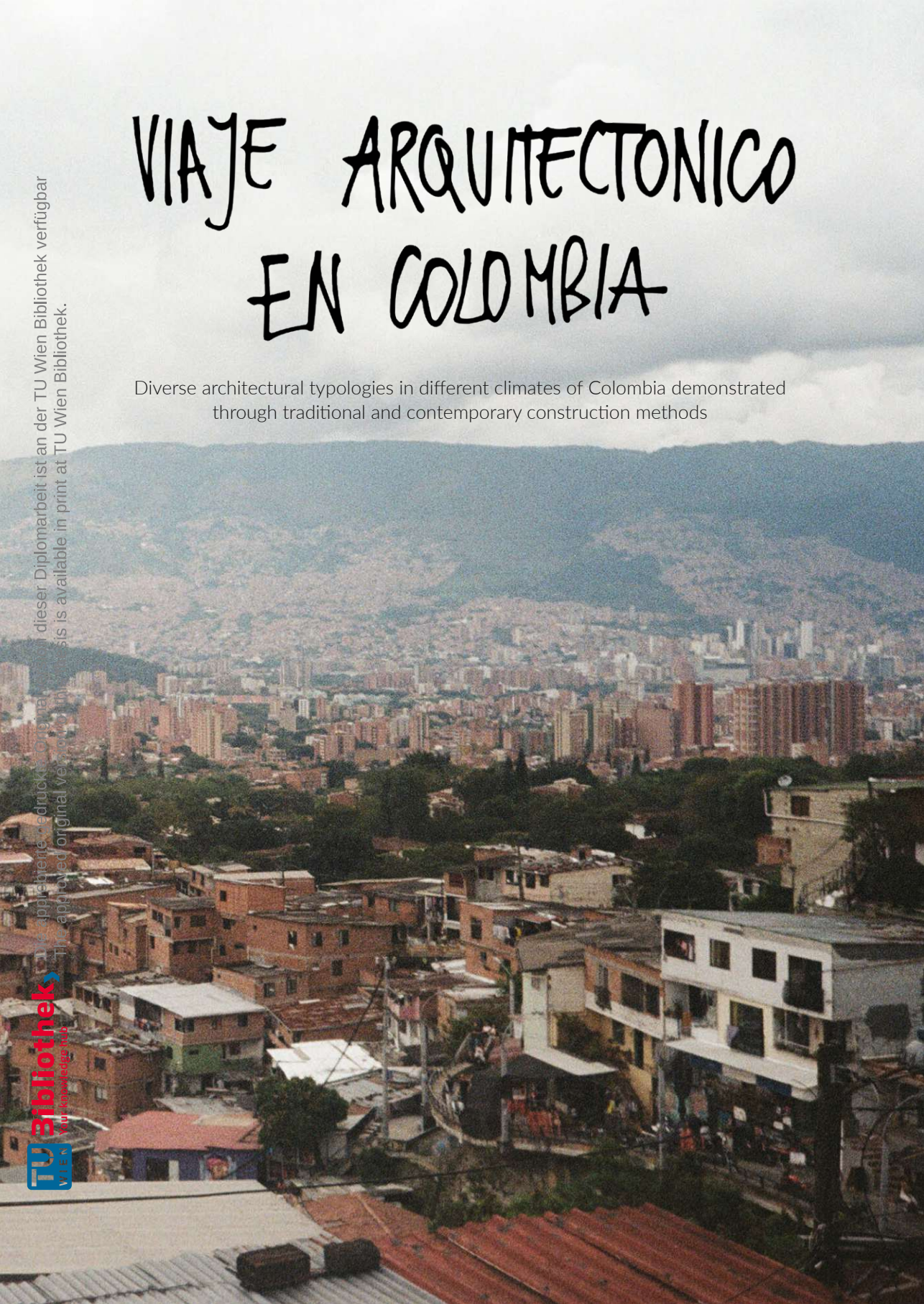
VIAJE ARQUITECTONICO EN COLOMBIA

Diverse architectural typologies in different climates of Colombia demonstrated through traditional and contemporary construction methods



TECHNISCHE UNIVERSITÄT WIEN
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DIPLOMARBEIT

Viaje arquitectonico en Colombia.
Diverse architektonische Typologien in verschiedenen Klimazonen Kolumbiens, demonstriert durch traditionelle und zeitgenössische Bauweisen

ausgeführt zum Zwecke der Erlangung des akademischen Grades
eines Dilpom-Ingenieurin unter der Leitung

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KURZFASSUNG

Zwischen Oktober und November 2022 hatte ich die Gelegenheit, durch das Land Kolumbien zu reisen, wobei ich mich auf die Erforschung und Entdeckung der kolumbischen Architektur konzentrierte. Während dieser Reise hatte ich die Möglichkeit, einige kolumbianische Architekt*innen zu treffen, sie zu interviewen und mich mit ihren Projekten und Erfahrungen vertraut zu machen. Während meines einmonatigen Aufenthalts wurde mir klar, dass die kolumbianische Architektur viel Potenzial, als Beispiel für eine effektive Klimaanpassung hat. In Kolumbien findet man immer noch wichtige Beispiele für pre-kolumbianische, koloniale, moderne und zeitgenössische Architektur, die sich jeweils unterschiedlich an die Umgebung und das Klima angepasst haben.
Ziel dieser Arbeit ist zu analysieren und wissenschaftlich herauszuarbeiten, wie sich die Architektur in Kolumbien über die Zeit und abhängig von ihren verschiedenen Klimazonen geändert hat. Daraus lassen sich Methoden, Formen und Materialien der aktuellen kolumbianischen Architektur herauslesen. Damit legt diese Arbeit einen wichtigen Beitrag zum Verständnis der kolumbianischen baulichen Entwicklung und der aktuellen Tendenzen in der Architektur.

ABSTRACT

Between October and November 2022, I had the opportunity to travel through the country of Colombia and focus on researching and discovering Colombian architecture. During this trip I had the opportunity to meet some Colombian architects, interview them and familiarise myself with their projects and experiences. During my one-month stay, I realised that Colombian architecture has great potential as an example of effective climate adaptation.
The aim of this work is to analyse and scientifically review how architecture in Colombia has changed over time and in relation to the different climatic zones. From this, the methods, forms and materials of today's Colombian architecture can be derived. This work thus makes an important contribution to understanding Colombia's architectural development and current trends.

RESUMEN

Entre octubre y noviembre de 2022, tuve la oportunidad de viajar por el país de Colombia, centrándome en la investigación y el descubrimiento de la arquitectura colombiana. Durante este viaje, tuve la oportunidad de conocer a algunos arquitectos colombianos, entrevistarlos y familiarizarme con sus proyectos y experiencias. Durante mi estancia de un mes, me di cuenta de que la arquitectura colombiana tiene mucho potencial como ejemplo de adaptación eficaz al clima.
El objetivo de este trabajo es analizar y elaborar científicamente cómo ha cambiado la arquitectura en Colombia a lo largo del tiempo y en función de sus diferentes zonas climáticas. A partir de ello, se pueden identificar los métodos, formas y materiales de la arquitectura colombiana actual. De esta manera, este trabajo hace una importante contribución a la comprensión del desarrollo arquitectónico colombiano y de las tendencias actuales.

ESTRATTO

Tra ottobre e novembre 2022, ho avuto l'opportunità di viaggiare attraverso gran parte della Colombia, concentrandomi sulla ricerca e la scoperta dell'architettura colombiana. Durante questo viaggio, ho avuto l'opportunità di incontrare alcuni architetti del posto, intervistarli e familiarizzare con i loro progetti e le loro esperienze. Durante il mio soggiorno di un mese, mi sono resa conto che l'architettura colombiana ha un grande potenziale come esempio di adattamento efficace al clima.
L'obiettivo di questo lavoro è analizzare ed elaborare con una richerca come l'architettura in Colombia sia cambiata nel tempo e a seconda delle diverse zone climatiche. Da qui si possono identificare i metodi, le forme e i materiali dell'attuale architettura colombiana. Questo lavoro offre quindi un importante contributo alla comprensione dello sviluppo architettonico colombiano e delle tendenze attuali.

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first chapter - INTRODUCTION

vocabulary

ladrillos = bricks
techo = roof
guadua = bambus
carrera, calle = street
barrio = district
septima = seventh
chirco = type of wood
ladrilleras = brick oven
chircales = brick oven with chirco tree
maloca = amazonic house
desarollo = development
hallazgos = findings
alrededor = around
abrigo = coat
rasgo = feature
hogar = home
aunque = although
piso = floor
cerca = fence
tamano = size
altura = height
muestra = sample
hizo = made
apoyar = support
hito = milestone
mesa = table
lugar = site
sencilla = simply
palma = palm
madera = wood
vivienda = home
casa = house
bahareque = wattle & daub
arquitectura = architecture
caña = cane
bajo = low
alto = high
comedor = dining room
maleta = suitcase
tierra = earth
roza = grazes
trupillo = typical tree from La Guajira
tapia pisada = rammed earth
yotojoro = typical cactus from La Guajira
guayacan = typical tree from Chocó
artesania = arts and crafts
invasiones = invasions
silvestre = wild

research question and methodology

How does Colombian architecture adapt depending on the climatic situations and respond to the different biodiversity and environmental situations?

What can be learned from the indigenous examples and the way they adapt? Which architectural indigenous features should be still used or are still used in the contemporary architecture?

Coming from Europe, I was always used to builing with materials that would protect against both the great winter cold and the long, sultry summers, and building methods that could withstand temperature differences of up to 50 Celsius degrees throughout the year. It was only in Colombia that I finally saw the possibility of building with much more natural and ecological materials as well, precisely because the performance required is mainly structural or repair against rain, as temperatures in this case are always the same. To answer the research question, I traveled around Colombia looking for the different building typologies in the different climates. Colombia is a very interesting country because it has the second-largest ecosystem after Brazil. As Julian Restrepo from Taller Architects said, each different ecosystem brings a different culture. More ecosystems and more different cultures also mean more architectural typologies. Thanks to the fieldwork and research at Colombian universities, I was able to collect data on Colombian architecture, from examples of pre-Columbian and indigenous to examples of colonial, modern, and contemporary architecture, with testimonies from architects scattered throughout Colombia. Finally, the most important way to get to know Colombian architecture was to talk to architects from the country itself and to have the opportunity to read books by architects and professors from Colombian universities. To answer the research question, I will show the interviews with the architects and their projects, as well as the places I was able to visit with the most interesting information about them.

Interest of knowledge:

- What are the most common construction typologies in Colombia?
- Which materials are used in this country?
- How are they combined?
- How does the use of materials and construction typologies differ in response to the different climatic zones?
- How does society respond to architecture?
- How has building construction changed over time?
- How do today's various architects respond to European and North American influences?
- Are traditional constructions still used or maintained?
- What are the prospects for future construction in Colombia?
- Which architects and craftsmen can be a good example of architecture from which we can learn something for the future?

methodology

A qualitative, empirical research approach is used to answer the research question. In order to be able to best analyze Colombian architecture, field research was carried out, thus giving me the opportunity to visit almost all the places covered in the thesis. Also accompanying me on the trip was Sebastian Wack, who helped me with the Spanish language for communication, especially during the interviews, when my knowledge of the language was still not enough to express myself clearly. The research trip started on October 19, 2022, with the arrival in Bogotá, and ended on November 19, 2022, with the return to Vienna. In the span of exactly one month, we had the opportunity to travel through almost the whole of Colombia. From October 19 to 23, 2022, we were in Bogotá. Here took place the interviews with Ana López Ortego, Harold Guyaux, and Naira Viviana Perenceja from Arquitectura Expandita on October 21, 2022, and the interview with Julian Restrepo from Taller Architects on October 23, 2022. In Bogotá, we also visited the Universidad Nacional de Bogotá, where we also met an architecture student, Miguel Pollo, from the student council, who explained to me how the university works. He could not tell me about indigenous or vernacular architecture, as it is not a subject that the students go into much depth about.

At the National University of Bogotá, we spent a whole day in the library looking for texts that could also guide us in our journey and especially in our research.

On the evening of October 23, we then flew to Cali, Valle del Cauca, where we stayed until November 4, 2022. During the days in the Valle del Cauca, we also visited Montebello, Tuluá, Andalucià, Sevilla, Roldanillo, Filandia, and Salento. In Cali, we was able to talk with the architects Andrés Hoyos and Olga Milena Cadavid of OM Arquitectura y Urbanismo, and with the director Gloria Patricia Sarria Giraldo and the teacher Andrés Mauricio Guayara Rincón of the school designed by Andres Bäppler, Colegio de las Aguas, while in Andalucia, I interviewed Alvaro Chaparro Roldan.

During my days in Cali, we went to the Universidad del Valle, and here too we were able to find books on the history of Colombian architecture and on guadua, material specific to the area. On November 4, 2022, we moved to the north of Colombia to visit Cordoba and Manizales. On November 6, 2022, we left for Medellin, where we stayed until November 9, 2022, and interviewed two junior architects, Andrés Rodriguez and Daniel Monroy of plan:b, on November 8. Medellin is one of the few destinations from which it is possible to connect to Bahia Solano on the Pacific coast, where we stayed from November 9 to 12, 2022, and where we were also able to visit El Valle, both coastal places in the Chocó

region. From Bahia Solano, we flew back to Medellin in order to catch a flight to Cartagena de Indias. Unfortunately, the railway network that once connected Colombia no longer exists, so the only way to get from one place to another is by private car, bus, or plane.

From November 12 to 13, 2022, we were able to see the cities of Cartagena de Indias and then Santa Marta. Near Santa Marta, there are connections to Parque Tayrona, where we stayed from November 14 to 17, 2022. From here, we then had to return to Bogotá, where we stayed for two more days before returning to Vienna.

In Vienna, I was able to continue my research, through books and websites where I could find more information to go deeper into the theme. At the end of April 2023, I was able to video call with two other architects, who planned and built some interesting projects in the department in the north of Colombia, La Guajira. On the 29th of April 2023, I videocalled with Juan Salamanca Balén, and on the 1st of May, I called with Dario Ernesto Angulo Jaramillo.

19th-23rd october	Bogotá
23rd october - 4th november	Cali, Montebello, Tulua
31st october - 2nd november	eje cafetero
4th - 5th november	Cordoba
5th - 6th november	Manizales
6th - 9th november	Medellin
9th - 12th november	Bahia Solano, Chocó
12th - 13th november	Cartagena
13th - 14th november	Santa Marta
14th - 17th november	National Natural Parl Tayrona
18th - 19th november	Bogotá

Using literature mainly found in Colombian universities, the Universidad Nacional de Bogotá and the Universitad del Valle (near Cali), some facts can be discussed and compared. The site visits clarified and supported some facts, since I personally had the opportunity to visit most of the places discussed in the thesis. This allowed me to process the necessary information based on personal experiences, conversations with locals, and literature. In addition, interviews with architects, artists, craftsmen, and locals allowed me to better understand the Colombian architectural situation.

During the site visits, I was able to take notes and, especially, photographs of the various elements and buildings, thus collecting documentation.

For the interviews, I always used the same questions, from which the architects drew inspiration to focus on the different topics of their interest. The questions that I prepared as a basis for the interviews were the following:

- How much does traditional architecture influence contemporary architecture? Is there a present reference to vernacular architecture in your projects? In terms of materials, room divisions, and the use of construction methods.

- Do you have any advice on what we should particularly learn about traditional Colombian architecture? Does it change according to the type of construction?

- What can we learn from traditional architecture? Which of your projects reflect more or some elements of traditional architecture?

- Do you notice, or have you noticed, a modernization, Europeanization or Americanization of architecture, especially by small private individuals?

- How do you work with Colombian architectural heritage? What are examples of Colombian architectural heritage?

- Is there anything that you consider extremely important for today´s architecture?

- From your inquiries and tenders, do you notice a greater demand in the public for modern concrete buildings or more different buildings?

- How do you see the use of guadua bamboo, for example?

- What is the architectural process like in Colombia?

- Is the city constantly expanding, in which case how important is the architect?

- What projects are you currently working on?

aim of my work

My research is structured like a journey through Colombia, explaining zone by zone the climate and environment of the region, as well as the historical and social data. I continue with the analysis zone by zone of architectural main styles, typologies, and building constructions.

It is important for me to understand how these styles developed differently and were influenced by the climatic zone and the environment. For contemporary architecture, my aim is to understand if it is still influenced by traditional indigenous architecture.

To do that, I used the examples of the architects I interviewed, their buildings, and other examples I found in the region.

In my thesis, I am using the word *indigenous* to define the traditional architecture of the Colombian inhabitants, who still build and live like before the advent of colonialism. Most of the time, such communities live separated from modern society and cities. Indigenous architecture can be pre-colombian and also contemporary architecture.
The term traditional shows the link to old architecture practices, without defining the era or the construction typology. At the same time, vernacular means an architecture that is built without the need for an architect.

introduction

In October 2022, I had the opportunity to visit Colombia for the first time in my life, and I was extremely fascinated. During the trip, we traveled all over the state with the aim of seeing and learning as much about the architecture as possible. One of the things that particularly impressed me was the strong territorial division due to the different climate zones. Colombia is located on the equator, which means that every day has the same length and the temperature has little variation, as do the weather conditions throughout the year, so there is only one season the whole year. This is not the same throughout the country, as it depends on the climate zone. Colombia is a very large country, almost four times the size of Germany, and has most of the different climatic zones that exist on earth.
Given these conditions of the land, the architecture also depends very much on the place where it is to be built, for it may be in a very dry desert or in a very humid forest. These very specific climatic zones led to a great differentiation of flora and fauna as well, which led to a different development of the tribes living in the climatic zones. This means different cultures. It also means different architectural features. This inspired me to write about Colombian architecture. During the trip, I was very surprised to find both great and terrible solutions to the surrounding environment and climatic conditions. The aim of this thesis is also to help raise awareness of different cultures and biodiversities.[1]

This work is like a logbook of my trip to Colombia. The areas I visited that interested me the most are: Bogotá, the Valle del Cauca, Medellin, and Manizales, the department of Chocó, the Sierra Nevada de Santa Marta and Cartagena. The departments of La Guajira and Amazonas interested me as well for their particular architecture. The peculiarity of these areas lies not only in the different building materials but also in the fact that, depending on the area, we find different demographics with different histories, sometimes very strong traditions, and sometimes younger ones that mix strongly with more older ones.
Using examples of indigenous, historical, colonial, and modern architecture, I would like to describe in this thesis the architecture of a country with 40 million inhabitants and 65 different languages spoken.[2]

Before leaving for Colombia, I contacted several architecture firms and asked for the opportunity to meet them and talk to them about their work and what they know, perceive, and think about Colombian architecture. It was very interesting to learn about other ways of thinking about architecture. As the climatic and environmental conditions are different from those in Europe, I was very curious to learn how some of the Colombian architects worked and still work today. At

1 interview Taller Architects with Julian Restrepo on the 23rd october 2022 in Bogotá
2 interview Taller Architects with Julian Restrepo on the 23rd october 2022 in Bogotá

fig.2 Sevilla, Eje Cafetero

"There is no single architectural solution for the whole of Colombia."[3]

the beginning of the trip, I tried to find out as much as I could about Colombian vernacular architecture and the origins of Colombian architecture. I thought that such indigenous low-tech solutions, mostly built sustainably, could be a good example for contemporary architecture. For my comprehension of architecture, it is very important to adapt to the environment, traditional knowledge, climatic, and regional conditions and to responsibly choose colors, materials, textures, shapes, and locations that are crucial for the expression of cultural and regional characteristics. [4]

After the first days and interviews with Colombian architects, I understood that the three columns of good sustainable architecture (ambiental, economic, and social) are very important in Colombia too. Therefore, the focus of this thesis is more on the environment (social and ambiental). The material issue follows the environmental issue because, in this case, it is better to use what can be found nearby.

In each chapter of this thesis, I will explain a different region or city in Colombia and the architecture, materials, and buildings we can find in that specific climate zone. The work serves to bring examples ofarchitecture from all over Colombia because of the different techniques and climatic or environment-adapted solutions.

With this work, I want to show how many other techniques and possibilities there are to build rather low-tech following the tradition that could also be applied to the needs of today. Some of these are cheap and quick to build, but above all, they respect the environment in which they are used. The goal is supposed to be to acquire knowledge from typical, local, and historical processes and procedures that can then be reincorporated into contemporary life.[5] We must reconsider design and have greater faith in traditional architecture, which was developed with an awareness of climatic and geographic extremes by using particular shapes and materials or adapting to the environment.[6]

"The importance of these techniques must be borne in mind, as most of the time they have been used for millennia and are therefore to be valued and learned, helping where necessary with our possibilities in the modern age."[7]

3 interview Taller Architects with Julian Restrepo on the 23rd october 2022 in Bogotá, translated from spanish by Alice Benussi
4 Piesik, Sandra (2017): Habitat. Traditionelle Bauweisen for den globalen Wandel, Edition Detail, München, 426
5 Piesik (2017)
6 Piesik (2017)
7 Piesik 38, translated from german by Alice Benussi

When we talk about the architectural history of Colombia, we may find some similarities with the European one because, especially in the last centuries, people started to look for materials with which they could build very quickly and cheaply because the cities were growing very fast.[8]
Different climatic zones affect not only the availability of building materials but also the different needs of a building and the life inside it, with, for example, the need for good ventilation or insulation. To provide insulation or sheathing, reflect or store solar energy, optimize ventilation, or protect against strong winds, rain, snowfall, building forms, settlement patterns, building materials, and construction methods have all been developed and modified in response to weather and climatic conditions. However, today more electric systems, which mainly rely on non-renewable energy, exist because of fast technological innovation and advancement.[9]

"Architecture is ubiquitous, whether we admit it or not, and it plays such a crucial role in people's lives that it is increasingly important to consider its cultural and social dimensions."[10]

Every culture has its own social, spatial, and aesthetic values; traditional architecture is an expression of these. In every situation, new social dimensions occur in which housing forms, designs, building materials, and environments change, which must be recognized and taken into account. Buildings, cities, and cultural landscapes provide an in-depth understanding of our communities, our societies, and our economic fabric.[11]

"The traditional dwelling is not simply an isolated element within a culture but part of a system of symbolic representations, including which it acquires meaning."[12]

The transition from traditional to modern construction methods is made with the aim of creating modularity and breaking away from regional culture and the use of local materials.[13]

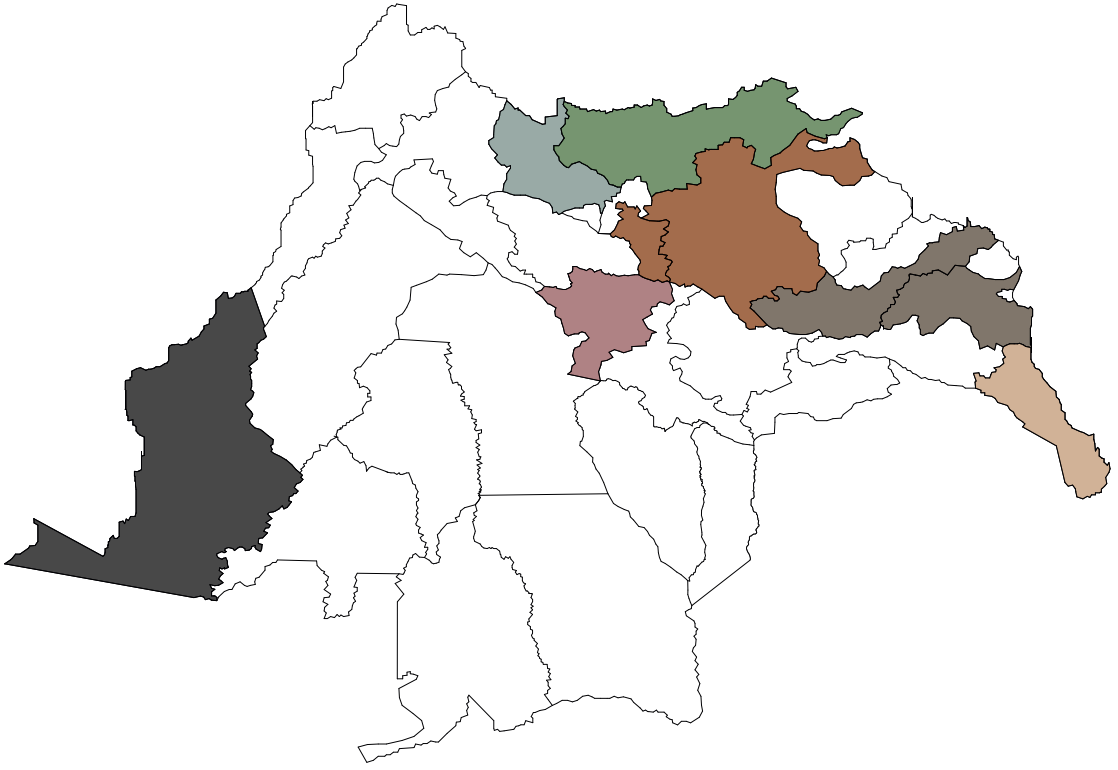
Similar passive cooling techniques and the use of similar building materials define temperate architecture.[14]

8 Piesik (2017) p.41
9 Piesik (2017)
10 Piesik (2017) p.43, translated from german by Alice Benussi
11 Piesik (2017) p.46
12 Piesik (2017) p.34, translated from german by Alice Benussi
13 Piesik (2017) p.49
14 Piesik (2017) p.303

"Rural areas feature pre-Columbian indigenous architecture adapted from Spanish and Portuguese styles. The coexistence of indigenous and colonial architecture is evidence of mutual cultural interpenetration while taking into account local climatic conditions and resources."[15]

fig.3 Cali, Valle del Cauca

15 Piesik (2017) p.303, translated from german by Alice Benussi



second chapter - COLOMBIA

fig.4 map of Colombia with the visited departments highlighted (p.30)

fig.5 map of Colombia

FAST FACTS

- OFFICIAL NAME: Republic of Colombia
- FORM OF GOVERNMENT: Unitary presidential republic, Gustavo Petro president
- CAPITAL: Bogotá
- POPULATION: 52,156,254
- AREA: 1,141,748 km2
- OFFICIAL LANGUAGE: Spanish
- MONEY: Colombain peso (COP)
- AREA: 439,619 square miles (1,138,910 square kilometers)
- MAJOR MOUNTAIN RANGES: Andes, Sierra Nevada de Santa Marta
- MAJOR RIVERS: Magdalena, Cauca, Atrato, Sinú[1]

1 https://kids.nationalgeographic.com/geography/countries/article/Colombia March 2023

Referred to as the "Gateway to South America," Colombia is the continent that connects South America with Central and North America. The second largest Spanish-speaking population in the world lives in this country, which is the fifth-largest in Latin America. In this state, you can find vulcanoes and other huge mountains with snow throughout the whole year, as well as multiple seaside locations on the Pacific and Atlantic oceans. Along with tropical forests, deserts can also be found. In fact, this is one of the nations with the greatest biological diversity. The ecosystems of Colombia's forests have mostly remained unaltered over millions of years. This has allowed animals to diversify into a wide range of species.[2]

Colombia is divided into 32 departments. Through the thesis, I will analyze the architecture of multiple of those.

Colombia's exports include a wide range of goods such as coffee, bananas, coal, oil, gold, platinum, and emeralds, as well as illegal drugs.[3]

The first inhabitants of Colombia arrived in the 5th century BC, and they were the Chibchas. From this group, other groups later emerged.
The Muisca, a highly developed society, emerged from the Chibcha and developed culturally and technologically. From that point on, a dozen cultures developed around Colombia until the advent of the Spaniards around 1500.[4]

1549: Colombia was defined by Spanish colonization until 1819, when Spanish troops were ultimately routed by Colombian forces under the command of the Venezuelan Simón Bolvar. [5]

After this event, the New Granada country was founded in 1835 and existed until 1856.
In 1886, it was already separated from Venezuela and Ecuador under the name of the Republic of Colombia.[6] Following the first part of the 20th century, Colombia also saw some bad times with guerillas and the drug trade.

2 https://kids.nationalgeographic.com/geography/countries/article/Colombia March 2023
3 https://www.britannica.com/place/Colombia/Economy May 2023
4 https://www.colombia.co/en/colombia-country/pre-columbian-era/#:~:text=The%20Chibchas%20are%20the%20first,Colombian%20territory%3A%20the%20Chibcha%20family. May 2023
5 https://www.chimuadventures.com/blog/2017/05/colombia-from-the-beginning/ May 2023
6 https://history.state.gov/countries/colombia#:~:text=From%201830%20to%201856%2C%20the,separated%20from%20Colombia%20in%201903. May 2023
7 https://kids.nationalgeographic.com/geography/countries/article/Colombia March 2023

"Thousands of years ago, Colombia was nearly completely covered in jungle. But people have cleared most of the trees to create farmland, and now only a handful of areas have their original forests. The government has set up several national parks to protect habitats, but damage to the environment continues."[7]

fig.6 tropical forest, Chocó

history of colombian architecture

In South America, there were already Paleoindian hunter-gatherer peoples around 10,000 years ago whose lives developed into villages due to the cultivation of maize, thus founding various tribes throughout the Colombian country.[8]

Historic Colombian architecture can be divided into four levels: 1. Paleoindian level; 2. Formative level; 3. Hunter level; 4. Village level.

The first level, the Palaeoindian level, is characterized by Tequendama rock shelters. These are the oldest dwellings on Colombian territory. The rock caves cannot entirely be called architecture, but at least a place of shelter in which to live with a fire zone, near which there must have been a kitchen and an area dedicated to the manufacture of hunting tools. Initially, nomadic groups stayed in these rocky caves for short periods, but gradually they began to stay longer. The theme of fire as the center of life, both from an architectural point of view as a source of light and heat and also as an element of fear for animals, remained in later periods, acquiring symbolic and religious characteristics.[9]

The second level was the tribal formative level of the communal house. At this time, architecture really began to take shape, defined as an artificial framework for living human activities. Coming from a nomadic situation, it is very likely that the first forms of architecture were communal houses, in which all the people of the group lived together. Most probably, the architecture of these communal dwellings was similar to that of the Amazonian *malocas*, also made of perishable materials for which no remains have survived. The materials used for these types of buildings are predominantly natural and can be found in the surrounding environment (generally wood and palm).
These buildings had a lifetime of 10 to 15 years. The group and the level of technical innovation used in the building determined the size and form of the floor plan, which could be round, oval, or rectangular, with a capacity for 80 people. The communal home served as the community's sanctuary, a place of prayer as well as accommodation, where, separated into families, residents could sleep in hammocks. The holy fire, where religious ceremonies were performed, was located in the middle. The beams, doors, walls, weave of the roofs, etc. each and every one of the building elements possessed a magical charge, which varies depending on the specific mythology. Protection, order, culture, womb, principle.[10]

8 Serna Cardenas David (1985): La arquitectura en colombia. Universidad Nacional de Colombia facultad de artes
9 Arango Silvia (1982): Historia de la arquitectura en Colombia. Universidad Nacional de Colombia
10 Arango (1982)

The third level is that of the hunters, with the first villages and the first underground tombs. The development of the tribes began in the rainforest, moving only later towards the Caribbean coast. From 1000 B.C. on, the tribes were quite developed and scattered over a large part of the country. Crucial was the transition from root to seed horticulture, as it changed the social organization of these groups. Cultivation from seeds could allow for growth in the population and extension to more areas of Colombia. In this way, it developed differently over the centuries, characterized by regional and climatic conditions. Thus, the tribes began to organize themselves with the specialization of certain trades, such as potters, goldsmiths, soldiers, and weavers, who developed richer ceramics as well as more elaborate architecture. In this third hunter-gatherer period, the groups organized themselves into two settlement patterns: one in an isolated house, and one, in villages, remaining grouped together as related people belonging to the same culture. The village was also interpreted as a physical unit and was protected by thick, thorny tree fences so that not even a man could pass through. Typically, two rows of enclosures were built, like a wall and a counter wall, with about 1.5 to 2 meters of space between them. The door to enter the village was placed so that these people would be completely sheltered.[11]

"The village was perceived as a unit made up of parts."[12]

The most important building was that of the tribal chief, the political and religious leader. An example is the indigenous Kogi, who lived in villages in two different types of buildings: the social center and the ceremonial center. The dwellings are the social center of the village and tend to be organized around the ceremonial house. Each dwelling always has a lit fire, a meeting point for the family, where women and children eat and sleep. On the other hand, the ceremonial house is a place for religious ceremonies and men-only meetings, like a dormitory. This house symbolizes the universe, and its different parts have other symbolic meanings. Birth, the sexual act, and death took place outside the house since the concept of home was spreading over several buildings and no social or ceremonial house was a permanent residence for them.[13]

Another example of the third level can be found at San Augustin and Tierradentro because of the monumental underground tombs that were found at this site, together with impressive stone statues. No architectural archaeological findings

11 Arango Silvia (1982)
12 Arango Silvia (1982), translated from spanish by Alice Benussi
13 Arango Silvia (1982)

fig.7 statue from Tierradentro (p.36)

fig.8 rock shelters, Tequendama

fig.9 Hypogea, Tierradentro

fig.10 Hypogea, Tierradentro

were made, but a series of tombs helps to understand what the architecture might have been like. These areas were populated by different social groups over the last 5000 years. Along with the funerary architecture, extensive Augustinian statues were also found. The necropolis was located on a hill with two plateaus joined by a central road, or ramp. On one of the two plateaus, ten monocles were found, logos in which the tombs were arranged in a circle, with an entrance area where the central road led. The most ornate tombs often have a burial room with a sarcophagus and offerings before an entry passage. After that, everything was covered with flat slabs, followed by an earthen mound. A sculpture, perhaps a guardian god, or two sculptures on either side of the entryway served as sentinels to watch the entrance of the tomb. The deceased person's likeness was depicted on the sarcophagus's lid, which was similarly carved. Yellow, crimson, and black paint were used to decorate the walls and sculptures as well as the burial chamber. Instead of being a temple, this underground construction was a tomb in the shape of an enclosure for the dead because the lowered height did not permit normal humans admission. The reduced or simpler structures represent the elaborate social system, with a hierarchical structure based on trades. The surrounding communities of the living stood against the exuberant necropolis, which was a village of the dead.[14]

Hypogea, collective tombs, have been found at Tierradentro. Hypogea are the dwellings of the deceased; they are arranged by family or class within the necropolis as a whole and are modeled on the dwellings in which they lived. The social order that must have governed this civilization was also clearly indicated by variations in the style of roofs and the level of ornamentation and elaboration. It is important to note that the construction of these intricate underground structures required the specialized assistance of architects, builders, sculptors, painters, and other craftsmen. It is estimated that this coordinated effort took an average of one year. The 200 hypogea discovered so far are distributed over several locations, including Alto de San Andres, Segovia, El Duende, and Alto del Aguacate. The hypogea consisted of underground chambers dug into the rock, oval in shape and decorated with colors such as black, yellow, and red. Their dimensions ranged from 3 to 8 meters in length and 2.5 meters to 5 meters in width. The entrance to these tombs was formed by steps, a sign that they were also used for celebrations, probably with the function of a temple. The largest hypogea had peripheral columns that leaned against the wall to create niches and two or three free-standing central columns. The niches, like the rest of the surface, were decorated with geometric motifs, while the columns typically depicted painted human figures. In these

14 Arango (1982)

cases, the hypoges reproduce the lifestyle of these populations. The structures that developed in this area had a circular design without central support and converging beams. These latter types of houses are represented in the hypogea of Tierradentro, where central and peripheral columns can be seen. In this case, the palm-shaped weave of the walls is represented by the rhombic surface design. The artwork also depicts the beams and rafters, some of which are even carved.[15]

The fourth level deals with the indigenous tribes of the Tayrona and Muisca. These great cultures were in the middle of development when the Spanish colonizers arrived. Interrelational hunting was at the basis of the organization of these societies, which were beginning to organize themselves into social classes and job specializations. The Tayrona, residents of the Sierra Nevada de Santa Marta, probably settled between the 11th and 12th centuries, as defined by the pottery and other materials they used. This social group was organized on the Buritaca River on several terraces, which were referred to as Ciudad Perdida in 1976. The Tayrona used terracing as the unit of measurement for their villages. The terraces were built with stones and supported by stone walls. Each terrace had a circular area on which the dwelling was later built. Based on the size and shape, one could understand the use and hierarchy of the construction. Similar to the Tayrona, the Kogi are today organized, with circular dwellings of wood and earth on a stone base.
Density is the key distinction between modern Kogi villages and traditional Tayrona villages. The upper Buritaca's spatial complex is more than just the union of its neighboring villages; instead, it suggests an urban network that is thought of as a whole. Unlike the Spanish, who apparently had not recognized cities in this extensive territorial conquest, the Tayrona's urban concept was being formed through the succession of structures along a route rather than by physical continuity.
The Muisca lived between 1450 BC and 1500 AD, a period from which ceramics, rock drawings, and traces of buildings have been found. There is no doubt that the Muisca were living in the Andean highlands, which today approximate the Sabana de Bogotá and a portion of the departments of Boyaca and Santander, when the Spaniards arrived in 1537. Within these areas, a sophisticated unitary culture emerged and took control of stationary farming.
Muiscas counted more than a million people at the time the Spaniards arrived. The Muisca possessed a sophisticated cosmology centered on the veneration of the sun and moon, fairly accurate calendars, and a robust mythology. As a result, the majority of people focused on farming. There were also groups that were skilled in weaving, military crafts, goldsmithing, and the mining of salt or emeralds. It is

15 Arango (1982)
16 Arango (1982), 28, translated from spanish by Alice Benussi

fig.11 terraces, Ciudad Perdida

"In the area of the Upper Buritaca, they found around 170 terraces, organized into eight distinguishable sectors. Seven of them have a similar internal hierarchy: the largest corresponds to terraces with small stone rings, possibly dwelling areas with areas between 12 and 50 m^2, and some terraces with more open areas and larger rings probably dedicated to home worship and gathering with areas between 50 and 75 m^2. The eighth sector consists of a series of terraces connected linearly by a central axis. This sector was possibly a ceremonial centre with buildings for the guests of the civil and ecclesiastical hierarchy and collective ceremonies."[16]

also likely that there were also skilled architects and painters. The Muisca lived in enclosures with buildings arranged in orthogonal shapes. The shapes and sizes were defined by the use and hierarchy of the building. For the Spaniards, each Muisca enclosure corresponded to a village, as they had large dimensions and many buildings within them. In each building lived a chief with his family, slaves, and personal guards. The buildings within the enclosure were not only dwelling houses but also storerooms for food and armaments, private or public temples, and burial places for ancestors. Within the enclosure, there was a 2.5 km long road that connected the main enclosure with the temple and served as a road for important ceremonies and religious processions. The houses were built with large patios and were very colorful and elaborate; the interior had paintings, and the entrances had gold pendants that shone in the sun and made tinkling sounds. Monuments were also built for rituals or as astronomical observatories. In conclusion, many of the indigenous constructions were destroyed by the Spanish conquest, as were the differences in architecture and urbanization in the various Colombian regions.[17]

However, the development of the indigenous cultures was halted with the arrival of the Spanish conquerors, when the pre-existing populations were decimated and their cultures annihilated, and the first Spanish constructions began to take hold. The first settlements on Colombian soil by the Spanish conquistadors were forts or palisades to defend themselves against attacks. An example of these is the fort of Doña Luisa de Espada, probably built in the 16th century in Guadalajara de Buga, whose vestiges still remain today. However, it took about two centuries for the Spanish to develop and establish urban structures. They often involved the destruction of what was there before in favor of a newer architecture, creating alterations and extensions. In addition to forts, part of this architecture developed in the form of haciendas, where farmers could work.
To lay the foundations for new villages and the construction of new houses, the Leyes de Indias (laws of the indigenous people) were written. These laws were used between 1514 and 1680 by the Spanish colonizers to regulate the founding of towns. However, these standards were mostly used as a general outline because the establishments still had to be adapted to the climate, topography, and pre-existence of the indigenous tribes; similarly, these laws were writtenas new villages were founded by the military, which had very precarious urban planning knowledge.[18]

17 Arango (1982)
18 Serna Cardenas (1985)

Cartagena, for example, from the 16th to the 18th centuries, was the center of the gold trade from Colombia to Spain and, for this reason, the most important city in the whole of Colombia. It was therefore a city rich in colonial architecture, characterized by heavy architecture, open patios and courtyards.
The first city to be influenced by modern architecture was Baranquilla. Architecture was modernized in two waves, the first between 1900 and 1940, which saw architecture as a tool for building a city. During this period, the country's first two schools of architecture were founded, one in 1936 at the Universidad Nacional de Bogotá and one in 1942 at the Universidad Bolivian Pontificia in Medellin, a period in which the architectural influence on city infrastructures became important. The most important architects in Colombia at this time had trained mainly in the US and Europe, so they had a completely new approach to Colombian architecture. There was then a second wave of Colombian modernization, starting in the 1950s with the adoption of modernism as Colombia's national architecture. During this period, concrete and brick began to be used and established. The architects Sert and Le Corbusier were certainly accomplices in this modernization; the first was able to transmit an urban planning culture, which still survives in the city of Medellin, while the second was the teacher of two great Colombian architects, Germán Samper and Rogelio Salmona. Samper was the one who remained most attached to concrete and realized projects such as the Museo de Oro. Salmona, on the other hand, was the protagonist of brick. Both were at the center of the national debate at the time, so everyone in Colombia followed their example, even in other regions, to such an extent that modernism is still considered an important Colombian architectural period. Soon the prevailing perception was that Colombian architecture was built in bricks as the best response to local conditions, and that no one else but Salmona could embody this reality.[19]

19 Mehrotra, Rahul; Echavarría, Camilo; Restrepo Ochoa, Camilo (2022): a+u 2022.03 Colombia. Architecture and Urbanism magazine. Shinkenchiku-sha Co, Japan

fig.12 rock shelters, Tequendama
fig.13 Hypogea, Tierradentro

From the 1960s on, there was a beginning of globalization, but this period was characterized by the guerrilla wars all over the country and later by Pablo Escobar's period of power, where little architecturally relevant was built. In these years, many people moved from the countryside to the city. A second period of globalization can be found between the end of the 1990s and the present day, whereby cities were formed through the societies that inhabited them. On the other hand, it is characterized by an almost fragile architecture, whereby even many of the historic buildings have been or are still being demolished, and the figure of the architect has almost no significance.[20]

20 Mehrotra, Rahul; Echavarría, Camilo; Restrepo Ochoa, Camilo (2022): a+u 2022.03 Colombia. Architecture and Urbanism magazine Shinkenchiku-sha Co, Japan

fig.14 village, Ciudad Perdida
fig.15 house, Muiscas

In conclusion, by analyzing the centuries and the different regions, we can define different architectural types in Colombia. The first is the canopy, which is used as a shelter; hence, the architecture open on all sides and public. The form of this is its very structure, which is usually built in two materials, working more on an architecture that is an extension of nature. The second type is that of the porous cave, where the perimeter of the house is more monolithic but may have windows or openings to maintain communication with the outside. These caves may be characterized by internal patios, as in the colonial architecture of Cartagena. These two types are the most frequently found in Colombia, according to the buildings and architectural styles I analyzed.[21]

21 Mehrotra, Rahul; Echavarría, Camilo; Restrepo Ochoa, Camilo (2022): a+u 2022.03 Colombia. Architecture and Urbanism magazine Shinkenchiku-sha Co, Japan

climatic zones

Between the equator and the 15th and 25th parallels, there is a region of the world known as the tropical climatic zone. With monthly average temperatures of 18°C or higher and a lot of rain, sometimes exceeding 1500 mm, it is typically warm all year round.
Tropical climates are characterized by a huge diversity in traditional architectural elements because they are determined by their respective geographical and regional characteristics.
The knowledge about the various ecosystems and the comprehension of the weather conditions allow for an adequate architecture, which can change from region to region if the inhabitants have a connection to nature. The materials that are easier to find in the tropical regions are local plants like wood, coconut, raffia, sago, and rotang palms, as well as various grasses and climbing plants, sometimes together with clay and stone.
However, in order to be modern, concrete, corrugated iron, and even asbestos are replacing indigenous cultures and frequently distinctive traditional buildings on practically all continents today. There are hardly any methods for incorporating tradition into a regional urban layout.[22]

The year-round consistency of Colombia‘s climate is one feature that amazes visitors from other countries. This is due to the country‘s equatorial location, which means that dawn and sunset times are constant and there are no seasons like in most other parts of the world. The dry seasons in Colombia are from December to January and July to August, whereas the wet seasons are from April to May and October to November. This does not imply, however, that Colombia‘s climate is comparable. In actuality, Colombia‘s topographic diversity provides a wide range of landscapes, wildlife, and temperature floors.[23]

If we follow the Köppen climatic subdivision, the climatic zones would be the following:
Climas cálidos (hot climates): The climate in this zone is warm, with an average temperature between 23°C and 28°C. On the Pacific and Carribean coast, such a climate is easy to find. Most of the climatic zones are below 1,500 m above sea level.[24] [25]
Climas templados (temperate climates): The temperate climates are characterized by temperature ranges from 17 °C to 24 °C. Such climates are to be found in Medellín and Cali.

