Housing Agency

Lily Chi
Associate Professor, Dept. of Architecture, Cornell University, USA
lhc3@cornell.edu

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Incremental or progressive housing are starter homes designed specifically to facilitate owner adaptation and expansion. The base unit can vary greatly in size and completeness, but includes all amenities necessary for immediate occupancy – bathroom, kitchen, utilities, etc. Designs are developed in various degrees of consultation with eventual occupants, or their representatives (housing associations, non-profit or sponsoring agencies) and post-occupancy development may be self-built or contracted, wholly left to individual owners or mediated by resident associations. Parameters for user expansions may be explicit, as in the latter case, or implicit (built into the design of the unit and/or its aggregation).

There is much of contemporary relevance in this approach to housing. Adaptability extends the life of buildings in a context of rapid technological and economic change, mobile lives and livelihoods, and uncertain environmental futures. For a discipline of global reach but finite knowledge, designing for change makes room for difference, and a virtue of disciplinary limits. Beyond this specific relevance to the field of housing, architectures designed for adaptation and growth intrigue as artefacts in themselves. Devised as platforms for interpretation, ongoing adaptation and building *by others*, they suggest an approach to architectural form that has critical relevance to design thinking more broadly. This approach to form, and by extension, to architectural agency, is the subject of the discussions that follow. The first is an introduction to incremental housing, beginning with varying motives for, and diverse contexts in which this format was pursued over the last five decades. Interested in how architectural form is deployed to serve indeterminate uses and users, I offer an overview of schemas and tactics observable across a range of contexts. The second discussion expands focus to consider theoretical and critical questions for which incremental housing design has intriguing relevance beyond housing itself. Designing for adaptation suggests in a very specific way that form *matters*. That this argument is not new is itself illuminating – to situate this point, I revisit post-war debates about architecture's role and relevance within an expanding technocratic society. Herman Hertzberger's definition of polyvalence and the critical concerns of Dutch Structuralists are particularly helpful here. The paper concludes with a reflection on the critical potential, and limits, of design for adaptation for (re-)imagining architectural agency in contemporary contexts.

Incremental Housing: An Overview

Incremental housing was widely pursued in the decades following World War II as cash-strapped governments struggled with urban migration, massive housing shortages, and swelling populations in precarious self-built settlements. Requiring less capital outlay than mass fabricated developments, sites could be afforded closer to city centers and, in contrast to site and services schemes, offered safely constructed, immediately occupiable dwelling. The 'progressive' housing format also facilitated phased financing for both state providers and occupants, making it a viable route for addressing the enormous demand for affordable housing.[1]

1 A sampling of recent arguments for incremental housing policy: Bruce Ferguson and Jesus Navararrete, "New approaches to progressive housing in Latin America: A key to habitat programs and policy," *Habitat*

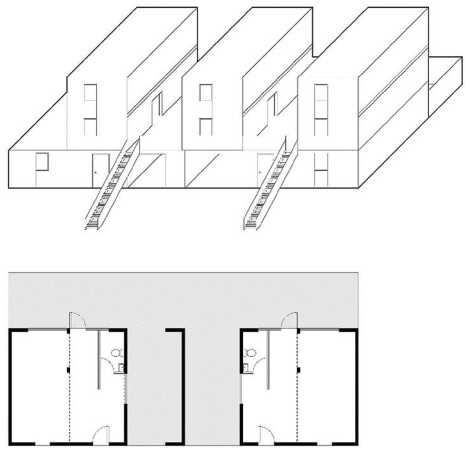


Fig. 1: Elemental, Quinta Monroy housing, Iquique, Chile (2001-2004): starter houses.

The most well-known of these projects was a workers' neighborhood built on the outskirts of Lima as part of the *Proyecto Experimental de Vivienda* (PREVI, 1968-1975). Funded by the Peruvian government, the UN, and the UN Development Programme, PREVI Pilot Project 1 began as an international design competition for a new urban quarter with housing for 1,500 families. The thirteen international firms invited to compete alongside thirteen Peruvian firms were amongst the most renowned architects of the day, including James Stirling, Christopher Alexander, Charles Correa, Candilis Josic Woods, and Kikutake, Kurokawa, Maki (PREVI was the only building the Metabolist members did together). While political instability subsequently intervened to truncate the project to 500 units, the organizers' decision to build all but two of the entire set of entries makes PREVI an exceptional case study of experimentation in incremental housing design and fabrication.[2]

PREVI was the most renowned but not the only example of incremental housing design by mainstream architects before the Quinta Monroy project by Pritzker Prize winner Alejandro Aravena's firm Elemental (2001-2004, Iquique, Chile. Fig. 1). During the seventies and eighties, a wide range of projects spanning corporate dwellings, factory worker and mixed income residences, and squatter resettlement housing were built throughout Latin America, Asia, and Europe, all varying in setup and approaches to incrementality and adaptability.

More recently, adaptable and expandable dwellings have seen resurgent interest in design discourse as well as amongst state housing providers. The flexibility of phased financing

International 27 (2003): 309-323; Julia Ferrero, "La Vivienda Evolutiva [Evolutionary Housing]," *Vivienda Popular* 3 (1998): 5–11; Margarita Greene and Eduardo Rojas, "Incremental Construction: A Strategy to Facilitate Access to Housing," *Environment and Urbanization* 20 (2008): 89–108; United Nations Human Settlements Programme (UN-Habitat), *The Challenge of Slums: Global Report on Human Settlements* (London: Earthscan Publications Ltd, 2003); Laura Sara Wainer et al., *Incremental housing, and other design principles for low-cost housing*, C-38400-RWA-1 (Boston: International Growth Centre, 2016), https://www.theigc.org/publication/incremental-housing-and-other-design-principles-for-low-cost-housing/ URL; Patrick Wakely and Elizabeth Riley, "The Case for Incremental Housing,"C*ities Alliance Policy Research and Working Papers Series*, 1 (2011): 1–56.

2 "Previ/Lima; Low cost housing project," *Architectural Design (AD)* 4 (1970), whole issue; Peter Land, *The Experimental Housing Project (PREVI), Lima* (Bogotá, Universidad de los Andes, 2015); Fernando García-Huidobro, Diego Torres Torriti, and Nicolás Tugas, *El Tiempo Construye!: El Proyecto Experimental De Vivienda (PREVI) De Lima*, (Barcelona: G. Gili, 2008); Helen Gyger, *Improvised Cities: Architecture, Urbanization & Innovation in Peru* (Pittsburgh: University of Pittsburgh Press, 2019); Patricia Lucas Alonso, "El Concurso del Tiempo: las Viviendas Progresivas del PREVI-Lima" (PhD diss., Universidad Politécnica de Madrid: 2015).



Fig. 2: Nils-Ole Lund, Skjetten Town housing (1965-1974): initial base unit with two variations and their possible expansions.

