The Angel of the Anthill: The Global Phenomenon of Unregulated Housing

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INTRODUCTION

Because unregulated settlements are now growing on the edge of developing cities worldwide at a rate unprecedented in the history of the world, it is paramount that architects focus their efforts and research to find better solutions for housing. This paper looks at the unregulated settlement of *colonia* Roma in the northern border city of Reynosa, Mexico as a symptom of a global phenomenon and as a site for making improvements in the quality of the built environment. The paper concentrates on the rapid urbanization of cities in the developing world in terms of political, economic and environmental effects and evaluates possible policies and design innovations that improve housing in unregulated and impoverished neighborhoods. This paper also examines the results and objectives of a research/ building project aimed at improving the quality of life through "low-tech" material and design innovations.

The term "unregulated housing" refers to a broad category of housing that includes informal housing, spontaneous settlements, slums, shanty towns and self-help housing. These settlements generally result from illegal occupation of land or appear on land developed in an unauthorized fashion. Because most inhabitants of unregulated housing communities are poor and lack formal ownership of the land, the physical structures are crude and temporary. What follows is a general uncertainty about a settler's ability to stay on the land, creating dilemmas for making improvements in the housing and limiting a settler's social commitment to the larger neighborhood and community. The first step in implementing any improvements in unregulated housing communities is to legalize the occupation of the land and to allow further access to land on which this type of settlement occurs. Even when regularization (the subdivision of land into private parcels and public right-of-way through legal means) does occur, residents must absorb the costs, and make other necessary improvements in both housing and infrastructure.

Fig. 1.

The rapid growth of unregulated settlements in the peripheries of developing cities is becoming a serious global issue. Asia, Africa and Latin America all share this unprecedented urban growth. In the last 30 years, the earth's population has almost tripled. In 1900 only one in 40 people lived in urban areas, but now about half of all people live in cities. Estimates on future population growth and urbanization are staggering.[1]

Poverty is widespread in developing countries, and the strain on limited resources to sustain an ever-increasing population has fostered an extremely low standard of living for many communities. Currently more than two-thirds of the world's population lives in substandard housing. An increase in population, combined with extreme poverty, inevitably results in increased exploitation of resources and environmental degradation. The World Bank states that urban poverty could become one of the most explosive political problems of the 21st century.[2]

The housing problems that have developed along the Texas/ Mexico border are similar in nature to rapid urbanization in many parts of Latin America. The mass migration of Mexicans in search of work spawned by the North American Free Trade Agreement (NAFTA) and the increased number of *maquiladores* (foreign-owned factories) along Mexico's northern border have led to an enormous housing deficit. Poverty and a lack of financing force most new arrivals to construct their own homes. Poverty often persists in these settlements because there are not nearly enough jobs in the formal sector to go around.

When evaluating the rapid growth of unregulated housing on the edge of developing cities, it is important to understand that many factors combine to form a complex system that affects the physical and social nature of these unregulated communities. In *Housing the Urban Poor*, Aldrich and Sandhu state "experts are beginning to recognize that providing good, secure housing in Third World countries is not just a matter of bringing in new methods and techniques, but a recognition of the fact that housing programs must take into consideration local political, economic, and social variations in order to be effective."[3] A change in political policy will often have an economic impact relating to the housing environment and vice-versa. Housing, however crude, actually provides stability in an otherwise unstable economic environment. Studies have shown shortages in housing, infrastructure and health services will almost always lead to an increase in family breakdown, child neglect, drug addiction and alcoholism.[4] The essence of the housing crisis is primarily connected to issues of poverty, but it can also be seen as

part of a larger set of environmental problems. Water shortage and contamination, air pollution and raw sewage are the major environmental problems that characterize the rapid industrialization and urbanization of developing cities. These conditions ultimately lead to an enormous public health dilemma, with the spread of disease being three to five times the national average in these communities.[5] These issues also must be addressed when searching for ways to improve the physical nature of the built environment. The role of the architect in this instance is complex because the design of adequate housing in unregulated settlements relies on many diverse factors. In this context, architecture must embrace not only the typical living conditions but also the extremes to sustain its relevance to society.