22 Piesik, Sandra (2017): Habitat. Traditionelle Bauweisen for den globalen Wandel, Edition Detail, München
23 https://colombia.travel/es/informacion-practica/clima March 2023
24 https://colombia.travel/es/informacion-practica/clima March 2023
25 https://regionesdecolombia.org/regiones-de-colombia-con-clima-calido/ March 2023

Climas fríos (cold climates): With temperature ranges between 12°C and 17°C, these are the cold climates that can be found in Bogotá.
Páramos and the *Zonas glaciares* (glacial areas): More rare are such climates like the paramos and the ones of the glacial areas, because here the temperatures are in a range from 6 °C to 12 °C and can go even below 6°C, such as in the Sierra Nevada de Santa Marta.
Selvas tropicales (rainforests): with temperatures over 27°C and hot and humid characteristics, climates like the rainforest are to be found in the Amazonas and in the department of Chocó.
Tropical de estepa (tropical steppe): The last climatic zone of Colombia is the tropical steppe. The main example of this climatic zone is La Guajira, where we can find very high temperatures, little vegetation, and minimal rainfall.[26]

If we take into consideration the climatic classification of Richard Lang, we will have six different climatic zones in Colombia.
To define these climatic zones, the average temperatures and the amount of rain that are to be found in the different departments are needed.
The first climatic zone is the *desertico* (desert), which can be found only in the department of La Guajira.
The climatic zone *arido* (arid) is mostly found on the Carribean coast, which comprehends Madgdalena, and Bolivar.
The climatic zone *semiarido* (semiarid) is partly found in the regions of La Guajira, Bolivar, and Magdalena.
The climatic zone *semihumedo* (semihumid) can be found in many departments of Colombia, mainly in Cundinmarca (Bogotá) and Valle del Cauca.
Humedo (humid) is a climatic zone that we can find in the departments of Amazonas, Antiquoia (Medellin), and Caldas (Manizales).
Chocó is the only region to have a big superhumedo climatic zone; in fact, it is an important characteristic of the department.[27]
Colombia is pretty well characterized by its diverse territories. Starting from the north, we can find the region of La Guajira, which has very desertic zones. Near that region is the Sierra Nevada de Santa Marta, with peaks up to 5700 m high, and very nearby are Santa Marta and Cartagena de los Indios, both seaside cities with a range of temperatures between 20 and 35 degrees. There are two cordilleras cutting through the whole country. On these mountains, we can find the cities of Bogotá, Medellin, and Cali, all of which have different temperature ranges and weather conditions. Bogotá is the more rainy and cold one, while Cali is the more sunny and warm one. The region of Medellin is in between. To these

26 http://atlas.ideam.gov.co/basefiles/clima-text.pdf April 2023
27 Castañeda Tiria, Paola Marcela: Zoning by climate model Caldas - Lang Black river basin using geographic information system SIG April 2023

climatic zones, we have to add two others that are very humid: one on the Pacific Ocean, in the region of Chocó, and one in the Amazonas region in the south.

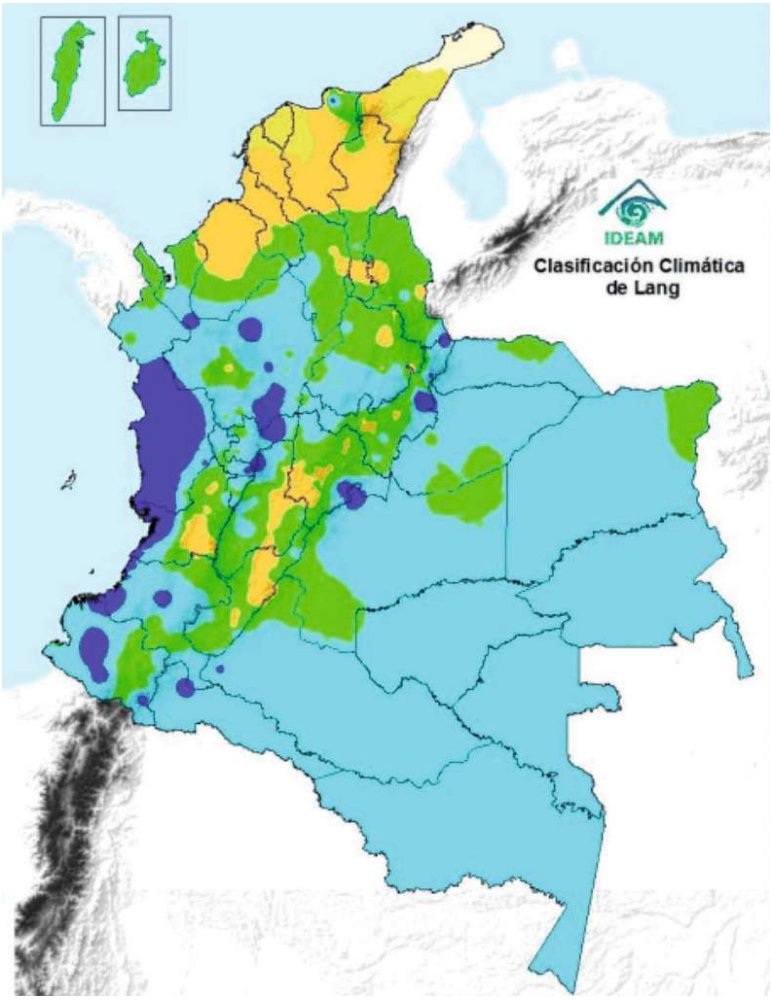


fig.16 climate zones, Colombia

In Colombia, there are no such seasons as the European ones, with very hot summers, very cold winters, and springs and autumns in between, but this has to do with rain and sun because the temperatures are the same throughout the whole year. The subdivision is mostly in rainy months and sunny ones.

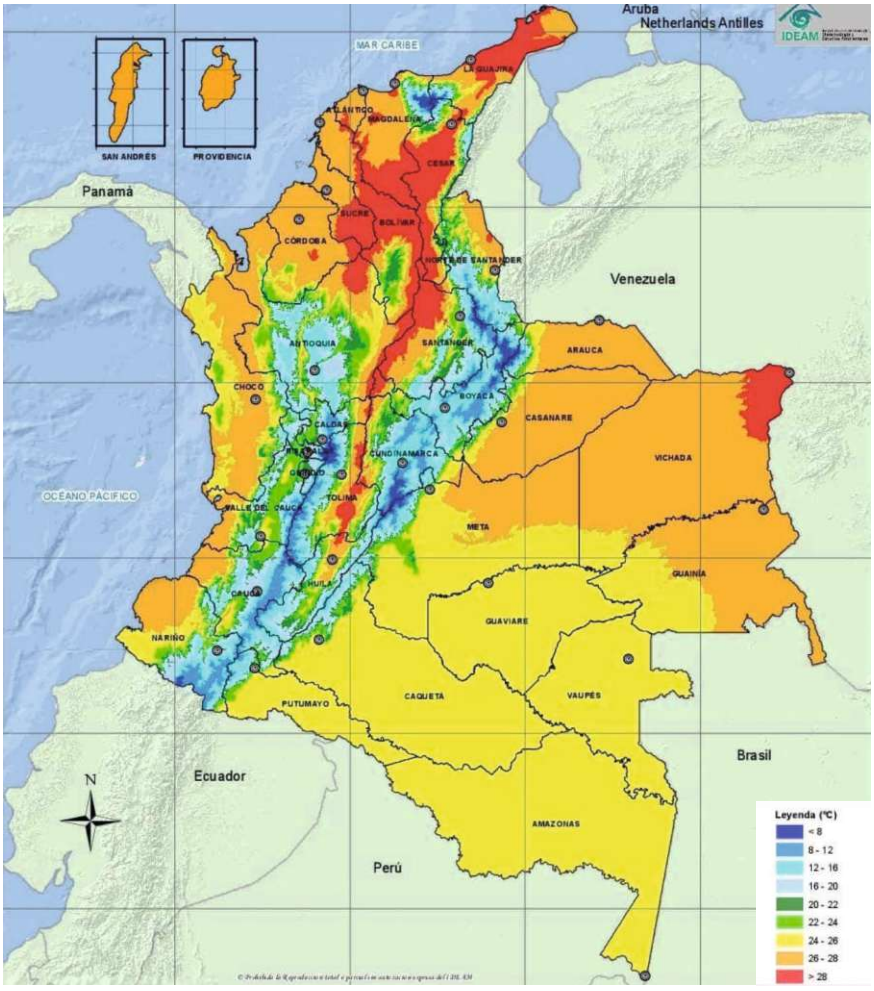


fig.17 temperature map, Colombia

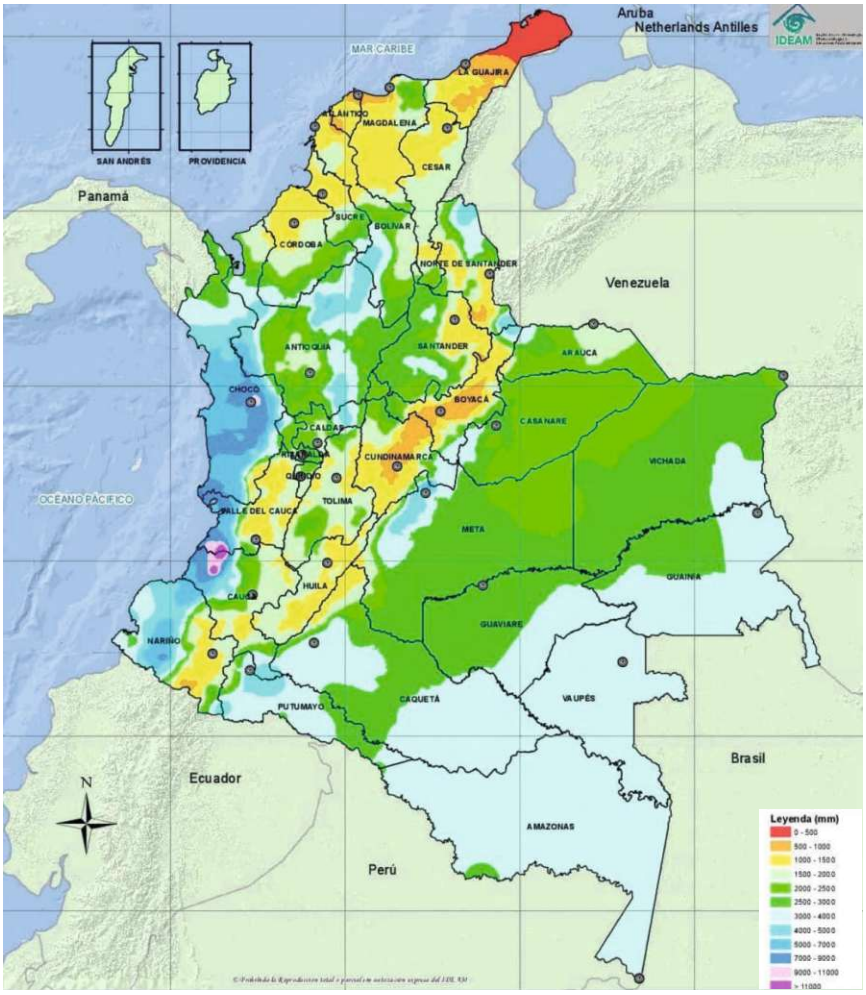
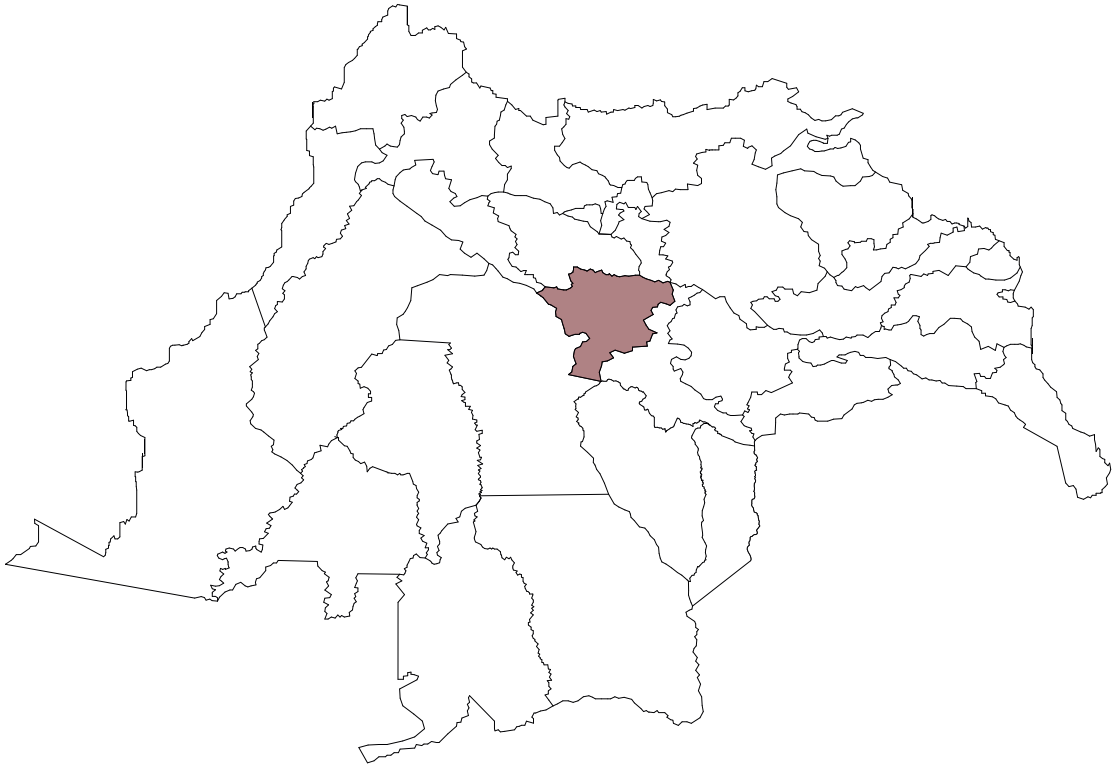


fig.18 average rainfall map, Colombia



third chapter - BOGOTÁ

Between the 19th of October 2022 and the 23rd of November 2022, we visited Bogotá.

Day 1:
On the 19th october we arrived in Bogotá.

Day 2:
On the 20th of October 2022 we went to visit the Universidad Nacional de Bogotá, where we had the chance to meet and speek with some Colombian architecture students, like Miguel Pollo. He told us a little bit about the architecture school in Bogotá. After that we visited the some of the buildings of the university, like the building 225 of Human Sciences graduate studies, which was planned by the architect Rogelio Salmona. This building is not only very beautifull, but it has also an important meaning for Sebastian, since there is the Auditorium Virginia Gutierrez de Pineda, which is the sister of Sebastian´s grandmother.
After seeing the building we went to the library of the university to search some interesting books about Colombian architecture.

Day 3:
On the 21st of October we went to see las Torres del Parque, the most famous building of Rogelio Samlona, student of Le Corubsier.
We went also to La Perseverancia, a very nice market with tradtional food, where Taller Architects made an installation during the pandemic of Covid19.
In the afternoon we met and interview the three activists of Arquitectura Expandida.

Day 4:
On the 22nd of October 2022 we visited the barrio of La Macarena, a district very influenced by english bricks architecture.
Later on we visited the barrio of Las Cruces, where we were able to see how the barrio looks like today.

Day 5:
On the 23rd of October 2022 we visited la zona Rosa, one of the most rich districts of Bogotá, where the feeling was to be in a completely other city. The 23rd was a sunday, and it was beautifull to walk thorugh the city, since some of the streets are closed to the car traffic. Later that day we had the opportunity to talk and interview Julian Restrepo from Taller Architects. And in the evening we flew to Cali.

fig.19 plan of Colombia, with Cundinmarca highlighted (p.54)
fig.20 Bogotá (p.57)

bogotá

Bogotá was founded by a Spanish conquistador, Gonzalo Jimenez de Quesada, in 1538. This event marked the beginning of Bogotá's history. In the middle of the 16th century, the city was regarded as South America's cultural and intellectual hub, thanks also to the construction of one university.
Bogotá became the Republic of Colombia's capital in 1819 and maintained its political independence up until about 1930. The first worker housing complexes were constructed as the city counted more than 100,000 inhabitants in the 1910s. In the 1930s, the first sky scrapers of Bogotá were built, and together with the rising costs, they made the population move from the inner city to the marginal neighborhoods. In the 1950s, when Bogota's population escalated from 550,000 to 900,000 inhabitants, the first barrios clandestinos (invasiones) were constructed without authorization and lacking infrastructure. Bogotá gradually started to invade the nearby countryside, leading to the development of a large city with more than 3 million residents. 1970-90 The city administration gradually lost control over the city's growth. The government's attempt to address the housing crisis with a social housing program was unsuccessful since the alternatives provided were not financially feasible for the immigrants, who were primarily from the lowest socioeconomic levels. The rapid population growth simply made socioeconomic divisions worse. In 1993, Bogotá had 5.5 million residents. Due to the city's rapid growth and the lack of any existing green spaces, modest gardens and avenues were constructed in the 20th century, leading to new suburban residential districts. Years later, the government had to legalize some of these sites due to the city's rapid growth and the municipality's inability to keep up.[1]

In Bogotá, where the issue of population increase is still present, it is still important to deal with invasions, also because today the city is simultaneously affected by the issues that Covid19 brought with it and those caused by the departure from Venezuela.
At the same time, Bogotá is a huge metropolis, with 8 million of inhabitants, which has grown rapidly in the last century. Today, we can still see that the city is getting bigger; in fact, as we were there, we were able to see that many districts were under construction, to create new living possibilities.

1 Hirsch, Wolfgang (1999): Selbstverwaltung am Rande der Stadt. Stadterweiterung in der Drittenwelt am Beispiel Bogotá/Kolumbien. TU Wien (pg.64)

ladrillo

"The soils in the Savana of Bogotá are very clayey, so it is very easy to use this material for construction, which leads to a large presence of the material in the Colombian capital."[2]

In Bogotá, the most visible and widely used material is *ladrillo* (brick). Bricks are made from a very simple recipe consisting mainly of clay, sand, and water. A *ladrillo* is a basic unit for construction, and for Colombia, is the symbol of the emerging civilization. A brick alone is worth nothing, but together. This material is used in most of Bogotá's buildings, both authorized and invaded. Perhaps the *ladrillo* is not appreciated by the Bogotans because of the abundance of this material, although it is very cheap and easy to produce.[3]

Ladrilleras and *chircales* are the factories and, the kilns where the *ladrillos* are made. These were able to shape the city with their social, economic, and cultural dynamism.[4]

"The name chircal derives from chirco, a very common shrub that grew on the city's hills and was used to light the kilns in which bricks and ceramic products were produced."[5]

At the same time, the name *ladrilleras* comes from *ladrillo*-brick. The history of the *ladrilleras* begins before the founding of Bogotá and before the arrival of the Spaniards. More than 3000 years ago, the Muiscas of Boyaca and the Savana de Bogotá had ceramic traditions and produced clay artifacts that are still found today. The Muiscas did not use clay for *ladrillos* for their constructions, but for pottery.[6]

"The first chircales appeared in Bogotá in the colonial era with the encounter between the traditional techniques of the Muisca and the techniques for ceramic construction that the Spaniards brought."[7]

During colonial times, the Spaniards enforced the use of bricks for the tiles of the *techas* (roofs) for the construction of houses and other buildings with an order, the *real audencia*.[8]

2 https://www.eltiempo.com/bogota/radiografia-del-ladrillo-en-la-arquitectura-de-bogota-541338 April 2023, translated from spanish by Alice Benussi
3 https://www.eltiempo.com/bogota/radiografia-del-ladrillo-en-la-arquitectura-de-bogota-541338 April 2023
4 https://archivobogota.secretariageneral.gov.co/noticias/historia-los-chircales-y-las-ladrilleras-bogot%C3%A1 April 2023
5 https://archivobogota.secretariageneral.gov.co/noticias/historia-los-chircales-y-las-ladrilleras-bogot%C3%A1 April 2023, translated from spanish by Alice Benussi
6 https://www.facebook.com/archivobogota/videos/882493769144140 April 2023
7 https://www.facebook.com/archivobogota/videos/882493769144140 April 2023, translated from spanish by Alice Benussi
8 https://www.facebook.com/archivobogota/videos/882493769144140 April 2023

At that time, *Chircales* gathered on the eastern hills, where it was possible to find raw materials for building, perfect for making bricks. This worked throughout the three centuries of Bogotá's colonial history. At the end of this period, the production method of the *chircales* changed until the 20th century, when the *ladrilleras* and *chircales* went through a phase of modernization as many technological changes took place. Firstly, coal was used as fuel instead of wood. Secondly, the types of kilns changed, with more powerful and faster machines. However, this did not lead to a complete industrialization of the material, as there are still some artisanal *ladrilleras*.[9]

"These are the ladrillos with which part of Bogotá was later built."[10]

At the beginning of the 20th century, *ladrillos* were only used for buildings in the south of the capital. It was not until the 1930s and 1940s that *ladrillos* began to be used more, following the English historic style of some European cities. Very important to this aesthetic is the La Merced neighborhood, which is still well preserved and has become a symbol of the city, although ironically, it is not entirely Bogotá´s architecture.[11]

What brought the *ladrillos* to the city of Bogotá? They built churches, popular houses, and much more. The *ladrilleras* are also extremely important for the history of self-building in some barrios of Bogotá, where the buildings are still self-built by the owners and are made of *ladrillos*.[12]

9 https://archivobogota.secretariageneral.gov.co/noticias/historia-los-chircales-y-las-ladrilleras-bogot%C3%A1 April 2023

10 https://archivobogota.secretariageneral.gov.co/noticias/historia-los-chircales-y-las-ladrilleras-bogot%C3%A1 April 2023, translated from spanish by Alice Benussi

11 https://www.eltiempo.com/bogota/radiografia-del-ladrillo-en-la-arquitectura-de-bogota-541338 April 2023

12 https://www.facebook.com/archivobogota/videos/882493769144140 April 2023

las cruces

In Las Cruces, we can *"encontrar la belleza oculta de esta ciudad"*[13] (discover the hidden beauty of this city). Las Cruces is a neighborhood that, since the 19th century, has been considered one of the roughest but also one of the most active in Bogotá. This neighborhood was considered uninhabitable because of the large amounts of clay and water (7 small rivers and the Río Sanjuanito) found in the area and because of the dark forest near it. Las Cruces is considered the first industrial area of Bogotá because of the Loza factory, which was the first one built there, and because it began to be populated by rural workers and artisans, who had always marked the popular, warlike character of Las Cruces. In 1832, some artisans arrived with machinery from England, where they also learned how these architectural structures worked.[14]

The architectural style of Las Cruces is mainly colonial, but since the beginning of the 20th century, it has been built with artisan materials.

"For many years, this historic neighborhood of Bogotá was inhabited by the indigenous population and poor communities who worked in the chircales."[15]

The seven streams, perfect for moving grain mills; the clay, ideal for pottery; but mainly the Chirca forests, attracted many businesspeople and pioneers to Las Cruces, following the lead of the Loza factory. Due to the fact that the wood *chirca* was used to cook the *ladrillos*, the older *ladrilleras* in Bogotá were known as *chircales*.[16]

In Las Cruces, the most important place for the inhabitants of the *barrio* was and is the main square, which was used as a parade ground and for military exercises. Above all, this square is very important for commemoration, decoration, and recreation. As in most districts and villages, in the main square there is a church, Nuestra Señora de Las Cruces, built in 1655. It was not until the end of the 19th century that Las Cruces really became a neighborhood of Bogotá. Here, the Plaza del Mercado was built in 1925 in the Art Deco style and restored in 2012. In the main square of Las Cruces, there is also the central fountain of La Garza. This monument was moved to the neighborhood after 1875.[17] In recent years, there have been several projects to revitalize the neighborhood, some of which were

13 https://www.youtube.com/watch?v=oqzo95woA0A YouTube video Callejando- Capitulo 2 El encanto de las cruces March 2023, translated from spanish by Alice Benussi
14 https://www.youtube.com/watch?v=oqzo95woA0A YouTube video Callejando- Capitulo 2 El encanto de las cruces March 2023
15 https://conexioncapital.co/fantastica-historia-las-cruces/ March 2023, translated from spanish by Alice Benussi
16 https://conexioncapital.co/fantastica-historia-las-cruces/ March 2023
17 https://conexioncapital.co/fantastica-historia-las-cruces/ March 2023

carried out by the architect Santiago Pradilla. The main goal of the revitalization is to increase the appropriation and confidence of residents in this heritage.

For the purpose of connecting multiple buildings in one location, Pradilla's interventions are typically made in the neighborhoods hidden behind the facade. He uses the creation of workshops for artists and the community, where people from various backgrounds have a place to produce their own things, as an intervention to better the suburbs.[18]

fig.21 church Nuestra Señora, Las Cruces

fig.22 invasiones, Las Cruces (p.65)

18 http://www.santiagopradilla.com/detalle/(1)-pasaje-las-cruces April 2023

rogelio salmona

Rogelio Salmona was born in France in 1927 to a Spanish father and French mother. Early in his life, Salmona moved to Colombia, where he was able to study at the Universidad Nacional de Colombia. In the early 1950s, he worked with Le Corbusier and learned to use the element of water. In 1958, he returned to Colombia and planned the *Torres del Parque* project. As can be seen in most of Salmona's projects, he uses *ladrillo*, or brick. Even though he learned from one of the greatest European architects, he has always tried to adapt his architecture to the environment and light of Colombia. For Salmona, the choice of *ladrillo* as a material for his buildings is a choice of ornament, because for him, the expression of the material is there to represent the city and its social impact. *"La buena arquitectura transforma sin modificar.* For Salmona, it is important that a good architecture can transform without modifying while respecting the natural environment in which it is located (*respecto por el entorno natural*).[19]

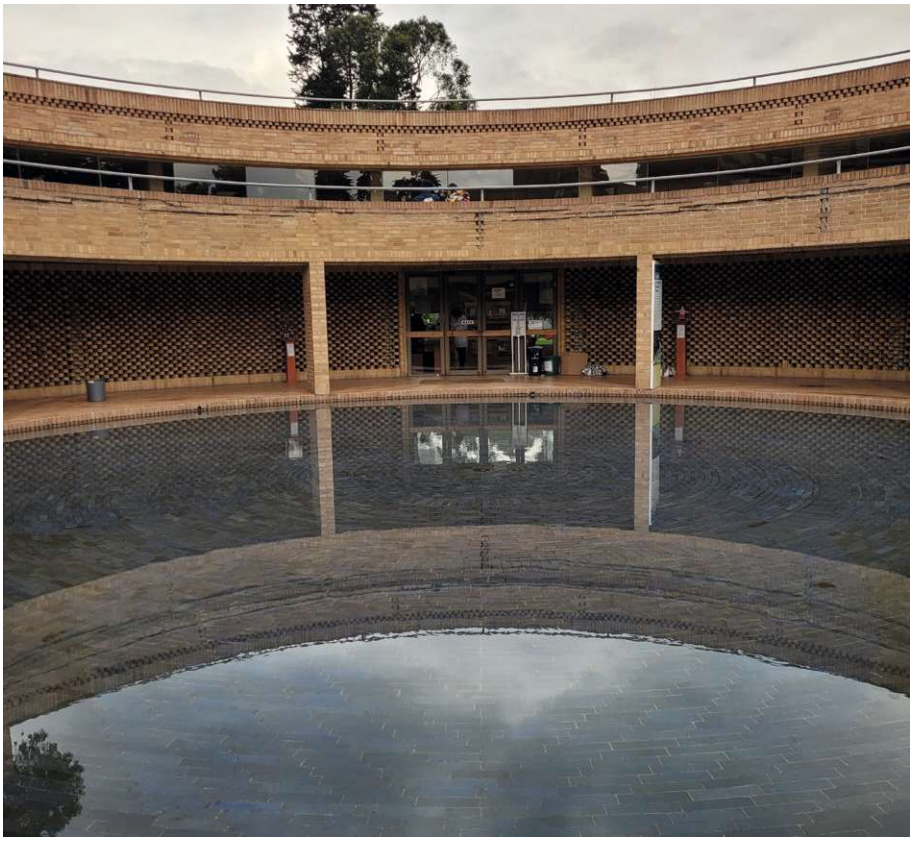
Other architects define him as the greatest Colombian modernist and Bogotá's maestro of brick. Salmona is the architect who most enriched the material of *ladrillo* in Bogotá, the city of red bricks. With Salmona, the use of *ladrillos* changed from a cheap substitute for stone to a sophisticated and detailed product. In his final ten years of practice, he produced many important commissions, some of which are still under construction.[20]

Torres del Parque (1964-70), Salmona's first significant undertaking, three residential towers and a park in the middle of the city, is widely regarded as his finest work.[21]

"He redefined the material.
The projects were completed by considering and pushing the brick's potential to its absolute limits. The areas where the curves intersected, the protruding edges, and the laces that showed the depressions underlined the challenges in using the blocks, and from that point, aesthetic suggestions developed."[22]

19 https://www.youtube.com/results?search_query=interview+rogelio+salmona March 2023
20 https://www.architectural-review.com/architects/a-tribute-to-rogelio-salmona-the-greatest-of-colombian-modernists-and-bogotas-maestro-of-brick March 2023
21 https://www.architectural-review.com/architects/a-tribute-to-rogelio-salmona-the-greatest-of-colombian-modernists-and-bogotas-maestro-of-brick March 2023
22 https://www.eltiempo.com/bogota/radiografia-del-ladrillo-en-la-arquitectura-de-bogota-541338 April 2023, translated from spanish by Alice Benussi

The National University Human Sciences Postgraduate Centre (1995–2000) is another example of Salmona´s projects. For this building, he worked with bricks and water to create a circular courtyard connected by walkways and steps.[23]



"The towers in Salmona were the only ones among them to be constructed with exposed brick. Nearly 50 years after their opening (1970), the buildings still look cutting-edge because of the sheen the material provided them."[24]

23 https://www.eltiempo.com/bogota/radiografia-del-ladrillo-en-la-arquitectura-de-bogota-541338 April 2023

24 https://www.eltiempo.com/bogota/radiografia-del-ladrillo-en-la-arquitectura-de-bogota-541338 April 2023, translated from spanish by Alice Benussi

25 https://www.eltiempo.com/bogota/radiografia-del-ladrillo-en-la-arquitectura-de-bogota-541338 April 2023, translated from spanish by Alice Benussi (p.70)

fig.23 National University Human Sciences Postgraduate Center, Bogotá (p.68)

fig.24 Torres del Parque, Bogotá

fig.25 National University Human Sciences Postgraduate Center, Bogotá (p.70-71)

"It is obvious that his impact on the city goes beyond the influence of the bricks he used. It is also obvious that not all the buildings that started to use exposed brick have as rich a design as those in Salmona."[25]

taller architects

I met Julian Restrepo, founding partner of Taller Architects, a Colombian architecture firm headquartered in Bogotá with two offices, one in Amsterdam and one in Shenzen. The studio was founded by him and his colleague Pablo Forero 15 years ago, and five years ago they opened an office in Amsterdam. Not only the interesting architecture they produce but also the collaboration between South America and Europe are the reasons why I thought it was interesting to do an interview with them, to talk to someone who knows several ways of thinking about architecture.[26]

Julian Restrepo really impressed me during the interview because topics came up that I never expected. As with the other interviews, I had prepared questions as a guide for the interview. Julian Restrepo surprised us because the conversation reflected much more about everything related to architecture, not just Colombian architecture. What struck me was that his way of seeing and making architecture is one that exists very little in Europe or North America. The interview began with an explanation of their office and also their work between the three continents of South America, Europe, and Asia, which led to a discussion on the influence of traditional western architecture on the rest of the world. Julian Restrepo referred to western architecture as order imposing, the opposite of chaos, which is exactly what is unpredictable, but in a complex system and not disorder. And European order, for him, is only apparent order, which costs a lot of energy.[27]

How are we going to work in Colombia, where chaos reigns? And above all, what does it mean that there is chaos?

