

Field Report

Political Space: The Architecture of Squatter Settlements in São Paulo, Brazil

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Spontaneous urban settlements are no longer seen as separate from the workings of the city, nation or world. There is a considerable body of research on residents' contributions to the formal sector of the economy and their demands for recognition as urban citizens. However, until very recently the built form of these settlements has been treated in the literature as distinct and different from established scholarly categories of the built environment, and typically has not been seen as worthy of careful documentation and analysis. Building on vernacular-environment theory, researchers have recently established a multidimensional framework for analysis of spontaneous settlements that emphasizes the importance of structural constraints to the built form of the dwelling and the settlement. This article analyzes and compares the built form of three physically mature squatter settlements in São Paulo, focusing specifically on the local contexts that define and constrain the physical development of these settlements. It shows how various municipal interventions are reflected in built form, highlighting the cases where, in spite of differences in context, aspects of built form remain constant across the research sites.

One has to be an artist to survive as a poor person . . . you have to imagine space where there is none.

— Resident of a Rio de Janeiro *favela*¹ (FIG.1).

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Class, politics, and the built environment converge, if uneasily, in the squatter settlements of Latin America. At first glance, the physical characteristics of these spontaneous settlements, their apparent chaos, mark them as separate from the officially legitimized urban fabric.



FIGURE 1. A young boy who has created a toy car racetrack in a São Paulo favela.

Perhaps even more importantly, their boundaries are not only physical; for residents, they are the boundaries of class and of social acceptability. The outward appearances of squatter settlements have formed the basis for theories such as the “culture of poverty” and “marginality,” both of which have influenced squatter policies for decades and often resulted in the eradication of entire communities and the displacement of thousands of people.² Peattie has written that such applications of power based on appearances qualify as “aesthetic politics.”³

Many squatter settlements throughout Latin America have recently developed a high degree of physical maturity, partly due to governments’ shifting policies toward these communities. Several decades ago the bulldozing of entire settlements was common, but today many governments provide permanence of tenure and improvements to infrastructure (upgrading) to settlements occupying invaded land. Perhaps the most remarkable thing to come to light as a result of these new policies is that when squatter settlements are legalized and allowed to develop and consolidate, outsiders may not be able to distinguish them from surrounding formal-sector neighborhoods.⁴ This fact raises a series of new questions. If illegitimate settlements can become, in the end, physically indistinguishable from legitimate ones, what might this mean in terms of “aesthetic politics?” What does it say about who squatters are, about the nature of the environments they cre-

ate, and about the building processes they employ? Is knowledge about building “handed down” from past to present generations of builders? If this were true, according to Shils’ definition of tradition,⁵ squatter-built environments would be a “new” kind of traditional architecture.

Kellett and Napier have established that several theories used to analyze vernacular environments are now sufficiently developed to apply to the analysis of the built form of squatter settlements.⁶ They argue that the multivalent, multilevel theories of Turner, Lawrence, Rapoport, Oliver, and Stea and Turan have the capacity to contain and incorporate the full range of relevant information. Kellett and Napier have integrated concepts from these theorists in a “multidimensional framework” for analysis that is built around “the residents, or households; the dwelling and how it is used; the processes through which the dwellers shape it; and, perhaps most significantly, the context or the setting in which these actions take place.”⁷ Indeed, the specific legal context within which spontaneous settlements exist has been the primary distinguishing factor preventing their inclusion in the academic discussion of vernacular environments. But, as Kellett and Napier have argued: “The fact that urban informal settlements are constructed in situations of artificial constraint . . . should lend as much interest to the study of these housing products as [to those] previously developed in circumstances of only natural constraint.”⁸

In this article I will attempt to show how some of the physical and legal constraints inherent in upgrading projects are reflected in the built form of three spontaneous settlements in São Paulo, Brazil. After providing an overview of the political context of housing in São Paulo, I will briefly outline the history of urban housing movements and the processes of invasion, and how vernacular-environment theories relate to the spatial analysis of squatter settlements. I will then describe three former squatter settlements in São Paulo, first establishing their historical precedents and the particular political constraints acting on them, then analyzing their spatial patterns and how they result from these “artificial” constraints.

THE POLITICAL CONTEXT OF SQUATTING IN SÃO PAULO

Housing policy in Brazil in the twentieth century has been greatly influenced by the centralization of power that began with Getúlio Vargas’ “revolution” of 1930 and that lasted at least until the end of the military dictatorship in 1986. In part because much authority in Brazil was officially restricted to the federal level, the local policies that dealt with illegal housing were characterized by an unofficial client-patron relationship that arose between squatters and politicians. In São Paulo, this dynamic allowed for the development of an urban housing movement that has somewhat changed the nature of squatter policies in the city.

Vargas’ government centralized nearly all policy-making at the federal level to pave the way for the industrial development

that he believed would allow Brazil to become a wealthy modern nation. During this period the Brazilian government began to accept responsibility for housing provision for the first time, seeing its role as a guarantor of appropriate-cost housing for the new generation of industrial workers.⁹ In 1942, just as rural migrants began to stream into the city to take advantage of the new industrial jobs, the city of São Paulo imposed a rent freeze which lasted some twenty years. As a result, private-housing development became an unattractive investment, the inner-city housing stock became overcrowded and deteriorated, and clandestine subdivisions, completely lacking in services or infrastructure, began to spring up in the outskirts of the city.¹⁰ Kowarick and Bonduki have written that the reaction of state and local authorities was far from punitive; in 1946 Ademar de Barros, Governor of the State of São Paulo, told some of the city's poor residents: "Go ahead and build your homes without a permit. City Hall will turn a blind eye."¹¹ In the illegal settlements, politicians saw an opportunity to alleviate the housing shortage without investing government funds in low-cost housing. Furthermore, as the settlements grew in number, politicians began to see squatters as a voting bloc waiting to be won over. A new form of exchange between the working class and politicians was struck: votes for infrastructure. In de Soto's view: "The formals themselves first gave informality room to develop when, in the early decades of this century, they violated the laws governing urban development and sought arrangements wherein these general rules were replaced by class privileges, bribes, and other shady dealings."¹² At the same time, leaders of urban social movements in São Paulo spread the idea that residents of peripheral areas had the right to infrastructure and services. In particular, the Progressive Democratic Committees of the Brazilian Communist Party (PCB) played a role in bringing poor workers together to demand improvements in housing conditions. After the PCB was banned in 1947, Societies of Friends of the Neighborhood (*Sociedades de Amigos do Bairro*) in São Paulo developed what Bonduki calls a "clientelistic relationship with the populist politicians, creating a tradition of diffuse and partisan struggles still very much present today in the popular movement (for housing)."¹³

Favelas, or squatter settlements, are distinguished from illegal or clandestine subdivisions by the fact that land is occupied without permission from the owner, whereas in the latter case land may be purchased, albeit illegally. While *favelas* had occupied the hillsides of Rio de Janeiro since the turn of the century, in São Paulo during the postwar years the *favela* was a new kind of illegal settlement. Although the housing crisis was severe during these years, invaded settlements still housed a very small percentage of the city's population, compared to other Brazilian cities.

