MACHINE GUNS and MUSICIANS

ARCHITECTURAL DESIGN in REVOLUTIONARY NICARAGUA



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Daniel J Glenn

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To my mother,
who gave me the
gift of feeling....



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A professional paper submitted in partial fulfillment of the requirements for the degree of **BACHELOR OF ARCHITECTURE.**

Daniel J. Glenn

10/9/1986

Date

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Daniel Glenn

IT WAS A SUNDAY

It was a Sunday

Into the mountains we went
An old jeep with machine guns and musicians
It was a joyous, adventurous day for me
But also there was sorrow
We weren't going to the mountains
To play music of birth, or music of marriage
We went to play music of death.
A young man had died at 23
Killed in the nearby mountains of Achuapa
His mother and family and friends came together
in their mountain home, there
They built an altar of pine and flowers
And to this they said farewell
There was a sweet sadness in the air
A sadness of death but an understanding of death
An awareness of a purpose and a meaning.

Into the mountains they flew
A light plane with only togetherness aboard
Together they flew as together they lived
The mountains of Nicaragua were bathed in warm sunshine
But the mountains of Montana were paled white
They were flying into an adventure
As they'd done many times before.
And Mom had been so worried
When I last said farewell to her
Her eyes had filled with tears
And these eyes begged me to stay home
Danger lives abroad.

Within togetherness there is safe warmth
So together they flew
But the ice and snow came as the bullets of the Contra
And together they fell
They fell into the mountains, the mountains
they had loved
As he fell upon the soil, the soil
that he had loved
Some fight and die for their freedom
Some die within their freedom.

I was in the mountains of Nicaragua
And there I witnessed death
They were in the mountains of Montana
And there she met death...

It was a Sunday

Daniel J. Glenn
February 2, 1986

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Ideological Basis For Project

1



IDEOLOGICAL BASIS FOR PROJECT

After studying and working in architecture for five years, including summers in offices and a 5-month internship in Boston, I have become greatly disillusioned by the profession as it is practiced in mainstream western society.

At this university and in travels abroad, I have studied the history of architecture and discovered an essential truth: architecture represents the most elite of the arts, an art in service of kings and bishops, bankers, financiers, and corporate presidents. And the architectural excesses of history (just like all the golden excesses of the wealthy) are often extraordinarily beautiful, but have almost without exception been created at the expense of the vast majority of the people.

In the midst of our studies of architectural history we would occasionally turn our eyes away from the Great Pyramids, Gothic Cathedrals, and the mansions of Wright and look at the other ninety-nine percent of the built environment: the architecture of the masses. We were often shocked by the beauty of the peasant hovel or the Italian hilltown. My thesis concentrates on that "other" ninety-nine percent.

When I went beyond the walls of academia and dealved into the "real world," I only reconfirmed my doubts of my chosen field. During my five-month internship in Cambridge, Massachusetts, I was surrounded by a politically and intellectually vibrant city with famous universities and liberal traditions. But I was strapped to a drafting table, taking orders from a greedy developer. There I watched the principals, with Masters degrees from Harvard and Berkeley, grovel before this little man because he offered money. We spent hours cranking out drawings of middle and upper-middle income "condos"; our designs dictated by the developer's market-analyzers.

Perhaps my experience could be attributed to a bad office. However, I spoke with a wide range of professional architects all over Boston and Cambridge, and I have yet to meet a more disillusioned group of people in my life. I spoke with Harvard, Yale, Berkeley, Virginia, M.I.T., Arizona State and Ecole Des Beaux Artes Graduates. They, like we here at Montana State, were trained to be artists and visionaries. They were then confronted by a world dictated by profit and fashion with little interest or need for their services.

I had always thought of architecture as being a noble art, noble because through architecture an individual can create environments, little worlds of light and shadow, color and form. But the nobility is obscured when the creation of better environments for people becomes a secondary, tertiary, or completely ignored aspect of building; instead monetary profit becomes the primary issue.

So the architect with noble intentions is reduced to a small voice begging for concessions here and there from the capitalist interests.

Or, the architect forgets noble intentions completely and joins in the game, creating thin facades of color and form dictated by current fashion. When I page through Progressive Architecture or Architectural Record, I have great difficulty discerning the essential difference between these magazines and Vogue or Cosmopolitan. Each concentrate on fashion and flash designed to catch the consumer's eyes; meaning and content are irrelevant. A posh chrome and white interior glistens on a page like a seductive model, both posed for an act that is left to the imagination of the reader. The intrusion of the reality of the human condition upon the architectural setting is as unthinkable to the editors of Progressive Architecture as the depiction of the seductive model engaged in the sexual act would be to the editors of Vogue.

The absurdity of this fashion game played by architects is grossly apparent within the framework of our own wealthy society, but when viewed in its broader context of a world in which the vast majority of humanity lives on the edge of survival, the fashion game can only be viewed as criminal.

While I was in Cambridge bent over my desk drawing "condos," the President of the United States, Ronald Reagan, and his Congress openly sent $26 million to the "Contras," a small group of CIA trained and organized mercenaries led by the former National Guardsman of Anastasio Somoza, the deposed dictator of a little country called Nicaragua in Central America. The "Contras" have used extraordinarily violent tactics against primarily civilian targets in Nicaragua in an attempt to overthrow its revolutionary government.

Given the history of U.S. involvement in Latin-America, this was not terribly surprising. But there I was at 22 years old rapidly becoming entrenched in a system which supported such barbarity. I felt overwhelmed by the absurdity of my job, a job whose primary aim was to increase profits for a thoughtless developer. I felt overwhelmed by the absurdity of my profession, a profession which thrives on designing for people like Somoza and Reagan.

So I decided to quit playing the fashion game. I packed my bags and left my job, my apartment, and the insulated island we live in. I flew to the revolutionary country of Nicaragua: in search of meaning.

Project Statement 2



PROJECT STATEMENT

My thesis represents an emphatic rejection of the fashion-oriented, elitist profession of architecture as it is taught in universities and as it is practiced in Corporate America.

To undertake this symbolic act, I first left Corporate America and flew to Nicaragua. I went to Nicaragua with no predetermined design goal in mind; I had in mind a project which was of immediate importance for the people of Nicaragua and which might embody the spirit of revolution.

I spent a total of seven weeks in Nicaragua, 3 weeks in August of 1985 and 4 weeks in January of 1986. During these visits I attempted to absorb as much as possible in such a short time about the culture, traditions, architecture, people and political situation of Nicaragua. My research was far from structured or academic. I traveled about using photography, drawings, paintings, writing, and conversation as my analytic tools.

During my first visit I was part of an American technical aid group called "TecNica." My task was the design of a machine shop for a tractor school in the Matagalpa region. The project was not a great success. Due to my extraordinary ignorance of the economic-aesthetic-cultural-climatic dynamics of the situation I repeated what I now perceive to be the classic error of the "gringo" architect: cultural arrogance. I designed a cheap block and sheet-metal structure that at the time appeared to be the most economical and reasonable solution. This was also the school's stated desire.

There are many such structures throughout Nicaragua, so I assumed I had developed an appropriate solution. However, I've since discovered that such buildings are designed by Nicaraguans who have been trained to think like "gringos"!

Through my friendship with Rita DeFranco, the director of Nicaragua's only school of architecture, I learned that the educated elite of Nicaragua are nearly as culturally removed from the campesino or peasant farmer, as a gringo. And judging by a number of recent housing projects and cooperative designs, the Nica architects can be equally insensitive to the campesino lifestyle as U.S. architects are to the needs of our urban poor.

However, judging by Rita DeFranco and her coworkers, Nicaragua is well on the way to creating a new generation of revolutionary architects.

With this realization and many other eye-opening revelations I returned to Nicaragua in January of 1986. I had become somewhat adapted to life in the midst of "machine guns and musicians." Therefore, I was able to concentrate directly on architectural concerns.

After two weeks of traveling, consulting with the professors of the school of architecture in Managua, local builders, international "Brigadistas," professional architects and planners, and artists, I found a suitable project.

I found a ranching cooperative which is in need of a community. Currently the cooperative consists of 23 families, 8 of whom now live in makeshift shacks and stables scattered around a 1200 hectare ranch. The other 15 families live near Achuapa, in a heavy war zone 26 kilometers to the north of the cooperative.

The project goal is the creation of a small community of 35 houses, an elementary school, general store, medical clinic, and baseball park. The project will utilize indigenous methods and materials of construction, and include the design of appropriate water and sanitation facilities.

The plan will attempt to consolidate the individualistic campesino lifestyle with communal living, both for increased social involvement and to aid in group protection against attacks from the Contras.

A primary goal of the project will be the revitalization of the disappearing art of indigenous building.


José Enrique
Sandoval Valle


HONDURAS
NICARAGUA
COSTA RICA
ATLANTIDA
COLON
GRACIAS A DIOS
OLANCHO
EL PARAISO
FRANCISCO MORAZAN
CHOLUTECA
VALLE
LA PAZ
INTIBUCA
LEMPIRA
COMAYAGUA
SANTA BARBARA
COPAN
OCOTEPEQUE
CORTES
YORO
El Progreso
Tegucigalpa
Comayagua
Choluteca
Esteli
Jinotega
Matagalpa
Managua
Granada
León
Chinandega
Masaya
Rivas
Isla de Ometepe
Lago de Nicaragua
Lago de Managua
Lago de Apanas
Volcan Momotombo
Volcan San Cristóbal
Volcan Masaya
Volcan Mombacho
Cordillera Nombre de Dios
Montañas de Comayagua
Montañas de Colón
Cordillera Isabelia
Cordillera Dariense
Cordillera de Amerrisque
Cordillera de Guanacaste
Serranías Huapí
Golfo de Fonseca
Golfo de Papagayo
Golfo de Nicoya
Península de Nicoya
Bahía de Salinas
Bahía de Santa Elena
Islas Murciélagos
Cabo Velas
Punta Guiones
Cabo Santa Elena
Río San Juan
Río Grande de Matagalpa
Río Coco
Río Wawa (Huahua)
Río Prinzapolka
Río Kukalaya
Río Bambana
Río Kurinwás
Río Pantasma
Río Tuma
Río Escondido
Río Patuca
Río Aguán
Río Ulúa
Río Chamelecón
Río Motagua
Río Negro
Río Frío
Río Sarapiquí
Río Reventazón
Río Pacuare
Río Tortuguero
Río Chirripó
Río Grande de Térraba
Río Sixaola
Río Coen
Río Sicsibila
Río Wampú
Río Segovia
Río Jalán
Río Guayambre
Río Ulúa
Río Chiquito
Río Paulaya
Río Plátano
Río Sigre
Río Patuca
Río Tinto
Río Grande
Río Blanco
Río Matiguás
Río Mico
Río Siquia
Río Kama
Río Tuma
Río Grande de Matagalpa
Río Kurinwás
Río Pantas

ANTHEM OF THE SANDINISTA FRONT

Forward, lets march, compañeros
Lets go forward with the revolution
Our people own its history
Architect of its own Liberation.

Combatants of the Sandinista Front
Go forward because the future is ours
The Red and Black flag covers us
Free Homeland, Victory or Death.

The children of Sandino,
Neither sell themselves, nor surrender
Never!
We fight against the Yankee
Enemy of all humanity.

Go Forward...

Combatants...

Today the dawn is no longer just a temptation
Someday tomorrow a new sun will rise
Which will give light to all the Earth
Left for us by the martyrs and heroes
With abundant rivers of Milk and honey (chorus)

Foward, lets march, compañeros
Lets go forward with the revolution
Our people own its history
Architect of its own Liberation.

Combatants of the Sandinista Front
Go forward because the future is ours
The Red and Black flag covers us
Free Homeland, Victory or Death.

NICARAGUAN POLITICAL HISTORY

1821 Nicaragua and rest of Central America declare independence from Spain and form a federation known as United Provinces of Central America.

1838 The Central American union is dissolved and Nicaragua becomes a republic.

1848 Lake Nicaragua is a major route for prospectors on their way to California Gold Rush. Travel across Nicaragua is under control of a company belonging to Cornelius Vanderbilt.

1850 The United States and Great Britian sign Clayton-Bulwer Treaty, which declares that both nations shall share rights to a trans-Nicaragua Canal. The Nicaraguan government was not consulted.

1855 William Walker and 58 other American adventurers arrive in Nicaragua, having been given free passage on Vanderbilt's ships. Walker declares himself president, reestablishes slavery, and is recognized by U.S. President Pierce.

1857 Walker is defeated by a combined Central America force which fears he will try to impose U.S. rule throughout the area. He takes refuge on a U.S. Navy ship.

1909 President Zalaya resigns in the face of open U.S. hostility after he cancelled U.S. concessions in Nicaragua, borrowed money from Great Britian, and appeared to favor granting Great Britain or Japan rights to a canal across Nicaragua.

1912 U.S. troops arrive to end the political turmoil which followed Zelaya's resignation. They meet armed resistance from a small group organized by Benjamin Zelandon.

1914 Nicaraguan government signs Bryan-Chamorro treaty giving exclusive canal rights to U.S.

1925 Marines leave, feeling incumbent government is suficiently pro-U.S. and stable.

1926 American troops return as attempts are made to oust pro-U.S. government.

1927 General Moncada, leader of forces opposing incumbent government, agrees to a peace treaty. One of his generals, Augusto Ceasar Sandino, rejects peace pact as a perpetuation of U.S.-imposed government. Sandino organizes

guerrilla force to oppose American occupation troops.

1933 U.S. troops leave without defeating Sandino. Their role is assumed by the U.S.-created National Guard headed by Anastasio Somoza Garcia.

1934 Sandino is assassinated on orders of Somoza after attending peace talks with President Sacasa.

1936 Somoza forces President Sacasa from office and assumes presidency after fraudulent elections.

1954 Somoza permits Nicaragua to be used as staging area for CIA-sponsored coup against democratically elected Guatemalan President Arbenz.

1956 Somoza is assassinated by poet Rigoberto Lopez Perez at party celebrating Somoza's "renomination." He is succeeded by his elder son, Luis Somoza.

1961 President Luis Somoza permits Nicaragua to be used as staging area for CIA-sponsored Bay of Pigs Cuba invasion.

1961 Frente Sandinista de Liberacion Nacional (FSLN) founded.

1963 Somoza family confidant Rene Shick assumes presidency. Anastasio Somoza Debayle, brother of Luis, serves as head of National Guard.

1967 Anastasio Somoza Debayle assumes presidency.

1972 Earthquake destroys much of Managua. President Somoza's profiteering from international aid alienates business elite.

1974 FSLN offensive builds momentum after taking hostages at party for Managua's elite and exchanging them for ransom and freedom of political prisoners.

1978 January. Pedro Joaquin Chomorro, editor of opposition La Prensa, is assassinated, further isolating Somoza regime.

August. FSLN seizes National Palace, taking dozens of congressmen hostage and exchanging them for ransom, freedom of political prisoners, and safe conduct to Panama.

1979 July 19. FSLN forces triumphantly enter Managua after flight of Somoza.

BEAT THE DEVIL.

A Mendacity So Immense

I had reckoned that the Star Wars address represented President Reagan's most prodigious leap into fantasy, but the delirious monologue on the subject of Nicaragua delivered on March 16 to a national audience was far more extraordinary. The torrent of mad abuse was awe-inspiring. I counted forty-seven distortions, false conclusions, outrageous inductions and direct misrepresentations of fact. Every lie about Nicaragua concocted by the factories of the right over the past six years was compacted into the twenty-minute paroxysm: Nicaragua is planning to overthrow Mexico; it is building a military deep-water port for the Soviet Union, constructing the largest airfield in Central America, destabilizing Brazil, acting as a country club for every terrorist group in Europe, smuggling cocaine to the United States.

Every one of these whiskered phantasms and scores more have been explored and refuted, but of course that did not deter the President and his speech writers. Nor should we expect any reverence for fact on their part. But the lies were so sickly egregious that, in the days that followed, there was some timid effort on the part of the press to correct the record. Brazil's protest was noted (unlike President Alan García's statement that if the United States intervened in Nicaragua, Peru would break off relations), as was the Drug Enforcement Agency's reiteration that it has no evidence to support Reagan's allegations that "top Nicaraguan government officials are deeply involved in drug trafficking." But no paper I read quoted the A.P.'s coverage of a story that ran in the *San Francisco Examiner* that same Sunday. The *Examiner*, quoting from previously sealed court records, disclosed that a cocaine ring organized in the San Francisco area by one Carlos Cabezas had helped finance the *contras* and that another ring, organized by Julio Zavala on the West Coast and in Miami, had enabled Zavala to send $500,000 to two *contra* groups operating in Costa Rica. Most scandalous of all, Federal authorities had returned to Zavala $36,020 in drug money they had confiscated after Zavala quoted a *contra* leader as saying the money was for the "reinstatement of democracy in Nicaragua."

To have had and not used such a story, available on the A.P. wires as the President was denouncing Sandinista drug trafficking, suggests an astounding degree of self-censorship on the part of the press, which now regards it as treason to assemble factual rebuttal or provide balancing commentary from serious opponents of Reagan's policies.



Ronald Reagan

CENTRAL AMERICA

All for One

Vows of contra *unity*

Nicaraguan rebels accused of diverting U.S. aid

BOZEMAN DAILY CHRONICLE, Friday, June 6, 1986



TIME, JUNE 9, 1986

Show of solidarity: Cruz, Robelo and Calero at a press conference after summit

A more democratic distribution of power in the ruling triumvirate.

FACT SHEET THE NICARAGUAN CONTRAS AND THE SANDINISTAS

Information in this fact sheet is condensed from numerous sources. At the end the sources are listed.

WHO ARE THE CONTRAS AND WHY ARE THEY FIGHTING THE SANDINISTAS?

Leaders of the Contra are mainly ex-Somoza National Guardsmen. In 1984, forty-six of the forty-eight top leaders were ex-Somocistas. Some leaders are disgruntled Sandinistas.

Many of those doing the fighting are mercenaries, many of whom are not Nicaraguans (the pay is many times better than that of a Nicaraguan soldier, or of that that could be earned by the ordinary Central American.) Some are Somoza's men who fled fearing retaliation, some are dissatisfied Nicaraguans such as the Miskito Indians. Many are very young, some were kidnapped and forced to fight for the Contras or face torture and death for themselves and their families.

The Contras have no specific program except to overthrow the existing government. They have been organized and funded by the CIA and its attempt to destroy the Sandinista Government. Although private funding is substantial, the Contras would fall into disarray without U.S. government support.

ARE NOT THE SANDINISTAS A COMMUNIST, TOTALITARIAN GOVERNMENT THAT WOULD DESTROY OUR WAY OF LIFE?

At the present time, 60% of the economy is in private hands; private businesses, plantations and factories that are productive are allowed to remain in the private sector. There are some Marxists in the government. Following the revolution all of Somoza's property (which was enormous) was nationalized. Land distribution is still being carried out.

There are seven active political parties including the FSLN. In the November 1984 election all seven were on the ballot, were allowed free access to radio, TV, and newspapers. Of the 80% who voted, 63% supported the FSLN and the present Assemby (somewhat like our Congress) is constituted according to the popular vote. Many independent observing groups from the U.S. and

Europe were there to study the election and declared it a fair election. In addition, a constitution is being formulated by a committee composed of all parties and could be ready for consideration soon.

WHAT ARE THE GOALS OF THE SANDINISTA GOVERNMENT?

Originally the most important goals were land reform, education and improved health care. In 1979 literacy was less than 50%. It is now 88%. Few had access to proper health care and much of the government resources were devoted to improvement of health. As a result the World Health Organization cited Nicaragua as a model in its health care improvement. For example, infant mortality decreased from over 130 to less than 39 per thousand. Unfortunately, because of the war, both programs have declined. Nevertheless, major effort is still being made toward improvement in health care and education. Other goals include improved standard of living and development of a military to protect the country from aggression.

WHAT ABOUT HUMAN RIGHTS IN NICARAGUA?

America Watch, an internationally respected organization studying human rights, issued a long report on Human Rights in Nicaragua. Although reporting some isolated cases of individual abuses, the Sandinistas generally scored high for respect of human rights. By contrast, there were many cases of torture, murder, rape and kidnapping at the hands of the Contras. Missionaries, both Protestant and Catholic, who have lived there for many years confirm the general respect for human rights by the Nicaraguan Government and the total disrespect of human rights by the Contras.

ARE THE SANDINISTAS EXPORTING REVOLUTION TO OTHER COUNTRIES?

Shortly after the victory against Somoza in 1979 some arms were supplied to the rebels in El Salvador. However, in the last four years there has not been a single documented case of interception of arms from Nicaragua to El Salvador or other countries. With the advanced techniques at U.S. disposal for detecting such activity, this indicates that arms are not being exported to support other revolutions.

The real fear of our administration is that a successful revolution in Nicaragua will give courage and stimulus to oppressed people in other Central

America countries and the U.S. will no longer be able to control them.

WHAT ABOUT SOVIET MILITARY BASES IN NICARAGUA?

Although the Sandinistas get arms and supplies from U.S.S.R. and other Eastern European countries (also from many western European countries), there is no evidence of Soviet domination or the establishment of military bases in Nicaragua. The people have consistently stated that they desire an end to the war and to be left alone so that they can work out their own problems.

They recently agreed to sign the Contadora Peace proposal if the U.S. would withdraw military aid from the area and the Contras quit fighting.

Sources: Central America Bulletin, Central America Research Institute P.O. Box 4797, Berkeley, CA 94704

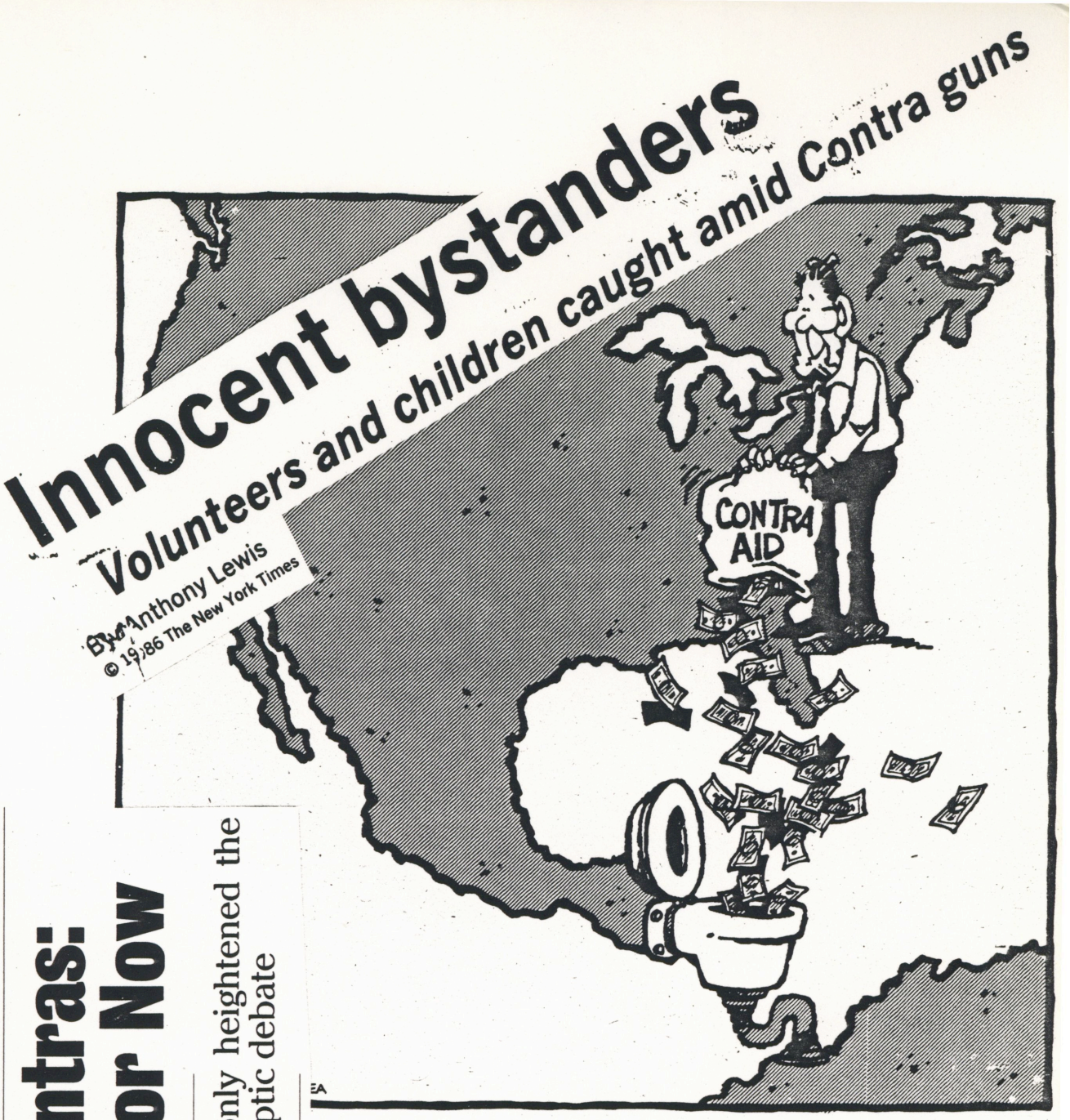
"The Church and the Nicaraguan Revolution" Cesar Jerez, SJ The Catholic Institute for International Relations, 22 Coleman Fields, London England. NI7AF.

"Human Rights in Nicaragua: Reagan Rhetoric and Reality," America Watch, 36 West 44th Street, New York, NY 10036.

"The Nicaraguan Elections," William R. Callahan, SJ with Jack Bresette and Vilma Smith Guerrere Quixote Center, P.O. Box 5206, W. Hyattsville, MD 20782.

"Nicaragua: A Look at Reality," Quixote Center, P.O. Box 5206 W. Hyattsville, MD 20782.

Fact Sheet written by Charles P. Caughlin, Montana State University, 1986.



NATIONAL AFFAIRS

Aid to the Contras: Saying No—For Now

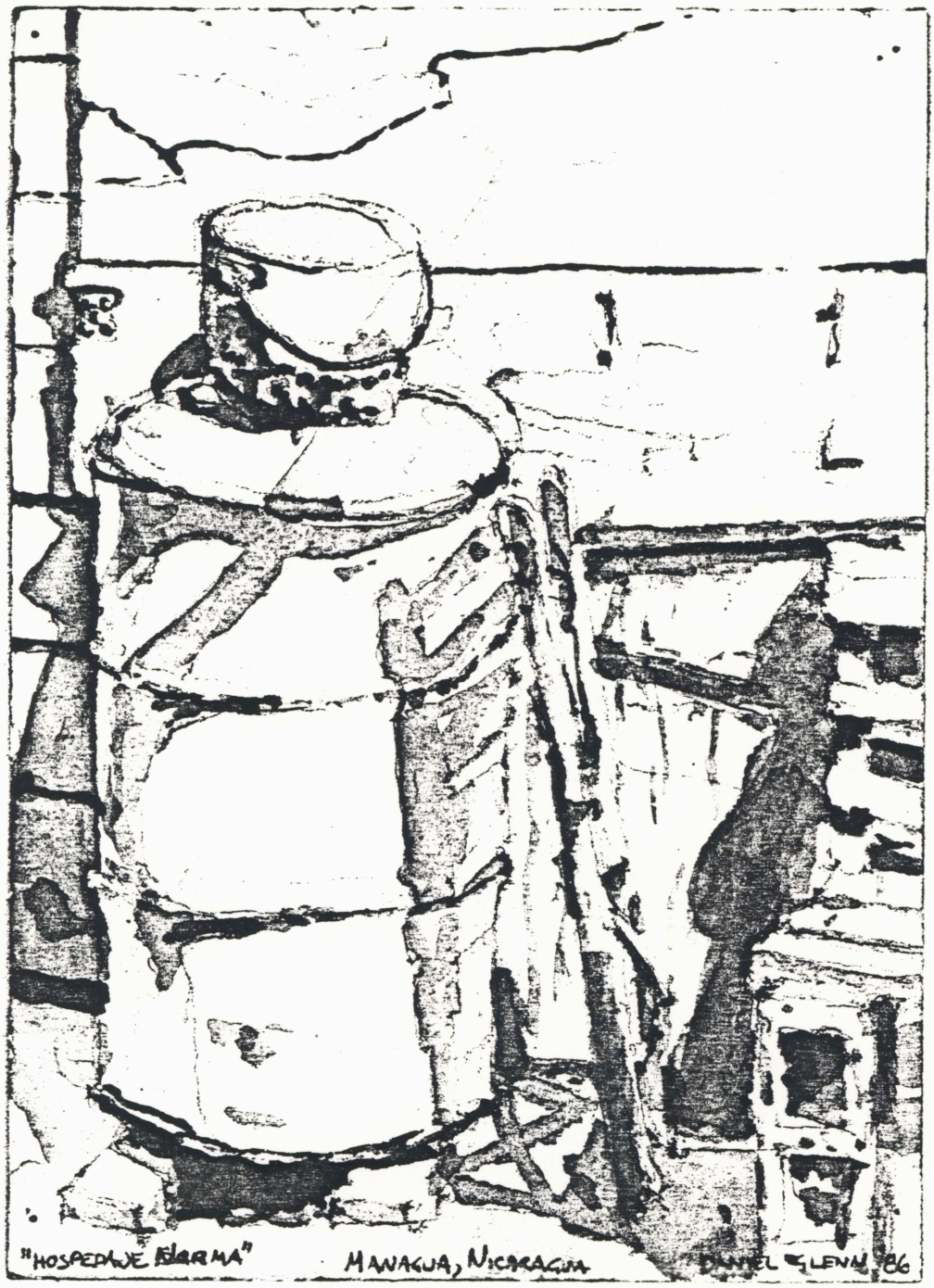
An expected compromise only heightened the surreal quality of an apocalyptic debate

10 BOZEMAN DAILY CHRONICLE, Thursday, May 22, 1986

Nicaragua attracts thousands of foreign volunteers

Just Between 'Sisters': A Helping Hand for Nicaragua

The Journal 4



...Ah! I finally had a sip of something cold and delicious. I'm sitting here at Los Antojitos, a fancy restaurant right across the street from the Hotel Intercontinental. That's where all the big-wig visitors stay. Strange this meal will cost just over a dollar but I know I can't affort to be so extravagant. I think I surprised the waiter when I asked him the prices.

You'd love the weather here--blue skies, hot sun, and 87° temperature (on my handy little thermometer). There's a light breeze blowing and I'm starting to feel better.

There's a group of Germans or maybe Dutch sitting nearby on these outdoor white steel lawn tables. The majority of people are foreigners, of course, however there are a few tables with Nicas.

I've been going through a lot of mental duress about my goal here. I really had better try to establish some very concrete goals and some sort of schedule.

I seem to be leaning heavily towards a housing project. I've heard there is a group of architects and planners here in Managua. I would really like to get in touch with them. Saying that and doing that are two very different things, I'm discovering. Communication here is always a tricky process. Telephone numbers and addresses are often difficult if not impossible to find (if they exist in the first place).

So anyway back to housing. A market seems too nebulous and non-architectonic. I'm not sure I even like architectural solutions to such problems, like superstructures for instance. And I don't think the vendors or the customers like them either. Perhaps that's because they just have not been done too well, at least not here. I know there are giant market structures in Mexico and elsewhere that are very successful.

Also, markets do not seem to be a pressing need. I'd like to work on a project that is vital right now, and the only thing I can think of is housing.

Or, perhaps, the School of Agricultural Mechanization. They

need 14 houses and some more shops. But I can't imagine that constituting a thesis.

I thought of an urban plan for Managua; that is certainly needed. And I know of an American who is already doing that for his graduate thesis. But that would really be a project in mega-bullshit. Especially since Managua is so huge and so confusing and so spread out. I'd need aerial photograph site plans, and a needs analysis that could take years. But I will mention it to Rita as a possibility.

Of course, I'd rather do something smaller in scale that I might feel more comfortable with. Also I know the FSLN is attempting to build-up the farms and small communities and to lessen the concentration of people in Managua, almost one-third of the country's population live here. (See APPENDIX G.)

Although you'd never know it, Managua, like everything in Nicaragua, is so spread out that it doesn't feel concentrated at all. Actually, it feels somewhat deserted. Of course, that would definitely be something to work on. I suppose a conceptual urban plan with an overall direction for Managua's growth and eventual reconcentration might be worthwhile.

But then again I don't like Managua. I'd have to stay here the whole time.

Rita (DeFranco, thesis advisor) and I had a great conversation (my Spanish is improving rapidly) about my thesis project. Now I've decided to design a refugee barrio (neighborhood). She knows of at least two that need designers. The great thing about a refugee camp is that it combines <u>both architectural and political problems</u>. Also, of course, the country is in dire need of them, both for their own war refugees and for Salvadoran refugees (interesting that Salvadorans flee a U.S. sponsored government to live in this "communist dictatorship"). Also the barrios require a systemized building method.

At the moment I'm sitting on the shore of Lake Managua. I've finally got the chance to take my shirt off and enjoy a few moments of solitude.

Today has been rather quiet and relaxing thus far. I got up about 9:00 and left the Hospedaje Portal for good. $5 a day to, as I discovered last night, a Nica family with 9 children, most of whom live in the U.S. and all of whom are "Somozistas." The old lady asked me last night if I was a communist or possibly a Sandinista, because of my 5th Anniversary t-shirt and my Lenin books. I said I was neither, instead: "a student of politics." She divulged, during a quiet evening chat in her living room, that she was a great fan of both Somoza and Reagan! She longs for the days when there were more clothes and cars and things for her and her children. She hates the Sandinistas but won't leave the country because her husband's work is here, I think as an accountant, and because of their old house and garden, that really is not much to speak of.

I didn't make any attempt to convince her otherwise, of course, but I did ask her a lot of questions. We had an interesting discussion until she began to doze off about 10:00 p.m.

Today, I wandered around Managua a bit. I met a group of the <<Marchistas for La Paz>> (Peace Marchers). Have you heard much about this group in the States?

