

José Afonso Botura Portocarrero

Indigenous technology  
in Mato Grosso

dwellingS

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*In memory of Rondon,  
to the Bakairi, Bororo, Irantxe, Kamayurá, Karajá, Javaé,  
Myky, Paresí, Yawalapiti, Umutina and Xavante peoples.*

*To my wife Mônica, and my children,  
Pedro, Ângela, Carolina, Lucas and Júlia,  
To my parents, Iracy (in memoriam) and José Afonso,  
and my brothers, Márcio Antônio,  
Marcelo Augusto and André Guilherme.*

*To those who, through this work, or through simple affinity  
and at different times, became my travel companions.*

*Architecture is a continuous invention where history  
turns into memory and is transformed.*

Paulo Mendes da Rocha

# Reflections

*Paulo Mendes da Rocha*

The title: "Indigenous Technology in Mato Grosso: Dwellings" introduces a subject which is indispensable for any type of Architectural teaching in Brazil.

The report by one of the first Portuguese navigators when first sighting an *Oca* was that these stupendous constructions were capsized ships. They consist of living spaces of fragile ingenuity with an apparent "floating" lightness and can be built in groups to form villages, "flotillas" and towns.

All of the disasters committed in the colonial times, still so recent, can be illustrated by the contempt for this human wisdom, confrontation with nature and fabrication.

Nowadays, this divide is no longer admissible, and the topic has become current and universal.

I saw a remarkable class in Brasília, when the Minister of Culture Darci Ribeiro, with the collaboration of FUNAI, had natives build an *Oca* on the university grounds for an architecture seminar.

At the 42nd Venice Biennale, the Brazilian pavilion, at the hands of the curator Radha Abramó, presented watercolors by Renina Katz and beautiful pieces of indigenous feather art; the geometry in the drawings of Geraldo de Barros and textile artifacts of the same native populations.

Other international recognition came with the "Tupinambá mantle", a cloak made of fragile red feathers covering the whole body, which is part of the Nationalmuseet's collection in Copenhagen.

In this moment of urgent need for a review of policies containing traces of colonialism, more in-depth studies become indispensable in University Architecture faculties dealing with the origin of man in the universe and in our dear America.





# Indigenous dwellings: a necessary provocation

*Prof. Dr. Cristina Sá*

To talk about Brazilian indigenous dwellings always seems to present something of a challenge. Among architects, admiration may be aroused but usually it is thought of as something picturesque and exotic. It is not hard to come across ignorance and disregard. This topic is often viewed based on well-established and sometimes prejudiced ideas, being thought of as a relic from a dead past rather than tradition and culture that is very much alive. With some exceptions, the received view is of crudeness and repetition, something of little interest. It is generally doubted that these can be the sophisticated results of a long experimentation process, and that there may be much to be learnt from them.

To talk about diversity of indigenous dwellings and, furthermore, associate them with the idea of technology causes surprise and even a sense of provocation.

A necessary provocation. This is how I see this work by the architect and professor José Afonso Botura Portocarrero. Not only in his book, *Indigenous technology in Mato Grosso: dwellings*, now in its second edition in Portuguese, but in all the teaching, research and documentation activities carried out at the UFMT (The Federal University of Mato Grosso), its Architecture and Urbanism Department and the Tecnoindia Research Group, as well as through the exercise of his profession and his contemporary architecture studies and projects.

José Afonso's work needs no introduction, it speaks for itself. To emphasize its importance, just remember that the study of Brazilian indigenous dwellings is practically absent in most of the country's Architecture and Urbanism faculties, and that research institutions, national heritage organs and even institutions set up to protect and disseminate indigenous culture are rarely interested in the subject. As a result, access to documentary sources is hampered, the much-needed field surveys become impractical, and the number of research projects, researchers and publications end up being reduced. On the other hand, the topic of indigenous dwell-

ings, like everything that is part of a living culture, is not static and is in constant transformation, but as soon as an ethnic group comes into contact with non-indigenous society, this transformation accelerates. Although the spatial organization usually remains largely unchanged, this is not the case when it comes to the construction methods and materials which are normally modified very quickly. As a result, much of what could be studied and documented has already been lost.

The subject of Brazilian indigenous dwellings naturally fits into the wider scope of the term dwellings, or within vernacular architecture, also known popular architecture or architecture without architects. The undifferentiated use, in this case, of the words architecture and dwellings is justifiable since vernacular architecture consists almost entirely of dwellings. However, it is not very common to speak of Brazilian indigenous dwellings as architecture.