In 1964 the Brazilian military seized control of the national government. The aim of the regime was to consolidate power and wealth even more securely in the hands of the elite, while repressing dissent. It used housing production as a macroeconomic tool to stabilize the economy during this peri-

od of crisis by creating the National Housing Bank (*Banco Nacional de Habitação — BNH*) and orienting its housing policy toward new construction and homeownership.¹⁴ But it also created an even more heavily centralized mode of capital accumulation that drew resources away from the working class, resulting in reductions in wages as well as in basic services.¹⁵ As a result of these policies, during the 1970s the number of *favelas* in São Paulo grew by 50 percent.¹⁶ While the growth of illegal housing had been ignored and even encouraged throughout the previous three decades, during the military period Brazilian society and government saw *favelas* as growths, or parasites, on the city. In São Paulo the *favela* was portrayed by some as a place with no community cohesion, where promiscuity reigned, where the substandard living conditions caused residents to lose their moral values, and whose youth frequently caused problems in schools and other institutions. Excision from the urban fabric was the proposed solution.¹⁷

COMMUNAL ACTION AND THE FORMATION OF NEW SETTLEMENTS

Suffering from discrimination in the distribution of resources during this period of violent repression, squatter communities began to form neighborhood organizations, encouraged by the Catholic Church's Base Communities (*Comunidades Eclesiais de Base*).¹⁸ But by the late 1970s the iron grip of the military regime had begun to loosen, and official policies toward squatters relaxed somewhat. PRÓMORAR, a federally sponsored upgrading program instituted in 1979, offered legal tenure and substituted core houses for shacks. This was also the first and only federal program that allowed residents to remain on the invaded land.¹⁹ Another program, PRÓFAVELAS (*Programa de Urbanização de Favelas*), was implemented at the state level in 1981. At the municipal level, PRÓ-ÁGUA (*Programa de Abastecimento de Água para Habitações Subnormais*) and PRÓ-LUZ (*Programa de Eletrificação de Favelas*) were implemented in São Paulo in 1979 to provide water and electricity to illegal settlements.²⁰

In the early 1980s São Paulo was hit by a recession that resulted in severe unemployment and more housing shortages, giving rise to a new intensity within the existing squatters' housing movement. In August 1981 squatters executed the first organized land invasion in São Paulo, paving the way for 65 more collective invasions in the following two and a half years. Until then, the most common mechanism for illegal land occupation had been the gradual construction of individual dwellings. Bonduki wrote that in these mobilized invasions, squatters often defined the circulation system and their lots beforehand. He argued that the purpose of doing so was to avoid the physical irregularities characteristic of squatter settlements, and to give it instead the physical attributes of a working-class, formal-sector neighborhood. The future residents, he argued, were aware that living in a squatter settlement marked

them as outsiders, and that regularizing their physical surroundings was an attempt to neutralize the negative attitudes of neighbors, and perhaps of local power-holders. In a gradually occupied settlement, however, where the construction of houses preceded the definition of the circulation system, access paths became irregular and often labyrinthine. Bonduki suggested that perhaps this morphology had the additional advantage of discouraging strangers from entering the settlement.²¹

In 1982 a thousand members of the squatters' movement demonstrated in front of the office of the mayor, a member of the state-sponsored political party (ARENA).²² Although he refused to recognize them, *favelas* were finally being recognized as permanent physical expressions of urban contradictions.²³ In the same year squatter activists proposed a new approach to low-income housing they called *autogestão*, self-managed housing provision, that could be applied in both upgrading and new housing projects. They demanded that the government provide funding, materials, and technical assistance for new construction, while the squatters themselves would retain much of the control over the type of housing unit, the construction process, and financing. *Autogestão* was widely implemented in São Paulo after the 1986 fall of the military regime, especially during the mayoral term of Luiza Erundina de Souza, a member of the left-ist Workers' Party (*Partido dos Trabalhadores* — PT), who had stated publicly at the beginning of her term that to house low-income families was her most serious challenge.²⁴ During her term in office, policy arguments focused on concepts such as the "failure of the provider-state" and the need for integration of the *favela* into the urban fabric.²⁵ Meanwhile, the official view of squatters and *favelas* continued to change: squatters came to be seen more as workers than "marginals," and attempts were made to find a solution to their tenure problems.²⁶ The squatters' housing movement experienced a brief moment of success, as upgrading became more common (partly because it was cheaper than eradication and reconstruction). The municipality established FUNACOM, an agency that supported self-managed projects,²⁷ and passed the Concession of Use Law (*Lei 51/91, Concessão de Uso*), giving the city the legal power to cede use of municipal land to squatters for a period of 99 years.

Housing professionals in São Paulo hold varied opinions about the political ramifications of the squatters' housing movement. For example, Bonduki praised the process for its exploitation of principles of direct action: "In a manner totally different from what happened in populism — when petitions and the professional politician were the channels linking residents and authorities — the concept that the popular sectors should organize to take direct action developed."²⁸ However, today the housing movement comprises only a tiny fraction of the four to five million families living in illegal or substandard housing.²⁹ Taschner has written that as the use of *autogestão* and other self-help techniques expanded, they became co-opted by middle-class ideology, so that the concepts of cooperation, self-help and mutual help, private initiative, and community development became vehicles for the transmission of the idea that squatters could in fact improve their lot through

their own individual and communal efforts, without significantly changing the structure of the system itself.³⁰

Today approximately half of the population of greater São Paulo lives in illegal or substandard housing.³¹ The situation is clearly worsening: 19.3 percent of the total population of the municipality of São Paulo was living in *favelas* in 1993, and of these, 48 percent once owned or rented houses in the formal market.³² Yet, many policy-makers and analysts believe that upgrading, in spite of its economically undesirable effects on land markets, is still the most feasible response to the housing crisis in São Paulo. Taschner asks:

*What can be done? Remove 1 million squatters? How and where to? São Paulo[s] municipal government] estimated the cost of removing each family as 10,000 dollars. The removal of the entire squatter population will require approximately 10 billion dollars. According to the City Hall, the upgrading of all favelas will cost a little less than \$1.3 billion. . . . Upgrading seems to be . . . a cure for the existing problem. However, this cure has its own repercussions. Unfortunately, with the upgrading, the real estate submarket consolidates in the favela. Both land and houses become consumption goods and the price soars. The perfect solution will be housing and land for all. Is this a utopia?*³³

AN OVERVIEW OF RELEVANT VERNACULAR ENVIRONMENT THEORIES

Rapoport was one of the first behavior-environment theorists to apply his framework specifically to spontaneous settlements. Because of the expansiveness of this framework, which is basically a list of process and product characteristics, and because of his insistence that no single characteristic need be present for inclusion in a dwelling type, he was able to assert that spontaneous settlements "may well be the closest thing to vernacular we have today."³⁴ He also acknowledged the importance of external constraints (referred to as "artificial constraints"³⁵ by Kellett and Napier). For example, he wrote:

*Some constraints to the creation of such [spontaneous] settlements, (e.g., those of knowledge and resources) are severe, but those of regulations, codes, and formal professional ideologies tend to be very weak. In environments created by the users, resource constraints may often be less harmful than those of regulations or professional ideology. This is because wrong planning decisions on the larger scale (e.g., road frameworks or infrastructure) may make the creation of user-built dwellings or groupings of dwellings on the smaller scale impossible.*³⁶

This article will expand on this idea by addressing the repercussions of large-scale planning decisions when implemented in a previously existing settlement.