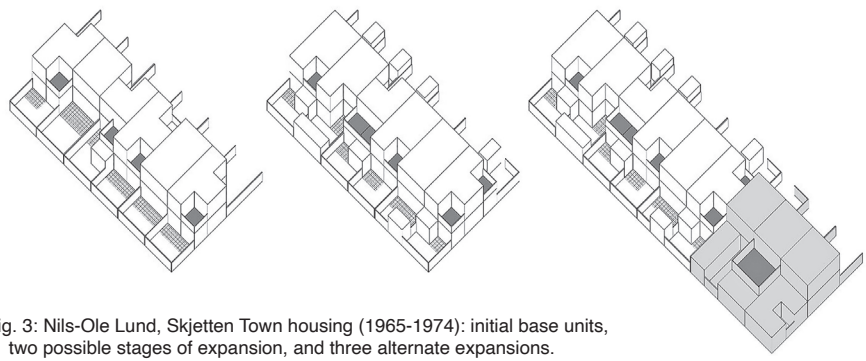


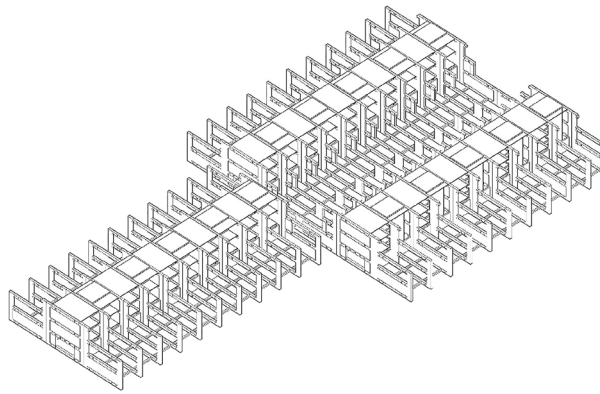
Fig. 3: Nils-Ole Lund, Skjetten Town housing (1965-1974): initial base units, two possible stages of expansion, and three alternate expansions.

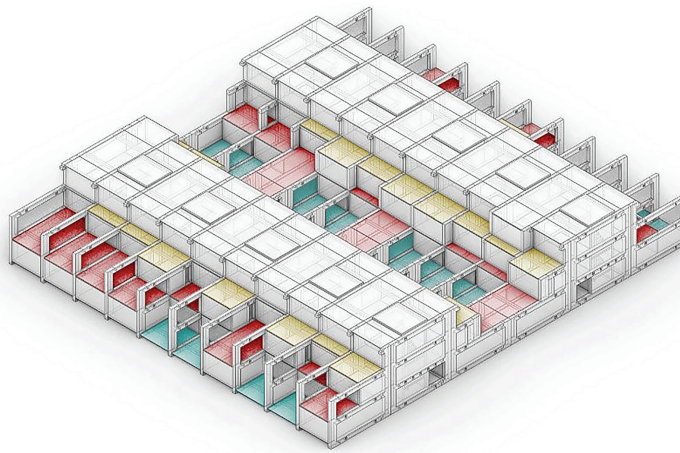
remains a major impetus amongst public agencies contending with accelerating global urban migration. Elemental's well publicized and premiated project for resettling a squatter community at Quinta Monroy, in partnership with the Chilean government and the non-profit Un Tech Para Chile, modeled what has become a widespread goal, if not format, in social housing.[3]

Financing was not the only argument for incremental housing amongst early advocates. John Turner's famous critique of government produced housing, drawn from eight years of work in Peru's squatter settlements, proposed the self-built dwelling as a model of autonomy lost to subjects of mass-produced housing. "The existential value of the *barriada* is the product of three freedoms: the freedom of community self-selection; the freedom to budget one's own resources and the freedom to shape one's own environment."[4] A similar

3 See for example, Edgar Rosas, "Vivienda Progresiva, el concepto clave en la reforma al Infonavit de AMLO," Centro Urbano, November 6, 2020, https://centrourbano.com/2020/11/06/vivienda-progresiva-el-concepto-clave-en-la-reforma-al-infonavit-de-amlo/, accessed June 3, 2021; Goran Ivo Marinovic, "Limits of the current implementation of incremental housing," *ARQ* 24.4 (2020): 369-378; V. Portugal, Caleb Harper, L. Shaikley, "Incremental Expansion : Examining user-initiated transformations in government housing in Manaus," Manaus Expansion Notes, 2013, http://web.mit.edu/incrementalhousing/articlesPhotographs/pdfs/Manaus%20Expansion%20Notes.pdf; Patrick Wakely and Elizabeth Riley, *The Case for Incremental Housing* (Washington D.C., Cities Alliance, 2011); United Nations Human Settlements Programme (UN-Habitat), *The Challenge of Slums: Global Report on Human Settlements* (London: Earthscan Publications Ltd, 2003); Ferguson, "New approaches."

4 John Turner, "The Squatter Settlement: Architecture That Works," *AD* 8 (1968): 355-360; see also Turner's *Freedom to Build; Dweller Control of the Housing Process* (New York: Macmillan, 1972); for a reading of Turner's political occlusions, see Rod Burgess, "Petty Commodity Housing or Dweller Control? A Critique of John Turner's Views on Housing Policy," *World Development* 6.9/10 (1978): 1105-1133.





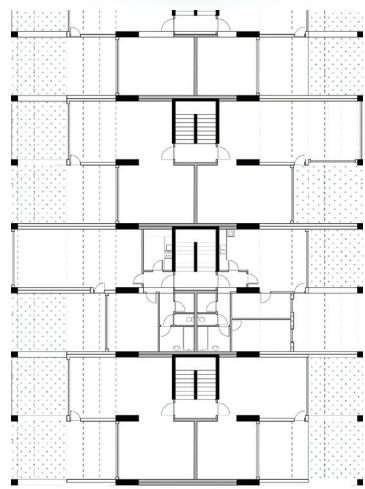


Fig. 4: Ottokar Uhl and Jos Weber, Wohnen Morgen, Hollabrunn, Austria (1971-1976): 'Support.'
Fig. 5: Ottokar Uhl and Jos Weber, Wohnen Morgen, Hollabrunn, Austria (1971-1976): Infills.
Fig. 6: Ottokar Uhl and Jos Weber, Wohnen Morgen, Hollabrunn, Austria (1971-1976): Support with sample infill layouts.



