Aesthetics and Self-Built Houses: an Analysis of a Brazilian Setting

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ABSTRACT

Aesthetic considerations on the appearance of low income family houses in a specific Brazilian setting, Campinas, São Paulo, are discussed in this work. Houses built by owner families in private subdivisions are analyzed. Formal aspects of architecture are shown to have limited application in relation to this self-building process. Specific house facades are preferred by the population studied. The sample showed diversity of construction and comfort quality. Low building quality and slow construction evolution, in the self-building process of houses, ask for some technical aid. The complexity of the meaning of aesthetics and the environment of economic constraint call for restricted professional intervention. Technical aid should concern neighborhood design, siting of individual dwellings, house plan configurations, and construction detailing guided by knowledge on aesthetic preferences.

INTRODUCTION

Houses built by owner families can be termed self-built houses. In much of Latin America the predominant mode of urban house production of lower income populations is today the self-building process, as shown by Kellet and Napier as well as Turner. Self-built settlements are often considered urban blight. This evaluation has been strongly criticized by Turner, defending the self-help activity as a correct approach towards solving enormous urban housing deficits in growing cities of developing countries. On the other hand, Hamdi shows that the acquisition of finished houses is preferred by the public. A low income population however cannot afford them. According to Brazilian data around 60% of the local housing production is self-built. The income level of the urban self-builders in Brazil lies between 3 to 10 minimum salaries. This income range has been shown to be insufficient for the acquisition of a home through the regular housing market, especially for families whose income is due to informal economic activities.
There is a need for minimum technical support in the self-building process to bring houses to an adequate quality standard in a reasonable time span. Technical interference in the self-building process needs guidance. Interventions by professional groups address technical, economic, social and political as well as aesthetic issues. Due to the subjectivity and plurality of definitions of aesthetics, guidelines on involvement are complex. The economic constraints of the context pose difficulties in the search for appropriate professional aid. As a result of the survey described in this paper, a specific technical support system for the self-building process in Campinas was developed\(^7\). The system consists of a computerized house design method, reducing the cost of individual professional intervention and creating the possibility of technical orientation with a degree of individualization. To apply such a system a better understanding of the meaning of aesthetics and its complexity in the context of self-built houses is necessary.

**ASPECTS OF AESTHETICS**

Discussions of architecture stress the importance of the intent of aesthetics in urban design and buildings. Aesthetics, particularly in residential architecture, can include the simple behavior of improving appearance of the physical environment, such as painting a house or weeding a garden. Discussing aesthetics of self-built settlements must therefore address a wide variety of issues. Many studies have been carried out during the last thirty years to characterize the self-building house activities around the world, where the resulting communities are often called spontaneous settlements. Spontaneity is especially related to the design and building process of houses which lack professional planning and technical orientation. Most of these studies looked at the process which gives rise to the product, the house and its urban context, the suburb, with emphasis on non-architectural issues. Recent studies, as in Kellet and Napier\(^8\) have concentrated on formal ways of studying spontaneous settlements with good descriptive analyses of the dwelling, its use and users. Their evaluation of a South American example is positive, showing the self-building process to posses a common design language, with variations expressing individuality of owners, reflecting income differentials of families and variations in household structure. Positive aesthetic elements are based primarily on a visual coherence of the settlement achieved through formalized street layout, vegetation, uniform single-story building height and use of building materials.
In Brazil several studies exist which discuss self-built house constructions in subdivisions with some degree of security of tenure. This factor is important when studying spontaneous settlements in contrast to slums and the recent organized land invasions of major cities in Brazil with their own specific characteristics. Motta and Sampaio and Lemos\(^9\) primarily discussed family habits and comfort satisfaction. Sampaio and Lemos\(^10\), Ornstein, Roméro and Cruz\(^11\), Kowaltowski, Pina and Ruschel\(^12\) and Nolasco\(^13\) analyzed useful house area, plan configuration and construction detailing and environmental comfort issues. In these studies, positive qualities of the dwellings and settlements are linked to the adequate human scale of houses and the existence of variety within a common design language. Although descriptions of houses are included, they avoid specific aesthetic analysis or judgment.