„Even in Belgium, where a few years ago there were several deaths, even a river burst its banks and caused chaos. So if the world is becoming more and more like Latin America, in the sense that it's already becoming unpredictable, it's not because climate change is making it unpredictable. It's a factor that makes it more complex, but why? Let us say Europe and the United States used to paint a unified picture of the world. Did that give them the impression that there was an order? Yes, because they maintained order. But underneath was always an infinitely more complex, increasingly distorted system. The use of the resources and the energy of the world powers means that other things are giving me these new narratives, and we are beginning to read a disordered world. If it has always been disordered, yes, but then how? How does it work that way? As an architect, in our house we refer to Bogotá and our country, Colombia. And as for the fact that we are famous for many things these days, let us put that aside."[28]

26 interview with Julian Restrepo from Taller Architects on the 23rd of October 2022 in Bogotá
27 interview 2
28 interview 2, translated from spanish by Alice Benussi

Colombia is a beautiful country, second only to Brazil (which is six times the size of Colombia) in terms of biodiversity. According to Julian Restrepo, each different ecosystem means a different culture, which is why Colombia is also one of the countries with the most different cultures. It would be impossible to come up with a single order for the whole country. In addition, many ecosystems and cultures are still unknown to us. In Colombia, there are 54 different natural regions with practically all the ecosystems that exist in the world today. This also means that Colombia is the country with the most cultures per square meter in the world. All of this has been erased from the narrative, because the narrative is that they (the Europeans) came to Colombia to bring development and progress, and only then would Colombia develop, after erasing everything that was before. The Spaniards erased much of the country's history, forgot everything, and lost everything.[29]

The great cultural diversity in Colombia is due to the fact that the inhabitants have learned to live with the existing ecosystem. A cultural exchange that has led to enormous wealth. Therefore, it is important for people today to raise their awareness of the diversity and complexity of ecosystems and cultures. What Julian Restrepo believes in above all is sensitive design as an approach moving away from the mechanization and rationalization of the Western world and returning to an essence that has to do with feeling. Because feeling is not a primitive way of knowing, but the exact opposite, according to Julian Restrepo. Feeling is a way of processing information that is so complex that our brain capacity sometimes does not allow us to understand it.
So there is something about feelings that is very important because it has to do with understanding what people really need.[30]

„We architects work a lot; we want to win awards; we want to have everything, and that's not architecture. Architecture is a service, just like medicine. Architecture is not sculpture, even if we love shapes and buildings. Architecture must also be a service, because today we architects have entered a state of practical relevance in the world because we have become tools of capitalism. We have created a co-dependency in which capitalism does what it wants. For capitalism, there is no spatial quality, no urban planning quality; it's about housing as many people in as many ways as possible. Zero sensitivity. Yes, pure capital. That's what's happening all over the world, and that's what I am getting at. For us, this discussion has nothing to do with materials. Materials are important because our profession is spatial. There is a discussion about materials, but in my opinion, it diverts

29 interview with Julian Restrepo from Taller Architects on the 23rd of October 2022 in Bogotá
30 interview 2
31 interview 2, translated from spanish by Alice Benussi
32 https://tallerarchitects.com/project/158_la_perseverancia January 2023, translated from spanish by Alice Benussi

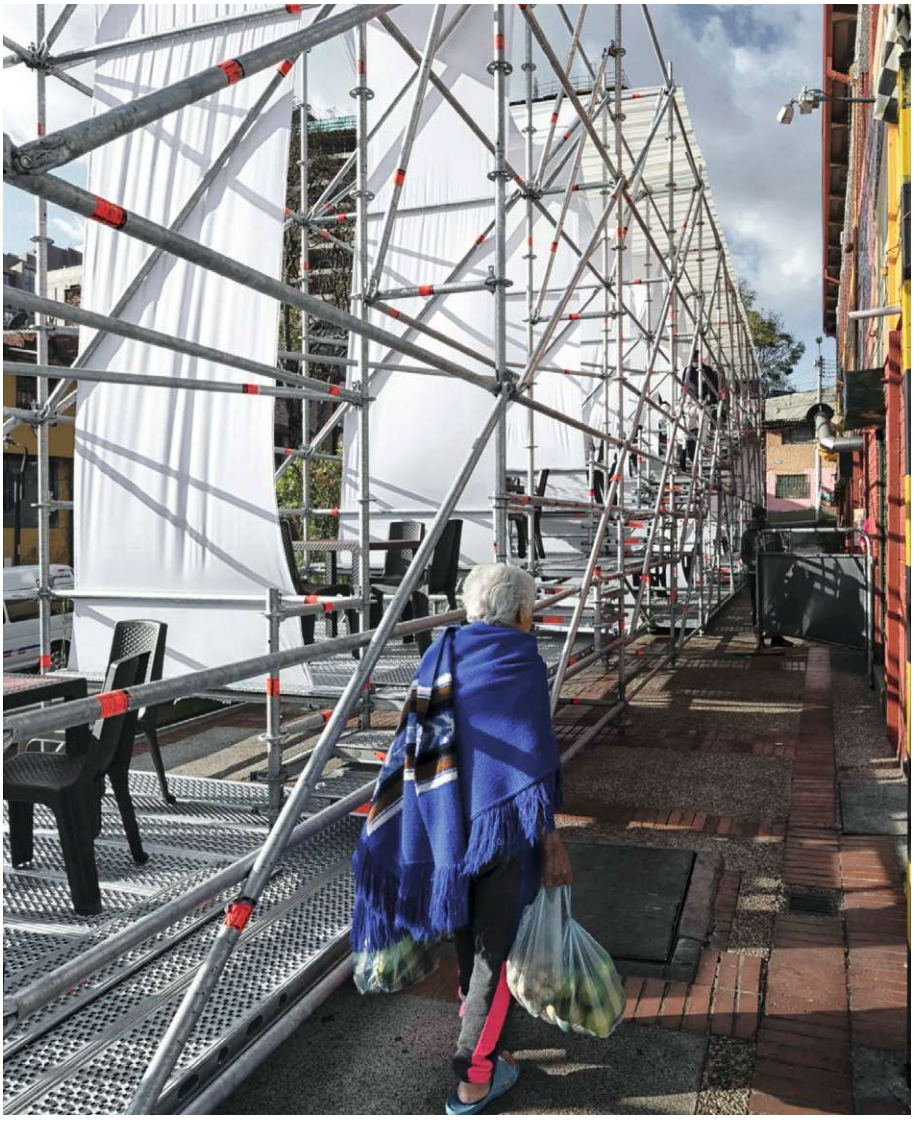


fig.26 La Perseverancia, Bogotá

"How else should we make decisions, with 50,000 problems in Colombia? Which would be the first to be addressed? Maybe with a spreadsheet where you put variables to see which one has the most points? With feelings, we can instead make choices that lead us more precisely down the path we want: less rationalization in the world, destruction of ecosystems."[31]

fig.27 La Perseverancia, Bogotá

"La Perseverancia became an icon of Bogotá's social and economic reactivation."[32]

attention because it becomes a technological discussion. It diverts attention from the social function of architecture. So today, cement is bad and clay and wood are good. Ana Anupama says something very true: materials are neither bad nor good they were never human, and therefore materials are materials. If we continue to discuss good and bad materials, we are shirking our responsibility. In Colombia, at the moment, it does not make sense to build with concrete. This is not to say that it is not ideal; quite the contrary. But not in our socio-economic situation and reality. There are many people who will be without housing; there are many problems because we have no way to support others. Even if I were to advocate the use of concrete, the questions to ask would be more like, -How do we use it? How do we minimize the impact?- So why not renovate more instead of building so much? The discussion needs to be context-sensitive because, depending on the context, the answers can be completely different. -What should I do in Europe or China?- It can be the exact opposite of what I do in Colombia, and that does not mean I contradict myself. It means that I try to understand the context, the people, the land, the nature, and to give an answer to a problem. Because, for example, if I want to build a building somewhere in the world where there is no wood, what do I do? Import wood from who knows where? It is ridiculously expensive. I do not want to say that we are servants of place or material, but that architecture has social rather than material origins, and that's something we often forget, and that's what makes us today, let us say, focus on project development."[33]

It was very interesting to talk with Julian Restrepo, because he explained his point of view on social issues related to architecture. With Julian Restrepo we also talked about the issue of women in the workplace, where men should be more sensitive and know how to listen to women's problems because they do not know them. They should listen to women to understand what they really need. And the most striking thing is that these problems happen more in Europe than in Colombia (which is why he was shocked that this happened in Europe). The architect's sensibility should also be sensitive to the staff, to the residents and their needs, and to the environment.[34]

As an example, he cited their intervention in vertical social distancing projects such as La Perseverancia and La Concordia, where they have succeeded in creating open-air places where people can sit and eat in these markets that are usually very crowded and could accommodate few, if any, people during Covid19. La

33 interview with Julian Restrepo from Taller Architects on the 23rd of October 2022 in Bogotá, translated from spanish by Alice Benussi

34 interview 2

"Inserted into a dense urban fabric, one of the main premises of the project is to contribute to the construction of a better city through generous and wide public spaces."[38]

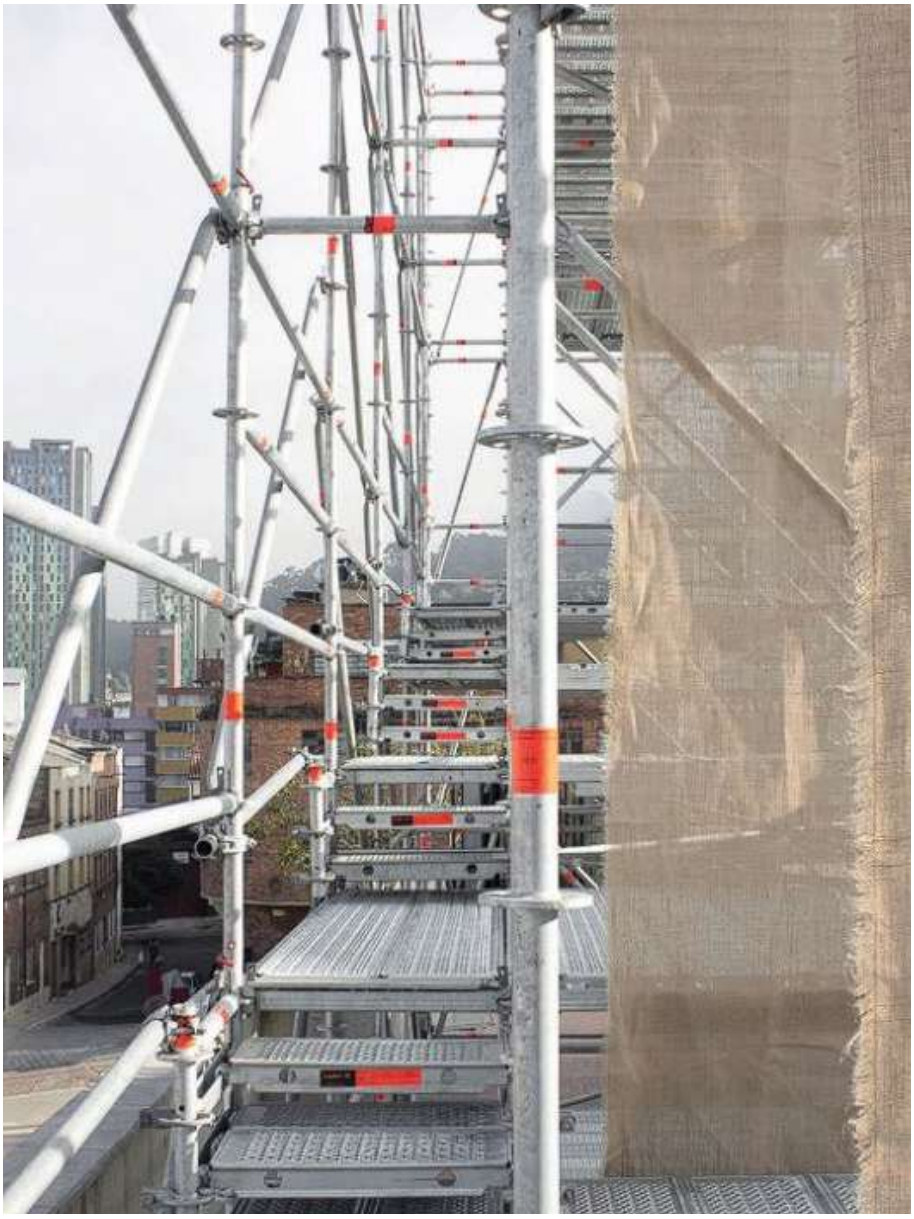


fig.28 La Concordia, Bogotá (p.79)

fig.29 La Concordia, Bogotá (p.80)

Perseverancia is one of the two buildings in the "vertical activation" project in Bogotá. Both projects were built in 2020 to improve the public spaces of two markets during Covid19. The program is called *Bogotá cielo abierto***.** This enabled the gastronomic industry to carry on its activities outdoors, by intervening with some architectural structures. For this purpose, they used scaffolding. In this way, they had an ecological solution that could be dismantled after use and provided seating possibilities following the Covid19 norms. The scaffolding was also a good choice because the system was designed to be set up quickly and at a low cost. These materials respected the historic heritage, and there was no waste as the scaffolding was returned to its original use after the program was completed. With this architectural solution, they were able to prevent the closure of the market and also increase its sales.[35]

The La Concordia Amphitheater is the second undertaking of Bogota's "vertical activation" in 2020. Similar to the Perseverancia Project, scaffolding was used for the construction of La Concordia to increase seating options during the pandemic-related lockdowns. The idea behind these two projects was to increase distance by vertically densifying in order to accommodate the capacity of 14 tables. In order to use the plaza in front of the market as an amphitheater, the vertical activation this time took the shape of a U. The three distinct levels of the amphitheater have mixed uses, including eating with tables on the middle floor, retail on the ground floor, and a public park on the top floor.[36]

Together with this installation, Taller Architects is also working on bigger projects, like the Engineering Laboratories Tower of the Pontificia Universidad Javeriana. This building was built between 2014 and 2020 in Bogotá and has 13,674 m^2. This project is characterized by a protected public space, an open ground floor free for pedestrians, and community use. This decision was made because of the climate of Bogotá, where we can find strong and cold winds and rains. This project is an addition to the already existing university building, connecting the city and the university through a publicly accessible vertical square that leads up onto a public terrace on top of the university building.[37]

35 https://tallerarchitects.com/project/158_la_perseverancia January 2023
36 https://tallerarchitects.com/project/158_la_concordia January 2023
37 https://tallerarchitects.com/project/069_puj_labs January 2023
38 https://tallerarchitects.com/project/069_puj_labs January 2023, translated from spanish by Alice Benussi

arquitectura expandida

On October 21, 2022, we had the opportunity to meet with a group of activists, architects, and artists from Arquitectura Expandida. Present at the meeting were Ana López Ortego, Harold Guyaux, and Naira Viviana Perenceja. The conversation with them was very relaxed, more like a chat between architects or people interested in architecture than a real interview. Initially, they explained to us that theirs is neither an office nor an architecture studio as we imagine it because they are not bound to architecture. They define themselves as an urban movement. They work in the *barrios* of Bogotá to help improve the situation, trying to support the people who live in these neighborhoods rather than the institutions that govern the city. They participate a lot in the neighborhoods because they want to work with the locals so that they can learn how the buildings were constructed so that later on they will be able to construct them themselves or at least repair and maintain them. Their projects take place often because they are called upon by the people in the neighborhood, who respect them. They work a lot with hip-hop bands, which is a way for young people to express themselves, to let out their anger, and also to get out of their house and go outside. They are also very pro-feminism and education.[39]

Most of the time, AXP works closely with the residents of the neighborhood rather than with the public administration. They do what suits the citizens of the community, not what is right for the public administration. Here lies the difference between Arquitectura Expandida and the public administration: AXP considers the people; it does not impose things like the public administration. AXP is always ready to communicate and find solutions for which both the public administration and citizens would find agreement, since the studio of AXP studied a lot of laws and procedures, so they know how to move legally as well as build things that hopefully will not be demolished shortly afterwards. The legal part is also very important to them, and they combine art and politics to fight bad politics. AXP sometimes inspires institutions with their work. It is a kind of activism that is sometimes connected with piracy.[40]

For AXP, *negociarse la calle* (negotiating the street) is the way they try to understand the language of the inhabitants of the various communities within the borders of Bogotá. They also use hip-hop a lot to understand the language of the ***calle***. If the community accepts them, the projects remain even if the permits are lacking because the community makes sure to protect them. They use architecture as a language to express the power of the community that collaborates with them.

39 interview with Ana López Ortego, Harold Guyaux and Naira Viviana Perenceja from Arquitectura Expandida on the 21st october 2022 in Bogotá

40 interview 1

Because they collaborate with poor communities in Bogotá, they do not have any real clients. They also often use their work to create or unite new collectives that perhaps did not exist before or were not shared before.[41]

AXP initiates solid starts that involve people who are often times in marginalized groups who do not feel represented by the political establishment or people who are economically disadvantaged, to teach them building techniques and social skills, which they can perhaps also use to fix up their own house. They define their projects as *conspiration correctiva* (corrective conspiracies). They see four forms of work: construction, tactical provocation, *las cartografias* (mapping), and *projectos pedagogicos* (pedagogical projects). For the construction method of work, they build the social projects themselves with the community and also have to pay for the materials. In these projects, they are on the same level as all other collaborators. The tactical provocation consists mainly of mobile structures, often for existing collectives or communities (if they are part of the problem, they are also part of the solution). Since 2014, they have been working with movements and collectives. After the provocation comes the negotiation with the municipal administration. The third form of work for arquitectura expandida is public cartographies, where they mark all the decrees, norms, and laws that are relevant for their needs, research what can be done and where, and try to define an urban vulnerability with people, the environment, and politics. The pedagogical projects are urban, non-confrontational readings. For example, they recount their projects and their way of acting in university lectures. They always organize seminars because they want to teach a new form of architecture that is not just architecture.[42]

They also told us about living and working as activists in Bogotá, which is a city with very little green, high-qualitiy public space and a very excluding and segregative urban structure. According to them, the architecture in Bogotá is rancid. In fact, in Bogotá, there is a new green gentrification because these communities that have little are much more ecological, and above all, they save much more than communities that are very influenced by consumption.[43]

They do not have an impact on Colombian architecture proper, but more in the community. What they build are sculptures, and based on that, they choose which materials to work with. Apparently, *guadua*, a type of South American bamboo, is not used too frequently in basic Colombian architecture because it is used a lot in

41 interview 1
42 interview 1
43 interview 1

rural areas. They use *guadua* mainly for an economic theme and also because it is very quick to use or learn how to use. *Guadua* is an important symbol for them. It is a material that allows them to live with the environment even if they have no money. In addition to the choice of materials, there is also the importance of transparency, so that in neighborhoods like the barrios, there are few lights and they are generally darker, so for a safety criterion, it is necessary and important to have good transparency, where you can see what is happening inside the building or on the sculpture, and it must not be dark.[44]

After the interview, they gave me some small books where their projects are explained. In this brochure, we can see the different typologies of interventions they are creating and in which areas of the world they are taking place. The first project is the *Enriesgo, Alto Fucha*. Even though human settlements among people who had no other options were already starting to appear, the eastern highlands have been a nature reserve for protective purposes only since 1977. This was made worse by some districts' self-development in the 1980s and 1990s, which coincided with periods of rising violence and significant international migration into the nation. Due to the fact that these neighborhoods still engage communities, leaders, environmental organizations, businesses, public institutions, and occasionally even the judiciary, decision-making procedures there are still quite challenging. For instance, the communities in Alto Fucha started organizing independently over 30 years ago and are unwilling to cooperate with other institutions.[45]

Arquitectura Expanded took part in this project by employing biodegradable and environmentally friendly materials and engaging the neighborhood in discussion. This intervention is a tactical provocation intended to "unleash urban talks" and group environmental management initiatives, that will keep going in the months to come.[46] *Cazomizo* is a Spanish term that refers to how each individual feels about and interacts with their social, economic, and political environment.[47]

One of the projects AXP was asked to complete is *El Bicho*. In Guadua, they constructed this hip-hop stage quickly and cheaply. They made the decision to keep the building exposed.[48] For this project, AXP was asked to co-work on the construction of this mobile production for the hip hop festival *Aguante el Barrio*, organized by the Golpe de Barrio, Distreestyle, and Bajo Frecuencia Producciones

44 interview 1
45 López Ortegon, Ana (2019): #enriesgo #altofucha
46 López Ortegon
47 López Ortegon
48 interview 1

fig.30 El Bicho, Arquitectura Expandida Bogotá

collectives. The mobile pavillon should underline the public space occupations in barrios with stigmatized youth.[49]

"The construction of El Bicho took place in the first months of 2022, after several co-creation spaces in which it was necessary to articulate the possibility of different forms of appropriation (a stage for presentations, meeting space for workshops or conferences, or simply spontaneous and daily appropriation that allows protection from the sun and rain), with the possibility of being self-built by young people, the use of soft materials in a context of high hardness, the mitigation of dynamics that could be negative for coexistence in the space (areas that are not visible or difficult to access), or the adaptation to a limited budget (approximately COP 3 million - approximately USD 700)."[50]

El Bicho was built out of *guadua*. It is a mobile pavillon, so with just 10 people, it can be moved to another place. AXP created with this building tactical mobility.[51]

The project *Casa de la Lluvia (de Ideas)* is a building created as a meeting place for the community of the barrio La Cecilia, where ideas for social autonomy can be collected.
The project began in 2012 with the community of La Cecilia asking AXP for cooperation. This was a self-construction project , where different people from the community, from AXP, and others participated together, each providing their knowledge for the benefit of the community. For the construction, two main materials were chosen: guadua and a semi-transparent latter; the guadua was chosen for the structure because of its characteristics and cheap price, while the semi-transparent latter was chosen for a more inside-outside connection.
In 2015, a proposal was made to legalize the neighborhood, but the proposal was institutional and envisaged the deconstruction and reconstruction with other materials, without taking into consideration the social and territorial governance systems. However, the community rejected the proposal. Thus the territorial conflict over Alto Fucha began.[52]

49 https://arquitecturaexpandida.org/?s=el+bicho January 2023
50 https://arquitecturaexpandida.org/?s=el+bicho January 2023, translated from spanish by Alice Benussi
51 https://arquitecturaexpandida.org/la-casa-de-la-lluvia-de-ideas-en-proceso/January 2023
52 López Ortegon, Ana (2019): #enriesgo #altofucha, 91
53 López Ortegon, Ana (2019): #enriesgo #altofucha, 92-93, translated from spanish by Alice Benussi

fig.31 Casa de la Lluvia, Bogotá

"The struggle for the permanence of the Casa de la Lluvia is a form of struggle for each of the houses and families at risk of displacement."[53]

fig.32 Casa de la Lluvia, Bogotá

Another project made possible by AXP is the cinema Potocine, the first non-commercial cinema in Colombia. This self-management and self-construction project is located in the barrio Potosi in Ciudad Bolivar, Bogotá. The barrios like Potosi are called invasiones and were built rapidly in the 1980s and occupied by people often displace because of the guerrilla. Since they were occupied and built very quickly, no services or public spaces were built in this neighborhood.
In 1984, the Cerros del Sur Institut was founded as a comunitarian project that included discussions on human rights, culture, education, the environment, public space, and housing. Thus, a community film school and the Ojo al Sancocho festival have also had a place here for ten years. Other collectives have also participated in the activities, increasing the social, cultural, environmental, economic, and educational empowerment of the people.
The idea behind Potocine was to create a cinema, a theater, and logistical support for the activities of Cerros del Sur. The building was constructed through a process of self-construction on two sites granted by Cerros del Sur. On one site, the laboratory, used as a sound room and production area, was built, while on the second site, the Sala Potocine was constructed. During the planning, it was decided to leave the guadua structure visible in the building as a reminder of the self-construction process. The façade was built with a thermo-acoustic tile on the inside and a polycarbonate honeycomb on the outside. The women of the neighborhood also participated in the construction of the cinema hall, weaving the materials for the chairs.[54]

54 https://arquitecturaexpandida.org/?s=potocin January 2023

fig.33 Potocine, Bogotá

fig.34 Potocine, Bogotá

carrera septima

Carrera Septima is the *carrera de la versatilidad* (street of versatility).
It is a street that goes through most of Bogotá. Many of the important events and most of the important people in the history of Bogotá happened on the *carrera septima*. The *calle* has very old origins, because it was the path *del sal* of the Muiscas (indigenous tribe). In a more recent period, it was the *carrera* where a student carnival took place.[55]

From an architectural perspective, we can find 500 years of different styles, mainly in colonial buildings, such as the *Casa del Florero* and republican buildings such as Colpatria skyscrapers. Today, the carrera is partly pedestrianized.[56]

One example of a collective that works to get a better Carrera Septima is the Colectivo Microurbanismo [MU], which was founded just a couple of years ago with the aim of recovering, reorganizing, and revitalizing public space in Bogotá through temporary and participatory actions.
These interventions are urban acupunctures that address various issues regarding urban conditions, and make public space available to residents. For this reason, interventions are small-scale and must be aesthetically and socially attractive, realistic, and easily executed. To create social change, it is necessary for interventions to be made that involve local people, using tactical urbanism. These small projects must also serve as a place for group interaction, dialogue, and reflection.[57]

"MU's work has been to create welcoming moments and spaces in the midst of an emerging landscape that is beginning to make strides in consolidating an image of the city intended to be pedestrian-friendly."[58]

An example of the interventions and actions of the collective is the project "We are all the Seventh", whose aim was to create communication between universities, locals, and visitors. This is a part of the Seventh Avenue activities.

"By appropriating and utilizing public space in a playful manner, this intervention at the pedestrian intersection aimed to control how pedestrians, cyclists, and cars interact at this intersection of Seventh Avenue."[59]

55 https://www.youtube.com/watch?v=E--ek_aPULw YOUTUBE CAPITULO 10 - la Carrera 7 February 2023
56 ibid.
57 https://www.archdaily.co/co/876709/colectivo-mu-urbanismo-a-escala-humana-en-bogota February 2023
58 https://www.archdaily.co/co/876709/colectivo-mu-urbanismo-a-escala-humana-en-bogota February 2023, translated from spanish by Alice Benussi
59 https://www.archdaily.co/co/876709/colectivo-mu-urbanismo-a-escala-humana-en-bogota February 2023, translated from spanish by Alice Benussi

fig.35 interventions on the Carrera Septima, Bogotá

Near the intervention "We are all the seventh", there was the intervention "17 x 17 and 18 x 18", which took place to activate the bicycle lane on Carrera Séptima (Bogotá).
Another intervention is the "eSCAlera" made on the public pedestrian access stairs to the SCA (Colombian Society of Architects) headquarters, during the annual event of "Architect's Week".[60]

Like these projects, there were also other projects to socially activate the city.

60 https://www.archdaily.co/co/876709/colectivo-mu-urbanismo-a-escala-humana-en-bogota February 2023

61 https://www.archdaily.co/co/876709/colectivo-mu-urbanismo-a-escala-humana-en-bogota February 2023, translated from spanish by Alice Benussi

fig.36 interventions on the Carrera Septima, Bogotá

"By appropriating and utilizing public space in a playful manner, this intervention at the pedestrian intersection aimed to control how pedestrians, cyclists, and cars interact at this intersection of Seventh Avenue."[61]

fig.37 ladrillos, Rogelio Salmona

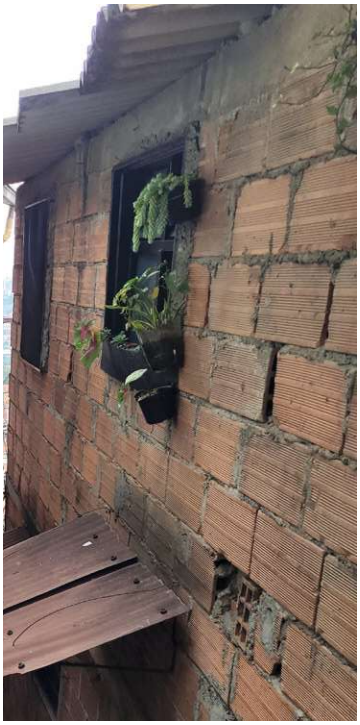


fig.38 ladrillos, self-built invasiones

As we saw during the chapter on Bogotá, the architecture in this big city is modern, characterized mainly by the red ***ladrillos***.[62] If we compare the material to the climate, this is a good solution because of the good insulation of bricks, which is perfect for the colder and rainier days of Bogotá.
In the environment of this large metropolis, architectural solutions follow technological development instead of natural materials, with the only exception of clay. In fact, in Bogotá´s soil, clay is to be found, which is used to create the red bricks that characterize the buildings of the entire city.
In this case, ladrillos are not linked to traditional techniques but spread widely throughout the country, becoming a hallmark of Colombian architecture.
The material of ladrillo also carries forward the indigenous idea of self-built houses, since it is easy to build with it without extra tools. This makes ladrillo the most widely used material in the ***invasiones***.
Still, some important architects showed the beauty of the material in their buildings, like Rogelio Salmona.

62 https://www.eltiempo.com/bogota/radiografia-del-ladrillo-en-la-arquitectura-de-bogota-541338 April 2023

fig.39 concrete and metall, Taller Architects

fig.40 scaffoldings, Taller Architects

fig.41 guadua, Arquitectura Expandida

But in Bogotá, there are more mixed traditions, coming from European countries, which led to constructions like the Engineering Laboratories Tower from Taller Architects, made out of **concrete and metal**.[63] These materials are good for different forms of architecture, but are more expensive than bricks and do not have the perfect insulation conditions for the cold climate of Bogotá.
The vertical activations from Taller Architects are made with **scaffolding**.[64] This way of using these materials is similar to the traditional indigenous way of using wood and guadua. In the cases of vertical activations, scaffolding is a good solution, since it is needed just for temporary buildings and to create an extension of the existing building.
On the other side, the activists of Arquitectura Expandida use ***guadua*** for some of their interventions in Bogotá because of its structural skills and its affordable price

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63 https://tallerarchitects.com/project/069_puj_labs January 2023
64 https://tallerarchitects.com/project/158_la_perseverancia January 2023

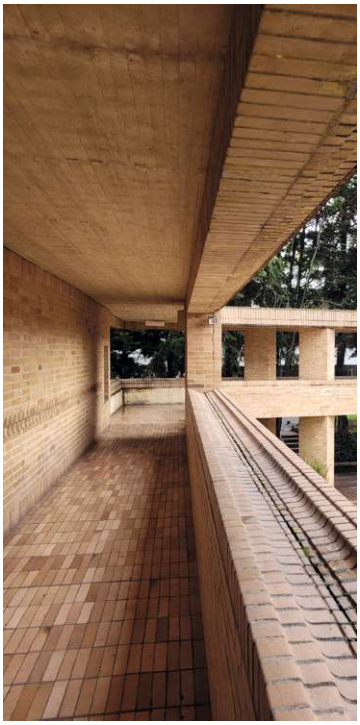

fig.42 corridor, Rogelio Salmona

fig.43 public entrance, Taller Architects

Regarding the relation between traditional and contemporary architecture, the analysis of the different architecture typologies showed a typical feature that persists in all architectural styles in all areas of Colombia: **open space**. This characteristic is also to be found in the examples of architecture in Bogotá, where various solutions are used, adapted especially to the climate and environment, but also revisited in a modern and contemporary way. This traditional indigenous architectural form, which wants a connection with nature and the surrounding environment remains in contemporary architecture in the form of a **veranda, balcony, patio, canopy,** and also as an interior solution in the form of a **corridor** on a patio, or **interior plaza**. These forms are used to create a sheltered open space to protect from sun, rain, and sometimes even wind, and are different depending on the climatic zone.

These types of construction are used by contemporary Colombian architects in response to the social needs of the inhabitants of Bogotá. In fact, for the Bogotá architects interviewed, the social issue is the most important of all, especially given the size of the city and the speed with which it has developed in recent decades, which has made the economic gap more evident.

fig.44 extension to the public, Taller Architects

fig.45 movable installation for squares, Arquitectura Expandida

In the case of Bogotá, the open space needs to be covered because of the frequent rainy days and strong winds.
One example is in the building of Rogelio Salmona, the National University Human Sciences Postgraduate Centre, where he built all over the building **covered corridors**, which are always opened towards the outside.
Another example is the Engineering Laboratories Tower from Taller Architects, where on the ground floor is a public entrance. In this case, Taller Architects created a **protected square** inside the building; this was planned because of the strong winds and rains of the zone.[1]
Taller Architects also built the two vertical interventions, La Perseverancia and La Concordia, both built as an outside extension to the exinsting markets.[2] To do this, they used multiple levels, like working with multiple **verandas** on top of one another.
The El Bicho pavillon of Arquitectura Expandida was built similarly to a traditional hut, with a guadua structure and a big roof to protect it from the rain. In this case, the architects created an outside movable installation, similar to the form of a **pergola,** which is adaptable to multiple environments by withstanding the rains of Bogotá.

74 https://tallerarchitects.com/project/069_puj_labs January 2023
75 https://tallerarchitects.com/project/158_la_perseverancia January 2023

fourth chapter - VALLE DEL CAUCA

Between the 23rd of October 2022 and the 5th of November 2022, we visited the department of Valle del Cauca.

Days 5-10: During the week from the 23rd of October 2022 and the 29th of October 2022, we had the possibility to visit, especially Cali, the city where most of the family of my friend Sebastian lives. In Cali, we met the two founding architects of OM Arquitectura y Urbanismo, together with their coworkers. Here we visited lots of places around the city of Cali; one of them, for example, in the barrio of Montebello was the Colegio de las Aguas, a school made out of guadua bamboo, a project of the architect Andres Bäppler, where we interviewed the school director and the guadua workshop teacher. In Cali we also went to see one of Salmona´s builidings and the Universidad del Valle, were we found some books about Colombian architecture.

Days 10-11 and 16-17: On the 29th, 30th, 3rd, 4th and 5th of November we were in Tuluá, where the family actually comes from and where the grandma still lives. In Tuluá, we interviewed the architect Alvaro Chaparro Roldan, an expert on the quicha technique.

Day 12-15: Between the 31st of October 2022 and the 2nd of November 2022 we went on daily and short trips to some pueblos, villages, and the eje cafetera. The pueblos we visited are Andalucia, Sevilla, Roldanillo, Filandia, Salento and Cordoba, where we saw much of the colonial architecture that characterizes these pueblos. On the road, we also saw some fincas and casas de hacienda.

fig.46 map of Colombia (p.100)
fig.47 casa colonia, Sevilla Eje Cafetero (p.103)

valle del cauca

The department of Valle del Cauca is named after the Cauca River, which flows through much of Colombian´s country.[1] The department is characterized by two mountain slopes, the western and eastern Cordilleras. The indigenous people living in the area were the Gorron, Jamundi, and Lili. In 1536, the Spanish conquistadors arrived and settled in the area. Later, towards the end of the 19th century, inhabitants from Antiquoia also colonized the mountainous areas of the Valle del Cauca.[2]

The surface area of the department measures 22,140 km^2, with a population of approximately 4,660,000. The capital of the department is Santiago de Cali. Valle del Cauca is located in the southwest of Colombia. The department of Valle del Cauca has a temperate climate divided into three zones. The first is the humedo, which, towards the Pacific Ocean, is a plain between sea level and 1,000 m above sea level. It is one of the rainiest areas in Colombia, with an average annual rainfall of between 5,000 and 6,500 mm. The temperature in this area is above 25°C. Rainfall increases from the coastal zone towards the slopes of the Cordillera Occidental. The climate on the western cordillera differs between the two sides; on the side towards the Pacific, there is a semihumid climate with rainfall that exceeds 4,000 mm/year, while on the other side, the climate is a semiharid one with less than 2,000 mm/year.[3]

"In the Cauca river basin, rainfall varies between 1,500 and 2,000 mm/year, and the average temperature fluctuates between 20°C and 10°C."[4]

The central cordillera, on the other hand, has a lower rainfall of 1,000 - 1,5000 mm/year. At altitudes between 1,800 and 3,500 m, the average temperature varies between 20°C and 6°C. The months of the year most characterized by precipitation are April and May and October and November, while the driest periods are June, July, and August. Thus, in the areas around the Valle del Cauca, rainy days are around 100 per year, while towards the Pacific Ocean, rainy days are around 250 to 300 per year.[5]

1 https://web.archive.org/web/20131110210522/http://www.valleonline.org/tiki-index.php?page=Valle+del+Cauca April 2023
2 https://www.todacolombia.com/departamentos-de-colombia/valle-del-cauca/historia.html April 2023
3 https://www.todacolombia.com/departamentos-de-colombia/valle-del-cauca/clima.html April 2023
4 https://www.todacolombia.com/departamentos-de-colombia/valle-del-cauca/clima.html April 2023, translated from spanish by Alice Benussi
5 https://www.todacolombia.com/departamentos-de-colombia/valle-del-cauca/clima.html April 2023

guadua

"Guadua, as a building material, is the common denominator of this popular traditional architecture."[6]

Regions near the equator use traditional building materials such as adobe, *bahareque*, wood, palm, straw, and *guadua*. Although we know that there were buildings made of *guadua* more than 3,400 years ago in Colombia, in the region around Cali and near the equator, much of this knowledge has been lost. While wooden construction techniques have survived for more than 4,000 years, bamboo construction techniques have only been documented for about 30 years.[7] Thanks to a number of architects and researchers such as Simon Velez, Marcelo Villegas, Ximena Londono, (etc.), in the last few years it has been possible to achieve results that put *guadua* in an avant-garde position, especially in the fight against poverty and underdevelopment.[8]

More specifically, the name *guadua* was taken by Karl Sigismund Kunth (a German who made a botanical expedition to the Rio Magdalena in 1822) from the indigenous peoples of Colombia and Ecuador. The *guaduales* are forests of *guadua*.[9] Different departments (mainly Caldas, Quindio, Risalda, and Valle del Cauca) are traditionally bound to *guadua*.[10]

"There are currently an estimated 36,000 hectares of guaduales, of which 31,000 are natural and 5,000 are cultivated. The ideal crop composition in the guadales is estimated at 10% new, 30% young, 60% mature, and super mature and dry, with a density of 3000 to 8000 plants per haul. It´s productivity per haul is 1200-1350 guadua/hectar/year. This growth is hardly exceeded by the native woodland species of the region. The guadules are ecosystems that host diverse flora, microflora, entomofauna, mammals, birds, reptiles, and amphibians. More than 120 plant species are associated with guadules; more than 48 bird species, 20 mammal species, and 7 reptile species have been recorded. In Colombia, guaduales are best developed in the central region of the Andes, at an altitude between 500 and 1,500 m, with temperatures between 17 and 26 degrees, rainfall between 1,200 and 2,500 mm/year, relative humidity of 80-90%, and alluvial soils rich in volcanic ash, with moderate fertility and good drainage."[11]

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6 https://www.revistacredencial.com/historia/temas/la-vivienda-popular-tradicional-en-la-region-cafetera-central April 2023, translated from spanish by Alice Benussi

7 Bäppler, Andres (2019): Das Supergras. Zukunft bauen mit Bambus Werkbericht in 4 Bänden, Band 1, 189

8 Villegas, Marcelo (2003): Guadua. Arquitectura y diseño, Villegas Editores, Bogotá

9 Minke, Gernot (2016): Building with bamboo: design and technology of a sustainable architecture second and revised edition, Birkhäuser Basel

10 Villegas

11 Villegas, 27 and 30, translated from spanish by Alice Benussi

Bamboos grow in association, are connected underground through rhizomes, and function collectively and for a collective.[12] In the bamboo family, there are woody bamboos and herbaceous bamboos; the woody ones are *guadua*, bamboo, and radan (which is a guadua of the woody bamboos), the herbaceous ones are rice, sugar cane, wheat, and barley. The *guadua* is a graminea, like rice, like sugar cane, they call it a giant meal.[13]

Guadua canes with a diameter between 9 cm and 12 cm are used for building construction. This material is commonly used with this porpoise, because it grows really fast, between 12 and 21 cm per day, and reaches between 15 and 30 m in height. There is no single gudua typology, since they vary according to the climate and environmental conditions.[14]

The bamboo plant guadua has very positive environmental effects.Because of its rapid growth, guadua produces lots of biomass and helps against soil erosion because of its roots. Guadua plants are also capable of retaining water in the rainy season and using it in the dry season (one hectare of *guadua angustifolia* can retain over 30.000 liters of water). Guaduales are also good for air temperature reduction since they still have leaves and will improve the shadow area.[15]

"Because of its rapid growth, bamboo can take in more CO_2 than a tree. The guadua angustifolia Kunth takes in 54 tonnes of CO_2 per hectare during its first six years of growth."[16]