Certainly, there are good arguments to defend both the use of the term "indigenous dwellings" as well as "indigenous architecture". But I don't think they can be used indiscriminately, and there is also a need to discuss the limits of the concepts of dwellings and architecture when applied to research in indigenous areas. The fact that José Afonso used the word dwellings in his book I believe is fully justified, since he is referring to the home, a dwelling in the strictest sense of the word. However, it is quite possible that the most common doubt among architects as to whether to talk about indigenous dwellings or indigenous architecture may in fact be masking larger issues, such as that of legitimacy which, whether they like it or not, is conferred by the use of the word architecture and the undefined discomfort that this legitimization provokes.

Disdain caused by ignorance may partially but not entirely explain this discomfort. This is because it is a discomfort that originates not from the existence or not of indigenous architecture, or of a variety of indigenous architectures. It begins with the Indians, or rather, the stubborn existence of the more than two hundred different indigenous ethnicities that are still left in Brazil after five hundred years of fighting, massacres and genocide.

In order to justify atrocities and turn them into a holy war, you must first make the other less human, disqualify them. That is why the Brazilian Indian had his image transformed into that of a generic being, erasing the historical and cultural differences between the various ethnic groups, and furthermore, characterizing them as primitive, brutal savages since the beginning of the European conquest. It is no wonder that this idea of generic Indians, who prevent the productive occupation of part of the national territory and thus hold back the prosperity of the entire Brazilian people, continues to be imposed on the Brazilian public. But today, with agribusiness having already arrived at the center of the country, we are beginning to realize that high productivi-



ty does not necessarily mean prosperity, at least not for the majority of people. Of which, in fact, the indians are part of.

The discomfort that the idea of an indigenous architecture provokes can therefore be partly attributed to disdain caused by ignorance, but it is also, or mainly, a consequence of the false image of the indian as being incapable of making complex use of space, creating forms and techniques that provide greater comfort whilst remaining adapted to the environment. Ultimately, they are seen as being unable to use simple resources to produce architecture.

To the majority of Brazilian people, the indians are all the same and live in small dwellings which are not aesthetically pleasing nor provide any comfort. This clashes with the admiration generated by well-known indigenous dwellings that do not fit into this stereotype: the majestic contemporary villages of the Yanomami and ethnic groups that inhabit the region of the sources of the Xingu River, much publicized by the media. The also magnificent Guarani Jesuit missions from the XVIII century in Rio Grande do Sul arouse great tourist interest, although in fact even the older indigenous dwellings there cannot be considered as indigenous dwellings since their design is of European origin which was replicated in different places as a strategy for cultural de-characterization. Another example is the well-known Tupinambá villages of the southeast coast, with large houses surrounded by a palisade, which appear in the textbooks, but these were destroyed in the 16th century, leaving just the European descriptions and engravings as documentary records of the design of the houses and villages, as well as the festive anthropophagic rituals.

In Brazilian Portuguese, there are different terms that separate and disqualify different types of indigenous dwellings. The word "house" (*casa*), which we use routinely, is almost never used to refer to indigenous dwellings except in some specialized or more recent texts. Normally, indigenous houses are referred to as huts, shacks, cabanas (*choupana, choça, casebre, cabana* in Portuguese) or some other term with a negative connotation, despite all of them being also applied to non-indigenous dwellings. The word *maloca* ("long house"), meaning an indigenous house or one for *mestizos* which is normally of indigenous origin located in interior parts of the country and often used to refer to large houses, can also be derogatory, at least in urban areas. However, in everyday language, the most used term, except by the indians themselves, is the word *oca*, which in Brazilian Portuguese exclusively designates an indigenous house, regardless of size, shape or the ethnicity that built or inhabits it. The word "home", with its strong emotional connotation, is never used.

The difficulty in defining the object of study itself, doesn't come just from the language we speak but also from the concepts that we form. To what extent are we aware of these concepts

and prejudices? From what perspective are we looking and what exactly do we see? What are we dealing with? Which factors, consciously or sub-consciously, guide our perspective and the choice of objects, objectives and methods used? Should we talk about Brazilian indigenous architecture or about the different architectures? Of housing or dwellings? Dwellings as concrete objects, the center of individual worlds, or as a bundle of forces in the social landscape. As a defining place of being in the world, or as an articulated set of houses, villages, camps, small-holdings, trails and territories? Should we talk about a house or an *Oca*? Or the *bái*, the *´ri*, and the *ãtã*?