I remember reading a little bit about them but not much. Here the news about them is everywhere. They are a group of 120 Americans and Europeans (and even a trio of Japanese Bhuddists) who originally were going to march all through Central America. But they have met considerable opposition from the right-wing governments in the region. Now they are waiting to get permission to enter El Salvador and Guatemala.

I just had the most interesting experience. After a long tour of TelCor, the telephone building, I got a chance to draw my Bhuddist friends. I sat down on the monument and even as I brought out my sketchbook and pencils, a small crowd began to shift toward me.

Children and adults alike watched over me like I was doing something incredible. You should try drawing a decent sketch under such conditions. Of course, I had similar experiences in Italy, but this was unbelievable.

These monks, I discovered, are on a three day dry fast for peace in the region. I can't believe that they can chant as they do, "Namumyo ho Engekyo, Namumyo ho Engekyo, Namumyo ho Engekyo..." over and over again, every 6 seconds for 12 hours a day, sin water, sin food.

...I actually like my little spot here at the Norma. I wonder how you'd react to it. The rooms surround a small courtyard with a gate leading out to the dirt road in front. Within the courtyard is a row of wooden enclosures that house the toilets and showers. The toilets are flush toilets, but as usual, you do not put paper into the toilet, but in a tin can next to the toilet. And I guess I'll have to buy toilet paper because thus far only stacks of newspaper have been provided.

Also in the courtyard are sinks with washboards within them. There's a small sitting area with chairs and a hammock next to these.

The rooms are built with vertical wooden slats in varying degrees of disrepair. I have a double room ($3/night) so there is only one double bed. I have a wood table and chair (next to my bed) which is of course covered with my piles of "stuff."

Today I met with Katrina--I'm not sure of her last name. She is with the Capp St. Foundation, an international leftist funding organization that primarily works with refugees. She and her Salvadoran priest friend, Jose Avis, work with refugees here in Nicaragua. They brought Fermin here and Capp St. pays his salary. She is Irish, freckled and stoutly proportioned with incredible energy and determination. She has offered me enormous help in my thesis project because she thinks she could use my presentation for aid procurement. Plus she thinks it's a great idea! Oh, I have so much more to discuss, but I'm getting sleepy.

1-14-86

I'm really nervous right now. I am going into a more dangerous area. The friends I'm riding up with to Matagalpa (or Sebaco, actually) work at a hospital near Esteli. This hospital has a number of bullet holes in it but it has never suffered a full scale attack. But Joe Lowe, who works as a nurse there, told me that they treat primarily war casualties, so it's a pretty rough area. Matiguas, where I'm going, is about two hours east of their hospital. So obviously, that close to Honduras will be very dangerous.

My friend Stephen here at the Hospedaje Norma works in a northern region also (in Jinotega). His advice was no matter what, don't ride or hitchhike in a government vehicle of any sort, since they are <u>prime targets for Contra attacks</u>. So anyway, I'm a bit nervous.

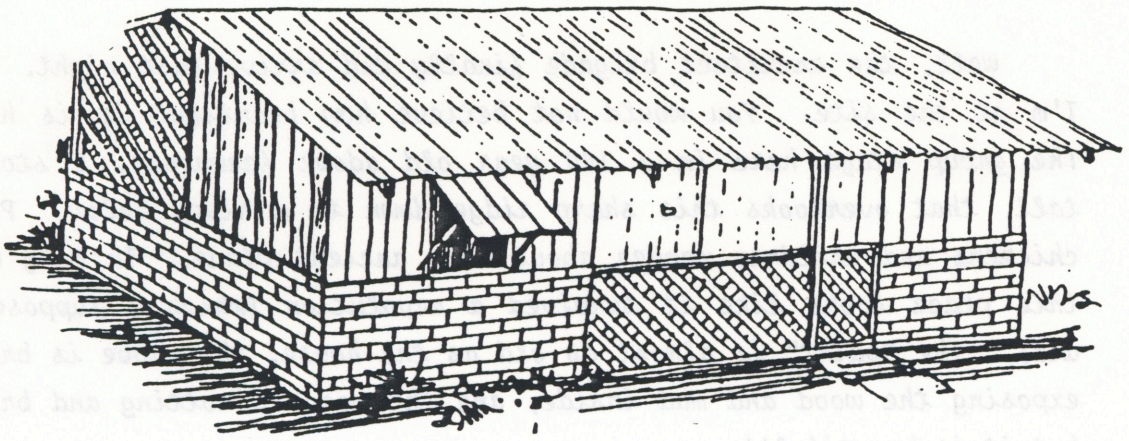
1-15-86

I'm sitting on the concrete step of a bus stop in Matagalpa waiting for the 10:00 a.m. bus to Matiguas. I traveled to El Cacao yesterday and stayed there at the school last night. I rose at 5:30 this morning (hard to believe, eh?!) to get out here to Matagalpa. I hitched the 11 km or so from Chaguitio to here (but I still missed the 7:00 a.m. bus!).

I've gotten more than a few surprised looks when I said I was heading to Matiguas. I stashed my communist literature (Ho Chi Minh would not please the Contras) but I still have a FSLN flag and bandana. I don't want to be mistaken for a Contra either! So I'm a bit nervous. Well, I don't know of any Americans (gringos) that have been killed yet so I'm sure I'll survive! Besides there is a whole group of American architects and planners up there and if they can handle it, I'm sure I can.

Students in Nicaragua get a 3 month vacation from December to March. The vast majority of them go up in the mountains to "cut" coffee for the harvest; there are not enough cutters because of the war. They get paid and have room and board. If I can, I'd like to put a week of work in also, but I doubt I'll have time. There's a lot of international brigadistas helping out in the harvest.

I've been thinking on this trip that I have got to get some organization to my attempt at a thesis. I'm trying to break my investigation into distinct parts so I can have some clarity to all this.



U.S. ASENTIMIENTO PROJECT

At the moment, I'm at my destination, Matiguas. But nobody is here! I guess this is only a base camp for the 4 architects who are working on the 2 new asentimientos. This place has a carpentry shop and a concrete shop for the new house materials. The actual projects are a couple of hours from here high in the mountains away from light and water.

So I never thought of this aspect of the project. If I did an asentimiento in the countryside, I could incorporate a shop design also. I suppose I could even do this in Managua.

So they're building the new houses with block and wood. I imagine they are very similar to the ones here. Block stem walls, concrete floor high above grade, and lap siding without sheathing for the upper walls and a steel roof.

These look pretty nice, but considering that there is a wood shortage here (although up here in the mountains it's not too bad) and Mira mentioned that even though blocks are made here, the most expensive part (cement) must be imported.

I've been told here by Francisco, the lead carpenter, that the Contra situation here is far from calm. I can't wait to talk to my architect friends and see what they think!

I just spoke with a soldier who says he's a guard here for the taller. He claims there is definitely "Bastante problema" with Contras here! Asi es la vida.

1-16-86

Well, the architect brigade finally did arrive last night. Now I'm at the site. You would not believe how beautiful it is here. The group stays here in a 100 year old adobe farmhouse, 2 stories tall, that overlooks this sharp ridge down to a river below. Pigs, chickens and children wander about this ancient place. In many ways this place looks like it survived a revolution (which I suppose it did). The "paint" is almost as old as the house, the adobe is broken exposing the wood and mud inside, and the wood is rotting and broken but it is beautiful!!

And down the road my friends here are putting up little concrete block and wood and zinc roofed houses. A typical example of architects: ask any one of them 6 months from now when their houses are done if they'd rather live in this broken adobe farmhouse or their new block house and 9 out of 10 would take the broken adobe.

I'm very glad I came here. I've learned an extraordinary amount already. Lucky I came when I did because this brigade leaves today at noon. Too bad, I'd like to hang out here. I might come back here and work here for a week or so if they let me. That would give me a great hands on experience in building an asentimiento.

1-16-86

THOUGHTS ON U.S. ASENTIMIENTO PROJECT:

There is a house amongst the new block and wood houses that has given me a great deal of information. This house was build 14 years ago by a tractor driver who lived here during Somoza's time. Now the house belongs to a local coop. I spoke with Santa Domingo, the present owner. He's 50ish with a family of 8 that live in this house. The house itself is dark and dirty. They have hinged wooden windows but they were closed. The people seem to sleep primarily in hammocks, in rooms divided by wood and plastic sheets. The first thing I noticed when I walked in the door was that one end of the main living area was filled with drying corn! Santa Domingo says they use that space for 6 months of the year. The floor is primarily packed earth with a bit of scrap concrete poured haphazardly in the middle of the house. The walls are brick infilled stem walls (3' - 4') with wood vertical boards to the ceiling. The roof is wooden trusses with zinc roofing.

Santa Domingo says his house is very hot; and this is here in the low mountains of Pacasan.

The thing that struck me most here is the extraordinary similarity between Santa Domingo's house and the new houses built by this American brigade.

They have a 3 foot block stemwall with horizontal wood siding over frame, and a rafter roof with zinc cover. They are all identical. They look extraordinarily out of place in these beautiful mountains, while Santa Domingo's house is an integral part. The only difference is block vs. brick and weathering with age.

I spoke with one of the Brigadistas here who said they used block because the local taller in Matiguas makes block, at 11¢ a block. And because they are trying to offer some protection from bullets, they filled the blocks with sand. But he says that won't stop an M-16 anyway. You'd need a 9 inch solid concrete wall, so the justification is pretty shallow.

Also, according to Mira Brown at the National Institute of Energy

block is only cheap because it's heavily subsidized. The fact that block is made here is only a partial plus, because the most expensive part of block, the oil for production, is of course imported.

I like their planning approach, however. The houses are in groups of 4 or 5 with a water tap in the center of each grouping. They have not yet dug the wells here, which I think is an error (it's so easy to be critical, I think I'd best write my criticisms and keep my mouth shut, at least they are actually building!) It is an error because they have to have all their water for construction. But I suppose the wells will not be constructed for some time so they had no choice. Best to get something visible up quickly for funding and morale.

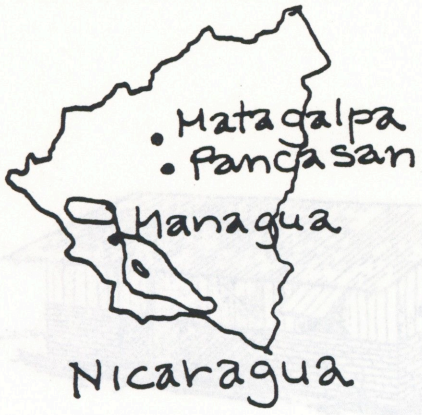
They will be building 24 houses in 3 months, 50 in 6 months (the rest are at a different site). They seem to think that is a lot. I'll have to look into frequency questions. To me it seems very slow. I'm fast falling in line with Fathy's arguments: indigenous material, local labor (of course, he didn't have a war to contend with) and indigenous building techniques.

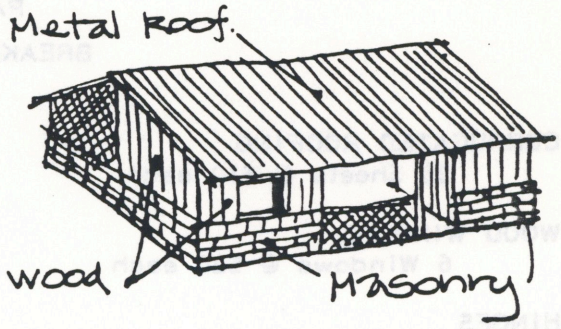
I wonder how long an adobe house takes to build. Mud and wood! No steel, no concrete, (except perhaps the foundation) and hopefully a local skilled population in that technique. Brick or adobe both have much greater climatic qualities. The roof, as always, remains an extraordinary problem.

ARCHITECTS AND PLANNERS IN SUPPORT OF NICARAGUA

HELP BUILD NOT DESTROY IN NICARAGUA

JOIN A BUILDING BRIGADE TO NICARAGUA





BUILD

We will be building 50 units of housing in Pancasan, a rural area in Northern Nicaragua. The housing will be for families displaced by the war.

TRAIN

Help train Nicaraguan workers in the use of building equipment and techniques

SOLIDARITY

show your solidarity with the Nicaraguan people. Share your ideas and experiences with fellow workers.

SCHEDULE: 4 contingents of 10-12 construction workers will be in Nicaragua for 6 weeks, with options to stay and see more of the country, on the following dates:
Dec. 5 – Jan 16; Jan. 25 – Mar. 6; Mar. 13 – April 24; May 1 – June 12

For further information call or write:
ARCHITECTS & PLANNERS IN SUPPORT OF NICARAGUA
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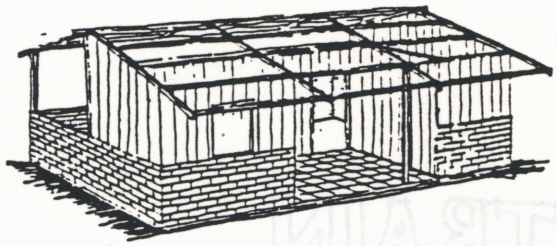
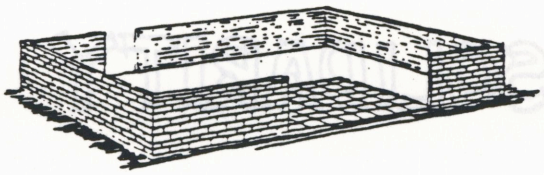
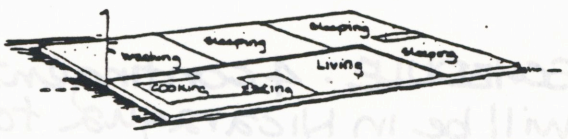
PANCASAN PROJECT
BREAKDOWN OF HOUSE COST

CORRUGATED ROOFING 25 Sheets @ $10 each	$250
WOOD WINDOWS 6 Windows @ $20 each	$120
HINGES 6 Pair of Hinges @ $4 each	$ 24
DOOR LOCKS 6 Locks @ $4 each	$ 24
DOOR PULLS 6 Pulls @ $2 each	$ 12
COOKING STOVE	$ 40
ELECTRICAL WIRE	$ 50
WOOD SIDING 400 Lin. Ft.	$200
NAILS 50#	$ 25
FRAMING LUMBER 200 Lin. Ft.	$100
WATER ROUGH-IN Pipe Fixtures	$ 25 $ 50
CEMENT BLOCKS 400 Blocks	$120
CEMENT 30 Sacks	$ 90
STONE	$ 30
FORM TIE WIRE	$ 5
TOTAL COST	$1,165









THOUGHTS ON ROOFS

Roofs--Tin/Zinc

Grass/Thatch

Tile

Cedar Shakes

The question of a roof??

Man has struggled with this problem for centuries. In Africa there is a tribe that worships a leaf because it is their roof. Without it they die.

So here in Nicaragua the problem is far from solved.

Some think Zinc is the solution. It has its advantages:

For one It's light

Another It's readily available

Another It's durable and fire resistant

Another It's relatively cheap

Plus It provides a useful water catch.

Disadvantages:

For one: It's ugly

and It's imported

and It's hot

Some like asbestos cement, which is very similar in use, but more expensive, heavier, but provides more solar resistance (but not good) also:

It's ugly

It's imported

and It's hot.

Closer to home we have "Tejas": Tile roofs. They've been used for centuries, and some still here are centuries old! It has many advantages:

It's beautiful

It's indigenous

It's cheap and renewable

It's a great protection from the sun

It's durable and fire resistant

It has disadvantages, however:

It's very heavy (thus mucho madera)

It's thus dangerous in earthquakes

Then we have grass and leaf rooves, which also have many advantages:

It's very light

It's beautiful

It's indigenous

It's very, very cheap and renewable

It's also good solar protection (but not great)

But: It's a fire hazard

It lasts only ±4-6 years (grass)

±5-10 years (leaf)

It's not so great for insects

And from the suburbs of L.A. and the mountains of Matagalpa we have cedar shingles. This is the solution according to Groundwork Institute, (See APPENDIX F) because:

It's light

It's beautiful

It's indigenous (in some areas)

It's cheap (if available) and renewable

It's also good solar protection

But: It's wood, therefore a strain on an already critical wood supply problem (but depends on the region)

It requires relatively frequent repair especially in high winds of mountain areas.

It's not a common trade.

So I'm leaning towards grass and tejas roofs. But both require great improvements to solve their inherent problems. There is the possibility of creating lighter tejas, if higher temperatures are used in the firing process, how much lighter remains a question. Grass roofs could possibly be fireproofed (resistant) perhaps with the same chemicals used for fireproofing shingles. This also requires experiments. These two ideas are not mine, they are the Nica dancer's (Alan Bolt).

Alan Bolt, Nica Dancer 6



1-17-86

I danced to the sun this morning! I believe I have found a true creator of spirit and light, here in the mountains of Matagalpa.

I'm at a theater cooperative. In the midst of Contra fire they dance. The spirit of revolution lives in these mountains. They don't "just" dance, as Alan Bolt says, they also and always think of the stomach and the mind.

Alan Bolt, unusual name for a Nica, is the director of this place. He is 35 with a beautiful wife and child. He has designed all the buildings here that house this cooperative and they are extraordinary.

I know this man has had a hard life, in fact his brother-in-law was killed by the Contras in October of '85. They broke every bone in his body before they killed him because he is the brother of Alan Bolt. But I still envy Alan.

Alan played an active visible role with the vanguard of the FSLN. He knew Carlos Fonseca, and he and Omar Cabezas went to school together at the University of Leon. He danced then too to help bring the revolution to the country-side.

Commandante Cabezas has said he'd like to make Alan the Cultural Commandante of the FSLN! Alan doesn't seem to think that would be such a great idea.

1-17-86

I'm still a guest at Alan Bolt's theater coop. I came back from Matagalpa by myself to try and discover more from this man. Thus far I'm gaining very little here, at least for my project.

As I write I sit amidst his troupe in his kitchen at 10:00 p.m. They've been having a big discussion in which I've taken absolutely no part. If I don't make a great effort, I can't understand a damn thing. Well, I understand words now and again. I keep waiting for a pop in my brain and the words will flow in unscrambled! But I don't think that's going to happen! I'm glad I'm finally away from my American friends so I can practice Spanish.

He's basically bitching these young Nicas out because they are not demonstrating any interest in his essential goal: the campesino enlightenment. He says they don't show discipline, force or interest. And he's threatened them with his resignation if they don't shape up.

I sit and draw and write and vaguely listen.

Today I really started feeling like I'd like to continue my work as an architect. I'm starting to figure out that I could play a very critical role here, and maybe in other parts of the world. The housing problem in the world definitely needs some original thinkers who are truly willing to try revolutionary ideas.

Those architects and planners for Nicaragua really kind of pisses me off. They drag down here their undesirable Western concepts of housing, construction and planning.

Alan has really reinforced my belief that Western concepts of beauty and usefulness and culture are fucking up these societies. And there are many, many people here who do not understand that and still look to us as models to follow.

"The only way to push for changes is to know exactly how to change ourselves, in order to have a real communication, we need to know the symbols of the community."

I was one of the 13 or 15 leaders in the revolution

"I had to learn again the traditions of the Indian communities."

"My grandmother was the daughter of an Indian Chief in San Isidro"

"We hand to learn how to get back to our Indian heritage."

"They were building good houses before--they haven't lost the confidence in their ability to create beauty. Still they are passive."

"Trust that if they have beautiful things, no one will take them."

"Violent history created fear of openness--thus dark closed spaces."

"We are in a revolution thus revolutionary changes can and must occur, both in form and in ideas."

Cooperative--Community can take part

A problem: Some people don't even want beautiful houses.

Heirarchy--Rich farmers feel offended and the people themselves feel as though they are trespassing a hidden boundary

Fear--of contras (attack Gov't. house)

"Create life around the fire."

In a small house, one division with one door "the kitchen and the rooms"

*Plurality--campesino life.

Oppression has said that the houses of the campesinos are not beautiful--only those houses of concrete, or the rich, are beautiful.

Take advantage--of 400 years of colonialism. If I tell them their houses are beautiful, they are more likely to listen because I come from outside.

Thoughts:

Alan thinks that I do not have time to develop the trust and knoweldge of community to actually develop the design of their community.

He is quite right.

I don't want to draw a plan of a village in the Western sense.

I want to help create a village with the cooperation of the people.

Since I don't have time to actually implement such a concept, I would like to spend my thesis time developing the concept of (integral design) and developing actual housing systems to improve existing ones.

El Sauce - Project Search Continues

7



Ester Antonia Guido Real

1-19-86

Right now I'm sitting in El Sauce, some little town 5 hours from Managua by train. I haven't the slightest idea what the hell I'm doing here. Supposedly there is a cooperative nearby that needs some housing. I thought it sounded like a good project until I just found out they only need eight houses or so. I may as well work at El Cacao. They want fourteen.

I just don't know what to do. I spent 3 days with Alan Bolt and only got more confused about my project and life in general. He wants me to work with him on my ideas in Matagalpa. He is trying to set up a workshop to study exactly the problems that I am looking into: indigenous construction techniques and materials and improvements of them, the incorporation of Indian culture and ideas into a design i.e. getting rid of Western imperialist influences, and in general trying to approach the problem in a revolutionary way.

But if I did do that, first off I would not have time to really solve any problems. Besides, I'd be working on problems of roof and wall that people have struggled with for centuries and I'd have four weeks.

1-20-86

How things change with so little time. The preceding passage was definitely a low point in my work here. But now I am a happy man. I've finally figured out what I'm going to do here. My thesis will be a book (or a manual) rather than a project. Basically it would be a book by a North American Bourgouis telling the people here not to look for answers from North American Bourgouisie.

There is one fault with riding on top of an ancient train like this. About every 5 minutes we get a huge blast of black noxious smoke!

The land here near Leon reminds me a lot of Africa, flat dry plains with fields of golden grass broken by small twisted trees and silhouttes of giant volcanoes in the distance.

The train arrived in El Sauce at 5:00 a.m. this morning. I used my alarm clock to wake everyone because the theater group I was staying with were all heading to Leon along with me. Their collective is in Leon.

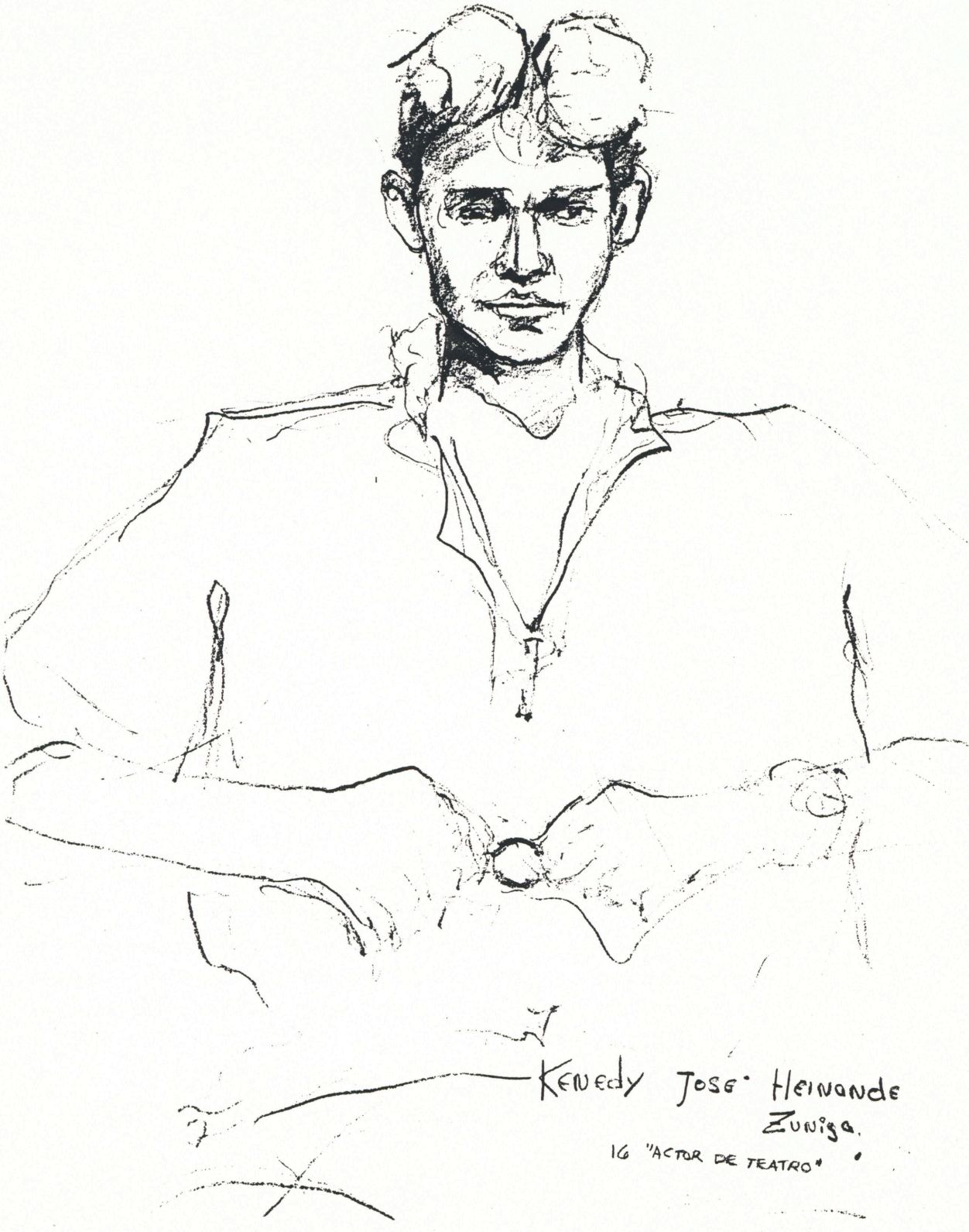
My alarm went off at four a.m. but I shut it off and nobody got up till the train whistle blasted us at 5:00.

So then we jumped up and threw our stuff together and ran to catch the train. My campanero Filiberto and I were last out the door. We ran in almost total darkness two blocks to the tracks. Then we ran another half mile or so on the tracks to the glaring headlight of the waiting train. I was practically blinded but we just kept running. Just as we got there the train started to roll. I threw my bags in a car and jumped on. Fili was still running to catch it and I thought he was left behind. Then suddenly the train stopped and backed up to the station. I don't know why it came back. So we climbed on to the roof with the rest of the theater group.

Filli is quite a fellow. You'll get to see him one day because he has a role as a Contra commander in the American made film "Latino." Now he's acting in an all-Nica film about the revolution. Fili is the only one of these guys I really got to know. I met him at Alan's cooperative in Matagalpa. He is the head of the theater cooperative in Leon.

I haven't spoken any English since Saturday night when I said goodbye to Alan, but my Spanish is still very lousy.

Letter to Advisors - Preliminary



LETTER TO ADVISORS—PRELIMINARY

From: Daniel Glenn, January 20, 1986, Managua, Nicaragua
To my advisors: Rita DeFanco and Jerry Bancroft.

I have been in the country side for one week. I learned a lot about the revolution and the needs of the people here in Nicaragua.

The primary thing I learned was that they do not need a gringo architect to design houses for them, or anything else for that matter. The whole concept of my sitting down at the drawing board and laying out a plan for their community or their houses is counter-revolutionary.

The people here, especially the campesinos, must learn that they will not find answers for their problems or needs in the West. They must look within themselves, at their own capabilities and customs and desires, to find solutions.

I have found here an infatuation with Western capitalist ideas and things, an infatuation imposed on these people by 60 years of Somoza's rule and centuries of Catholic domination. This infatuation must be replaced by a renewed trust in the strength of the campesino and the Indian, if this does not happen there will never be a real revolution in Nicaragua: "The revolution must take place in the hearts and minds of the people."

I came here to create beauty and facility in the tradition of an architect. But I discovered that beauty and facility exists here, in the ladrillo, the Tejas, the Palm, and the Adobe. I found ugliness here too: dirty, dark smoke-filled rooms, unsanitary broken outhouses, and imported ideas such as concrete block and zinc roofs.

Often I found great beauty hidden just below a surface of dirt and fear: the dirt of hopelessness and the fear of oppression. But they have had a revolution here in Nicaragua, these are only vestiges of a dark past and part of a war-filled present.

I had long discussions with the Nicaraguan dancer and playwrite Alan Bolt, and from these I learned a great deal. He made me realize that the answers must come from within the people, not from without; But he also taught me that part of the problem here is that even the leaders of the revolution have placed their faith in imported ideas.

For example, their is an infatuation in this country for concrete block. Concrete block is supposedly a local material because it is produced here,

but 80% of the cost of the block, the fuel for the machines and the chemicals of the cement, is an imported cost. (See APPENDIX F). But besides economics, blocks do not function as well as indigenous ladrillos or adobe in solar protection. Also, they require imported construction techniques and materials. And finally, they are ugly. Why are they ugly? Because they "perfect" in an imperfect environment. They are unconnected to the earth and thus to the people.

Yet both the leaders and the campesinos believe they are beautiful. They are blinded by an imposed love of another culture, a culture that even without aggression is destroying the world through extraordinary waste, over consumption and over production.

So what is my solution? I don't have one, but I do have a small part of one. I will not design an "asentimiento," a market or cooperative. Instead I am going to write a manual, a manual written by a North American that says in essence: "Don't listen to North Americans." The manual will be an attempt to revive faith in local building techniques and regionally appropriate technologies. Through interviews with regional master builders, I will write a technical self-help manual. In it I also will offer ideas for improving the ancient methods for earthquake and fire resistance, and also offer ideas for more efficient stoves (such as the Lorena—See APPENDIX E) and sanitary placement and construction of outhouses.

The primary emphasis of the book will be more on the whys then the hows of such practices. In it I will attempt to demonstrate the potentials for great beauty and facility of indigenous materials and methods, and their importance in this revolutionary society.

The design of the manual itself will be an attempt to communicate directly with the campesino, in a clear, understandable manner. The manual is also an illustration of the concept of self-help design.

I cannot design a campesino's house, at least not 300,000 campesino's houses. The concept of mass housing design is in itself presumptuous and offensive in practice. And this country does need at least 300,000 homes. But it needs homes, not "units."

The manual will not be a how-to book for campesinos. I don't suggest that with this book a person could construct a house. It is primarily a gentle reminder that these people already know how to build houses; and also as a form of recording a bit of the vast knowledge that was almost lost or destroyed

during decades of oppression.

According to Groundwork Institute, a Berkeley design team that came and looked for solutions, there are problems with traditional building systems. (See APPENDIX F) But the primary problem is that they are used incorrectly. So perhaps this manual will help correct that situation.

So now I have four weeks to research this manual, through photography and drawings of existing structures and interviews with local master builders, I will also visit the Appropriate Technology project in Esteli. Then I will have one week at UCLA to do research on state-of-the-art appropriate technology systems to add to locally obtained knowledge.

Obviously, the extensiveness of this study is time-dependent, and a complete book would require much more time. So I shall design the book in parts, so I can complete later parts after graduation. I am not sure at this time, but I believe the first part will concentrate on the use of adobe, since adobe is both the most widely used and widely misused wall type I have seen here.

The second part will concentrate perhaps on roofs: grass, palm and tejas. I would like to research methods for improving these roofing methods, such as creating a lighter tile through high temperature firing, and methods of fire-proofing grass and palm roofs. This research could continue as a part of Thesis II.

The goal of Thesis II will be the creation of this manual, or at least the first parts of such a manual, as a final product for distribution here in Nicaragua. Thesis II will also include a description of latter parts of the manual, and the results of my research with roofing tiles and other structural elements.

Final Project Decision 9



Here I go again. I thought I had it and once again I'm unsure. The more knowledge I gain the more confused I become. I spent the morning studying various books on housing in Nicaragua at the School of Architecture. Then, during lunch I had a long discussion with two of Rita's colleagues. I learned a lot during this discussion.

For one thing it was pointed out that campesinos work 10-12 hours a day year around, thus the sad state of housing is most likely due more to lack of time and energy, rather than lack of knowledge or some vague cultural infatuation with the West.

I also learned that the vast majority of housing in this country is of indigenous materials (for obvious reasons) and that the only real infatuation with the West exists with architects like the ones I talked to today and the various professionals of the country.

One fellow had an interesting thought: the only way to improve the life of a campesino is to improve production capabilities via tractors, etc., so that they might have more time and money to live better.

He implied that misery is a necessary step towards eventual industrialization and the welfare of all, not that I agree. I also realized that my insistence on individual improvement and construction of homes with appropriate technology is very anti-Castro.

Castro's goal was to industrialize as quickly as possible to end the campesino life altogether. (See APPENDIX H).

My original idea when I first came here was just that: centralized systematic design. But I wanted to use indigenous materials and individual labor to provide the housing, not factory-produced concrete panel structures.

Perhaps Fidel's belief in such programs is part of what made his society so dependent on the Soviets, monetarily and resource dependent.

But, given the massive work day of the peasant farmer and the huge lack of housing, perhaps ancient methods are simply too slow and painstaking, albeit beautiful, to be a real solution.

I don't know the time differences between modern and ancient construction methods, but systemized designing would definitely speed things up.

...Alan Bolt suggested inventing an adobe or taquesal panel system. By using Western technology in combination with indigenous materials, this does sound like a possibility.

So I suppose that my original idea of an indigenous structural system would be something more valuable to work on. But I feel like I definitely need a test site to design for using the proposed system or systems.

I keep feeling like I should just walk over to the nearest barrio and start counting and interviewing the residents. I can't really justify such a terse method given my stated beliefs but for a test project, primarily used only to test a new design system, I think such a thing might be alright.

There is of course the cooperative (Armenia) which needs some 23 houses. So I could spend a week or less there, interview each family, and I thought I'd request each family to draw a plan of the house they would like to have.

At the moment they are living in stables and scattered shacks. They want a centralized community both for social reasons and for safety from the Contras. The great thing about this cooperative is it is just that: a cooperative with the willingness to attempt such a concept.

I must admit my primary hesistation is that they do not have an existing community per se.

I have a strong desire to use one of these shack/shanty barrios in Managua just because they already have a definite community, laid out by them for existing social reasons, also a larger barrio would justify systemized design. Plus it's a helluva long ways to El Sauce and time is quickly running out.