Social housing solutions imposed from the outside have had a questionable track record. Government corruption hinders progress coming directly from governmental agencies. Many projects that were funded by governmental and non-governmental international organizations to help solve the current housing crisis often contributed as much to the problem as to the solution.[6] Most governments of affected countries do not have the resources to remedy the current housing situation and now actually see unregulated settlements as a solution to a dire housing problem they have been unable to control or fix. At this level of housing, almost all improvements have been citizen-directed and organized from small-scale collaborations within the community.

In *Optimism and Overpopulation*, Virginia Abernathy states that foreign aid has been largely unsuccessful in improving the current living conditions of developing countries, but "certain kinds of aid remain appropriate. ... Micro loans that foster grassroots enterprise, where success is substantially related to effort," is more apt to succeed.[7] Any successful project in this context must encourage communities to help solve problems because members of the community are the primary shapers of their environment. Any institution that would collaborate with a community would act primarily as a resource for new ideas and help the community harness the ingenuity of its builders to further stimulate innovation. This allows the priorities of the program in each community to be determined by the beneficiaries themselves, who organize their own communities and elect their own representatives.[8] What is clear is that there must be unprecedented cooperation between central government, local authorities, public and private enterprise, architects, engineers and trade associations.

THE GLOBAL ECONOMIC AND ECOLOGICAL IMPACT OF UNREGULATED SETTLEMENTS

Mexico is becoming more important to the global marketplace due to the buildup of export-oriented factories along its northern border region and the passage of NAFTA. This globalization of the Mexican economy is one factor in the shift from an agricultural and rural economy to an industrialized, urban economy based on export-oriented goods and characterized by an abundance of cheap labor. Other urban environments in Latin America share some of the same industrial growth factors and influences with Mexico, yet "each nation has its own unique, complex mix of economic, social, political, ecological and demographic characteristics that influence the form that urbanization takes, as well as the types of housing problems that emerge."[9]

In these unregulated urban zones we have found unique spaces and places in which the norms and conventions of the formal sector do not apply. They are connected to the urban fabric as a whole, yet retain their own individuality. It will be from these unregulated urban zones that new ideas essential to the growth of an inclusive society can emerge. Because these people build directly, without the sanction of any institutional authority, the chances for a more authentic collective environment are greater.

The rapid urbanization of developing cities benefits society in many ways. If these large populations were to continue to develop the rural landscape, it would, in all likelihood, lead to much higher rates of deforestation from subsistence farming and further endanger a region's natural resources and wildlife. Even though the conditions in unregulated settlements are poor, the lack of alternatives found in the local villages make urban settlement attractive. The opportunity for better education, health care, and the promise of a better standard of living and employment draw people to urban areas. The residents of these unregulated settlements actively participate in the economy by providing labor and skills that contribute to the global market. Aldrich and Sandu found that,

> the people living in slums and squatter settlements subsidize the formal economy (and perhaps the world economy) by not requiring large amounts of capital for housing and related services. Slums with their physical deterioration, and squatter settlements built by their own residents with marginal or cast-off materials, minimize the need for capital from the formal sector. The financial resources that have been saved in this process could be used elsewhere.[10]

In most unregulated settlements in the developing world, traditional building techniques seem to have been exhausted. Home builders rely on mass-produced building materials such as wood studs, plywood, concrete and concrete block, corrugated metal and a large inventory of salvaged materials, which also contributes to the building industry. The growth of cottage industries in the building and construction of unregulated settlements by members of these communities could also contribute much to the economy of the informal sector as well as generate much needed income.

In response to these new urban conditions architects can develop "low technology" building systems that are sustainable, reflect new conditions of global access and delivery and allows for creative flexibility. This project focuses on the development of low-cost construction techniques that can be used as self-help mechanisms in these communities. The development of a better, lower priced, efficient and sustainable building technology will allow for more capital to be invested in infrastructure, which is desperately needed to combat disease and environmental degradation.