One specific study on aesthetics can be cited for the Brazilian scene. Monzeglio\(^14\) analyzed what was termed “perceived beauty” in the outer suburbs of São Paulo, the largest city of Brazil. The street was considered predominantly “beautiful”, linked to socializing aspects. Perceived “ugliness” was linked to a lack of urban infrastructure. In relation to the houses, the same study found a predominance of perceived “ugliness” based on such grounds as: lack of identifiable form or color, absence of embellishments, lack of maintenance and uniformity as well as diversity in house appearance. Diversity was however also seen as a positive “beauty” element of houses, showing some discrepancies in meaning of aesthetics.

Discussions of aesthetics in architecture are often related to questions of style. Elements such as harmony, diversity, symmetry, order, equilibrium and scale are commonly found in stylistic discussions. Design methods to improve the production of mass housing have shown the importance of these elements, as seen in a study by Duarte\(^15\), where appropriate computerized design grammars within the context of modular building systems were developed. Research in environmental psychology uses descriptive attributes to study the representation of setting and their aesthetics. Form, detail, quality, context, style, size and status are specific for the residential scene according to Sanoff\(^16\). Berlyne\(^17\) in his study of aesthetic product comprehension uses terminologies from environmental psychology which relate to stimuli such as: diversity, complexity, novelty and ambiguity. Post-occupancy evaluations refer to volume and mass,
complexity of form and pattern, rhythm, texture, color, roof line, light effects and size as important architectural elements for aesthetic comprehension.

Aesthetic aspects linked to stylistic developments distinguish two primary trends of this century, the modern movement or functionalism and the recent post-modernistic attempts of searching for meaning in the past. Rowe in his work on modernity and housing uses the term “contemporaneity”, primarily based on abstraction or what he defines as “architectural reduction”. The formal appeal of functionalism are spare outlines, primary colors and clear geometric forms, based on rational technical scrutiny, which post-occupancy evaluations in housing have however shown to be distrusted. Housing projects based on postmodernistic ideals with elements of the past, attributes of house types familiar to local populations and aesthetic aspects of normal local or vernacular building types are on the other hand shown, in Rowe, to have high levels of user satisfaction and few user interventions.

Aesthetics of self-built houses can be studied as popular art, which shows preferences for curvilinear, flowery forms and copies of classic stylistic decorative elements, belonging to kitsch as shown in the work of Moles. The study of kitsch has been applied to low-income houses, not specifically defined as self-built, in Brazilian suburbs by Guimaraens and Cavalcanti and Reis, where it is considered a creative manifestation of house builders. The result of such manifestations are however often grotesque miniatures of known architectural monuments with rich juxtapositions of decorative elements. Self-built houses studied by Viviescas in South America also use imitation. Here a perceived middle class type of building is shown to be copied, interpreted by Viviescas as expressing the desire to be in another place through a “style of aspiration”, or “penurious kitsch”. In Kellet and Napier imitations are on the other hand seen as part of a positive trend towards consolidation of communities and a search for a common architectural language: a new vernacular.

The result of self-building efforts have recently been analyzed as a widened scope of the vernacular or as a type of nascent, urban vernacular particular by Kellet and Napier and Rapoport. What is sought in these studies is to find the underlying rules of order in the apparent
"messiness", using methodological ways of looking at vernacular manifestations around the world. When looked at in detail, the vernacular is described, by Rapoport, as to attributes of tradition where aesthetic elements of a vernacular product have specific formal qualities of: complexity, solid-void relations (wall to opening), fenestration, massing volumes, articulation of building elements, level changes and light and shade variation, efficient use of resources, effectiveness of response to climate and specific relation to natural elements such as vegetation, with positive aesthetic results.