Glassie's structuralist analysis of folk houses emphasized the sequential nature of the building process. He wrote of the dialectic between the builder's ability to compose ("competence") and ability to place the composition within its context, asserting that "an object is not simply composed and then related to external objects; a conception of the object is related to internalized ideas of external objects while the object is being composed."³⁷ In this model, the dialectic between the idea and the object has a definite beginning, middle and end, and the set of choices made by the builder along the way results in a specific house type. Glassie's view was that the builder's competence arises from a set of rules used to "generate perceivable things."³⁸ He treated the compositional problem as being constrained primarily within the mind of the builder, proposing to write "an account not of how a house is made but how a house is thought."³⁹

Hubka has also argued that "folk" builders generate form through a process of assembling objects or elements, familiar from previous experience, into new structures.⁴⁰ He wrote that knowledge of this building method is "carried exclusively in the human mind and maintained within its culture by tradition — the handing down of information by word of mouth, observation, replication, and apprenticeship."⁴¹ Upton and Vlach have called attention to a particular aspect of Hubka's work which enriches the analysis: the "preconstrained" position which limits the set of potential design choices to a reasonable range. They maintained that, "Although this mode of composition seems superficially to generate monotonously similar structures, it allows in fact for considerable individuality within its boundaries, permitting the designer to focus on skillful solution of particular problems rather than reinventing whole forms."⁴²

Rapoport, Glassie and Hubka have contributed to an analytical approach that emphasizes process as well as product. Glassie, in particular, has made the case that "silent artifacts" may be "read," and in fact must be read when no other documentation exists for a particular historical subject.⁴³ All three scholars have also recognized the impact of physical and conceptual constraints on the design and construction processes of traditional environments. These theorists' work, understood here within the current context of Brazilian squatter settlements, offers a firm foothold from which scholars might extend the reach of their investigations into traditional and vernacular settlements.

AN OVERVIEW OF ISSUES OF CONSTRAINT

Based on the availability of research on upgrading programs, I selected three research sites to measure and photograph. All were initially occupied in the 1970s, through a gradual process of invasion. Two of these settlements have been legalized and upgraded by local governments within the last fifteen years; the third has been improved but not legalized. As a result of professional intervention, therefore, the physical environments of these communities are not entirely the result of individual or family decisions. Many aspects of their form are also the result of specific decisions

made by architects, planners, and government policy-makers.

All three research sites are located in the interstices of developed areas, limited in their expansion by streets and other legal boundaries, so that even before upgrading scarcity of space is one of the primary constraints faced by builders. Where upgrading programs were implemented, the dimensions, proportion and orientation of lots also constrain house form. All three communities have also experienced steady population growth over the years, as extended family members join those already established in the settlement. While the average area occupied by each family is minimal (lots range from about 80 to 600 square feet), there are often two or more dwellings on a single lot, resulting in extremely high population densities.

The primary structural system used in these settlements, and indeed all over Brazil, involves a reinforced-concrete post-and-beam frame with structural brick infill. This system is inexpensive, flexible, and simple to work with. It has several practical advantages: materials are produced in discrete units and can be accumulated gradually as funds become available; the system is durable and forgiving, so that builders can leave an unfinished structure or raw materials exposed to the weather with little serious risk of damage; and building components are lightweight and easy to manage, enabling two people working together to build an entire house.⁴⁴ Granted, tectonic innovation may be limited by the nature of the materials, which tend to give rise to simple volumes and rectangular openings. But this modularity may also be viewed as one of the system's best qualities, since each room can potentially contain a range of different uses.

The system also allows for incremental change, since it permits builders to make both additive and subtractive alterations to the dwelling. Rapoport has written that, "The spaces, buildings, relationships, fenestration, and other characteristics of both traditional vernacular and spontaneous settlements can change often, and in many ways, without losing their essential character or quality."⁴⁵ This quality can also be thought of as the attribute that gives spontaneous environments what Turner has called "use-values."⁴⁶ This process of adaptation can also be viewed within the context of Glassie's discussion of the dialectic between context and competency: a continuous process of responding to existing conditions with new solutions, then reevaluating the results, as builders attempt to resolve multiple constraints.

JARDIM SANTA RITA

Jardim Santa Rita, formerly Favela Dom João VI,⁴⁷ is located in the municipality of Diadema, ten freeway miles south of the center of São Paulo (FIG. 2). Part of the largest industrial manufacturing zone in Latin America, it is a relatively prosperous city by Brazilian standards. From 1982 through 1996 the Workers' Party (PT) controlled Diadema's municipal administration. Early in his term in office, the mayor and his administration began a battle for squatters' legal tenure while simultaneously upgrading 3,575 lots in 51 *favelas* located on pub-



FIGURE 2. General view showing the morphology of Jardim Santa Rita.

lic land.⁴⁸ Well after upgrading had already begun in most of these *favelas*, in 1985 a municipal law was passed giving squatters legal tenure to their lots for a period of 99 years. Jardim Santa Rita was one of the earliest *favelas* to be upgraded, comprising approximately three hundred lots, and it now shelters about 1,400 inhabitants. Because the administration decided to upgrade in spite of legal barriers, Diadema became a pioneer of upgrading policy in Brazil.⁴⁹

Because of the dramatic nature of the physical and legal constraints imposed during upgrading, houses in Jardim Santa Rita exhibit some of the strongest spatial patterns. The project team responsible for upgrading the settlement decided to maintain all residents on the invaded site by redistributing individual lots on a more equitable basis and reconstructing dwellings from the ground up. Through a gradual and lengthy process of surveying lots, dismantling shacks, relocating families, and rebuilding houses (usually in masonry), the settlement was completely physical reordered. Many of these structures are precariously built, some reaching four and a half stories in height due to the dramatic slope of the site. Many are reinforced with steel rebar, but some are built altogether lacking columns or beams. All materials, including blocks, cement, windows, doors, and finish materials, are purchased locally and often on credit. The quality of finish varies greatly from house to house: in some, the floor and walls are tiled, and the sink is surrounded by a granite coun-

tertop; in others, the floor is rough concrete and walls are brick or block with a tracery of exposed wiring. But new-looking manufactured furniture is common, and nearly every household has a color television set. Many residents also own an array of other consumer goods: video cassette recorders, cameras, dishwashers, stereo equipment, and washing machines. Most of the current residents of Jardim Santa Rita did not participate in the original upgrading process; instead, they bought their lots, with or without an existing house, after legalization. The original beneficiaries were thus able to capitalize on their investments of money and labor by selling to newcomers.

RECANTO DA ALEGRIA

Beginning today, this is no longer a favela, since the people do not want to live in a favela, nor in public housing, which belongs to the government, nor a development, which belongs to the landowner. It will be simply Happiness Corner, which is the name the people gave it.