Generally, between 3 and 6 years of age, the guadua is ready to be used because the bamboo has reached its maximum hardness. Only 70% of a *guadua* plant is used, so out of 15 to 20 meters, about 10 to 12 meters are used. Architects working with *guadua* use certified *guadua*, as unprocessed ones are to be thrown away after 6 months.[17] To prepare this bamboo for building construction, the main way to cut the guadua from the guaduals is with a machete . After the cutting, the next step is to prepare it in sticks for the drying phase, which can be air drying or microwave drying to evaporate the humidity from the canes. After drying the *guadua* out, it is important to protect the bamboo surface against fungus, lichens, and insects. There are many immunization products on the market. One of these

12 https://bambuguadua.org/ February 2023
13 Interview with Alvaro Chaparro Roldan on the 3rd november 2022 in Andalucia, Tuluá
14 Minke, Gernot (2016): Building with bamboo: design and technology of a sustainable architecture second and revised edition, Birkhäuser Basel
15 Minke
16 Minke, 11
17 Interview with Alvaro Chaparro Roldan on the 3rd november 2022 in Andalucia, Tuluá

fig.48 guadua stem

fig.49 guaduales (p.111)

techniques is to paint the bamboo with lime, which, due to its low pH level, acts as a fungicide and insecticide.[18]

The product that generated the best results in the last 15 years is a German product made of creolin and linseed oil called impranol, of which there are different colors: teak, mahogany, light, dark, and brown. This product can be applied to both bamboo and wood.[19]

Guadua has to be protected from sun and rain, for example, by using paints based on beeswax or oil, which can normally be applied also to wood. Also, fire-resistant treatments are the same ones as for wood.
Protection from rain and water is necessary because if the bamboo gets wet, it will dimish its mechanical properties. Because of this, *guadua* has to be stored in a dry and covered place, similar to that also used for building construction.[20]

"The physical characteristics of the bamboo depend a lot on climate, topography, soil, altitude above sea level, cutting and treatment, age, and humidity."[21]

The cane is the part of guadua that can be used for building construction. This is made out of the bamboo stem, without branches, leaves, or rhizomes. The lower part of the cane is used for columns since it is mostly thicker and has smaller internods, but canes can also be used for beams and trusses.
A quality guadua cane is made out of mature and dry bamboo, which is between three and six years old; it doesn´t have any cracks, fungus or damage caused by insects; it can be straight or smoothly curved.
This bamboo, with a very low ecological footprint, is highly resistant to tension. It is very light, so a person can carry a 6m long piece alone. On the other hand, its structural behavior depends on the characteristics of the cane; in fact, environmental characteristics of the growing site are important, like the age of the cane, its spieces, and which part of it is used.[22]

"The most important disadvantage today is still that structural calculations and construction permits are difficult to obtain since official regulations do not exist."[23]

18 Minke
19 Interview with Alvaro Chaparro Roldan on the 3rd november 2022 in Andalucia, Tuluá
20 Minke
21 Minke, 19
22 Minke
23 Minke, 27

By building a structure out of guadua, joints between the bamboo canes are needed. In the best case, the two guadua canes have complete contact.
The *bocal pescado* is used as a cut for the *guadua*, similar to the flute tip; in this way, the *guadua* end gets cut perpendicularly or inclined, which helps the conjunction of two *guadua* together.
To do that, the perforations for screws have to be aligned with respect to the axis, with a diameter not less than 1.5 cm and not greater than 2.5 cm. This joint element must be anticorrosive.
In the case of big loads, the cane can be filled near the joints with a mixture of cement and mortar. For this technique, a 3.8-cm-diameter hole is needed in the internode where the mortar and cement can be filled in.
The traditional joints were made out of lianas and natural fibers, or dampened leather, which would tighten as they dried. Talking about sustainable solutions, hard wooden or palm pins can also be used as joints for the bamboo canes.[24]

Guadua is a very good material for earthquake-resistant structures, because it has a high resistance against forces and a low weight.
A design with *guadua* and mud can also resist in zones of high seismic risk.[25] In 1999, for example, *guadua* was used for housing plans after an earthquake because of its ideal earthquake resistance, its low material cost, and its short building time.[26]

The bamboo canes can be used for different construction parts. The most common uses are as columns or for roof structures.
Also, light walls can be built out of guadua by having a guadua structure and an esterilla cover. This technique is mainly used in warm climates, like Valle del Cauca, because it permits good cross-ventilation.
The guadua canes can be used like esterilla, an open cane, or even woven cane strips.[27]

"As it was possible to explain throughout the whole chapter, guadua is a very important material for architectural sustainability because it is environmentally friendly, very versatile in its processing. It is used for various purposes, from artistic and handicraft to architectural and structural projects. It has a large number of applications in the daily life of rural populations: musical instruments, household utensils, handicrafts, furniture."[28]

24 Minke
25 Minke
26 Villegas
27 Minke
28 Villegas, 35, translated from spanish by Alice Benussi

Guadua always played an important role in the economic, social, environmental, and cultural development of some of the Colombian departments. In fact, it is a traditional material, especially in the Valle del Cauca. Contemporary architecture is often not taken into consideration because it is not yet completely socially accepted and is still connected with poverty. In Colombia, this material is still important. In fact, the Colombian Bamboo Society´s goal is to open a dialog between different members to exchange various information, strengthen research, and promote the use of bamboo.[29]

fig.50 guaduales

29 https://bambuguadua.org/ February 2023

colegio de las aguas

The architect Andres Bäppler is half Colombian and half German and was born in 1960 in Manizales. Together with his wife, he founded in 2003 the foundations „Schule fürs Leben“ in Frankfurt and „Escuela para la Vida“ in Cali. Through these foundations, he was able to plan a new school building in Montebello, a suburb of the metropolis of Cali in the state of Valle del Cauca. The aim of the “Colegio de las Aguas” was to improve the children’s future in Montebello, where a lot of inhabitants have few or no incomes.
The “Colegio de las Aguas” is a very important building because of the use of guadua bamboo. New techniques were developed for the structure of the different units. The site for the school has an area of 25,000 m^2 over rough terrain with steep slopes.[30]

While I was in Cali, I had the opportunity to personally visit the “Colegio de las Aguas” and interview the headmaster of the school, Gloria Patricia Sarria Giraldo, and a teacher, Andrés Mauricio Guayara Rincón, who teaches techniques for working and building with *guadua*. From the interview with Gloria Patricia Sarria Giraldo, we discovered many things about the colegio, such as the fact that its site was a finca before. The first part that was built was La Vieja (the old house) and was supposed to be a hostel or student dorm to accommodate exchange students from Germany. The intention behind it was to gain extra income for the school, but unfortunately they ran out of resources and the project was left to deteriorate. This colegio is not only important for the children but for the entire Montebello suburb, as it also gives the parents of the children the opportunity to learn something new, such as the 20 sewing machines that are available to the mothers of the school families.[31]

Throughout the interview, I´ve got to understand that many people collaborated on the construction and decided to set up a foundation in Germany to send money for the school, 120 million pesos colombiano (5000 COP = 1 euro) a year, with which they survive for about two months and then receive 160 million from the municipality, so they manage to collect the money to run the boarding school for five months, and the remaining seven months are borne by the families in the neighborhood, who often do not have enough money. They dream of better situations and, above all, that the children can afford school. However, the school’s headmistress, Patricia Giraldo, is trying to save the school and has therefore sent tests of the land surrounding the school to the national university in Palmira to wwfind out what is possible to cultivate, so that there is also the possibility to work with what is there on the site.

30 Bäppler, Andres (2019): Das Supergras. Zukunft bauen mit Bambus Werkbericht in 4 Bänden, Band 1
31 Interview with Gloria Patricia Sarria Giraldo and Andrés Mauricio from Colegio de las Auguas on the 25th of October 2022, Montebello, Cali

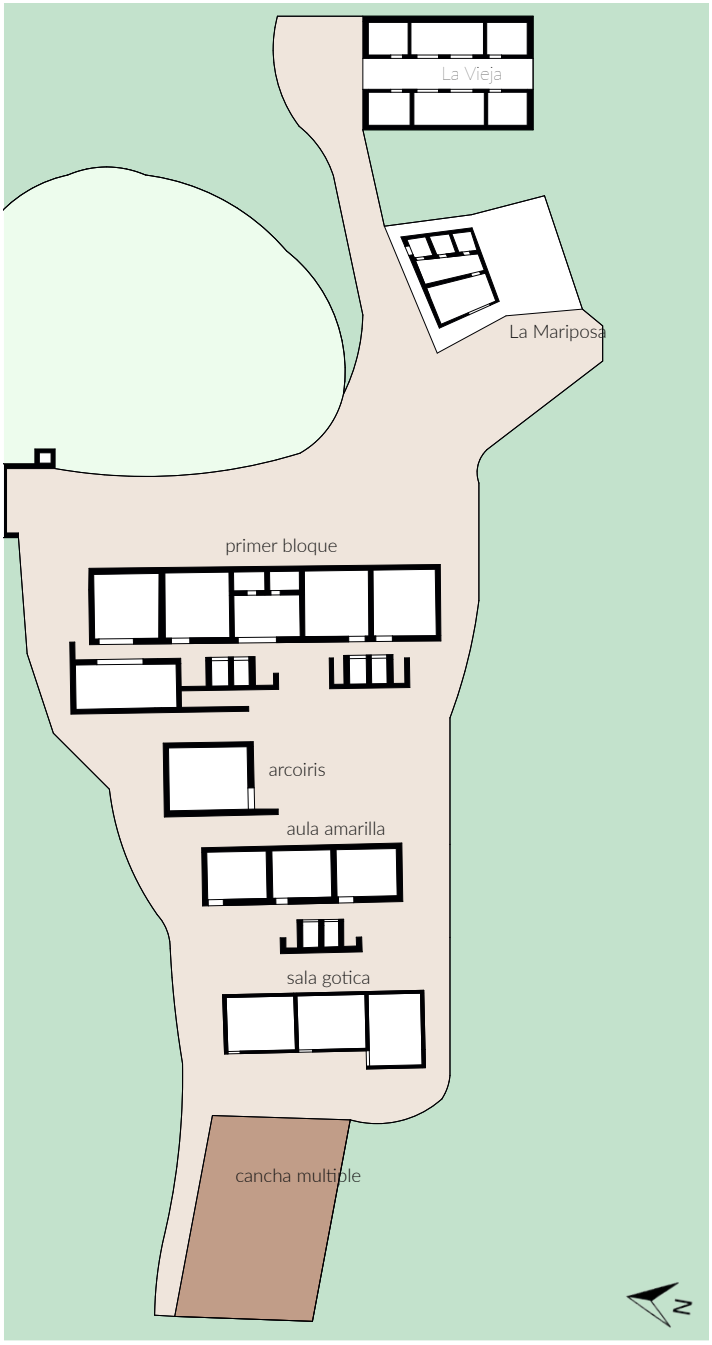


fig.51 map of the Colegio de las Aguas

fig.52 guadua bridge, Colegio de las Aguas

fig.53 guadua structure (p.118-119)

Along with the opportunity to talk to Patricia Giraldo, I was also able to talk to Andrés Rincón, a *guadua* teacher at the colegio. He learned everything about *guadua* in an empirical way: before being a *guadua* teacher, he studied politics and economics and is a political scientist, so even if he teaches different *guadua* techniques, he is no architect, engineer, or carpenter. Andrés Rincón told us more exact things about the school and the *guadua* material itself, because he participated in the construction of the Colegio De Las Aguas. He is part of a group working in the social and political field, the Tropa Guaduera, a collective of young activists, through which he came to collaborate in the construction of the Colegio De Las Aguas. The collective deals with organic and urban architecture. For the collective, doing architecture with guadua is a form of political and economic resistance, because it is very political, because it was used by communities that had been displaced from their territories by violence. The *guadua* was used to build a vivienda (house) with a process of communitarian autoconstrucción (self-construction), because with this material, a vivienda could be built in a week. This also led to the stigmatization of *guadua* as a material for the poor.Andrés works at the colegio as a teacher of *guadua* and has a workshop at his disposal. From what he told us, the subject of guadua is studied very little, even in Colombian universities, due to the stigma it holds. There are still some problems with concessions for the use of guadua grubbed up by unofficial guaduales since guaduales are classified as forests. However, guadua is different from trees in that it grows much faster, and if cut correctly, for every *guadua* cut, four more will grow. This is why the *guaduales* are called *el bosque que camina* (the walking forest).[32]

Colegio de las Auguas is an example of a good way of building in Valle Del Cauca because of the choice of materials and techniques. The city of Cali is in a temperate climatic zone and has an average temperature of 23 - 24 degrees. In this case, it is very important to repair from rain, but there is no need for a fixed and closed-wall building. In the *colegio*, it is possible to see how the architecture responds to the temperate climate by having walls with lots of openings for cross ventilation. This kind of building was very good for the children also, because they were very in touch with nature without thick walls dividing them from the surrounding trees and greenery.

All of the buildings of the school are built out of *guadua*, together with wood, concrete, bricks, and clay. Andrés Rincón calls the *Colegio de las Aguas* an avant-

32 Interview with Gloria Patricia Sarria Giraldo and Andrés Mauricio from Colegio de las Auguas on the 25th of October 2022, Montebello, Cali

33 Bäppler, 43, translated from german by Alice Benussi

34 Bäppler, 49, translated from german by Alice Benussi

fig.54 La Mariposa, Montebello

fig.55 guadua esterilla, Montebello

"The esterilla technique is made out of guadua; the harvester beats the stem lengthwise with his machete to split it vertically. Because of the fibers running lengthwise, the bamboo does not break apart completely, but tears open lengthwise without losing its connection to the rest of the cane. The worker has to perform several dozen of these machete cuts until he has split the guadua in its entirety and all around. Then he places the machete at one end of the cane and pulls it through to the other end. Like a zipper, the stem finally opens up and lays at the harvester's feet as a mat about 30 cm wide (circumference of the cane) and between 1 and 3 centimeters thick (wall thickness of the cane). The inner thickenings, which previously strengthened the bamboo horizontally as knots, are planed off by hand with a pila, a kind of pole plane. The versatile building material is ready! The esterilla can now be used directly as formwork, dried and immunized for other tasks such as roofing, or as raw material for furniture construction."[33]

fig.56 guadua esterilla, Montebello

"The finished work was then framed with wooden frames and set up so that it was structurally independent but ended directly under the roof. Unfortunately, you could hear every word through the mats, so to enhance the beautiful look of the esterilla mats, they had to give them a layer of plastering with cement mortar, which was later painted white. So for the walls, they developed a vertical sandwich element consisting of bamboo, rabitzdrat, and cement mortar."[34]

garde building, not only because of the use of *guadua*, but also because of the new techniques that were experimented with in these buildings for the first time.

The building *La Vieja* has walls made of *esterilla*. The *esterilla* technique is used in *La Vieja* as a covering layer to cover up the construction and as a dividing function between the rooms.Because of the very warm temperatures, they also built a swimming pool in front of the *Vieja*, which got completely destroyed by the pressure of the ground.[35]

Andrés Rincón explained to us the importance of *buenas botas y buen sombrero* (good boots and a good hat), intended as a good base or foundation and a good roof to ensure that the *guadua* is maintained for a long time, as the *guadua* structure must be protected from water, sun, and soil. *Guadua* must always remain dry; therefore, it must be planned with a distance of at least 10 - 15 cm from the ground. It is best to place the *guadua* supports on a base: in this case, a hole is drilled in the lower part of the wall of the *guadua* pipe, and cement mortar is injected with a syringe. This mortar connects the steel rod emerging from the concrete foundation to the inside of the guadua neck.

For the first time while building the *colegio*, openings in the buildings were made out of *guadua* and also special curvatures were created. This type of curvature allows the guadua to be worked in flexion and tension.[36]

Normally, *guadua* is used for longitudinal figures; if placed longitudinally, they work better at pulling force. The *guadua* is a bamboo that also works very well in compression, due to its round shape formed by an outer part with fibers and a hollow inner part. The *guadua* is oriented in the direction in which it grows; you can tell the direction by how the nodules of the guadua are positioned. The *guadua* is subdivided into nodules and canutes; a canute goes from one nodule to the next nodule, so each canute lies within the one before (this specifies the direction of growth). When the *guadua* is born, it already has all the canutes. Its culm is covered with ***ochas*** *caulinares* (ears) as protection. Initially, it is a very flexible material that becomes increasingly hard as time passes. The *guadua* grows depending on how much water it has and which environment it finds; there is no perfect bamboo size; it grows what it genetically needs to grow, which is a lot due to environmental factors. There are no two *guaduas* that are alike, but it´s grown logarithmic. In centimeters, it grows approximately between 12 and 21 cm per day. The *guadua* becomes mature between 3 and 6 years of age, when,

35 Interview with Gloria Patricia Sarria Giraldo and Andrés Mauricio from Colegio de las Auguas on the 25th of October 2022, Montebello, Cali

36 Bäppler

based on the sound it makes, one can tell whether it can be *matassed* (cut off) or whether it still needs some time to grow. Especially from a seismic point of view, it is important that the guadua is not too soft. It should be *biche y hecha* guadua (not ripe and mature).
As important as the connection to the ground is the connection between *guadua* pieces for knots. When working with *guadua*, one must always respect its knots. For example, when you want to cut the *guadua* with a point in the shape of a *bocal pescado* (fish mouth), this cut must not be further than 5 cm from the knot, bearing in mind that about 8 cm are mouths. For structures, the triangle is used a lot because it gives better structural conditions and because the *guadua* works best slightly inclined. Nowadays, two *guaduas* are joined together with nails (*pernos y tornillos*), and in the past with fibers or leather.[37]

fig.57 base for guadua structure, Montebello

37 Interview with Gloria Patricia Sarria Giraldo and Andrés Mauricio from Colegio de las Auguas on the 25th of October 2022, Montebello, Cali

fig.58 concrete and stone base

fig.59 concrete base made with guadua frame-work

fig.60 La Vieja

fig.61 wall construction

Among the buildings of the Colegio de las Aguas, it is important to mention **La Vieja** because it is an example of **various construction techniques with *guadua***.[38] In the first image, we can see the bases of the house, which were built with stones and cement. More specifically, the guadua columns have an extra base to raise them off the ground, also made of cement, with a formwork built with parts of *guadua*.

38 Bäppler, Andres (2019): Das Supergras. Zukunft bauen mit Bambus Werkbericht in 4 Bänden, Band 1

fig.62 wood doorframe

fig.63 separating walls

fig.64 stairs

fig.65 ornaments

The columns are used to support the roof of the house and are made from several pieces of *guadua* joined together. The walls of the house were built with a structural guadua base and then, on both sides, an *esterilla* cover (sandwich construction). Guadua was also used for the remaining parts of the building, like separating walls, stairs, and furniture, in some cases together with wood, for example for the door frames.

fig.66 La Mariposa

fig.67 the structure holding the roof

fig.68 the kitchen

fig.69 the roof

The remaining parts of the building were also built with *guadua*, sometimes together with brick, glass, and wood. For example, the building **La Mariposa** (butterfly), where the canteen has its place, has a big roof all held up by a beautiful guadua structure. It is an example of how this material should be valued again, because of

fig.70 open corridors outside the classes

fig.71 dividing walls to the classes

fig.72 roof construction in the classes

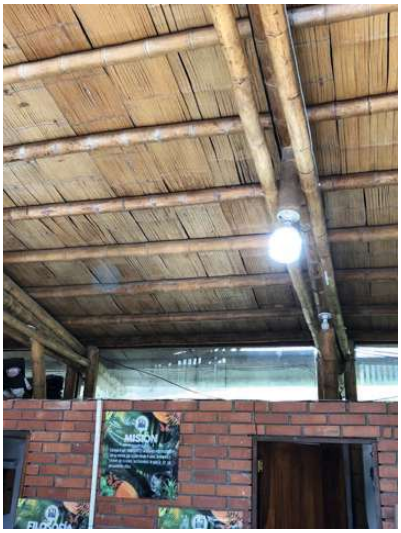


fig.73 roof construction with esterilla

its construction characteristics.
As can also be seen in the images of the **classes of the colegio**, these buildings seem to have been built to celebrate the material of *guadua*.

fig.74 roof construction with esterilla

la quincha

"Guadua is therefore defined by Andrés as a gift from Mother Earth."[39]

In Tuluá, I had the opportunity to talk with Alvaro Chaparro Roldan, an architect whose focus is the *quincha* technique.

The *quincha* technique is an example of vernacular architecture that is still used with adobe, wood, and *guadua*. This technique is also called *bahareque*.

Alvaro uses the bahareque or *quincha* technique for his projects, working with *guadua* instead of wood. It can be used to build houses up to 1 or 2 storeys high. The official process starts with holes in the ground of about 80 - 100 cm, depending on the type of soil. Here, iron wires or poles about half an inch thick are driven in, and with stirrups, they make the foundations, on which beams and columns will lie. In each of these corners, a piece of wood about 10 cm thick by 3 meters long is placed; this is type 1 wood, used only for construction. With other wooden boards, a frame of about 1.20 x 2.30 meters is created, and the guadua is also applied. For the fastenings, plant *lianas* are used to join the various pieces, which, once dried, become very strong, like nails. Then a net is put in the frame, and finally the earth is used to create the walls. These frames are the walls they use (like giant bricks) for their houses. These 'bricks' are the load-bearing walls of the house. The walls are tied together by means of a beam, so that should there be an earthquake event, the walls will stand and not move. The electrical and plumbing systems are inside the wall. Earth is then applied to the wall panels, which are first allowed to mature for 5 - 10 days by pouring water over them, until they reach the right strength. From here, the earth is applied directly by hand, after which a net is applied, which will hold the earth inside the wall panel. When it is ready, when the earth is dry, the holes are covered with sand-cement (sand-cement), but looser, more saturated, and with a lot of water (on the other hand, when we make this model, it is a dry mixture, which serves to fill the holes). Then we move on to the plaster. *Arena*-cement is also used for this. The roof, on the other hand, is also made of bamboo, but what we call *caña brava* here: about 5 meters long, and hollow on the inside, it is very light. The leaves of the *caña brava*, similar to the *ochas caulinas* of the *guadua*, are nailed one by one, placed one way and the other. On the *caña brava* roof, the tile can be layed directly or with a little mortar, since the heat depends on the temperature of the house environment. A woven straw roof is used. It is called *palma de chonta* and is a very large palm tree. It can

39 Interview with Gloria Patricia Sarria Giraldo and Andrés Mauricio from Colegio de las Auguas on the 25th of October 2022, Montebello, Cali, translated from spanish by Alice Benussi

One example of a building with the quincha technique of Alvaro Chaparro is Casa Marinilla. In these pictures, we can see how the building was constructed. Important is the main structure out of guadua. For the walls, the ***quincha* technique** is used, which means that between the main structure´s guadua pieces there are some intersectional pieces. In certain points, wood was used instead of *guadua*. Clay

fig.75 the ground floor of the construction with the main column structure made of guadua on a concrete base. In the picture, we can see the walls made out of a wooden frame and guadua pieces.

fig.76 the whole building, in the phase of the construction of the second floor and roof structure.

is put on top of the wall structure. In the pictures of the construction phases, it is shown how the base was made with concrete to keep the *guadua* safe from water on the ground. Also, in the pictures of the final phase of the building, the size of the roof can be seen. In fact, this is built to cover the clay walls and the *guadua* structure.

fig.77 the construction with some ground floor walls already covered with clay.

fig.78 the whole building, in the last phase of the construction, with already painted walls.

be weaved on the roof. The *palma de chonta* is not rare, but there is not a lot of it, so it is difficult to get it on short notice. It is worth about 3,500 Colombian pesos per leaf (0,70 euros), which measures about 1.20 m2. It is important that the straw be fixed at the top so that when the rain falls, it breaks up into particles. On the other hand, it is important that the guadua be worked because there are small animals, not even one centimeter in size, that would otherwise eat it. With his experience with the *quincha*, Alvaro traveled to various world exhibitions and congresses (in Central America, Venezuela, Panama, Mexico, Pereira).[40]

The *Plan de Padrinos Interntional* was planned to build houses for people with little money, give them access to health, education, and housing infrastructure, and teach the community about social living. Alvaro participated in the Plan de Padrinos International as an architect, while his other colleagues were social technicians or engineers and had other specializations. Alvaro being the architect in the *Plan de Patrinos Interntional* means he was in charge of teaching things related to architecture that were needed on a daily basis, such as what a square meter is, how to calculate it, what a wall is, and how to read a map, because the inhabitants of this neighborhood were sometimes literate and sometimes not. To work out how much housing was needed, they did a *plan de vivienda*: a planning of who lives and how they live, because they found that 10 - 12 people from 3 - 4 families were living in one house, with social problems, children living together with adults, and health problems. So they built a new neighborhood in Tulua, with houses for 197 families built with bricks and earth. In another project, they had to build housing away from Tulua, but it was too complicated to get the materials there (two hours away from Tulua), so they decided to work with locally available materials such as *guadua* (which grows there). The neighborhood was built 32 years ago and is still inhabited, mostly by the same people. They also did a project in Tuluá: a neighborhood with 32 brick houses, which were built in collaboration with the community. Everyone collaborated in the construction of all the houses, as they did not yet know which one would be theirs.
Alvaro built other neighborhoods with the *Plan de Padrinos*. Several houses with two bedrooms, a bathroom, a kitchen, a work area, a living room, and a dining room, about 60 m^2 in size. At the time, each house cost 16,000 Colombian pesos (32 years ago); the houses Alvaro builds today cost about one and a half to two million pesos per square meter of construction. In short, a 30 m^2 house, multiplied by two or three, is worth 60 million Colombian pesos. And the climate there is very different, on a grand scale. For example, Calima on the lake, where Alvaro has built 3 - 4 houses in that space, is very cool, about 12 - 14° degrees

40 Interview with Alvaro Chaparro Roldan on the 3rd november 2022, Andalucia, Tuluá

or more or less. These three houses have a kitchen inside, a veneer, and all the walls are made of earth.[41]

Alvaro works with *quincha* nowadays, using some more modern ways of interpreting this technique. Another house built by Alvaro was built with a similar technique to the *quincha* but with waste materials such as plastic bottles in the large modules used for the walls. The fully assembled house consists of three bedrooms, two bathrooms, a living room, a kitchen, and a patio. The modules to build it were made from plastic bottles, to which a layer of aluminum, also recycled, was added; on top of this was applied a net called maya, which ensured that there was more adhesion. The use of aluminum is necessary because the earth does not adhere directly to plastic bottles. The aluminum is taken from the tetrapak boxes, because a special process allows the cardboard and plastic to be detached from the aluminum of the tetrapak. Some spaces in the modules are left empty to put a television, refrigerator, or other necessary parts in the house. Solar panels are used to generate energy for the house. This house was built on a farm, then disassembled, transferred by truck to an exhibition in Medellin, and reassembled by crane. In all, the house was assembled and disassembled four times; this was possible because there are no real walls but modules.
Alvaro always uses a module of 3.60 m in his projects between columns or walls made out of guadua. He normally works with guadua columns or wood for his projects. These are not only buildings but also lights, bridges, lighting, and furniture; in fact, he built 80 figures for lighting with companions.[42]

In 1999, because of an earthquake, many houses collapsed. From this moment on, Colombia changed its earthquake code NSR 1012 (seismic-resistant norm). Thanks to this norm, builders like Alvaro are able to build legal buildings. To construct buildings out of bamboo, there is a need for a *guadua* certificate. To be certified, the *guadua* has to be treated; it is immersed in a pool of acid and borax for 5-8 days and then dried vertically for 6 months. The borax acid is a mineral salt that enters the vertical fiber of the guadua so that it is not eaten by insects. Certified guadua is measured in 6 m and 12 m lengths and 10 - 12cm diameter pieces. The length is given by the length of the containers. In November 2022, one 6 m long piece was worth 38,000 Colombian pesos (7,60 euros) per piece. The other type of *guadua*, not for construction, with a smaller diameter,
about 6-8 cm was worth about 28,000 Colombian pesos (5,60 euros) per piece. It cannot be bought in every city, but in Cordoba, Pereira, and Manizales (places

41 Interview 5
42 Interview 5

in or near the Valle del Cauca). Through my interview with Alvaro, I also got to know SENA, a research community about housing typologies (which took place with the Cartagena agreement, where the different South American countries met and presented the different forms, methodologies, systems, and materials and made various schemes, including how to work with *guadua*, wood, earth, and cement). The aim of SENA is to *disenar* (collect the different designs) throughout the country of Colombia, in order not to lose Colombian culture.[43]

fig.79 guadua furniture

43 Interview 5

fig.80 guadua furniture

In these pictures, we can see some furniture built with *guadua* by Alvaro Chaparro Roldan and some other craftsmen from Valle del Cauca. Different parts of the *guadua* bambus were used to make these chairs. For the last one, there were two different plants, and in both cases, the part of the roots.

fig.81 guadua furniture

The next example is the building from Alvaro Chaparro Roldan build with plastic botthles an alluminium sheets together with *guadua*, a modern way of interpreting the *quincha* technique. Thorugh this photos the different building phases are to be seen. In the first picture the *guadua* structure is build, by creating the first columns and frames for the *quincha* walls. The infill of the walls is mainly made out of recycled plastic bottles, like in the second picture with a first cover made

fig.82 the guadua-frame of a wall is being constructed. The main columns are built on concrete bases.

fig.83 most of the frames are built and already filled with plastic bottles

out of alluminium sheets and a wire net. On top of these two last layers is given clay and some color. The outside surface of the new *quincha* wall, look very like the more traditional one. Finally the building was completed, like in the last photo, having some walls built traditionally and some in this new way. The building was later deconstructed and rebuilt on an other site.

fig.84 The plastic bottles are covered with aluminum and a metallic net.

fig.85 the house is finished, with some walls left unfilled and some covered with clay.

om arquitectura & urbanismo

In Cali, we had the opportunity to visit the architecture firm OM Arquitectura & Urbanismo and visit some construction sites with Olga Milena Cadavid and Andrés Hoyes.

Similarly to Bogotá and Medellin, in Cali, architects are creating more sensilbe designs. The intention is to make a change back to a more culturally influenced architecture and away from the western one. The aim for OM A&U is to work more with restorations and climate adaptations. They take advantage of the physical characteristics of some materials to create a better indoor climate and reduce energy consumption. The projects of OM A&U have always had an indoor building physics concept, also to adapt the project to the surrounding environment and not just take predefined western standards.

The first construction site we visited was inside the shopping center Unico Outlet. Here, the architects are designing a new Italian restaurant. The shopping center already exists, so the plan is simply to redesign a part to create a suitable space for the new restaurant.

Since Cali is in an area with an average temperature of 24 degrees, the architects thought of leaving one whole side of the restaurant open. This side can be closed off with tarpaulins or rain covers only in case of rain or strong winds, which happen very rarely in Cali. This solution is very interesting, as it also allows a lot of ventilation inside the building and does not require thick walls to resist the winter cold, which does not exist in Cali.

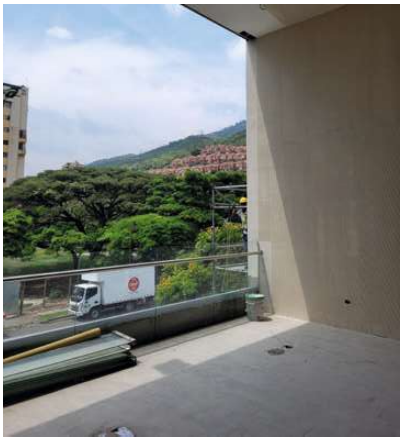


fig.86 open wall of the restaurant

fig.87 inside room of the restaurant

fig.88 inside view of the restaurant under renovation, with the open walls

fig.89 inside of the church

fig.90 constructing materials outside the church

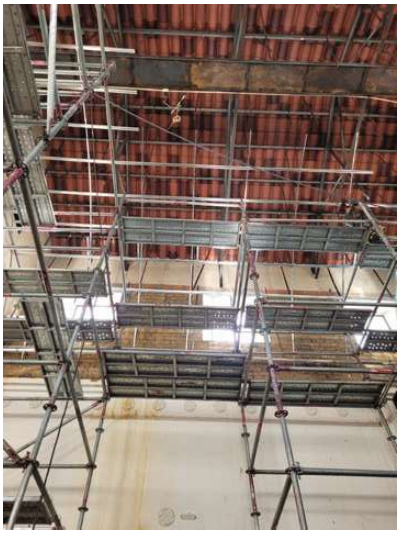


fig.91 inside the church

fig.92 constructing material of the Capilla

The second construction site we were able to visit was that of a church, the Capilla Nuestra Senora del Rosario. This church is supposed to have been built in the colonial period and also needs to be restored. The church was built of clay and wood and later reinforced with concrete, which the engineer also said is quite dangerous as it would not function as a support during an earthquake. Similarly, some of the columns that have been 'built' were actually mock-ups to artificially increase the labor-hours to generate higher profits.

eje cafetero

The Eje Cafetero, or axis of coffee, is one of the regions, spread in the departments of Caldas, Quindio, Risalda, Tolima, and Valle del Cauca. It is a UNESCO heritage site for its cultural landscape. This area was colonized in the last decades of the 18th century. The architecture of the Eje Cafetero is characterized by the small villages called *pueblos*, where the architecture developed in a pre-colonial and colonial style. Later on, with the improved economy due to the sale of coffee, the traditional architecture was supplemented with details and ornaments. These houses often have the typical organization, with a central courtyard on one or two floors. They are generally built of rammed earth and clay. The roofs are usually gabled with clay tiles.[44]

As can be seen in some pictures, the houses were built with façades made of esterilla and adobe, then painted.
Today, buildings are still built combining Hispanic heritage with the use of *guadua*.

The second important point of architecture in the Eje Cafetero are the farmhouses, or *fincas*. Usually *fincas* in this area are clad with typical materials, such as wood mixed with *bahareque* walls and covered with *guadua* mats, lime, and clay tiles, making these buildings resistant to earthquakes. Often painted in strong colors such as blue, orange, yellow, and red, which are used for window doors or decorative structural elements.
There are many styles of fincas. For example, there are large buildings with large kitchens, dining rooms, living rooms, and bathrooms on the first floor, as well as multiple rooms with balconies to the outside of the house. They also have a long corridor with wooden floors that connects them to the first floor. The family hierarchy is evident in these constructions, the larger and more conspicuous the house, the more important the person living in it.
Also not to be forgotten are the interior ornaments of the houses, because they are an integral part of the *finca*, where coffee can be brewed.
In addition, religious buildings stand out in the Eje Cafetero, such as churches, chapels, cemeteries, and religious schools. Most of the temples that still exist today were built in the late 19th and early 20th centuries. The churches have an aesthetic inspired by classical or neo-Gothic decoration.
A very typical construction of this area are the small coffee farms, established since the end of the 19th century in the region.[45]

44 https://proyectosurbanos.com.co/3-datos-arquitectonicos-del-eje-cafetero/ March 2023
45 https://proyectosurbanos.com.co/3-datos-arquitectonicos-del-eje-cafetero/ March 2023

fig.93 Sevilla, Eje Cafetero (p.148-149)

fig.94 Sevilla, Eje Cafetero

Linear or angular in shape, these buildings often have an external corridor on one or two sides. *Guadua*, clay tiles, and wooden or *guadua* structures are used as materials.
Various facilities are needed for coffee cultivation, including washing and drying the coffee beans. A special type of coffee house was developed, Helda, which has a sliding zinc roof that, when moved, uncovers a wooden platform for drying the beans. The same platform is also the ceiling for the interior spaces of the house. In the Quindio area, *guadua* is also used for sloping grounds, as this helps in the resolution of different slopes. Some scaffolding supports houses up to 3 or 4 stories high, as they are flexible and allow a good seismic response. Even today, buildings are constructed using this technique.[46]

Together with the *guadua* structures, the ornaments on the façades and interiors were very characteristic of the architecture of this area. Wood was often used, especially on doors, windows and balconies.[47]

"The use of bamboo and wood in the coffee region is not limited to the construction of houses. There are remarkable examples of bamboo and wood structures in the churches of some municipalities and cities."[48]

The *casa de hacienda* (ranch house) is an important traditional building in the Valle del Cauca and in particular in the Eje Cafetero. This typologie is part of the cultural heritage and a dominant part of the landscape. These houses were mainly built for agricultural purposes, following the Andalusian farmhouse model. They played an important economic and social role in Valle del Cauca. A few examples can still be found today, but unfortunately, some of them are very deteriorated. The architecture of the *casa de hacienda vallecaucana* begins with the Spanish colonization, whereby the first buildings were constructed incorporating local techniques and materials, such as *guadua* and palm.
The need to adapt to the resources, climate, landscape, and culture of the place led to the local development of *hacienda* houses. The climate in the Valle del Cauca is characterized by an average temperature between 22 and 26 degrees, sometimes with short, intense rainfall. Especially in April and November, heavy downpours can occur, while there are also other very dry and warm periods.

46 https://www.revistacredencial.com/historia/temas/la-vivienda-popular-tradicional-en-la-region-cafetera-central April 2023
47 https://www.revistacredencial.com/historia/temas/la-vivienda-popular-tradicional-en-la-region-cafetera-central I April 2023
48 https://www.revistacredencial.com/historia/temas/la-vivienda-popular-tradicional-en-la-region-cafetera-central April 2023, translated from spanish by Alice Benussi

A house was also built along with the *casa de hacienda*, which could not be simple and sober, so that the owner could control his land and farm. The second house had to meet the needs of the owners and show their prestige. In this case, architecture had to be functional and representative of tools and symbols.
The houses described were extended, modified, and repaired over time to adapt to the needs and economic and social conditions of the owners. A common transformation consisted of closing off external corridors with walls to create new living spaces, which led to a constant variation in the typology of later constructions. The house is usually organized around a courtyard, formed by two or three rows of fences connected by long corridors. The program of the *casa de hacienda* is generic, so that the rooms only differ in importance based on their central or peripheral location. The only room that stands out is the main hall, due to its size. Initially, the kitchen was built separately from the house in a small warehouse. Only later, in the 18th century, was it incorporated into the dwelling. These houses tended to be one or two-storey high.
The baths were mainly pits dug into the ground to collect water and were covered with bricks, so that by descending the steps, one could use these pits as a swimming pool. Mills were an important part of the *casa de hacienda* and were often found near to it. During the colonial period, they were built with a thatched roof. Towards the end of the 19th century, most were built with bricks and a tiled roof.
The *ramada* was another building dedicated to work spaces.[49]

"In their most basic form, they were gabled on brick or adobe pillars, bonded with mud, but in some cases they were even quadrilateral with interesting overlapping roofs to allow central lighting. Their floors were made of rammed earth, pebbles, or bricks."[50]

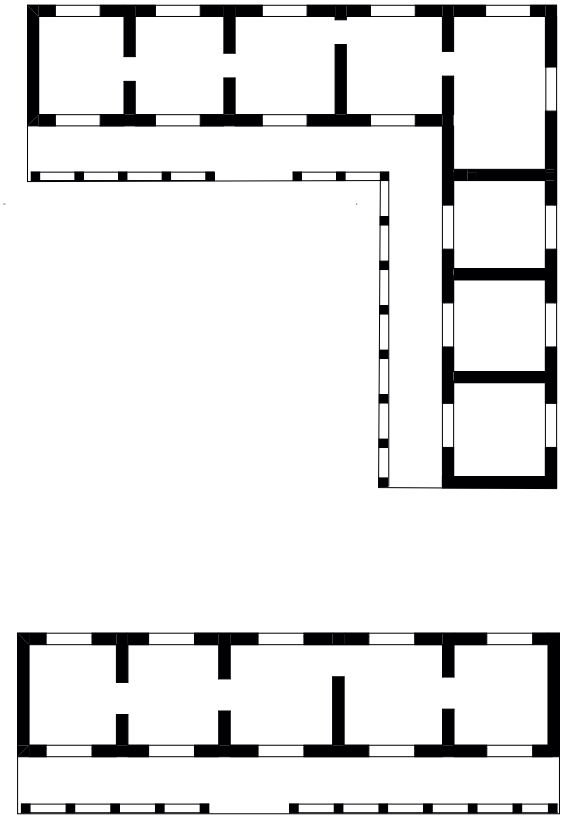
Important for the order of the house are the doors and fences. These clearly mark the entrance. Gates divide the area from the house and from other courtyards. The gates between the courtyards were sometimes *tranca* gates and were built with drilled posts or coupled with cross-pieces on which wood or *guadua* ran horizontally. This was necessary because of the need to separate crops from livestock. For the construction of the different buildings of the *hacienda*, it was common to use kilns, or *galapones*, which were capable of producing large quantities of bricks. Baked brick was used for foundations, floors, the edges of

49 Ramirez, Benjamin Barney Francisco (1994): La arquitectura de las casa de hacienda en el Valle del Alto Cauca, El ancora editores, Bogotá

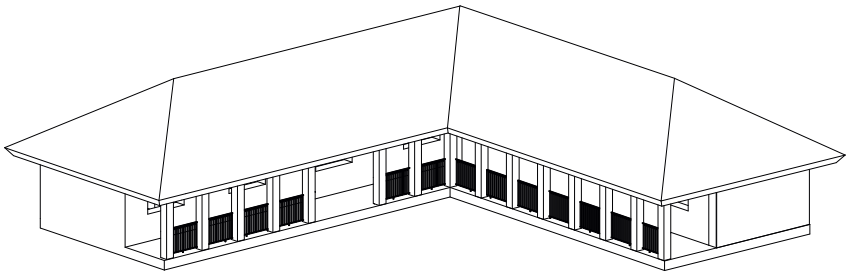
50 Ramirez, Benjamin Barney Francisco (1994): La arquitectura de las casa de hacienda en el Valle del Alto Cauca, El ancora editores, Bogotá, tranlsated from spanish by Alice Benussi

pits and pools, and spurs and columns. In the early periods of colonization, floors were only made of earth but were later replaced by bricks.