Manning, in his work on environmental aesthetic design, extends the meaning of aesthetics, arguing that objects of aesthetic value contain qualities of contemplated experience which express the emotions of the creator, where Manning argues that “image” and “atmosphere” must be achieved by deliberate design action. “Image” expresses the purpose, significance and status of an architectural object. “Atmospheres” can be expressed through descriptors such as: happy-miserable; safe-dangerous; hard-soft; complex-simple; serious-humorous etc. Advocated particularly by Sommer in his early works, “humanization” has been the descriptive “image” in the housing sector influenced as well by questioning the adequacy of aspects of the modern movement in housing as discussed in Rowe. The “image” and “atmosphere” of humanization have been studied by Kowaltowski. This study found that elements from nature (landscape, vegetation), architecture based on the house image of specific regions, proper proportional human scale (smallness) and aesthetics (represented mainly in relation to humanization by ornament or embellishment) are found to be missing in environments considered dehumanized. Such study results can be applied as guidelines for housing design within the self-building process, when added to user satisfaction and preference data.

THE CASE STUDY IN CAMPINAS

In an effort to study some aspects of the complexity of aesthetics in a specific self-built housing context, a survey was undertaken in the suburbs of the city of Campinas, in the state of São Paulo. Houses in many of the neighborhoods are built by their owner families in low cost private subdivisions. The purpose of this study was larger than the analysis of aesthetic aspects. The main goals were to describe a distinct self-built housing manifestation and to create a mechanism to improve the quality of houses through professional involvement.
Campinas is a city located one hundred kilometers from the largest city of Brazil, São Paulo. The city is thus influenced by the strong industrialization trends of the region. In the main growth vectors of the city, public and private settlements form a belt of urban developments interspersed with large pockets of unused land, waiting for speculative advantages. The topography of the outer suburbs is hilly. Many private subdivisions have self-building characteristics as attested by the census of 1991\textsuperscript{33}. Residential developments adopt land divisions with traditional gridiron street patterns, narrow rectangular suburban lots. Most subdivisions lack social infrastructure giving rise to the introduction of mostly illegal commercial enterprises amongst the fabric of residential constructions. Over time, which can last over twenty years, neighborhoods develop into fairly comfortable communities with mostly completed houses, some private and public landscaping and public infrastructure of pavement, street lighting, water supply and sewage removal systems. Economic waste is common in this setting due to cycles of “construction-destruction-reconstruction”, caused in part by poor subdivision planning, the self-building process, dissatisfaction with housing conditions where technical support is needed.

The western region of the city was chosen as the survey base. The income level of the region is between one to ten minimum salaries\textsuperscript{34}. Some squatter settlements (favelas) are present in the region, inhabited by the lowest income groups. These were excluded from the sample since dwellings, mostly in the form of shacks, do not have a psychological ownership basis, judged important in the self-building context to be analyzed. The region was developed over the last twenty years. For proper field study dimensioning, an inspection “in loco” was conducted to assure the homogeneity of the population of the area and characteristics of settlements. Sampling was based on data shown in Table 1\textsuperscript{35}. Two distinct questionnaires were used in the study. An extensive document, consisting of questions on characteristics of lot occupants, house construction detailing and evolution, satisfaction, design preferences, graphic recording of house design and environmental comfort and a short questionnaire, consisting of questions of preference and number of lot occupants was prepared. For the actual application a random path was established on maps of every neighborhood chosen.

| Population of the city of Campinas according to official data from 1991 | 850 000 inhab. |
Results showed that the occupations of the sample population varied from public employees, such as municipal gardeners, to factory workers, maintenance personnel, security guards, freelance bricklayers and some small shop owners. 21% of the sample population had prior construction experience before building their own homes. Assistance from professional builders was sought by 64% of the self-builders for specific heavier building tasks such as the construction of ceiling slabs. Otherwise houses were built through an informal process of purchasing building materials periodically and using immediate family members as labor. In 55% of cases, houses were designed by the family and only 10% of the survey population sought official help, through the use of house plans distributed by the local administration. Designs were declared to be primarily based on examples of a previous house or solutions commonly found in the neighborhood. The ages of house constructions varied from older houses started twenty years prior to this study and those houses barely started but already occupied.