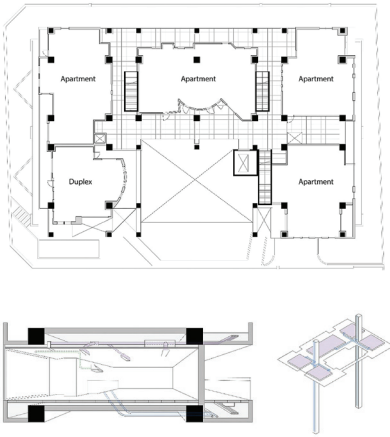


Fig. 7: Yositika Utida, Next 21, Osaka, Japan (1991-1993).
Fig. 8: Yositika Utida and Osaka Gas, Next 21: fourth-floor plan with infill apartment; partial section and diagram showing plenum for utilities in the Support component.

redirection of housing from product to *process* – constructive, economic, existential, and biological – underlay John Habraken's *Supports: an Alternative to Massing Housing* (1972) and the hugely influential Open Building movement he fostered. Individual choice was also a motive for architects who promoted incremental and adaptable architecture as part of a broader critique of Europe's post-war urban environments, effaced by rising mass culture, industrialized building, and rapidly expanding, anonymous peripheries. Through modular or constructional frameworks — designed for individuation in Nils-Ole Lund's Skjetten housing for Norwegian factory workers (1973-1974), for unknowable future occupants in Wohnen Morgen (Ottakar Uhl and Jos Weber, 1971-1976, Hollabrunn, Austria), or for seeding urban diversity in Charles Correa's Belapur housing in Navi Mumbai (1983-1986) — incremental housing served more than financial necessity, aiming at sociocultural concerns well beyond the *barriada.* (Fig. 2-4)

Ecological and lifecycle accommodation are two concerns driving more recent experiments in incremental housing. An early forerunner was Next21 (Yositika Utida, 1991-1993), built by the Osaka Gas Company for its employees as a pilot project to test a new urban type and building system. (Fig. 7-8) Next21's ambitious goal was a form of high-density urban housing that could support aging in place, incorporate state-of-the-art technologies for energy production and conservation, and contribute to urban biodiversity and environmental quality.[5] A key factor in ecological design was the building's ability to accommodate not only changing residents and programs, but also advances in utility and environmental technology over time, thereby extending the building's longevity.

More recently, and at the opposite end of the typological spectrum is the Henning Larsen's contribution to the Danish MiniCO2 experimental house program which challenged designers to reduce carbon emissions in the construction and maintenance of single-family dwellings.[6] Like Next21, the Adaptable House (2013) is a prototype aimed at extending building life, in this case, by facilitating adaptation, expansion and subdivision in response

5 Jong-Jin Kim, Ryan Brouwer, Jennifer Kearney, "Next21: A Prototype Multi-Family Housing Complex," http://www.umich.edu/~nppcpub/resources/compendia/ARCHpdfs/NEXT21.pdf.

6 "The MiniCO2 Houses," Realdania By & Byg, accessed January 10, 2021, https://www.realdaniabyogbyg.org/projects/the-minico2-houses.



Fig. 9: Henning Larsen, Adaptable House (2013): plans and diagrams of alternate upper-level arrangements by occupants using movable closet/partitions.

to residents' life changes.[7] (Fig. 9) A similar motive is at work in Geraghty Taylor Architects's new LivinHome (2015-ongoing), though this is less explicitly incremental in format.[8] Given the substantive economic, material, and environmental cost of renovations – not to mention demolition and rebuilding – ecological concerns are finding fresh impetus in economic motives, raising incremental and adaptable building to mainstream consideration in construction engineering and real estate enterprises.[9]

The following section reviews some of the aforementioned projects to offer an analytical overview of approaches to incremental design. Spanning contexts and programmatic parameters, all were explicitly posed as prototypes for addressing a pervasive need and for widespread application, making them particularly helpful as points of entry. A number were well publicized competition results: the PREVI design brief sought out incremental housing specifically, but Skjetten Town and Wohnen Morgen (Living Tomorrow, a periodic national competition in Austria) were general calls aimed at housing needs in the cities of Skjetten and Hollabrun, respectively.

7 "Designing the Adaptable House," Henning Larsen, accessed January 10, 2021, https://henninglarsen.com/en/news/archive/2012/06/14-designing-the-adaptable-house.

8 Geraghty Taylor, "Flexibility, Adaptability, Transition: A New Prototype for Homes and Communities in Transition, Livinhome," https://geraghtytaylor.com/wp-content/uploads/2017/01/Geraghty-Taylor-livinHOME.pdf.

9 See for example Paula Fementas and Faustine Geromel, "Adaptable housing? A Quantitative Study of Contemporary Apartment Layouts That Have Been Rearranged by End Users," *Journal of Housing and the Built Environment* (July 2019), https://doi.org/10.1007/s10901-019-09693-9; Robert Pierre Geraedts and Joost Ruiterkamp, "A Business Case for Flexible Housing: The Feasibility of Implementing Flexibility Measures in the Housing Market Article," *Journal of Civil Engineering and Architecture* (October 2017); W. Addis and J. Schouten, J. *Principles of Design for Deconstruction to Facilitate Reuse and Recycling* (London: CIRIA, 2004); J. Douglas, *Building Adaptation* (London: Butterworth and Heinemann, 2001).

Tactics

It is a defining paradox of housing design that the most intimate living environment is produced, more often than not, for anonymous occupants and repeated in series – often in large numbers and at a great socio-cultural remove. Still more curious when a design claims to provide for users' individual preferences and the alternate futures that may unfold therefrom. This is the wager of incremental housing design, which intrigues not just for the specific intentions therein, but also for what it suggests as an approach to the object of design – and to the architectural artefact itself. If housing design, subject to and accountable to the multiple, needs to be thought systemically, incremental housing requires both systemic and *tactical* thinking.

The wealth of case studies demonstrates two interrelated components: a structural and constructional framework for adaptation and infill, and a spatial matrix designed to generate maximum interpretive choice.[10]

Framework

The framework can be a building enclosure, a structural and constructional armature, or some combination thereof. Elemental's Quinta Monroy exemplifies the first in offering equipped shells, prestructured for infill and expansion. (Fig. 1) These comprise ground-floor units of three structural bays and, above these, two-storey, two-bay duplexes. One structural bay in each of the ground-floor and duplex units is left open to accommodate expansion, equipped with strategically placed beams and easily removable cladding. The PREVI projects are also structured shells, but infill and expansion options in each design are much more varied, as will be discussed below.

Uhl and Weber's Wohnen Morgen and Next21 exemplify the latter in their constructional process and logic. (Fig. 4-8) In both, a concrete structural frame, mechanical systems, and public movement components precede the unit infills – literally in the case of Next21, conceptually in the case of Wohnen Morgen, a winning competition entry. The 70 units of Wohnen Morgen were laid out in consultation with the residents, while the 18 dwellings in Next21 were designed by 13 different architects with their respective clients following the completion of the framework. Next21 takes the distinction between support and infill logic further in building for flexibility and incremental change at the infrastructural level: structure, enclosure and utility components are kept separate, with plumbing and mechanical systems located in plenums in the flooring. This facilitates change not only at the unit level – where everything from partitions to heating and plumbing can be readily relocated – but also at the scale of building subsystems in response to changes in technology.