THE COLONIA

The basic unit of these unregulated settlements on the Texas/Mexico border is the *colonia* (neighborhood). *Colonias* often include a church, *tiendas* (small groceries), *tortillerias* (where tortillas are sold), and, occasionally, medical and dental services. Schools are usually located nearby, as well as bus lines and other services that allow the *colonia* to connect with the city. The *colonias* are created entirely by citizens and eventually become enfranchised by the government.

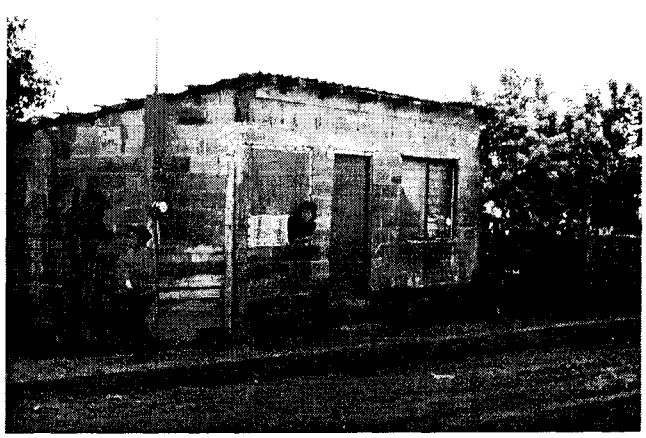

Fig. 2.

Once the community has a sizable population, the *colonia* creates its own pseudo-governmental body, which operates like a neighborhood association with a president, treasurer and other officers. This organization then approaches the Mexican government for assistance. The first phase of assistance entails subdividing the land into private parcels and public right-of-way (regularization). The Mexican government then allows families to buy parcels and gives them six months to begin to construct a house, if they have not already built there, or risk losing the property. The second phase of government assistance is implementing infrastructure such as electricity, water, street lights, sewer lines and sidewalks, which are added one by one, usually over a period of many years. The improvement costs are shared equally between the government and the *colonias*.

We have been working in *colonia* Roma in Reynosa, Mexico. This *colonia* occupies approximately 11 acres, accommodates close to 2,000 inhabitants, and has a population density of approximately one person per 175 square feet. Roma was built on a landfill, which makes matters more difficult. Roma achieved legal status (regularization) eight years ago; however, the oldest structure in the *colonia* is approximately 15 years old.

We have identified three stages of building development in Roma. The first stage focuses on survival and is constructed with minimal means, primarily salvaged or found materials. Due to the inevitable environmental degradation in these dense urban areas, the natural resources associated with traditional ways of building are nonexistent. **Stage one** home builders compete for what we would consider urban refuse.

Stage two housing is built primarily with mass-produced material and a minimum of salvaged materials. It is generally constructed when money becomes available to invest in more substantial materials and is usually constructed while the family is living in the stage one house. Upon completion, the stage one house will be abandoned, substantially modified or integrated into the new stage two house. The average cost of a stage two house is approximately US$300.

Stage three construction consists of finished materials, plumbing and electricity. The material of choice for stage three construction is concrete block on slab with a concrete roof. Stage three houses often have more than one story and represent the culmination of a long process of building and rebuilding.

STUDENT WORK

The project was first introduced to students in the fall of 1996. We began by setting a goal to design a viable **stage two house** for around $300, which represents the construction cost of a typical house in *colonia* Roma. Typical designs were approximately 192 square feet and used modified balloon frame construction. We quickly realized through this effort that we could not meet our budget limitation using balloon frame construction and developed alternative building systems. During this investigation we limited ourselves to the tools, skills and materials available in Roma.