For the roof structure, round timber with carved pieces was used. The construction of *casa de hacienda* was not learned during architect training, as these were rather the result of a popular building culture.[51]



51 Ramirez, Benjamin Barney Francisco (1994): La arquitectura de las casa de hacienda en el Valle del Alto Cauca, El ancora editores, Bogotá



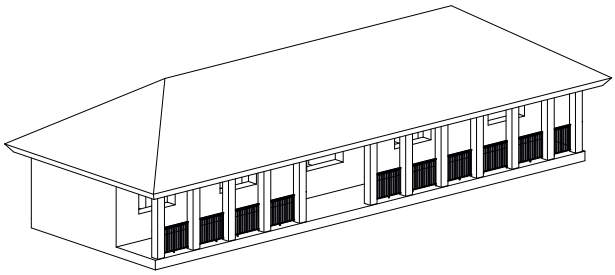


fig.95 plans of the casa de hacienda from the Valle del Cauca (p.154)

fig.96 axonometries of the casa de hacienda from the Valle del Cauca

fig.97 adobe bricks, Capilla Nuestra Senora del Rosario

fig.98 esterilla, Colegio de las Aguas

The temperate climate of these areas makes it possible to live in architecture made of ***guadua*** using the *esterilla* technique. Often, a layer of **earth** is placed on top of the *esterilla*, usually for sound insulation reasons. Guadua is used a lot in this area mainly because it grows so much, so the choice to use it is important since it is a material that is very connected to the environment. Regarding adaptation to the surrounding environment, this happens especially in rural areas such as the Eje Cafetero and in buildings such as casas de hacienda and fincas. In the Valle del Cauca, the materials mostly used are similar to those in Bogotá, except for

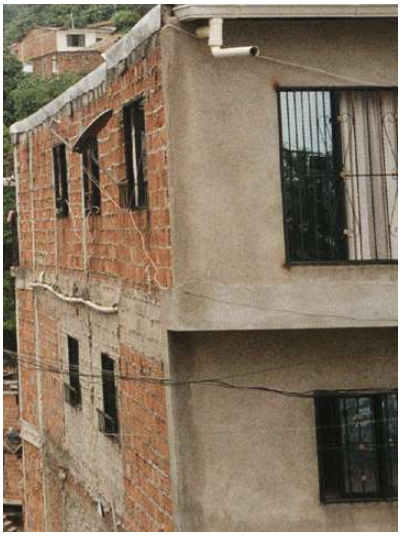


fig.99 ladrillos, invasiones Cali

fig.100 concrete, Colegio de las Aguas

guadua. In fact, this material can be found in this area in great abundance, and it can be used with different techniques. The colonial architecture of Eje Cafetero also led to the development of adobe bricks, such as those that were used for the construction of the church. **Concrete** and especially bricks are also used for the construction of more modern buildings. Concrete is also used in combination with *guadua*, especially as a support to keep the material high above the ground so that it does not get wet. **Bricks** are used especially in the neighborhoods of the invasiones as shown in the photo.

fig.101 carpark, Eje Cafetero

fig.102 restaurant, Eje Cafetero

fig.103 tollgate, Eje Cafetero

fig.104 La Vieja, Colegio de las Aguas

On this page are some examples of architecture in the Eje Cafetero, mainly using ***guadua*** structures with esterilla walls, sometimes covered with earth. *Guadua* architecture is also used for roofs.After seeing and analyzing the various architectural typologies of the Valle del Cauca, we can understand more about the architecture of the rest of Colombia.

One of the most important elements of the architecture in Valle del Cauca is the *guadua* bamboo, since it characterizes most of the architectural typologies we can find. It is a symbol of adaptation to the environment and, most of all, to natural resources.[52] It can be used to build **structures, floors, walls, and furniture**. The pictures on the left show how the material is used for structures. In some cases

52 https://proyectosurbanos.com.co/3-datos-arquitectonicos-del-eje-cafetero/ March 2023

fig.105 esterilla, Eje Cafetero

fig.106 colored esterilla, Eje Cafetero

fig.107 esterilla, Eje Cafetero

fig.108 esterilla with clay, Eje Cafetero

the *guadua* is even colored, like in the example of the first car park, where black paint is used on top of the *guadua*. In the second example, the guadua is colored with green paint, used for the structure of a restaurant. The next examples are of more clean *guadua* designs, with no colors on top. The third image is the inside of La Vieja at the Colegio de las Aguas, while the fourth picture is a tollgate, with part of the structure made out of guadua.
The pictures on the right show different examples of *esterilla* technique in the Eje Cafetero; sometimes the walls are made out of just *esterilla*, while sometimes they are covered with clay and color. Both of the building techniques are linked to tradition and respect the surrounding environment.

fig.109 patio, casa de vivienda

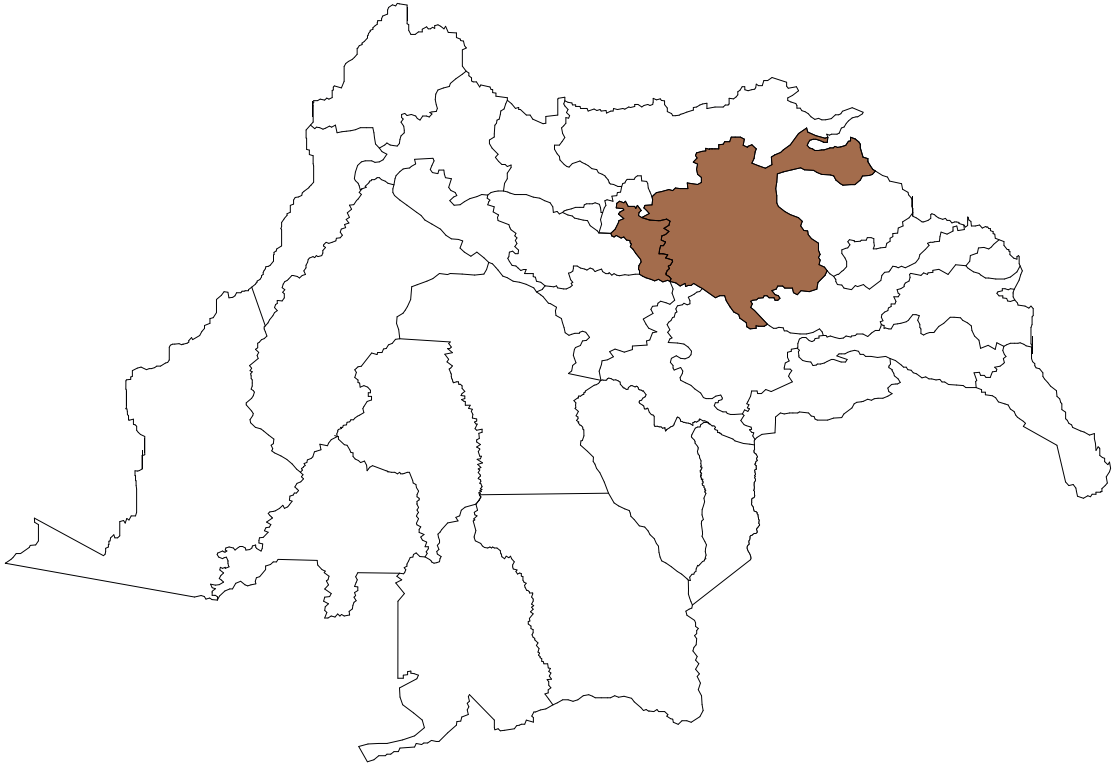
fig.110 outside patio, Colegio de las Aguas

Also in Valle del Cauca, the architectural form that most persists, even in contemporary buildings, is that of **open space**. In fact, during the colonial period, the *casas de hacienda* were built with **verandas** around the perimeter of the house, sometimes even internally with a **patio**. During this period, the houses were built in pueblos characterized by balconies and interior patios.
In the example of the casa da hacienda, we can see a building built with a veranda in front, an integral part and also a sign of recognition of the *casa de hacienda*.
In the present day, this architectural form persists both in the architecture with traditional materials, as can be seen in the photo of the Colegio de las Aguas,

fig.111 restaurant, Unico Outlet

fig.112 living room-terrace, condo in Cali

where the roof is much wider than the walls of the classrooms to allow more shade and more repair from the rain, and where the students can make use of the **outdoor space**. In this case, the desks have also been arranged externally.
The two examples in modern style are the restaurant in the Uniclo shopping center and normal apartments in the city of Cali. In the former, the restaurant was designed with huge **openings** to the outside, without the use of glass, but of tarps against the rain. This architectural form takes shape both in contemporary materials in architecture for commercial use and also in private settings, such as **balconies** of one´s own home.



fifth chapter - MEDELLIN MANIZALES

Days 18-19

Between the 5th and the 6th of November 2022, we visited Manizales.
On November 5, we arrived in Manizales in the early afternoon and had time to visit the historic center of the city. This city is located in the mountains, so most of the streets are downhill or uphill, depending on which direction you go. The city center is located on the highest point of the city, and from there, down the mountain, the city develops.
On the second day in Manizales, the 6th of November, we visited the Recinto del Piensamento, that is to say, the pavilion built for the Hannover Expo in 2000 by architect Simon Velez. This building impressed me a lot because it is a particularly large building constructed entirely of guadua and wood, nowadays mainly used for events such as weddings.

Days 19-22

After staying in Manizales, we moved to Medellin, where we spent the days, from the 6th to the 9th of November 2022. As soon as we arrived in Medellin, we visited the neighborhood of El Poblado, a very beautiful and new neighborhood, mainly famous for its nightlife and good restaurants, dotted with new hotel buildings. On the 7th of November 2022, we visited with Ramiro the new Parques del Rio Medellin project, whereby they reclaimed an area where one of Medellin's major roads used to run, making the road underground and building a park on the surface instead, in order to give the city areas back the outdoors.
On the afternoon of November 7th, we had the opportunity to visit the neighborhood of Comuna 13.
On November 8th, 2022, we visited the center of Medellin, where we were also able to see the Palacio de la Cultura Rafael Uribe, a palace built in a style tending towards the neoclassical, with a beautiful inner courtyard surrounded by a patio. In the afternoon, we visited the Jardin Botanico Joaquin Antonio Uribe, where you can find many different plants and a pavilion built by plan:b arquitectos, whom we had the opportunity to interview that afternoon.

manizales

Manizales is a town in the center of the Andes at 2,200 m above sea level. It is located in an area where there is a volcano, Nevado de Ruiz, which was active for a long time and made it impossible to live in the area but made the soil very fertile. It was only after the extinction of the volcano that the area began to be populated. The high ground was chosen to protect against malaria.[1]
Manizales is located in the department of Caldas and is its capital. Caldas has almost one million inhabitants, half of whom live in Manizales. Almost 8,000 km^2 of surface area. Rainfall is approximately between 1,500 and 5,000 mm/year. The climate in the department is semi-humid and almost humid.[2]
In Manizales, the temperature is between 14°C and 23°C a mountainous equatorial climate, and it is quite rainy.[3]

The first buildings in Manizales were built with rammed-earth but were destroyed in a violent earthquake in 1860; the only houses that survived were those made of wood and bamboo. For this reason, rammed-earth constructions were abandoned after the earthquake, and wooden and bamboo constructions were increasingly developed. A number of fires destroyed the entire historical center, built of wood and bamboo. After that, people started to build mainly with concrete, so that today wood and bamboo techniques are only used by a few experts or poor people due to the low cost of the materials, especially bamboo.

"The flexibility of the plant component that characterized this unique traditional architecture has been replaced by the fragility of 'modern' reinforced concrete."[4]

1 Piesik, Sandra (2017): Habitat. Traditionelle Bauweisen for den globalen Wandel, Edition Detail, München
2 https://www.todacolombia.com/departamentos-de-colombia/caldas/index.html April 2023
3 https://es.weatherspark.com/y/22485/Clima-promedio-en-Manizales-Colombia-durante-todo-el-a%C3%B1o April 2023
4 Piesik, 506 , translated from german by Alice Benussi

simon velez

Simon Velez is one of the most important architects in Colombia. He is originally from Manizales and is known worldwide for his constructions in *guadua*. He calls himself a vegetarian.[5]

In his constructions, he uses *guadua*, which he defines as a very important material in Colombian architecture because it is green steel. It is a material that grows much faster than any tree and absorbs a lot of CO_2, which it releases as oxygen. It defines Colombian culture.
The most important buildings Velez constructed were the Zeri Pavilion for the World Expo in Hannover 2000, the "Church without Religion" in Cartagena, and a Temporary Church in Pereira.[6]

The Zeri Pavillon was built for the Hannover Expo in 2000 and designed together with Marcelo Villegas. It was first built in Manizales, where the materials were tested. 3,500 *guadua* enter barrels were used for this construction, and thanks to 40 specialized workers, it was possible to build it entirely without cranes.
The Temporary Church of Pereira was built on the site of a church that collapsed during an earthquake in 1999. The structure of the church was made of *guadua*, as was the façade. Metal mesh and cement cladding were laid on the walls and roof. This church is 16 m wide, 35 m deep, and between 8 and 11 m high, and it took five weeks to build.[7]

5 https://www.youtube.com/watch?v=p9xJE_PFGCw April 2023
6 Gauzin Müller, Dominique (2019): Pflanzenfaserarchitektur Heute.50 ausgezeichnete Buwerke aus aller Welt, Museo Editions Amaco VDF
7 Minke, Gernot (2016): Building with bamboo: design and technology of a sustainable architecture second and revised edition, Birkhäuser Basel

fig.115 roof construction from the inside, Zeri Pavillon

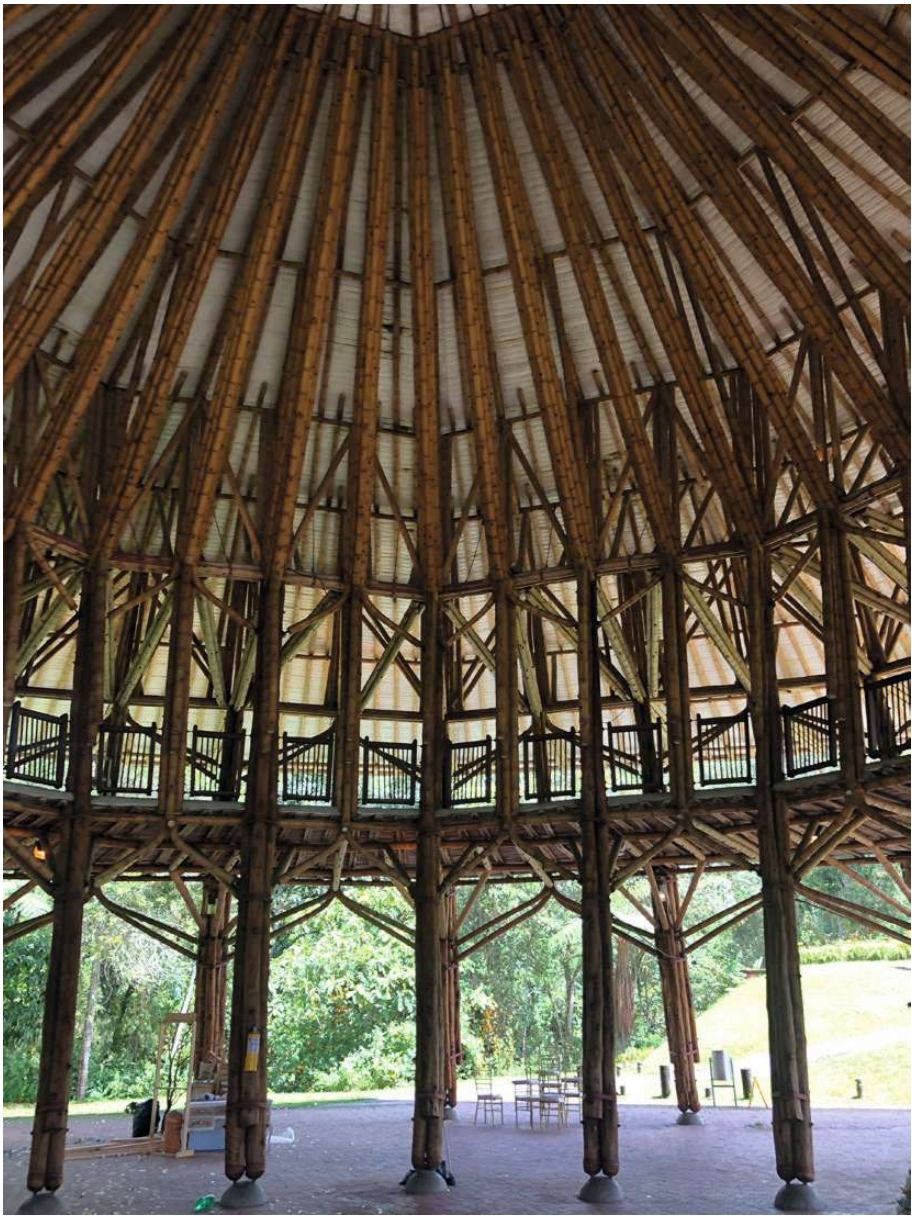


fig.116 guadua and wood structure, Zeri Pavillon

fig.117 and fig.118 guadua structure, Zeri Pavillon

These images of the building by Simon Velez Zeri Pavillon, show the *guadua* and wood construction. For the connection parts were used the the *guadua* closest to the base of the plant were used where it curves entering the ground where

fig.119 and fig.120 connections between the guadua pieces, Zeri Pavillon

it will later have roots. This structure is impressive in its size. It has a function mainly as a pavilion for events, of which the large roof protects the building and the *guadua*, to protect from rain and sun.

fig.121 Zen Pavilion, Simon Velez

medellín

Medellin is located in the Antiquoia department, of which it is the capital. The department has 6.5 million inhabitants in an area of 60,000 km^2. Atiquoia has a temperate climate, which can be humid and semi-humid depending on the zone. Rainfall varies between 1,500 and 4,000 mm/year depending on the area within the department, with a total of 100-150 rainy days per year.[8]
Speaking more specifically about the city of Medellin, it has a temperature that varies between 16 and 26 degrees throughout the year.[9]

The city of Medellin is an example of a good development of infrastructure and architecture in an urban context. In Medellin, architecture tools were used for the benefit of the culture of the city itself.

Medellin was once an oasis of peace; it then turned into a city of violence. 14,704 people called the Villa de Medelln home in 1778, and 55% of them were mulattos or black slaves. The founders wanted to build a community-based city where people might live a "civil and peaceful life".
The first buildings that were constructed were all thatched, except for a few with tile roofs. The walls were made of earth and plant debris, which is why adobe was used for the construction of both churches and houses. Between 1890 and 1950, the city changed a lot and industrialized, bringing public services to the area such as electricity and rubbish collection, increasing coffee production, and reactivating mining activity, until it became Colombia's first industrialized city in the 20th century. Due to the appearance of new industries, the city also grew due to the growth of the population and the formation of the working class. New neighborhoods were created in these years, leading to a real urban colonization. In the 1950s, the population of Medellin numbered 358,000, and in the 1960s and 1970s, it reached 600,000.
Unfortunately, however, at the beginning of the 21st century, Medellin was the center of infighting. In recent years, after the guerrillas, the city has lost its cohesion with bucolic and pastoral life, becoming urbanized and moving away from religious dogmas.[10]

Medellin is a city that has gone from being the headquarters of Pablo Escobar's cocaine cartel to being the benchmark for urban planning and innovation.

8 https://www.todacolombia.com/departamentos-de-colombia/antioquia/index.html April 2023
9 https://es.weatherspark.com/y/22535/Clima-promedio-en-Medell%C3%ADn-Colombia-durante-todo-el-año April 2023
10 Alvarez Echevirri M.D. Tiberio (2003): Medellind: De una pequena villa a una ciudad violenta. Iatreia vol.16 no.4 Medellín Oct./Dec. 2003

comuna 13 and the urban planning of Medellín

The greatest concentration of migration in the city took place in the 1960s and 1970s. For these reasons, many global urbanization problems also took place in this city, some of which were also influenced by the city's location in the center of Colombia, leading to the development of both legal and unfortunately also illegal trade and commerce. This is where the involvement of architects in better urban planning proved to be of fundamental importance. Of course, all this took time because, initially, it was not easy to change the city and react so quickly to the growth.[11]

"The questions were always more powerful than the capacity to resond."[12]

Part of the slowdown was certainly due to this new idea that cities should be car-proof, believing that this would make mobility optimal.
Making the city's development even more difficult was the violence that spread throughout Colombia in the 1980s and 1990s: inequality, poverty, social segregation, violence, and terrorism reigned over the city. From the 1990s onward, with the end of the *guerrillas*, a process of improvement of the social situation in Medellin began, leading to the improvement of neighborhoods and the city itself.[13]

The change in Medellin was most probably brought about by Antonio Mesa, who tried to establish a new concept of the architect as a social actor and agent of change. Three important concepts were established in Medellin for architecture and urban design that could determine the quality of life of its inhabitants: livelihood, housing, and mobility. It is on these three characteristics that the city of Medellin is based at every stage of urban planning. Thus, even the most important and frequent route in every person's life, home to work, becomes pleasant, viable, and functional. In Medellin, this was also possible thanks to the collaboration between various actors in the city scene, whereby associations, professionals, governments, and agencies also collaborated for the same purpose; this happened especially in the 2000s. In this way, architecture students also saw the possibility and responsibility for the social and spatial transformation of the city. The first projects began as early as the 1960s and 1970s, when some barrios were redeveloped, and again in the late 1980s and 1990s. With the redevelopment of these areas, it was also declared that there was no longer a difference between formal and

11 Mehrotra, Rahul; Echavarría, Camilo; Restrepo Ochoa, Camilo (2022): a+u 2022.03 Colombia. Architecture and Urbanism magazine. Shinkenchiku-sha Co, Japan
12 Mehrotra, Rahul; Echavarría, Camilo; Restrepo Ochoa, Camilo (2022): a+u 2022.03 Colombia. Architecture and Urbanism magazine, 158
13 Mehrotra, Rahul; Echavarría, Camilo; Restrepo Ochoa, Camilo (2022): a+u 2022.03 Colombia. Architecture and Urbanism magazine

informal city, so these barrios had to be integrated. The most striking example of this integration is certainly the cable cars that were built to connect the neighborhoods in the hills with the mobility system that was already provided in the city. Along with these more infrastructural changes, some were also made more on a cultural level, such as the construction or foundation of several libraries within the *barrios*, which could also become communal spaces or youth centers. In this case, architecture takes on a "transformed potential for both space and society". Medellin had about 100,000 inhabitants at the beginning of the 20th century; today there are more than 2.5 million. This city has thus multiplied its size by 25 in the last 100 years, bringing about major changes to the economy and culture, as well as to living conditions in the city. Suffice it to say that in the mid-20th century, Medellin had 300,000 inhabitants.[14]

"Public works and buildings linked to the landscape and climate, with rich spatial relationships and intermediate spaces between the building and its context, have been the hallmarks of our architecture in the region. It is common to encounter buildings with patios, corridors, pergolas, squares and gardens in private properties made accessible to the public. Our working-class neighbourhoods, likewise, are a universe of architectural experiments in which access and the management of topography have become open to the addition of external decks and staircases on facades."[15]

At the level of city safety, there has been a great improvement, thanks also to the improvement of the *comunas* (the neighborhoods of Medellin), where new schools, parks, and libraries have been built, and transport networks such as the cable cars and metros have been improved and integrated to provide access to the city.[16]

The Comuna 13 used to be a *guerrilla* neighborhood, where there have been a couple of serious attacks and many civilians have also died. The last attack happened in 2002, and today the neighborhood has completely changed. The inhabitants of the *comuna* have organized themselves to work with tourism. They hold guided tours inside the *comuna*, where they tell the history of their *barrio*. Many bars and small restaurants have been opened, and it is fascinating to be

14 Mehrotra, Rahul; Echavarría, Camilo; Restrepo Ochoa, Camilo (2022): a+u 2022.03 Colombia. Architecture and Urbanism magazine

15 Mehrotra, Rahul; Echavarría, Camilo; Restrepo Ochoa, Camilo (2022): a+u 2022.03 Colombia. Architecture and Urbanism magazine, 162

16 Otis John(2014): Medellin´s Makeover. Manhattan Media, Latin Trade, Vol.22 (5), p.70

able to visit this place, which was once the center of great violence and terror and is now a happy place every day of the week, with music and graffiti everywhere. When we visited Comuna 13, we had a guide called Lady Jane. She showed us the house where she lives and told us how her family came to live in this neighborhood.

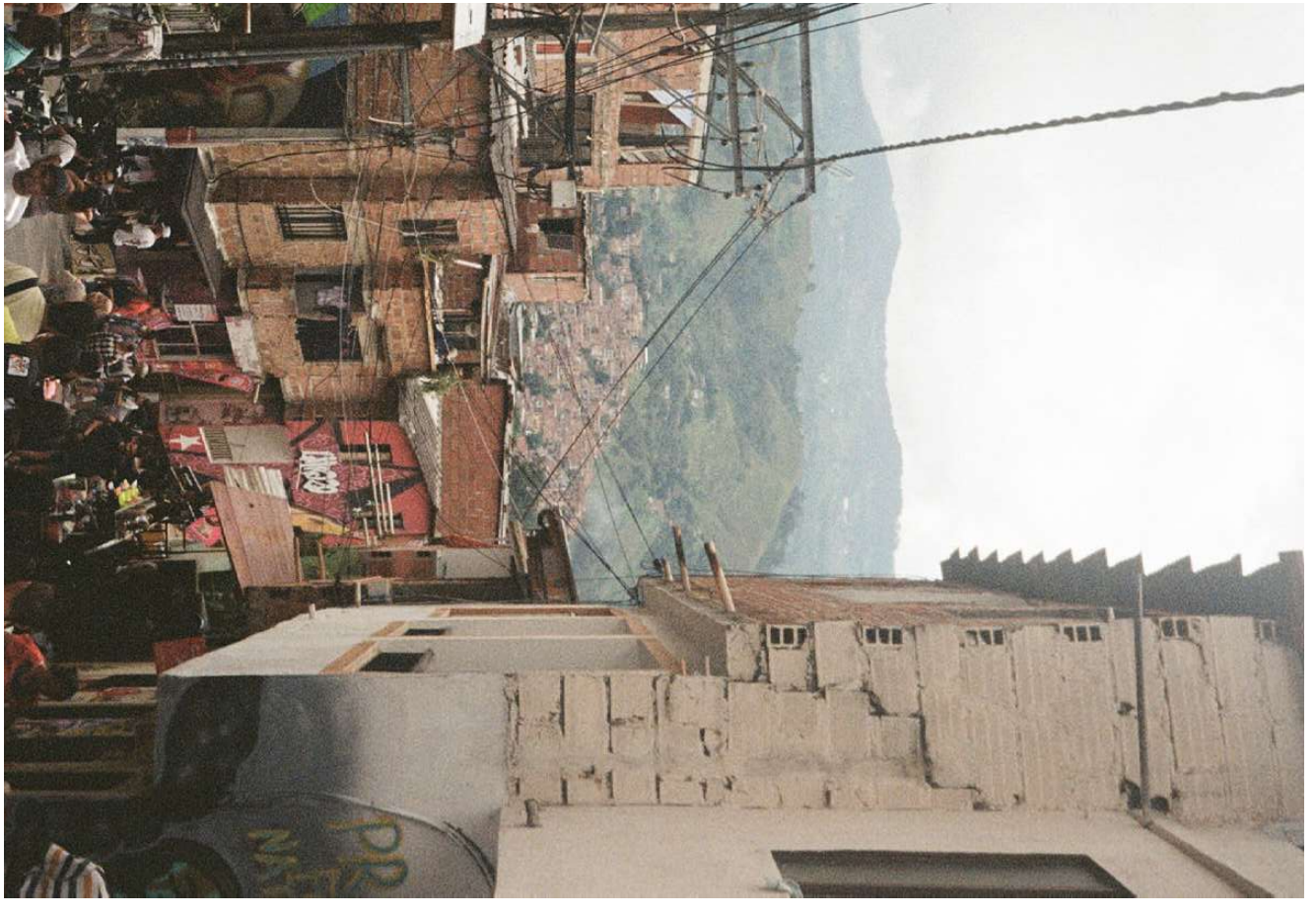
Lady Jane's grandparents arrived in the 60s or 70s in this barrio and lived in houses made of wooden poles and tarpaulins to protect themselves from the rain, which they built with their own hands. At that time, Comuna 13 was lived by very few people. As soon as they had more money, they built a house out of *madera* and later on, her dad built his own house with bricks and concrete. In Medellin, similar to Bogotá, people use bricks to build their houses because they are easier to self-build with the help of just a few family members or friends. Most of Medellin is red, like Bogotá; if you watch the city from far away you will notice that everything has a red color.

As part of the urban planning project, the intervention that helped Comuna 13 develop was, for example, an open-air escalator built to improve transport for its inhabitants, as it is located on the mountainside. This neighborhood was previously connected by narrow streets and steps, so climbing from the bottom to the top is equivalent to climbing a 28-story building.[17]

fig.122 Comuna 13, Medellín (p.181)
fig.123 escalators comuna13, Medellín (p.182)
fig.124 escalators, Comuna 13

17 Otis John(2014): Medellin´s Makeover. Manhattan Media, Latin Trade, Vol.22 (5), p.70

fig.125 Lady Jane´s house, Comuna 13
fig.126 main street Comuna 13 (p.185)
fig.127 Comuna 13, Medellin (p.186)



plan:b arquitectos

In Medellin, we had the opportunity to interview some collaborators of the plan:b arquitectos studio. With them, we were able to find out some information about the architecture of Medellin, especially focusing on some of the projects carried out by the studio and also on the topics of restoration and maintenance of public works or those under cultural heritage protection.
The plan:b aquitectos projects are different from each other, with different areas, different clients, and, rightly so, different solutions being applied. It is very impressive the choice that they made for the building at Rio Mendihuaca, to build a self-sufficient house, as was also very much the case for the Orchidorama, which tends to copy nature, in order to be able to fit in as well as possible, again using the least amount of materials, given the temperatures in Medellin, which make it very comfortable to stay outdoors any day of the year. Given the quantity of good materials even relatively close to Medellin, I believe that a solution in guadua or entirely in wood, for example, would have been more sustainable and perhaps more suitable for a green place like the *Jardin Botanico*.[18]
The Orquideorama was built within the Jardin Botanico of Medellin, which would fit well into the context. The building's main function is to be able to create a covered space where events, weddings and conferences can take place, protecting participants from sun and rain. To do this, modules were used, 7 hexagons per module (for a total area of 380 km2), which can be joined in different shapes; the whole is supported by hollow columns, inside of which are plants that are watered by the rainwater that is collected inside them. These columns are built like real trees, in fact they have a height of 14 metres and are made of metal, with a wooden covering, so that the light penetrates in a filtered manner. In this way, the building is completely open to its surroundings, but protects against rain and the strong equatorial sun.[19]

During the interview at Plan:b arquitectos, we had the opportunity to speak with Daniel Monroy and Andres Rodriguez. They both told us some information about their architectural work in Colombia, with a particular focus on a couple of projects of the studio they are employed by and some information about the Colombian architectural heritage.

The first project we were able to talk about is the Casa Mendihuaca project, near the Sierra Nevada of Santa Marta and the Parque Tayrona. This is a private house, interesting in that it has no access to services, water, electricity: it is a completely isolated house.

18 https://www.planbarq.com/ February 2023
19 Mehrotra, Rahul; Echavarría, Camilo; Restrepo Ochoa, Camilo (2022): a+u 2022.03 Colombia. Architecture and Urbanism magazine. Shinkenchiku-sha Co, Japan

The clients wanted to take advantage of the resources of the place. In fact, the house is located by the Mendihuaca river, from which it also takes its name. The idea was that the architecture should not only respect, but also exploit this imposing river and play with it spatially in the space, for example by mimic the flow of the water in its shape and orientation.
In the process, it was essential to think about how we could achieve a completely isolated house, using the resources of the place.
The problem of water, for example, was solved with the river, by putting a pump a little far from the house that could collect the water and purify it, and then use it inside the house, since the house could not collect rainwater: this was also an easier choice, because it allowed us to use a constant source, rather than waiting for the rainy seasons to collect it.
Because of the isolation issue, there was also discussion about whether to install an energy transformer, whether to connect to the power grid, or whether to use solar panels. Taking into account that there are no neighbours around the house, the choice was solar panels, which are usually more expensive, but in this case were cheaper.
Another condition for the construction was to use palm trees, a material available in the area. On the other hand, wall materials were used, which were imported from Medellin, and these were ruined during transport to Parque Tayrona.[20]

"The beauty of mixing more modern materials such as cement and traditional like palm, is that the traditional material is enhanced as the protagonist of the architecture. And also to maintain the culture."[21]

In this way, the importance of having materials that are available locally was also made clear again to plan:b. Andrés Rodriguez and Daniel Monroy work by looking at both sustainability and the wishes of its clients, who often arrive with architectural ideas or desires inspired by Europe and the United States. For this reason, the studio often looks for a supplier that has the same or a similar material as the one desired in Colombia, or if there is a supplier interested in experimenting and recreating this material here in Colombia.[22]

A particularly sustainable project of the plan:b studio is the Escuela Sustentable. This school is located in San Jerónimo, Antioquia, and was built in wood. Wooden profiles with a roof made of palm trees. It is a very beautiful project, with a very important social component, so that the children attending the school were also able to participate in baking. The neighbourhood where the school was built

20 interview Plan:b arquitectos
21 interview Plan:b arquitectos, translated from spanish by Alice Benussi
22 interview 6

fig.128 orquideorama, Plan:b

fig.129 Orquideorama, Plan:b arquitectos

fig.130 Escuela sustentable, Plan:b arquitectos (p.194-195)

suffers from a number of social and cultural problems, so this was the best place to build a school.
The design of the school is a participatory design, so architecture students from other countries and some city offices also participated in the construction.
The Tagma Foundation, which carries out social projects in Latin America, also participated in the project and carries out this type of social project in Latin America.
The design can be defined as participatory design because workshops were also organised with the children of the school, where we asked three specific questions: What do you want? How do you want the school to be built? What materials would you like it to be made of?
The children had to answer by making drawings creating spatial relationships. In addition, they specified that they wanted to use recycled and local materials. Thanks to this participation, they began to think of classrooms with a spatial relationship for the children on a small scale.
Along with the shape of the project, it was also important to work on a water circuit. In fact, the water that is collected from the roofs is collected in tanks and filtered. One part of the water will be used to water the plants, and one for the toilets.
It was envisaged that the materials in this area could be recycled, so that these could be natural, the wooden ones with the palm, the bottles, the recycled plants. For example, an earth wall was also planned here.[23]

In Medellin, *guadua* is not used to build because it has a social aspect, so it is considered for the poor and stigmatized. An example of a *guadua* building in Medellin was built in Moravia, a neighborhood in the center, above the botanical garden. A project was carried out here a few years ago, before the pandemic. The project was a collaboration between Medellin and the TU Berlin. Students from TU Berlin came here and held participatory workshops with the Moravian community. Part of the architecture was made of guadua to restore different buildings that served the community.[24]

In a second part of the interview Andrés Rodriguez, talked with us about Colombian heritage. He was born and raised in a municipality near Bogotá, about an hour away: a cultural environment, with ecological parks; the entire historic centre is heritage. Andres Rodriguez's grandparents also lived in this area in houses built with adobe, *bahareque* and *tapia pisada*. Everything is very interesting to him there, especially the spatial relationships that existed with the patios and those spaces arranged around them. He wanted to study how those spatial experiences are made, what they mean to people, how they are built and what their history

23 interview 6
24 interview 6

is. Then, later in his career, he focused on railway stations in the centre of the country. These are unused buildings, with an entire network no longer in use, which are now falling into disrepair. This was his thesis, and his proposal was therefore to intervene in the central area of the municipality, close to the institutions, to create a cultural environment for the municipality, which the municipality does not have. So this was proposed as an extension of the station, which would also serve for a commuter train from Bogotá to the village and back. That would make the project very functional and efficient and attract more people to come to the municipality and would create a cultural space following the courtyard theme. More generally, the architectural heritage in Colombia has a very important value.[25]

Many places are trying to preserve it, especially some small villages like Salento. Because in architecture you have a very strong charge of memory, also because it is a country of war: it carries with it all the memory, of the centuries that have passed of the descendants of these of familys that were suppressed by the war. In Colombia, however, the architectural heritage is interpreted and revisited from project to project.

25 interview 6

fig.131 Zeri Pavillon, Simon Velez

fig.132 Orquideorama, plan:b

Places such as Medellin and Manizales also have social needs for **open space**. These architectural features can be seen in the examples of the Orquideorama (Plan:b) and the Zeri Pavillon (Simon Velez), two big structures built to create open spaces mainly for events. Also in the Escuela Sustentable (Plan:b), we can see the open space realized, both with the use of glass (connecting interior and exterior because of its transparency) and with the distribution of the spaces (having an open front of the classroom).
These examples show the attention that is still paid to traditional architecture in rural areas of Colombia, where it is still built with materials such as *guadua*, wood, and palm. In fact, in rural areas, there is more attention paid to the surrounding environment, unlike in more civilized areas, like the comunas of Medellin, where the most important purpose is to improve social conditions.

