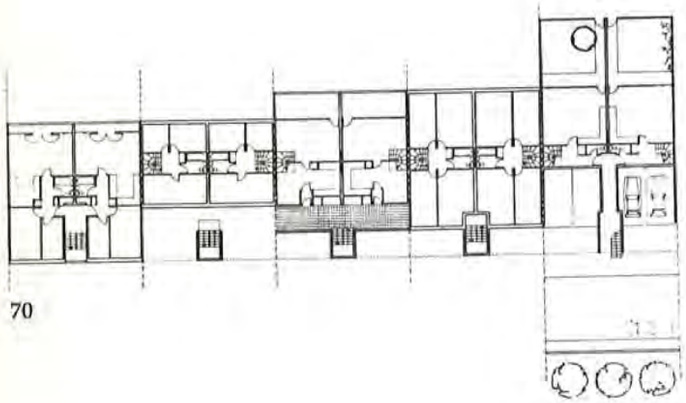
70
Rowhouses, Runcorn, England. James Stirling, 1968.
71
El Paraiso apartments, Caracas. Carlos Villaneuva, 1956.

lery for the upper maisonettes. Stirling's Runcorn housing (70) is perhaps an evolutionary development of the same scheme, with the building now five stories high and a gallery at the third floor. Here the maisonette on the bottom two floors has private entrance at ground level, the gallery gives access to the maisonette on the next two floors, and stairs give access to the flat on top, which extends over the gallery. Brinkman's Spangen Quarter (67) is a very early example of this type. Here the gallery, really an independent structure, services upper maisonettes while independent stairs and private entrance give access to the two lower units in a four-story building. Le Corbusier's Immeuble Villas projects (12) are more extravagant: two corridors side by side, one service and one public, give access to a huge two-story unit with a double-height living room and large terrace. The same idea is also used in much taller buildings. For instance, the L'Aero Habitat slab of Bourlier and Ferrier in Algiers of 1950 (51)—a thirteen-story building and a series of slabs, one placed perpendicular to a steep slope—and Villaneuva's El Paraiso slabs in Caracas of 1956 (71).

Single-loaded system; corridor every third floor. The more unusual types of single-loaded, alternate-level corridor buildings position a corridor every third floor with stairs up or down to the units that are not at the corridor level.



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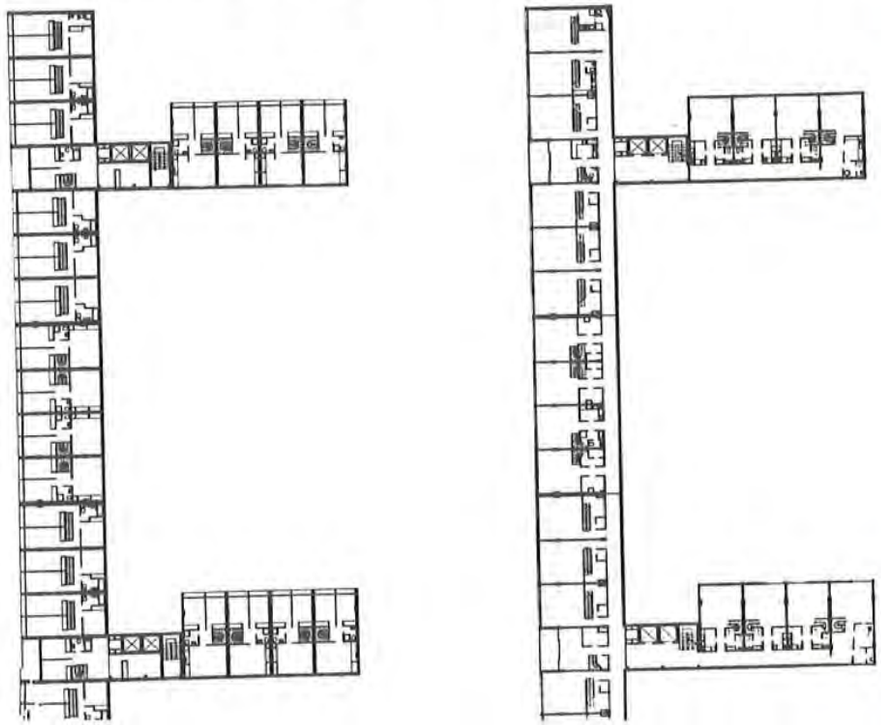