### APPEARANCE OF NEIGHBORHOODS AND HOUSES

A visual analysis of houses and their settings shows varying levels of quality of construction, finishing and urban infrastructure. Different urban qualities of suburbs however do not affect substantially the quality of houses. Fig. 1 shows an impression of a self-built neighborhood. Design elements of houses which determine differences of appearance and visibility of the house on the urban scene are: lot fencing conditions; stage of completion of the house exterior; size and shape of house; volume; level changes; external stairs; construction materials and type of external wall finishing; roof: existence, type and orientation in relation to the street; window type, size, shape and number; existence of security bars over window openings and their detailing; window framing details and its color in contrast to wall finishing; verandahs; wall color; applied...
ornaments; verandah railing details; exposed infrastructure such as water boxes or clothe lines; landscaping and maintenance conditions of the lot. Elements such as plan configuration and window detailing define surface patterns and the volume of the house with the roof design influencing light and shadow conditions. A high front fence, present in 70% of cases, affects the visibility of the house and essentially the appearance of the suburb. Self-builders express the need for security by constructing high lot enclosing walls and adding of security bars over wall openings.

The presence of a roof influences the visibility of the house from the street. A red ceramic tiled roof, in predominantly gable form, was present in 62% of houses. 12% of constructions, waiting for roof completion, have only a ceiling slab to protect the rooms from the elements. The presence of a roof is seen as important in relation to the “image” of the house and the aspect of humanization in the local context.

House fronts can be divided into distinct types as shown in Figure 2. Houses of poor finishing or mere shelter are present (examples 1 to 3). Simple but solid houses can be found (examples 10 and 11). House fronts having a dominant triple arch as a window configuration with brick veneer wall finishing and a gable roof are locally called “colonial style”. This style is predominant with an example shown in Figures 3 as well as examples 13, 16 and 17 of Figure 2. In houses imitating the so-called “Mediterranean style” the roof is hidden behind a curved parapet and stucco is used for finishing the exterior walls (examples 13 and 14 of Figure 2). This style often also features the triple arch window configuration without the contrasting frame, since brick veneering is not easily adapted to the parapet construction. These style names are given to present day house designs, predominant in middle class suburbs of the city, having little however in common with the colonial vernacular in Brazil and traditional buildings of the Mediterranean region. The new “colonial” style merely adopts the triple arched front window arrangement at a reduced scale from the true local colonial vernacular and the “Mediterranean style” only hides the roof behind a parapet.
Aesthetic types, which can be distinguished in the local study, relate essentially to house plan types shown in Figure 4 and lot siting conditions. The houses of plan type 1 are cubic in volume and located in the front of the lot, thus more apparent on the urban scene. These houses predominantly adopt the so-called “colonial style”, although rare examples of the “Mediterranean style” can be found in every suburb visited. Aesthetic preferences are further shown for an integrated side garage, brick veneer finishing and triple narrow, long, louvered front windows with a wide cement framing as well as a gable roof with the high gable end facing the street as seen in Figure 3. In inner city suburbs small lower middle class houses, built prior to 1960, predominantly included a front verandah, which is replaced in recent self-built examples by the deeper car port or garage. This feature has had a marked effect on the appearance of houses. Light and shade variations of a shallow verandah create contrast on the total volume. Deep car ports obscure the visibility of the front door and divide the façade into two distinct elements.

The type 3 and 4 plans of Figure 4 are primarily represented by houses of poor construction and comfort quality, intrinsic to this type of house with a single front where openings may be introduced, as seen in Figure 2 (examples 4 to 9). These rectangular, often unfinished constructions are smaller in volume than the previously described houses. Over time, this typology suffers many additions and adaptations. The survey data showed all of the examples of this type to have suffered some remodeling attempts. An “L” or “U” shaped plan form is used to complete the minimum space program of a living room, kitchen, with attached laundry area, bathroom and two bedrooms. These transformations cause obstructions to the original rooms of the house, reducing natural illumination and ventilation and creating complicated roof construction details, often not resolved. The aesthetic impact of these houses is related to the poor construction quality of most examples but can be enhanced by a landscaped lot, a visible roof facing the street and a front verandah which can give depth as well as a light and shade play.