The architect Simon Velez is a good example of how to use materials that respect the environment because of his great work with *guadua*. With his work, he is trying to enhance *guadua*, which for years was stigmatized as a poor material.
In the Zeri Pavillon, it can be seen that the construction with *guadua* and wood is good for the temperatures in Manizales, since these have an average of between 14°C and 23°C. In this case, walls to enclose the rooms are not needed. On the

fig.133 Escuela Sustentable, plan:b

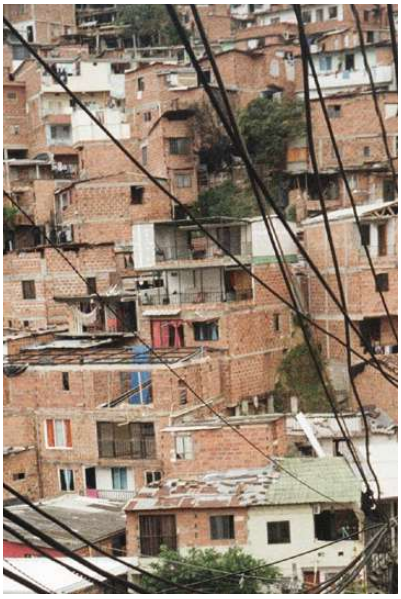
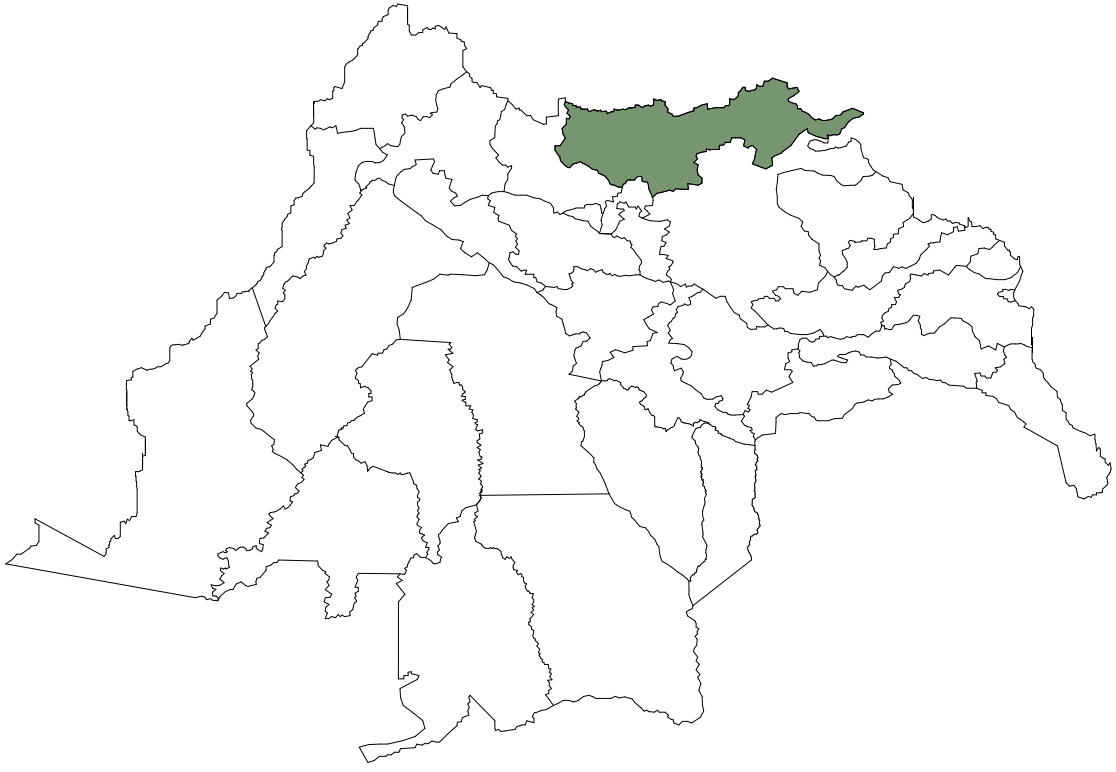


fig.134 Comuna 13, Medellin

other hand, the large roof, built to protect against the most frequent rainfall, is necessary for the *guadua* structure to remain dry and creates a qualitative open space.

If we confront the Zeri Pavillon of Velez with the Orquideorama of Plan:b, we can notice that they have some strong similarities and also some big differences. In fact, both were built with an event function. Both were built in a park, the Zeri Pavillon in a more rural park outside Manizales, and the Orquideorama in the Jardin Botanico in the middle of Medellin. Both are huge structures made out of columns and a big roof. The main difference between the two is the choice of materials. The Zeri pavillon is built out of *guadua* and wood, maintaining its regional character, while the Orquideorama is built out of metal and wood.
The Orquideorama is a solution for a good adaptation to the environment in the city and mostly in the Jardin Botanico; in fact, the form should remember some big trees and work to collect water for the inner plants.

Like in Bogotá and Cali, and also in Medellin, we can find the invasiones and other contemporary architecture, which is built almost out of context and could be built in almost every other big city in the world.



sixth chapter - CHOCÓ

Days 22-25

On November 9 2022, we flew to Bahia Solano, in the Chocó region of the Pacific Ocean.
On November 10 2022, we visited the pueblo of El Valle, where we could see lots of buildings with traditional architecture.
On November 11 2022, we visited Playa Mecana and went through the jungle, where we saw a few examples of vernacular architecture.
On November 12 2022, we visited Bahia Solano and had to fly back to Medellin to get to our next destination.

chocó

The department of Chocó is very humid. As we arrived, the weather welcomed us with a very heavy downpour, so the connection to running water and electricity broke down, for the rest of the day. The living areas near Bahia Solano are only connected to the rest of Colombia by plane or boat, as there is no developed infrastructure connecting Bahia Solano with cities like Medellin.
In general, there are very few roads, mostly not paved; in fact, the place where we stayed overnight was on the beach, Playa Mecana, but it could only be reached by boat, as there is only a footpath from there to Bahia Solano, and this is not accessible at high tide.
On the second day, we visited the village next to Bahia Solano, El Valle, where we could see that part of the path joining the two villages was paved, while the rest was not. In Bahia Solano and El Valle, people move around with bicicles, tuc-tucs, motorcycles. There are just a few cars, mainly military ones.

The capital of Chocó is Quibdo. This region has about 500,000 inhabitants in an area of 46,500 km^2.[2]
Chocó is a super-humid rainforest, with rainfall throughout the year, reaching up to 10,000 mm per year, making it one of the rainiest regions in the world. The number of rainy days can reach 300 per year, but still, the average temperature is 27°C.[3]

guyacan madera

The wood that is used for building construction in Chocó is mainly *guayacan*, also called *lignum vitae* or *palo Santo*. This wood can be found in North and South America. The tree can reach 6 to 10 m high. The color can vary from olive green to brown, almost black, maybe with some red. It is perfect for use on the outside, even though it is very resistant to insects. It is considered one of the heaviest and hardest woods in the world.[4]

2 https://www.todacolombia.com/departamentos-de-colombia/choco/index.html April 2023
3 https://www.todacolombia.com/departamentos-de-colombia/choco/clima.html April 2023
4 https://www.wood-database.com/lignum-vitae/ April 2023

arquitecture in chocó

In Chocó, the forest is very predominant. It was once seen as an inexhaustible resource and is today protected for its biodiversity. The inhabitants of the department of Chocó live in symbiosis with the environment, exploiting the resources it offers to build their vernacular architecture.
This region is particularly underdeveloped compared to the rest of the Colombian country, partly because of the dense forest that makes it difficult to build roads and infrastructure. However, humans live in these places and have managed to build urban centers, villages, and towns from the 18th century onward. In the 20th century, the town of Bahia Solano was formed.[5]

Talking about architecture, the Chocoan vernacular house has remained almost unchanged over time; in fact, it very much reflects the descriptions or drawings of travelers in the 18th and 19th centuries.
These buildings, called *bohios*, have a cylindrical shape with an upper level, the *zarzo*. The buildings can also be square, but the most important thing is that they are built high off the ground due to the frequent flooding caused by heavy and thick rain.

"The floor is made of palm boards whose trunks are opened and split for the purpose, some of which serve as walls, but more commonly the pieces are open to all winds. On these palm boards, a mound of earth is placed in the center, which forms the hearth of the house"[6]

These typologies are built with respect for the environment, as shown by the elevation from the ground, the opening to the outside, and the construction materials.
Buildings constructed on stilts to protect against water, dampness in the soil, and animals in the jungle. This type of construction has always distinguished and still distinguishes the houses in the Chocó.
The materials used for this construction are palm leaves and palm tree trunks, used as roofs, floors, or walls. On the other hand, *guayacanes* was used for the main structure, as well as *guadua*, depending on the geographical situation. The houses are built open to the outside, which shows adaptation to the environment and also allows greater air circulation.

Another specific example of vernacular architecture in Chocó is one of the

5 González Escobar, Luis Fernando: Evolución histórica de la arquitectura en madera en el Chocó
6 González Escobar, Luis Fernando: Evolución histórica de la arquitectura en madera en el Chocó, 19, translated from spanish by Alice Benussi

Embera Katio. Embera Katio means people of the river, also called Chocó, is an indigenous community living in Colombia, in the department of Chocó. They live in a culture very closely linked to the environment, perceiving the human being as part of the world and not as the head of it.
The Embera believe in an abode, the *Dé*, that is able to protect them from evil spirits, the sun, rain, and forest animals. This protection can also be found under the branches of the *palma de guerregue*. Precisely because of its protective power, the palm tree is a material that we always find in the constructions of the Embrera. For them, the number 4 is also very important: in fact, the *Dé* should be built with four main columns and four beams tied to the main posts; for the remaining beams, these must be multiples of four. And finally, the house is built on four levels: the first is the animal level, hence the feet of the *Dé*, where the river or rainwater can pass. The second level is the heart of the building, where humans live. The third level is the roof, where we find a storage area. While the fourth level is a clay pot that is placed on top to close and protect the roof structure. This is the only element of the house that is elaborated and painted.
The *Dé* is a reference point for the community to interact with the environment. The Dé is recognizable by its roof, its four levels, and its round base, as well as because it has no walls.[7]

"The height of the first level can be up to 2 meters and the minimum height is 80 cm. In mountainous areas, the thatched roof extends on one side, up to 30 or 40 centimeters above the ground, to protect one side from the cold. The slope of the roof is very steep, about 80 to 100 per cent, to deflect strong winds and allow rainwater to drain away quickly, thus protecting the dairy from the weather. Another form of protection is achieved by placing banana leaves around the perimeter of the building or enclosing the dormitory with wooden boards to create a more comfortable microclimate."[8]

Hammocks are usually used for sleeping.
Several steps are necessary to construct a building. The first is the choice of the site for the construction, which normally takes place while hunting or fishing, trying to find out what territory is suitable for protection during the floods of the river, away from wild animals, and preferably in a flat place. The proximity of the river should not be forgotten, as it facilitates transport and serves as a communication network. This step is also important for the collection of materials, including the *guayacan* wood. The steps for the construction of the building are also very much linked to the rituals; this, for example, concerns

7 González
8 Salas, Antonia Reina(2022): Para la gente del Rio. Tejiendo casa de fuera de casa. Universidad de los Andes, 30, translated from spanish by Alice Benussi

the cutting of the building materials, which must be embellished on the waning moon days. The construction begins with the four supporting pillars; then a staircase is built, also using *guayacan* wood or guadua, with a function like that of a contemporary crane, capable of transporting people and materials.
The next step is the construction of the ribs of the building, and then finishing with the roof and the closing point of it, made with clay. Then there is still the floor, which is usually built with *barrigona* palm, and the staircase to enter the house.
The *barrigona* palm is usually cut and brought to the site via the river. It is then opened, cut lengthwise, and emptied of its softer interior so that it is flattened. After these steps, it is possible to light the central fire that will smoke the roof, preventing the leaves from rotting due to rainwater, and making them last 12 to 15 years.[9]

On the basis of this indigenous architecture, the Spaniards built their own houses. The indigenous people still living in Chocó continued to build on stilts, and gradually the remaining inhabitants of the department started building similarly. For example, some buildings were built enclosed within themselves with a fence, not as open to the jungle as indigenous buildings. In these constructions, the kitchen was always detached from the main body of the building. Given the labor shortage among the Spaniards, it was the natives who built the first dwellings for them.
As far as buildings in villages or towns are concerned, in the 19th century, the indigenous hut adapted to the urban environment. In this case the dwellings were raised from the ground with a larger side facing the main façade on the street, like a corridor (understood as a pergola or veranda). The façade communicated with the outside through one or more doors and windows. The roofs were thatched, at the beginning but gradually began to be built with tiles, which needed a stronger structure.[10]

"It was in the second half of the 19th century, when the influx of new economic dynamics and trade links facilitated the introduction of new materials into local architecture, that formal, technological, and probably spatial changes began to occur."[11]

From this time on it was also possible to built on two floors.

In both Bahia Solano and El Valle, we have seen examples of pile-dwelling constructions which are built adapted to the environment and climate. Almost

9 Salas
10 González
11 González,26, translated from spanish by Alice Benussi

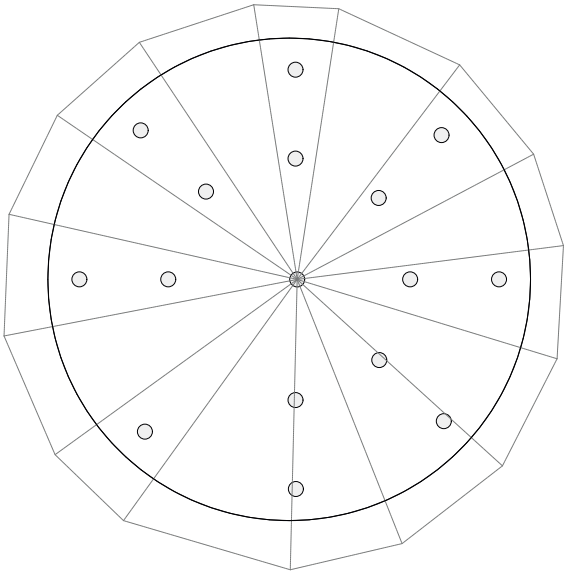
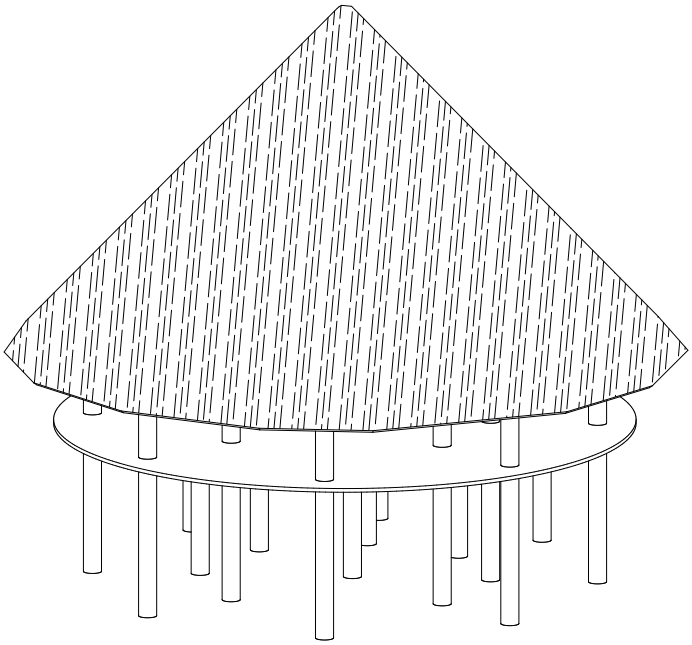


fig.137, traditional indigenous house in Chocó

fig.138, plan of the traditional indigenous house in Chocó



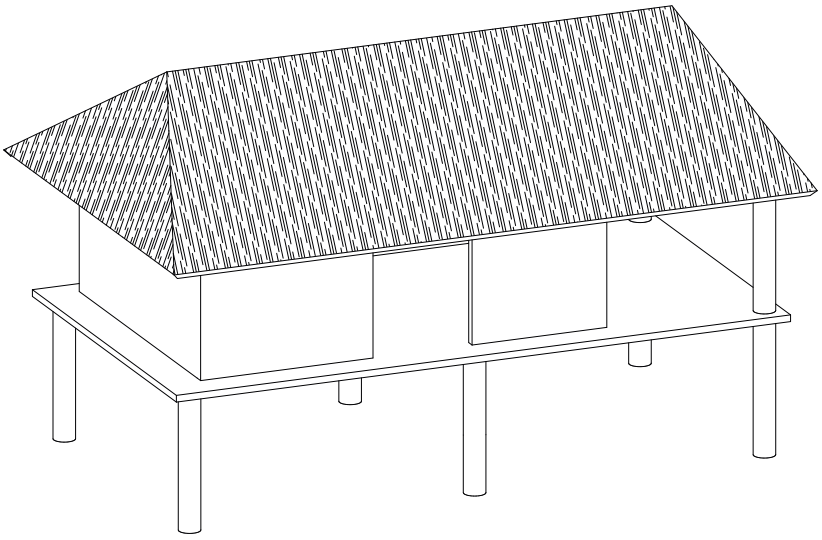


fig.139, axo of traditional indigenous house in Chocó

fig.140 axo traditional house in Chocó

all of the buildings are constructed in wood, mainly *guayacan*, a material available in the area due to the immense jungle, which is used for all parts of the construction. Given the temperatures and the frequent rainfall, it is important that these buildings have roofs that can withstand even the heaviest rains, but that also remain open so that there is more fresh air flowing through the building, especially due to the high humidity.
In Bahia Solano, especially on Playa Mecana, buildings are still being constructed on stilts because, on days of heavy rain, the water rises a lot. Also at El Valle, we were able to see a new building under construction, whose structure was being built on stilts at the time of our arrival.

fig.141 contemporary architecture in Playa Mecana, Chocó

fig.142 building construction, El Valle

fig.143 buildings on stilts, El Valle

fig.144 building construction, El Valle

fig.145 building, Playa Mecana

fig.146 traditional Dé, Embera Katio

fig.147 house, Playa Mecana

In conclusion, the architecture of the department of Chocó is a good example of an adequate architecture for the climatic zone. The department is characterized by heavy rains and flooding that lead to construction on piles. No other of the departments that I analyzed is characterized by such an architecture.
This typology of building is still used today, even for the newer constructions, since the infrastructure is not complete and the bad weather still brings flooding. Most of the time, it is necessary even in zones near rivers and the seaside.
As we saw, the most traditional indigenous buildings are built without real walls, which were only built in the colonial period.

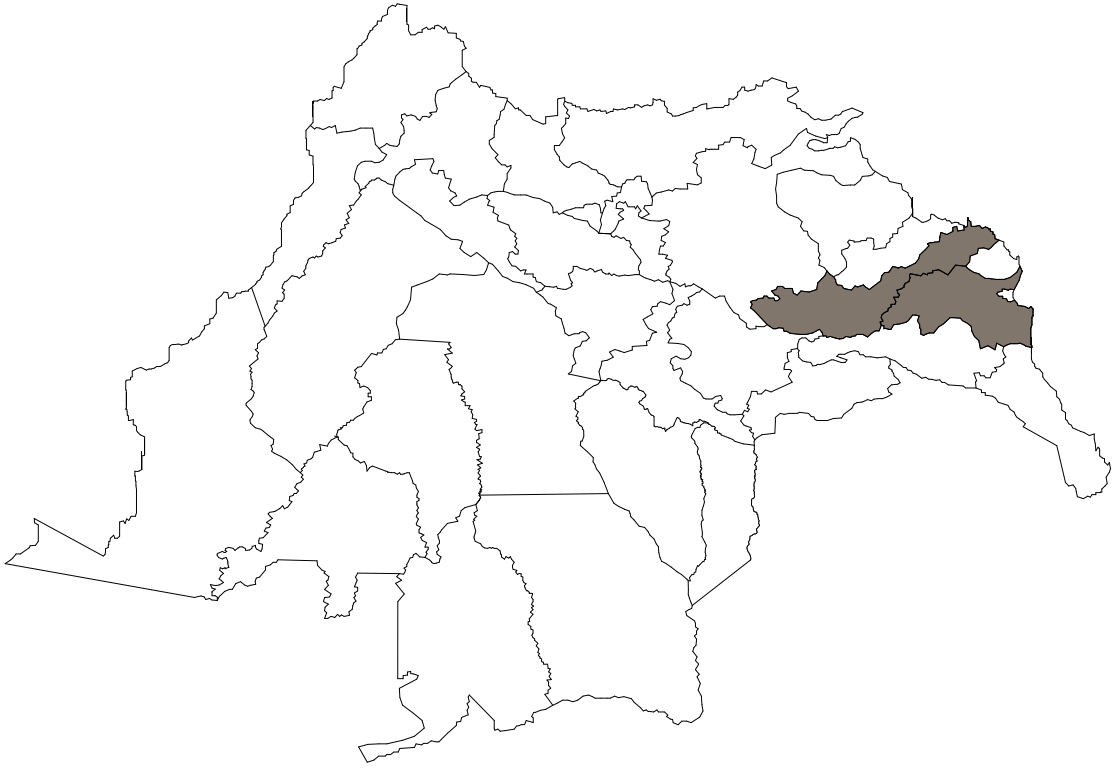
The contemporary houses in the *pueblos* and cities are built with walls, while the houses in the rural zones, like on the seaside or in the forest, are still built openly. The house where we slept on the Playa Mecana had many elements of indigenous architecture: it was built on multiple levels with a complete wood structure, apart from the roof, which was made out of metal sheets. The only

fig.148 house, El Valle

fig.149 house, Bahia Solano

walls of the building were the walls for the private rooms; otherwise, everything was open towards the outside. Some houses still don´t have any sleeping room, and people are still sleeping on hammocks.

As we could see in the architecture of the Chocó, we have an architectural form completely adapted to the environment and climate of the department. These pile-dwelling structures have remained even in today´s contemporary architecture. The architecture of the Chocó has developed mainly in materials; in fact, the use of palm for the roof has been replaced in some cases with corrugated metal sheets. On the other hand, as far as walls are concerned, buildings that were once open to the environment are now closed with wooden walls, as they were already in the colonial era, transforming the shape of the house from round to square. In villages and towns, the pile-dwelling form has also been lost, as some more modern buildings are also constructed of brick and concrete. In the architecture in smaller villages or more rural areas, it is much more traditional.



seventh chapter - CARIBBEAN COAST

Days 25-30

On November 12 and 13 2022, we went to Cartagena de Indias, where we visited the city.

The next day, we visited Santa Marta, another city on the Carribean coast.

From November 13 to 17 2022, we had the opportunity to visit the Tyrona National Natural Park, where we were able to see the Pueblito and some examples of indigenous and contemporary architecture.

bolivar

One of the departments on the Caribbean Sea is Bolivar. It is named after the liberator of Colombia, Simon Bolivar. The capital is Cartagena. This department has a surface area of 25,978 km^2 and approximately 2,122,000 inhabitants.[1]

Like the other departments, Bolivar has areas with rainfall up to 4,000 mm/year and others towards the coast (Cartagena) with 1,000 mm/year. In the whole department, the number of rainy days during the year is about 100. The average temperature in the department is 24°C, but on the coast it is higher.[2]

Some indigenous tribes inhabited the Caribbean coast first. In 1501, the first Spanish explorers arrived in Cartagena.[3]

Today, Cartagena is a very touristic place, characterized by its colonial architecture and old town.

1 https://www.todacolombia.com/departamentos-de-colombia/bolivar/index.html April 2023
2 https://www.todacolombia.com/departamentos-de-colombia/bolivar/clima.html April 2023
3 https://www.todacolombia.com/departamentos-de-colombia/bolivar/historia.html April 2023

bahareque technique

In the chapter about La Quinca and Alvaro Chaparro Roldan, I already explained one of the ways to build with *bahareque*. This chapter is to explain the use and technique on the Caribbean coast. The *bahareque* technique is one of the oldest earthquake-resistant construction technologies in Colombia. *Bahareque* constructions mainly have stone or brick foundations, columns made of *guadua* or wood, as well as floor beams and walls made of guadua, *esterilla*, and rammed earth, covered with earth and sand or mortar. The roof structure, on the other hand, is made of tiles or *guadua* elements and palm. The *bahareque* system consists mainly of a combination of wood and woven reeds with a mud cover. This technique has developed most on the Carribean coast and in Boyaca, due to the microclimate created inside the buildings. This technique works very well in Colombia because of the materials and climate. The technique can be used to build any type of structure, not just houses.[1] This method of construction also has a very low cost.[2]
Building with this technique requires a load-bearing base structure, usually of wood or *guadua*, with horizontal pieces connecting it. This is filled with a mixture of earth, straw, and water. This creates insulating walls both acoustically and in terms of temperature.[3]

Once the supporting structure is fixed, the rods or pieces of wood are also fixed from the bottom upward. As soon as the wall part is ready, the construction of the roof can begin, made of palm or clay tiles. After the roof, it should continue with the walls. In this case, a mixture of mud (40 % organic soil, 60 % clay soil) is used to fill in the previously built structure. Dry grass or straw is added to this mud. As soon as the walls are dry, plaster can be put on the wall, first pulled over the wall so that it enters deep into the cracks in the wall, and then smoothed and leveled. A second plastering can be done after a few weeks, until finally a whitewash or painting is done.[4] This is not the only type of technique, as it can be built entirely of wood or filled with earth and stones.[5] More so than methods using clay bricks or rammed earth.[6]

1 https://www.archdaily.cl/cl/892994/bahareque-una-tecnica-constructiva-sismoresistente-en-colombia March 2023
2 https://blog.structuralia.com/el-bahareque-el-remoto-sistema-constructivo-que-respeta-el-medio-ambiente March 2023
3 https://www.youtube.com/watch?v=8ri6dtj89WU March 2023
4 http://www.museo.una.ac.cr/index.php/es/bahareque-sist-constructivo March 2023
5 http://www.museo.una.ac.cr/index.php/es/bahareque-sist-constructivo March 2023
6 Piesik, Sandra (2017): Habitat. Traditionelle Bauweisen for den globalen Wandel, Edition Detail, München

fgi.152 Kogi´s house, Parque Tayrona

"The traditional construction process began with the laying of the ground and the digging of trenches, where wooden columns were placed at a distance of 70 cm, or 1 m, from each other. The base was then filled with stones."[7]

Through these pictures, we can see how the bahareque technique phases look, and how people work on them by hand, just using wood, palm, and earth. In the picture on the left, a building in the Parque Tayrona is made with the *bahareque*

7 http://www.museo.una.ac.cr/index.php/es/bahareque-sist-constructivo March 2023, tranlated from spanish by Alice Benussi

fig.153 wood connection, bahareque technique

fig.154 clay, bahareque technique

fig.155 refinement layer, bahareque technique

technique.

These pictures show some examples of how people are working with this technique. The women working on the bahareque walls are from TierraTEC training. Two of them are adding clay to the wall, while the third one is working on the refinement layer.
As in the picture, the woods for the structure of the *bahareque* walls are connected and held together with lianas.

architecture in cartagena de indias

Cartagena was located in a sheltered area within a bay, providing protection for the city. Being so protected from the sea, it needed walls as protection from the mainland. Today, the inside of the walls is the historic quarter. This is characterized by colonial architecture.[4]
Historically, the pre-colombian architecture of Cartagena de Indias was that of the indigenous Mocanes tribe. They built monospace *bohios* with a structural and enclosure system, using the *bahareque* technique. Everything was supported by wooden pillars. The floor was made of rammed earth, and the roof was *palma de marna.*[5]
In 1501, the first Spanish explorers arrived in Cartagena.[6]
Once the Spanish conquistadors arrived, they partially changed the architecture by adding earth to the weaving of branches and a white dye over it. Only the roof remained the same, which was later changed to tiles. The initially round plan was also later replaced with a square or rectangular one.[7]

The *casa colonial* has its origins in the Spanish house of the Levant, especially Andalusia, which in turn shows a strong Mudejar influence that expands in the concept of the interior patio, made of wood, around which the house revolves.[8]

Houses are classified according to their floors. The *casa baja* has one floor, while the *casa alta* has two or more floors. The *casa baja* house was initially only for *vivienda* (living), and of these, only the corner ones could have a business premises. These houses mainly had an entrance hall with a vestibule, a patio, and an outdoor *comedor* (dining room) with a roof but no walls. The remaining sleeping rooms, on the other hand, had walls and were therefore enclosed. The *casa alta*, on the other hand, was two-storey high and also had a patio. The floors were divided into shop and warehouse room on the ground floor and *vivienda* upstairs. Here too, the patio was open and connected on both floors, with balconies upstairs.
On the other hand, we have civil architecture. An example of civil architecture in Cartagena, is the Palladio de la Inquisition.
This is a typical 18th-century house in Cartagena and consists of three houses put together: two on the square and one on the neighboring street. After 1810, people continued to build with typical elements of colonial architecture, but with the independence of Spanish rule, new models were found in the

4 https://saltaconmigo.com/blog/2013/09/cartagena-de-indias-joya-colonial-colombia/ March 2023
5 https://www.eluniversal.com.co/suplementos/dominical/arquitectura-cartagenera-5-siglos-de-historia-57900-JSEU139101 April 2023
6 https://www.todacolombia.com/departamentos-de-colombia/bolivar/historia.html April 2023
7 https://www.eluniversal.com.co/suplementos/dominical/arquitectura-cartagenera-5-siglos-de-historia-57900-JSEU139101 April 2023
8 https://www.youtube.com/watch?v=Q7ZKKT7ufuw March 2023

rest of the West with new influences and currents from England, France, and Italy for this so-called republican period in an eclectic style. Since the end of Spanish colonization, colonial buildings have suffered a series of changes and transformations, both negative and positive.

In Cartagena, we can find, near the *casa colonial*, important military architecture like the Castillo de San Felipe de Barajas. This castle is the only Colombian monument declared a World Heritage Site by UNESCO. It is imposing and complete colonial architecture, like much of the military architecture, such as the city walls.

Religious architecture is also worthy of mention. One example of religious architecture is the Catedral de Santa Catalina de Alejandria. This is considered one of the oldest cathedrals in America, with a Spanish Renaissance style. The master builder was Simon Gonzales, and it was built in 1577 to replace the old church made of straw and cana.The church tower was remodeled in the 20th century by a French architect.[9]

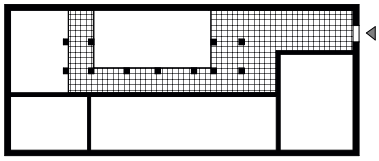


fig.156 plan casa baja

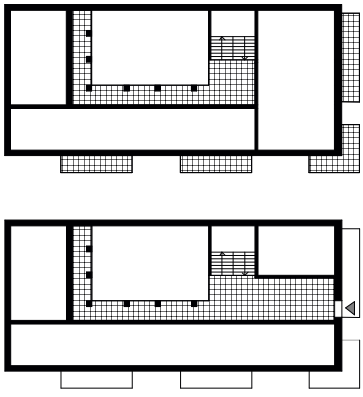


fig.157 plans casa alta

fig.158 street of Cartagena (p.237)

9 https://www.youtube.com/watch?v=Q7ZKKT7ufuw March 2023

fig.159 traditional indigenous buildings, Bolivar

fig.160 traditional buildings with palm roof and more massive walls, Bolivar

These pictures show the historic development from the more indigenous traditional buildings to the colonial houses. In fact, the more traditional architecture in Cartagena was made of palm leaves and *bahareque*, developing into a more massiv architecture.[10] In the second picture, we can see buildings

10 https://www.eluniversal.com.co/suplementos/dominical/arquitectura-cartagenera-5-siglos-de-historia-57900-JSEU139101 April 2023

fig.161 first traditional colonial buildings, Bolivar

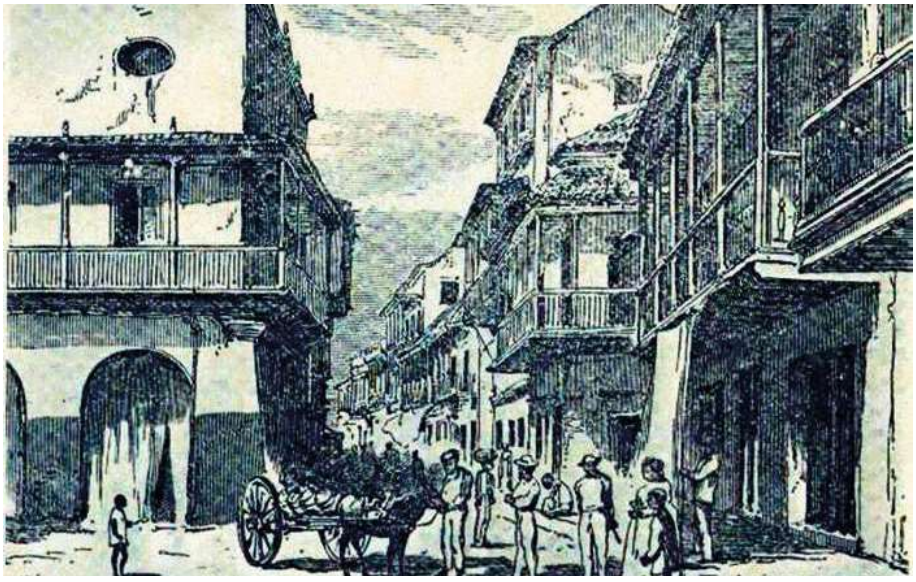


fig.162 traditional colonial buildings, Bolivar

still made out of traditional materials, but already having more colonial windows and doors.
From the more traditional one-storey houses, the architecture developed with the new materials to include two- or more-storey houses. From a more Spanish influence, they also developed the use of balconies, which are very characteristic of colonial architecture in Cartagena.

fig.163 street in the historic center, Cartagena

These two pictures show Cartagena´s architecture today. On the left, the nice street in the historic center, inside the walls, with balconies and two- or three-storey buildings. On the right, the picture was taken from the top of the walls

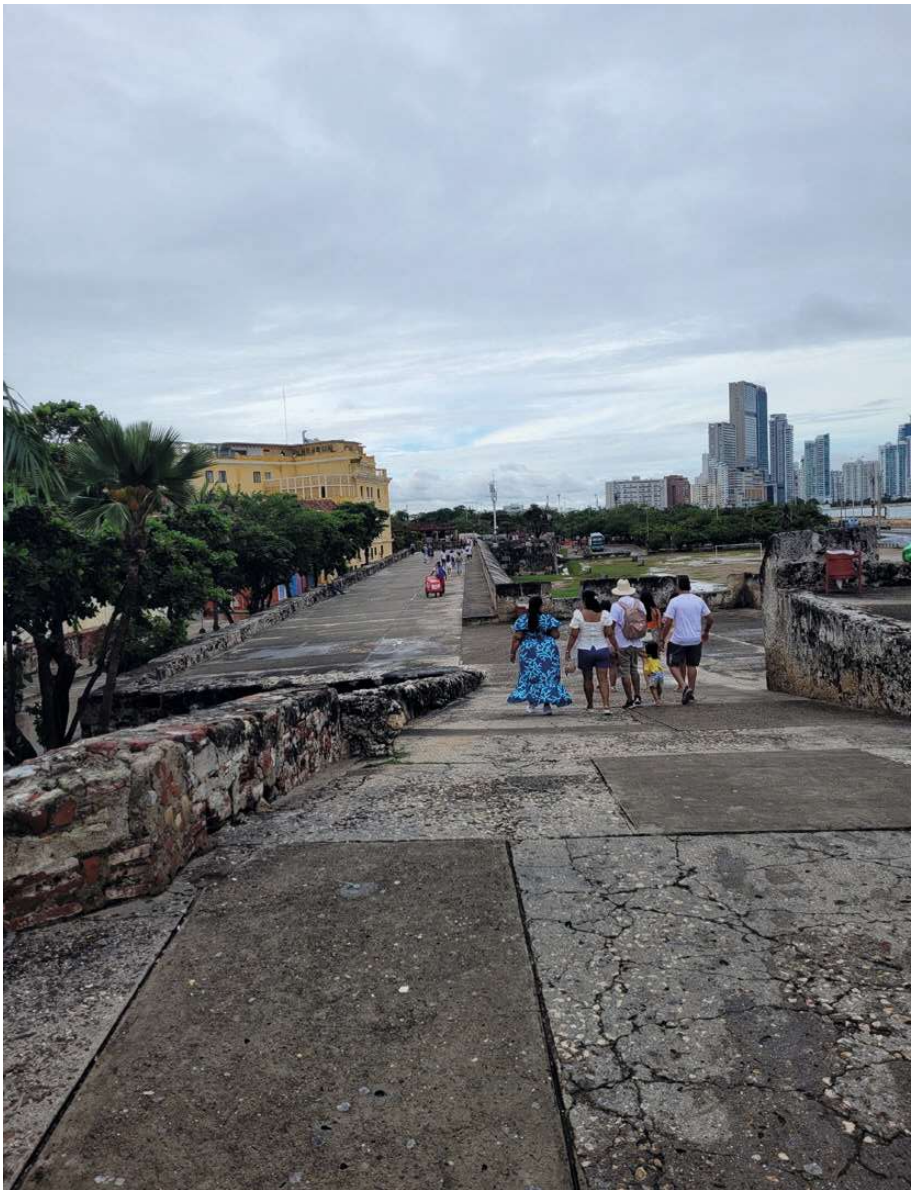


fig.164 walls, Cartagena

surrounding the historic center. In this case, the strong division between the traditional colonial buildings and the new contemporary skyscrapers of the new town of Cartagena.

magdalena

Already at the beginning of the 16th century, the department of Magdalena was the first department explored by Europeans.[10]

The department is named after the Magdalena River. The capital of the department is Santa Marta. It has a population of approximately 1,300,000 inhabitants and an area of 23,188 km^2.[11]

The Sierra Nevada de Santa Marta is located in the department of Magdalena, near the Carribean coast, and is 5,700 m high. While in the whole department the rainfall is particularly moderate, around 1000 mm/year, on the Sierra Nevada de Santa Marta it is over 2000 mm/year. The number of rainy days in the department is between 50 and 100 days, while in the Sierra Nevada it can exceed 200 days per year. The average temperature differs from area to area. In the Sierra Nevada, it is 8°C, while in the rest of the department, it is 28°C. Overall, the climate is hot and semi-arid, and the Sierra Nevada is humid.[12]

10 https://www.todacolombia.com/departamentos-de-colombia/magdalena/historia.html April 2023
11 https://www.todacolombia.com/departamentos-de-colombia/magdalena/index.html April 2023
12 https://www.todacolombia.com/departamentos-de-colombia/magdalena/clima.html April 2023

tayrona & kogi´s architecture

On the coast near Santa Marta, towards the Caribbean Sea, the Sierra Nevada de Santa Marta and the Tayrona National Natural Park are to be found. Some peaks reach up to 5,700 meters in height.[13]
In this area lived the Tayronas and are still living the Kogis.