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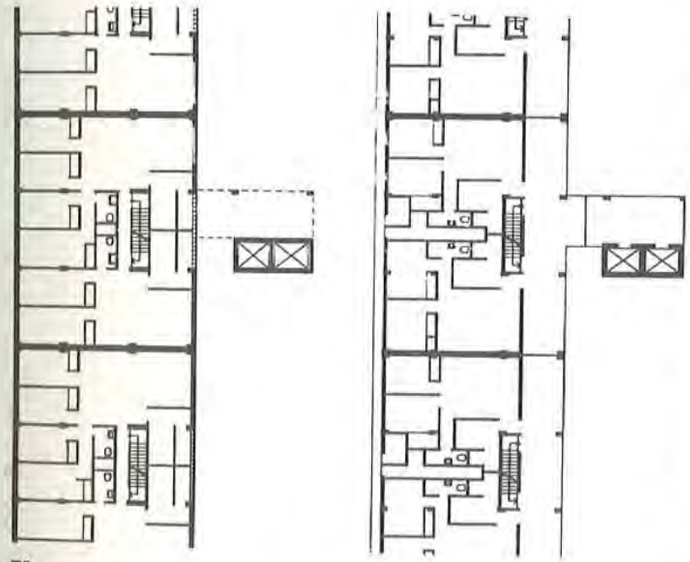
72
December Apartments, Caracas. Carlos Villaneuva, 1956.
73
Nytorp apartments, Malmö, Sweden. Jaenecke and Samuelson, 1959.



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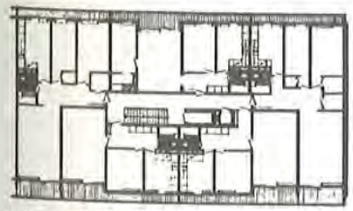

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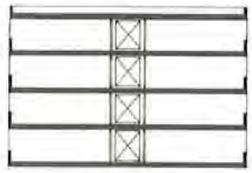
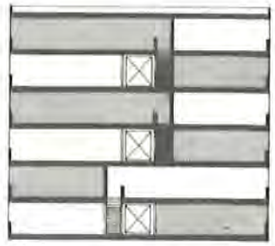
Sometimes there are maisonettes at the corridor level with a smaller apartment below, sometimes there are larger units below. This is strictly a low-income housing type except where the maisonette is used, and it is typical of high-density, low-income public housing such as Park Hill (2). Slabs with a single-loaded corridor only every fourth floor are quite unusual because few building codes allow such a considerable inconvenience. However, this kind of building is sometimes built in South America; the Villaneuva slab in Caracas, the December Apartments (72), is one example.

Double-Loaded Corridor Systems

Double-loaded corridor slabs are more numerous than the single-loaded type, and a greater variety of types are possible. Able to accommodate either single-orientation units (corridor every floor) or double-orientation units (skip-stop), this building type has much greater flexibility than single-loaded buildings. Le Corbusier's Unité d'Habitation at Marseilles of 1952 (46) popularized the double-loaded, skip-stop section, and it appears frequently thereafter in many countries.