The primary difficulty of any systemized building process is the inherent lack of individuality. The goal would be to come up with a rapidly implemented system using indigenous materials which allows great flexibility both with layout and in "decoration."

Once again, I feel as though I'm confronting an impossible dream.

So let me think out loud a bit.

In adobe construction, the unit is a large rectangular block of clay.

Brick construction has a similar but smaller unit of the brick.

Taquesal construction does not really use a unit at all, unless it's the rock or handful of mud that is stuffed between pieces of wood.

So one idea to speed construction is to make the unit larger. It could be as large as a wall. The larger the unit the less flexible the method.

Oh, another thing I learned today is that people have been struggling in much greater depth with these same problems for centuries. Of course, I knew that, but I keep having grand illusions of revolutionary leaps with my little thesis project.

Perhaps with research I could find an existing system using concrete and steel and adapt it to indigenous materials. Of course, that's rather ridiculous since a system must inherently be designed around the materials it uses.

I am not a structural engineer, or particularly adept at such things. One reason I like indigenous materials is that they seem so much more readily understandable. Of course, I can't imagine what a structural analysis of an adobe wall might consist of!

A book in many ways make sense, but a book without an actual project or model of action to back it up seems to have less punch especially in architecture. I read one of Rita's books today that was produced by a group of Swedish architect students. It was an extraordinarily complete study of Nicaragua along with a design for an asentimiento. I would love to produce something similar, but of course on a smaller scale. They had a year here and a group instead of one!

I just had a thought. I wonder if the government here would implement some kind of compensatory leave of say 2 months in which a campesino could build himself a decent house.

O.K. Here now is my new plan: I've decided to do both, both and neither. I'm going to design housing--23 houses for the Armenia coop and in conjunction with the design I will produce a smaller

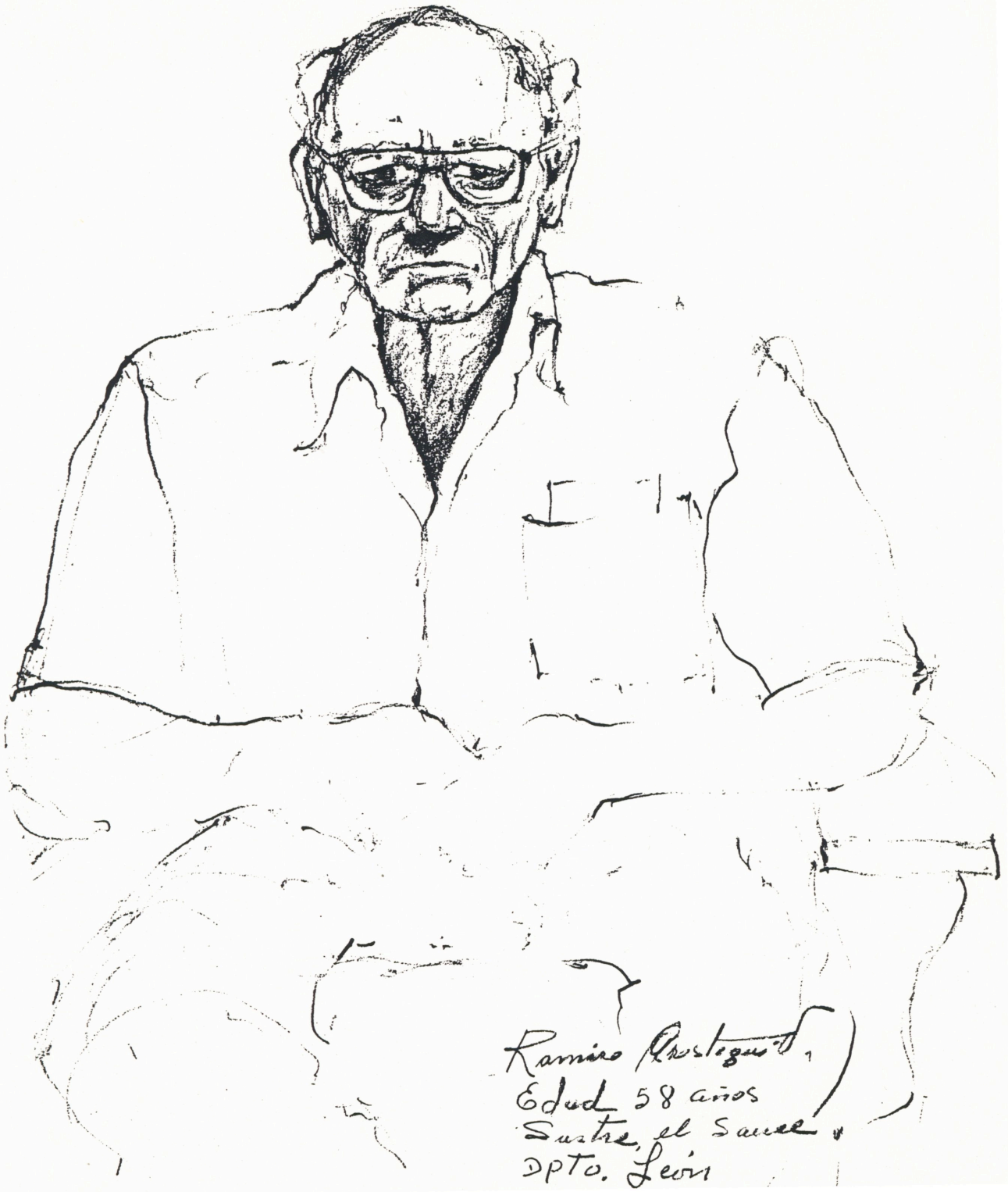
manual, that gives very specific tips on such things as floors, doors, windows, and latrines. I'll keep it simple and short. I won't attempt anything so grandiose. I've learned today that there are dozens of construction methods of which most are already pretty well documented. (See APPENDIX C). This way I'll have both a concrete example and test site, plus a manual that can be then more widely used.

As I discovered today there is already a tremendous amount of existing materials at my disposal for background information, architectural and historical, for me to use in both Thesis I and Thesis II presentations.

I feel like I've finally got a reasonable plan of action.

Letter to Advisors - Final

10



A LETTER TO MY THESIS ADVISOR, JERRY BANCROFT,
CONCERNING MY WORK ON THESIS I:

Dear Jerry,

Hi! I'm still alive and kicking down here. I hope life is sweet for you. You really ought to be here; this is a helluva an exciting place to learn about architecture and life!!

My time has gone by here in approximately this fashion: Week I was primarily a week of getting organized, getting contacts together, easing back into the Nica life, etc. I spent most of that week here in Managua. Week II, I took off into the northern countryside. That week was characterized by soul and project searching. I went to Matiguas, a heavily combatted area, to talk with some architects and planners for Nicaragua from the U.S.

This group was working on the construction of an "asentimiento" (settlement) for war refugees. I had long since given up my market idea and was thinking of designing an asentimiento. My immediate reaction to this group was that they are a nice bunch of people but they really haven't the slightest idea what is needed down here.

They are building 50 houses, 50 block and wood houses with concrete floors and wooden partitions and nice little shutters and doors.

The houses are expensive, time consuming (50 in 6 months!), unrealistic, hot (they have zinc roofs), and ill-suited to the site.

The site is gorgeous; green mountains and ancient adobe structures. The houses, partially completed, look ridiculously out of place.

I shouldn't be so critical, they are at least producing something, but I believe in the long run this country will not profit from their venture.

They are applying very typical Western thinking to a very un-Western society. They are contributing to what I believe is a strong infatuation with U.S. culture and values in this country. This infatuation is a hold-over from 60 years of Somoza's domination and oppression of Nicaraguan culture.

And on a purely technical level they are not putting their money and time into things that could really help change these people's lives—decent cooking stoves, sanitary latrines, etc. (See APPENDIX E). I'm sure in the end they will provide these things, but in a manner that is too expensive and foreign to be incorporated into the thousands of other housing projects that

are needed in this country.

This is an extraordinarily poor country, one that cannot really afford such things as concrete block. Block is produced here; so many people believe that it is a cheap, local item. But in fact 80% of a block's cost is lost on the world market, because of the imported oil that is used to run the block machinery.

There is, however, a definite desire here amongst the professionals and leaders of the country to use such materials. Zinc and cement-asbestos roofs are on all the new structures, and all the housing projects I've seen are based on similar unit, barracks type low income housing we see in the U.S., but with an even sadder outcome.

The Nicas are trying to follow the Cuban model of rapid industrialization. (See APPENDIX H). The term "appropriate-technology" is anathema to Fidel. I have not yet had a chance to study many of Fidel's housing project (I'll get my chance at UCLA) but from what I have seen the projects have the dehumanized, machine aesthetic of mass production. I am, of course, a big fan of Fidel, so I will study his approach closely. But thus far I am against it, at least for this country.

First of all, this country cannot afford it. It will be years before they will have the necessary infra-structure for mass-producing pre-fab housing. Perhaps Fidel would not be so financially dependent on the Soviets if he had been slower to jump on the band-wagon of techno-industrialization.

I hope to find books on China's approach to the mass-housing problem, I have heard here that they have quite successfully used the principles of appropriate technology.

If you recall my original goal here was to develop a simple, indigenous material, systemized construction technique, and apply this system to some sort of project. At the moment I am leaning heavily towards the systems that have been used here for hundreds of years: "tarquesal," adobe, clay brick, tile roofs, grass and palm roofs, etc. These systems are generally well suited to their regional climate, extremely cheap, beautiful, and most people know how to build in these traditional methods.

But there are also many problems with these systems. The primary problem, however, is incorrect usage due to a slow process of eroding knowledge as people shift to Western techniques. Also the people work so much they

often don't have the time or energy to produce decent houses.

There are also actual technical problems with even the best built structures. For example, tile roofs are beautiful, cheap and excellent protection, but they are also very heavy. This requires heavy wood beams in a country with a wood shortage and they can be very dangerous in an earthquake.

Earthquakes are actually one of the primary reasons that people are giving up traditional techniques. During the '72 earthquake in Managua, thousands of people died when "tarquesal" walls collapsed on top of them or asphyxiated them with the clouds of dust created by the wall's internal mud and stone infill. These walls are now prohibited in the Managua region.

But I believe there exists methods improving these traditional systems so they have better earthquake resistance, fire-resistance, etc. The advantages of these techniques justify at least an investigation into such improvements.

This past week, Week III, I have been spending my days at the school of architecture, gathering valuable data on climate, culture, traditional and recent developments in construction, etc. (See APPENDICES A, C, D, F, G).

Tomorrow I will begin Week IV. I will spend that week near a little town called El Sauce in North Western Nicaragua. I am going to be living at the cattle cooperative "Armenia," interviewing the 23 families that make up the cooperative.

They are currently living in stables and scattered shacks and want 23 new houses for their cooperative.

I plan on designing these houses as a part of my thesis project. They need simple, but diverse houses, and with only 23 I will be able to individually design for each family.

They need portable water and latrines. They need decent cooking stoves so their precious wood supply can be conserved and their lungs won't be black from smoke.

I plan on using indigenous methods and materials combined with state-of-the-art appropriate technology, designed so that they can build the houses themselves.

And the houses need to be grouped in a manner that will provide both social interaction and help to protect against the constant threat of Contra attack.

The other part of my thesis will be the production of a simple, clearly

illustrated manual that provides a variety of ideas for use by the dozens of similar cooperatives around the country. The book will also serve to stress the importance of appropriate technology and traditional methods here in Nicaragua.

This all sounds quite practical and conservative, doesn't it Jerry? In many ways, I suppose it is, but in many ways the ideas I am proposing are quite revolutionary in this country. They represent an emphatic rejection of the Western architectural and political tradition.

This entire thesis symbolizes my rejection of architecture as it is practiced in North America and Europe, an architecture of fashion games and elitist principles.

So as I hope you can see I am learning an extraordinary amount on my journey through Nicaragua. After my week in El Sauce I plan on extensive interviews with local "master builders," more photography and drawing. I look forward to my week in the UCLA library and my eventual return home.

Until then, Companero!

Daniel J. Glenn
Managua, Nicaragua
January 24, 1986

Project Site - Impressions



1-27-86

Well, here I am, finally at Armenia. The people here seem interested in getting started on their houses. They say we can have a meeting tomorrow afternoon. And they've offered me a horse of my own for the next few days so I can wander around this great big "finca" to interview each family. They also have a map, which is supposed to have the entire finca, including existing buildings on it. That should help immensely, the last thing I wanted to do was pace off this place!

I just went for a ride on one of their horses. My friend Gonzalez gave me a quick lesson. Funny, I have to come all the way to Nicaragua to learn how to ride a horse!!! Of course, I've ridden quite a few times but never enough to learn much.

It is kinda nice having this theater group here. There should be plenty of songs and such in the evenings here.

NOTES ON ARMENIA

A ranch cooperative near El Sauce, Region II Leon, Chinondega
Existing site:
--A 2-story hacienda, water connection not functioning
--A stable now used to house 3 families
--Various corrals, watering structures etc.
--Pump house
*23 families spread out on the site and outer edges of the cow grazing land and living off the site 26 km. to the north near Achuapa.
The goal here would be to provide a centralized community of 25-30 houses grouped together for social life and protection from Contra attacks.
Existing materials available:
--Plenty of wood
--Bamboo, but only a weak variety (not good for construction)
--Tejas (a factory in El Sauce)
--Ladrillos
--Grass for roofs but no palm leaves nearby

(See APPENDIX B for Government description of Cooperative.)

1-28-86

Things were getting real lonely around here earlier today. I was counting the days down till I could come home. My Spanish or lack there of has actually made me quite shy and silent. But I got a lot of work done. I spent the morning first washing my clothes, then translating a book which thoroughly describes this cooperative. (See APPENDIX B). I'm gaining tons of information very quickly (luckily) because as I learned today, this project has really already been designed. Surprise, eh? I don't have any idea why no one ever said this before. Maybe they did but it didn't translate! Anyway the government has already designed 35 houses and a school for this place. But they say here the government won't have the money for this project for 15 years! So I'm not bagging this thing. I'm going to use their design as a great data base, add my own info through interviews of families (which they did not do) and now I can have the perfect chance to compare my method of design (both in cost and beauty) with the standard government method. Which is exactly what I'm trying to point out. Hopefully, I will be able to do more and better using cheaper materials (but better materials). Also, I can use my presentation to get money in the U.S. from churches and solidarity groups so I can come back here and really build this thing!! I just found out they need a school today, that should be fun to design.

I asked if one of the theater members would sit for a portrait in watercolor. Enrique, who is my only real friend here, sat for me. Of course everyone sat around and watched and thank God it turned out quite well. Anyway this little painting really seemed to warm these people up towards me! They have all been real nice but still very removed. I have been very hesitant to speak, which is stupid because I don't get any better in Spanish. After the painting I taught Enrique and this other fellow to play poker. So I am opening up a lot also. Now they all want me to paint them, which is great. I can do anything I want for my painting class and portraits are always the most fun. I think they really bring alive the people here too, so they'll be good for my presentation. I have plenty

of photographs of buildings, although I definitely want to paint some also.

So tomorrow there will be a special meeting with the whole membership to discuss my plans. Today I also wrote a description of my position and goal here in Spanish. I read it to the president and a couple others, they seemed to understand it and approve of it. Tomorrow, I will read it to the whole assembly.

One thing I have to remember: these people are campesinos, half of them can't even read. I think they only have a vague idea what an architect even is. So even though these folks own and manage a large ranch with 800 head of cattle, they are still quite ignorant of a lot of things. I'm not sure what they really think of me, but I think they have a bit of peasant fascination of the wealthy educated North American but also with a healthy cynicism.

I've had a very full day. I started off with a painting of a "cocina," a fire stand for our cook. I wasn't too pleased with the result but I learned a lot painting it. Plus I provided great entertainment for some youngsters here. An adorable little Nica of 4 or so with dirty clothes and coarse hair played with my pencil sharpener and asked a lot of mostly unintelligible questions.

I spent the afternoon interviewing 5 or 6 campesinos. That was quite a bizarre experience. First of all they are all, thus far, illiterate or close to it. So, first with the help of a campanero from the theater group and then alone, I had to listen very closely as they went through their half dozen children, dozens of animals and interesting living conditions. None of them thus far have latrines in their houses. Most or I should say all, sleep 2, 3, and 4 children to a bed. It was also quite interesting to watch an illiterate try to draw a plan of their house, if I could convince them to hold a pen! I am sure learning a lot about the life of the campesino here!

Anyway, after an afternoon of interviews and waiting for the oft-promised meeting, (now scheduled for 8 a.m. tomorrow), I took off with my friend Gonzalez on a couple of horses for the 6 mile or so ride to El Sauce.

And what a beautiful ride it was! We took a long short-cut through the finca, down green gully's and through cool streams, and past bamboo shacks, instead of the main road. My horse was real jumpy and well aware of my inexperience. He kept trying to launch into a full gallop every minute or so. I had to keep very alert and I think I got him pretty well under control in the end.

When I'm on a horse I feel this deep, distant feeling almost of "deja vu", but more like Isaac Dineson describes her sense of Africa. I feel all my childhood dreams of my Indian heritage flowing right back into my imagination.

The ride back was even more exciting, because it was during a starry but moonless, black night. I literally could see almost nothing. Luckily the horses know exactly where to go to get home, and my friend Gonzales has the night sight of a gorilla fighter,

so he could open and close the gates.

In El Sauce I stopped to chat with a couple of old Nicas constructing an adobe house. As I suspected it is a much cheaper method even than bricks. One adobe brick costs 12C$, one brick costs 30C$, and you need 3 bricks for every one block of adobe! The reinforcing for their top tie beam was made of tightly stretched barbed wire! I am going to do my best to convince these folks adobe is better than brick.

Tonight I had an informative discussion with one of the theater members who pointed out an error in my interview. I asked each fellow how much land he had now for his house and how much he wanted in the new grouping, they all said ½ a manzana, or ¼ a manzana. A manzana is 100m square, so they wanted a lot!

My campanero said that 1/4 or 1/8 of a manzana is more realistic.

He also brought up an aspect of this project I had not thought of, but now I realize it is both exciting and critical. I am designing a "cooperative" which implies a very different thing than a community. In my lay-out I have to be very conscious of giving enough individuality but allowing for a unity that is not devisive into small factions or individuals.

I thought the center should include a small store, since as I discovered on my ride into town, the people here to go to El Sauce for every little and big thing.

My friend suggested a baseball diamond also, since baseball is very popular here.

He thought a pool/bar was a bad idea because the people would drink and screw-off too much!

So much to consider!

Pre-Meeting Thoughts

1-29-86

I am going to give each of the 24 "socios" a sheet of 9"x12" paper. On this I want them to place as much information as possible about themselves and their family and also the type of rooms they want in their house. This will be very difficult since almost half cannot read or write. I'm going to ask them to obtain help from one another.

I want to know:

--Age

--Work Position

--Number of Children

--Number and Types of Animals

--Existing Living Conditions

- °Construction Method
- °Floor Plan
- °Orientation
- °Water Source
- °Latrine/No Latrine

Speech to the General Assembly 12



— veronica paz —

TO THE GENERAL ASSEMBLY OF THE
"LUIS VELASQUEZ PALMA COOPERATIVE"
(Translated from Spanish)

My name is Daniel Glenn. I am a student of architecture in my final year of study at Montana State University in the United States.

I have come to Nicaragua to do a project for my thesis in architecture. I live in a country that is actively trying to destroy your country and your people. My objective here is both to obtain information about the reality of your situation to bring back to the people of the United States and also to try to help the Nicaraguan people with my knowledge as an architect.

I have been here in Nicaragua in total six and one half weeks, 3 weeks in August of 1985 and 3½ weeks this time.

Obviously, this is not much time to understand your problems and your triumphs, especially with my poor Spanish, but I think I have learned a few things.

My primary study here involves housing, the local methodology of construction, and the local materials of construction.

From what I have seen thus far here in Nicaragua , the government and the internationals like myself are making great errors in the construction of new housing, both in design and in methodology of construction and materials. I believe they are trying to follow the model of Cuba, that is, rapid industrialized development. They want to use products of industry, in the construction of houses, for example: concrete blocks, corrugated metal roofing, asbestos cement, and reinforced concrete. Also in the design of houses they want to use identical housing units for rapid construction and houses that have the "style" of North America.

In the first place, this is a revolution against North America. Why do the people and the government here want the things of North America. We should leave the things of North America in the past, with the dictator Somoza.

In the second place this is a very poor country. And it is impossible, in my opinion, to follow Castro's concept of rapid industrialization because Nicaragua has both a war and much less Soviet aid.

In the third place, the products of industry, especially in housing, are products of the machine, without humanity, without individuality. Also, the industrial products usually do not conform to the earth or to the climate.

For example, concrete block does not provide as good protection against the sun as adobe or "taquesal" construction.

And finally, there are many things that can improve the conditions of life for the "campesino," that are not costly, if we use "appropriate technology." For example, the open fires of the campesino have many problems. They use wood in an inefficient manner. Also, the smoke of an open fire is very bad for the health of the cook and her family.

But it is possible to make stoves with a chimney that is more efficient and that is better for the health. The stoves of appropriate technology do not cost much. In fact, they can cost nothing but the work of our minds and our hands.

I came here to the "cooperativa de Armenia" because you need houses and I believe, a school. I ask for your help and your cooperation in the creation of your houses, using primarily the ideas of the people here for the plan of each house. I want to use this design as an example of my ideas of a new architecture for Nicaragua that uses both the methodology and the materials of tradition and new ideas that improve those traditions.

For this design, I would like to have a meeting with each family about their needs and wants for their house. And also I would like to have more meetings like this one, for discussions of the overall plan of the group of houses and the school.

I have many problems with my mission here, especially language and time. For this, I am sorry and I ask for your help and your patience.

Originally, I wanted to do my design work in the large and poor neighborhoods of Managua. But I soon learned that the revolution lives here in "el campo," not in the "barrios" of Managua. Because of this, I am here with you.

Thank you for your time.

—Maximo—




MATILDE

NOMBRE: Matilde Ruiz, Matute 44 años

Compañera: Maria Lourdes Brobo. 36 años.

Hijos

1. Eddys Ruiz. 22 años, Socio de Cooperativa. *
2. Martha Lorena Ruiz. 20 años, trabaja en su casa. [LEON]
3. Pedro Juaquin Ruiz. 18 años, alluda ala casa, TRABAJA
4. Morivel - Ruiz. 14 años, alluda en la Casa → PRIMARIA Estudia
5. Yader Antonio Ruiz. 8 años. Menor de eda → Estudia
6. Marveli _ Ruiz. 5. años. no estudia
7. Osmar antonio Ruiz 3. años. - menor de eda.

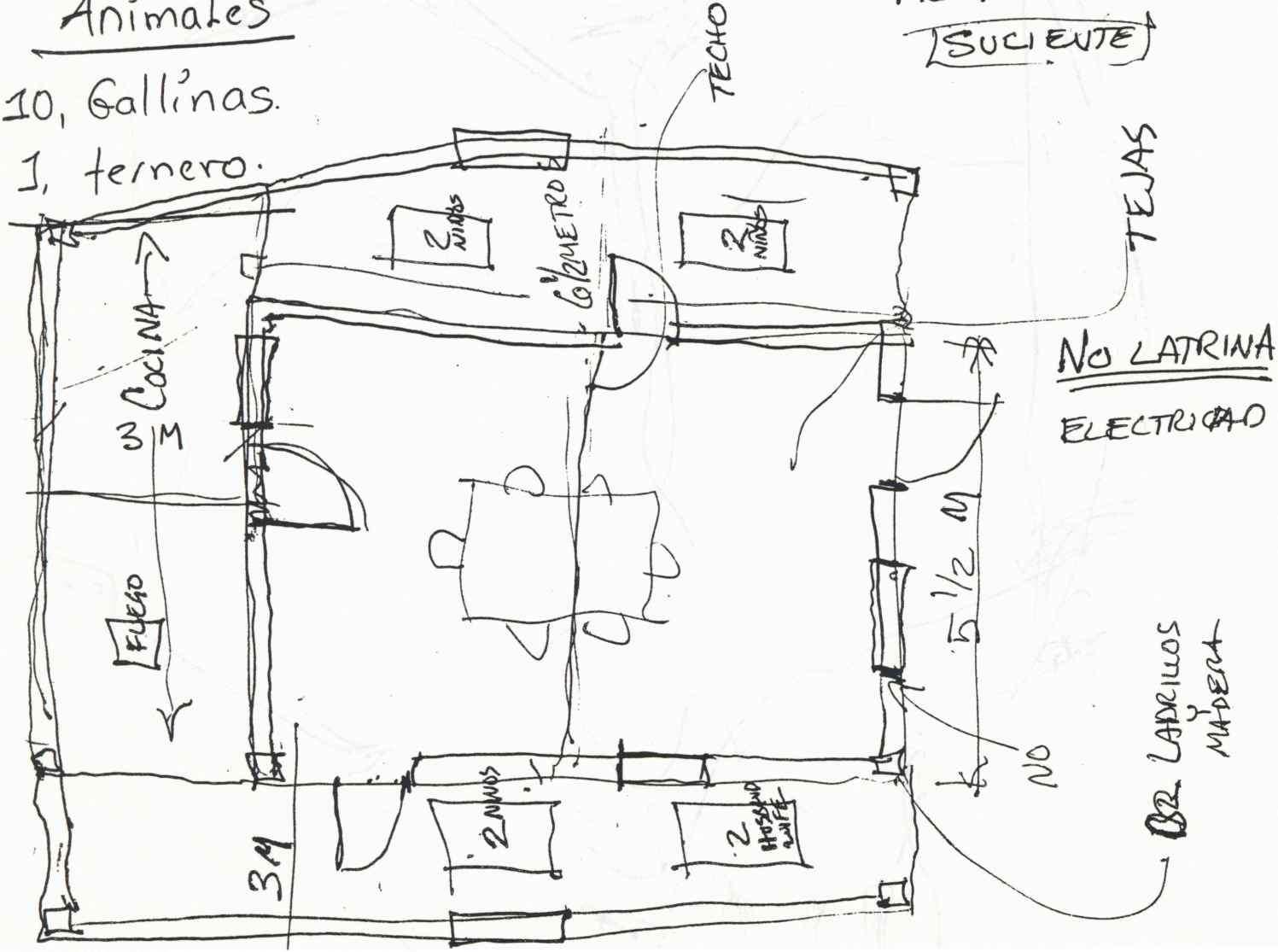
Animales

10, Gallinas.

1, ternero.

MEDIA MANZANA

SUCIENTE



NOMBRE: THOMAS ROJA ORANDO 52

ILLITERATE → "SOCIO"

4TO GRADO → GREGORIA 48 AÑOS
READ WRITE

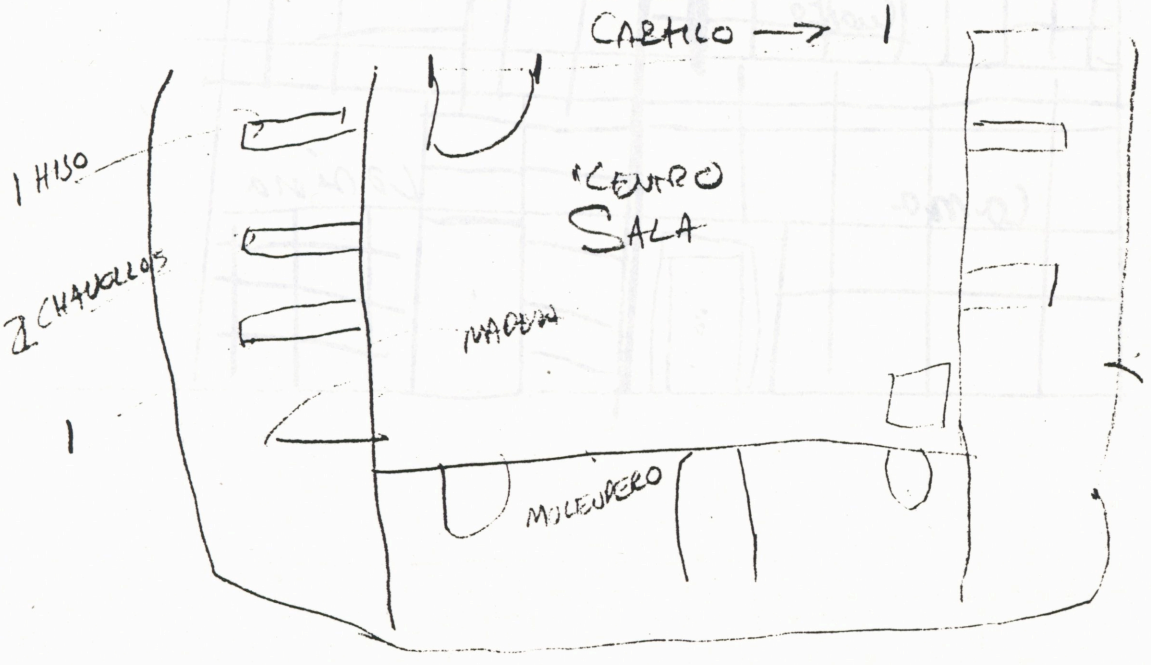
HIJOS:
- JUSTO ROJA RIVA 25 AÑOS
  AGRICULTOR
  ESPOSA → CRISTINA 21 AÑO
  HIJO: RIGOBERTO → 1 AÑO

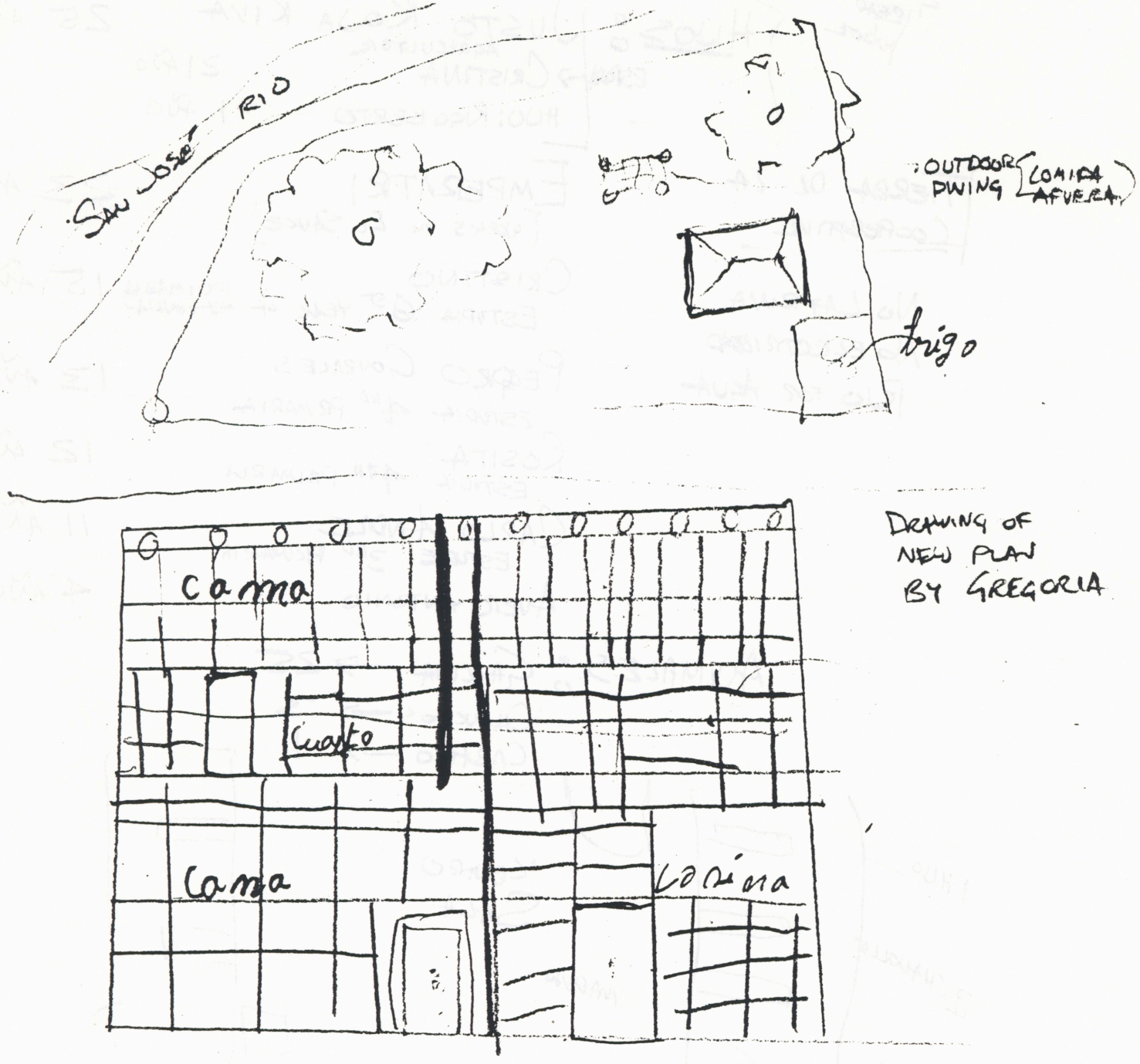
TIERRA DE LA COOPERATIVE

NO LATRINA
NO ELECTRICIDAD
RIO FOR AGUA

- EMPERATRI 23 AÑOS
  [WORKS IN EL SAUCE]
- CRISTINO 15 AÑOS
  ESTUDIA 6ST YEAR OF ~~SECONDARY~~ PRIMARIA
- PEDRO GONZALES 13 AÑOS
  ESTUDIA 4RD PRIMARIA
- ROSITA 12 AÑOS
  ESTUDIA 4TH PRIMARIA
- CARLO ANDRE 11 AÑOS
  ESTUDIE 3RD PRIMARIA
- AVER ANTONIO 4 AÑOS