The settlement of Ciudad Perdida was founded around 660 A.D. and abandoned between 1550 and 1600, when Spanish colonizers arrived. This settlement is one of 250 Tayrona settlements found around the Sierra Nevada de Santa Marta. This is located between 900 and 1,200 meters above sea level and comprises a highly developed system of roads, buildings, stairs, and walls interconnected on terraces.[14]
In fact, the Tayrona people were a highly developed population living in the mountains of the Sierra Nevada de Santa Marta. The Tayrona dominated the geographical area of the mountain with a system of stone road networks that connected all the slopes and folds of the mountain range and with earthworks for their towns.[15]

To make it easier to reach the various areas, the Tayrona developed a dense network of communication with stone paths and trails. These connected the various terraces on which the Tayrona houses were located.
Here, the buildings are constructed with mud huts and tatched palm roofs.
The indigenous groups living near the Sierra Nevada still perform in September ceremonies with offerings in the Ciudad Perdida. In fact, the city has never really been forgotten because the natives knew all along that it existed.[16]

As we have seen in the chapter on Colombian history, this area of the Tayrona National Natural Park and Sierra Nevada de Santa Marta is one of the most important in terms of the indigenous architectural history of the Colombian state.
The Parque Tayrona (Tayrona National Natural Park) measures 15,000 hectares and is characterized by being on the Caribbean coast. In this area, a multitude of plants, as many as 770 different species, four species of felines (jaguar, leopard, ocelot, and margay), and many other animals can be found.[17]

13 Hurtado Garcia, Andres (2021): Paraisos Colombianos. Villegas editores
14 http://colombiapotenciaendesarrollo.blogspot.com/2009/11/las-7-maravillas-de-colombia.html April 2023
15 Hurtado Garcia
16 https://www.youtube.com/watch?v=wE-r4Pevm9k March 2023
17 Hurtado Garcia

The ethnic group living today in the Parque Tayrona is called Kogi, which means jaguar, and is organized in different villages. They are very attached to their beliefs, which they use as the basis for their lives and their architecture. For example, the sacred temple of the Kogi, the Nuhué, is built in a place planned according to whether the location is propitious or not. Afterwards, the central point of the building is fixed with a rope and a stick, and then the circumference of the building is traced, identifying the four cardinal points of the Kogis, so that this must take place on June 21 or December 21. The interior of the Nuhué is characterized by a central fire. The roof of the structure is conical and made of straw.[18]

The materials that were used by these inhabitants were mainly wood and adobe. The houses in which they live are built of thickly interwoven wood, covered with layers of adobe. The roofs of these are made of palm. In Tayrona Park, Kogis are still living in the Pueblito, a village inside the park.

The houses in Pueblito do have "doors" made out of mats and wood. The fire in the middle of the house is always on because the smoke has a maintenance function; it keeps insects and humidity away. If someone in the family dies, the house will be abandoned, and the family will build a house somewhere else. It is easy to recognize which house is no longer lived in because of the plants growing on top or inside of it. After a while, these houses fall apart, and it is possible to build new ones on top of them.

18 Salas, Reina Antonia (2022): Para la gente del Rio; tejendo casa fuera de casa. Universidad de los Andes

fig.165 indigenous relief, Parque Tayrona

fig.166 indigenous hut, Parque Tayrona (p.248-249)

fig.167 indigenous house, Parque Tayrona

As we can see from these pictures, on the left we have an example of a traditional indigenous building of the Kogis. This was built with the *bahareque* technique, with a palm roof. Like the rest of the traditional houses in the region of the Sierra Nevada de Santa Marta, the building was constructed on a stone base.[19]
On the right, some pictures of the architecture to find in the zone. These building examples of architecture in the Sierra Nevada de Santa Marta, are all almost the same size; in fact, they are just one floor and one room. In most cases, the roof is made out of palm leaves, while the walls change in material and technique. Sometimes buildings are constructed with wood, earth, concrete, and bricks.

19 https://www.youtube.com/watch?v=wE-r4Pevm9k March 2023

fig.168 indigenous house, Pueblito

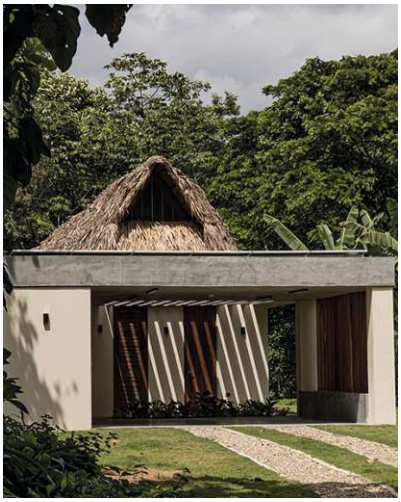


fig.169 Casa Mendihuaca, Plan:b

fig.170 house, Playa Brava

fig.171 toilets house, Playa Brava

Actually, *bahareque* techniques are very fine for the warm climate of the Carribean coast, to create a pleasant indoor climate. This technique is often exchanged with concrete and bricks because these are thought to be more functional materials.
Not only the materials but also the construction typologies are a different in the newer architecture also because of the environmental conditions; in fact, the buildings on the mountains of the Sierra Nevada de Santa Marta are constructed with the *bahareque* technique and with woven palm leaves, while the contemporary buildings on the coast are built on stilts or with concrete walls, to protect them from sea water.

fig.172 woven palm leaves, Pueblito

fig.173 bahareque technique, Parque Tayrona

fig.174 palm leaves roof, Playa Brava

The materials used on the Carribean coast, between Cartagena and the Sierra Nevada de Santa Marta, are on one side the traditional ones, which follow the traditional technique of *bahareque* and have a palm roof, and on the other side the modern ones, which use concrete, bricks, and stones for more massive

fig.175 wood, Parque Tayrona

fig.176 massive stone construction, Cartagena

fig.177 fossiles stones, Cartagena

constructions. Near the *bahareque* technique, the massiv stone walls also show the necessity of creating colder insides of the houses. These materials are the proof of the different architectural styles in the different eras, which developed mainly in the city of Cartagena.

fig.178 patio, Cartagena

fig.179 balconies, Cartagena

These examples show open spaces along the Caribbean coast.
In Cartagena, the most common open space solutions are patios, verandas, and balconies. Patios and verandas are organized on the inside of the building, while balconies look on the outside, mainly on the street.
In the Parque Tayrona, the open-spaces are linked to the traditional architecture;

fig.180 open space, Parque Tayrona

fig.181 traditional open space, Parque Tayrona

in fact, the roofs of the indigenous buildings are very wide, so that the Kogis can spend their time under them, protected from rain and sun.
This is the main way for the inhabitants of the Caribbean coast to have some fresh air in the building without having to leave it.

eighth chapter - LA GUAJIRA

Days 27-30

As we were in the Tayrona Nationa Natural Park, Sebastian told me about his aunt, Virgina Pineda Gutierrez, who studies antropology at the Universidad Nacional de Bogotá. She was actually one of the first women to ever study in Colombia, together with his grandmother. Her studies were focused on the research of life in La Guajira, a desertic region in the north of Colombia. To do her research, she lived with the tribe of the Wayuu for a long period of time and wrote some diaries, which got later published as her PhD research.

I got so touched by this story, that I decided to search for and write something about this special region, even if, unfortunately, we dind´t have enough time on our trip to visit in it.

To comprehend more of this department I was also able to make a videocall with Salba, a Spanish architect who worked on a project in La Guajira.

fig.182 map of Colombia
fig.183 La Guajira

la guajira

The Guajira is characterized by a desertic climate. The mountains in this area barely reach 900 m in height. Rainfall is very rare, with between 125 and 400 mm annually. The average temperature in this area is 28°C, with constant winds. In this climate, it is typical to use thorny shrubs and cacti for construction.[1]

"The only desert in Colombia is La Guajira."[2]

The indigenous population living in this department is called Wayu. The Wayu live in this area and partly in Venezuela, a neighboring country.[3]

The department of La Guajira was named after a Wayu word meaning a person who respects and follows established social norms. This department has almost one million inhabitants over 20,848 km^2. The capital of the department is Riohacha.[4]

Before the arrival of the colonizers, this place was occupied by the La Guajira, Macuiro, and Anate indigenous groups. Like the departments of Bolivar and Magdalena, since Guajira is also located on the Caribbean Sea, this was one of the first departments to be colonized.[5]

1 Piesik, Sandra (2017): Habitat. Traditionelle Bauweisen for den globalen Wandel, Edition Detail, München
2 Hurtado Garcia, Andres (2021): Paraisos Colombianos. Villegas editores, 86, translated from spanish by Alice Benussi
3 Hurtado Garcia
4 https://www.todacolombia.com/departamentos-de-colombia/la-guajira/index.html April 2023
5 https://www.todacolombia.com/departamentos-de-colombia/la-guajira/historia.html April 2023

arquitectura en la guajira

The architecture of La Guajira is divided into territorial ranch architecture. In fact, the Wayu are not organized in villages, but in groups of ranchos, whose inhabitants are united by ties. Probably, the territorial dispersion is due to better management and control of the herds. The rancheria is the typical Wayu dwelling and means the existence of several buildings in one group. Each building meets a different family´s needs. The first is the room unit, whereby an elongated building with a gabled roof is used for sleeping in hammocks. The second building is the *enramada*, a space for popular social activities, loom work, and a dormitory for visitors. Another unit is for the kitchen; this can be open with a hearth on the ground and only a roof, as well as with a cactus enclosure or completely enclosed.

The enclosure was built with branches and sticks and was used for animals, which could be goats, horses, or donkeys. Another type of fence, the *roza*, was used to protect crops from animals and the wind. Materials found in the area are used for the construction of La Guajira. In fact, walls are made of *bahareque* and *yotojoro*. These buildings were handmade.[6]

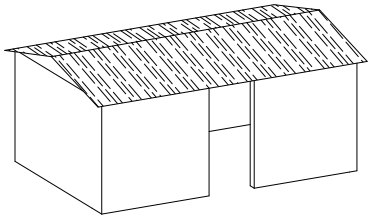
The materials used for Wayuu constructions are often subject to deterioration due to climatic and environmental conditions. This is not a problem for the Wayuu inhabitants, as they know the craft and construction methods and are able to maintain or rebuild the buildings.[7]

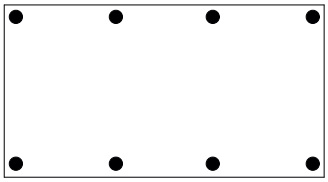
The typical construction in this region is the *pinchi* building. These types of buildings are divided into two areas: one for sleeping in hammocks and one for storing clothes and belongings. Inside the buildings are clay jugs that are used to keep water in the house, these are placed in the ground. These rectangular-shaped buildings are usually constructed of *bahareque*. The roofs are gabled, pitched, or single-story and covered with yotojoro. In the centre of the village is a pergola, a place for communal activities, and a reception area for guests.[8]

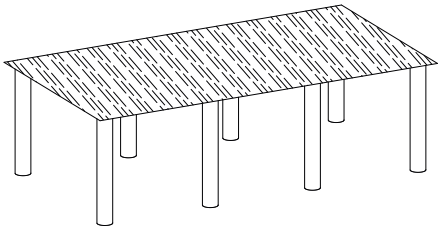
"The use or protection from climatic conditions in any type of building is another aspect of the environmental adaptation of Wayúu housing. Closed rooms store heat during the day and radiate it at night, when the temperature drops considerably. Open enramadas benefit from shade and wind. The kitchens are protected by thistle fences to prevent the wind from disturbing the work of food preparation. In each construction, the intention is to respond to a specific environmental condition."[9]

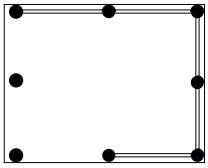
6 https://lenguayculturaguajira.blogspot.com/p/arquitectura-en-la-guajira.html April 2023
7 https://www.banrepcultural.org/biblioteca-virtual/credencial-historia/numero-351/la-rancheria-de-los-wayuu-en-la-guajira April 2023
8 Piesik, Sandra (2017): Habitat. Traditionelle Bauweisen for den globalen Wandel, Edition Detail, München
9 https://www.banrepcultural.org/biblioteca-virtual/credencial-historia/numero-351/la-rancheria-de-los-wayuu-en-la-guajira April 2023, translated from spanish by Alice Benussi

fig.184 traditional indigenous vivienda and enramada, Wayuu









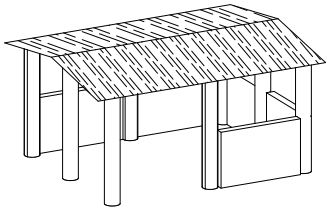
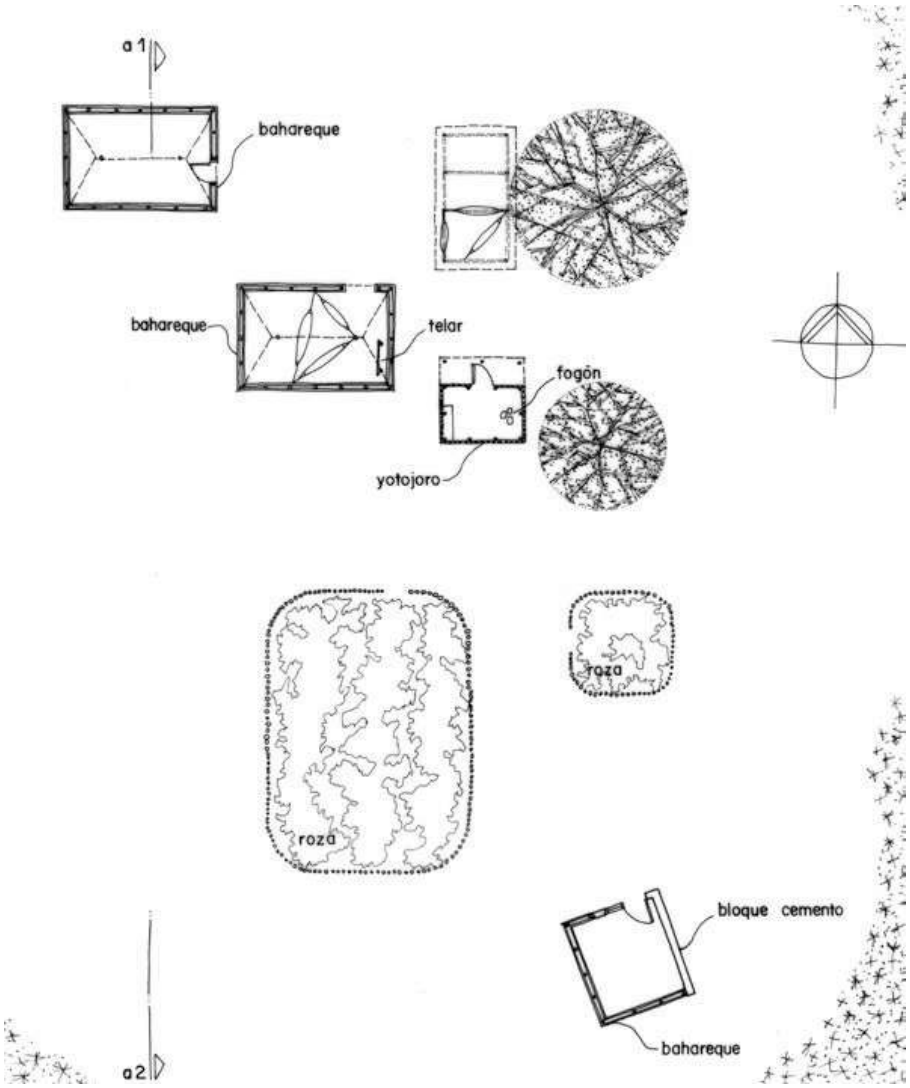


fig.185 plan and axo of the vivienda Wayuu
fig.186 plan and axo of the enramada Wayuu
fig.187 plan and axo of the Wayuu´s ktichen
fig.188 example of rancheria Wayuu (p.267)



proyecto guajira

A final example in this department is the La Guajira project, which focuses on improving the quality of life of communities living in the region.[10]

For example, for this project, an educational center was built 20 km from Uriba. This center is a project of the architect Juan Salmanca Balén. In this case, a very flexible building was constructed, which can be used as a classroom for students, as well as a dining hall or workplace.[11]

"As in local architecture, the school uses earth as its main component, but materialized in a different way, with compressed earth blocks."[12]

Also used is guadua, a material not from the La Guajira area but from Colombia.[13]

On April 29, 2023 I had the chance to interview Juan Salamanca Balen. He told me about his experiences in the department of La Guajia, where he already realized and is realizing many interesting projects.
He always traveled a lot throughout Colombia, discovering many different places, environments, people, and cultures.
12 or 13 years ago, he visited La Guajira for the first time and felt a strong connection with the place and also with the Wayuu inhabitants.

Juan Salamanca Balan traveled multiple times to La Guajira after that first journey, to photograph the department, and so he got to know very well the inhabitants of the region.

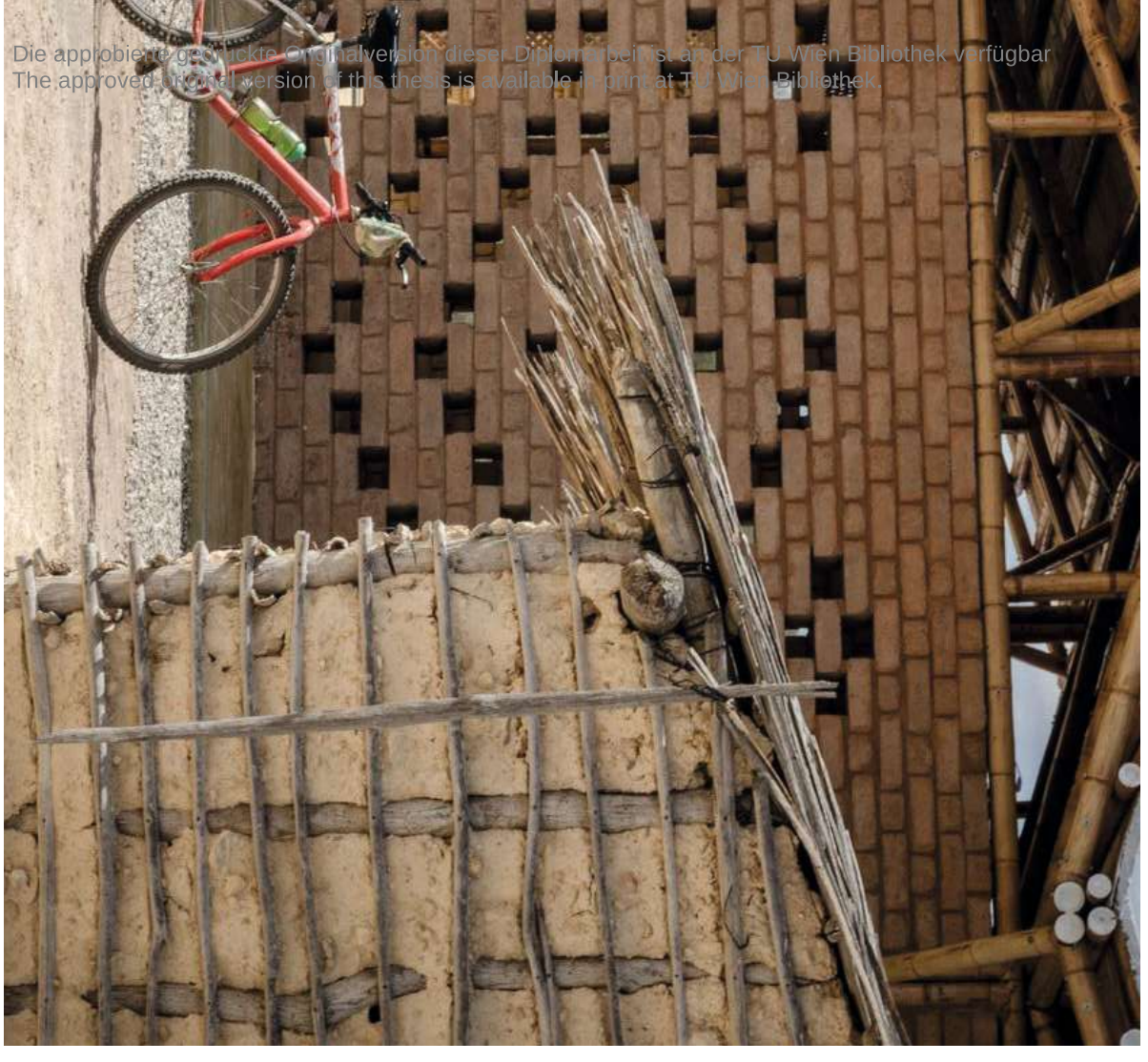
Also, one of his friends got very interested in the department and began a new foundation, Proyecto Guajira, a project to create more work, communitarian, and social opportunities for the inhabitants of La Guajira.

The main aim of the foundation can be divided into three pillars:
1. basic assistance (especially for children), nutrition, and health;
2. entrepreneurship, like selling *artesania* objects made from the Wayuu, so that they can have an income;
3. education, to create a basis for the next generations to learn about technical themes and about some jobs.

Through the Proyecto Guajira Foundation, they also carry out some architectural

10 https://www.proyectoguajira.org/nosotros/ April 2023
11 https://www.archdaily.com/980382/walirumana-ethno-educational-center-salba April 2023
12 https://www.archdaily.com/980382/walirumana-ethno-educational-center-salba April 2023
13 https://www.archdaily.com/980382/walirumana-ethno-educational-center-salba April 2023

fig.189 house made with bahareque tecnique and Walirurama, Juan Salamanca Balen and Dario Angulo



projects, for which both volunteers and Wayuu have worked together. The land belongs to the Wayuus, which means that collaboration is necessary. At the same time, the inhabitants of the region should learn the building techniques to accept and maintain the buildings[14].

One example of such construction is the Walirumana, a building symbolizing the three pillars of the foundation. This building was constructed with flexible functions; in fact, it can be a dining room with a kitchen to prepare food for the community, but also a class for the school and a shop where the Wayuu can sell their *artesanias* objects.
This building was constructed out of earth blocks made out of sand and adobe, which are sundried. The blocks were not fabricated on the project´s site but still in La Guajira. The structure was made out of *guadua*.[15]

The second project of the Proyecto Guajira Foundation is connected to the theme of kitesurfing. In fact, kitesurfing in La Guajira is getting very famous, and the Wayuus are also learning how to surf. Because of this, the foundation planned to build a kitesurfing school near the seaside. The name of this project is Potsipa (El Centro de Etnodesarollo Potsipa Cabo de la Vela - La Guajira).
The project was designed to be completely sustainable. Sustainable in an economic way by creating a kitesurf school and a hotel.
Socially sustainable, because the project is sustainable through an ethno-education school and learning spaces, collective construction, and employment generation. The project is environmentally sustainable through construction without concrete, using only sustainable materials. The construction should be sustainable so that the Wayuu will not depend on the foundation in the future.[16]

In the area of La Guajira, there are very few building materials, such as *trupillo*, the only tree that grows in the deserts of La Guajira, together with *yotojoro*, the inside of a cactus, and earth (mud).
Wayuus do associate *yotojoro* with poverty.
The structure of the building is made of guadua, which is not directly found in the department of La Guajira but was imported, as otherwise there are no other trees that can be used in these quantities. The choice of guadua is also due to its low price. For the construction of the Walirumara project, they also used blocks of earth, dried in the sun, for which it was very difficult to make a local production, so they were produced in La Guajira, but in another area.[17]

14 interview with Juan Salamanca Balén on the 29th April 2023 online in Vienna
15 interview 7
16 interview 7
17 interview 7

As far as construction in respect of the local climate is concerned, given the desert climate, it is important during construction to take into account the very strong solar radiation. Shade must be created, which is why a large *sombrero*(big hat) is required for the building. Secondly, the desert climate is characterized by a hot wind, so it is necessary to work on maintaining constant natural ventilation, but be careful that sand often enters with the wind. It is also important to remember that it rains a lot two or three months of the year anyway, so in Potsine, for example, which is still under construction at this time of rain, they have put up tarpaulins, in order to build a roof in the future. In addition, the most important thing for construction suitable for this climate is the soil. They took this idea from the traditional *bahareque* technique, as a reinterpretation of traditional knowledge. In La Guajira, in particular, the internal skeleton of the *bahareque* is made of *yotojoro*. The problem with not using *bahareque* for these constructions is that when it rains, it gets completely ruined and needs someone to fix it. The techniques traditionally used are influenced by the fact that the Wayuu were nomadic people and therefore built houses that were not meant to last forever. A low temporality of architecture, which requires frequent labor, is very difficult for the Proyecto Guajira.[18]

According to tradition, the Wayuu live in constructions that are somewhere between outer and inner space, so they only need a roof, like a *enramada*, which is four poles, and on top you put *yotojoro*.
In La Guajira, we can find examples of buildings constructed with the *bahareque* technique, while others are simply made out of trapillo wood and *yotojoro*. The choice of materials is because of their adaptation to the desert environment. The most important thing for the architecture in La Guajira is to create shadow, because of the very hot desert climate and the sun.[19]

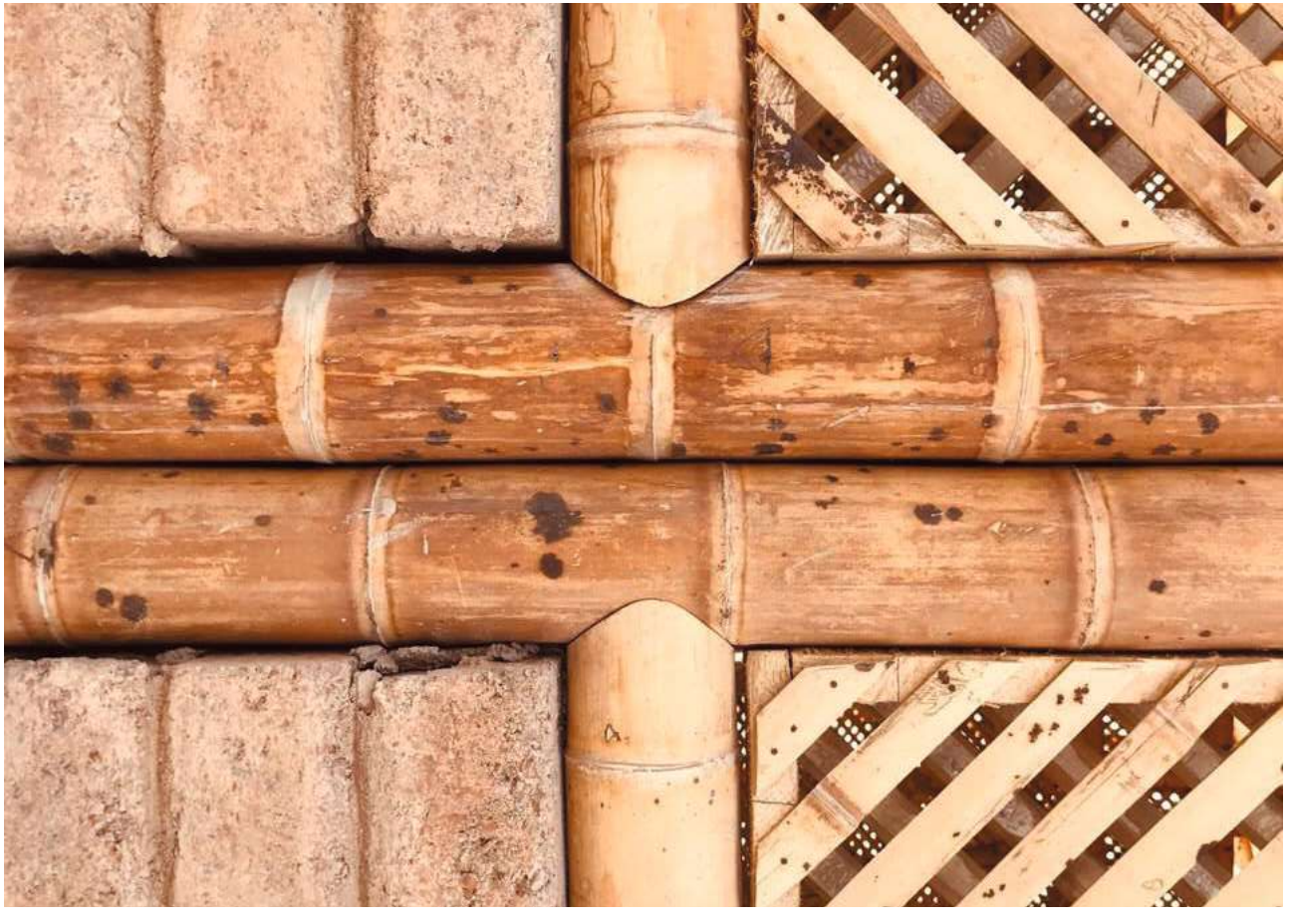
Today, contemporary architecture is built differently; in fact, for the project Walirurama of Juan Salamanca Balen, materials were also used that are not found in La Guajira.
The building was still built to protect the inhabitants from the sun and strong sandy winds, with the right openings for good ventilation.
The traditional architecture of the Wayuus is still evident in the typology and use of the building, since it is built for communal use and to welcome people from other places and tribes. [20]

18 interview 7
19 interview 7
20 interview 7

fig.190 Walirumana, Juan Salamanca Balen and Dario Angulo

fig.191 carpenters working on the guadua structure, Walirumana
fig.192 materials, Walirumana
fig.193 earth blocks wall, Walirumana (p.276-277)

In La Guajira, we have the only example of a desert in Colombia. The architecture here is different from the other zones.
In this region, the most commonly used building technique is the bahareque, to have good building insulation so that the buildings are fresh during the day and still warm at night.
Buildings are adapting to the environment by using materials such as *yotojoro* and *trupillo*.



tierraTEC

On May 1, 2023, I had the possibility to video call Darío Ernesto Angulo Jaramillo, the director of the firm TierraTEC. He has been a member of Craterre for 37 years, and since 30 years he has owned a BTC (compressed earth block) production facility in Bogotá and since 5 years one in Santa Marta. His company designs, constructs, and produces earth architecture.
Colombian norms expect 5% cement in the mix for the BTCs. As Darío Ernesto Angulo Jaramillo explained to me, it is necessary to sell these BTCs and to build with them; it still doesn't compromise the characteristics of the brick, like insulation, but it makes it less ecological.[21]

I got to know about Darío Angulo through the projects of Juan Salamanca Balen in La Guajira, where Darío Angulo participated in the construction too.[22]

Darío Angulo explained how important it is that earth experts bring their knowledge to those who don't know about it. In fact, he is an earth (clay) expert, and works mostly with adobe, *bahareque*, tapia pisada (rammed earth), and BTCs.

With his company, they organize workshops about these earth techniques every two months for two days, so that everyone can participate and learn more about this fantastic material.

fig.194 earth blocks, Dario Angulo

fig.195 earth blocks, Dario Angulo

21 interview with Dario Ernesto Angulo Jaramillo from TierraTEC on the 1st of May online in Vienna
22 interview 8

For these workshops, they developed some *maletas pedagogicas* (pedagogical suitcases).
Based on the incomes of the whole year, Darío Angulo and his company also organize workshops for poor regions. One example are the workshops that they organized for the women of the south of Cesar (a Colombian department). Here the women learned the *bahareque* technique, to help them build and maintain their own houses.
They also organized workshops for the indigenous communities, like the Wayuus and the Kogi. In particular, the Wayuus have very difficult living circumstances. Since they live in the desert, they have very few plants, like the *trupillo* and *yotojoro*, and almost no water with which they could build their own buildings.
For TierraTEC and Darío Angulo, such workshops are very relevant because of the importance of the maintenance of the architectural and cultural heritage.[23]

Even if earth is a traditional material, it is also modern because it has been and is being modernized with architecture, production, and building techniques.[24]

Earth is a universal material that is used in all of the regions of the world. It was used in the past, it is used in the present, and it will be used in the future.
In the last century, it has been devalued and despised.
The advantages of building with earth are, that it is very ecological, immediately applicable, cheap, and easy to build.
Earth is like a magic wand in the hands of an architect or engineer.
When you work with earth, you have to know how to analyze it because not all of the earth typologies are good for each building technique, sometimes they have to be combined.[25]

If we talk about the relationship between earth and climate, it is important to say that earth is good to build in all of the climate typologies; just the building techniques are going to change. For example, we have *bahareque* mainly on the Caribbean coast, because here the climate is more warm and doesn't need thick walls. On the other side, in the departments of Boyaca and Antioquia, we will have more *tapia pisada* or adobe as building materials.[26]

23 interview 8
24 interview 8
25 interview 8
26 interview 8

fig.196 creating new earth blocks, Dario Angulo

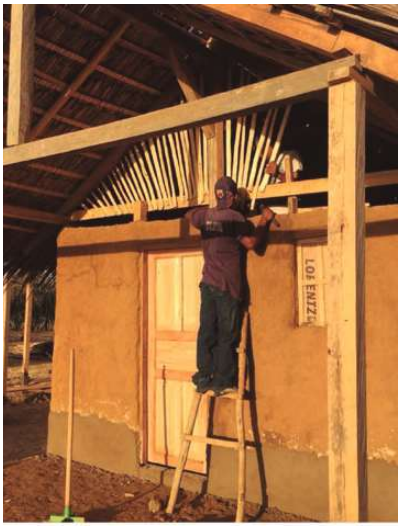


fig.197 earth wall, Dario Angulo

fig.198 construction fundaments, Dario Angulo

fig.199 yotojoro, Wayuu

fig.200 trupillo, Wayuu

The architecturally traditional and indigenous examples of the Wayuu are a good example of an environmental and climate-adapted architecture.
In fact, La Guajira is characterized by a desertic climate, where the only construction materials are earth and sand, ***trupillo*** (tree), and ***yotojoro*** (cactus). These materials are used for the *bahareque* technique and for the roof constructions.
As we saw in the chapter with the interview with Juan Salamanca Balén, it is difficult to build with these traditional materials since they are used to build buildings that should last for 15 years.This is why Juan Salamanca Balén and

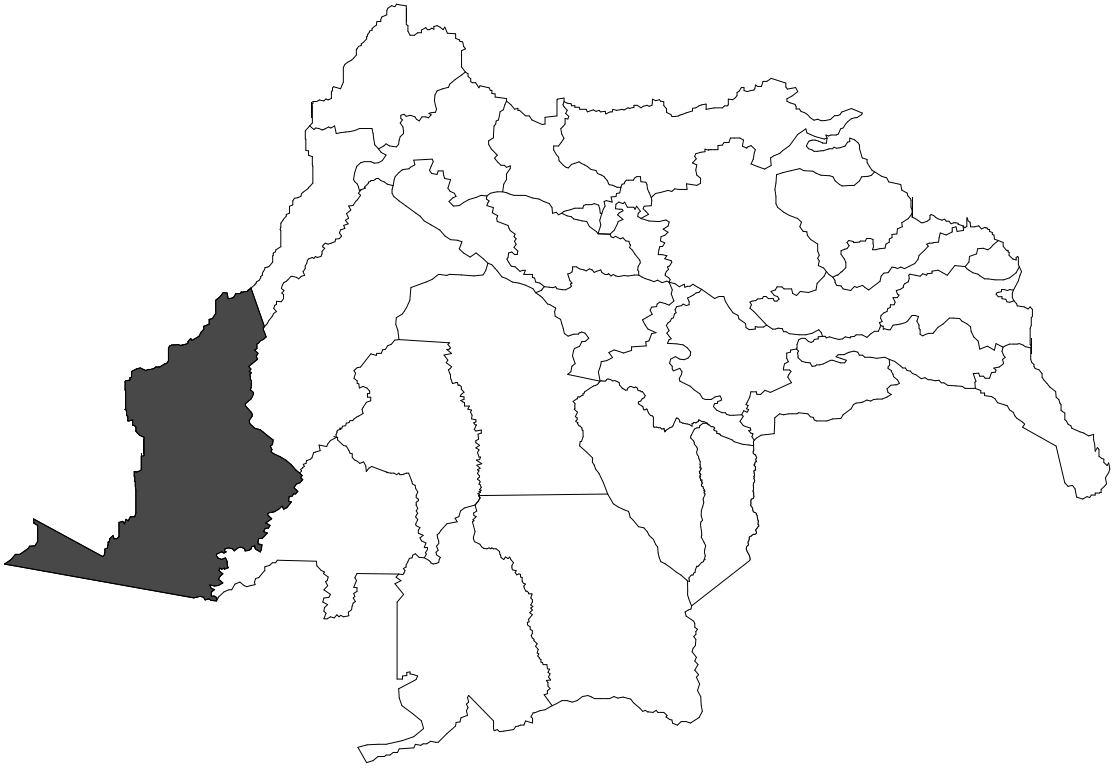
fig.201 enramada, Wayuu

fig.202 veranda, Walirumana

Dario Angulo used earth blocks and *guadua* to build the Walirumana; in both cases, the materials are still very sustainable, apart from the fact that these had to be imported to La Guajira.[27]

Also in La Guajira, open-space is a topic, since already in the indigenous traditional architecture were built *enramadas*, like pergolas, constructed to be a meeting point for the community of the *ranchera*.

27 interview with Juan Salamanca Balén on the 29th of April 2023 online in Vienna



ninth chapter - AMAZONAS

Similarly to La Guajira, the department of Amazonas I did not managed to visit it. However, I found many references to Amazonian Amazonian architecture, especially the vernacular Colombian constructions.
Colombian.
For this reason I have made a chapter especially on the architecture of the malocas.

amazonas

The department is named after the Amazon River.[1] The capital is Leticia. The department has approximately 77,000 inhabitants in an area of approximately 109,000 km2. Temperatures in this area are very constant, with a maximum of 27.6 °C and a minimum of 23.5 °C. Rainfall is around 2500 mm/year, with 150-200 rainy days per year.[2]

1 https://www.todacolombia.com/departamentos-de-colombia/amazonas/index.html April 2023
2 https://www.todacolombia.com/departamentos-de-colombia/amazonas/clima.html April 2023

the tukanoan maloca

In the Amazon rainforest, part of which is in Colombia, there are still people living in tribes, much like the indigenous before the arrival of the Spanish colonisers throughout the country. The indigenous of the Colombian Amazon are called Barsana.[3] The temperature in the Amazonas region is about 26 degrees, and there are 2660 mm of rain/year.[4] Through the Amazonas region flows the Rio Uaupes. In the last thousand years, multiple Indian tribes lived near this river or its tributaries.[5] This population lived in small groups in special houses called malocas. The *maloca* was built to give space to the whole tribe, up to 100 people, or about a dozen families, and was placed around one or two hours walking or by canoe from the next maloca. Each family has its own compartment, separated by palm leaves. *Maloca* were indipendent and interdipendent at the same time because they were connecting to the malocas near them, mostly through social interactions like marriage.[6]

The *maloca* is a long house. It is made out of a wooden skeleton with a woven roof on top. The *maloca* is a shelter for its tribes and protects them from sun, rain, and the forest. It has a symbolic load like a placenta, which can protect from animals and also evil influences.[7]

The *maloca* stands on an area of the rainforest that got bruned down from the rainforest. To separate the *maloca* from the forest, there are some intermedial layers made with plants and fuit trees, which work symbolically like protective eagles.