The options are many. Different researchers naturally have their own lines of inquiry and perspectives and define their object of study in different ways. José Afonso chose to work on indigenous houses and in the first two lines of the book he defines his objective saying: this book deals with the design of the traditional dwellings of ten indigenous populations in the territory of Mato Grosso State and their constructive characteristics. *Behind the deceptive simplicity of this definition are many years of researching, studying and summarizing of documental material and, mainly, hard work conducting field surveys on architectural methods, presented in the form of technical drawings, sketches, models, photography and many conversations.*

I emphasize here the importance of the fact that this book presents data collected directly from field surveys conducted by the author himself. It's a book that doesn't invent, repeat or copy anything. José Afonso gives us detailed information and when he uses data from other authors he is careful to cite the references, allowing the reader to seek the sources, if desired, and also to reconstitute processes, both for the transformation of indigenous dwellings as well as the development of approaches, methods and techniques for its documentation and study. Furthermore, this book presents new information, but it mainly compares and discusses information, so, in other words, it produces knowledge.

In his book, José Afonso states that his object of study is traditional indigenous dwellings from the point of view of their design and construction characteristics. This dwelling is, quite clearly, a house in the sense of a concrete object consisting of space and building material and its design, use and transformation are observed and graphically or photographically documented.

But objects of research are not always so concrete. To the architect or future architect who, encouraged by this book, wishes to also be a researcher, remember that indigenous dwellings, like any other, can be studied from a number of different perspectives. Moreover, when taken in its strictest sense, a dwelling is a house, but in a broader or metaphorical sense it can be a set of houses, a village, a set of villages, a territory, an environment, a landscape or even a mythical

place. But remember too that choices need to be made, to define a field of action. No one can study everything.

Research on indigenous dwellings, as with any other dwelling, can refer to something concrete, but it can also refer to memories, remnants, traditions, processes, representations, or it may start with something material and move to the immaterial, and vice versa. Dwellings meet a number of different human needs, not all of which are practical, and researching very simple objects can lead to surprising developments when you start to notice that things like shapes, techniques, building materials, objects and spaces, that are apparently common, can reflect myths, transmit tradition, define hierarchies and inform social roles. That's to say, they can be producers and products of social relationships or complex symbologies, which is especially true of the so called empty spaces. Reality is not always visible or tangible. Dwellings, however fragile, precarious and transitory they may seem, are always important: they are never a simple topic to research because they are always steeped with meanings, a support for the invisible.

Rio de Janeiro, 24th June 2015



# Preface

[ to the 1st edition in Portuguese ]

*Carlos Zibel Costa, Architect*  
FAU-USP

*A museum is the world; it is our quotidian experience.*  
(Hélio Oiticica, 1966)

The book in hand, the fruit of an exceptional piece of study and design that José Afonso Portocarrero conducted for his doctorate from the Faculty of Architecture at the University of São Paulo (FAU-USP), reaches my eyes with multiple layers of meaning. First, it places itself in the world; part of this world and achieves a partnership with knowledge instead of isolating itself for analysis without dirtying its hands.

In fact, it takes a rather rare position in the realms of academia where much idleness and undisguised self-interests enchant minds that are prone to maintaining the status quo of the state of prior knowledge production and recent history. So, and as a consequence of the previous layer, the architect José Afonso has, in my view, diverted from the shortest, more direct route by choosing to see the world in its thought-provoking complexity.

The choice is even rarer when considering that it is a study of Brazilian architecture and urbanism which has precisely not been urging for insertion and dialogue with formal and conceptual diversity that contemporary culture offers. And so, in another layer, emphasis must be placed on the relevance of this study's methodological basis.

Indeed, along the line generally known as postcolonial anthropology (post colony), providing a voice to the objects of research, more than just acknowledging that the image presented of them was the product of (colonial, intentional) fiction, can transform them into subjects of the present and make them the writers of their own destinies.

I believe that this is the best perspective from which to see this book.

This way, the book opens us up through all its originality and dignity, but also through all its socio-economic and technological constraint and specificity in relation to Brazilian Indigenous

Architecture in terms of each of the ethnicities studied. Indeed, it is precisely this process that brings them out of the dusty limbo of historical references and prejudices, inviting them to enter the universe of local cultures and the dominant civilizations of the globalized and living world of the current age.

Finally, in the last layer, this work by Portocarrero articulates and continues the efforts made by countless architects. This is a continuity that relies heavily on anthropologists and sociologists who are widely recognized for their unrivaled academic and scientific merits and who accepted the challenge of extending the concept of architecture, urbanism, art, and design into the field of human culture.

I must remind you that I place myself in this line of architects who have, in particular, this cultural and anthropological "DNA" in our blood, which is why I proposed the term cultural design, which is a line of work of which Portocarrero, as my former mentee, is a true continuer. This includes not just the two of us but all the other alumni and supervisors from the FAU-USP with the same "DNA" such as Selma Nakamura Hardy, Silvio Cordeiro, Nanci Takeyama-Losch, Caio Vassão, Flavia D'Albuquerque da Silveira and Paula Quintão, to mention the most active in the field of cultural design and architecture.