The idea that building systems or a "layered" approach to constructional assembly can accommodate different speeds of change within a building has been popularized by Stuart Brand, and has become a key technical and economic parameter for current Open Building proponents.[11]

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10 The abundant literature on adaptable architecture ranges from Jeremy Till and Tatiana Schneider's wide-ranging case-study approach in *Flexible Housing* (Oxford: Architectural Press, 2007), to more technical prescriptions such as that of Sarah Slaughter, "Design Strategies to Increase Building Flexibility," *Building Research & Information* 29.3 (2001): 208-2017; Jia Beisi, "Adaptable Housing or Adaptable People," *Architecture & Behaviour* 11.2 (1995): 139-162; or Bernard Leupen, "Polyvalence, a Concept for the Sustainable Dwelling," *Nordisk Arkiteckturforskning* 3 (2006): 23-31.

11 Stuart Brand, *How Buildings Learn: What Happens After They're Built* (New York: Viking, 1994); see also Jonathan Gosling, Paola Sassi, Mohamed Naima, Robert Lark, "Adaptable Buildings: A Systems Approach," *Sustainable Cities and Society* 7 (2013): 44-51; Israel Nagore Setién, "Towards an Open and User Driven Housing Architecture," *UPCommons* (2014), https://upcommons.upc.edu/handle/2099/14882; Sarah Slaughter, "Design Strategies to Increase Building Flexibility," *Building Research & Information* 29.3 (2001): 208-217.

For John Habraken, who founded the Open Building movement, the support-infill system was much more than a technical issue.

> "To build is to exercise power and to change the environment [...] The dweller should be recognized and understood as a power. Only when users themselves exercise power, by directly influencing and controlling a part of the physical environment, can we expect healthy, vital, steadily improving environments. SAR [Stichting Architecten Research] has formalized this concept of power invested in the users by introducing the dual concepts of 'support' and 'detachable units.' Detachable units include all the building elements that can be decided upon by the dweller. Elements that lie outside the control of the dweller are the support. Therefore, the professional realm is primarily concerned with support. In other words, we professionals should work mainly to structure the environment in which non-professional powers must operate. We have to create spaces for others to change and add to at any level .... This does not imply a desire for neutrality; it means that what we professionals decide not to do, and leave instead for others, is as important as are our more obvious contributions."[12]

Support was Habraken's response to the participatory design movement: not to transfer professional responsibility but, through design, to build space for the user's "voice" directly into the architectural artefact itself.[13]

Spatial Matrix

The building systems approach is not the only way to accommodate change and expansion by others –nor is it complete in itself. Size is an important factor in the framework of both Next21 and Wohnen Morgen. Key to the latter's more technologically and economically modest support system is a spatial matrix built up from a 30 cm module. (Fig 6) The module accommodates constructional components, but is also the base unit for a strategic dimensional underlay, observable in part in the architects' drawings, and in plans of the users' infills. Latent in the 4.7-meter space between the structural frames are dimensions for a minimum movement space, one large room, and/or two smaller rooms. Embedded in the length of the frames are measures for 1-2 room lengths, possible locations for bathrooms and kitchens, but also options for sectional and planimetric extension in relation to daylighting. This dimensional underlay, together with the location of structural members, utility infrastructure, unit access points, and components of public movement, form a kind of gameboard for diverse subsequent "moves" by the individual unit owners.

From Quinta Monroy's simple infill to the more varied expansion possibilities in Wohnen Morgen, a more complex and much richer spatial matrix can be observed in James Stirling's patio houses at PREVI. (Fig. 10-11) The underlay is a nine-square grid, comprising bay widths of 3.2 m, 3.8 m, and 3.2 m in both directions. The widths of the outer squares can accommodate a modest movement space and one or two rooms, visible in the various starter units as an implied ring around the central square. The square units are aggregated to expose two adjacent sides, with access points on each of these open sides. The innermost corner square of each unit in this aggregation forms an open-air service patio equipped for bathroom and kitchen. The central square is defined as an open patio by the structure and initial enclosures. Each unit is structured to accommodate two storeys, and a staircase to the second level is placed within one small room from one of the entries.

From this intricate spatial matrix arises a number of possible starter units, each with a range of options for infill and vertical expansion. The wealth of alternate configurations is notable because this house – like all houses at PREVI and in many affordable incremental housing projects, including that at Skjetten Town – is designed to accommodate not just growing

12 N. John Habraken, "Design for Adaptability, Change and User Participation," in *Housing Process and Physical Form* (Philadelphia: Aga Khan Awards, c.1980): 23-25.

13 N. John Habraken, "Towards a New Professional Role," *Design Studies* 7.3 (July 1986): 139-143.

families but also income generation in the form of commerce, services, or tenants. Stirling's PREVI design supports multiple possibilities for horizontal and vertical partitioning between home and work, between dwelling and rental unit(s), and/or between core and extended families. A number of spatial "prompts" enable these alternate or simultaneous configurations: the two entry points on two different facades, connecting to two different axes of movement; the proximity of the stairs behind a small room next to the entrance; the generous central patio providing daylighting through multiple variations of infill and vertical expansion; the service patio terminating the two movement axes, equidistant from the two entries. These attributes are intimately connected to an aggregation strategy that made all the houses *corner* units. Each house thus opens onto two potentially different urban conditions, thereby afforded two different public interfaces: two possible *addresses* to deploy in support of internal programming and/or to take advantage of urban conditions, whether these be dwelling and business address, double storefront, or family home versus upper-level apartments.

Candilis Josic Woods's PREVI is a similarly multivalent spatial matrix in rowhouse configuration. (Fig. 12-13) Two main unit types are formed by two or three parallel walls creating a 4-meter bay and one or two flanking narrow bays of 2.6 meters. The larger bay is subdivided into alternating patios and rooms along its length, threaded by an implied movement zone on one side. The narrow bays are similarly divided transversely; one is left for expansions, the other roofed, enclosed and plumbed for kitchen and bathroom. In three-bay units, the second narrow bay is divided into two modest spaces of 2.6 x 4 meters. Openings in the transverse walls of the narrow bays create an implied movement zone along their shared edge with the larger bay. The effect of all this – the dimensioning, the location of portals to and through the linear arrangement of spaces, the staggering of transverse partitions in the wide and narrow bays so that the rooms thus created "overlap" – is rich in possibilities for subdivision and simultaneous programming. The three bays of the bigger unit type, especially the ones with patios immediately behind the entrance, can be used completely independently – as three parallel enfilade spatial units for example. Alternatively, spaces can be used in lateral clusters – across bays – in varying combinations, separated by patios in the central bay. (Fig. 13) The different bay widths and the adjoining spaces they create facilitate such clustered programming in their measure (2.6 x 4 and 4 x 4.6 meters, respectively) in supporting distinction of service/private and collective/public uses.