"However many layers real or imaginary are envisaged, the sense of human centre (culture) versus wild periphery (nature), could scarcely be clearer, and the layering continues within the maloca."[8]

In the periphery of the *maloca* there are family compartments, and in the center there is the ritual focus.[9] At first glance, the *malocas* look like Christian basilicas because of their rectangular shape (about 30 x 12 m).[10]

3 Piesik Sandra (2017): Habitat. Traditionelle Bauweisen für den Globalen Wandel. Edition Detail.
4 https://www.todacolombia.com/departamentos-de-colombia/amazonas/clima.html May 2023
5 Piesik
6 Blunell Jones, Peter; (2016): How buildings shape society. Architecture and ritual. Bloomsbury Academic. 169
7 Piesik
8 Blunell, 169
9 Blunell
10 Piesik

fig.205 maloca, Amazonas (p.294)

fig.206 maloca, Amazonas

To the centrality of the building, we have to add a principal line that divides the front from the back and the left side from the right side.

"The construction starts with the five pairs of central columns, their lashed-on cross-beam, and the three sets of longitudinal purlins that form the primary support for the roof. Starting with the placement of the columns, the maloca must be laid out initially along its center line, and the first decision concerning the number and spacing of columns also determines the layout of its ritual center. The five pairs of columns are regarded as male and identified with the men who build the maloca."[11]

The roof, is completely waterproof and can stand a tropical heavy rain, it has a double pitch which descents to one meter from the ground.[12] This creates a triangular section which is the only facade of the building, since the back of the building is rounded, forming a half cone for the roof that slopes down to the ground on three sides. The triangular facade is the only side facing the outside, welcoming visitors.[13]

"The lower part of the symmetrical front is often clad in sheets of bark, as opposed to the woven palm used elsewhere, to accept decoration with symbolic figures, and it is the main part of the building to receive such treatment."[14]

In front of the facade, there is a plaza, used for gatherings, with a ritual significance and importance.
The *malocas* were always one or two hours away by foot or canoe from the next maloca. Most of the *malocas* were built near rivers to have a connection to the other *malocas* and also because there weren´t really paths in the forest. Rivers were landmarks for communication. According to Tukanoan myth, different tribal groups migrated upriver and formed a family tree, branching out as they moved away from the river mouth. This family tree determines a group's position within the ancestral hierarchy.[15]

The construction of a maloca starts with a family who wants to build its own one. The families are made of brothers and wifes where the oldest brother is the chief.
The first step is to search for an area in the forest, clear the site, and start to assemble the frame, beginning with the central columns. While building the

11 Blunell, 169
12 Piesik
13 Blunell
14 Blunell, 170
15 Blunell

maloca, manioc is planted, and its cultivation will continue after the building is completed.
The *maloca* is built very easy it and must be rebuilt or repaired due to the deterioration of its fabric, but it is unlikely to last more than thirty years because of the changes in the family or tribe. As in other indigenous communities, when the leader of a *maloca* dies, the maloca dies with him. The leader is buried beneath the *maloca*.[16]

In the building we can find two entrance doors: one in the front for the men and one in the back, in the rounded part leading directly to the manioc gardens, for the women; the door to the front is the main light source. Similar to the doors and the division inside the building is the division of the duties, which are assigned by gender. In fact, men, as methaphorical protectors, occupy the front end of the *maloca*.

The *maloca* society is still a patriarcal society, where men are still een as protectors, ritual leaders, and officiators at public events involving outsiders. On the other hand, women and children are situated towards the cone end of the maloca. Each nuclear family lives, sleeps, cooks, and keeps their possessions in a compartment located on the rear periphery.
While women are working in the garden, men spend the daytime out hunting or in front of the house.
Normally men and women would sleep in the center of the house. Just in case of marriage or pregnancy the will move to the back to sleep with their wife.[17]

„To divide the half-round women's space from the columned male centre, a temporary woven screen can be installed just behind the last pair of main posts on ritual occasions… Spatially this screen identifies the principal internal threshold between male public ritual space and female private dwellings.“[18]

For the Barsana, indigenous comunity in the Amazonas, *malocas* are extremely important, like their own microcosm of the universe itself. Their days revolve entirely around the maloca. Each part of the *maloca* has also a symbolic interpretation: the columns are the men who built the maloca, supporting the whole *maloca*; the roof is the sky; and the floor is the earth. These buildings are built so that every neighbor, spirit, and ancestor can live in them. *Malocas* are orientated along the east-west axis, so that the sun rises where the men´s door is. With this, the maloca is a very interesting building because it offers a place to

16 Blunell
17 Blunell
18 Blunell, 174

live, eat, meet, and do rituals, so there is a good concentration of human culture in the rain forest.[19]

The wide central corridor of the *maloca* serves as a communal space for various activities. The most significant function of this space is for ceremonies that involve ritual dances, where light alcoholic and hallucinogenic drinks are consumed. They represented the tradition, faith, and independence of each tribe while simultaneously acting as a bulwark of its values.[20]

The *maloca* is a good example of an architecture adequate to the climate and the environment. Infact in this case the building is made out sustainable materials, with a big roof to protect it´s inhabitants from the weather and from the animals.

Amazonas is a department with a humid climate, so it means rains quite often, and trough the construction of a big root all the inhabitants live repaird from rain.

The maloca is an interesting building for the history of the indigenous architecture, is difficult to find still today some examples. If we think the typology which puts together different members of one family, having everyone its own compartment remebers the contemporary condos.

19 Blunell
20 Blunell

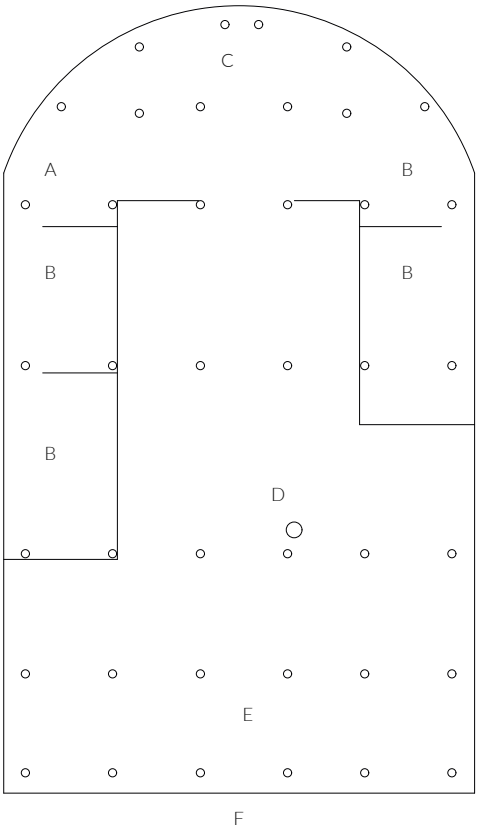


fig.207 maloca plan, A = Headman´s compartment; B = Other family compartments, C = women´s door; D = light spot; E = Coming-in-standing-place; F = men´s door.

The traditional indigenous architecture of the *malocas* is different from the others. In fact, all the inhabitants of the tribe live together in the same *maloca*. This building is very big and is shaped by its roof. The choice of the big communal house is given by the rain forest environment. The big roof is also a protection against animals and rain. Also, the materials are a symbol of the environmental adaptation, since these are very natural materials, like palm leaves and wood.
The light comes inside the maloca through the front facade, through the door, and through a window in the upper part.
The open space is given by the square, which is created all around the *maloca*, where the inhabitants have plants and vegetables.

fig.208 inside the maloca

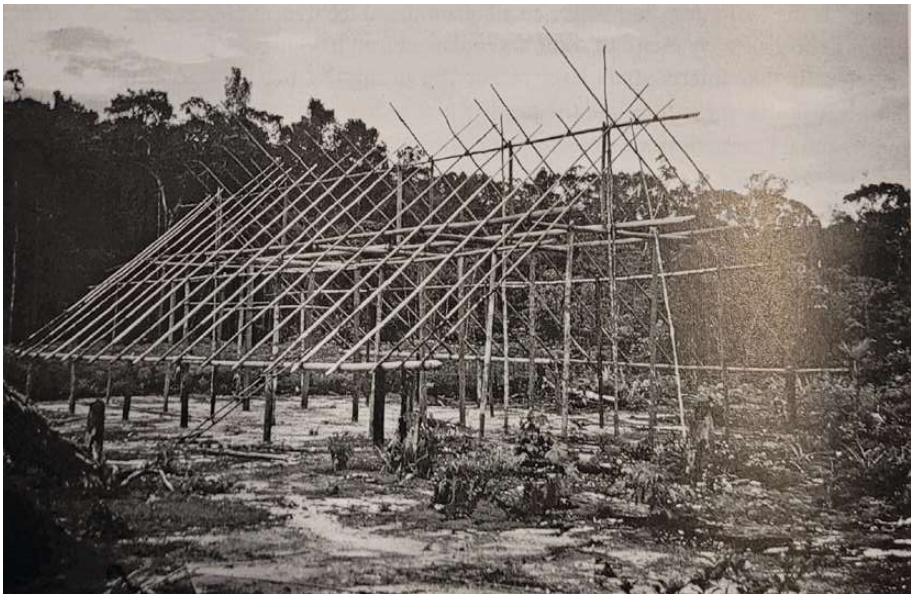
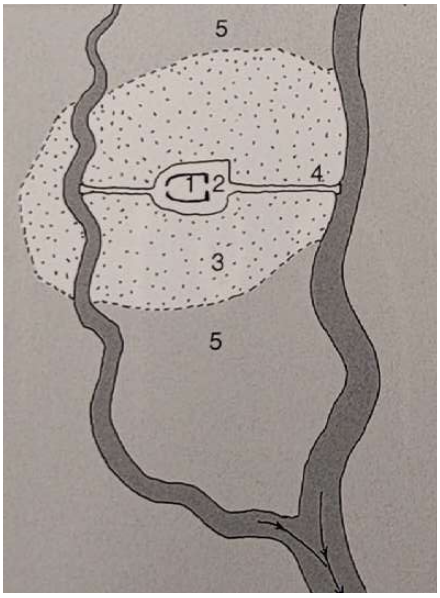


fig.209 maloca wood structure



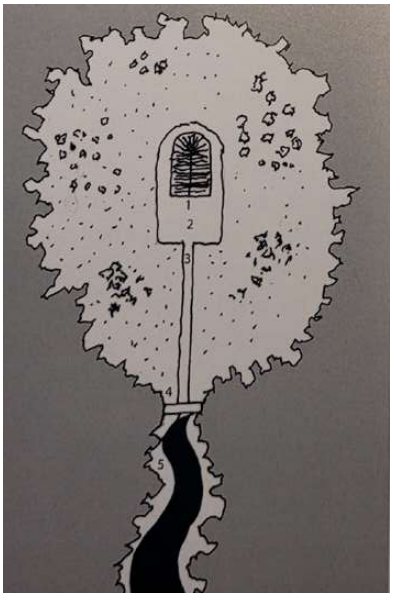


fig.210 and 211 maloca site near the river

fig.212 maloca site plan

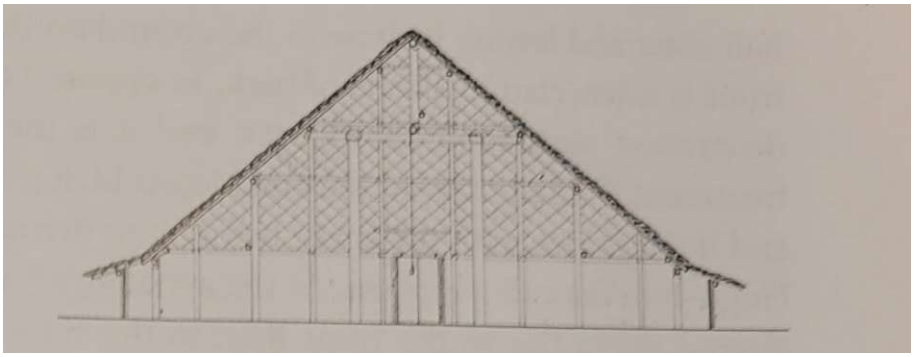


fig.213 and 214 maloca front facade

fig.215 maloca front facade

tenth chapter - CONCLUSIO

conclusio

In conclusion, this analysis of Colombian architecture has shown that throughout the country, there are many indigenous low-tech techniques that are still in use. In some very evident examples, such as in the Eje Cafetero, architecture has been modified in smaller steps, from the traditional indigenous architecture through the colonial to a modern and contemporary one. Therefore, it still remains linked to indigenous materials, but in a more modern version, in which the buildings are constructed in wood, bamboo, and adobe (earth).

It was a great opportunity for me to see most of this with my own eyes and learn from the architects of the place about how they are building their own buildings and where their focus is in Colombian society.

It is above all in the larger cities such as Bogotá, Medellin, and Cali that architecture has particularly changed towards a more western style. As far as the relationship with the climate is concerned, during the trip to the Colombian country, it was possible to discover the various types of adaptation, for example in Cartagena, where the patio is used as a garden inside the house, so that there is also an open space inside the house. Or the example of the desert of La Guajira, where houses are built with adobe, so that they are well insulated, so that during the day it is not too hot and during the night the rooms remain warm due to the thermal excursion. At the same time, in the larger cities with much more demand for construction, due to large extensions and the construction of many more floors, materials such as *ladrillo* are used much more. Especially in the case of Bogotá, this material is necessary due to the relatively low temperatures and frequent heavy rainfall. The choice of this theme for me is also due to the material of *guadua*, which fascinated me from the first moment. The analysis of indigenous architecture also showed how these buildings can still be built without the rules of Colombian society.

Concluding with the thesis, the answer to my research question is in the different architectural features like materials, structures, roof constructions, walls, and open spaces toward the outside of the buildings that characterize Colombian architecture.

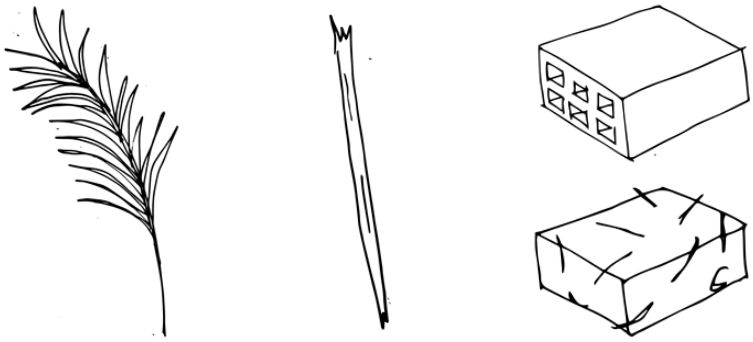


fig.216 palma
fig.217 yotojoro
fig.218 ladrillo and BTC

By analyzing the use of materials, construction techniques, and architectural forms, it is possible to discover which traditional characteristics still remain in modern architecture. In this conclusion, the architectural characteristics of the various styles due to climatic conditions are explained by means of examples. Through research, it was also possible to study which characteristics are prevalently used and with which functions.

As we have seen in previous chapters, the materials predominantly used in Colombia for traditional architecture are of natural origin.

Depending on the climatic region and thus the surrounding environment, there are different uses of materials, as they are the natural ones. In fact, in areas along the Caribbean coast and in the Pacific, palm leaves are used for the roof, while areas in the Vallecaucan hinterland use *caña*. In the desert region of La Guajira in particular, however, *yotojoro* is used for the roof.

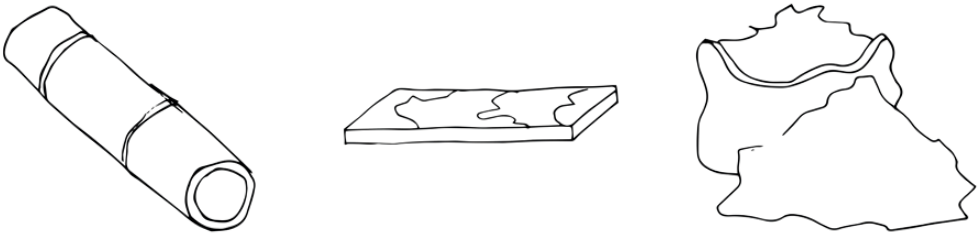


fig.219 guadua

fig.220 madera (guayacan and trupillo)

fig.221 tierra

All three materials have similar characteristics and are used for the same purpose.

For the different building parts, there are different materials to be used.
Other important materials are *madera* (wood), which is largely used all around the country (*guayacan* in Chocó and *trupillo* in La Guajira); *tierra* (earth), which can also be found in most of the regions, is simply not always the best material to build with, especially in the very tropical and humid zones like Chocó and Amazonas.

fig.222 roof, maloca Amazonas

fig.223 roof, enramada La Guajira

fig.224 roof, Parque Tayrona

As we have been able to see, all the indigenous tribes use lighter and thinner materials that are easy to find for **roofs**.
The roof shape used is often the same throughout the climate zones and environments; it may vary from area to area due to the function of the house.
In fact, by analyzing the various vernacular roofs, these have always had a wide shape that protrudes beyond the walls of the house, to create ample shelter from both rain and sun. This characteristic still remains in more modern roof constructions.
The roofs of vernacular construction are predominantly conical in shape with a dense union of palm or *caña* leaves. The circular shape at the base is typical of the Caribbean coast and Chocó regions (hot and tropical climates).
In desert areas such as La Guajira, on the other hand, the roof is rectangular, made of *yotojoro*, and serves as a sun shelter.
The most unusual roof can be found in the Amazon rainforest. In this case, the Amazonian *malocas* have a very large palm roof that gives shape to the whole building. The shape of the *maloca* is made up of a rectangular part and a round one.[1]

1 Blunell Jones, Peter; (2016): How buildings shape society. Architecture and ritual. Bloomsbury Academic.

fig.225 roof, maloca

fig.226 roof, Escuela Sustentable Plan:b

fig.227 roof, Playa Brava Parque Tayrona

The roof construction made with natural materials such as *caña* and palm is also used by some contemporary architects, such as Plan:b arquitectos, in two cases discussed during the interviews: the Escuela Sustentable and the Casa Mendiguaca. In both cases, this solution is used in contrast with more modern materials such as concrete and glass. In the case of the Casa Mendiguaca, the house is built in such a way that it can also be self-sufficient from an electrical point of view, as it is isolated in the middle of the Sierra Nevada de Santa Marta, in a hot climate typical of the Caribbean coast.[2]

The Escuela Sustentable, on the other hand, was built in a sustainable way, hence also the choice of the palm tree roof, also used traditionally in a temperate climate, so the use of this material is perfect since it is used in a type of construction so that it can be built sufficiently densely so that it is also waterproof. Among the positive characteristics of this material is also the fact that it can be found in the Colombian region.

2 interview Plan:b arquitectos on the 8th November 2022 Medellin

fig.228 roof, casa colonia Cartagena

fig.229 roof, Playa Mecana Chocó

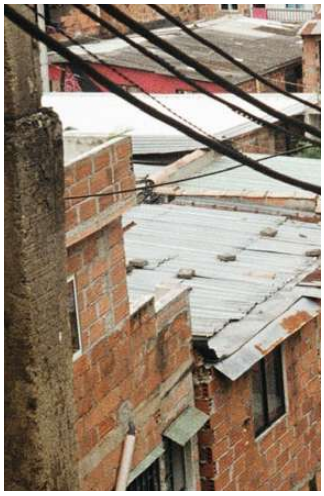


fig.230 roof, invasiones Medellin

As far as colonial architecture is concerned, however, roofs were normally built with tiles and wooden structures. Today, roofs covered with tiles are still used, as are metal roofs, particularly in more rural areas or in neighborhoods such as barrios where self-building is practiced. Roofs are built using more western techniques, including flat roofs, out of materials such as metal and cement. Examples are the Walirurama building by Juan Salmanca Balen, built in La Guajira, and the Playa Mecana House in Chocó. Even in the case of more contemporary architecture, the characteristic of the roof remains important as the main protection against rain and sun, both in areas with a very humid climate and in areas with a more desert climate. In some cases, this is done especially to protect materials from deterioration and to create open areas near the house with an extension towards the outside of the house.

fig.231 guadua esterilla walls, Eje Cafetero

fig.232 guadua structure, Zeri Pavillon

With regard to the **structure and walls** of the house, the results are more diverse and highlight climatic differences. In fact, depending on the climate zone, the environment, the availability of materials, and the construction requirements, completely different materials and techniques are used.

The temperate climate zone is characterized by the use of *guadua*. In this area, bamboo grows very frequently and is an important part of the tradition. In this case, it is a material that is used both for the construction of structures and for the formation of the walls themselves. In fact, the esterilla technique is used as a covering for the structure.

In the case of colonial and modern architecture, this material is used for walls and structures in combination with other materials. In the most ecological solution, it is used with earth and wood, as in Simon Velez's Zeri Pavilion or in the colonial houses found in the Eje Cafetera.
In the examples by Andrés Bäppler of the Colegio de las Aguas, the creation of guadua buildings in combination with brick, earth, concrete, and metal can be found.[3]

3 Interview with Gloria Patricia Sarria Giraldo and Andrés Mauricio from Colegio de las Auguas on the 25th of October 2022, Montebello, Cali

fig.233 walls, Chocó

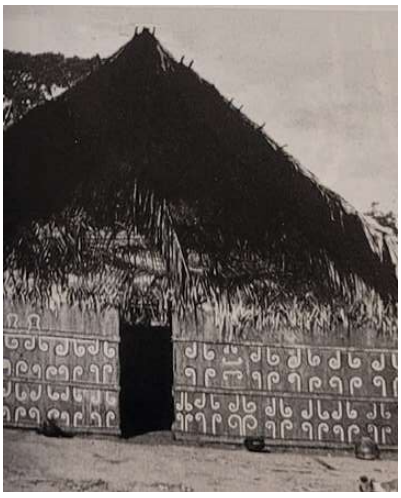


fig.234 walls, maloca Amazonas

In the tropical climate zones, of the Chocó and Amazonas departments, we find two different traditional architectural types. In the Chocó department, especially in the area on the Pacific coast, we can find traditional structures built of wood, *guayacan*, and also of palm (not only the leaves but also the trunk), characterized by the stilts. In fact, due to the very rainy climate, which often leads to great flooding, it is necessary that the houses be built high enough so that they remain dry.
This is how the traditional Dé houses are built.
This tradition has been maintained to this day, as modern houses, especially those closer to the coast or rivers, are also built of wood and on stilts, as in the example of the house in Playa Mecana. In both cases, the buildings are constructed paying particular attention to the roof and the structure, leaving out the walls, which only exist in the case of more contemporary architecture, mainly as room dividers.[4]

On the other hand, in the Amazonas, there is an important use of the roof, which gives form to the whole building, leaving almost no need for walls except for the front façade, which is made of wood and often decorated with drawings and symbols of religious importance. In the Amazonas, the whole tribe lives within the same *maloca*, so the front wall also marks the entrance to the community; the tribe lives all in the same house to better protect themselves from the animals of the forest.[5]

4 González Escobar, Luis Fernando: Evolución histórica de la arquitectura en madera en el Chocó
5 Blunell Jones, Peter; (2016): How buildings shape society. Architecture and ritual. Bloomsbury Academic.

fig.235 bahareque walls, Parque Tayrona

fig.236 casa colonial, Cartagena

In **the warm climate zone** along the Caribbean coast, in the areas of Cartagena and the Sierra de Santa Marta, the *bahareque* construction technique is the main traditional technique used for walls. Buildings are constructed with the *bahareque* technique using structures made of wood filled with a base of palm leaves and earth. In some cases, the wooden structure is simply covered with woven palm leaves. As the Caribbean coast was the first to be reached by Europeans, it was also the first to be joined by new Spanish and European building techniques. In fact, colonial architecture gradually broke away from traditional architecture, moving from the *bahareque* technique to more massive walls. This is where modern architecture first spread. Cartagena, apart from the colonial architecture preserved in the historic center, is characterized by skyscrapers and modern, contemporary buildings.[6]

A similar situation is to be found in the Sierra Nevada de Santa Marta, where the buildings along the road and in the villages are mainly constructed with modern materials such as concrete, bricks, and metal, following the most contemporary techniques. On the other hand, buildings constructed more recently in the forest or in the Parque Tayrona are built with mixed materials, for example, using concrete for the walls of the house and palm leaves for the roof, like the examples of the houses in Playa Brava and the Casa Mendiguaca by Plan:b arquitectos.

6 https://blog.structuralia.com/el-bahareque-el-remoto-sistema-constructivo-que-respeta-el-medio-ambiente March 2023

fig.237 bahareque walls, La Guajira

fig.238 walls, Walirumana

In **the desert climate zone** of La Guajira, the bahareque constructions are the main traditional architecture. In this case, the technique is used with *trupillo*, the only tree that grows in the area, and *yotojoro*, the heart of the cactus (with which the roofs are also built). In this very hot area, the *bahareque* technique is built using earth to use the insulating capacities of the material. In fact, this technique is functional, as it retains heat during the day and then releases it at night, thus achieving a comfortable climate throughout the day.
In La Guajira, one example of contemporary architecture is the Walirurama by Juan Salamanca Balén. This building was constructed with respect for the desert environment and the Wayuu tribe living in the area. The construction technique used is different from the traditional one; BTC blocks with a guadua structure and a concrete roof were used. The choice was made because of the need to construct a durable building. In fact, *bahareque* is a technique that needs a lot of care and was mainly designed to last for short periods since the Wayuus were traditionally a nomadic population. In the use of new techniques for the area, Juan Salamanca Balén, gave importance to the characteristics of the climate.
For this reason, he built with a guadua structure and earth blocks disposed to allow better ventilation inside the building.[7]

7 interview with Dario Angulo on the 1st of May 2023 Vienna

fig.239 ladrillos walls, Torres del Parque

fig.240 guadua structure, Casa de la Lluvia

In **the cold climate zone** of Bogotá, bricks are the material that characterizes the city. It is very difficult to find examples of traditional architecture; in fact, in Bogotá, it is predominantly built with bricks. This is certainly due to the fact that there is a large clay soil, which has helped the development of the use of this material and also made it very cheap. [8]

On the other hand, it is also a material suitable for a city with lower temperatures throughout the year and characterized by constant rainfall. However, as Bogotá is a city of 8 million inhabitants with a mix of different styles. The modern Salmona architecture, with its great use of bricks, is also common in self-built houses in the suburbs.

On the other hand, there are more modern architects who use traditional techniques from other climatic zones, such as Arquitectura Expandida in the Casa de la Lluvia, Potocine, and El Bicho, which are built using guadua and more modern materials.[9] Other examples of architects include Taller Architects who use scaffolding for installations outside two markets.

From an analysis of Colombian architecture, it has been possible to find various building forms that also differ according to climate zone. The main characteristic scattered throughout the country is the aperture of the building towards the outside. In fact, in pre-colombian and colonial architecture, as well as in the most modern and contemporary, the creation of open spaces towards the outside of the building is a recognizable characteristic of Colombian architecture. This occurs in different ways, depending on the climate zone and architectural style.

8 interview with Julian Restrepo from Taller Architects on the 23rd of October 2022 Bogotá

9 interview with Arquitectura Expandida on the 21st of October 2022 Bogotá

fig.241 veranda, casa de hacienda

fig.242 open space, Escuela Sustentable Plan:b

In **the temperate climate zone** of Cali, Valle del Cauca, Medellin, and Manizales, we can find different forms of open spaces to the outside, which is fundamental given the average temperatures of around 20 - 25 degrees. This construction characteristic can be seen in colonial constructions such as casas de hacienda. These were built with a veranda along the outer and inner perimeters of the house. In this way, it was possible to use both spaces as an extension of the house towards the outside.[10]

Other examples from the Valle del Cauca are the buildings constructed by Andrés Bäppler for the Colegio de las Aguas. In this case, the use of various architectural techniques related to *guadua* is done very openly towards the outside, so that sometimes the only closed walls are those separating the rooms, and in the case of classrooms, these are almost never completely closed but rather have open slits.

In Cali, examples of architecture open to the outside are so frequent that even restaurants have entire façades completely open to the outside. It is the same in flats and houses, where the windows are open; sometimes they do not even have glass, so that even the banal flat has a balcony and the door to it perpetually open, as if this were simply an extension towards the outside.

In the Medellin and Manizales areas, the two buildings Zeri Pavillon and Orquideorama in particular are constructed mainly for events, and were conceived as protection

10 https://www.revistacredencial.com/historia/temas/la-vivienda-popular-tradicional-en-la-region-cafetera-central April 2023

fig.243 open space, indigenous architecture Chocó

fig.244 veranda open space, Chocó

from the sun and rain; one is built with traditional materials such as *guadua* and wood, while the other is more modern in metal and wood. [11]

The theme of the aperture in the architectural form is also characteristic of **the tropical climate zone,** such as in the department of Chocó. In fact, traditional architecture requires an aperture to the forest to remain in constant connection with nature. In fact, the houses are also built on stilts as protection from animals, but without walls and therefore open to the surrounding environment. The only protection is provided by the roof.[12]
This type of construction is also used today in more rural areas of Chocó, where walls can be found mainly for private sleeping quarters. In villages and towns, this typology of aperture is transformed into a veranda, whereby the house itself is built with walls and has a veranda towards the main road, where people sit in the shade protected from the sun.
In Amazonas, the *malocas* are built differently; in fact, the building includes the whole tribe. The aperture is organized outside the building, where all the surrounding area is used by the community that lives there.[13]

11 Mehrotra, Rahul; Echavarría, Camilo; Restrepo Ochoa, Camilo (2022): a+u 2022.03 Colombia. Architecture and Urbanism magazine
12 González Escobar, Luis Fernando: Evolución histórica de la arquitectura en madera en el Chocó
13 Blunell Jones, Peter; (2016): How buildings shape society. Architecture and ritual. Bloomsbury Academic.

fig.245 enramada, Wayuu

fig.246 veranda, Walirumana

The interior patios in colonial houses, on the other hand, are typical of **the warm climate zone** of the Caribbean coast. In this area, colonial houses built on one or more floors always have an internal and private patio. The house is distributed around the patio, where also dining areas (*comedor*) are to be found. In traditional indigenous architecture, on the other hand, the roof is used for protection and is built so that it protrudes from the walls, creating a space where one can sit protected from the sun and rain. In the area around the Sierra Nevada de Santa Marta, more modern buildings are characterized by a veranda facing the street, where people sit during the day and evening.[14]

In La Guajira, in **the deserted climatic zone**, buildings are divided according to their function, so that the enramada, which is used for socializing, has the form of a pergola. The kitchen is also built relatively open, while the viviendas (houses), with the bedrooms, are closed, using the bahareque technique. In the more contemporary Walirumana building of Proyecto Guajira, an open part is also built, which is still covered by the roof.[15]

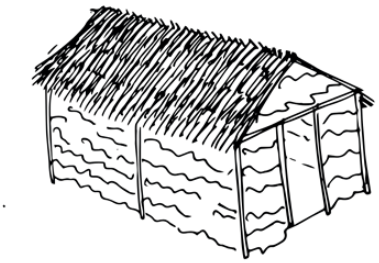
14 https://www.youtube.com/watch?v=Q7ZKKT7ufuw March 2023
15 https://lenguayculturaguajira.blogspot.com/p/arquitectura-en-la-guajira.html April 2023

fig.247 pergola, El Bicho

fig.248 veranda, La Perseverancia

Finally, in the **Bogotá climate zone**, we find this Colombian architectural characteristic in Taller Architects´ buildings, such as La Concordia and La Perseverancia, which are even an external extension of the two markets, and in the building of the Engineering Universidad Pontificia, where they build an entrance open to the public on the ground floor. Arquitectura expandita works in a similar way in the Casa de la Lluvia and Potocine by combining a *guadua* structure with semi-transparent panels, which allow a connection between inside and outside since you can slightly see through them. El bicho, on the other hand, is built directly as an exterior element, like a pergola, to feed and enhance life in the square.[16][17]

16 interview Taller Architects on the 23rd of October 2022 Bogotá
17 interview Arquitectura Exandida on the 21st of October 2022 Bogotá



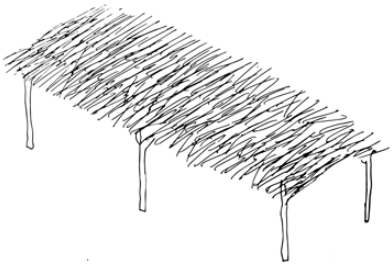


fig.249 Wayuu´s vivienda, La Guajira

fig.250 enramada, La Guajira

As we have been able to see through the examples analyzed in the various areas of Colombia, different adaptation solutions are used in the various climatic situations. These vary in the first place according to the materials available in the area and, secondly, according to the needs that the environment of a given area brings with it.

With regard to indigenous architecture, the examples are these: in Chocó, it is built in wood on stilts; in Sierra Nevada de Santa Marta, it is built on terraces in *bahareque* and palm; and in La Guajira, it is built in *bahareque* made with *yotojoro* and *trupillo*, or simply with pergolas, the *enramadas*.[18]

In contemporary architecture, the solutions in these places have remained similar, apart from the use of more modern materials thought to be more resistant to the passage of time.

18 https://www.youtube.com/watch?v=wE-r4Pevm9k March 2023

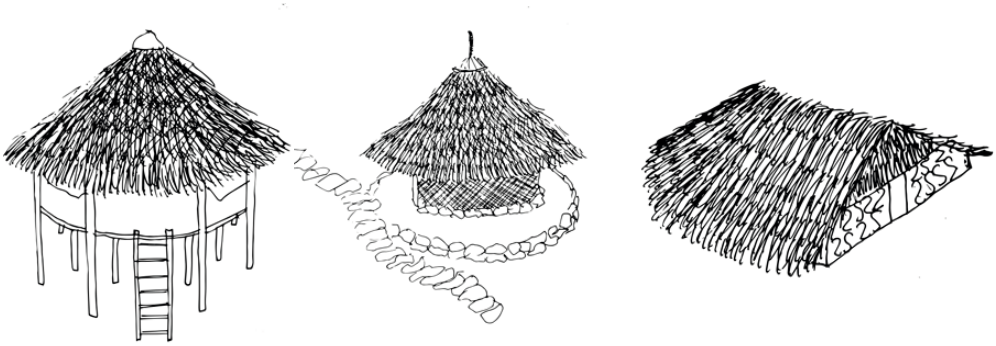


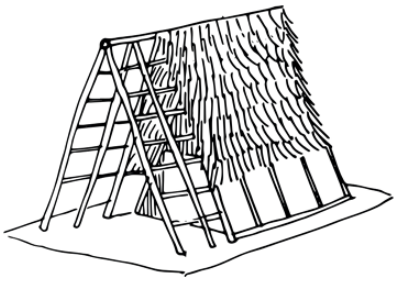
fig.251 Dé, Chocó

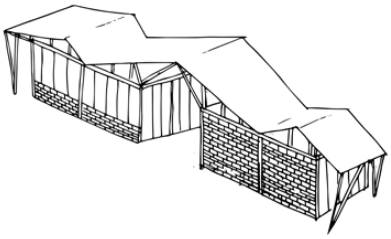
fig.252 Kogi´s vivienda, Parque Tayrona

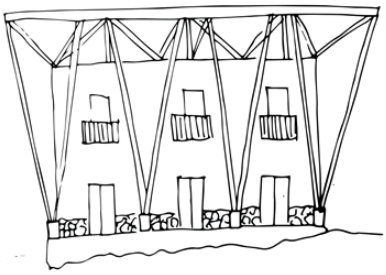
fig.253 maloca, Amazonas

The great difference between traditional and contemporary architecture that we have seen is mainly due to the environmental context. In fact, buildings in more rural areas are still built more similarly to traditional architecture, while those in large population centers have lost the connotations of traditional indigenous architecture.

Among the things to learn from indigenous architecture is definitely a greater respect for the surrounding environment, learning to give more attention, and becoming an integral part of the environment without being a source of disturbance. One example is the choice of more ecologically conscious materials.







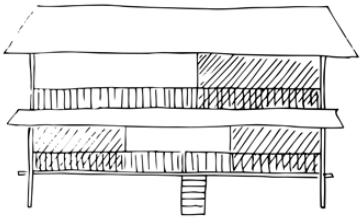


fig.254 Escuela Sustentable, Plan:b

fig.255 Walirurama, Juan Salamanca Balen

fig.256 La Vieja, Andrés Bäppler

fig.257 Playa Mecana, Chocó

The analyzed contemporary buildings are the examples with features derived from traditional building. In the first case, Escuela Sustentable is important because of the use of materials such as palm and wood along with more modern materials such as glass. Where the shape of the schoolroom is defined by the roof. The flexible building Walirumana is also an example of the adaptation to the climate working similarly with the ventilation in the Wayuus buildings.[19]

The architects, activists, artists, and teachers I interviewed all have the different focus in their approach to architecture and were therefore all very interesting for various Colombian architectural fields.

19 interview with Juan Salamanca Balén on the 29th of April 2023 online in Vienna

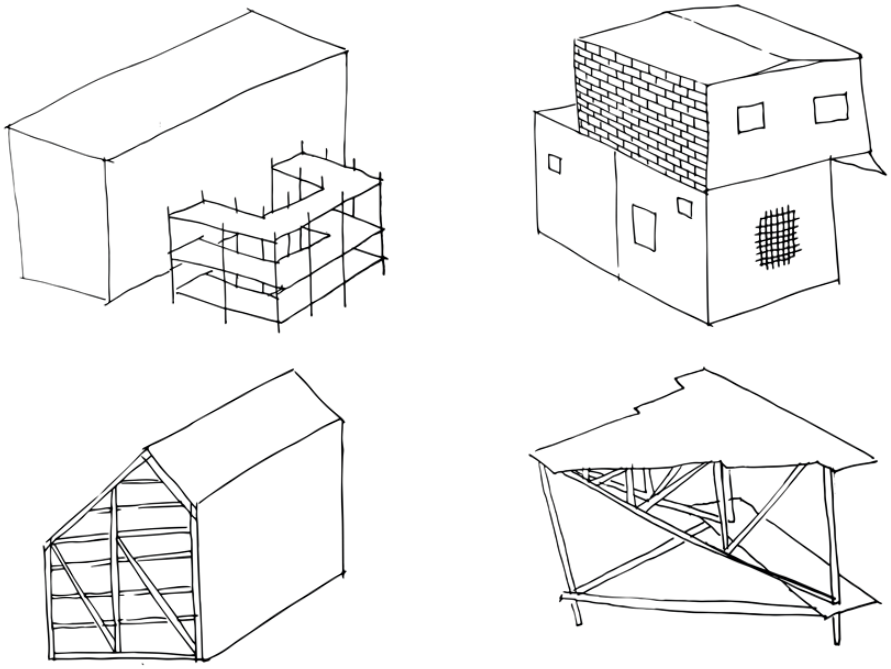


fig.258 La Concordia, Taller Architects
fig.259 Invasiones
fig.260 Casa de la Lluvia, Arquitectura Expandida
fig.261 El Bicho, Arquitectura Expandida

Taller Architects kept the focus on the importance of designing with sensitveness to the environment. Arquitectura Expandida showed the importance to create communal spaces in the *barrios* for the inhabitants. Juan Salamanca Balén and Dario Angulo are focused in the work on the collaboration and trainings with indigenous communities, using earth. Andrés Bäppler and the buildings of the Colegio de las Aguas is also a good example because it is a testing ground for various techniques with the material of the *guadua*.
With Plan:b the interview focused on the lowtech materials mixed with hightech materials and on the preservation of the historic building, similar as with Andrés Hoyes and Olga Milena Cadavid.
Alvaro is a good example of reviving an old technique like *quincha* in a way adapted to modern times.

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