However, we are entirely indebted to some colleagues, architects by graduation or otherwise, who preceded us in this line of work. Among the most recent ones are the "foreigners", Joseph Rykwert, Amos Rapoport and Paul Olivier and the "natives" Kurt Nimuendajú, Cristina Sá, Renate Brigitte Viertler, Sylvia Caiuby Novaes, Renato Delarole, Regina Müller, Maria Heloisa F. Costa, HB Malhano, Aracy L. da Silva, Delvair and Julio Cesar Melatti.

Since the architect José Afonso Portocarrero came through my supervision highly successfully, I myself should point out my own positive indebtedness to my professor, Michel François Veber, for opening up this path for me and to the anthropologist, Maria Inês Ladeira, for starting me along it.

Finally, special acknowledgment goes to Prof. Maria de Fátima Gomes Costa, from the Department of History of UFMT (The Federal University of Mato Grosso), supervisor for Portocarrero's master's degree; it was she who, warmly welcoming the initial proposal for "Bái, the *Bóe* house" (Bororo), enabled this work to be started and which has now been published. And also to Prof. Dr. Maria Fátima Roberto Machado, from the Department of Anthropology and the Rondon Museum of UFMT, responsible for the Center for Technological Research, where I am an occasional advisor, who provided the necessary research coordination support for José Afonso's work to be carried out.

São Paulo, 2010

# Introduction

[ to the 1st edition in Portuguese ]

*Prof. Dr. Maria Fátima Roberto Machado*  
*Department of Anthropology/Rondon Museum – UFMT*  
*Coordinator of the Tecnoíndia Nucleus*

When we look around ourselves, we get the feeling that the further we move into the realm of complex communication systems, with ever greater possibilities of integration between human beings, the further coexistence between those who think differently seems to become.

For this reason, one of the most important contributions that an intellectual who is committed to helping the world we live in is to place his creative energy at the disposal of people's understanding, from whatever different culture they belong to and in whatever material living conditions they exist.

This is the great challenge that has intensely pervaded Prof. Dr. José Afonso Botura Portocarreiro's reflections and professional practice for more than two decades, ever since he became an architect with a master's degree in History from the UFMT and a doctorate from the Architecture and Urbanism Faculty from the University of São Paulo, where I had the honor of participating in the examining commission together with his supervisor, Carlos Roberto Zibel Costa, and professors Rafael Antonio Cunha Perrone, Renate Brigitte Viertler and Claudia Terezinha de Andrade Oliveira.

His "mato-grossense" heart was won over, from an early age in his school days at the São Gonçalo college, by the cultural exuberance of the long-suffering Bororo people. His academic work has shown this in an innovative way, through the proposal of an architecture that is beautiful in its native inspiration and, at the same time, concerned about connecting to the new century, both in terms of the use of technological innovation as well as the urgent responses required to the environmental demands. Despite the extreme poverty that these indians have been subjected to, José Afonso has the anthropological sensitivity to understand that you can find there a deeply symbolic view of the world, which is materialized in their dwellings, remarkably planted there in the circular village around the sacred patio - the *wororo* - guided by their conscience and by the clans, whose complexity projected this people into world ethnology.

This work, which I introduce, is part of a set of proposals that have been developed since 2002, around a research center called Tecnoíndia, which is registered with the National Research Council (CNPq) and certified by the Federal University of Mato Grosso (UFMT), where it has its headquarters. The center is open to students and professors from the Architecture and Urbanism Course and this year it widened its activities through an extension project, included in the Ministry of Education's national extension system, called Indigenous technology and design: bases for an anthropology applied to architecture. Tecnoíndia's aim is to contribute, in a wide sense, to the debate on the notion of ethno-architecture incorporating designs that are considered to be traditional among indigenous cultures, by means of establishing dialogue between these cultures and the architect's contribution with the use of technology and materials from industrialized society.