The occasional multistory house, representing only 3% of houses built, stands out among its lower scale neighbors (examples 2 and 9 of Figure 2). Multistory examples demonstrate that some self-builders are adventurous in their construction activity. Technically such occurrences cause professional apprehension, having been built with little structural considerations.
SATISFACTION

Houses were evaluated by both house owners and observers and this data shows owners rating their properties primarily good and satisfactory, independently of poor quality construction observations. Results indicate that despite the often precarious state of the house, total dissatisfaction is rarely expressed. House evaluation data show that the status value of a well maintained home on the exterior does not play a role until interior necessities are overcome. This can be confirmed when factors of attention given to house decoration and maintenance are observed. Although 20% of all houses had signs of construction defects, 49% of houses could be considered externally finished. Of the survey total, 65% of cases were internally finished and decorating efforts were present in all houses through curtains, wall pictures and trinkets. Gardens were present in only 14% of cases, whilst another 32% of houses had totally cemented, bare yards. The outdoor environment had few or no decorative or functional detailing such as garden furniture. Lots, even when tidy, are rarely landscaped. When attention is given to the exterior appearance of the house it is first applied to the street facade.

PREFERENCES

Testing user preferences of house plans, as related to Figure 4, resulted in distinct plan preferences for type 1 house plan (28.5%) and type 6, the two-story house (33.5%). The simplistic one-story house using the plan type 1 was found to be the most frequently built house (43%) as well. Two-story houses are desired due to increased and discerned appearance among low constructions on narrow lots. The multistory house is however built by only 3% of the tested population, due to technical and economic difficulties.

The house preference test showed that the houses built by one third of the population, namely the lean-to, small, rectangular house using the lot limits as exterior house walls (type 3 and 4 house plans of Figure 4), is not desired. This result must be interpreted as a problem in the self-building activity, where the builder is theoretically free to embark on his own preferences. Economic restrictions are insufficient to explain the construction of undesired houses.

Only house fronts were included in the external house appearance preference test, which included pictures of house types selected in the “in loco” inspection prior to the survey application as
shown in Figure 5. This restriction was imposed due to normal urban lot dimensions, which limit the view of the house as a whole, giving emphasis to its frontal facade. House front preference is highest for houses of the so called “colonial style”. 56% of the population prefers examples 16 to 18 as seen in Figure 2. There is also a distinct preference (24%) of two story houses. It is interesting to note however that the test example of a multistory house (example 8 of Fig. 5), lacking the humanizing elements of applied ornament and a familiar roof configuration which reinforces the normal image of the house in the region, is rejected when tested for preferences. These data confirm the strong preferences for traditional elements of design and the need for the essence of humanization in housing as discussed previously.

The preference study shows that “images” of simplicity, sparse lines, the elements of the modernistic aesthetics, symbolize poverty in this setting and are therefore avoided. The preference for the so called “colonial style”, coming from middle class neighborhoods, is primarily based on the picturesque qualities of this style. The self-building style thus attributes little consideration to important attributes of tradition which are part of specific vernacular building forms as shown in Rapoport. The real values of vernacular traditions should, resist the homogenizing influences of modernity according to Rowe. In many immigrant communities however the continuation of a traditional building form is avoided. Imitations of the new surroundings are common, in an attempt to legitimize otherwise less than adequate conditions. Similar observations are true for the self-building process of this study.

In the Campinas examples the preference for curvilinear ornaments is a very strong feature. When the house has yet no roof, window panes or finishing, the arched window and door frame are introduced with flowery security bars. Symmetry is also an important aesthetic feature in both house front preferences and actually built houses. Symmetry in architecture enables distribution of construction elements with balance and harmony. But symmetry is difficult to obtain with the type 1 plan of Figure 4, especially when a carport is added as seen in Figure 3. The desire for symmetry is thus concentrated on the main window arrangement. The use of three elements on façade fronts is especially useful in facilitating symmetry technically. The symmetrically arranged arched windows are very much part of the local historical colonial urban house and are
found in local church architecture. Orally expressed allegations by some house builders of our sample attribute symbolic meaning to the triple arch element, of conveying a sacredness to the home.