— Resident of Recanto da Alegria⁵⁰

Recanto da Alegria is a former *favela* in the south of São Paulo, near the Guarapiranga Reservoir (FIG.3). The landscape surrounding the tiny settlement retains a semirural quality,

since much of the native vegetation has been preserved. The settlement boasts a community soccer field and a variety of semipublic sites along its two generous streets. The land on which Recanto da Alegria now sits was invaded in 1973. Wooden shacks predominated in the early years; then wattle-and-daub became the most widely used material. At the time it was upgraded, only a few of the structures were of concrete block, and the majority of the residents neither defined nor fenced in their lots.⁵¹

As the population gradually grew, residents participated in the large-scale mobilization of São Paulo squatters. Electricity and water in the *favela* were obtained after much difficulty; the battle for tenure was even more arduous. In 1982 a team of university architecture students and professors participating in a pilot project began assisting in upgrading the settlement. This team intended to implement the upgrading project with or without financial support from the city. By their own definition, success would simply mean demonstrating the potential of the *autogestão* approach to housing provision.⁵² The municipal government, for its part, promised to fund the project on the condition that each family would receive a core house.⁵³ Although residents were resistant to the idea of identical houses for every family, the technical team designed a core house prototype in order to obtain funding. As soon as funding materialized, however, the residents began to argue that each family occupied a different situation and that the core house would not be a solution for all of them. For example, some families had been saving money for some time, destined for the construction of a permanent home; these families preferred to use the municipally-subsidized materials to build only the most basic structure of a larger house — foundation, walls and roof — and to use their own money for windows and other finish materials. Even the poorest residents preferred to live for a time in a larger, unfinished house, rather than be squeezed into a single-room, finished unit. In the end, the city was unable to enforce the core-house requirement.⁵⁴ When the project was finished, because it did succeed in completing the project through the new process of *autogestão*, it quickly became known as a new model for future policies.

In 1997 Recanto da Alegria, a project that garnered so much praise when it was completed in 1985, is falling apart. Some residents believe that the degradation of the sewage, water, and power systems is due to municipal neglect. However, the infrastructure was originally engineered to serve only 37 families, and since upgrading, many of the original families have allowed family members to build additional units on their lots. The system is taxed to the limit: septic tanks are overflowing, and there is not enough electricity available to serve every unit on demand. A great majority of the homes are now built at least of concrete block, but the residents of Recanto da Alegria continue to lead difficult lives. Despite the material and perhaps social rewards gained in the process of upgrading the *favela*, the additional investment of labor required of participants required an extraordinary commitment to survive and even improve their material existence.

JARDIM SÃO REMO

Jardim São Remo occupies 62,000 square meters at the edge of the main campus of the University of São Paulo, the western zone of the city (FIG.4). The land it occupies, previously agricultural, had at one point been appropriated by the State of São Paulo for the future expansion of the university. But in 1950 Governor Ademar de Barros unexpectedly withdrew the state's claim on the area, and its owners, cashing in on the trend for clandestine subdivisions, promptly subdivided it into lots, which they sold illegally. Thus, until the early 1970s, the settlement had not been an invaded *favela*, but simply an illegal subdivision, like so many others in the city. However, in 1976, the University of São Paulo showed renewed interest in the area, and decided to reclaim its patrimony. The families living there, anticipating an invasion, began to subdivide and construct small spaces to rent and even sell. This initiative quickly led to the invasion of empty lots.⁵⁵ On the date that the university signed a decree of appropriation, a planned invasion took place on the site. Tanaka has asserted that such activity is consistent with the typical process of invasion in São



FIGURE 3. General view of Recanto da Alegria.



FIGURE 4. General view of Jardim São Remo.

Paulo: "While the areas are in private hands, control is maintained; when they pass to the public domain, the property is invaded. From 1976 until 1987 . . . the southwest area of campus suffered a continuous process of invasion."⁵⁶ The settlement has since become a stage from which political personages, student activists, and residents pull their influence, using the issue of tenure rights. At one point the leader of the *favela* was in fact received by the President of Brazil, João Figueiredo, who promised that the land would indeed be given to the squatters — a promise he did not have the legal right to fulfill. However, media reports of the president's statement soon resulted in more invasions, any still-empty spaces were quickly occupied by new residents.⁵⁷

Although the *favela* has not been officially upgraded, the city and the university continuously improve the basic infrastructure. In the late 1970s the municipal PRÓ-LUZ and PRÓ-ÁGUA programs provided electricity and water to the settlement. The university continues to covet the land on which the *favela* sits, but the complicated legal situation has brought the process of appropriation to a standstill. Depending on the policy adopted by the university, the *favela* may be totally eradicated, partially eradicated, or remain as it is. If construction activity is any indication of residents' confidence of tenure, it appears that they believe they will be staying.

As may be expected after such a process, the lots in the settlement are of various shapes and sizes. Physical consolidation has been gradual and has taken place over a long period, so shacks and well-built masonry homes exist side-by-side. Public spaces are extremely varied. Jardim São Remo is not as prosperous as Jardim Santa Rita, but it is more so than Recanto da Alegria. Many of its residents are employed by the adjacent University of São Paulo as maintenance and construction workers, cooks, etc. Because people have somewhat more disposable income than in Recanto da Alegria, for example, change in the built environment occurs extremely rapidly. Also, a few families own luxuries such as washing machines and VCRs, and many have color televisions and stereo equipment.

LOT BOUNDARY CONSTRAINTS AND SPATIAL RESPONSES

In the following sections I will analyze how the physical and legal components of upgrading are manifested in the use of space both inside and outside the legal or perceived limits of the lot. In two of the settlements, Santa Rita and Recanto da Alegria, lot boundaries are now legally fixed. In the other, São Remo, which has not been upgraded, lot limits appear to be communally defined. In all three sites, scarcity of space usually means that in order to claim and use outdoor space, the builder must define it with physical elements such as walls.

One of the most common spatial patterns observed in the three sites is a semiprivate buffer zone between the street and the house entry, although builders define this zone differently

depending on the specific spatial constraints acting on the lot (FIG. 5). In Jardim Santa Rita the municipality distributed three hundred narrow, deep lots of 11.5 by 46 feet. Because the lots are so small, most houses now occupy the entire lot, leaving little or no unbuilt space. The long walls of neighboring houses are built snugly against each other. Nearly all of the lots are sited perpendicular to the steep slope of the gully, so builders maximize living space by building three- to five-floor structures. Many of the dwellings would be structurally unsound if freestanding, but over time, the reinforcement of individual houses has created a structurally self-supporting whole. High, compact facades lining the narrow streets complete the impression of an impenetrable urban environment. Exploring the passageways of the settlement, however, one realizes that the facade at street level, which could be the division between public and private, is not a solid plane but a screen wall made of thin iron bars (FIG. 6). Behind the screen is a semiprivate zone between the house and the street, sheltered by the second floor and contained between neighboring party walls. The experience is almost like walking past a series of individual stages, each with a different cast of characters and activities. Peering into these spaces, one may find clues about their use: a concrete sink, laundry lines, a bicycle, potted plants, occasionally a car. The iron bars protect the residents from violence and theft, while allowing them to maintain a visual and aural connection with the community. These multipurpose outdoor rooms are used as reception areas, work spaces, storage, and carports. Of the more than three hundred lots that were upgraded in Santa Rita, 239 have some version of this enclosed reception and service area.

In Recanto da Alegria both public spaces and lots are of more generous dimensions than in Jardim Santa Rita. Several of the houses are freestanding within the lot, and do not have a well-defined buffer zone; the yard serves this purpose well enough. But in the lots that front directly on one of the two

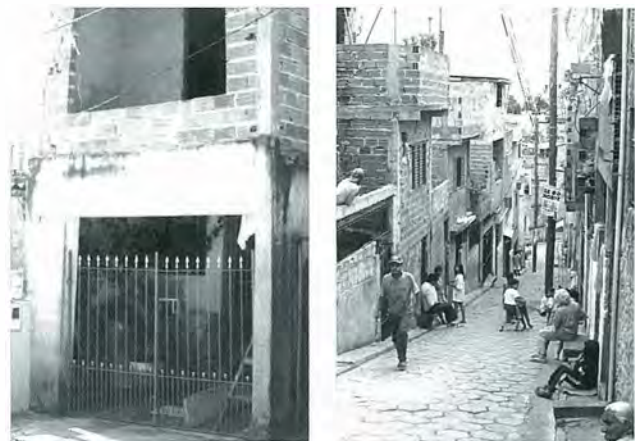


FIGURE 5. (LEFT) One version of the semi-private transition or buffer zone in São Remo.