ANIMALES:
- GALLINA → 25
- CHANCHOS → 3
- CABALLO → 1



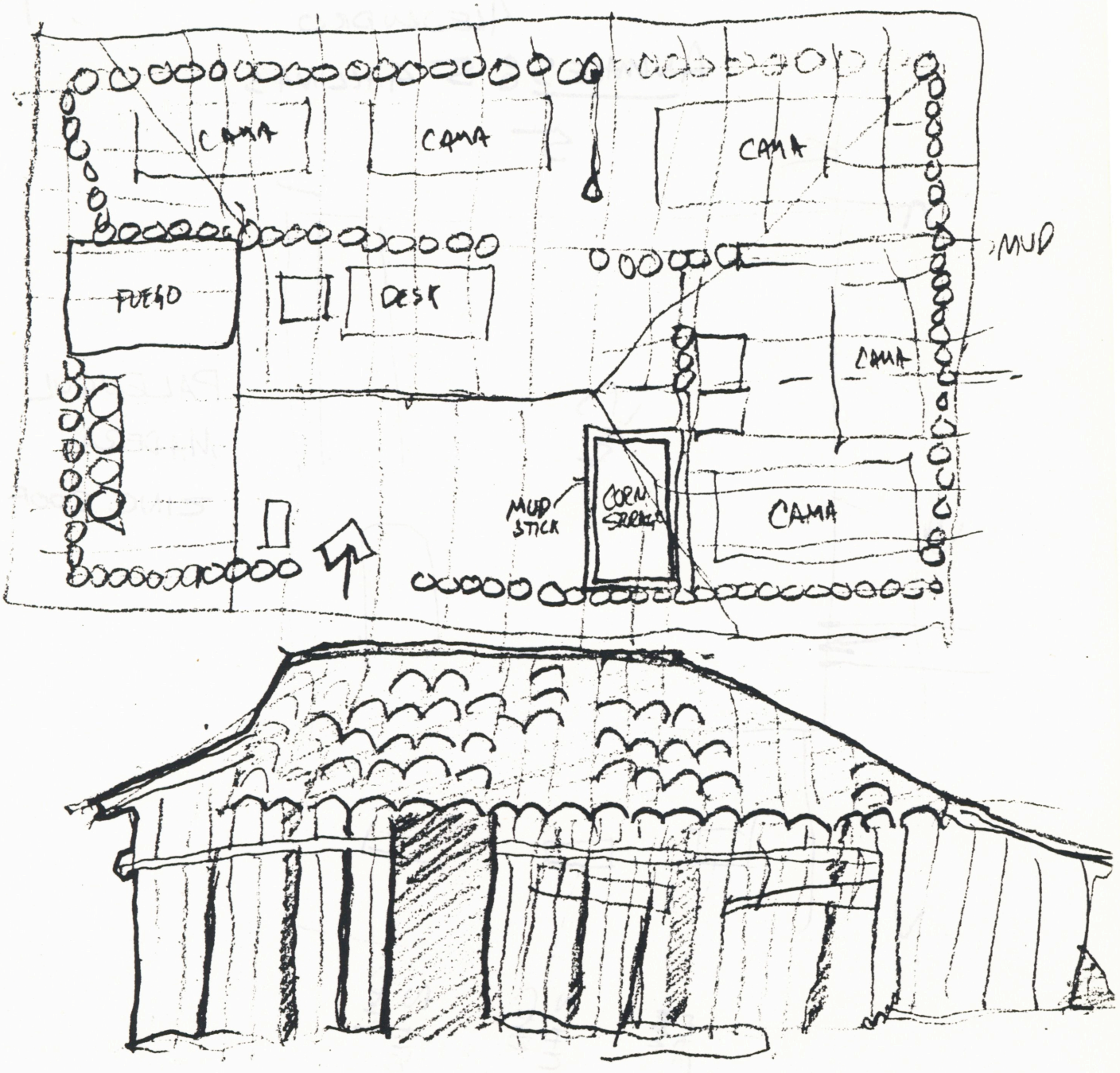


DRAWING OF NEW PLAN BY GREGORIA

HOUSE OF THOMAS ROSA ORANDO

- WOOD "STICK" CONSTRUCTION
  "ORCONE"
- ROOF "TEJAS"
- FLOOR DIRT

COLD AT NIGHT
HOT IN THE SUN



NOMBRE: ALEJANDRO MONTOYA 40
"SOCIO"

ILLITERATE
2

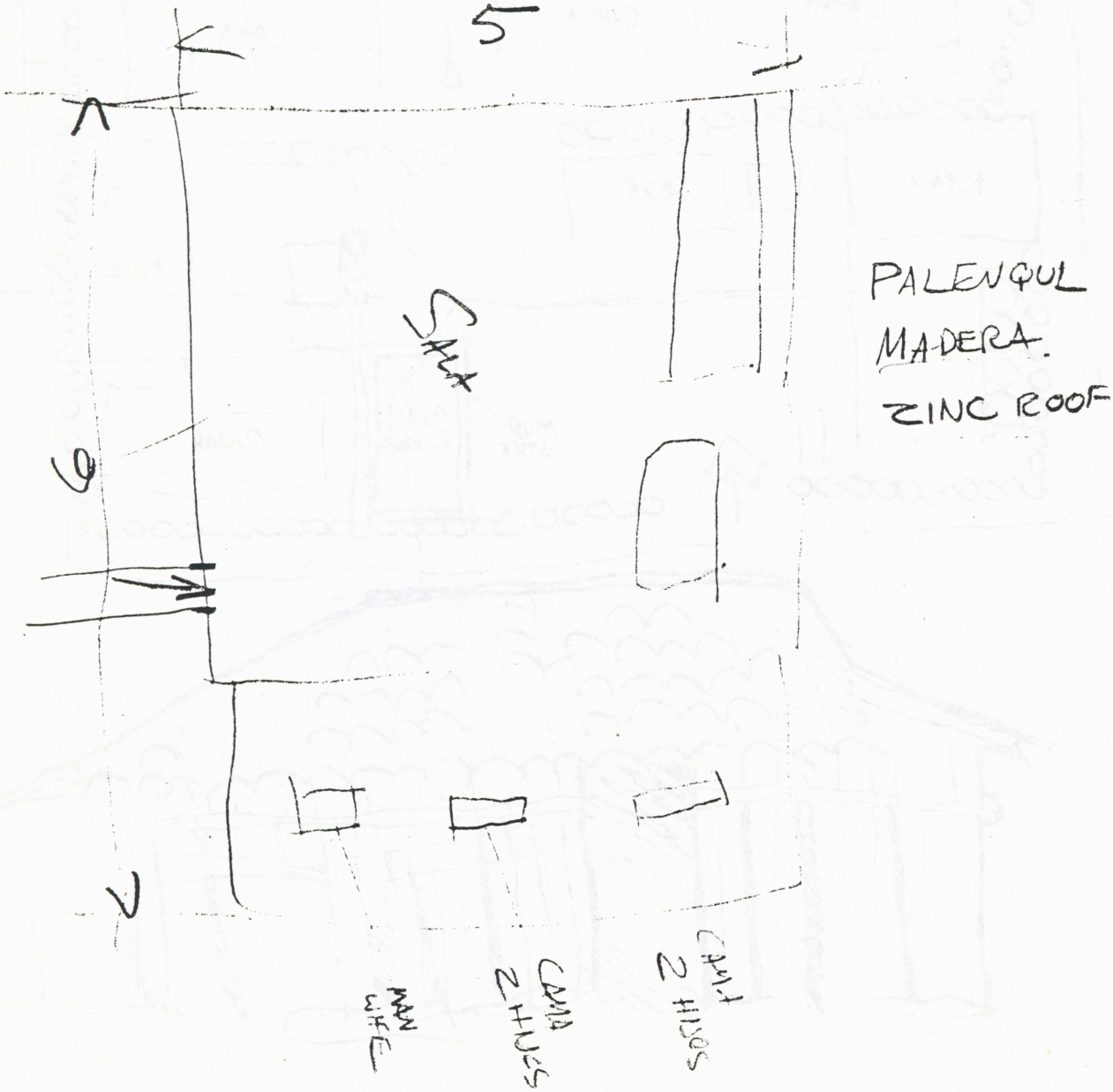
→ BILLMA VAQUE > 36

HIJOS: JAIME > 12
-ESTUDIE., 1ST GRADO
NOEL > 9
-ESTUDIE, 1ST GRADO
ALVA MARIA > 7
— MENOR
GUILLFREDO > 5
ALEJANDRO > 1

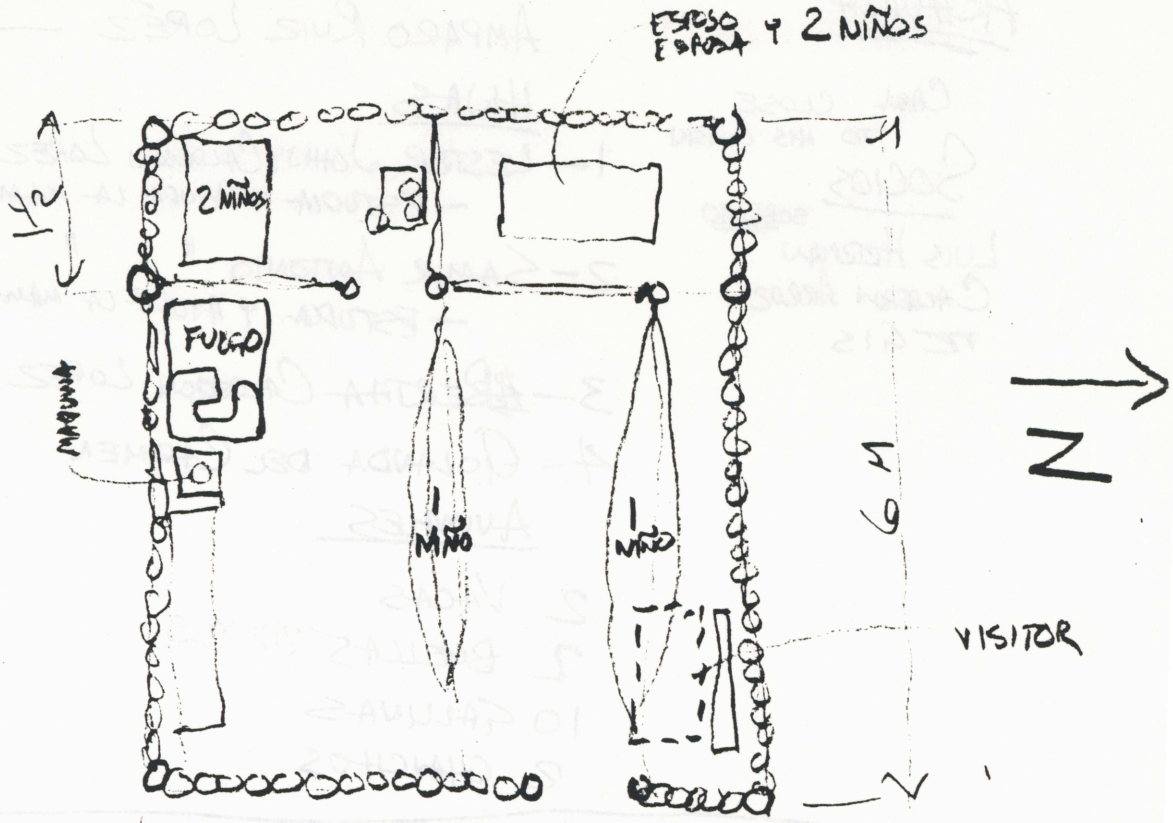
VIVE EN EL CAMPO

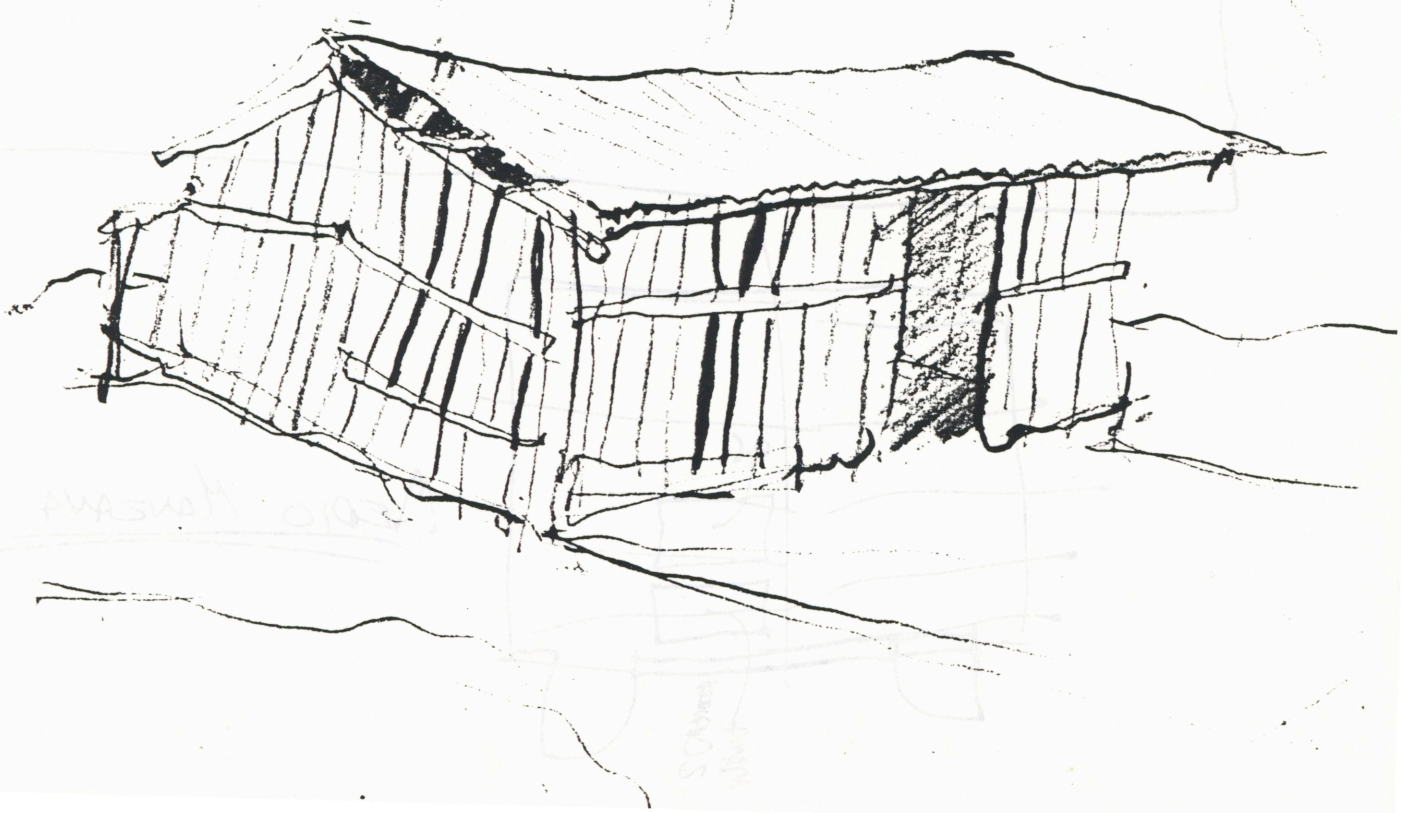
NO LATRINA
NO LUZ
AGUA IN RIO

ANIMALES: 5 GALLINAS



CASA DE ALEJANDRO MONTOYA





NOMBRE: PILAR CALDERON VELASQUEZ: 38 AÑOS
COORDINADOR DE PRODUCCIÓN
AMPARO RUIZ LOPÉZ ——→ 27 AÑOS

ACHUAPA

CASA CLOSE TO HIS COUSIN

SOCIOS

SOBRINO
LUIS HERMAN CALDERON ARROZ
TEGIS

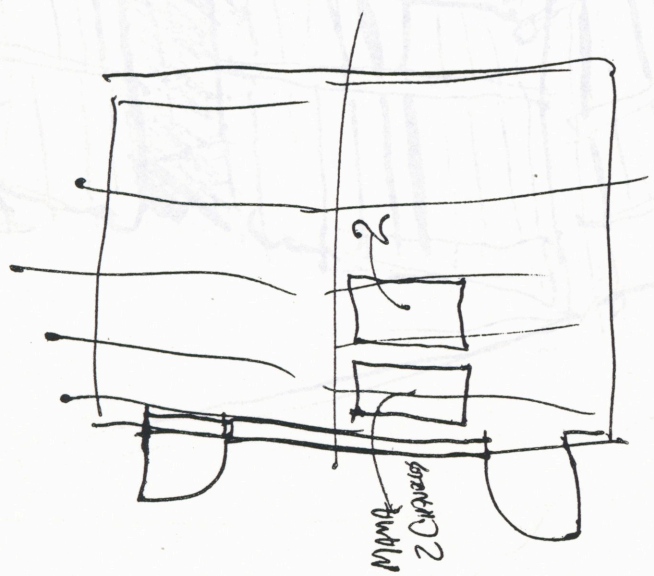
HIJAS

1— LESTER JOHNY CALDERON LOPEZ — 10 AÑOS
— ESTUDIA Y AYUDA LA MAMA
2— SAMIR ANTONIO " " — 8 AÑOS
— ESTUDIA Y AYUDA LA MAMA
3— ~~B~~BERTHA CALDERON LOPEZ — 5 AÑOS
4— YOLANDA DEL CARMEN — 1 AÑOS

ANIMALES

2 VACAS
2 BUELLAS BUEYES
10 GALLINAS
2 CHANCHOS





MEDIO MANZANA

NOMBRE: MANUAL FLOREZ VALIENTOS
COORDINADOR DE FINANCE 37 AÑOS

ESPOSA: MARIA LISA TERCERO 38 AÑOS

HIJAS:

1) FREDDIE TERCERO 18 AÑOS
-SERVICIO MILITAR-
AGRICULTORA

2) ANER FLOREZ TERCERO 16 AÑOS
SECUNDARIA AÑO ESCUELA
AYUDA LA MAMA

3) ALEXANDER MANUEL " 14 AÑOS
ESTUDIO PRIMARIA SECUNDARIA
AYUDA LA MAMA

4) DANIEL ORVELI " 11 AÑOS
ESTUDIA
AYUDA LA MAMA

5) DONALD " 10 AÑOS
ESTUDIA

6) ERVIN " 7 AÑOS
MENOR

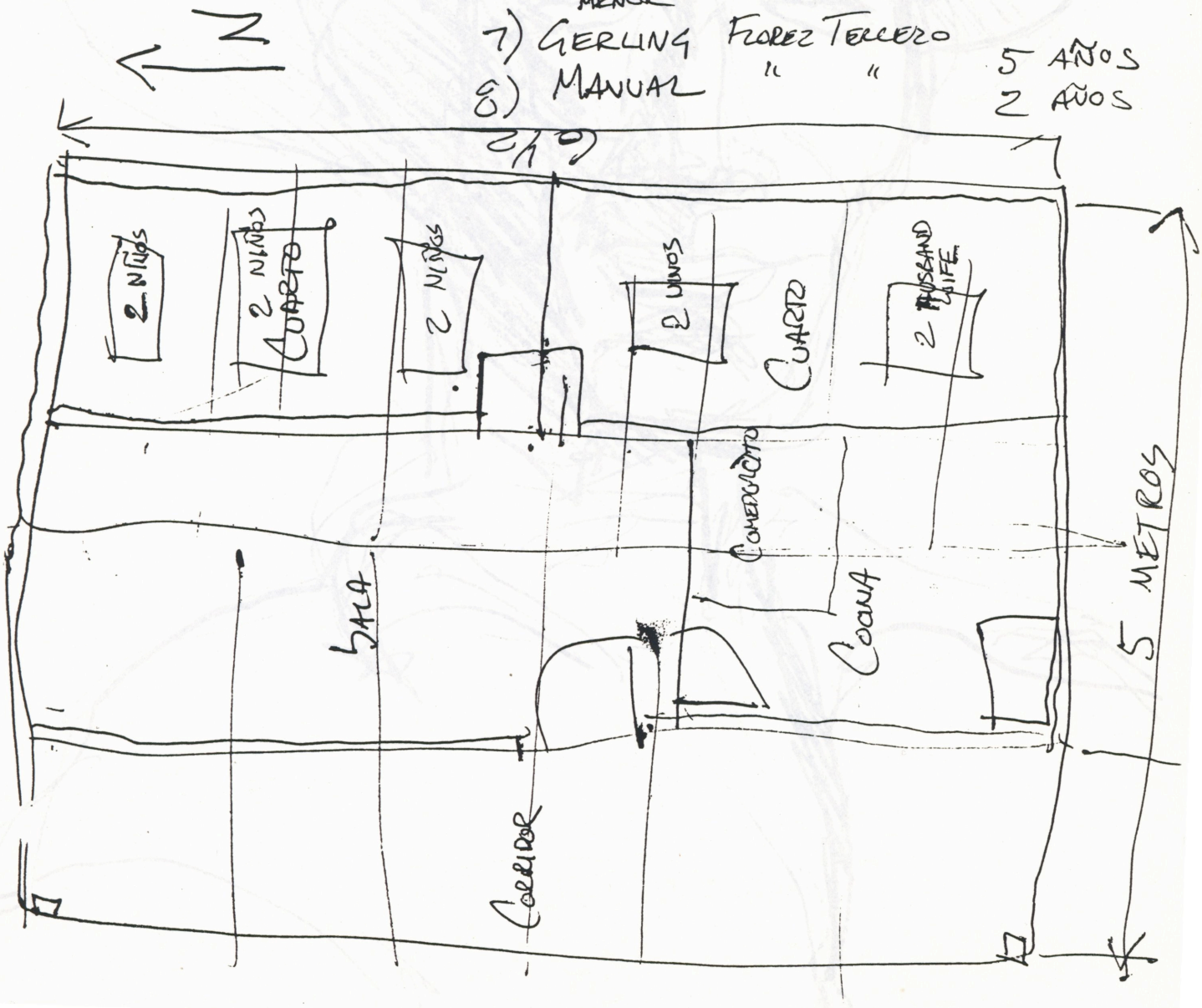
7) GERLING FLOREZ TERCERO " " 5 AÑOS

8) MANUAL " " 2 AÑOS

JUANNA FLOREZ
SALVADOR CRUZ
(SOCIO)

ANIMALES: 1 VACA

QUARTO MANZANA




- TUADALUPE -

NOMBRE: GUADALUPE PALMA 56
ILLITERATE "SOCIO"

ACHUAPA FILAREUA RODRIGUEZ 53

- WELL-WATER
- NO LUZ
- LATRINA

HIJOS (7)

VISITS RAMONA 26
(VIVE EN MANAGUA) + HIJOS
ESPOSO → ALBAÑIL.

- TEJAS
- ~~MADERA~~

LESPERANZA 25
(MANAGUA → 1 HIJO)
- ESPOSO

ANIMALES: NONE

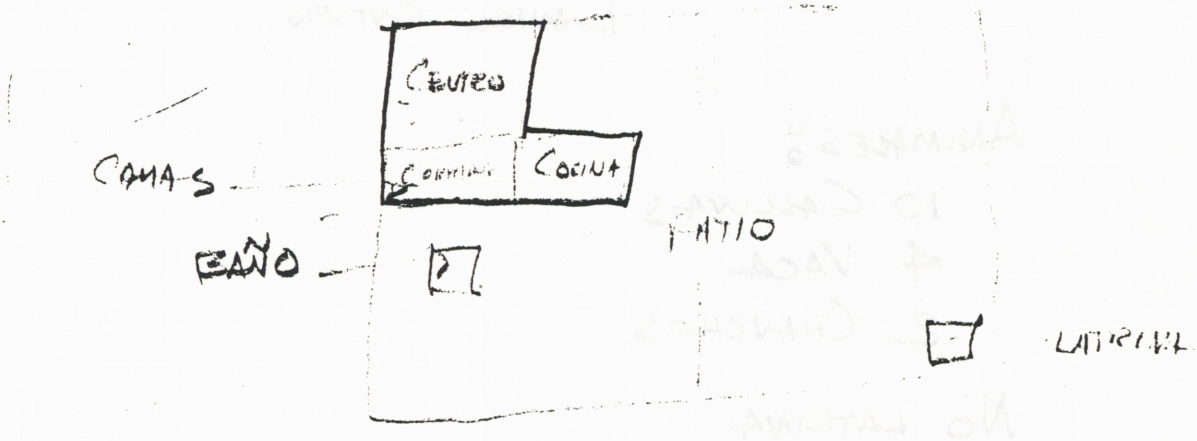
JOSÉ SANTO 22
(EJERCITO) 3RD GRADE EDUC.

TOMÁS 14
(ESTUDIA 1ST GRADO)
AYUDA LA MAMA

ANSERMO 11
NO ESTUDIA
AYUDA LA MAMA

CONCEPCIÓN 5

DIEGO 7



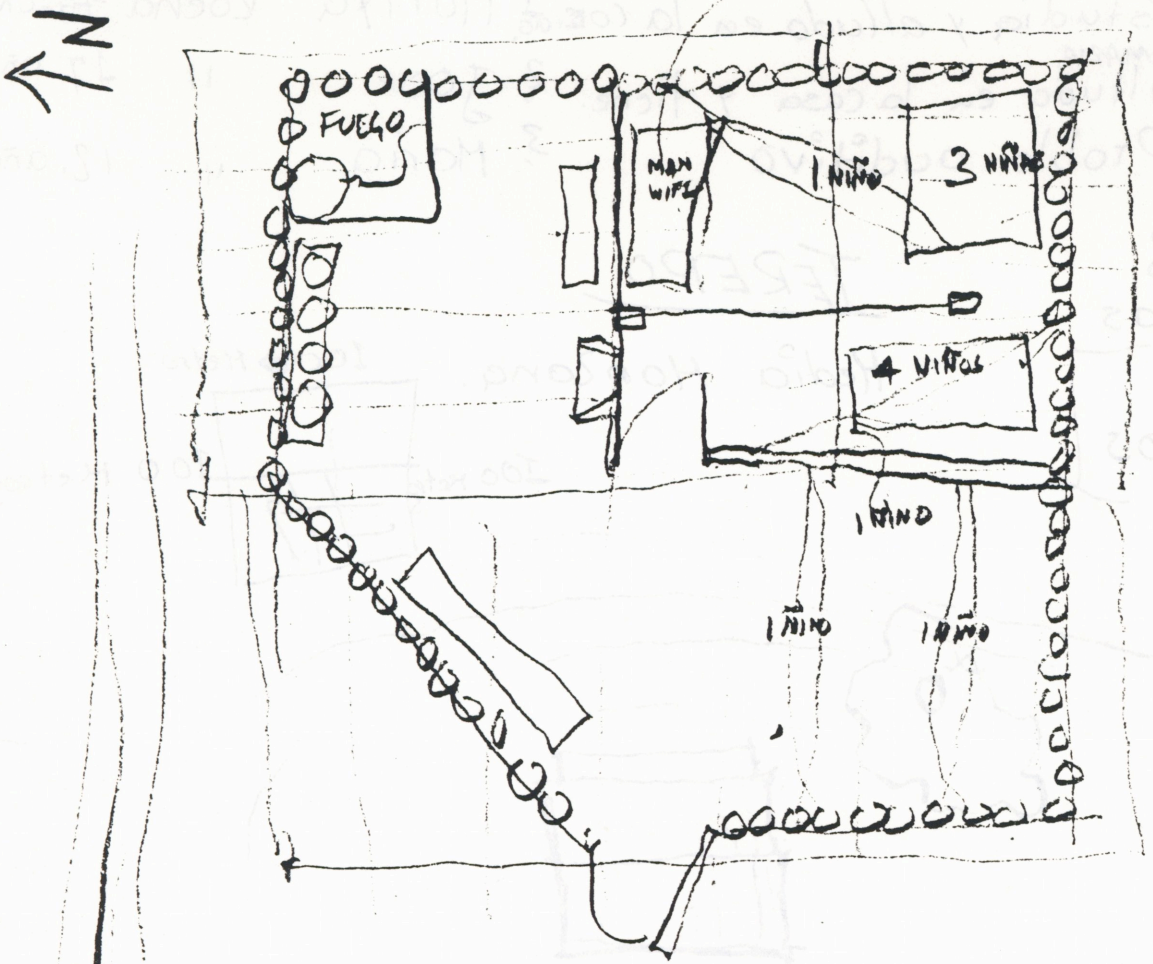
NOMBRE: AMBOCE MENDOCE → 39 AÑOS
"SOCIO"
2 GRADO → EPIFNIA → 29 AÑOS
2 GRADO
HIJAS: 11
(WORKS AS COCINERA) → RUFIL SELCORRE → 17 AÑOS
- 1 HIJO → 2 AÑOS
MIGUEL ANGEL → 15 AÑOS
ESTUDIA 5 GRADO PRIMARIA
AYUDA LA MAMA
JUANNA FRANCISCA → 13 AÑOS
(AYUDA LA MAMA)
1ST YEAR PRIMARIA
SALLUSTIN DEL CARMEN → 12 AÑOS
ESTUDIA 1ST GRADO
(AYUDA LA MAMA)
ALMANOVIA → 11 AÑOS
1ST GRADE
(AYUDA LA MAMA)
ESPERANZA MARIA → 9 AÑOS
RENNI SAVEL → 8 AÑOS
SYLVESTER → 5 AÑO
FELICIANNA → 4 AÑOS
RENAL AMBROSIO → 3 AÑOS
DANIEL ANTONIO → 2

ANIMALES:
10 GALLINAS
4 VACA
2 CHANCHOS

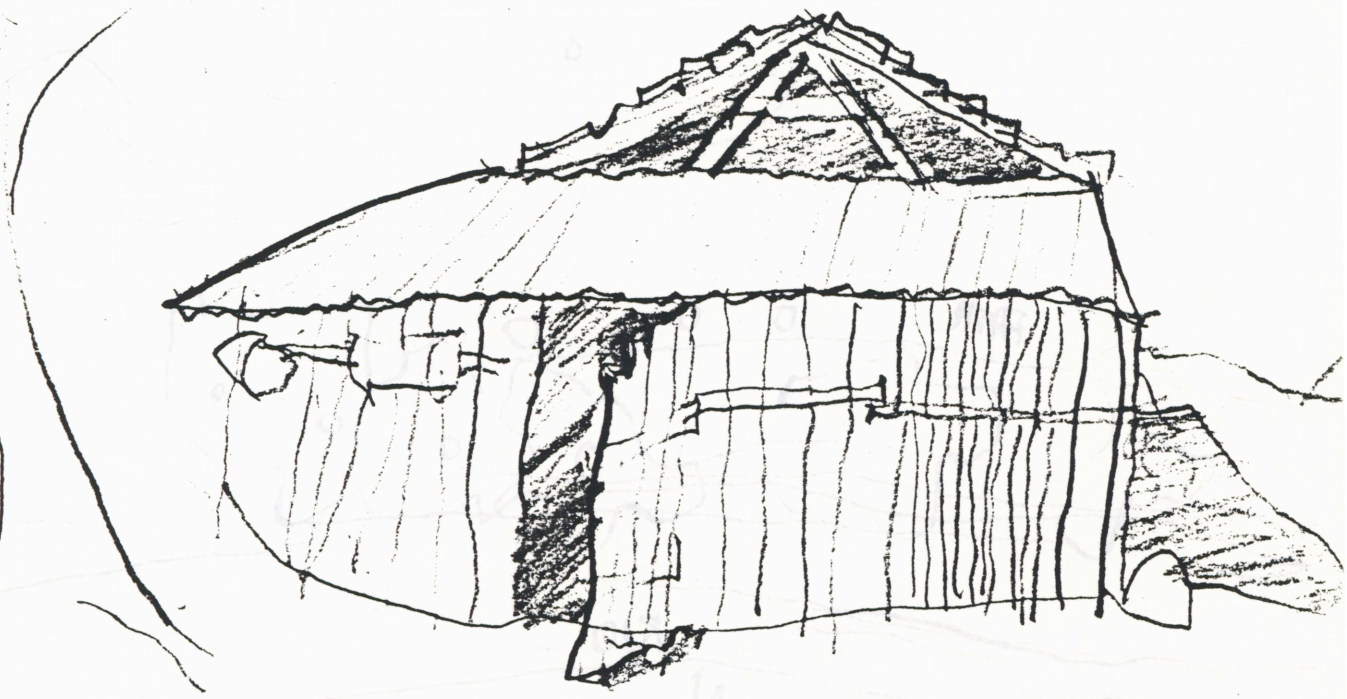
NO LATRINA
LIGHTS
AGUA (RUNNING)

CASA DE AMBOCE MENDOCE
(11 NIÑOS)

SHE SAYS SHE'D LIKE A PRIVATE ROOM FOR HER & HER HUSBAND



THE CHILDREN LIKE TO SHARE BEDS



NOMBRE: NIEVE ROCHA LOPEZ, SOCIO: 55 AÑOS
TRABAJO: Ordeña, Al Machete. COMPAÑERA: 60 AÑOS

Maria Estudia y alluda en la cocina
3RD PRIMARY
Marixa, Estudia y alluda en la cocina
6TH PRIMARIA
Jose, alluda en la casa y tiene Proble auditivo

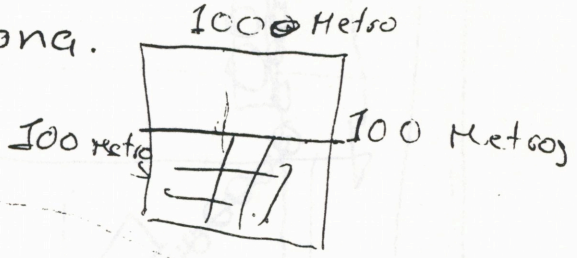
Hijos

1. Marixa Rocha 15-años
2. Jose " 17-años
3. Maria, " 12. años

ANIMALES:
30, Gallinas
2, Vacas
3, Caballos

TEREPO

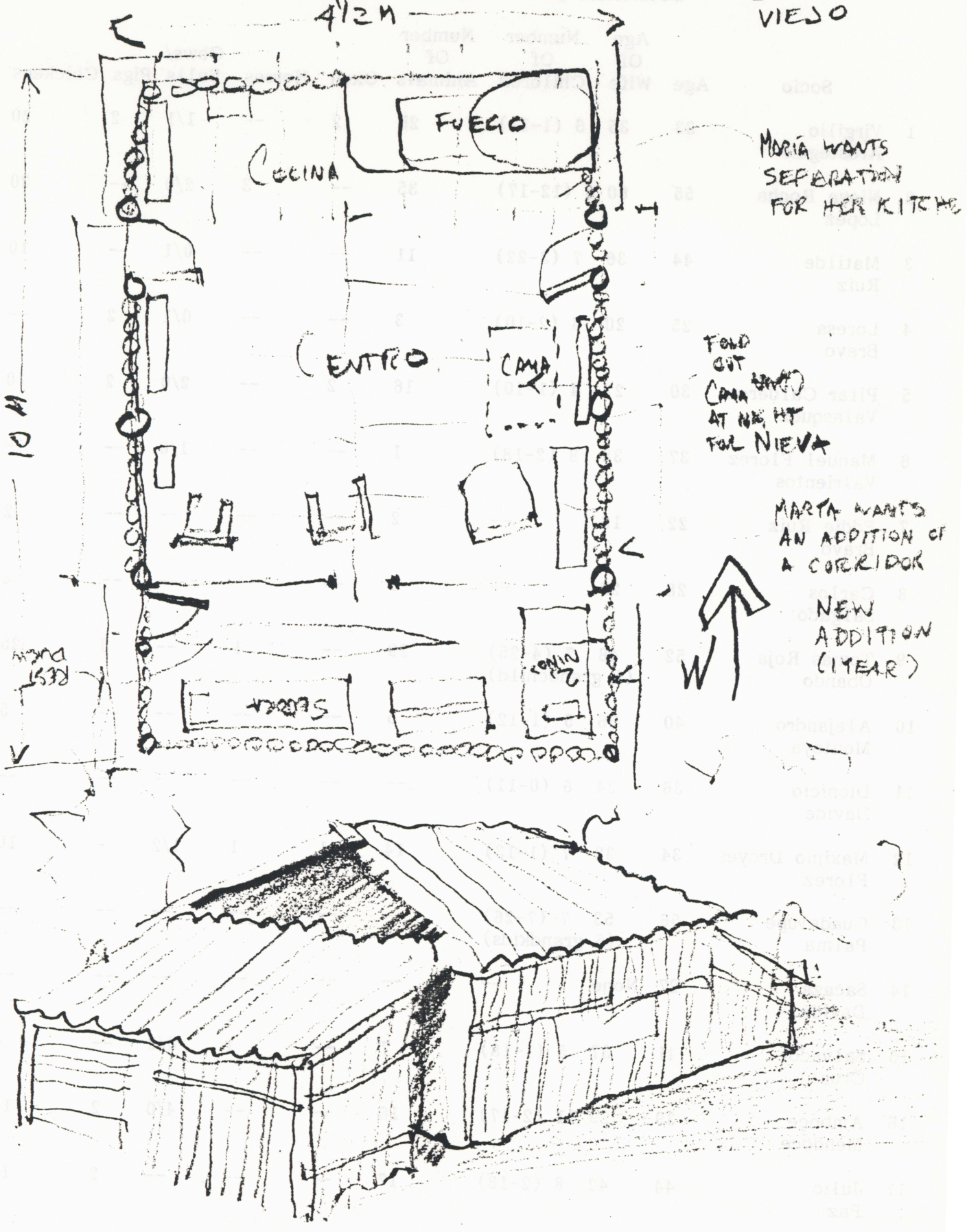
Media Manzana.