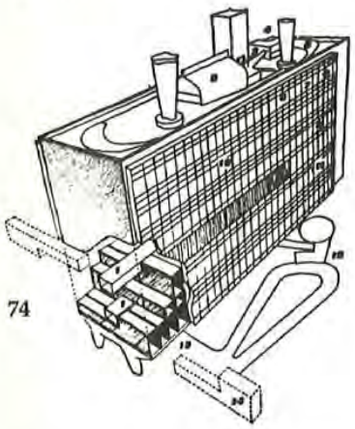


Double-loaded system; corridor every floor. Double-loaded slabs with a corridor every floor are especially sophisticated, popular, and practical in the United States, where fire codes until recently rendered skip-stop systems virtually impossible. This type of building is Mies van der Rohe's stock-in-trade. His Lake Shore apartments in Chicago of 1948 (7) and the apartments in Baltimore (6) are typical and set the pattern for much that was to follow—not only in the organization but also in the image of the expensive, glass-walled residential skyscraper. Although not as popular in Europe, similar types such as the Nytorp slab in Malmö by Jaenecke and Samuelson (73) do on occasion appear.



Double-loaded system; corridor every second floor. By far the more common double-loaded types follow the Marseilles Unité example, with corridors every second or third floor. The Lincoln Estate slab by Martin of 1960 in London (5) uses a system of corridors every other floor and an interlocking system of two-level units with living room at corridor level and internal stairs to bedrooms above on the opposite side of the building.

74
Unité d'Habitation, Marseilles. Le Corbusier, 1952.
75
Apartment block, Neuwil-Wohlen, Switzerland. Metron, 1962.
76
Apartment block, Munich. Fred Angerer, 1960.



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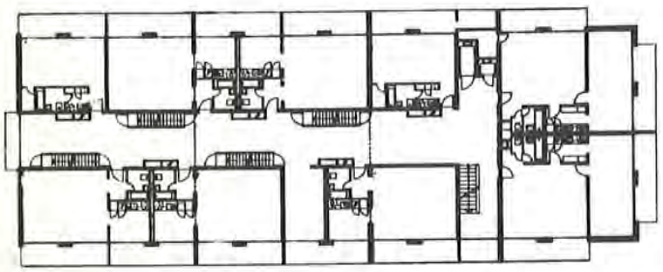

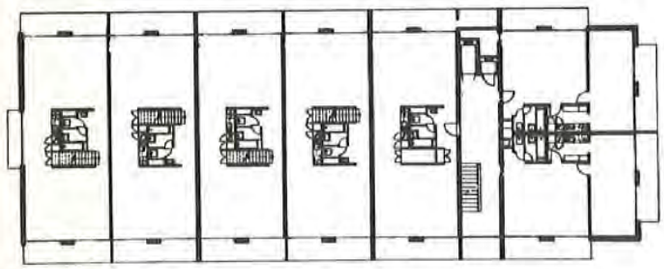

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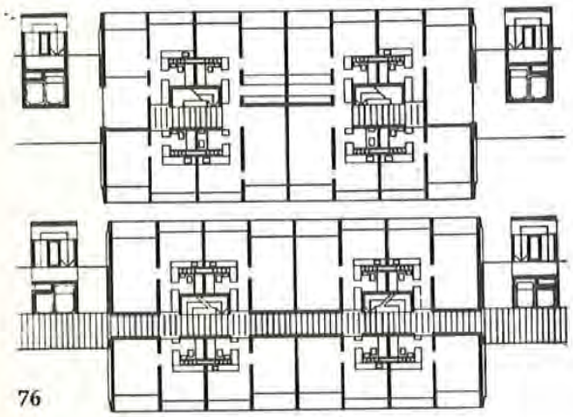

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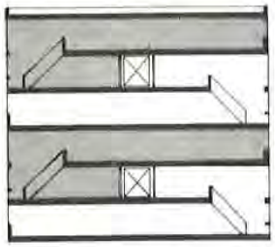
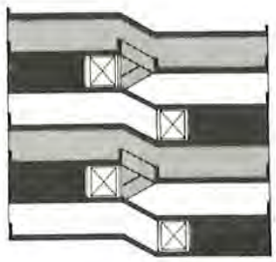