In his doctoral thesis, which is now published, the author adopted an ethnographic position in the surveying of indigenous house design, seeking sources in bibliographical records and in the extensive field studies made on the *Paresí, Bakairi, Myky, Irantxe, Xavante, Bororo* and *Umutina* people as well as the indians from the Xingu National Park (the *Yawalapiti* and the *Kamayurá*). The survey of the drawings is one of his most important contributions, which is incorporated into the set of studies that are consolidated references in the field of architecture itself, such as the research work of Cristina Sá, Maria Heloísa Fenelon Costa, Hamilton Malhano and Prof. Carlos Zibel, in his well-known study on the Guarani houses. The field material comprises an unprecedented collection, including dwellings that are recorded from an architectural perspective for the first time, in terms of their construction techniques, which also makes a substantial contribution to the indians themselves, by helping to record their own memories, especially in the case the Irantxe, Myky and Paresí. During the research work, it was gratifying to be able to witness the numerous occasions of knowledge exchange between Prof. José Afonso and the indians in the villages and the interest aroused by the design and the willingness to collaborate so that the information was as complete as possible.

Another important aspect to emphasize is the positive influence that the Tecnoíndia project has brought to the architecture students themselves in Mato Grosso, who have had growing opportunities to broaden their horizons beyond the hegemonic models of professional thinking and practice. This is an innovation that has been fruitful for the UFMT's Architecture and Urbanism, which has Prof. José Afonso currently at the helm, seeking to strengthen his area of knowledge and make an original contribution by our institution in the national academic scenario.



The decisive support from Sebrae for the publication of this book, together with the competence and earnestness of the publisher Entrelinhas, is a source of pride for us all, who have witnessed the birth in Cuiabá of one of its most significant developments: the “Knowledge Space”, to be inaugurated later this year. These are new times, new perspectives, new paths, taken with the wisdom of those who seek the future by respecting the beauty and the teachings of our traditions, that which makes us unique in the vast universal panorama of cultures.

Cuiabá, 2010



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# Introduction

This book deals with the design of the traditional dwellings of ten indigenous populations in the territory of Mato Grosso State and their construction characteristics. The process that led up to this publication, however, begins very far back. Taking a previously untrodden path, it went along trails and shortcuts, guided by texts and memories that have taught me a lot. It's the 'now' I am going to talk about here, in the hope that this may help students and researchers, who wish to follow in the same direction, to find their own future paths.

Some years ago, in 1992 to be precise, the Teacher's Association of the Federal University of Mato Grosso (Adufmat) provided me with the opportunity of doing the architectural design of the new faculty building at the Cuiabá campus. This became the beginning of a spontaneous, and even instinctive, link with the design of indigenous dwellings, since they represented, in my view, the technological crossover with the region's roots. Nowadays, the "oca", as the Adufmat building became known and which was also subsequently used as the association's logo, makes a unique contribution offering greater visibility to the UFMT's founding paradigm as the "University of the Jungle", as it was known when it was founded.

The studies made to develop this project - the bibliography consulted, the materials research, the visits to villages and the contact with indians - continued, sporadically, afterwards in both my professional and academic lives.

Following this, in 1997, I coordinated the studies for the "Rondon Memorial" project which was to be built on the margins of the Mato Grosso Pantanal in the town of Mimoso, district of Santo Antônio de Leverger.<sup>1</sup> Since Rondon's life and work was intrinsically linked to the indigenous issue, the architectural design for the Memorial was based on a large indigenous house with references to the peoples that Rondon had made contact with. This concept led to a deepening of the previous studies made to achieve a visual result that linked the Memorial's architecture to Cândido Mariano's work.

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<sup>1</sup> The Architectural project made for the government of Mato Grosso in the second administration of Governor Dante de Oliveira, with the co-authorship of the architect Paulo César Molina Monteiro.

In 1999, when applying for the master's program, I thought that I, as an architect, already possessed a research plan set out on indigenous houses in Mato Grosso. That's what I thought. The focus on this history that I had recently got to know, recognizes each indigenous group's identity and so would require much deeper and more specific research of each ethnicity's culture.

Therefore, following the recommendations made by my supervisor, Prof. Dr. Maria de Fátima Gomes Costa, the initial proposal underwent a change: I needed to concentrate on the houses of a single people. Naturally, I chose the Bororo people from whom the capital city's name was derived - Cuiabá.<sup>2</sup> When I started my research, I realized that my choice of the Bororo represented the return to the beginning of a connection which, unknowingly to me then, had begun a long time ago. The youthful curiosity aroused by these Indians, whom I often saw in the courtyard of the São Gonçalo school, in Cuiabá, and then at the end of junior high school at the Don Bosco College in Campo Grande, where I studied; the stories that the catechist priests sometimes told, with a certain air of mystery surrounding their missions, always fascinated me. Those impressions stayed with me and were only revived when years later I met the Bororo people during research for the Rondon Memorial, reading the work of Esther de Viveiros, in which Rondon, already blind and more than ninety years old, enthusiastically tells the saga of his life.<sup>3</sup>