LA CASA DE "NIEVA ROCHA LOPEZ"

20 AÑOS VIEJO



SUMMARY OF INTERVIEW INFORMATION

	Socio	Age	Age Of Wife	Number Of Children	Number Of Animals	Oxen	Horses	Cows/ Bulls	Pigs	Chickens
1	Virgilio Arosteguis	33	35	6 (1-11)	26	2	--	1/1	2	20
2	Nieva Rocha Lopez	55	60	3 (12-17)	35	--	3	2/0	--	30
3	Matilde Ruiz	44	36	7 (3-22)	11	--	--	0/1	--	10
4	Loresa Bravo	25	20	4 (2-10)	3	--	--	0/1	2	--
5	Pilar Calderon Valasquez	30	27	4 (1-10)	16	2	--	2/0	2	10
6	Manuel Florez Valrientos	37	38	8 (2-18)	1	--	--	1/0	--	--
7	Eddie Ruiz Bravo	22	16	--	2	--	--	--	--	2
8	Carlos Salgado	28	23	--	5	--	--	--	--	5
9	Tomas Roja Obando	52	48	7 (4-25) (1 grandchild)	29	--	1	--	3	25
10	Alejandro Montoya	40	36	5 (1-12)	5	--	--	--	--	5
11	Dionicio Davide	36	34	6 (0-11)	--	--	--	-	--	--
12	Maximo Dreyes Florez	34	32	7 (1-13)	14	1	1	1/2	--	10
13	Guadalupe Palma	56	53	7 (7-26) (5 grandkids)	--	--	--	--	--	--
14	Sacaza Davide	27	None	--	--	--	--	--	--	--
15	Salvador Cruz	41	37	5 (1-18)	7	--	1	0/2	--	4
16	Amboce Mendoce	39	29	11 (2-17)	16	--	--	4/0	2	10
17	Julio Paz	44	42	8 (2-18)	17	--	--	--	2	15

I must admit I am having a blast here! I'm learning and doing so much. And I'm really falling into the life in the "campo." At first everything seemed so foreign and troublesome, I hated bathing with a bucket of water hauled 100 m from a cow trough; I hated the strange soup they eat here and aways felt hungry; and I longed for the general comforts of home. These things are so insignificant now. The people here are incredible.

I just spent an evening drawing just about everyone here. I'm finally really loosening up in my drawing--it took a great effort. My paintings thus far are quite tight and pretty shitty all around. I hope this drawing session will help my painting. Part of my tightness, a great part, comes from always having an audience. I think I'm finally getting used to it.

This morning from 8-11:30 I had a meeting with almost all of the cooperative members. This turned out quite well too. I read them my prepared speech and they all listened attentively. After that, they warmed right up to my project. Everyone waited patiently for their turn for my quick data interviews.

They then went out of their way to line me up a horse and one by one I visited their "casitas" around the ranch.

I won't get to visit most of them I discovered tonight, however. Most of the families' houses are farther north outside a town called "Achuapa." I mentioned today at dinner that I wanted to get up there soon and this caused an uproar of unexpected denials. They say Achuapa is a heavy war zone. And they don't want me to go because I am a lone internationalist, thus they say a prime target for the Contras. I said that if their families were up there then it must not be too bad but they don't follow that line of thinking. They say if I get killed up there, it will be bad for the revolution! Bad because Reagan and the U.S. press will say I was killed by Sandinistas. This happened up here in 1983 when a lone doctor was killed. So anyway my personal interviewing will have to be limited to the 6 or 7 families in the area.

I really enjoyed visiting the families. The thing that struck

me most about them was their huge and beautiful mud fireplaces, each with a giant dome for baking inside.

The wives constructed these works of art. The wives here really struck me. Although I have to deal with the men, it is quite evident that the house is "hers." And the woman are generally better educated, also. Most of the men are completely or nearly illiterate.

The families are gargantuan, 6-11 children, 2 and 3 to a bed. And they like very much to sleep together. I'm sure if I built a room for each they'd all end up in 1 or 2 of the rooms!

Everything appears to be moving as I had hoped or better thus far here! I am never bored. I have just about everybodies' cooperation and great enthusiasm. I seem to have won them over with my drawings and photos and speech!

The theater coop adds a lot of artsy craziness to the place. And with their constant singing and my constant drawing and painting, this place really feels alive with creative energy.

I wish my Spanish would improve. The campesino Spanish is such a mumble that if they were speaking English I'd still have a helluva time!

Boy, if someone really did design this place already, they sure didn't let the campesinos in on it. This idea seems quite new to them. I mean they all know about the big plans but I don't think they've had much, if any, input before! I'm anxious to see the design. Tomorrow I'm supposed to go with the "president" here to get the book in El Sauce.

Oh, although everyone was quite convinced bricks were the best, after I explained the 12C$ vs. 30C$ they all agreed we should use adobe.

I'm still trying to convince them they don't need such huge individual plots. At first they wanted ½ a manzana (100 m^2), then a ¼, now I'm unsure but after I showed them a quick conceptual plan I drew up they started to understand that they might need less individual space since they'll have much to share.

I'm pretty sure I'm hearing mortars blasting in the distance. No one seems to notice, however. I didn't realize how close we were

to the war till tonight. This heavy war zone they mentioned is only 26 kilometers to the North of here.

The more I learn about these people the more unbelievable our government seems to me. Reagan is trying to stop exactly what is happening here. This cooperative represents everything the revolution stands for. These poor, formerly landless people are working hard to change their lives for the better. They all are excited about having a school here so they all can go, even the old men.

Well, as it turns out those weren't really mortars I heard last night. My friends here say they are part of some religious celebration in El Sauce.

Anyway, today was not quite as action packed or fulfilling. I hung out here waiting most of the day for Maximo, the coop president, to take me to El Sauce for the book on the "other" design. But for various strange reasons, we never got to go today. So for the second day, it is "manana," or "mananita" (early tomorrow morning).

But today was far from wasted, I completed 4 or 5 new portaits. Boy, they are rolling off my pencil lately like water! I'm really loose and getting better with every drawing, and my audience keeps growing.

I also joined in on a discussion of the Nica Agrarian Reform with the theater coop. Alfredo was leading them in a discussion/lecture using some Nica books on the subject. My Spanish is finally improving again, so I was able to take part. I didn't realize the theater folks actually studied this stuff, although a few were not too serious about the whole thing.

I'm starting to realize just how important farms like this are to the revolution. They are <u>its fruit and its meaning</u>. I also didn't realize how many there are in this country. In 1982 there were already 3,000 or so. Now there might be 10,000, I'm not sure. I also didn't know that much of the land was actually expropriated, if the former owners were Somocistas, which most of the "Latin fundistas" or great ranch owners were. And they didn't all run to Miami either. They guy who owned this finca of 1,200 manzanas and 3 more like it now lives down the road in El Sauce with only a small plot left for a house. They don't seem to think he's working with the Contras either to regain his land but I can hardly believe it. Obviously, I have got to get a hold of some books and read up on all this. You'll probably know more than me by the time I get back with all the reading you're doing!

One great idea popped up today, suggested by Alfredo, the theater coop leader. He suggested that I design one model house this weekend,

and using the info I'll get tomorrow in El Sauce from adobe builders and from a government asentimiento which is being built 12 km from here (with block and zinc, of course), I can make a cost comparison to present both to the coop and to the Agrarian Reform officers in this region.

So I definitely have my work cut out for me this weekend.

(The following refers to myself and my friend, Susan Atkinson.)

My theater friends say we can definitely have our own room here in this old farm house. And I thought we could eventually build a small shelter of some sort farther away on this beautiful land.

I've been thinking we definitely would need a motorcycle. We could either buy one in the States or buy one here. Here they are very cheap but hard to find.

If we bought one in the States, we could ride down together from Montana, through California, Mexico, Guatemala, Honduras and Nicaragua. What a great trip! I like this idea because I definitely want to see other Latin countries.

We could use my backpacking tent and cruise! We could work all summer and part of the fall in Bigfork to make enough cash for this adventure. If we could make $5,000, say, together, that'd be more than enough for the trip and 6 months or so here.

The other important aspect is raising money for this project. We can use my presentation and go to churches, universities, and solidarity groups to raise cash.

The theater group will be in Sweden this spring doing the same thing.

Then, we come here and start building. The campesinos here have no experience in construction, although the women make great stoves. So you would not be the least bit out of place as long as you'd like to help!

I really think this would be ideal for me, but I don't want to do it alone.

Thoughts on Housing Design

14



THOUGHTS ON DESIGN OF VIVIENDAS

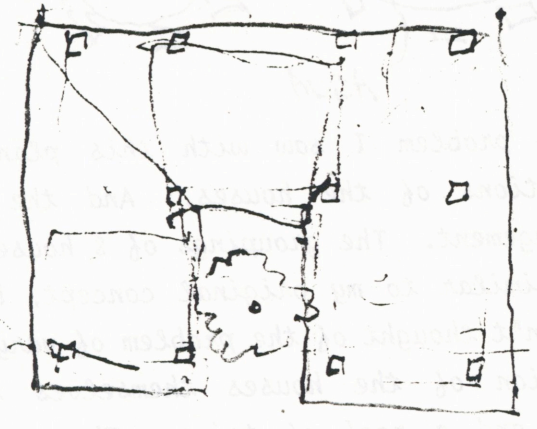
I have just visted the office of "Reforma Agraria" in El Sauce. I and Maximo had just walked the 6 km or so from the finca in the heat of the morning sun. When we entered the office, I thought for a moment they had air conditioning. The cool freshness inside was remarkable in the 85° temperature of 11:00 sun.

The structure has a very high roof, perhaps 15-17 ft., made of "tejas." The walls are probably concrete over brick but I can't be sure, it is a relatively new structure. The floor is some sort of tile.

Note: Check on tile/stone floor prices!

The coolness is a result of a combination of high ceiling, tile roof, stone floor and thick masonry walls. At the moment I'm sitting at the "Frente Sandinista" office just down the street. This office also has relatively high ceilings, "tejas," tile floor but it also has a courtyard. The offices face onto the courtyard and in the noon sun there is plenty of shade. It's cool here but not very. The air is not moving much. The trees in the center add to the feeling of freshness however.

I mentioned the possibility of courtyards to Maximo and his reaction was that only the rich colonialists have such courtyards. I said they could possibly have similar courtyards and he agreed.



The argument over adobe vs. ladrillos continues...
The "responsible" at the "Reforma Agraria" claims the people don't like adobe, why he didn't say. (He also said they <u>do not like</u> the "prefabricated, tin and concrete" houses either--too hot!)

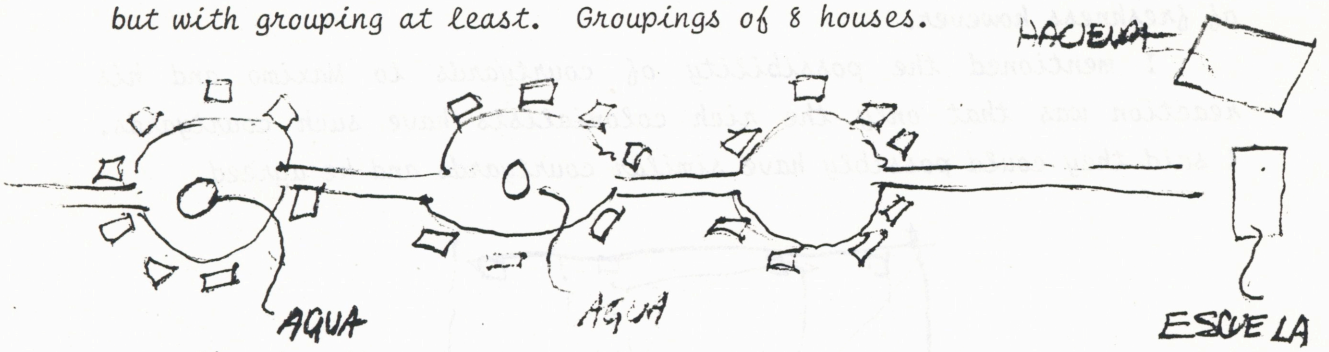
The campesinos at "my" cooperative seem ready to try adobe, because of my cost argument. But I am beginning to have some questions myself: I also spoke with a fellow who is working on the construction of another asentimiento near here. He is not a "Maestro de Obrero" but "casi este" he says ladrillos are faster in construction. I suppose because they are lighter, I'm not sure. Also, he said it is more difficult to build tall with adobe (tall for cooling) because they are heavier also.

2-1-86

I spoke with the local head of Reforma Agraria today. I discovered they do not have a design for Armenia yet! This is good in some ways but bad in that now I'll have much less site information. Although there is supposed to be a map of the site at Midinra in Leon. I got the address so I can get it on my way to Managua.

Also they had the plans for a new asentimiento (for a cooperative) near here. I can get these plans in Leon also.

This design was quite interesting. Very geometrical, regular, but with grouping at least. Groupings of 8 houses.



The immediate problem I saw with this plan was the varying solar/wind orientations of the houses. And the lack of "Center" in the linear arrangement. The groupings of 8 houses around a central water supply was similar to my original concept, but until I looked at this plan, I hadn't thought of the problem of varying orientations.

The construction of the houses themselves is with ladrillos and wood columns, and a roof of tejas. The construction and the planning allows for varying plans and growth of the houses. I was surprised by the simplicity of the drawings. I hope they are actual working drawings. If so, I can rapidly prepare such drawings as a part of my thesis and for construction.


CALLATANO BUCARDO
LUNA
"45" "MACHETE"

2-2-86

My head still aches from last night's bash, lots of rum and "fresco" with my campaneros from the theater cooperative. And I just got back from a day in the mountains with the same group.

At 8:30 this morning after my evening of drinking, I got in the back of a jeep with four musicians, guitars and machine guns. I really had no idea where we were going, except I knew it was some sort of town high in the mountains.

The trip itself was tremendous. We bumped along over a mountain road like the logging roads of Montana, but worse. We had to stop a number of times for bizarre reasons; I felt like Frederico Fellini was hiding somewhere with his camera giving his absurd direction of his twisted reality!

The first time we stopped because a very old mountain woman was easing along at her extremely slow pace right in the middle of a narrow rocky path. Alfonso, a "Frente" member who helps out the group hopped out and carefully approached the toothless old campesina. He touched her shoulder and motioned to the side of the road. The old hag whirled around and tried to wham Alfonso with her cane, and hissed at him like an alley cat. Alfonso jumped back, and ran to the jeep. We took off once again, slowly edging around her as she kept hobbling along just as before.

The mountain people I encountered today reminded me a lot of the inbred, ill-fed Appalachians. I saw a lot of children who looked just a little off in some strange way, crooked eyes or misshapen noses.

Our next stop was even funnier than the first. An ancient couple was walking along the same road many kilometers higher in the mountains. This time the old man had a huge she-pig leashed with a loop around her neck. As our jeep approached he tried to pull the pig out of our way but it wouldn't budge. In his attempt the noose came off the pig and she took off running. The old man and his wife and most of us took off after the escaped pig, running way off the road and higher in the mountains. By the time we got to meadow far from the road, the "chancho" was nowhere in sight. I

was shocked how quickly the ancient couple caught up with us, in hot pursuit of their valuable possession.

While we were looking for the pig I was blown away by the beauty of these mountains. We were high enough to have a tremendous view in the distance near Leon. I felt strangely at home there, I think because of the pine trees. The old couple, the man with his machete and the woman in her colorful dress and shawl, made the whole scene seem like a painting.

One fellow finally caught the pig and shouted his triumphant message to us. We returned to the jeep and I shot a picture of the old couple continuing down the mountain road, their pig once again between them.

It turned out our destination was a "Novena Dia" for a Sandinista Militia man of 23 years killed in combat near Achuapa, 26 kilometers North of the cooperative I'm working at. Achuapa is the town where most of the families in the cooperative are living, until they get their new houses that I'm designing.

So now I don't have to pretend I've been to the funeral of a war victim.

We had to walk the last 2 kilometers or so because the dead man's family lives high above the road. We left the jeep below and walked along this time accompanied by 3 or 4 local militia men and more machine guns.

There were dozens of people at the wake and they seemed happy to have the musicians come. We ate the traditional Nica "nacatal" the same moist bread and pig meat that I had only once before: at my first "Novena Dia."

The mother of the dead boy really struck me by her gentle femininity and warm manner. She looked beautiful with her mourning cloth on her head.

After the meal I joined the musicians and a few of our hosts in a secretive drinking of "cucusa," the campesino corn whiskey. It was secretive because they didn't want everyone drinking and disrupting the wake. "Cucusa" is legal now, but in Somoza's time the Guard killed and jailed many campesinos for producing it.

I spent my time drawing and photographing the people and the mountains. I joined in during a long, solemn gathering in the house in front of the altar made of pine branches and flowers.

As the people were singing and praying I became very emotional inside, as I witnessed the tragic results of Reagan's dirty war against these people. That son of a bitch.

On the way back we rolled to a slow stop when we saw a soldier running across the road and into the woods. Alfonso grabbed the AK I was holding as he and my "guitaristas" clicked their AKs into automatic and dropped a shell into the chamber. I really thought that this might be it. The 2 "frente" soldiers jumped out and walked slowly into the woods with their AKs in hand, but they luckily found only a drunk campesino in army fatigues.

A few kilometers further on we got a flat and had to walk the last 4 or 5 miles into El Sauce. I'm waiting now for the rest of the group to return with the truck so we can head back to the cooperative. I was going to drive the "rescue" car because they couldn't find a driver (not many people know how to drive up here, they ride horses or ox-carts more than cars) but Alfonso, the cautious as hell "Frente" member, though it would be dangerous for me to go in the night, so they found another driver.

I haven't spoken English since Sunday night in Leon one week ago when I had a long chat with a British cotton merchant. One week without English is pretty bizarre. I'm extraordinarily quiet a lot of the time! My Spanish is still really lousy and hardly seems to be improving.

I discovered yesterday I don't have to go to Managua to renew my visa, there is an immigration office in Leon. I'm going to head there on Tuesday with the theater cooperative. So I'm going to come back here and continue working on my project right here. I found out yesterday they really don't have a design yet for the coop! So I'll need more time developing the program and I might have to map the site, although there is supposed to be a map.

I've been thinking of new ways to work on my design. One idea I had today was this: I should live with one of the coop's families

for 3 or 4 days and carefully observe their manner of living. I can draw all the various utensils and tasks of the women and really get a better understanding of what is needed.

Also, I'm going to continue with my cost analysis and I'll also visit the new construction of a similar coop near here. So things are definitely moving along and always exciting!

It's getting late (10:30) and my friends aren't back yet. I hope they don't have any trouble. I am exhausted after this long, adventurous day.

THIRD WORLD

I in Managua
You in Montana,
The world's so big; the world's so small.
I must feel you in it, or feel nothing at all.

I in Managua
You in Montana...

You live within the hatred; I live within the pain,
I need to hide inside you; the world's so insane.
But here I cannot hide; here I must see all
And naked I am, and naked I crawl.
I crawl amongst these people
Naked one and all
We try to hide inside you
But you are much too small
And you are there with him
And he is standing tall.

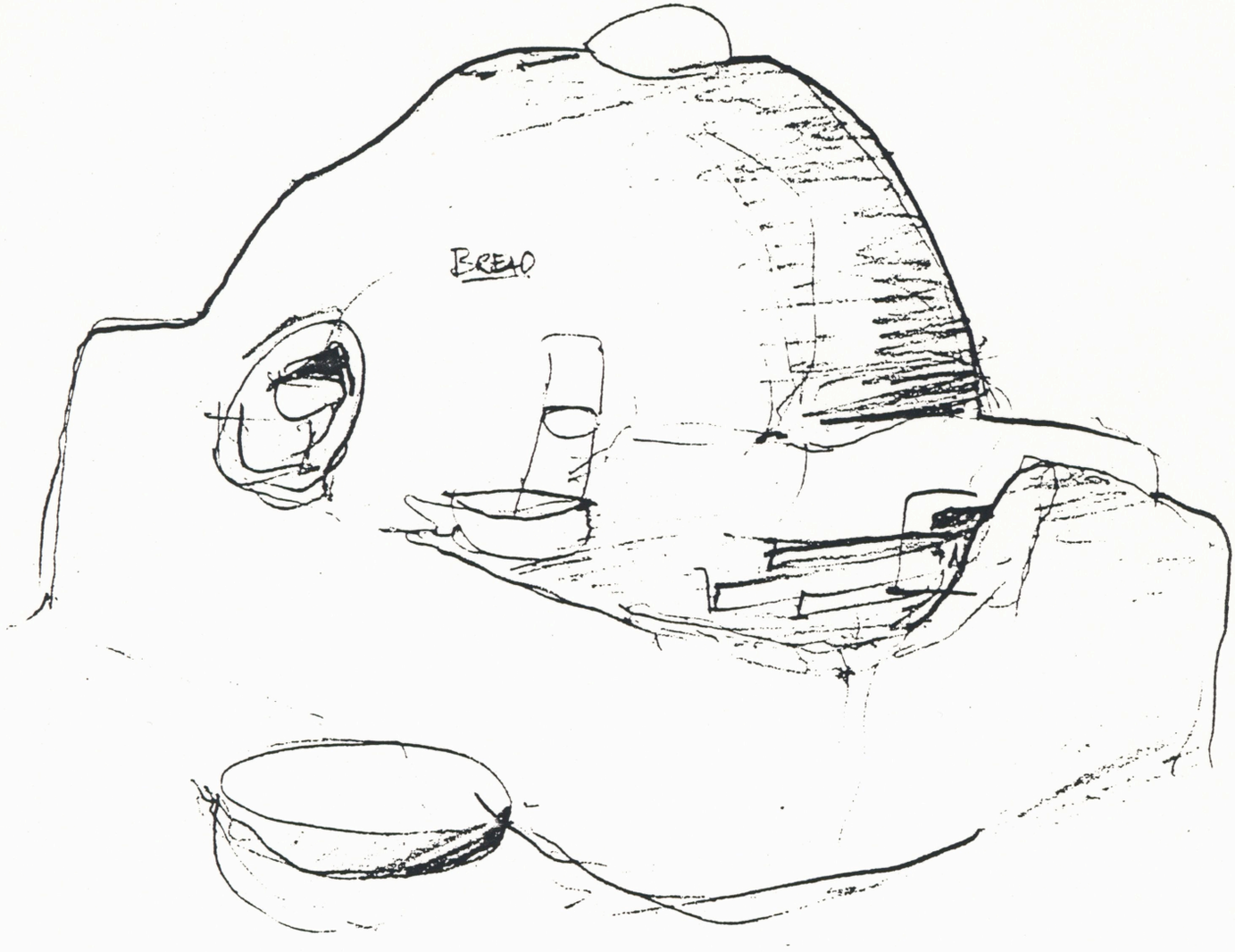
I in Managua
You in Montana...

He stands across the borders
And looks down on us so small
And with his ugly grimace
He hopes to make us fall
The bastard has great strength
And therefore thinks he's strong
But we who crawl so naked
Know that he is wrong

I in Managua
You in Montana,
The world's so big; the world's so small
Just as we feel, so shall he fall.

Daniel J. Glenn
January 10, 1986




BREAD

Programmed Spaces	Estimated Square Footage
°35 Houses (Casitas)	±600-900 ft² (each)
°1 Theater Cooperative Compound -Housing for 8-12 members (some with families) -Ampi-theater	±4,800-7,800 ft²
°1 Elementary School	±2,500 ft²
°1 Medical Clinic	±800 ft²
°1 General Store	±500 ft²
°1 Baseball/Recreation Park	Undetermined
TOTAL: (- park)	±36,050 ft²

SUMMARY OF DESIGN CRITERIA

DESIGN CONSTRAINTS	SUGGESTED SOLUTIONS
Seismic movement	-Symmetry in plan -Single story -Horizontal rigidity -Light weight construction -Research into seismic reinforcement of traditional techniques
High Temperatures (Dry season)	-Orientation to limit effects of solar radiation -Good ventilation -Overhanging roofs -Shading devices (including grass roof extensions) -Dense construction materials with long solar lag. -Natural shade (trees) -High ceiling (if possible) -Stone, tile, or concrete floor
Heavy Rains (Rainy season)	-Proper drainage around buildings -overhanging roofs -Covered walkways -"Paved" pathways -Raised floor (if possible, tiled) -Water-resistant materials (fired brick or cement stucco adobe) -Planting throughout site
Costly, Innefficient Transportation	-Use of locally available, locally manufactured materials
Extremely Restricted Budget ($300/house, Gov't. loan)	-Use of local materials -Use of appropriate technology -Self-help construction -Volunteer architect -Fund-raising activities °U.S. Churches, organizations, etc. °Europe: Theater Coop Contributions
"Contra" Attack Potential	-Concentrated site plan (for communally shared guard-duty) -Centrally located arms garrison -Strategically located trenches -Active protesting of U.S. aid to Contras

DESIGN CONSTRAINTS	SUGGESTED SOLUTIONS (Continued)
"Campesino" Individualistic Lifestyle	-Enlarged individual yards for chickens, pigs, etc. -"Sense" of privacy through low walls, vegetation, etc.
Revolutionary Goal of Communal Action	-Use of shared space: well springs, baseball park, centrally located school, etc. -Interlaced walkways -Performance "theater" for theater cooperative
TIME (Urgent removal of families from war zone in Achuapa, 26 k. north)	-Construction planning: war zone families have priority -Possible emergency temporary housing during construction
"Infatuation" with Western Products	-Education -Appeasement
Lack of Sanitary Facilities	-Pit Latrines (possible fertilizer source) [See APPENDIX E]
Open Fires	-Enclosed stoves, possibly "Lorena" [See APPENDIX E] -Location in seperate space -Oriented by wind direction
Lack of Sinks/Showers	-Adapted variations of the cement basin in cement-stuccoed mud -Creation of wet area, connected shower/ wash basin -Possible communal clothes washing centers

DESIGN CONSIDERATIONS

LIGHTING	If possible, I would like to incorporate some of the extraordinary filtered effects of light through slatted structures and fabric filters (within existing homes).
ATMOSPHERE	"Self-consciously unconscious" design approach to create informal, warm, inviting environments.
DETAILING	Borrowed details of alternated brick patterns, hanging shelves, roof clerestory lighting, connections adobe "punched hole" windows, grass thatched roofing (in certain areas), hung fabrics, etc.
IMAGE	"Horno Campesino"—Peasant oven. The curved sensuous beauty of the campesino is an inspiration for the whole structure, and the "horno" itself can provide a tremendous sense of center within the structure.

SUBJECTIVE ANALYSIS

What do the Campesinos want?

1. Security
2. Physical Comfort
3. Convenience
4. Privacy
5. Justification for Pride
   - -Ownership
   - -Control over their lives
   - -"Beautiful" things
   - -Opportunity for advancement
6. Education

What does the Revolution want?

1. Security
2. Sufficient food for all.
3. Mass housing
4. Health Care
5. Education
6. Cooperation
   - -United work force
   - -Ground for maximum social interaction/protection
   - -Model design

Security: -Safety from Contras

-Safety from wealthy power (large landowners)

-Close grouping of houses

-Central garrison

-Fire-resistant materials

Physical Comfort: -Cool houses

-Rain-proof roofs

-Protection from insects

-Isolation from smoke

-Storage

-Flexibility
-Clean water
-Showers
-PLENTY TO EAT
-Massive materials
-Orientation/Ventilation for cooling winds
-"sealed" houses
-tile roofs
-movable interior walls
-dry floors (proper drainage)

Privacy: -Isolated living
-Rural vs. Urban
-OPEN SPACE
-Large area for "field elimination"
-Space for individual animals/crops
-Individual plots i.e. suburban setting
-Latrines (eliminates large are for waste)
-Individual yard space
-Open views in at least one direction
-Delineation of private vs. public space
-Organic vs. Grid plan

HOUSE FLOOR PLANS

INTERIOR ELEMENTS:

1. Living room
2. Kitchen
3. Bedrooms
4. Storage

EXTERIOR ELEMENTS:

1. Wet area—shower, lav.
2. Latrine (individual or communal)
3. Porch (dining area)
4. Water
5. Clothes drying
6. Garden
7. Animals
8. Waste disposal
9. Children play area.

PRIMARY GOALS OF PLAN

-Isolate kitchen from house (division between kitchen and living room)

-Orientate kitchen by wind direction.

-Place bedrooms on perimeter

-Provide storage area

-Flexible interior walls

-Provide outdoor dining area

-Wet area

—sink for dish/clothes washing

—shower

-Provide large "Sala" (living room)

-Covered porch area.