Double-loaded system; corridor every third floor. Le Corbusier's section (74), with corridors every third floor, also uses a system of interlocking units. Unlike Lincoln Estate, however, the living room has a two-story volume and the bedrooms above run through the building. Entrance to one unit is at the living room level and in the other at the balcony level, with the double-orientation part of the apartment below. This is a much-copied scheme; other variations include the Neuwil block (75) by the Metron group of 1962 (although the units here do not interlock) and the Angerer slab at Munich of 1960 (76), a similar type with entrance off the corridor to one unit and stairs to units above and below. Each apartment here, like the Metron slab, is only one floor high. Sert follows this pattern in Peabody Terrace, the married students' housing at Harvard (43), one of the few alternate-level corridor buildings built in the United States until very recently.

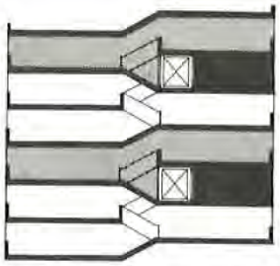
Double-Loaded Split-Level Systems

A final variation of the double-loaded corridor system is the split-level type. It comes with corridors every second and third floor or with the corridor in alternating positions in the slab. The idea of the split-level scheme is that one has to climb stairs up or down only one-half level from the corridor. Generally, both single- and double-orientation units are used to get a mix of large and small apartments. The smaller units are usually single-loaded along one side of the corridor while the larger are split-level, usually with sleeping spaces on one side and living area on the other for a double-orientation, dumbbell type.



Double-loaded split-level system; corridor every second floor, alternating position. An example of this type is the apartment house in Germany by Schmiedel of 1960 (49), where the corridor is always double-loaded but asymmetrically positioned in section in alternating fashion.

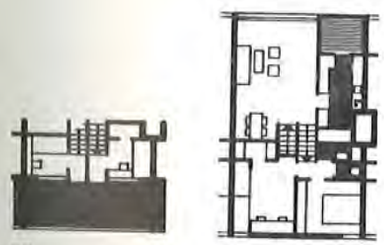
77
Ramat Hadar apartments, Haifa. Mansfeld and Calderson, 1964.
78
Apartment slab, Caracas. Carlos Villaneuva, 1956.
79
Apartments, Sausset-les-Pins, France. André Bruyère, 1964.



Double-loaded split-level system; corridor every third floor. The Ramat Hadar slab at Haifa by Mansfeld and Calderon (77) is the example of this split-level arrangement, with the corridor always occurring in the same position in section.

Double-loaded split-level system; corridor every third floor, alternating position. This type became well-known from the van den Broek and Bakema tower at the Hansa project in Berlin in 1956 (50). Villaneuva, however, was proposing the same system at about the same time for a slab project in Caracas (78). The split-level types not only produce very compact buildings with few corridors and minimum walk up or down to each apartment but also create some spatial expansion within the unit because one can see up or down the stairs into opposite halves of the apartment, giving the impression of one large space. The alternating-position corridor scheme also gives larger spaces on one side at each level, thereby accommodating the need to have larger living spaces as well as a mix of unit sizes.

There are countless variations of each typical section. Some buildings would seem to escape classification at all, such as the amorphous group by Bruyère in Sausset-les-Pins of 1964 (79) or Habitat by Moshe Safdie in Montreal of



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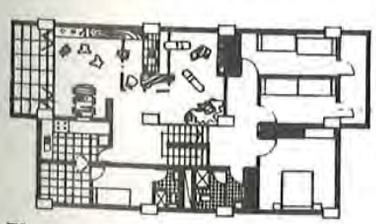