FIGURE 6. (RIGHT) A street scene in Santa Rita, showing the street edge, the screen wall, and a range of daily activities.

main streets, semiprivate zones follow the same pattern as in Santa Rita, screens and all. In São Remo, an extremely densely occupied environment, many houses exhibit some kind of buffer zone between the street and the house. However, because the lots are both more irregular and not legally but communally defined, the form and boundaries of the zone are not always as clearly circumscribed as in Santa Rita, with its uniform lot and street dimensions (FIG.7). In São Remo one version of the zone is a shallow porch that claims some semiprivate territory from the width of the street. In other cases, a small patio — not roofed, but shielded by a high wall and accessible through an open gate — serves the same purpose. If there is absolutely no space available to build one of these semiprivate zones or house extensions, then a Dutch door is used for the front door; when only the lower door is closed, residents can experience a minimal level of privacy and safety while maintaining a connection to community life (FIG.8).

The internal spatial arrangement of the house is also affected by the size and the proportion of the lots. In Santa Rita, in particular, a linear spatial structure predominates because the lot frontage is only equivalent to the width of a room — about ten feet. A string of rooms, ordered along a single axis, moves back into the lot, with the most public rooms at the street edge and the private rooms at the back of the lot, creating a gradation of privacy (FIG.9). In São Remo some lots are of similar proportions, though perhaps as a result of different processes of land distribution. Houses that occupy long, narrow lots show a virtually identical pattern. In both settlements openings between rooms are usually aligned so that circulation is maintained along one edge of the living space (FIG.10). Locating the bathroom is an especially difficult task in these narrow, deep lots, as it is usually impossible to do so without carving space out of a kitchen, living room, or bedroom. One commonly used solution is to locate the bathroom, about two by six feet in size, at the front of the house so that it shares the width of the lot with the buffer zone (FIG.11). This scheme also locates the bathroom at the less private edge of the house, adjacent to the living room or kitchen. Thus guests may use the bathroom without intruding on the private bedroom area, and the toilet can vent to the street or to the service area.

In Recanto da Alegria several of the dwellings were originally built as core houses. By definition, a core house is expected to expand. The core house originally consisted of an eight-by-eight-foot space partitioned off in one corner of a sixteen-by-sixteen-foot structure, leaving an "L" of eight by sixteen feet as common space. A four-by-six-foot bathroom was appended to either the front or the back. The core house was set back several feet from the frontage in a way designed to increase options for expansion. Over time the owners have added to the core houses. All three owners added a living room space to the rear. Residents appear to have increased the bedroom dimensions by tearing out and rebuilding one or both partitions. This decreased the leftover space to the sides, so that the L-shape became primarily circulation and never

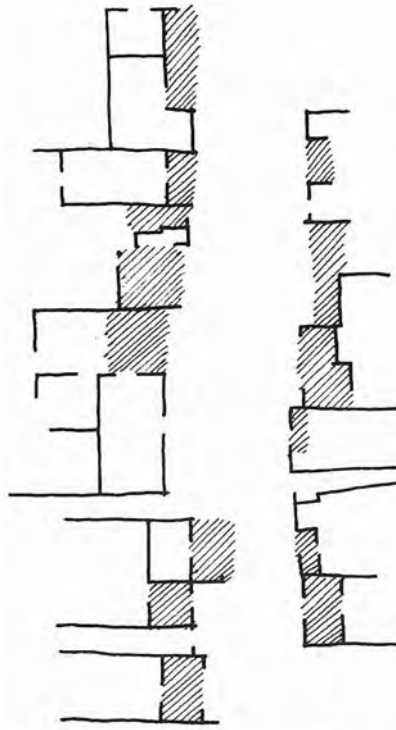


FIGURE 7. (TOP) The shaded areas in the diagram represent the semiprivate buffer zones between the street and the dwelling. The spaces serve as a foyer and often as laundry and parking areas as well.

FIGURE 8. (BOTTOM) A Dutch door in a dead-end passage in São Remo.

formed a coherent room. The owner of one house has allowed his in-laws to build an entirely new unit at the front of the original core house.

These observations may seem at first to point to a mode of decision-making that is controlled primarily by lack of choice; for example, in the long, narrow lots that pose the severest spatial constraint, the solutions employed by builders are the same regardless of the legal context: a string of rooms,

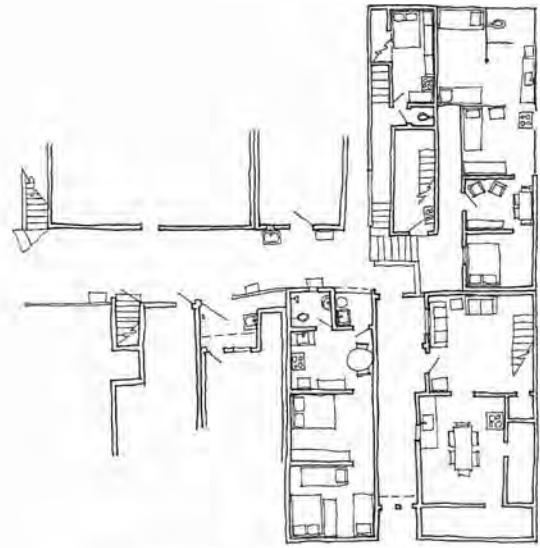
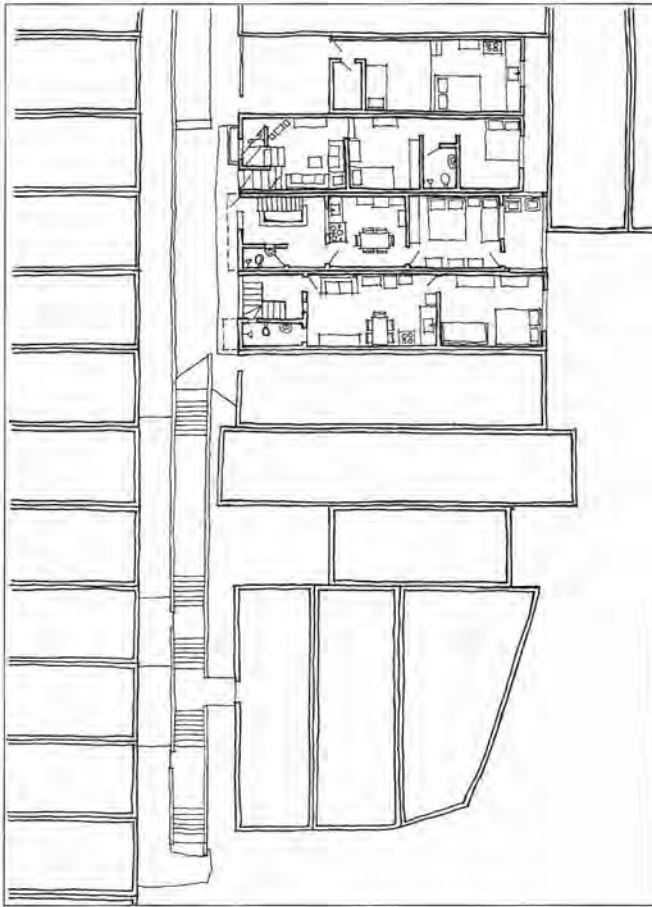