Thus, I began the research for my master's dissertation, entitled *Bái*, the house of *Bóe*: *Bái*, the Bororo house. A history of the of the Bororo Indian's dwellings ("*Bái*, a casa *Bóe*: *Bái*, a casa Bororo. Uma história da morada dos índios Bororo"), and began to grasp the meaning of an architecture that was very different from the one I knew. This is the subject of the book, which grew as I learnt more and more about the houses, first from their history and later from anthropology, in my doctorate work in which I conducted through field studies: *Tecnoíndia*: technology for the construction and adaptation of healthcare units for indigenous peoples, when the first drawings of the houses researched began "to appear". As an architect, the relationships that initiated from history and anthropology in my master's and doctorate were essential for me. I was lucky and honored enough to be introduced to these fields by the historian Maria de Fátima Gomes Costa and the anthropologist Maria Fátima Roberto Machado.

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2 **Ikuiapá - ikúia**, spear-arrow; **pá**, place [place of the spear-arrow]. Designation: 1. From a place where the spear-arrow is used for fishing; 2. From a place where the Bororo used to fish with a spear-arrow, corresponding to the mouth of the **Ikuiébo** river, color. of *Prainha*, afl. from esq. From the River Cuiabá, in the city of the same name. | We believe that the name of the capital of Mato Grosso, Cuiabá, built on the two banks of the *Prainha* stream, is nothing more than the adaptation of the like-sounding word **Ikuiapa**. ALBISETTI, C.; VENTURELLI, A. J. Bororo Encyclopedia. v. 1. Campo Grande: Dom Bosco Regional Museum, 1962. p. 610.

3 VIVEIROS, Esther de. Rondon tells her life story. Rio de Janeiro: Livraria São José, 1958.

I need to mention that my doctoral thesis had the same title as the research funded by the National Health Foundation (Funasa) through an agreement with the Federal University of Mato Grosso (UFMT) and whose research group was coordinated by Prof. Dr. Maria Fátima Roberto Machado. The Tecnoíndia project fulfilled a double objective: one which was set out by the call for papers and the other which was the research on the dwellings of indigenous peoples in the territory of the State of Mato Grosso, which supported the project and the thesis presented in the postgraduate program of the Faculty of Architecture at São Paulo University (FAU-USP), in 2006, with the architect Prof. Dr. Carlos Roberto Zibel Costa, to whom I am very grateful for the way in which he signposted the research path, the Indian way, when I realized that it was possible to glimpse the invisible.

The work for Funasa referred in particular to ethno-architectural research, which is to say, the study and surveying of designs considered to be traditional of indigenous dwellings, belonging to the ethnicities of a particular territory, seeking to identify the cultural traits of their dwellings and, from these references, present a proposal for the construction of “New Indigenous Health-care Houses” (*Casai*). The Tecnoíndia project has been completed but its proposal for the architecture it presented wasn’t considered to be admissible for approval and subsequent execution since it “did not comprise a physical/functional unit”.<sup>4</sup>

As mentioned at the beginning of this introduction, this book deals with the design of traditional dwellings of indigenous people, included in the Tecnoíndia research. Specifically, in the case of the Irantxe and Myky ethnicities, field studies for my doctorate were the first records of their dwellings, and although there was already a great deal of material on the Paresí, as a result of ethnographic research, particularly the work of Max Schmidt and Romana Costa in relation to the *hatí* - the Paresí house, this was the first time the construction design had been drawn up and shown.<sup>5,6</sup> Also included in this edition was the design of the Umutina house, since the thesis had only presented a historical summary, without showing its traditional design due to the initial difficulty in finding consistent information for the basis of the graphic construction, which

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4 The Tecnoíndia research was closed by Funasa on January 28, 2010, through the Official Notice No. 509 Codet/Cgcot/Densp. We are certain, however, that as a contribution to research the Tecnoíndia studies developed constitute a valuable reference project for new research and projects on constructions in indigenous areas.

5 SCHMIDT, Max. *Los Paressís*, 1943.

6 COSTA, Romana. *Cultura e Contato*, 1985.

was solved by the research of the architect Pedro Barros in his Final Graduation Paper (*TFG*), mentored by myself in 2008.

This text is organized into five chapters. The first chapter presents a summary of indigenous dwelling designs using an approach that focusses on the object of the research. The second chapter offers a wider view of the traditional conical form of the indigenous houses, a common characteristic of the peoples studied here. The pictures produced by travelers allows us to review these dwellings going back to the pre-colonial period before they suffered any alterations to their original designs. In the third chapter, the designs of ten indigenous houses are shown, which are part of the forty-one peoples that live in Mato Grosso, drawn up using existing studies and pictures and the support of field research. This chapter adds the designs of the Irantxe, Myky and Umutina houses to those that have already been studied and it is the first time these have had their dwellings investigated. An introductory discussion is put forward in the fourth chapter on the topic of ethno-architecture, in support of the studies and projects presented in the following chapter. The fifth chapter shows some of the projects that were carried out based on cultural design references of the indigenous houses, from an ethno-architectural perspective, particularly the Sebrae Sustainability Center (CSS) at Sebrae-MT (the “Small Business Support Service”), which is presented together with a description of its functions, the program and the national and international certificates that it obtained.