Post-occupancy studies of PREVI suggest that Stirling's design remains one of the most popular. Patio layouts, like that by Esquerra Saenz Samper Urdaneta (Fig. 14), comport with vernacular housing traditions, and the generous size of both the patio and the unit in the Stirling design assured its survival as an open-air space. A 2008 post-occupancy of PREVI showing the adaptations of a Stirling unit over four decades is illuminating of the extent to which Stirling's spatial prompts were engaged over four decades.[14] No detailed study exists as yet of the Candilis Josic Woods units, though the 2008 site survey notes that one corner unit has become a school, and the front half of another is a shop.

Growth

Incremental housing design by definition includes provisions to support expansions by occupants, self-built or contracted. The simplest are voids left in the shell for infilling, such as at Quinta Monroy. Next are frameworks for extending rowhouses at their extremities: from oversized structural frames in Wohnen Morgen to modular setups in Skjetten Town. More complex are constructional and spatial organizations that afford multiple possibilities for horizontal and vertical expansion, each opening onto new options for subsequent growth, such as Candilis Josic Woods's and Stirling's PREVI designs. (Fig. 11, 13)

Henning Larsen's 2013 Adaptable House offers a contemporary complement to the latter. (Fig. 9) A prototype aimed at reducing carbon costly relocations, renovations, and demolitions

14 García-Huidobro, Torres, Tugas, *El Tiempo Construye!*

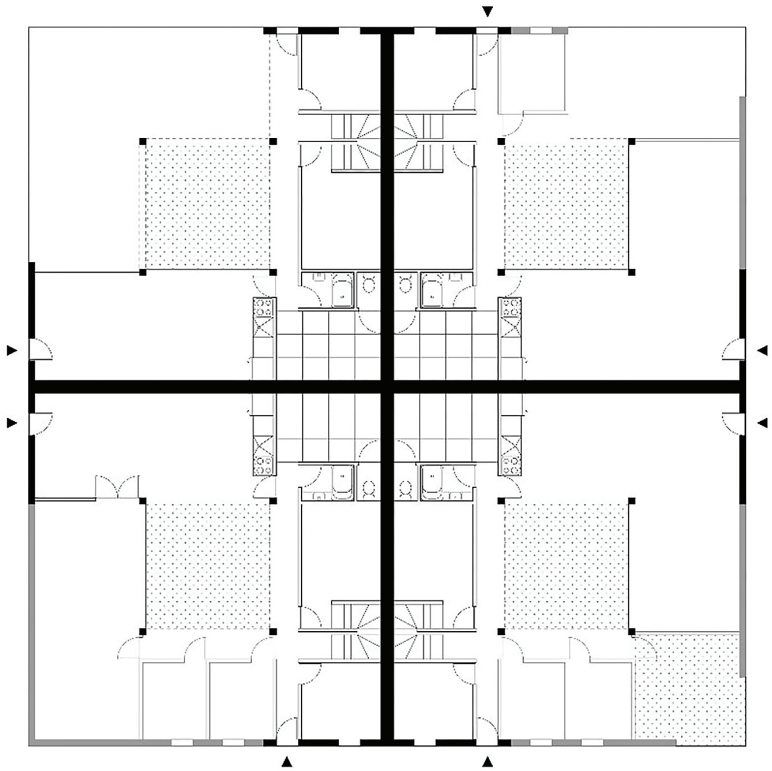
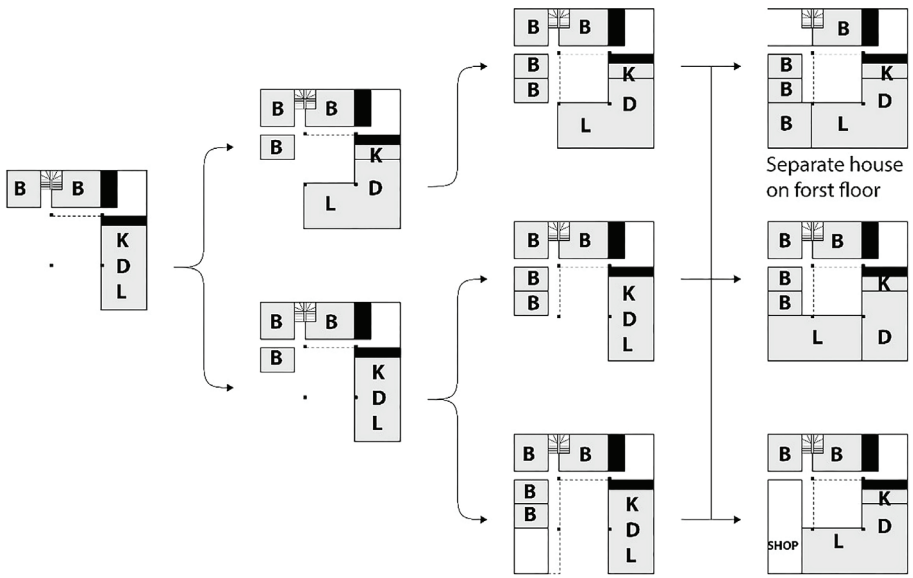


Fig. 10: James Stirling, PREVI housing, Lima, Peru (1968-1975): A four-unit cluster illustrating varying initial units.

Fig. 11: James Stirling, PREVI: growth scenarios.



in residential architecture, the single-family house accommodates multiple scenarios of inhabitation and cohabitation, growth and change through a host of constructional, dimensional, and spatial/relational provisions. Movable cabinet-walls, partitions, and wiring facilitate interior reorganization, while exterior changes are accommodated by standardized parts, including the coordination of door, window, and cladding components that allow them to be interchangeable and therefore reusable. Spatially, the house is loaded with prompts. The offsets between the house's upper and lower volumes offer three ready-made platforms for a first level of enlargement, and the detached garage is readily convertible into rental or added living space. Six different entry points on the ground floor support multiple options for internal horizontal and vertical partitioning.[15] The upper floor has seven potential entry points (two balcony doors and five window-doors) for more complex expansions, including extension to the upper level of the garage, located within spanning distance. These affordances work as prompts – or incentives – for adapting the house over time at minimal expenditure to accommodate a growing family, co-habiting divorced parents, independent home office(s) or professional addresses, income unit(s) for empty nesters, or more expansive outward growth.