Geometric, rectilinear, intricate patterns have periodically been part of traditional ways of building, their diminished use in the new self-built houses demonstrates to some degree a rupture in the evolution of the local vernacular. Color, once part of the Brazilian colonial vernacular is replaced by self-builders with brick veneer coming from the present middle class “colonial style” not a true vernacular development. To refer to the self-building examples as a “new vernacular” some adjustments of design are necessary, especially concerning environmental comfort and the development of an authentic design language able to show independence from middle class architectural inventions.

**IMPORTANCE OF AESTHETICS AND ITS DETAILS**

When tested, 85% of self-builders attributed importance to the beauty of a house. A completed and painted dwelling is given primary aesthetic importance. Inquiries on what specific details constitute beauty related to the home included: brick veneer, verandahs, framed round windows, “different” living room windows, visible house and roof, ornament, decorated iron bars, and items such as “a garage entrance”. Asked to rate specific positive design elements the survey population cited in sequence of importance: tree lined street, well visible house, high front fence, cemented lot, big tree on lot, two-story house and verandahs. These details affect appearance to varying degrees. Thus a high front fence is aesthetically problematic as well as a cemented lot, but a verandah and landscaping are positive. “Good taste” and the “colonial style” were also specifically mentioned in the self-built environment as features of house beauty, the first without definition as to its elements.

Importance is verbally given to flower vases. A tree lined street is said to be positive. Landscaping however is not given its comfort or aesthetic importance in the self-building settlements, although most of self-builders in the survey had a rural background. This contradiction can be explained by several factors. First the importance of landscaping is not understood beyond its rural agricultural value. Increased thermal comfort can be achieved
through adequate natural ground cover around the house and the positive value of shading from large trees could be better explored. Secondly providing shelter in a new and unknown urban environment is very much influenced by economic pressures and the lack of physical space on small suburban lots, in contrast to the rural building possibilities. Investment is primarily in terms of indoor space. Thirdly outdoor activities are reduced in city life due to security problems and new life styles of working far from home as well as predominant social activities around the television. These factors can also explain the expressed value for verandahs but the low rate (14%) of their presence in self-built houses in Campinas. Again the comfort and aesthetic values of a shading verandah are not understood by either self-builders or middle class. When the verandah is present it has only a purpose as a rain shelter and not as an element of enhancing the exterior through the aesthetic light and shade play it can provide.

Results of data trying to measure importance given to aesthetics by self-builders show that “beauty” is not directly related to architectural design elements but context bound. Finishing one’s own house, as well as rendering it secure through the addition of high fences and security bars on windows are major goals. Analyzed houses showed a 90% presence of security elements such as window bars and high fences which directly affect the appearance. These security features are used intentionally for aesthetic purposes, such as the decorative flowery iron bars over window openings. A fear of ostentation, expressed through the construction of a beautiful home in a society with high crime rates, was listed, in 5% of cases, as a factor of diminishing importance of aesthetics in this survey, which should be further investigated.

CONCLUSIONS

The self-building phenomenon analyzed here shows that the population uses design criteria of simplicity and some humanization elements, where aesthetics is essentially represented through applied ornament or embellishment, therefore not an integral part of house design. Traditional patterns of design adopted by the majority of self-builders, through factors of familiar construction forms and process, small scale, low density, are positive components in the search for solutions to the local housing problems. The appearance of houses, however, suffers influences from social class mimicry where emphasis is given to applied ornaments. A pattern of aesthetic preferences exists. These preference patterns are the symmetrical repetition of three
round elements on house fronts and the use of brick veneer as the street front finishing material. These are however timid elements for the development of a local “new urban vernacular” architectural language. Data on technical and comfort problems in self-built houses are evident from the survey conducted. Many houses have construction defects. The building process is often very slow with examples of roofless houses started some twenty years ago. Environmental discomfort was detected in many of the houses analyzed. The question of professional intervention arises. Technical help is needed on both the neighborhood and the individual dwelling levels. Most local neighborhoods today use an extremely monotonous planning scheme, with layouts that disregard local factors of topography, wind and sun orientation. On the dwelling level attention should be given to siting and plan layout, as well as construction and comfort detailing. House design, even when restricted to simple plan configurations, has clear aesthetic consequences. The results above show however that designers must work in a design environment which is far from the professional’s own aesthetic ideals and theories. Participative design methods can, to some degree, overcome this aesthetic conflict, letting the self-builder act out his own preferences.