I offer my sincerest thanks to the UFMT, Funasa, Sebrae-MT and the publisher Entrelinhas, who have all, at different times, made the publication of this book possible. It is especially dedicated to the indigenous people and architecture students; in the hope that reading it has the same meaning it had for me when writing it, as João Cabral de Melo Neto put it in his poem, how to build doors opening spaces: “doors through which... through which come freely: air, light, the rightness.”<sup>7</sup>

I feel extremely gratified with this second edition (in Portuguese) of the book *Indigenous Technology in Mato Grosso: dwellings*, now also with an edition in English which is due to the sensitivity and tenacity of José Guilherme Barbosa Ribeiro, Sebrae-MT Superintendent.

The interest in this topic, which moved me to do this research, seems to be alive and pulsating in the current generation of students from Brazilian and even foreign universities. Being awarded the 25th Design Prize of the Brazilian House Museum, *MCB*, in 2011, was very impor-

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7 MELO NETO, João Cabral de. *Fábula de um arquiteto*. Antologia Poética. Rio de Janeiro: José Olympio, 1979, p. 18.



tant and contributed to the circulation of indigenous technologies, which was the purpose of the publication. Contact with the indigenous peoples in the places we went to during the research is preserved and maintained with the book being present in the village libraries, putting out its signals. The projects we conducted attest to the use of indigenous principles and technology in buildings already completed. In 2015, we offered, for the first time, the elective class called *An introduction to Brazilian indigenous architecture*, in the Architecture and Urbanism Department of the UFMT, a pioneering addition to architecture courses in Brazil.

In this edition, minor adjustments and corrections have been made to the original text; the expansion and revision of Chapter V was necessary, considering the importance of the Sebrae Sustainability Center (CSS) building and the certifications it received.

I am flattered by the addition of the texts by the architects, Cristina Sá and Paulo Mendes da Rocha, which open and enrich this edition, adding to the previous introductions by the architect Carlos Zibel and the anthropologist Maria Fátima Roberto, which represent recognition and stimuli that drove me on and which I strive to be deserving of.

I express infinite gratitude to my family for lending me their precious time of our coexistence.

I renew my thanks to Sebrae-MT, Entrelinhas Publishing and the UFMT, the friends at *Tecnoíndia* nucleus, my fellow architects and my students, to all who have somehow supported the research and helped to re-design the indigenous dwellings and their technologies in motion. Incorporating and blending new knowledge with ancient, ancestral knowledge and innovative technologies, into the future.

Ikuiapá, January 2018

A handwritten signature in black ink, appearing to be 'Jairton', written in a cursive style with a long horizontal stroke extending to the right.





# The role of drawing in the studies of indigenous houses

*Art, and with it one of its languages - drawing -,  
is also a form of knowledge.*

(ARTIGAS, 1999, p. 77)



Oscar Niemeyer's sketches published in the article  
*"The Private Residence in Brazil" (A Residência Particular no Brasil)*, Module No. 43, Aug. 1976, p. 56,  
and subsequently with the same title in No. 70, May 1982, p. 42

This chapter aims to contribute to the initial development of the study of the image of indigenous houses, as a graphic language, establishing the bases for the construction of a prototype based on a summary of the main designs of indigenous dwellings known of in the state of Mato Grosso.

The most recent works by anthropology and architecture researchers are presented, emphasizing drawing as a research tool. The detailed studies produced by these researchers will only be partially mentioned here when referring to the morphological aspect, which is the object of study.

A subtle observation still needs to be made, initially, with respect to the designs of Brazilian indigenous houses: the indians build their traditional houses without a design project. It can be said that their design, or that which defines its peculiar architecture, is a product of its “non-design”<sup>8</sup>. Their constructions, it seems, have always been executed on the basis of the models held in the craftsman’s memories. Renzo Piano (apud LAPUERTA, 1997)<sup>9</sup> mentions this point when talking about the process of traditional design by drawings as a circular process: “This is very typical of the craftsman. Think and do at the same time. [...] Draw and do.” Artigas (1999,

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8 The term “non-design” was used by Prof. Dr. Rafael Perrone, referring to the fact that the indians build without using the tool of drawing, in his Qualification Examination for the thesis presented by the author, on December 12, 2005.