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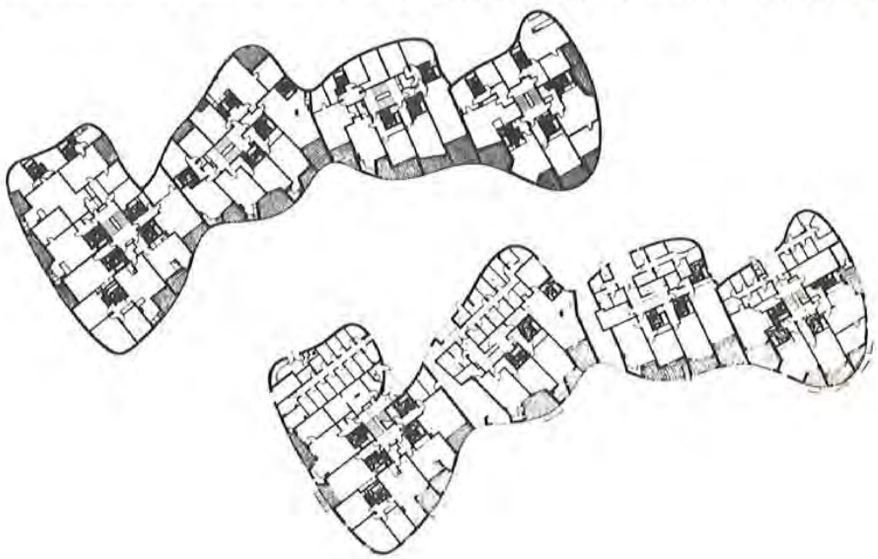

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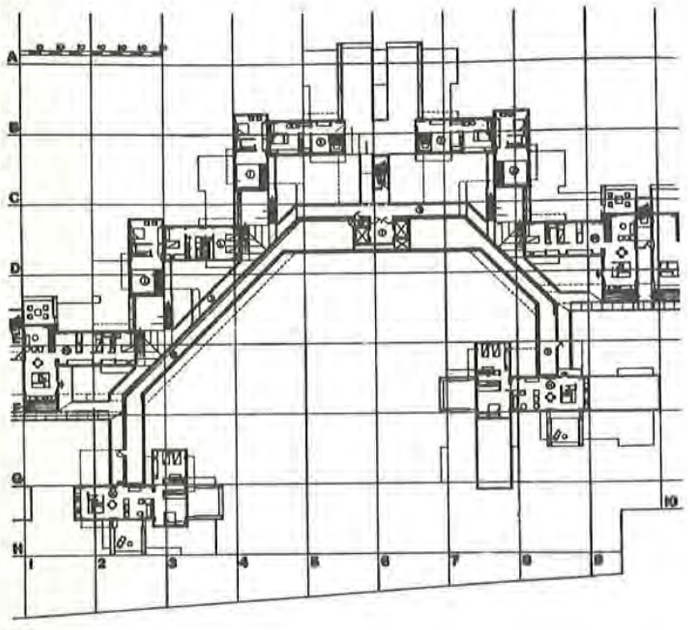
Habitat, Montreal. Moshe Safdie, 1964.
81
Ziggurat, Israel. Leopold Gerstel, 1964.
82
Durand apartments, Algiers. Le Corbusier, 1933.

1964 (80), which, in its built form, does not seem to exhibit any consistent notion about the combination of units. Still other projects, for instance the Ziggurat in Israel by Gerstel of 1964 (81), do not seem to fit into any building category. Some examples seem bizarre but are really just permutations of stock types. Le Corbusier's Durand project in Algiers of 1933 (82), a strange cantilevered step-section building, is really just a double-loaded corridor, skip-stop type in which units cantilever and diminish in size toward the top of the building; Aalto's tower at Bremen (10), which seems quite unconventional, is just a simple single-loaded corridor plan.

Of the thirty-two case studies that follow, it is significant that only four are from the United States. Two of the four (Suntop and El Pueblo) are groups of semidetached houses of a low-density type, and only two (Peabody Terrace and Price Tower) are high-density projects. Among the more common varieties of urban housing—the rowhouse, party-wall building, blocks, and slabs—no American examples are included; representatives of most of these types can be found, but the choice is limited.