Although self-built settlements are often described as urban blight, they contain the formal attributes of diversity within a common design language and thus can be said to have formal aesthetic value. On the other hand these communities can benefit from professional interference on purely visual grounds, ensuring building completion within a reasonable time span and reducing the need for house transformations, which affect settlement aesthetics. What is recommended is a help mechanism which least interferes in community traditions and locally expressed visual preferences. House designs not relating to local aesthetic preferences are shown to have high rates of interventions and transformations. Restricted professional technical interference can leave self-builders free to embellish the home during construction with their own choices of materials and preferred elements of house beauty.

REFERENCES NOTES

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built houses were presented at the XIIIth International Congress of Aesthetics: “Aesthetics in Practice”, Lahti, Finland, August 1995.


4. Based on reports of cement consumption in Barzilian urban areas, as found in A. Gois, “Cimento para os Pobres”, Veja 1440, (17.04.1996), p. 45 and earlier records as in C.A.C. Lemos, Alvenaria Burguesa, Nobel, (São Paulo, 1985), p. 18, between 65 to 70% of cement is used in informal residential building activities.


24. Viviescas, (1985), op. cit..

25. Kellett and Napier, (1995) op. cit..

26. Ibid.


28. Rapoport, (1989), op. cit..


34. Ibid.

35. For statistical dimensioning, the research had the support of the “Laboratório de Estatística” of the Instituto de Matemática, Estatística e Ciência da Computação (Universidade Estadual de Campinas, S.P.) special thanks go to Prof. Dr. Clarice Azevedo de Luna Freire and Prof. Dr. Jonathan Biele.

36. The actual number of applications was increased due to subdivision of individual lots and green areas in some of the neighborhoods. These conditions were not discernible from maps, data, local inspections and preliminary tests.

37. The number of valid extended questionnaires was reduced however due to incompleteness, mainly related to the house owner’s refusal of graphic recording of the house design.
38. Table of ages of self-built houses analyzed:

<table>
<thead>
<tr>
<th>Number of years of house occupation in %</th>
<th>1-2 years</th>
<th>2-5 years</th>
<th>5-10 years</th>
<th>&gt;10 years</th>
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<td>&lt;1 year</td>
<td>8</td>
<td>6</td>
<td>20</td>
<td>25</td>
</tr>
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<td>1-2 years</td>
<td>6</td>
<td>20</td>
<td>25</td>
<td>41</td>
</tr>
</tbody>
</table>

39. Preference examples represent only completed house fronts and included some professionally designed house examples for low income housing in the region.


43. Specific trends are evident in high income suburbs where the bay window and small window panes in wooden frames are now the predominant features of the front of houses. Brick veneer is being replaced by stucco finishing in earth colors. Symmetry is also no longer a major feature of middle class houses. These changes in the “aspiration style” must be assessed in the future, in the local spontaneous settlements to measure the existence of a true “new urban vernacular”.

Fig. 1: Impression of a self-built neighborhood in Campinas
Fig. 2: Stylized self-built house fronts
Fig. 3: Example of a so called “colonial style” self-built house, using the enlarged floor plan predominant in middle class houses.
Fig. 4: House plan types tested for preferences.
Fig. 5: House fronts tested for aesthetic preferences
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Fig. 2: Stylized self-built house fronts

Fig. 3: Example of a “colonial style” self-built house, using the enlarged floor plan predominant in middle class houses.

Fig. 4: House plan types tested for preferences.

Fig. 5: House fronts tested for aesthetic preferences