Designing for growth opens onto considerations unique to incremental housing. As spatial and material platforms for growth, the base designs have a role in negotiating present and possible futures not only for residents, but also for the collective fabric, if not the city that emerges therefrom. How do provisions for expansion address the incipient tension between individual and collective interests? Outward expansions of the rowhouses in Wohnen Morgen and Skjetten Town, for example, have daylighting implications on adjacent units – a risk that the two-bay widths given to each unit seems to aim at attenuating. Elemental's design for Quinta Monroy, on the other hand, has been criticized for severely underestimating residents' space needs. Superseding the allotted voids for growth, self-built expansions have begun to encroach on collective space, leading to a breakdown not only of the neighborhood's physical conditions, but the very sociality of the community itself.[16] A number of the designs at PREVI sought to address this issue through design: Aldo Van Eyck wrapped his units in a non-loadbearing hexagon perimeter wall that "discourages further building ... in any direction that would result in the loss of external space or internal light;"[17] Esquerra Saenz Samper Urdaneta arranged the units to create urban facades, orienting the expandable spaces to the back of the lots. (Fig. 14) James Stirling did the opposite and delighted in the proliferation of individual expressions.[18]

After five decades, the owner-built expansions at PREVI still far exceeded the designed provisions, but the communal spaces provided for by Peter Land's masterplan remained intact in part due to community activity. Indeed, between Quinta Monroy's minimal formal or administrative engagement and the architect-designed infills of Next21, range a host of support practices aimed at mediating house and community: from Wohnen Morgen's consultative process, to Skjetten Town housing, which came with a manual for residents, to professionally mediated and participatory building processes coordinated by residents' associations and cooperative ownership structures.[19]

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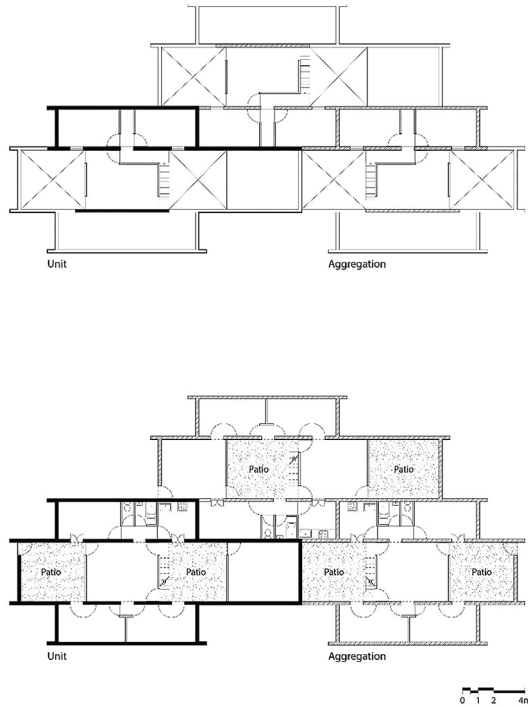
15 Though it could be asked why the location of the stairs and lower bathroom were not switched to enable an even easier first degree of partitioning.

16 Sandra Carrasco, David O'Brien, "Revisit Quinta Monroy," *Architectural Review* 1477 (Dec. 2020/Jan. 2021): 16-25.

17 Aldo Van Eyck, "PREVI/Lima; Low Cost Housing Project," 205.

18 Gyger, *Improvised Cities*, 264.

19 See On Skjetten, see Nils-Ole Lund, "Skjettenbyen, Norge," *Arkitekten* 10-11 (1973): 185-195, and "Adaptable Row Housing in Norway," *Architectural Design* 44.10 (1974):655-659; *Nordic Journal of Architecture* 2 (2012), whole issue. On mediated incremental building, see Jorge Andrade's Xacalli housing, Jorge Andrade, "Progressive Dwelling," *Education for an Open Architecture* (Muncie_Ball State University:2008): 173-181, http://www.irbnet.de › daten › iconda › CIB11048; and the model of co-op housing funded by Uruguay's Federación Uruguaya de Cooperativas de Vividenda por Ayuda Mutua.



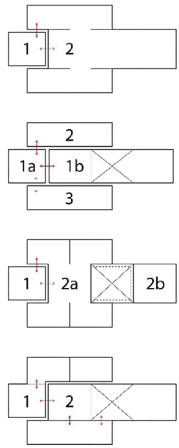




Fig. 12: Candilis Josic Woods, PREVI (1968-1975 built design).
Fig. 13: Candilis Josic Woods, PREVI: sample partitioned or simultaneous uses.
Fig. 14: Esquerra, Saenz, Samper, Urdaneta; PREVI (1968-1975).

Form Matters

It is often remarked in literature on adaptable architecture that before the twentieth century, spaces in the home were not assigned to fixed uses. Excepting areas equipped for kitchens and bathrooms, the use of rooms had more to do with their location, adjacencies, and socio-cultural protocol, and could change throughout the day or seasons. Such observations state what would seem obvious but is surprisingly not: that "tight-fit" form generated from – and expressive of – function is a historical novelty. The formulation tight-fit is itself illuminating of the persistence of an idea long rejected in theory. Its various antonyms in architectural debate – from "loose-fit" and "generic" or "framework," to Atelier Bow-Wow's "urban-ecological unit" – give voice to the struggle to articulate an alternate agenda, in many cases an urban agency, for architectural form.[20] In the context of rising questions about architecture's relevance to societal challenges – prompted in part by design culture's apparent co-option by the experience economy and neo-liberal development agendas[21] – the possibility that architectural form could have agency beyond aesthetic expression, whether of use, process, or "idea" remains buried in habit and assumption.

It is in the context of similar skepticism about architecture's efficacy that prompted one of the most striking observations about the agency of architectural form. Aldo Rossi's *L'Architettura della Cittá* was a counterpoint not only to the effects of unfettered capital development on post-war urban development, but also to positions advocated by progressive architects and critics in his time. To confront the social and political challenges of the expanded urban territory, Manfredo Tafuri had called on architects to collaborate with other disciplines to address the city as administrative, functional, and infrastructural organization, and Giancarlo di Carlo advocated understanding the city as a dynamic open framework against the stasis and hierarchy embodied in the architecture of historic urban fabrics.[22]

Rossi rejected such approaches as inadequate to the complexity of the modern city. It was in the context of a search for an alternate reading of the modern city – one that could account for the city *through* its specificity as a physical given, both temporally enduring and dynamic – that Rossi elaborated his famous critique of "naive functionalism." History is rich with examples of buildings that survived the centuries even as their functions changed, often repeatedly: amphitheaters that became small cities, a palace that became a law court, mosques that became churches, etc. The very adaptability of these buildings ensured their persistence in time. In Rossi's intriguing inversion, form could be *generative* of function rather than vice versa. Persisting in the fabric of urban life, architectural form and space have conditioning effects on the city itself – both conditioned by, and conditioning its ongoing evolution.

The English edition of Rossi's *L'Architettura della Cittá*, published in 1982 with greatly expanded graphics, included images of the Roman amphitheaters that persisted to become medieval cities (Arles) or town squares (Lucca). Coincidentally, the same references appear in Herman Hertzberger's *Lessons for Students in Architecture*, a 1991 publication of his lectures since 1973, in which he quotes his 1963 text on "The Reciprocity of Form and Program" that

20 Karen Franck and Quentin Stevens, eds. *Loose Space: Possibility and Diversity in Urban Life* (London: Routledge, 2007); Rem Koolhaas, "The Generic City," *Domus* 791 (March 1997): 3-12; Pier Vittorio Aureli and Martino Tattara, "Architecture as Framework: The Project of the City and the Crisis of Neoliberalism," *New Geographies* 1 (2009): 36-51.