High-density housing in the United States has tended to be either luxury high-rise buildings or racially segregated low-income developments. The luxury housing is publicized and monumentalized (Mies van der Rohe's Lake Shore Drive apartments in Chicago, for example). But more typical has been the Bedford-Stuyvesant/Pruitt-Igoe kind of urban housing—anonymous, overcrowded, racially segregated, and economically depressed. It is doubtful if architecture can ever be the means to social deliverance—the problem is one of national attitudes and policies. Ironically, the dramatic, explosive demolition of the housing slabs in St. Louis (83) happened to buildings which the inhabitants found well designed in some respects but which could not survive an extremely hostile socioeconomic environment. If the Pruitt-Igoe slabs had been built on the outskirts of almost any European city, they probably would have provided useful and acceptable housing.

Americans, with a continent of land available to them, have traditionally taken detached housing as a norm, and until recently a majority of middle-class families have been able to afford it. From 1955 to 1975, however, housing costs rose at almost twice the rate of income;[3] this trend, and the pressures of population growth and fuel shortages, suggest that new housing in decades to come will be preponderantly in forms other than that of the suburban single-family home. If higher-density housing is to become the norm for middle-income families, Americans will find it beneficial to look to a larger international scene for useful housing prototypes. The United States has very few



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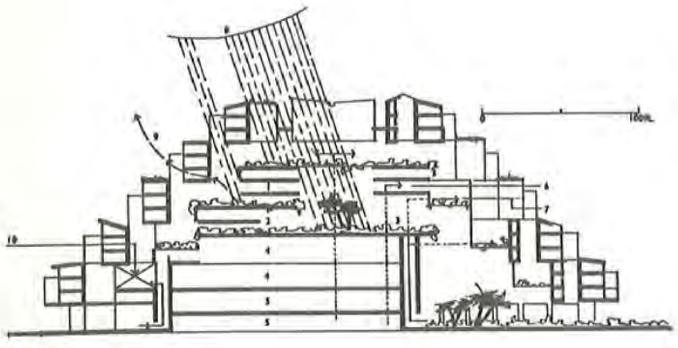

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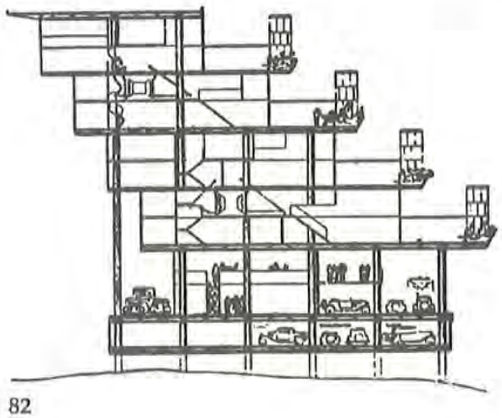

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83
Destruction of the Pruitt-Igoe slabs, St. Louis, Missouri, 1972.

that can compare with Spangen Quarter, Siedlung Halen, Frankfurt, or Siemensstadt; and it has had no national housing exhibitions such as Weissenhof or Hansaviertel to which outstanding architects and planners have been invited.

The buildings that follow are presented as case studies of different types of housing from throughout the world, beginning with the lower-density building types and ending with the high-density types. Included are detached housing (excluding the detached single-family house), rowhouses, terrace houses, party-wall housing, large courtyard housing, slabs, and towers. Each project is described in terms of the history of its development and its importance as a housing prototype. They are intended only as a representative sampling; obviously by no means can all the pertinent housing prototypes be covered in thirty-two examples. These particular buildings were chosen because they represent well-known models of a particular housing type—the Unité d'Habitation of Le Corbusier or Siedlung Halen by Atelier 5 for instance—or because they are particularly revealing examples of a type, such as the Vienna Werkbund Exposition rowhouse of Lurçat or Michiel Brinkman's Spangen housing. All of them, in my judgment, reward study.

3. From a report published by the National Association of Home Builders, Washington, D. C., 1975. The NAHB director of economics derived the contents of this report from statistics furnished by the Department of Housing and Urban Development.

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