9 PIANO, Renzo. *Why Architects Draw*. Interview with Edward Robbins. Cambridge: MIT Press, 1994.

p. 81), likewise, at the conclusion of his well-known text “The drawing”, had already stated: “To build churches we must have them in mind, as a design.”

During field surveys, no paper sketch has ever been shown or executed by indigenous interviewees; when necessary, sketches were made on the ground using their fingers.

The existing records found were, therefore, made by non-indians when contact was made. Due to this peculiarity, a classification of the designs of indigenous dwellings is suggested here, according to the “Summary of Typology of Architectural Design”, proposed by Perrone (1993, p. 28), in the category of Suggestive / Representative Drawings, as “drawings of studies or sketches” (*Desenhos de Estudo Gnoseológico/Metodológico*), or as “documentation and reconstruction drawings” (*Desenhos de Finalidade Cognitiva*).<sup>10</sup> A specific classification for the sketches will also be considered, taking into account the use for which they were intended: travel, self-sufficient, exploratory or recovery, thematic, and analytical sketches (LAPUERTA, 1997).

## 1.1 The primitive house

Reviewing the notions of the Theory of Architecture, it is possible to see a similarity between the primal man’s hut and the dwellings of the indigenous peoples. The current design of these dwellings represents the tip of an “evolutionary chain,” which is only partially known: the post-contact version. The earliest known remains would be the preliminary results of archaeological research. The houses would be the result of a long period of manipulation of what might be called “appropriate technologies” for the living conditions dating back to the Holocene. For Rykwert (1999, p. 139), Vitruvius was in agreement with one of the central positions of the stoics: “It is reflection, and not the need, that teaches man to use the natural elements to his advantage.”

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10 According to Perrone (1993, p. 29; 31-32), in his doctoral thesis: “[...] study and information sketches may not have the direct purpose of informing a project, and may be to aid interpretation, analysis and personal understanding of certain jobs. Examples of such sketches can be found in the travel notes made by Le Corbusier. And on the topic of documentation and reconstruction: [...] they encompass the images made for an architectural record and memory. In this sense, these are generally made for concluded jobs; for this reason, when they contain construction and/or dimensional information, they consist of technical and or formal and/or verifiable data. [...] with the purpose of recording and communicating that which extrapolates private use”.

For Krufft (1990) in the introduction to the book, *História de la teoría de la arquitectura*, an essentially more restrictive definition of the history of architectural theory could be understood as the sum of what was expressly formulated as an architectural theory: a history of reflection on architecture as it has been formulated in writing. Vitruvius (84-14 BC) was not the first to write about architecture, but all the writings prior to his were lost; his work *De Architectura Libri Decem* is the only surviving architectural treatise. Leon Batista Alberti (1404-72) wrote fundamental theoretical pieces on painting, sculpture as well as on architecture; his treatise on architecture *De Re Aedificatoria* was first printed in Florence in 1485. Antonio Averlino, known as Filarete (1400-...) wrote his *Trattato di Architettura*, divided into 25 books, probably between the years 1461-1464.

Filarete, following the principles of Vitruvius and Alberti, bases the origins of architecture in *the need (necessitas)*, making an analogy between the human needs of dwelling and eating, associating the origins of houses to Christian tradition: after expulsion from paradise, Adam would be the first architect and builder of the primal hut. Subsequently, Filarete associates the trunks used to structure the primal hut with the origin of columns; according to him, the length of these uprights is according to the height of the men, meaning that the size of the primal hut was designed according to human dimensions at the time. According to Krufft (1990, p. 63):

[...] Filarete's primal hut acquires the status of a major architectural statement. It not only marks the origin of architecture itself, but it also embodies the proportions and the orders. In Filarete's work, the proportions of the human figure become the decisive scale of reference. He is the first representative of pure anthropometry: 'architecture is derived from man, that is from the human body, its limbs and proportions'.

His anthropometric ideas become clear when he uses the Vitruvian figure to derive even the basic geometric forms of man's measurements: "*whatever it may be, the circle, the round, the square, and every other measurement derive from man*" (KRUFFT, 1990, p. 64). Filarete's anthropometric proposals (apud KRUFFT, 1990, p. 65) also establish an association with the idea of an organism:

Architecture, for him, is not only derived from human proportions but actually resembles the human organism in an intimate way. Architecture lives, sickens and dies, as man does.

Western houses, therefore, have their genesis in Adam's expulsion from paradise and would have an anthropometric grounding originating from the primal hut. While not intentionally look-