FIGURE 9. (TOP LEFT AND RIGHT)
*Interior plans of adjacent houses in
Santa Rita (left), and São Remo
(right).*

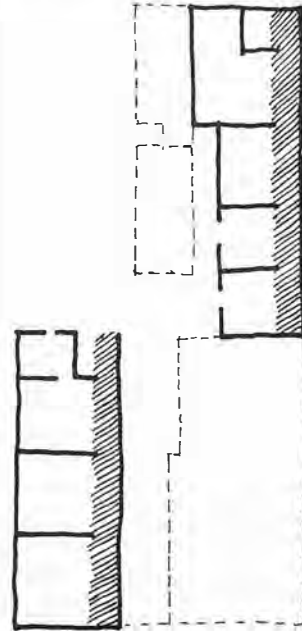


FIGURE 10. (BOTTOM)
*Diagrammatic representation of the
organization of circulation in two
houses in São Remo.*

gradation of privacy from the front to the back of the lot, and relegation of circulation to one side of the dwelling. Where lot restrictions are less severe, the number of possible arrangements are greater, and the spatial arrangement within the house does show itself to be much looser, and it might seem that there still are no clear overall patterns.

Yet in all three sites, regardless of spatial constraints or legal context, residents create a buffer zone at the street edge to mediate the transition from public to private and to provide control of a semiprivate outdoor territory. The forms change across the sites, depending on the specifics of spatial availability (which stem from the legal context and lot boundaries). For example, Meunier found that in a squatter settlement called Nueva La Habana, in Santiago de Chile, "Most houses, though tiny (with ground measurements of six by five metres), tried to enclose a piece of land, to mark a front yard as a semi-public space, while refusing space for common yards."⁵⁸ Perhaps there is indeed a cultural pattern evidencing itself in the use of public and semipublic space.

In particular, my observations in these settlements seem to point to the existence of a mode of exchange of knowledge between residents of the same settlement. This was especially apparent in Santa Rita, where 15 percent of the dwellings seem to recognize that the bathroom should not take space out of the width of the room, and that a good solution is to put it alongside

the semiprivate buffer area (the same solution is also frequently utilized in São Remo, in similar lots). The solution seems to be a piece of shared knowledge that has developed in response to the specific constraints in one particular site.

LOT BOUNDARY CONSTRAINTS AND ENCROACHMENT ON PUBLIC SPACE

Upgrading programs give the responsible agency the power to define legal and illegal construction within the new infrastructure framework. While enforcement is another matter, the nature of building in the settlement is permanently altered by the change in legal status. In order to analyze the built environment of these settlements, Santa Rita's and

Recanto da Alegria's enforceable, legal boundaries must be distinguished from the nonbinding, experiential boundaries of São Remo. This section will deal with encroachments on what is defined as public space (again, either legally or communally) both in upgraded and non-upgraded settlements.

As population density increases and a few square feet may be in demand by several inhabitants, it appears that a spatial hierarchy must be collectively acknowledged to ensure continued access. From this point on, the consensus of the community probably determines what types of encroachments on public space it will tolerate. For example, a stair partially blocking a narrow passage may be tolerated if neighbors perceive it as absolutely necessary (FIG. 12). But is it possible that physical responses to constraint on the built environment vary depending on the perceived or intended audience? Perhaps another kind of encroachment on a public space or facility provided as part of a municipal upgrading project has another meaning entirely. Can "broken" rules draw attention to an unspoken code?

The changes imposed to Santa Rita's physical structure were the most radical, as they completely restructured the urban fabric in an attempt to distribute land in an egalitarian manner. The planners began with two inflexible requirements: that all current residents would remain on the site and receive new lots, and that public streets would maintain a thirteen-foot width to accommodate service trucks. After the first phase of upgrading in the 1980s, public "green areas" and plazas were quickly invaded. When the municipal administration began the second phase in 1991, it forced these new residents to tear down their dwellings. However, with completion of the project, the municipality has now abandoned its concern over such encroachments on public rights-of-way, and it is now the responsibility of the Residents' Committee (*Comissão de Moradores*) to prevent them. From time to time, the leaders of this committee take the initiative in speaking with any resident who seems to be abusing the bound-

aries of his or her lot. However, if the builder persists in building or refuses to demolish the offending construction, confrontation is usually avoided and the builder keeps the addition. In fact, the fabric of the settlement has consolidated to such a degree that most new encroachments are no longer as viable as they once were and very few true examples of encroachment now exist in the settlement.

In Recanto da Alegria the nature of encroachments has been defined by the upgrading team's approach to physical reordering. Instead of reordering the urban fabric as in Santa Rita, the team wished to preserve as much as possible the richness of the existing urban fabric of the settlement. The residents, as well, agreed that they preferred to keep their original lots and not to destroy existing spatial characteristics. Interestingly, in spite of the fact that lot boundaries are legally binding as they are in Santa Rita, there are virtually no encroachments on the public realm in Recanto da Alegria. Perhaps this is due to the small size of the community and its social dynamics, perhaps to the relatively expansive lots. There have, however, been illegal developments within lots: in one case, four units had been built on a lot originally intended for just one family; in another, the original owner had allowed a family member to build a new two-story dwelling in the front yard.

If São Remo had been legally upgraded, I would be able to say that it contains the highest number of encroachments on the public realm. However, in a legal sense, they are no more encroachments than the original invasions. Because the settlement has not been officially upgraded, there are no explicit rules about street widths and no municipal authority

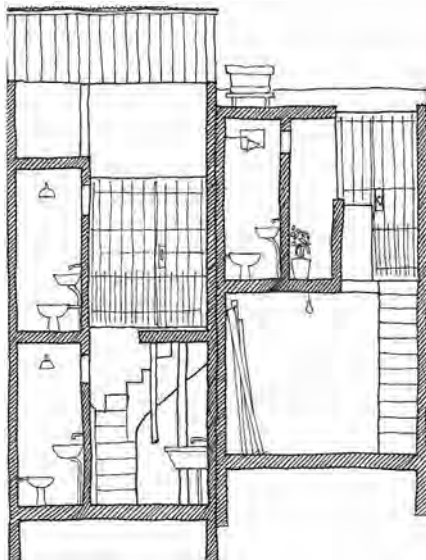


FIGURE 11. (FAR LEFT) Section through two adjacent houses in Santa Rita, showing the adjacencies of the bathrooms and the semi-private transition zones.

FIGURE 12. (LEFT) Encroaching stair in a narrow passage in São Remo.

over residents' building activities. Alongside these facts is the density of inhabitation brought on by years of subdivision, invasion, and now a complete halt to horizontal expansion. The pressure of the family on the living space forces an explosion into the public realm, where the only real constraints appear to be the neighbors' responses.