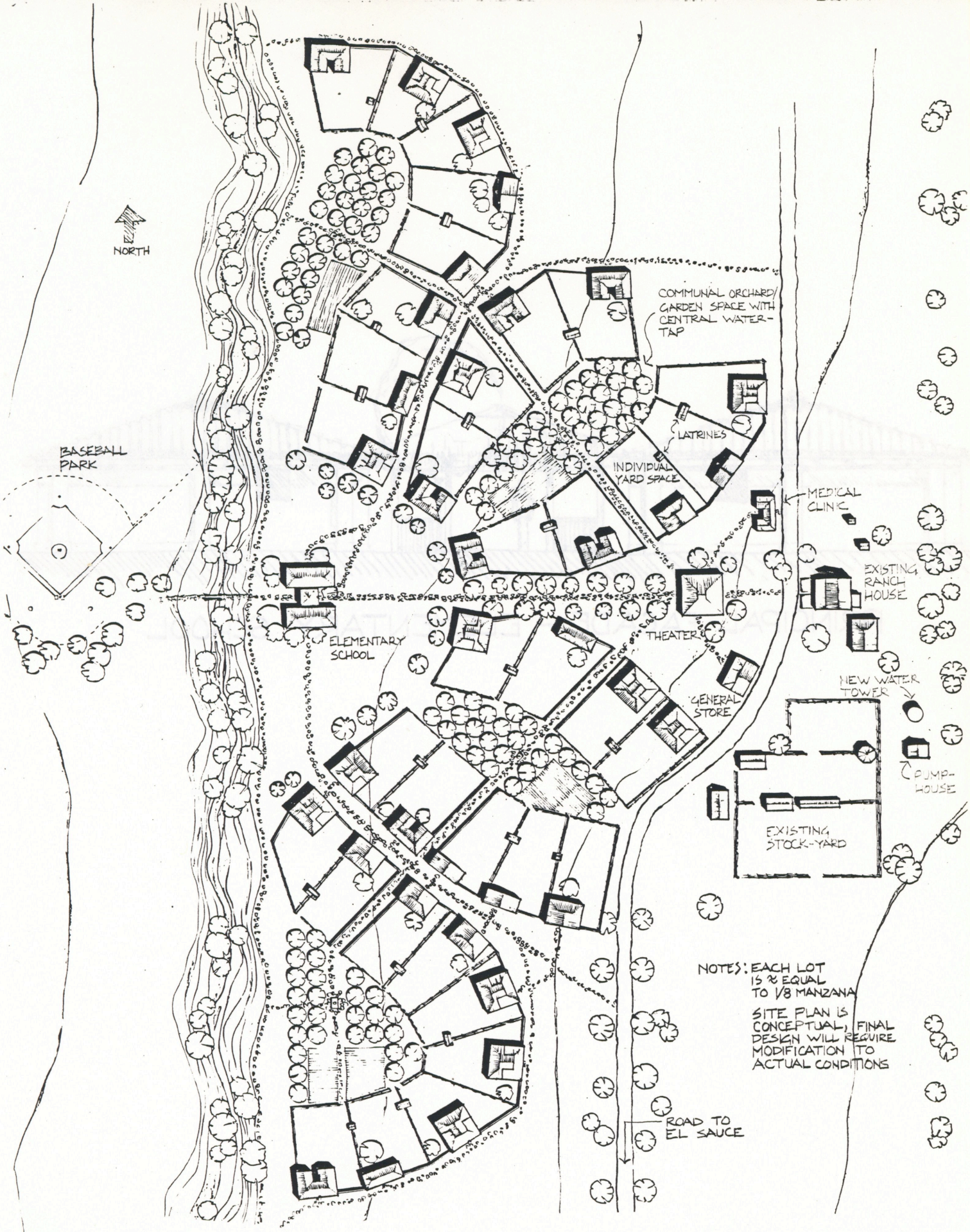
SITE PLAN—SOME THOUGHTS

1. New Discoveries: Water and Growth must be primary consideration of site plan.

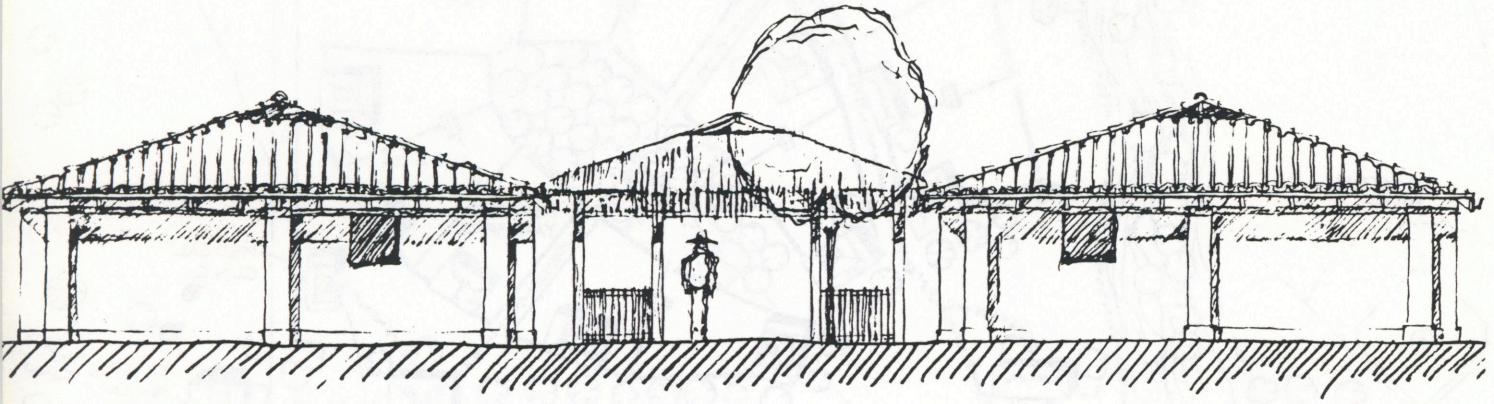
   WATER: The simplest, most reliable source would probably be a water tower located on high ground, filled with both rain water and pumped water (using existing on-site pump). [The tower would also be valuable as a day-time lookout tower for defense.] Luckily, my site plan is readily adaptable to a water tower branch-fed system, with two primary branches stemming off on either side of the dividing axis.

   GROWTH: Although the program seems to call for a limit of 35 houses, Eddie points out that such a limit would likely add to the migration to the city by the peasant youth. Given the rapid family growth, a plan ought to allow for the incorporation of sons (and daughters) into the coop. Once again, my site plan with its radial plan is well adaptable to growth by extending the radial branches.