21 Reinier de Graaf, "Building capital,"*Architectural Review* 237.1419 (May 2015): 36-45; Brian Lonsway, *Making Leisure Work: Architecture and the Experience Economy* (London: Routledge, 2009); Kenny Cupers, Kenny et al, eds. *Neoliberalism on the Ground: Architecture and Transformation from the 1960s to the Present* (Pittsburgh: University of Pittsburgh Press, 2020); Ana Jeinic and Anselm Wagner, eds., *Is There (Anti-)Neoliberal Architecture?* (Berlin: Jovis, c2013); Pier Vittorio Aureli, *The Project of Autonomy: Politics and Architecture Within and Against Capitalism* (New York: Princeton Architectural Press, 2008).

22 Pier Vittorio Aureli, "The Difficult Whole," *Anyone* 9 (Winter/Spring 2007): 39-61; Mary Louise Lobsinger, "the New Urban Scale in Italy: On Aldo Rossi's 'L'Architettura della Cittá,'" *Journal of Architectural Education* 59.3 (Feb. 2006): 28-38.

opens with the observation that "The most important characteristic of a city is, perhaps, the continuous change inherent in an urban environment, […] The city is subject to constant change […]." Where Rossi focused on how the *persistence* of particular urban elements in this ceaseless evolution could inform a critical reading of the city's structure as a cultural artefact of temporal and collective making, Hertzberger was interested in what made these forms open to and indeed *provocative* of ongoing (re)interpretation and re-use. His conclusions were crystalized in the concept of polyvalence.

If form produced through the concept of function reduces artefacts to machinic apparatuses, "flexibility" was equally problematic for Hertzberger. Seeking to be available to all possibilities, "neutral," indistinct forms defined by "absence" and "absolute denial of a fixed, clearcut standpoint [...] can never be the best and most suitable solution to any one problem." Contrary to what might be commonly assumed, empty space does not generate maximal difference. Polyvalence is instead "a form that can be put to different uses without having to undergo changes itself, so that a minimal flexibility can still produce an optimal solution."[23] The key to this generative capacity is a form's ability to incite interpretation.

> "It is not somewhere between these two extremes of the lack of commitment and too much self-assurance that the possibility of a solution lies, but quite aside from them: namely, in a standpoint that everyone can relate to in his or her own way, a standpoint therefore that can take on a different – and hence divergent – meaning for each individual. In order to be able to have different meanings each form must be interpretable in the sense that it must be capable of taking on different roles. And it can only take on those different roles if the different meanings are contained in the essence of the form, so that they are an implicit provocation rather than an explicit suggestion .... Personal interpretation is infinitely more important."[24]

Formal, spatial, and relational specificity are key to interpretability in facilitating imagined possibility: "the chooser must be able to visualize the alternatives one by one in terms of his own way of thinking."[25]

This "interpretable" attribute is substantive in distinguishing Herzberger's concept of polyvalence from recent literature on adaptability. The ecological and economic interest in adaptable and incremental housing has spawned abundant, and divergent, how-to texts on the subject. Prescriptions range from specific dimensions and quantities, to diagrams of space syntax for achieving flexibility and even polyvalence.[26] In contrast, Hertzberger defines polyvalence through descriptions of *situations*: thresholds, nooks, in-between spaces and what might happen there; steps, stoops, and platforms and how they might be availed of, by whom, or for what activities in a school, an open space, a public square; incomplete spaces that invite. The closest the texts come to prescription is a suggestion in one early text that "archetypal" forms are polyvalent because they are thick with accrued association,[27] a reference reminiscent of Aldo Rossi's own passages on type or monument.

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23 Herman Hertzberger, *Lessons for Students in Architecture* (Rotterdam: 010 Publishers, 1998), 170, 146, 147.

24 Ibid., 109.

25 Ibid., 162.

26 See Gosling et al, "Adaptable Buildings: A Systems Approach"; G. Ledent, "Permanence to allow change the archetypal room: the persistence of the 4 × 4 room," *Proceedings of the EAAE ARCC international conference* (Lison: 2016); A. Yunitsyna, "Universal space in dwelling—The room for all living needs," *Proceedings of 2nd International Conference on Architecture and Urban Design* (2014); Paula Femenias, Faustine Geromel, "Adaptable Housing? A Quantitative Study of Contemporary Apartment Layouts that have been Rearranged by End-users," *Journal of Housing and the Built Environment* (July 2019); M. Živkovic, G. Jovanovic, "A Method for Evaluating the Degree of Housing Unit Flexibility in Multi-Family Housing," *Facta universitatis-series: Architecture and Civil Engineering* 10 (2012): 17–32; K.W. Seo, C.S. Kim, "Interpretable housing for freedom of the body: The next generation of flexible homes," J*ournal of Building Construction and Planning Research* 1 (2013): 75–81; Leupen, "Polyvalence"; Slaughter, "Design Strategies."

27 Hertzberger, *Lessons*, 252.

As with Aldo Rossi, Hertzberger's critical redirection of architecture's formal agency had broader sociocultural targets. The texts in *Lessons for Students in Architecture* retrace Hertzberger's contributions in the Dutch structuralism movement in its concern with the post-war European city – in particular the erosion of individual voice and choice by the totalizing planning effects of welfare state policies and an expanding industrial political economy. Such effects led not to an egalitarian, open society but imply one set up for production and capital accumulation, transforming cities into oppressive and alienating territories. The buildings and cities produced under the logic of functionalism on the one hand, and that of economic, mass production on the other created not just monotonous environments, but had a corrosive effect on society itself.

> "By collectively prescribing where people will have to put their tables and their beds – generation after generation – we are actually causing that uniformity. This collective coagulation of individual freedom of action has assigned a pre-determined purpose to every place in the home and in the city alike – and has done so in such an uninspired way that all the variations that make up identity are radically nipped in the bud."[28]

Structuralism, with its distinction between *langue* and *parole*, between language as system, and as utterance, offered a conceptual vehicle for Hertzberger, Habraken, Piet Blom and others in their critical efforts. Believing still in the capacity of form and space to contribute to social and cultural welfare, they sought in varying ways to define architecture as an enabling framework – one that makes space for individual imaginations and destinies even as it addresses the broader challenges of the modern industrial city. What Habraken sought in the idea of Open Building, Hertzberger articulated in the idea of formal polyvalence. "Architecture should offer an incentive to its users to influence it wherever possible, not merely to reinforce its identity, but more especially to enhance and affirm the identity of its users."[29] In recent writing on polyvalence, Hertzberger makes clear that this reciprocal relation between formal and user agency remains relevant today. "The more dynamic and uncertain the world becomes, the more space we have to leave: space for other ideas, for other eventualities, for time [...]" Polyvalence is a belief in, and argument for architecture's ability to "provide for the unexpected" through the specificity of spaces and places that solicit engagement.[30]

Polyvalent, Not Autonomous

Hertzberger's critique of functionalism and its role in the cultural effacement of architecture by industrial capitalism was certainly not unique in the post-war decades. Most iconic, beyond Rossi's circle in Italy, were the debates and formal experiments around Colin Rowe and the New York Five, which sought an "autonomy" for architecture distinct from building, co-opted by industrial production into a problem-solving enterprise. Architectural invention would be guided by the discipline's own criteria, drawn from its discursive history as an artistic, symbolic, cultural form. The created artefact was in turn an object of aesthetic and intellectual contemplation, expressively divorced from questions of use, its meaningfulness above and beyond its quotidian existence.