Stairs which jut out into public space may be the most common form of encroachment in all three sites. In fact, most of the encroachments observable today in Santa Rita are stairs; perhaps the Resident's Committee sees this type of encroachment as a reasonable use of public space. In São Remo, where there is no municipal enforcement of the dimension of the public realm, again is probably the collective opinion of the surrounding neighbors that decides whether to tolerate an encroaching stair. Does an acknowledgment of necessity play into this decision? For example, the accompanying image shows a triangular bottom step, set at a mysterious angle to the house (FIG.13). Does its form communicate respect for the communal realm as it acknowledges sheer spatial necessity? Within the great variety of loose stair configurations made possible by poured-in-place concrete, the primary guiding principle appears to be an economy of space and material (FIGS.14,15). Stairs are nearly always narrow rather than wide (FIG.16). Stairs with mid-flight landings are rare; when a stair is forced to turn a corner, triangular steps take the place of a landing.

Another method of appropriating additional living space which is not technically an encroachment (and thus tolerated in all three settlements) is a cantilevered building section. Streetscapes in Santa Rita, in particular, take on an interesting rhythm as a result of variations within the repetition of the cantilever along the narrow passageways. As each floor rises, it juts out into the street by eighteen to twenty-four inches (FIG.17). In many areas there is proliferation of cantilevers that extend the envelope of the building further out over the street (FIG.18). In São Remo this pattern is even more common, though it exhibits more variations in form, and the encroachments often completely bridge the circulation path (FIG.19). Most often, they appear to support water tanks, storage of building materials, and occasionally bathrooms. In Recanto da Alegria most often the cantilever is not used to expand living space, which is in ample supply, but only to create a protective roof overhang.

I observed two additional forms of encroachment which, of the three sites, seem to be unique to São Remo. One was the appropriation of public utility equipment, notably power poles, into the private realm. In one example, the utility pole is surrounded by a circulation core that links several private rooms. In another, a gated service area was constructed around a concrete utility pole (FIG.20). What does it mean to build around a municipal power pole that represents a government that is willing to provide electricity but not permanent legal tenure? Might this be interpreted as resistance to authorities, simple necessity, or both? While in some sense it is resistance, in another sense it may be unlikely that the builder would consider his or her act an act of defiance.

Another category of encroachment observed only in São Remo is the extension of the dwelling into an already narrow passage (FIG.21). These encroachments, which occur in pedestrian-only paths, raise some interesting questions related to the previous discussion of stair encroachments. How do neighbors react to new encroachments? Through what kinds of negotiation or compromise among neighbors is an agreement reached about use of space?

When all of these variations are analyzed within the local context, a pattern appears that seems to explain the types and incidences of encroachments. The first requirement for the presence of encroachments, it seems, is a lack of unclaimed space into which dwellings can expand. The second requirement is a lax enforcement of or absence of rules against them, as local political conditions strongly affect the number and type of observable encroachments. Furthermore, different combinations of strong and weak spatial and legal constraints result in a different incidence of encroachments in each site. Where spatial constraints are extremely strong and legal constraints are extremely weak, as in São Remo, encroachments proliferate. Where spatial constraints are equally strong, but legal constraints are strong as well, as in Jardim Santa Rita, ground-level encroachments are seldom observed, while cantilevers and other methods of creating usable space are extremely frequent. Finally, in Recanto da Alegria, where spatial constraints are weak (there is room to expand within each lot), there is no need to encroach, and no encroachments were observed, though legal constraints would be weak in that case.

Once again, perhaps the most striking aspect of the analysis of encroachments is that the components used to appropriate living space seem to be shared among residents. In Santa Rita an encroaching stair is a common component of the family's strategy to maximize or appropriate its living area; the variations on its form are endless. In São Remo built extensions into the public realm are common; again, the pattern is shared, while variations are individually tailored.

CONCLUDING THOUGHTS

Informal builders build within a constantly shifting field of constraints, punctured at times by windows of opportunity. Change in the built environment of spontaneous settlements is incremental in nature, due to the unpredictability of cash flow. The builder's control over financial and labor resources becomes extremely important in efficiently managing the construction process, as the entire process becomes unified under the direction of one family. This may be the primary reason for the fine-grained development of these environments: it seems that most of the solutions embody a series of small-scale adjustments to the particular needs of the builder and his or her family. Some of the design principles used by squatters in the three research sites might be described as follows.

1. To protect the privacy and the property of the family,



FIGURE 13. (LEFT) Landing step encroaching into an auto-accessible alley in São Remo.

FIGURE 14. AND 15. (MIDDLE AND RIGHT) Cantilevered concrete steps in two different settlements in São Paulo.

designers build a buffer zone at the street of the dwelling which doubles as a service area.

2. If the lot is long and narrow, designers respect the natural organizing principle of the lot and lay out the dwelling as a string of rooms.

3. The designers usually locate the most private rooms at the back of the dwelling and the more public rooms at the front, creating a protective gradation of privacy from the street to the back of the lot.

4. Especially when the lot is only the width of a single room, designers often choose to place the bathroom alongside the semiprivate transition zone, since its function does not require it to occupy the full width of the lot.

5. If the dwelling must become a string of rooms, designers align the openings between rooms along one edge of the house to minimize the impact of circulation on the functions of the rooms.

6. When the space occupied by the family is insufficient,

designers appropriate additional living space through encroachment on the public realm, or through the frequent utilization of the cantilever to gain space on the upper floors of the house.

As in vernacular design processes and architecture, spatial solutions are generally based on a building model that is shared by the community and individualized by each family. The design and planning decisions made by municipally-employed professionals, such as lot size and layout and the design of core houses, create a set of constraints that affect the architectural solutions that may be implemented by builders. It seems clear that builders are making rational design decisions based on existing physical and political conditions, and are learning new techniques either from formal-sector construction experience (if employed there, as are many squatters), from sharing knowledge with neighbors, or from observation. In these three former squatter settlements in São Paulo, I encountered an architecture that was not so much “handed-down” as “handed-across.”

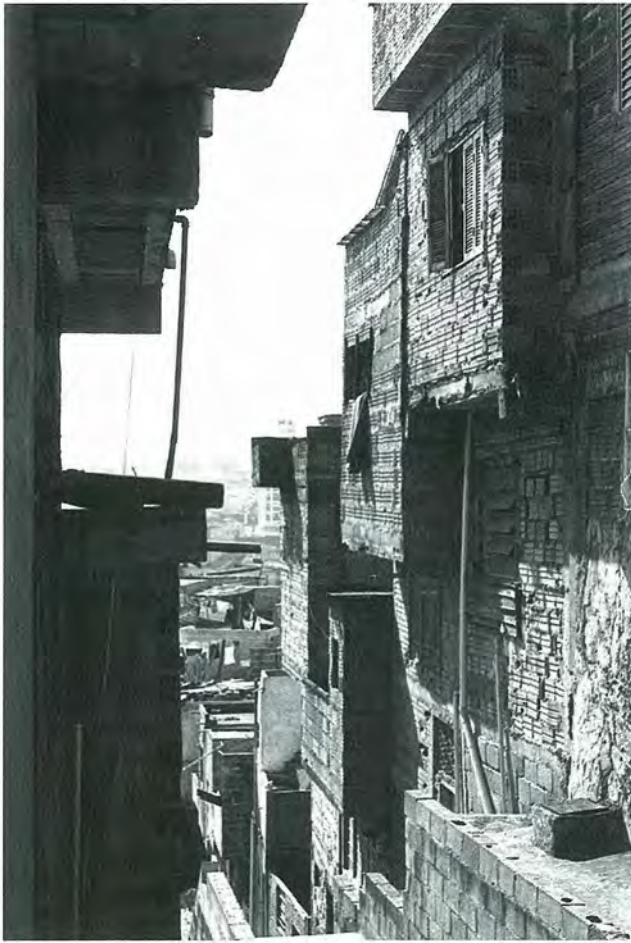
Often, upgraded settlements cannot be distinguished



FIGURE 16. Narrow stair that has avoided protruding into the auto-accessible street.