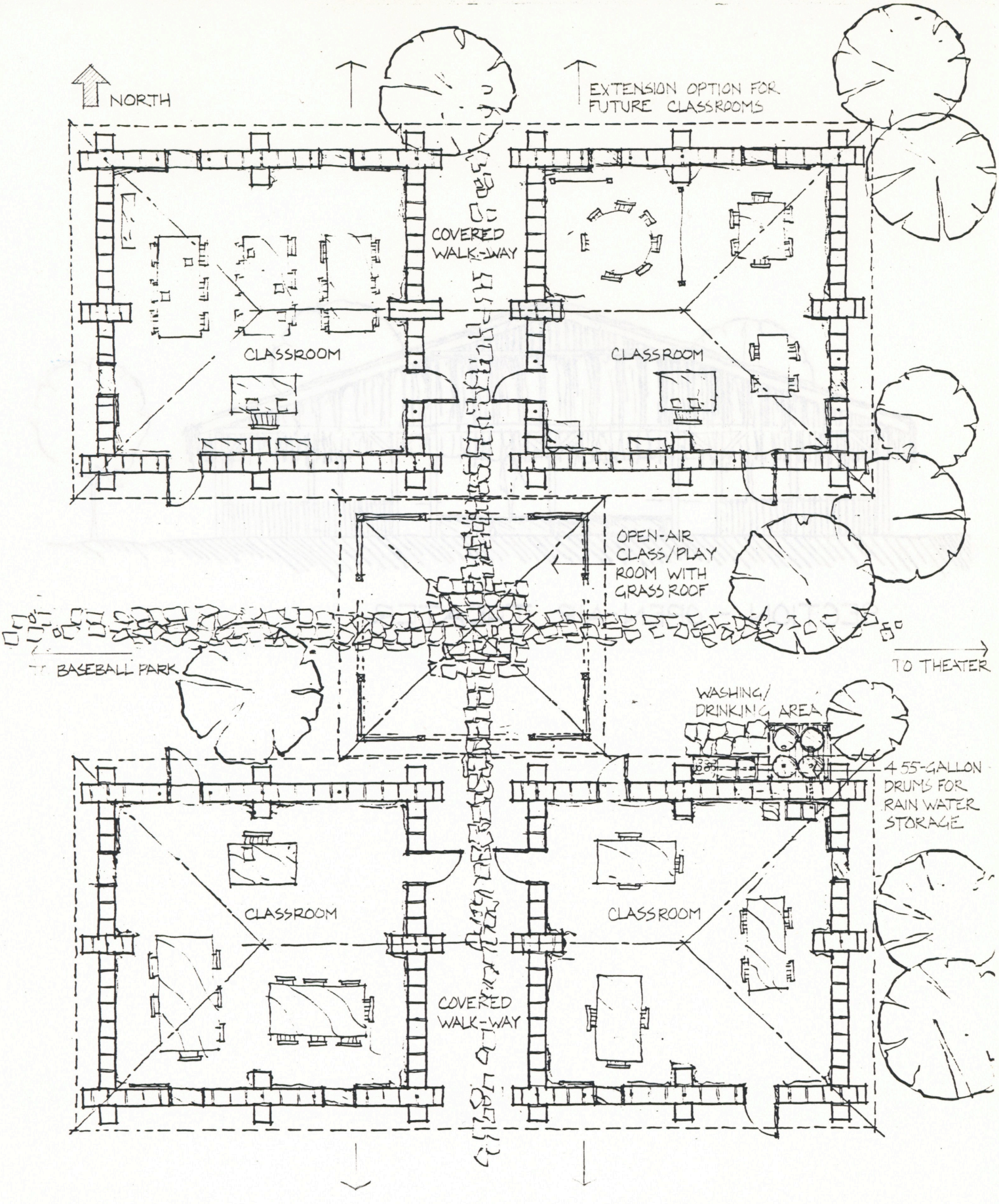




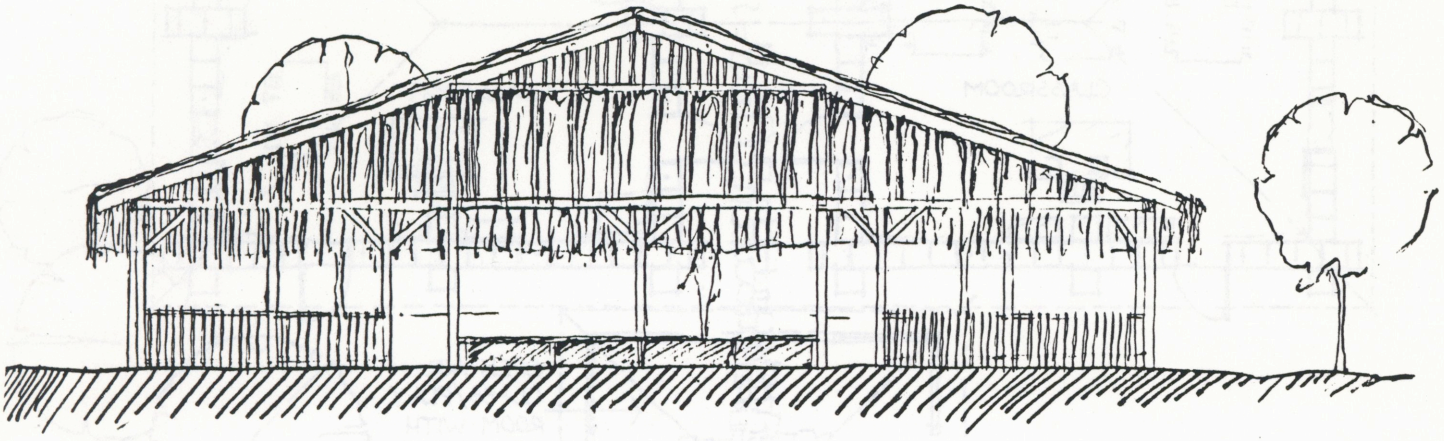
SITE PLAN – LUIS VELASQUEZ PALMA RANCH COOPERATIVE



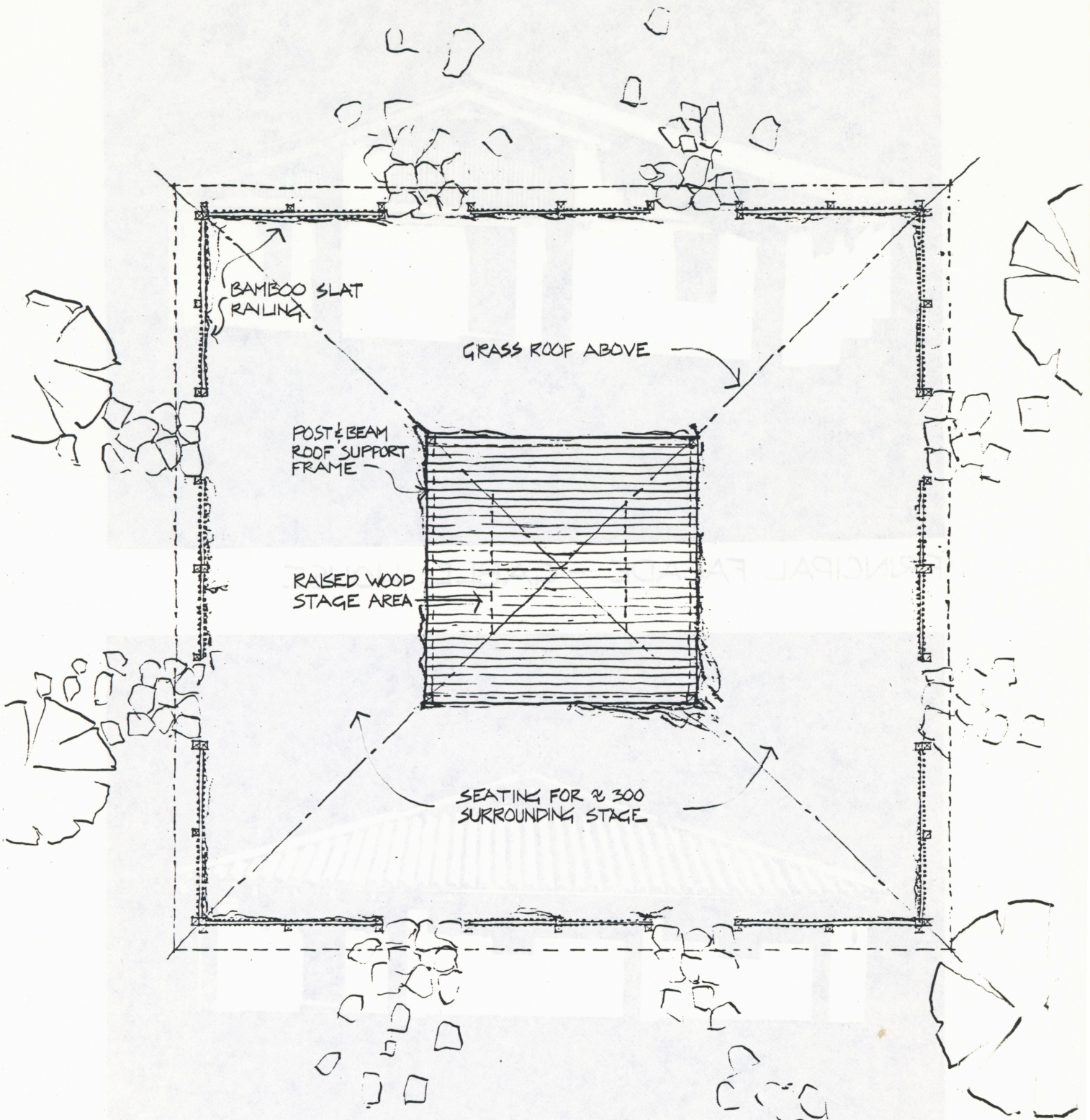
PRINCIPAL FACADE - ELEMENTARY SCHOOL



PLAN - ELEMENTARY SCHOOL

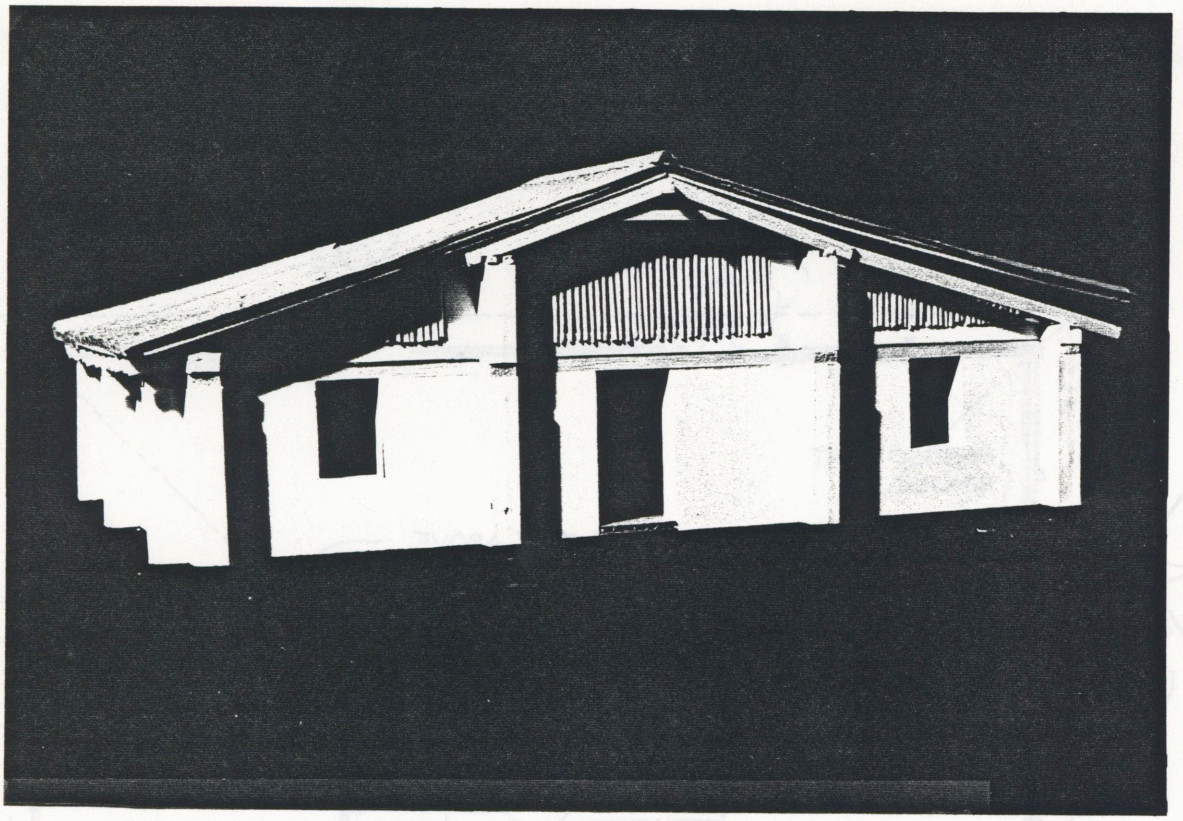


SECTION - OPEN-AIR THEATER

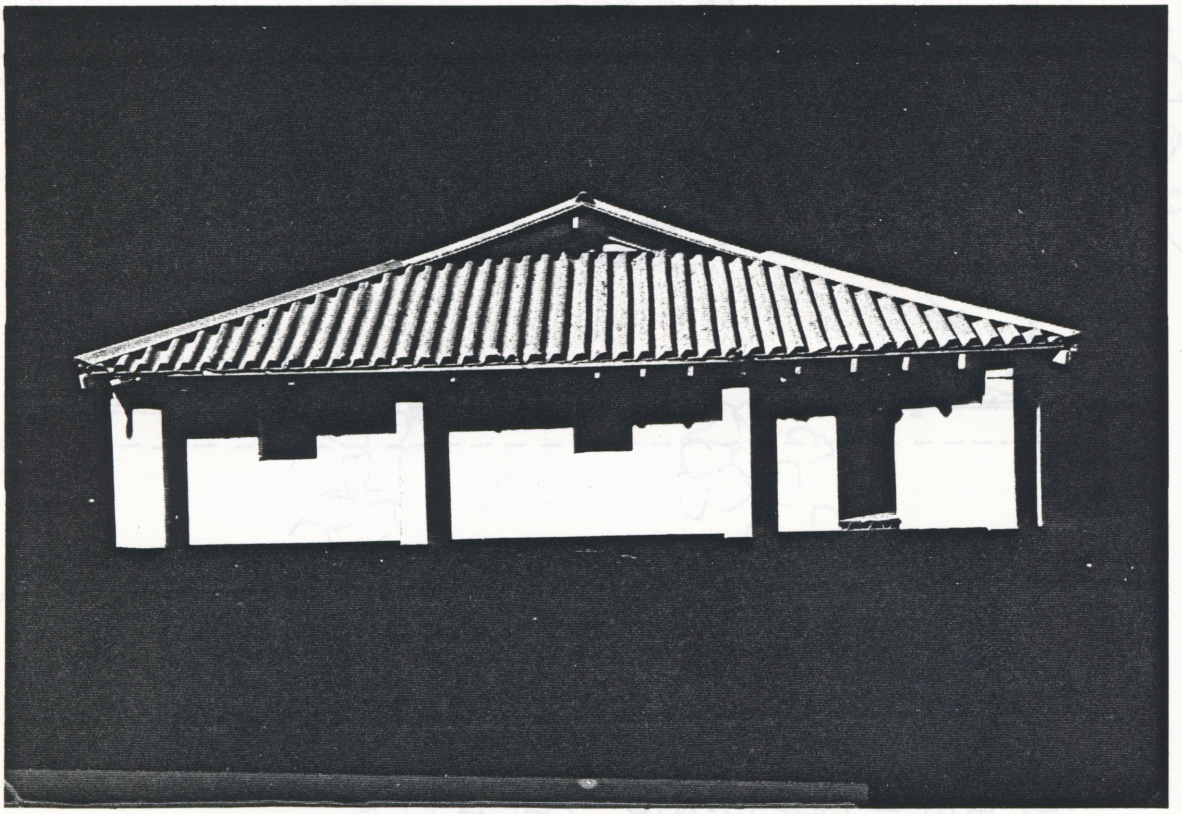


PLAN - OPEN-AIR THEATER

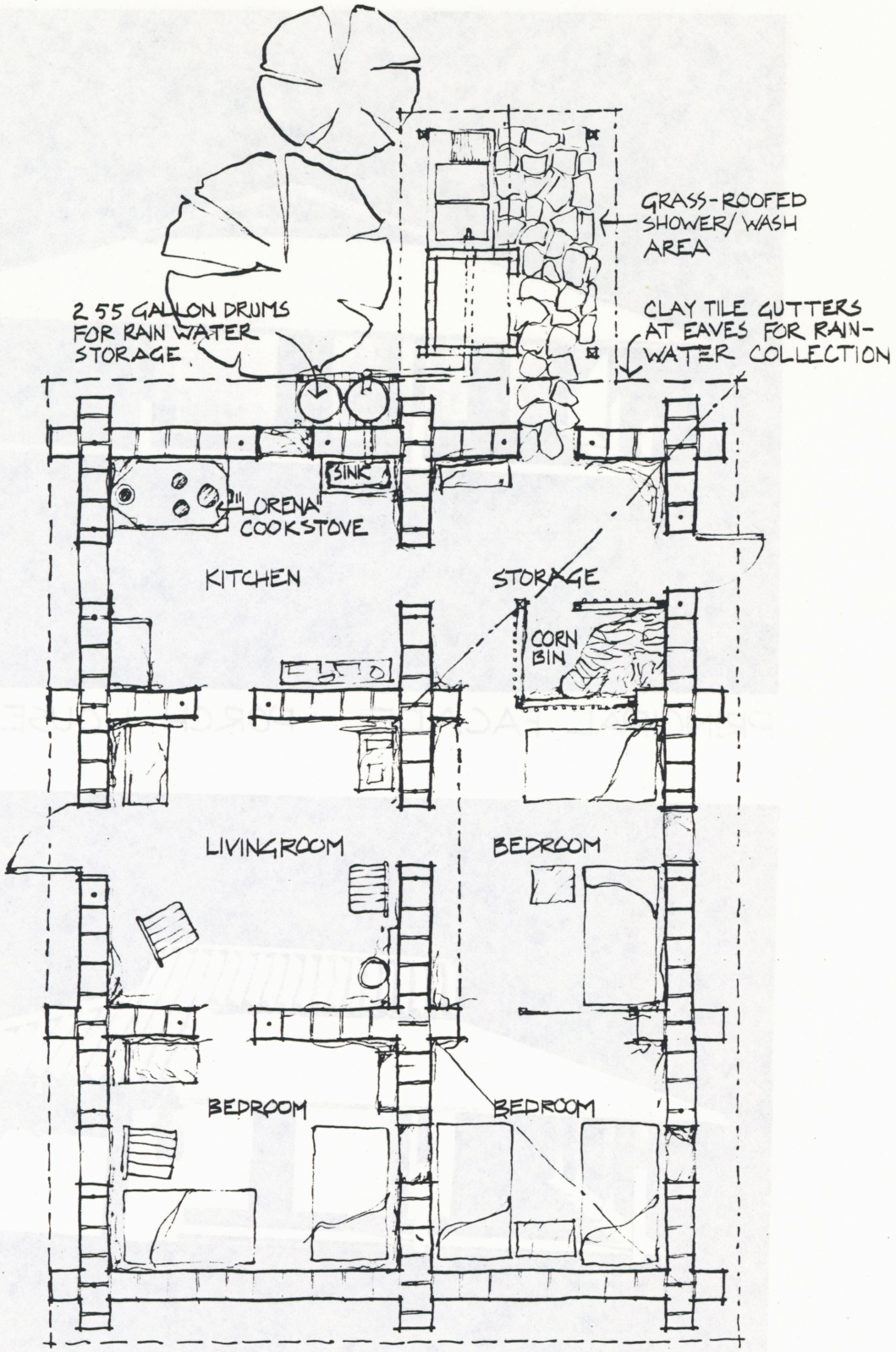
0 5 10 M



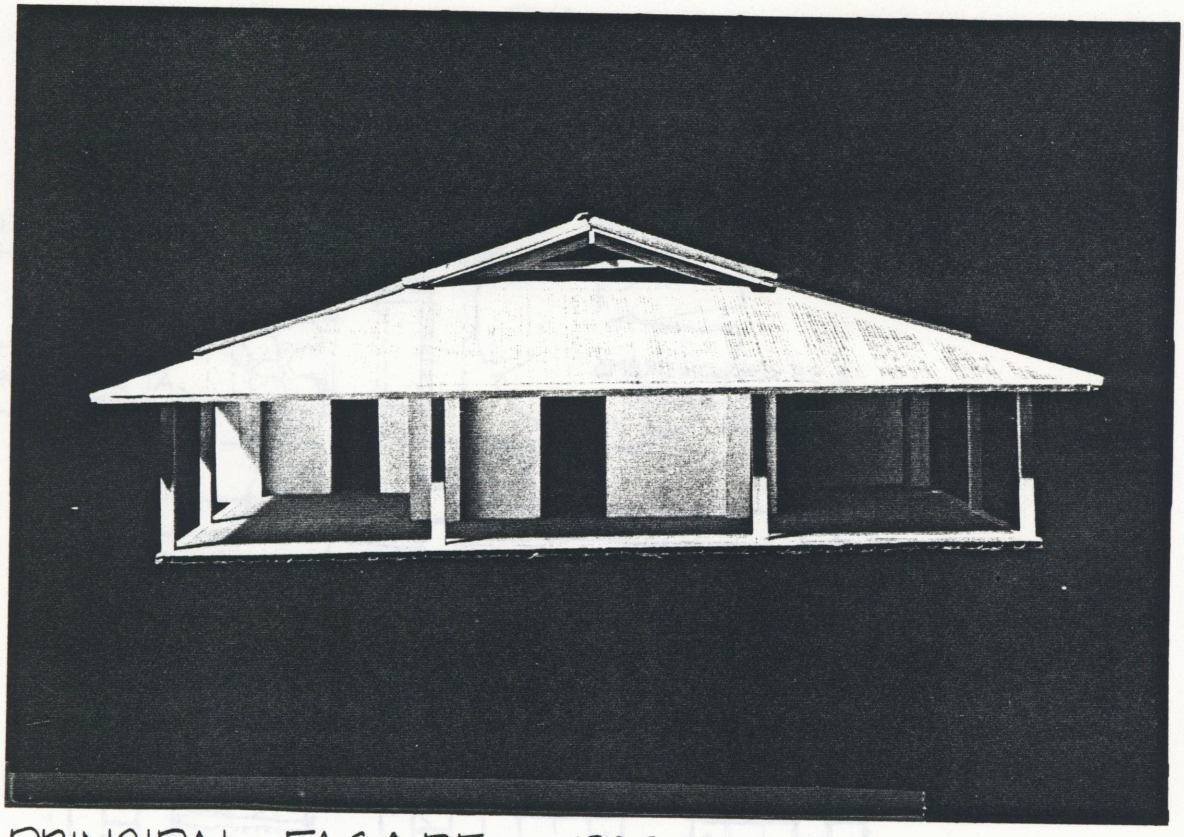
PRINCIPAL FACADE - GABLE HOUSE



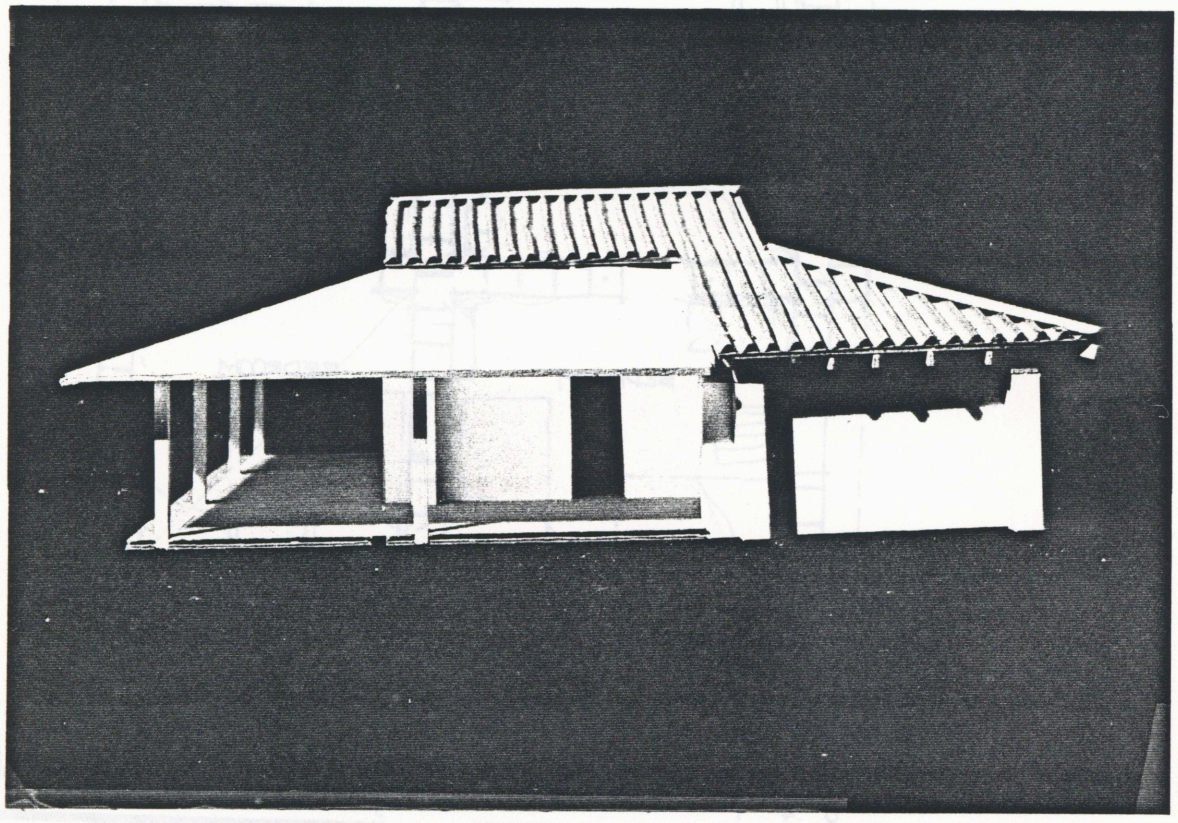
REAR FACADE - GABLE HOUSE



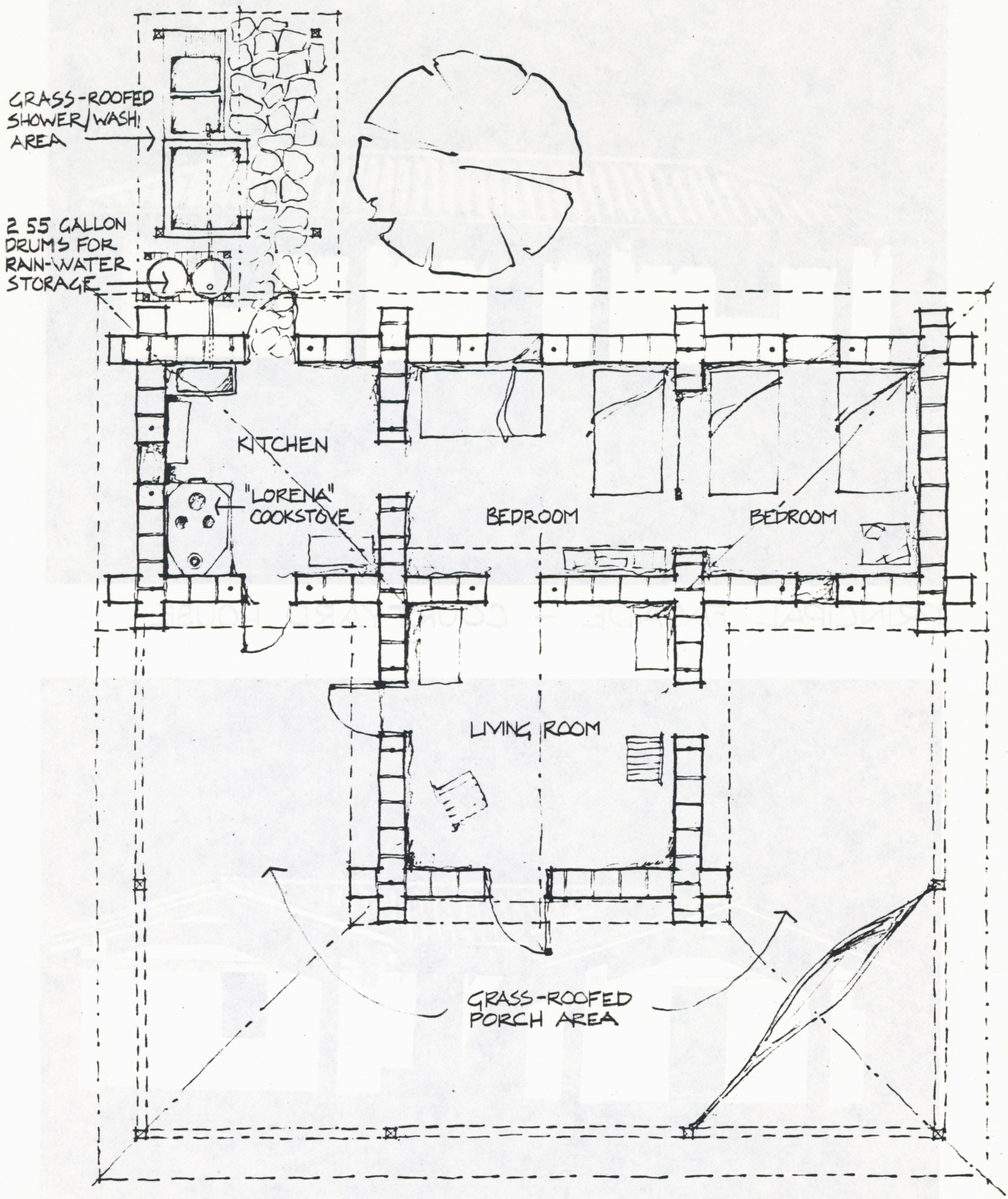
PLAN - 1-3 BEDROOM GABLE HOUSE



PRINCIPAL FACADE - PORCH HOUSE

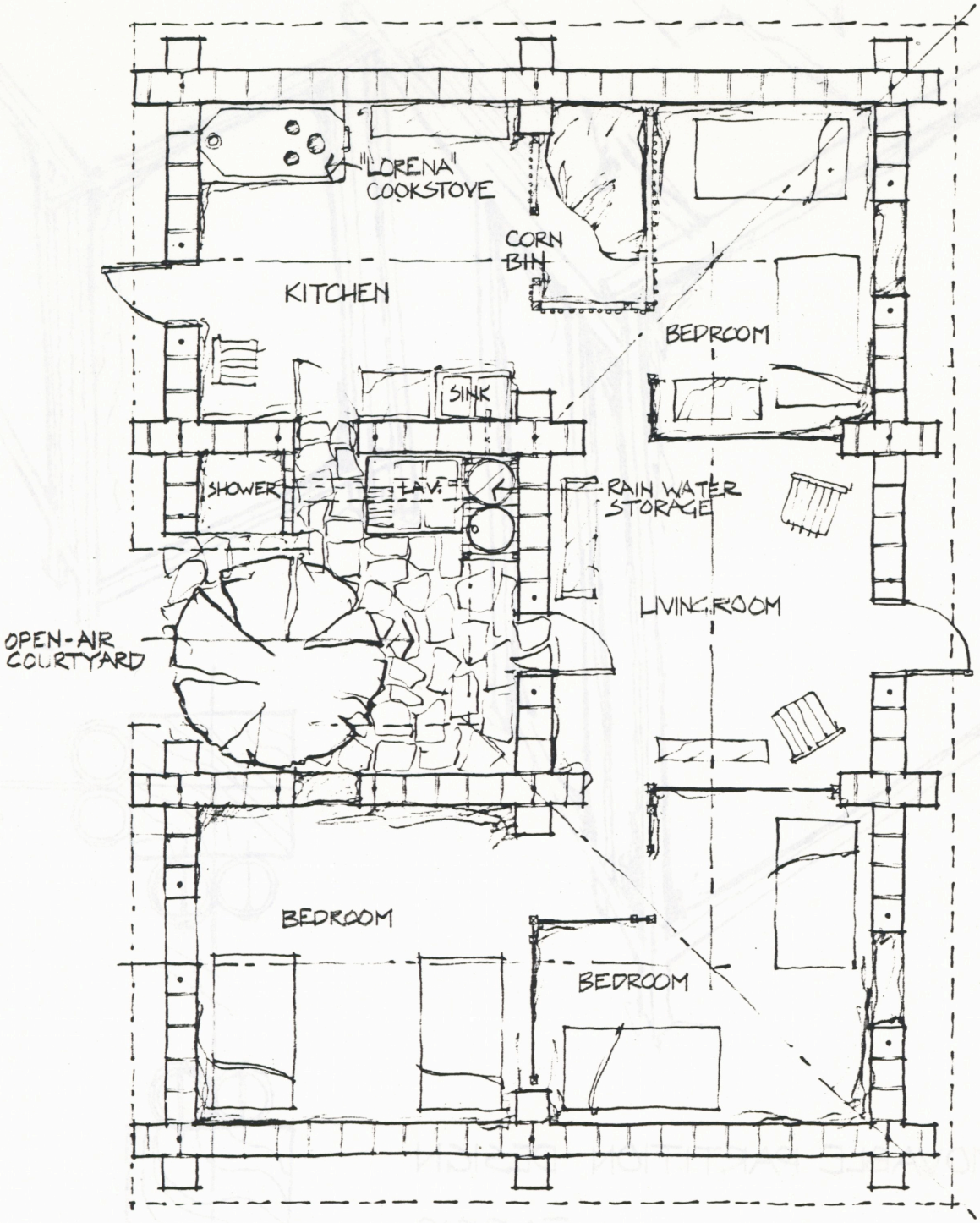


SIDE FACADE - PORCH HOUSE



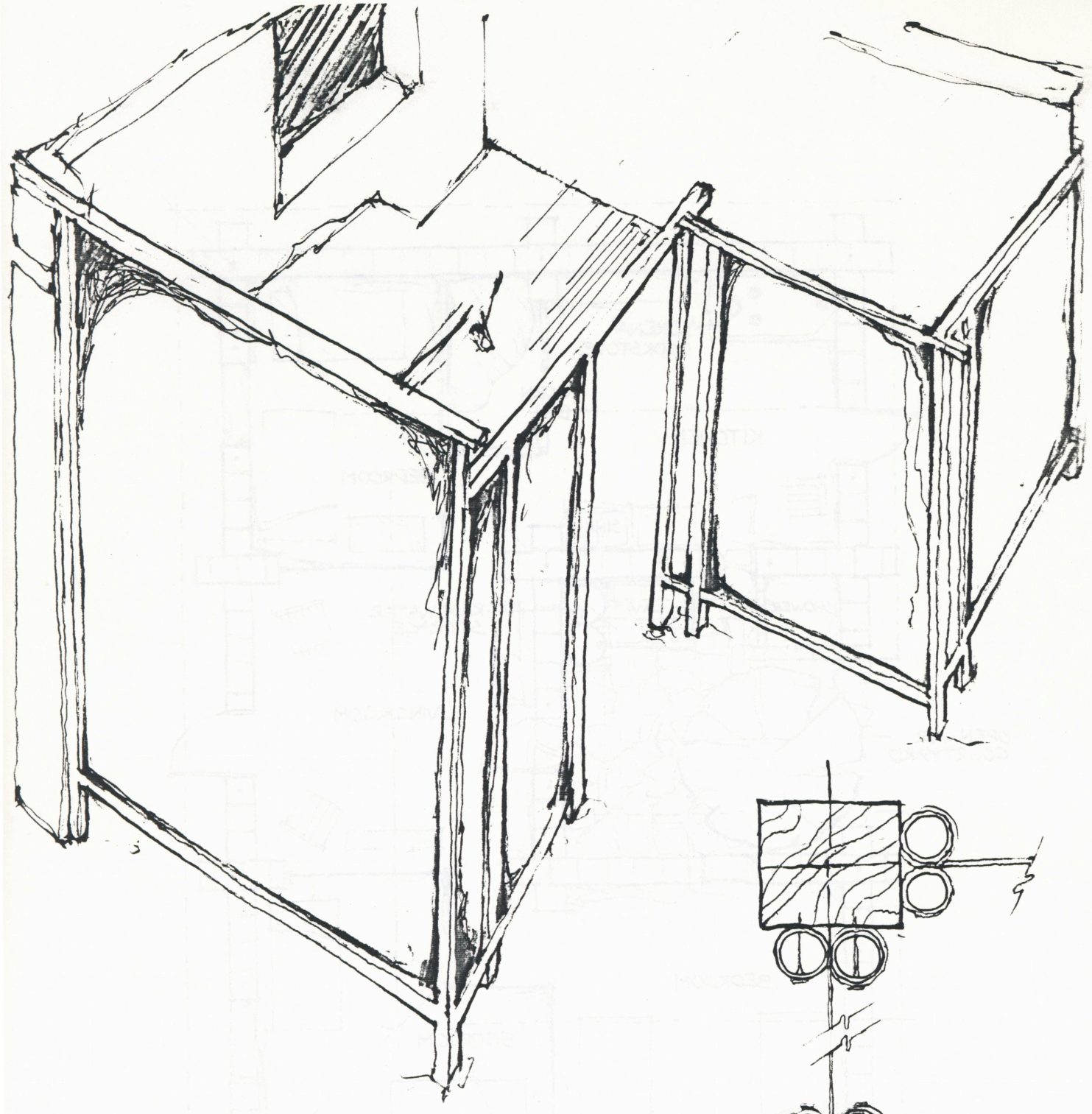
PLAN - 2 BEDROOM PORCH HOUSE

0 .4 1 5 10M



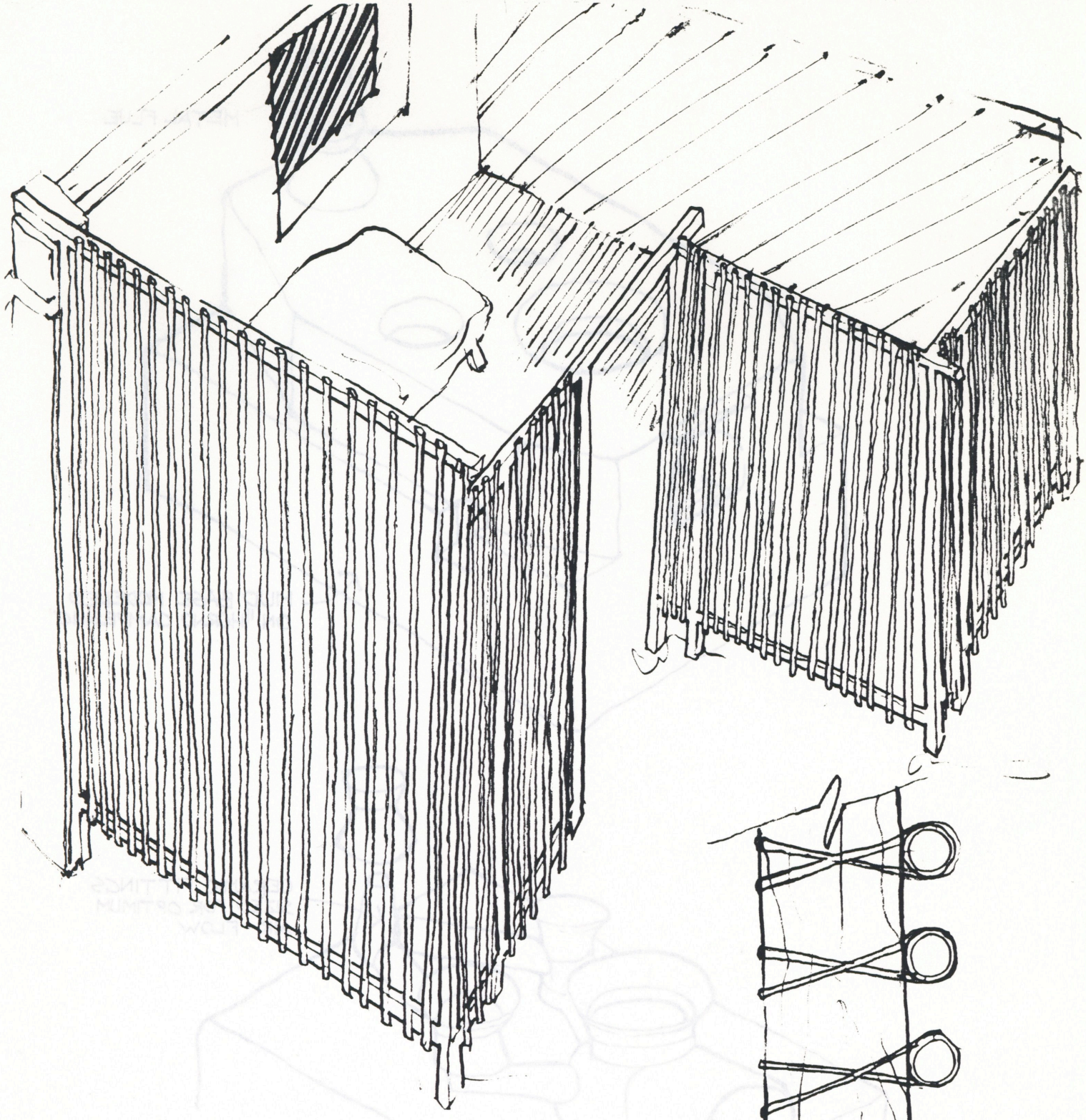
PLAN - 3 BEDROOM COURTYARD HOUSE

0 .4 1 5 10M



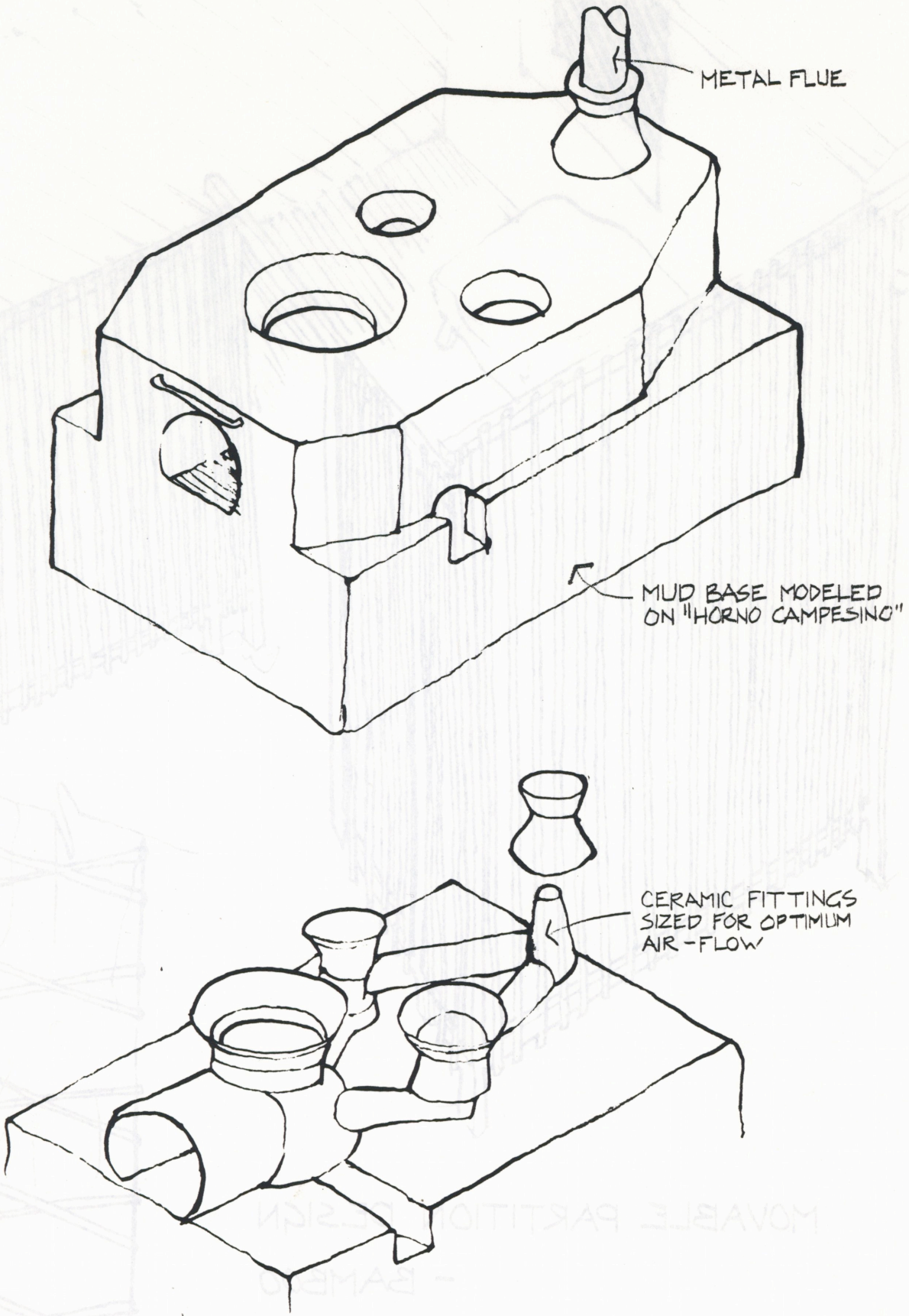
MOVABLE PARTITION DESIGN

- FABRIC



MOVABLE PARTITION DESIGN

- BAMBOO



MODIFIED "LORENA" COOKSTOVE (SEE APPENDIX E)



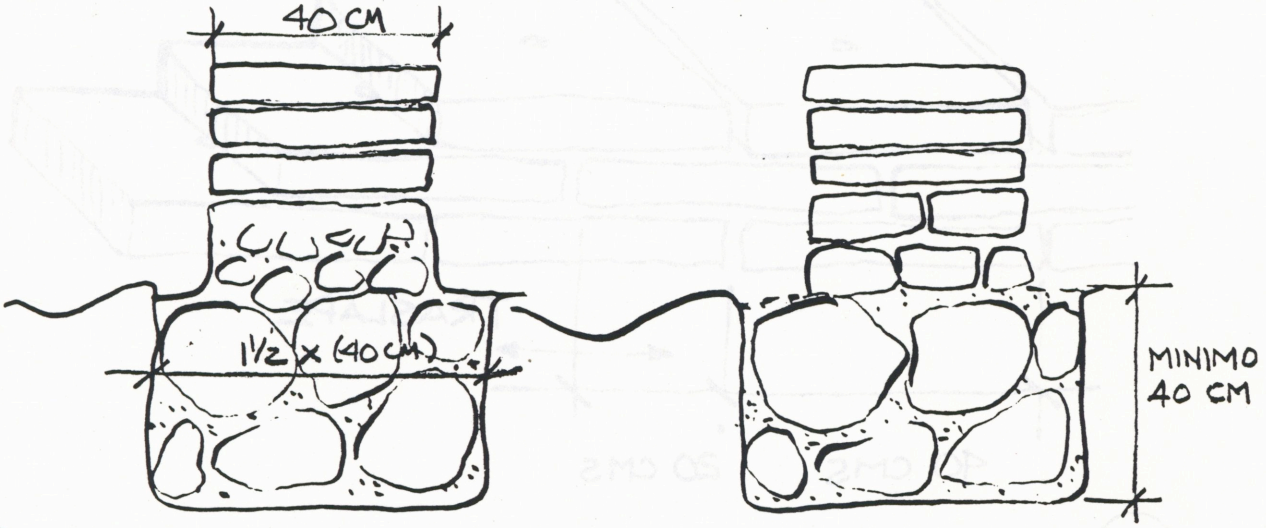


CEMENTO
1 PARTE

ARENA
4 PARTES

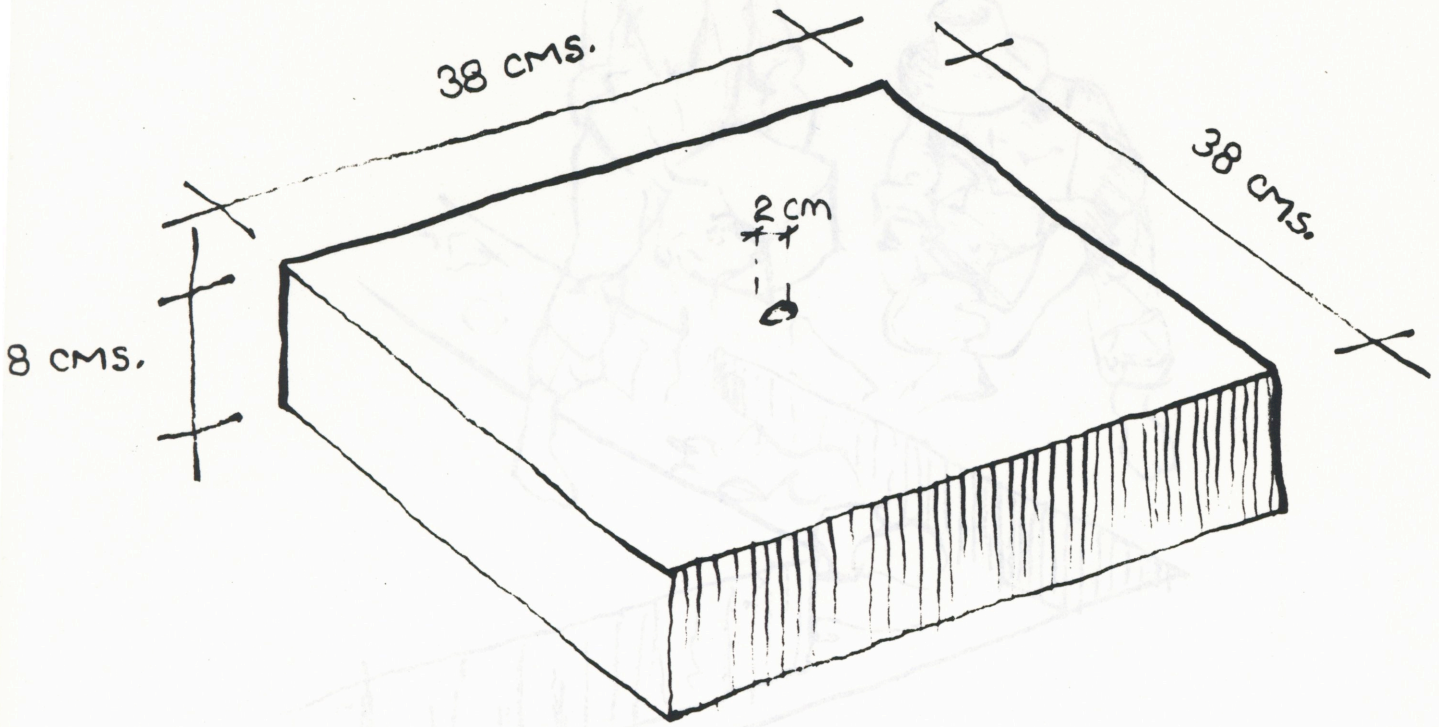
GRAVILLA
6 PARTES

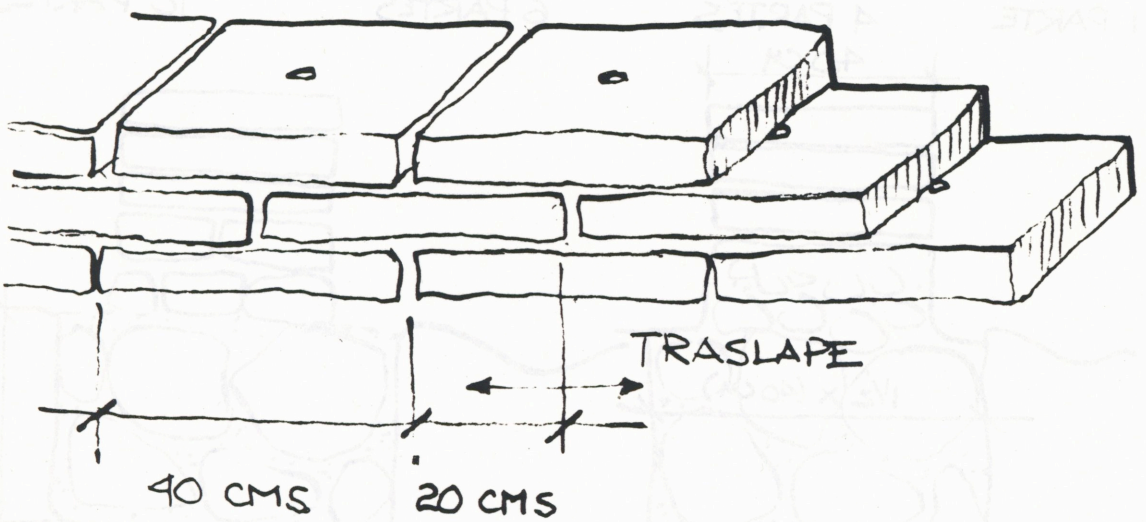
PIEDRA
10 PARTES



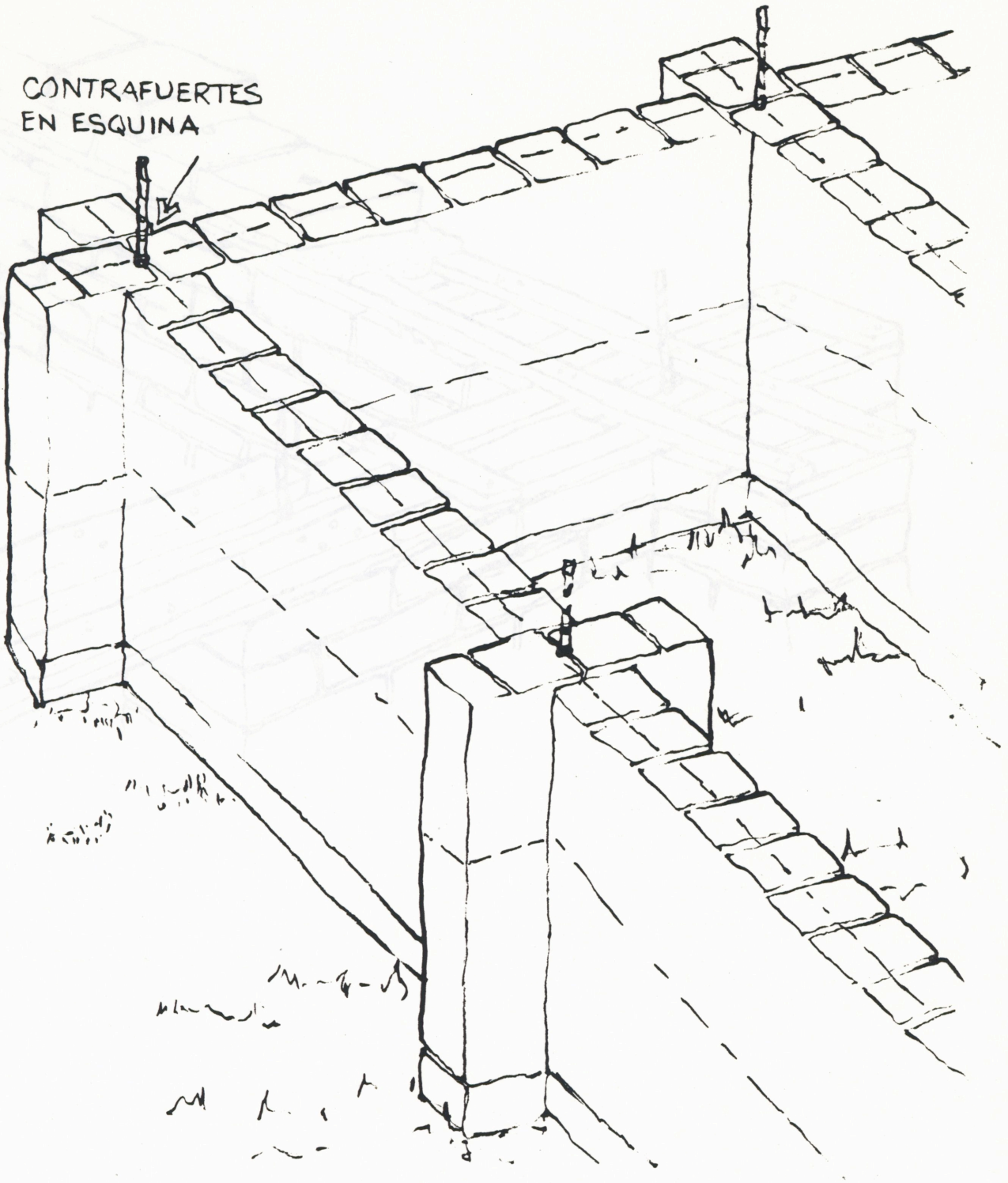
(1) FOUNDATION

(THE FOLLOWING DRAWINGS DEPICT AN ADOBE CONSTRUCTION METHOD DEVELOPED BY MARIO VASCONEZ WITH MODIFICATIONS BY DANIEL GLENN, SEE APPENDIX D)

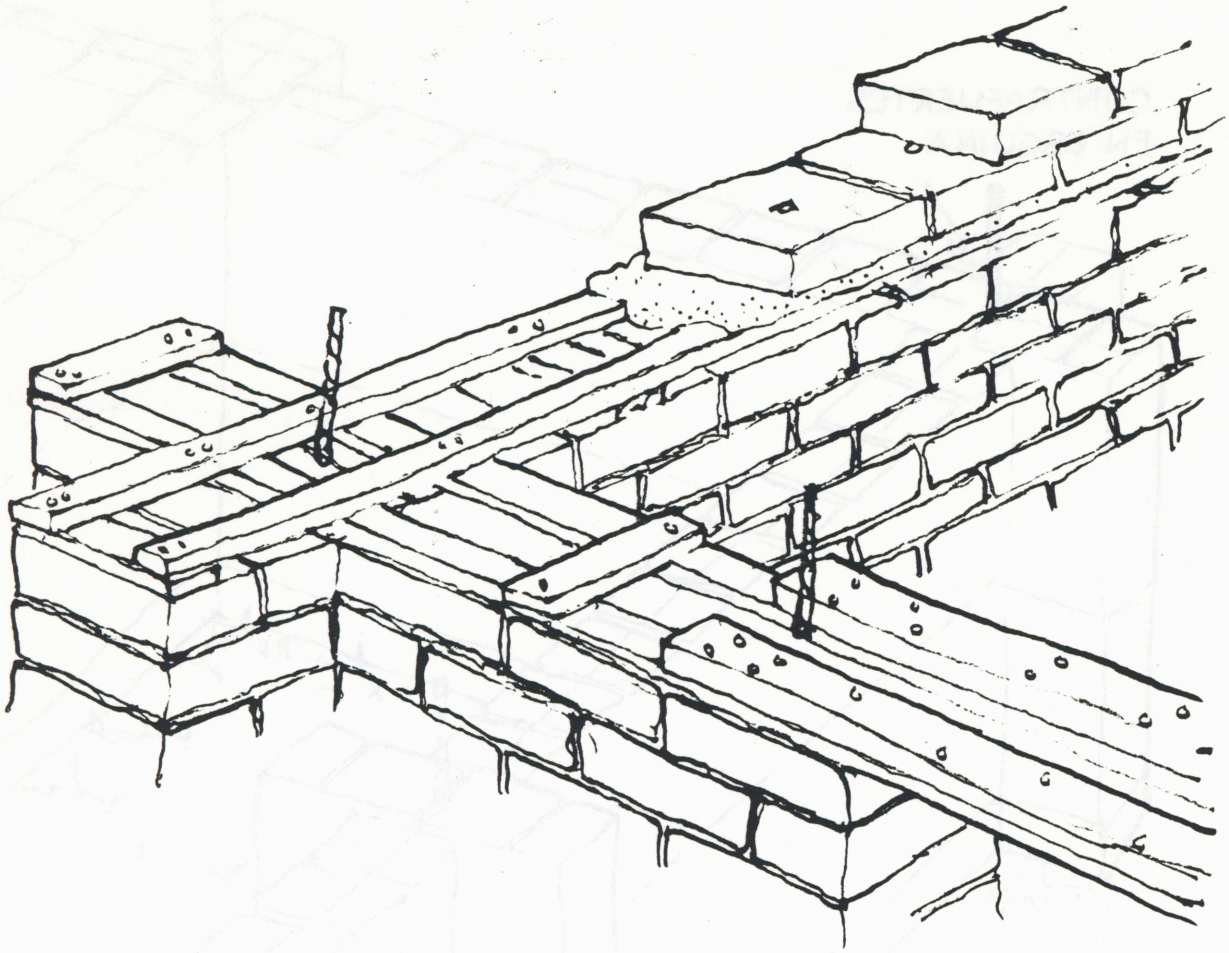




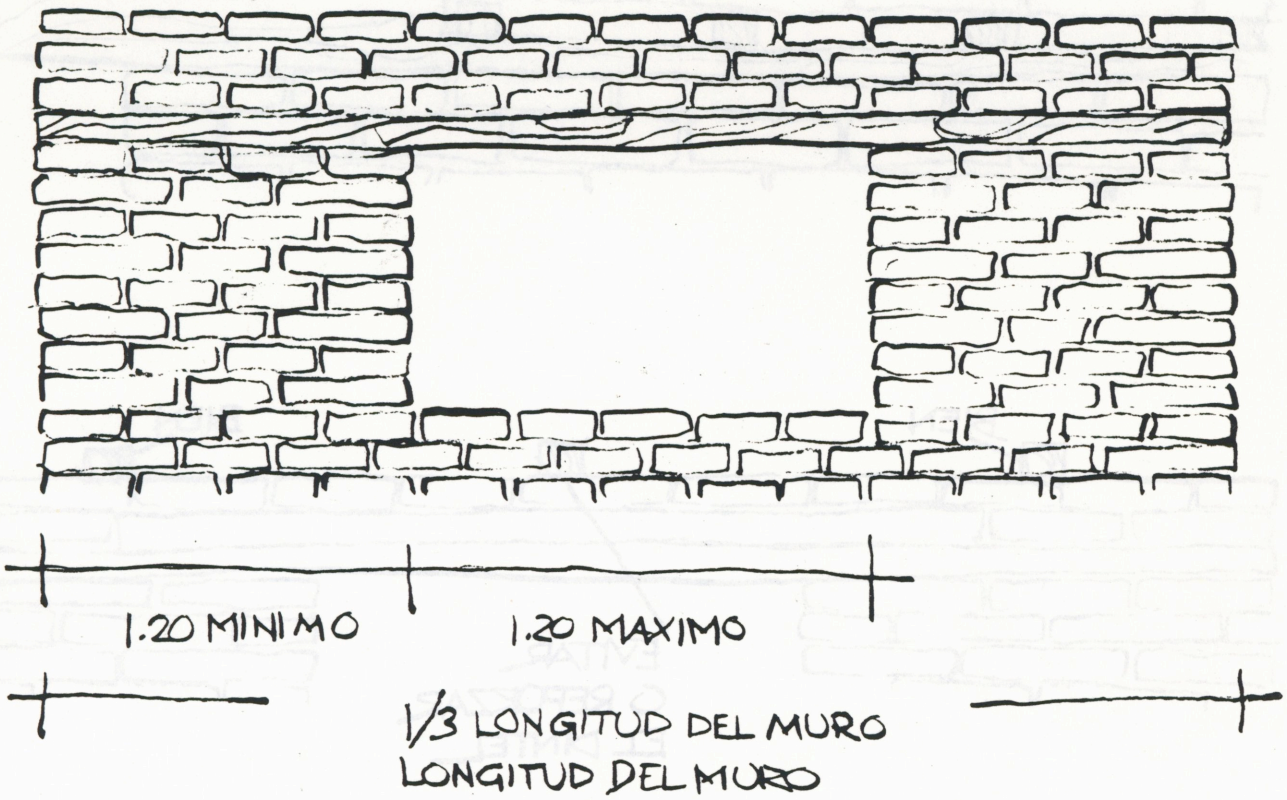
(2) MODIFIED ADOBE BLOCK

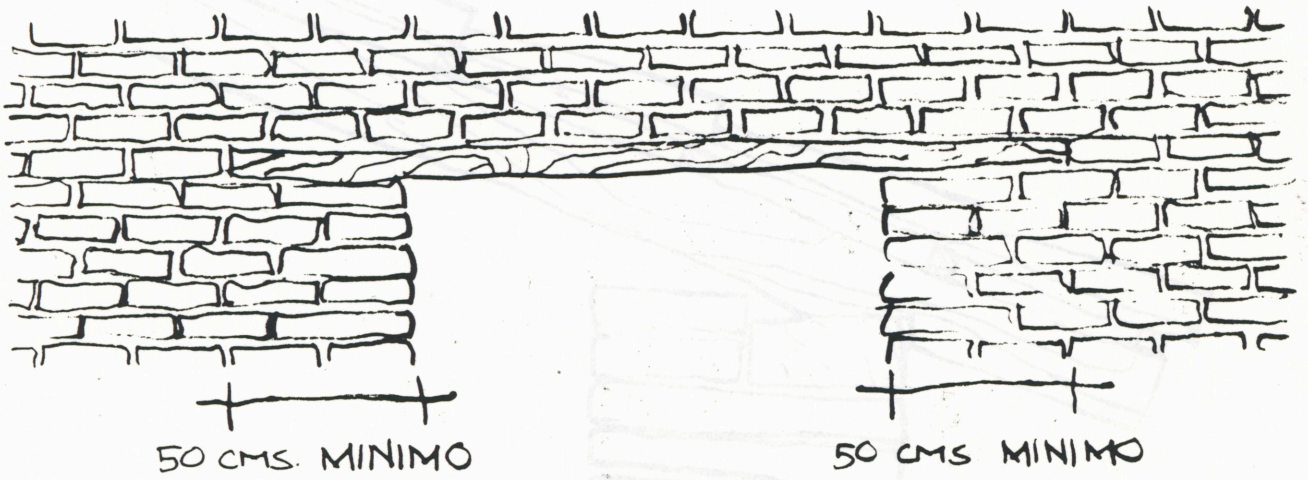


(3) WALL REINFORCEMENT (OPTIONAL, MUST BE SITE-TESTED)