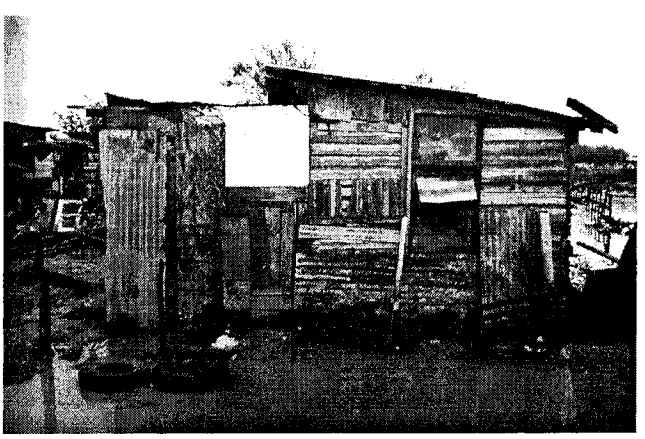

Fig. 3.

One of the most promising developments was a tilt-up concrete panel system constructed by second-year architecture students David Boira and Daniel Valazquez. The students constructed an outhouse to demonstrate the use of the system realizing the ultimate purpose was to use the system to construct a house. Wall panels measuring 3' x 8' x 1 1/2" thick were cast in simple forms and could be lifted into place by three people. The panels were joined together with bolts and steel angles. The material cost on each panel was approximately US$8. Not only did this system cost less than modified balloon frame construction, it was more durable. This system worked well with the fundamental building customs of the *colonia* because it was extremely flexible and could easily accommodate an alteration or addition.

MEMBRANE PANEL

For the past two semesters we worked to reduce the cost of these concrete panels in addition to making them lighter and easier to produce. The latest development is what we have termed the membrane panel. The panel is approximately 1/2" thick, contains no metal reinforcing, and has a structure similar to dry wall. The concrete is placed between two layers of screen door material and is surprisingly strong and durable. The panel can be moved and lifted into place easily by two people, and is folded vertically near the center to counteract stress when it is being lifted into place.

We have designed a prototype house using this technology and the material cost of the entire house is approximately US$200.00, which is US$100.00 less than the average home built in Roma. The screen is readily available and rather inexpensive. A concrete panel measuring 7' x 3' x 1/2" thick cost only $4.50 in materials. In addition, this system is much more durable than current construction methods and will dramatically reduce the time and money spent on repairs. This effort may seem like a modest improvement, but, if a US$100 savings is realized by every *colonia* household the impact could be substantial.

DESIGN-BUILD PROJECT: YESDOSA RESIDENCE

This spring we were asked by Pastor Yesdosa of Roma to assist with the design and construction of his home. The lot in which the house will be built measured 20 meters square. Pastor Yesdosa's desire is to build a three bedroom one bath home.

Although our primary focus is developing technologies that can serve as self-help mechanisms it seemed reasonable to expand the scope of our work to include this effort. It would give us a better understanding of the construction limitations and could strengthen our relationship with the community. In addition, it would begin a needed dialogue with the community about cultural and community sensitivity.

The result was a 1,156 sq. ft. house with a 48' x 6' porch along the south side that spills into an enclosed yard. The enclosure, a combination of block walls and chain link fence, provides security at the parameter of the lot so that the windows and doors of the house can be left open for ventilation. The structure is slab on grade with concrete block walls up to 6'-8". Above that point the structure becomes a modified wood frame which supports a corrugated metal roof.

Simple vents cross-ventilate the entire house. These vents can be opened when it is warm and sealed when it gets cold. In addition, the doors double as louvers that direct breezes through the house. The overhangs are calculated to minimize heat gain in the summer and warm the house in the winter. The roof is insulated and vented to provide additional comfort. In addition to thermal comfort there was an attempt to minimize material waste.

CONCLUSION

According to the School for International Training, if the worlds population were shrunk to a village of 100 people, 50 percent of the village's wealth would be controlled by six people. These six people would be United States citizens. Seventy people would be unable to read. Fifty people would suffer from malnutrition. One person would have a college education and 80 people would live in substandard housing.