FIGURE 17. Use of cantilevers to appropriate extra living space in Santa Rita.





from neighboring formal-sector neighborhoods. The upgrading process has begun to blur the boundaries between informal and formal design processes, their products, and their legal contexts. In fact, once settlements have been legalized they can no longer be called “squatter” settlements; and though their formation may have been spontaneous, their design is not. Thus, what meaning do such categories still have? Should new ones be defined that would tolerate the inclusion of upgraded settlements? Peattie wrote that in Venezuela, “squatter and planner differed — and differed tremendously — in the resources they could deploy. . . . But they did not differ in any essential way in the principles that animated action.”⁵⁹ She began to show this convergence, or rather, where the two classes, so different in access to power and resources, come together in spirit.

It may seem at first that the spatial solutions documented in this paper reflect above all a desire to maximize living space; but efficiency is not squatters’ only concern. They build formal elements mimicking the styles of elite housing that reveal a strong desire to be a member of the consumer society. They plant symbols of life everywhere: vegetables on roofs, flowers on balconies, trees in front yards, caged birds adorning porches and hanging in windows (FIG.22). The people who create these

FIGURE 18. (TOP LEFT) One of the narrow pedestrian passages in Santa Rita.

FIGURE 19. (TOP RIGHT) Overhead encroachments in São Remo.

FIGURE 20. (MIDDLE RIGHT) Appropriation of the space around a municipal power pole into the private realm of the dwelling in São Remo.

FIGURE 21. (BOTTOM RIGHT) Appropriation of the public realm by extension of the dwelling, only the minimum dimension for public access remains.

spaces and structures do so in spite of being, for the most part, tired and anxious about managing their lives, staying employed, putting food in their mouths. While simply finding the energy to build and improve their housing is a difficult feat, competing for housing in a capitalist society in which housing is status is a painful process for many. Accomplishing all of this under conditions of such severe constraint reflects squatters' strength of will, work ethic, creativity, and awareness of the forces that affect their housing environments.



FIGURE 22. Late afternoon in Jardim São Remo.

REFERENCE NOTES

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4. P. Kellett and M. Napier, "Squatter Architecture? A Critical Examination of Vernacular Theory and Spontaneous Settlement with Reference to South America and South Africa," *Traditional Dwellings and Settlements Review*, Vol.6 No.2 (Spring 1995), p.16.
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8. *Ibid.*, p.15.
9. C.H. Wood and J.A.M. de Carvalho, *The Demography of Inequality in Brazil* (Cambridge and New York: Cambridge University Press, 1988), p.58; L. Kowarick and N. Bonduki, "Urban Space and Political Space: From Populism To Redemocratization," in Kowarick, ed., *Social Struggles and the City: The Case of São Paulo* (New York: Monthly Review Press, 1994), p.126; S.P. Taschner, "Squatter Settlements and Slums in Brazil: Twenty Years of Research and Policy," in B.C. Aldrich and R.S. Sandhu, *Housing the Urban Poor: Policy and Practice in Developing Countries* (London and Atlantic Highlands, NJ: Zed Books, 1995), p.202; and G. Shidlo, *Social Policy In a Non-Democratic Regime: The Case of Brazil* (Boulder, CO: Westview Press, 1990), p.38.
10. Prefeitura do Município de São Paulo (PMSP), *Urbanização de Favelas em São Paulo: Uma Experiência de Recuperação Ambiental* (São Paulo: Secretaria da Habitação e Desenvolvimento Urbano, 1989), p.6. Clandestine subdivisions occur when the legal owners of agricultural or other land illegally subdivide it and sell lots for residential construction, usually without providing infrastructure.
11. Kowarick and Bonduki, "Urban Space and Political Space," p.125.
12. *Ibid.*, p.128; and H. de Soto, *The Other Path* (New York: Harper & Row, 1989), pp.33-34.
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16. See PMSP 1989, p.8; and Taschner, "Squatter Settlements and Slums in Brazil," p.193. While both city and *favela* in São Paulo experienced extremely rapid population growth throughout the decade, the increases in squatter populations cannot be tied simply to migration, because the rate of increase of *favelas* has historically been far greater than that of the rate of the growth of the city's population. Taschner and Vêras suggest that the increase is a result of a process of "pauperization," beginning in the early 1970s and continuing until the present, by which formerly middle-class families are priced out of the formal housing market and find themselves with no housing options other than the *favelas*.
17. J. Perlman, "Six Misconceptions about Squatter Settlements," *Development* 4, (1986), p.40; Prefeitura do Município de São Paulo (PMSP), *Projeto de remoção de favelas* (São Paulo: Secretaria de Bem Estar Social, Divisão de Habitação, 1971), p.2; and Taschner "Squatter Settlements and Slums in Brazil," p.205. See also Prefeitura do Município de São Paulo (PMSP), *Desfavelamento do Canindé* (São Paulo: Divisão de Habitação, 1962); Perlman, *The Myth of Marginality*; M.A.P. de Almeida, *Urbanização de Favelas em Diadema, no Período de 1983 a 1988* (São Paulo: Universidade de São Paulo, 1994); and Ramsdell, "National Housing Policy."
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- in Brazil," p.206.
20. *Ibid.*, p.208.
21. Bonduki, *Habitação & Autogestão*, p.60.
22. Taschner, "Squatter Settlements and Slums in Brazil," p.207.
23. *Ibid.*, p. 208; and Ramsdell, "National Housing Policy," p.166.
24. *Veja São Paulo*, October 2, 1996, p.14.
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36. Rapoport, "Spontaneous Settlements," p.52.
37. H. Glassie, *Folk Housing in Middle Virginia: A Structural Analysis of Historic Artifacts* (Knoxville: The University of Tennessee Press, 1975), p.17.
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39. *Ibid.*, p.21.
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41. *Ibid.*, p.429.
42. Upton and Vlach, *Common Places*, p.426.
43. Glassie, *Folk Housing in Middle Virginia*, p.12.
44. Since these are the same materials used in formal-sector construction in Brazil, for everything from sheds to luxury high-rises, a finished masonry structure may look no different from a comparable house in the formal sector. This fact carries great symbolic importance since residents often declare their participation in the modern consumer society through an emulation of bourgeois style.
45. Rapoport, "Spontaneous Settlements," p.70.
46. J.F.C. Turner, *Housing by People: Towards Autonomy in Building Environments* (London: Marion Boyars, 1976), p.73.
47. Jardim Santa Rita is the name of the neighborhood; the *favela* is no longer legally distinguished from it.
48. Almeida, *Urbanização de Favelas*, p.63. Most governments require that legal tenure be secured before upgrading.
49. *Ibid.*, p.42.
50. Bonduki, *Habitação & Autogestão*, p.59, translated.
51. *Ibid.*, pp.63-65,67. In 1996, one minimum salary equaled US\$50 per month. In November 1983, 10.8 percent of the families were totally without income, 32.4 percent earned one to two minimum salaries monthly, and 29.7 percent earned more than two minimum salaries.
52. *Ibid.*, p.62.
53. *Ibid.*, p.50.
54. *Ibid.*, pp.80-81.
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56. *Ibid.*, p.76.
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All illustrations are by the author.