The "formalism" of Herman Hertzberger, John Habraken, Lucien Kroll and others was wholly distinct. Tactical design in the form of polyvalence, supports, and "wandering columns," suggests an agency for architecture beyond aesthetics in the potential to "arouse and incite [users] to more intensive use of space." (Fig. 15) In contrast, too, to activists like John Turner – who saw little use for design against the complex institutional challenges of the real world on the one hand, and the better judgment of diverse users on the other – the *articulate* form, far from restricting participation, aimed to expand it in concrete ways, opening architecture to

28 Hertzberger, *Lessons*, 147.

29 Ibid., 148.

30 Herman Hertzberger, "Polyvalence," *Architectural Design* (2014), 108, 109.

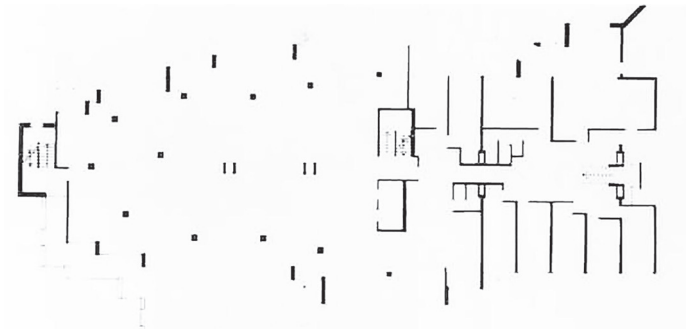


Fig. 15: "The wandering columns" at La MeMe; Lucien Kroll, Faculty of Medicine student residence, University of Louvain (1968, 1972-1976)

the agency of others. For Hertzberger and others, this enablement sought to maintain an open space for the individual as a creative and political voice against post-war Europe's expanding technological and economic hegemonies.

This paper has suggested that incremental housing design puts to work a similar faith in the gregarious potential of "inviting form." Whether such work is a critical, political project in the same vein requires additional qualification.

The pursuit of disciplinary autonomy for architecture in the 1980s inaugurated a tradition of formal invention that ironically made the discipline and the architectural artefact more amenable to economic co-option. The icon building by celebrity architects, the spectacular artefact at architecture biennials, the evacuated historic quarter – these are staple instruments for contemporary neoliberal development policies that have turned city centers into exclusionary zones for global capital and produced housing crises everywhere else.[31] Critiques of Quinta Monroy's "failure" as an incremental housing project merit consideration. For Camillo Boano and Francisco Vergara, Aravena's argument for "Half a Good House" is problematic. In making do with less – in accepting that housing can be provided at impossibly minimal expenditure; in hitching housing provision to commodity logic – the half-house shell as equity; in believing that "social" housing is somehow distinct from "housing," Elemental's solution did not solve so much as aggravated the problem of housing inequity.[32] Boano/Vergara's observation comports with broader analyses arguing that flexibility and decentralized forms of agency can also be a mechanism for capital development, even as it might open access in some contexts.[33] The flexible office plate, after all, is also a support and infill system.

Such observations suggest that adaptable, polyvalent form can by no means be equated with autonomous form – one invulnerable to capitalization, instrumental co-option.

> "No one theater is particularly privileged even though some of us may be more able, expert, and suited to act in one rather than another. A typical political mistake is the thoroughly understandable habit of thinking that the only theater that matters is the one that I or you happen to be in."[34]

31 See, for example, David Walker, "Resisting the Neoliberalization of Space in Mexico City," in T. R. Samara et al., L*ocating Right to the City in the Global Sout*h (Abingdon, Oxon: Routledge; 2013), 171-194; Mona Mehta, "Ahmedabad: the Middle Class Megacity," *South Asian History and Culture* 7.2 (2016), 191-207; Kenny Cupers et al., *Neoliberalism on the Ground* (Pittsburgh: University of Pittsburgh Press, 2020).

32 Camillo Boano and Francisco Vergara Perucich, "Half-happy Architecture," *Viceversa* 4 (April 2016), 59-81.

33 See Amy Thomas, "The Political Economy of Flexibility," in Cupers, *Neoliberalism on the Ground*, 127-149; Tahl Kaminer, *The Efficacy of Architecture: Political Contestation and Agency* (Abingdon and New York: Routledge, 2017).

34 David Harvey, "The Insurgent Architect at Work," in *Spaces of Hope* (Los Angeles: University of California Press, 2000), 234.

David Harvey's caution suggests that while design for adaptation recovers a social and political agency for architecture *as* built form and space – in housing and in-built environments more broadly – it cannot be the *only* tool. A critical pursuit of architecture as enabling framework necessitates taking on the frameworks that enable architecture.

For such work, the rich field of case studies in incremental housing design offers a rich pedagogical resource for an architectural discipline with expanding resources for creative invention, but incurious about its own "competence." Beyond its specific value as an approach to the challenges of resources, overcrowding, climate change and environmental urgencies – not insignificant and relevant architectural concerns – incremental housing design(s) offer lessons for seeing differently. The created artefact – drawn or built – cannot be observed as a thing in itself, but as a point of departure. Its formal attributes lie not in aesthetic shape, or in optimized virtuosity, but as matter loaded with virtualities. Hertzberger speaks of polyvalent form as instruments to be played; Atelier Bow-Wow speaks of a carpenter's jig, precise and deliberate in its form, but whose entire role is as a setup for some other construction.[35] The adaptable house as a "jig" is a framework accomplished through cunning dimensioning, tactical adjacencies, suggestive materialities. Just as rethinking architectural agency requires new words, so the work of design requires new ways of seeing and drawing form.

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ILLUSTRATION CREDITS

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Fig. 1: Drawings by Yuheng Zhu, with Madeline Esquivel.
Fig. 2: Drawing by Yuheng Zhu, base 3D model by Eli Maroscher.
Fig. 3: Drawings by Yuheng Zhu, after Lund, Architectural Design 44.10 (1974).
Fig. 4: Drawing by Alexandra Ciobanu and Carlos Colet, 3D model by Eli Maroscher.
Fig. 5: Drawing by Yuheng Zhu, 3D model by Eli Maroscher.
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Fig. 11: Drawing by Yuheng Zhu, after James Stirling.
Fig. 12, 13: Drawing by Yuheng Zhu.
Fig. 14: Drawing by Yuheng Zhu, after Esquerra, Saenz, Samper, Urdaneta.
Fig. 15: Drawing by Yuheng Zhu, after Lucien Kroll.