As illustrated in the example above, the global need is great. Architects have unique skills, knowledge and abilities that are a vital part of the solution. Architects can provide leadership if we expand the narrow scope of our profession to include the building needs of those in poverty. This would require a willingness to lay down professional agendas and collaborate with others based on their needs and values. We can no longer ignore the needs of 80 percent of the world's population.

The long term goal for the *colonia* Roma project in Reynosa, Mexico is to improve the quality of life in squatter settlements through better design and community empowerment. We propose that empowerment can be accomplished through workshops that teach community members how to construct better homes and plan better neighborhoods. The effort's ultimate success will be determined by the impact these workshops have on the quality of life manifest in the built environment. Therefore, a process of rigorous self-reflection and analysis must accompany any effort. The focus must be on the development of a community-based process rather than the creation of architectural objects. The eventual goal would be to empower members of the community to conduct workshops on their own. The need is so enormous that it would be impossible to implement effective change without the eventual shift to resident control.

NOTES

[1] Nicole Massignon, "The urban explosion in the third world," *The OECD Observer* (June/July 1993): 18.

[2] Ibid., 21.

[3] Brian C. Aldrich and Ranvinder S. Sandu, *Housing the Urban Poor* (Zed Books, 1995), p. 22.

[4] Leslie Sklair, Brian C. Aldrich and Ranvinder S. Sandu, *(ed.) Housing the Urban Poor* (Zed Books, 1995), p. 93.

[5] Andrew A. Skolnick, "Along US southern border, pollution, poverty, ignorance and greed threaten nation's health," *The Journal of the American Medical Association* (May 17, 1995): 1478.

[6] Aldrich and Sandu, 21.

[7] Virginia Abernethy, "Optimism and Overpopulation," *The Atlantic Monthly,* (December, 1994): 91.

[8] Mexico (Direccion General de Communicacion Social), *Mexican Agenda,* (Mexico D. F.: Direccion de Publicaciones, 1991): 101.

[9] Aldrich and Sandu, 18.

[10] Ibid., 20.

REFERENCES

Abernethy, Virginia. 1994. "Optimism and Overpopulation." *The Atlantic Monthly.* (December) 84-86,88,91.

Aldrich, Brian C. and Ranvinder S. Sandu (eds.) 1995. *Housing the Urban Poor.* London: Zed Books.

Barker, John A. 1981. *Reinforced Concrete Detailing,* second edition. London: Oxford University Press.

Center for Housing and Urban Development. http://chud.tamu.edu/chud/bibliography

Center for Housing and Urban Development. http://chud.tamu.edu/chud/colonias/articles

Dallasfed. http://www.dallasfed.org/whatsnew/colonias

Kamel, Wadie W. 1997. "Healthy borders 21." *World Health.* 50 (May-June):10

Main, Hamish and Stephen Wyn Williams. (eds.) 1994. *Environment and Housing in Third World Cities.* Chichester, England: John Wiley & Sons.

Massignon, Nicole. 1993. "The Urban Explosion in the Third World." *The OECD Observer* (June/July) 18-22.

McAllen Economic Development Corporation. http://www.medc.org/mexico.html

Mexico (Direccion General de Communicacion Social). 1991. *Mexican Agenda.* Mexico D. F.: Direccion de Publicaciones.

Patton, Carl V. (ed.) 1988. *Spontaneous Shelter.* Philadelphia: Temple University Press.

Skolnick, Andrew A. 1995. "Along US Southern Border, Pollution, Poverty, Ignorance and Greed Threaten Nation's Health." *The Journal of the American Medical Association.* 273 (May 17): 1478

Stulz, R. and K. Mukerji. 1988. *Appropriate Building Materials, A Catalogue of Potential Solutions,* St. Gallen/Switzerland. Skat Publications.

The Mexican Center of ILAS. 1995. *Synthesis/Memoria of the Bi-National Conference held at the University of Texas at Austin, May 5&6, 1995*

True, Philip. 1996. "Shantytown, U.S.A.: The Boom on the Border." *The Progressive.* 60 (January):25