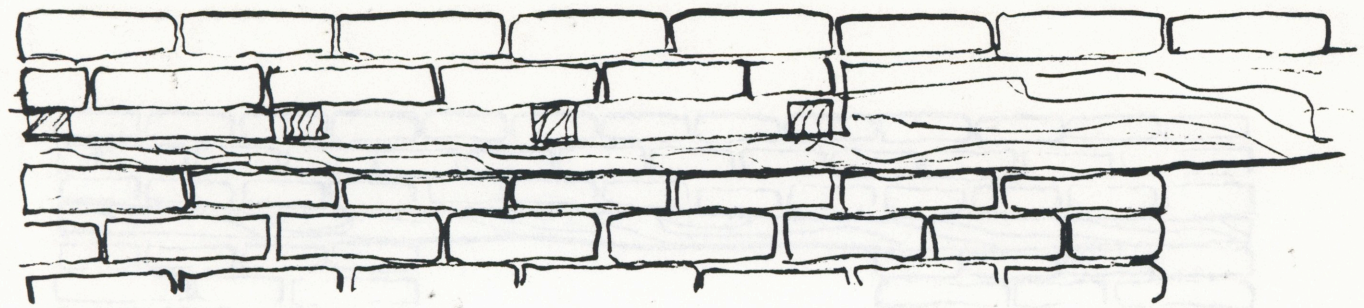


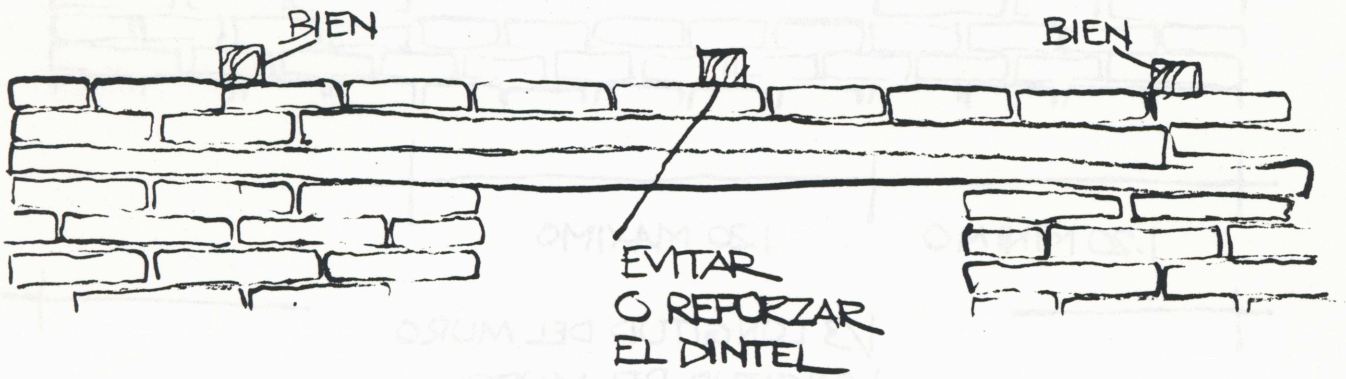
(4) WOOD TIE-BEAM

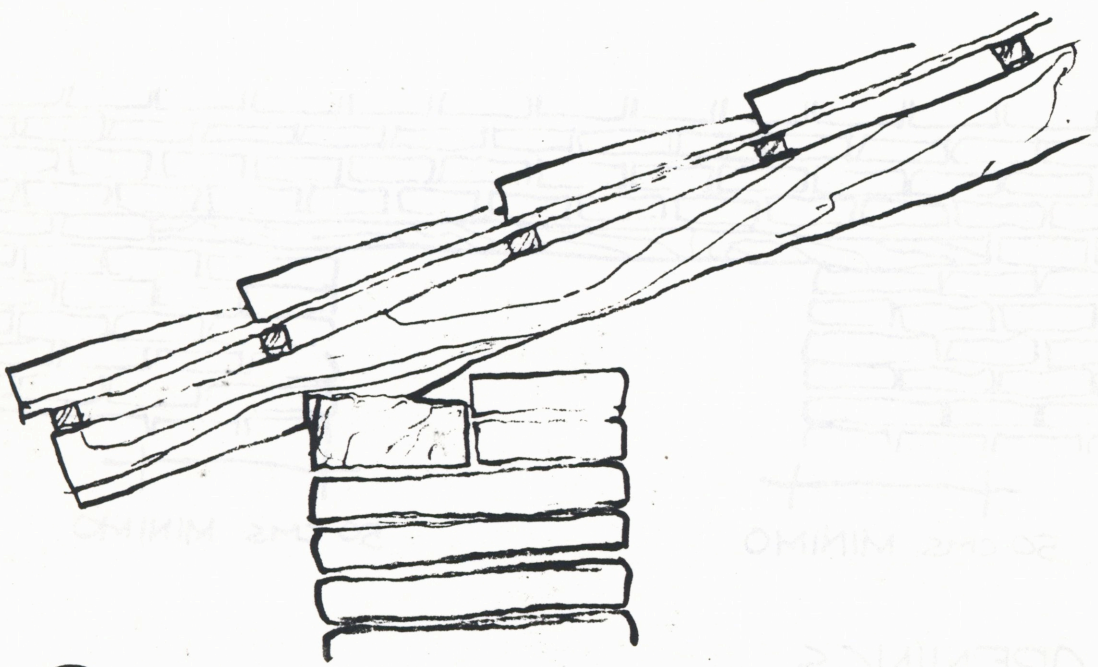

1.20 MINIMO
1.20 MAXIMO
1/3 LONGITUD DEL MURO
LONGITUD DEL MURO


50 CMS. MINIMO
50 CMS MINIMO

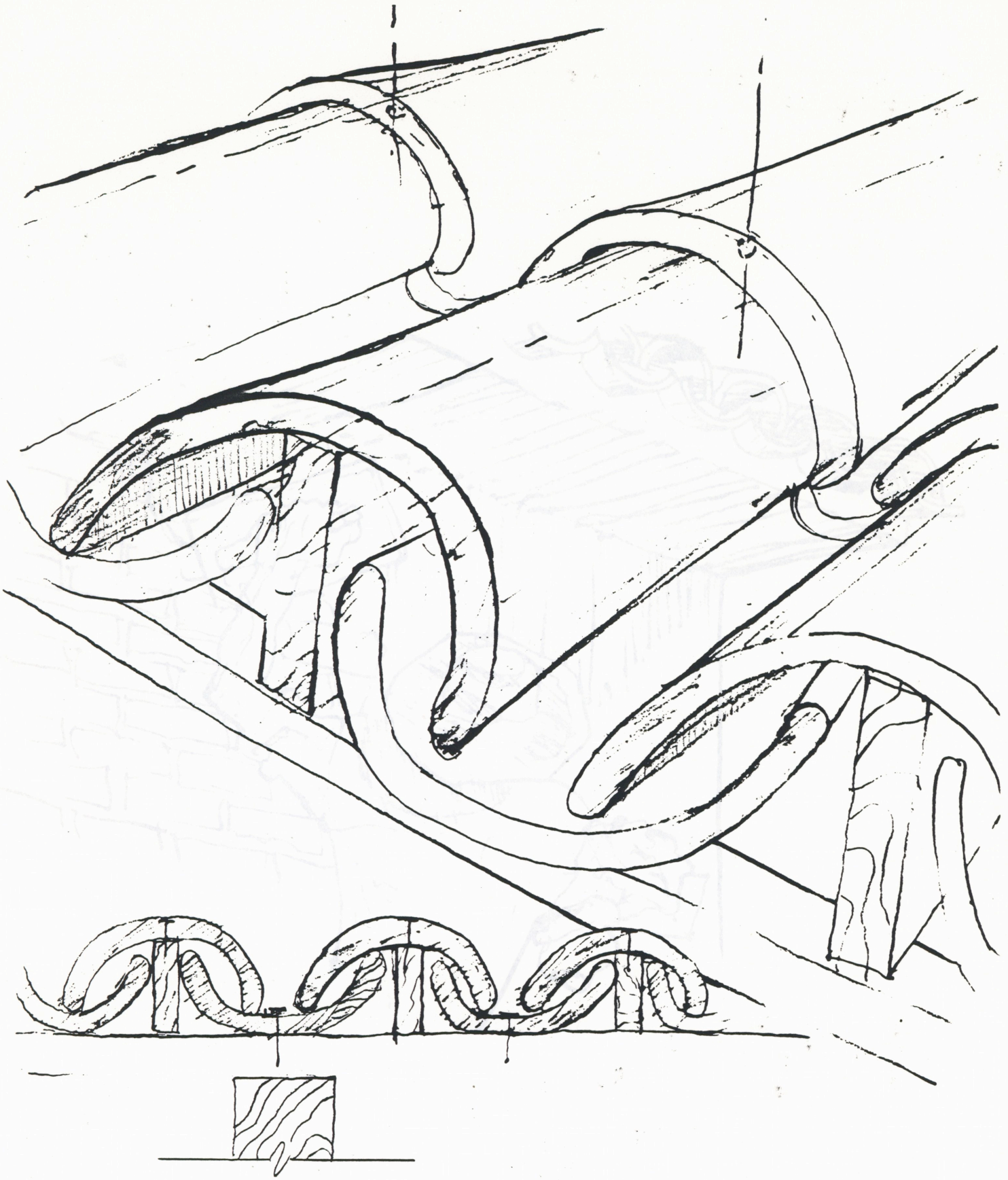
(5) OPENINGS



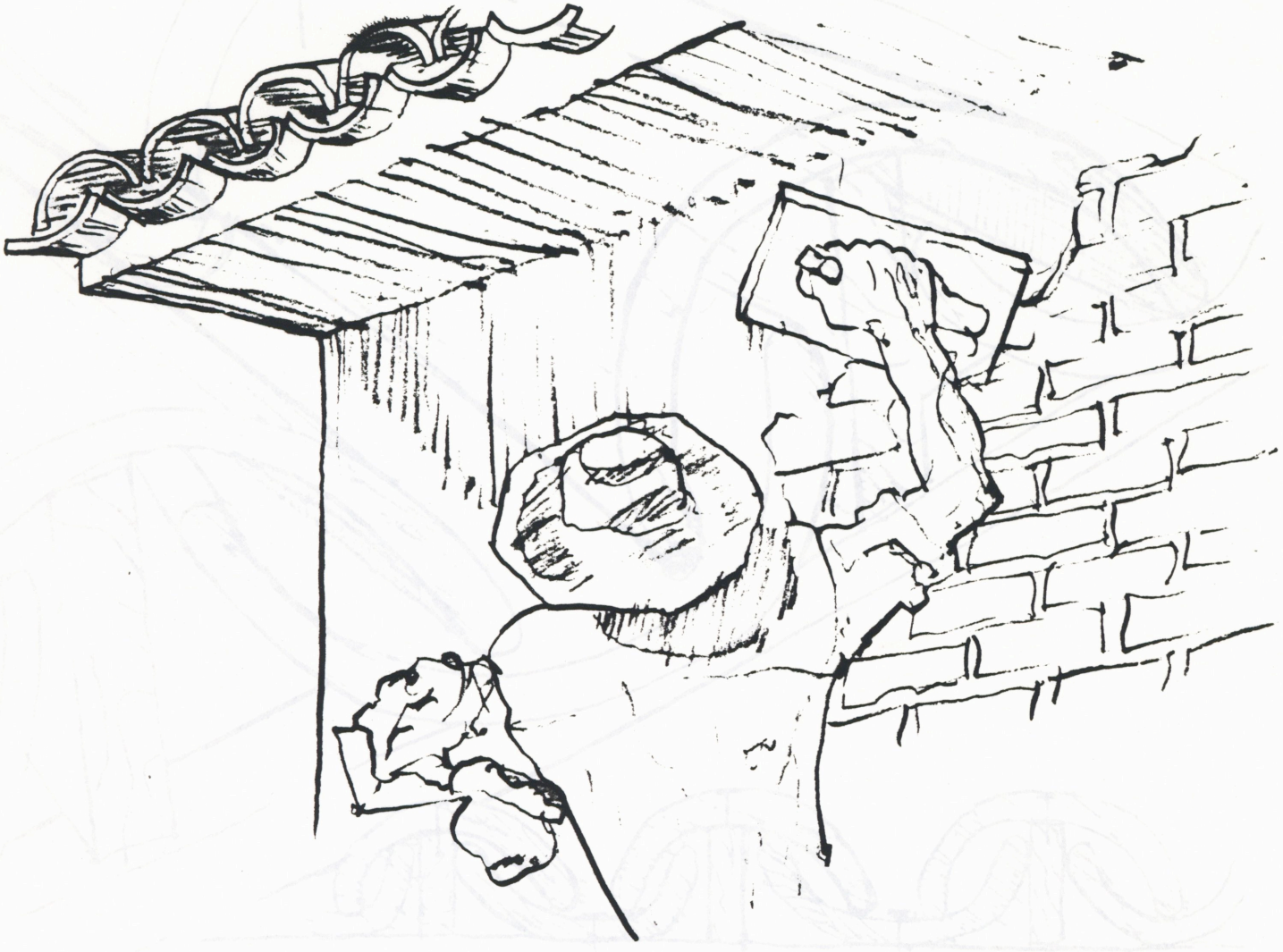




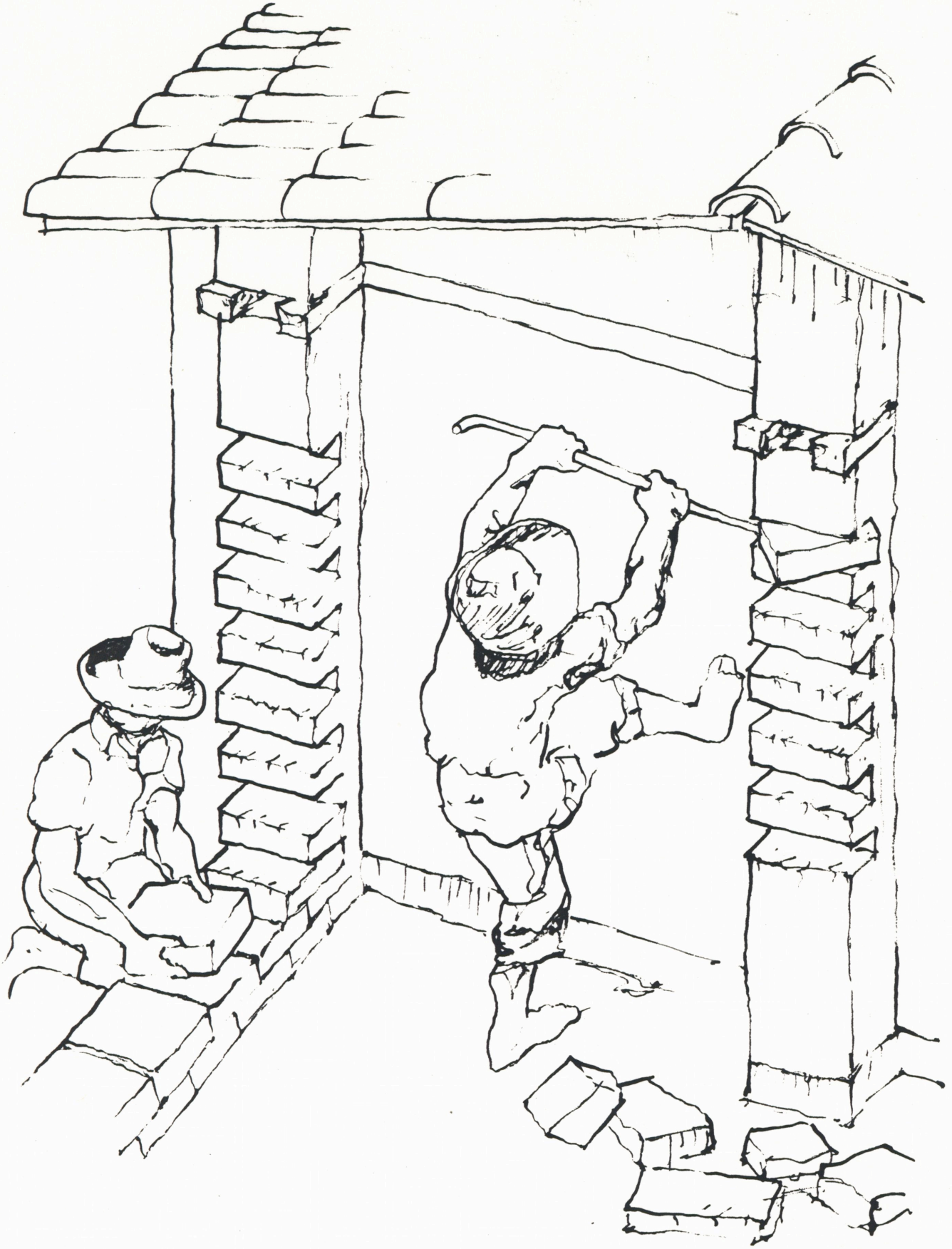
(6) ROOF BEARING



(7) ROOF/TILE CONNECTION



(8) WALL FINISH (USING CEMENT/MUD MIXTURE)

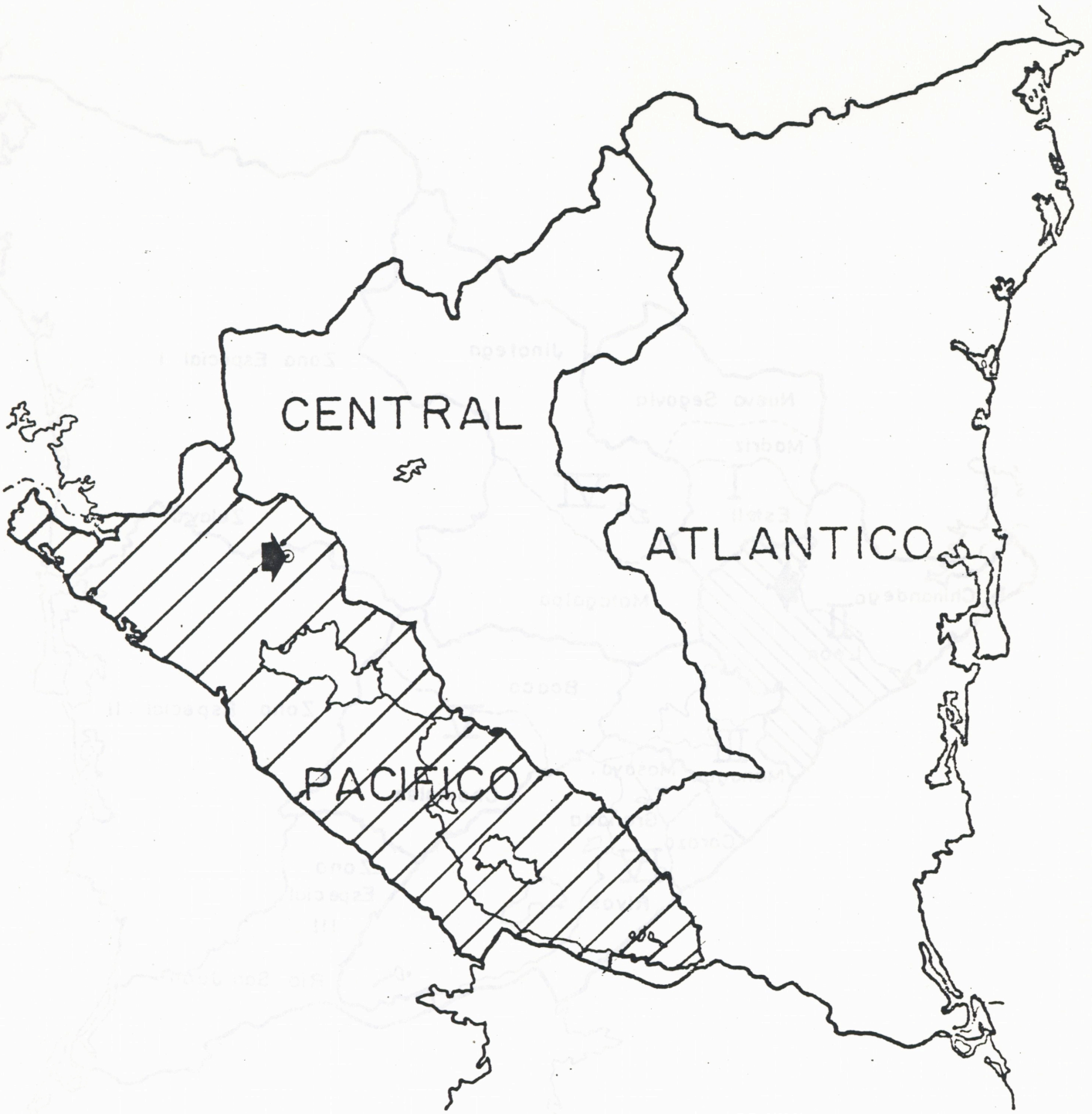


(9) EXTENSION METHOD (PROVIDES INTEGRAL, SEISMIC RESISTANT CONNECTIONS)


Francisco
Benito
Baldelomar
Guido
20
"ACTOR DE
TEATRO"

APPENDIX A

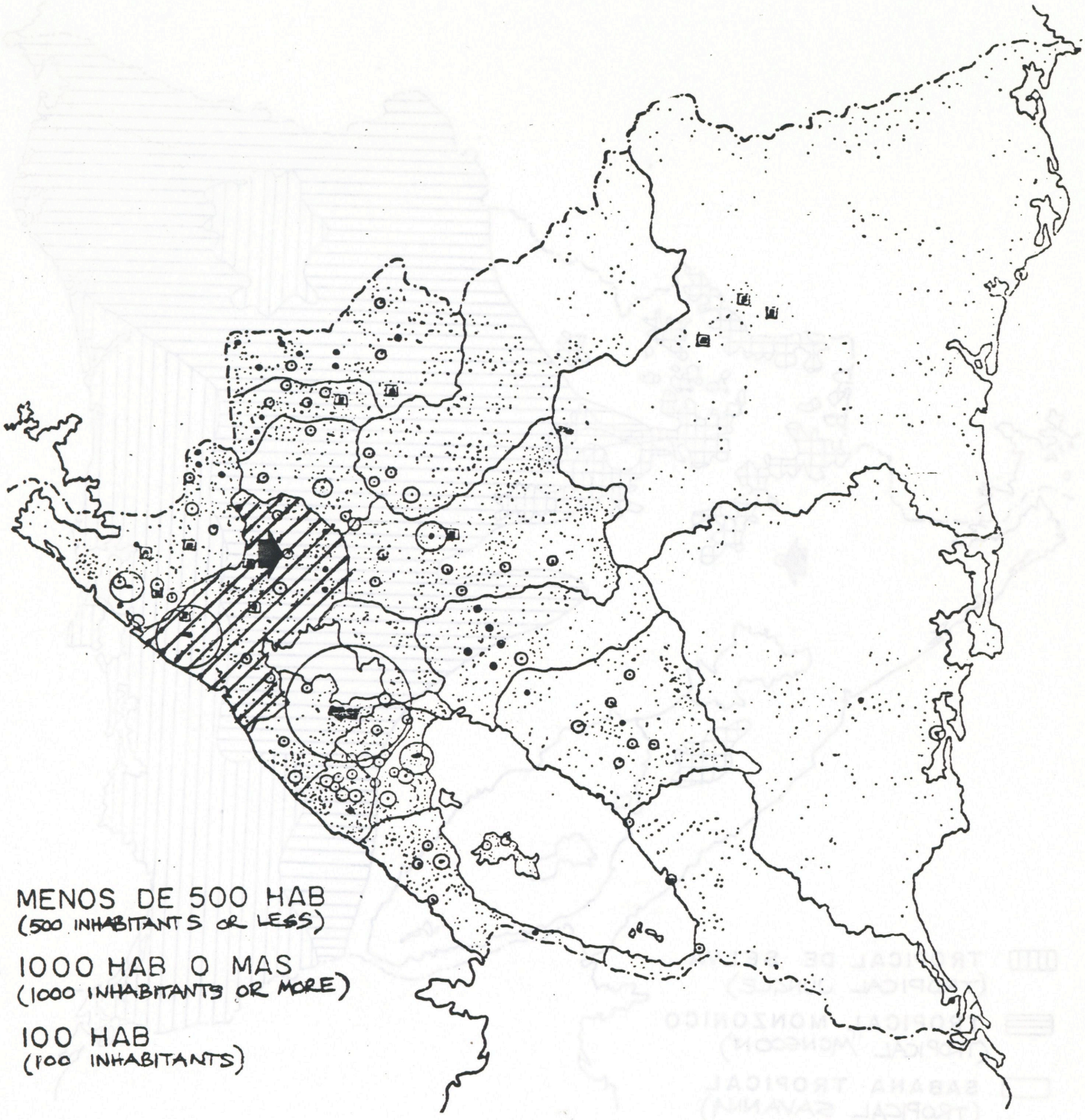
ZONES OF NICARAGUA



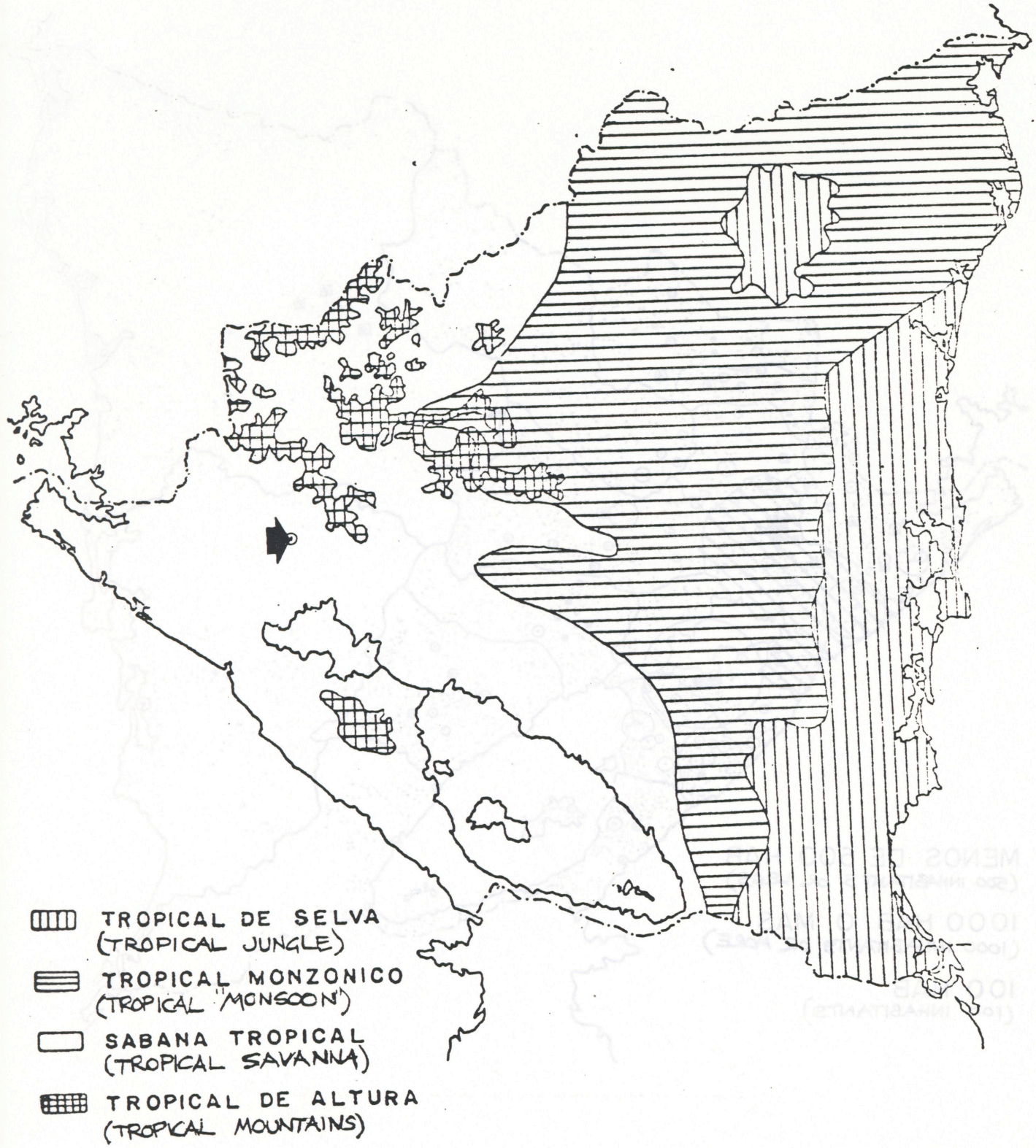
REGIONS


Jinotega
Zona Especial I
Nueva Segovia
Madriz
I
Estelí
VI
Zelaya
Chinandega
II
León
Matagalpa
Boaco
V
Zona Especial II
III
Managua
Masaya
Chontales
Granada
Carazo
IV
Rivas
Zona Especial III
Rio San Juan

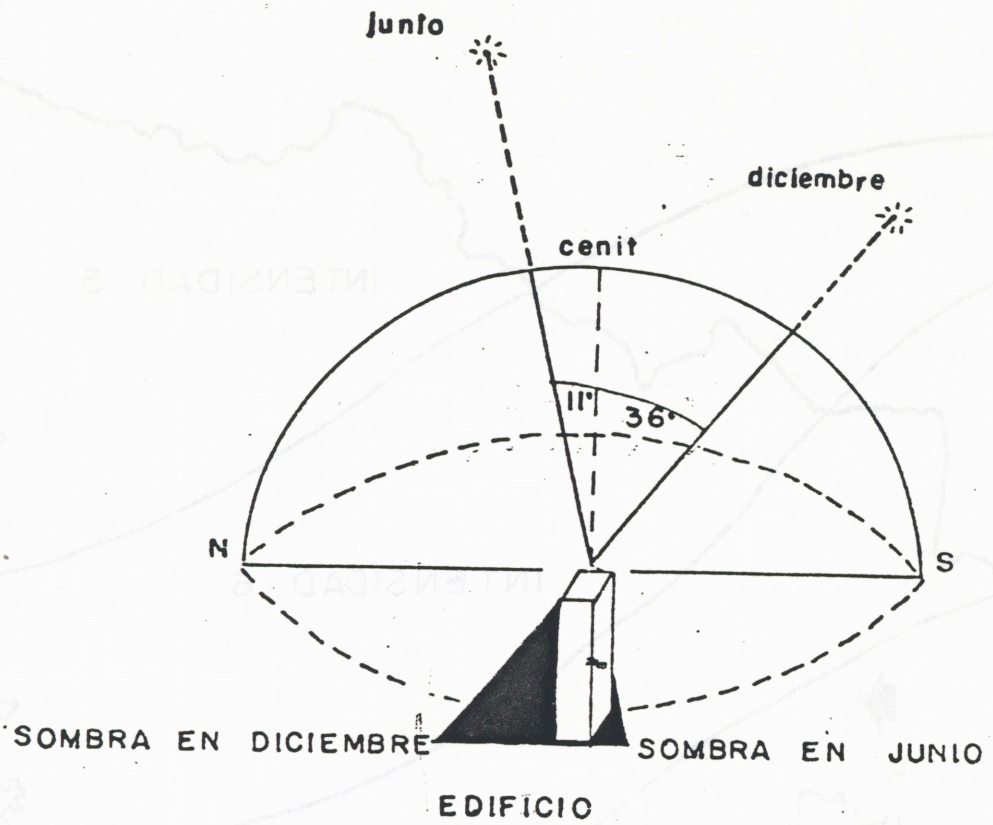
DISTRIBUTION OF POPULATION

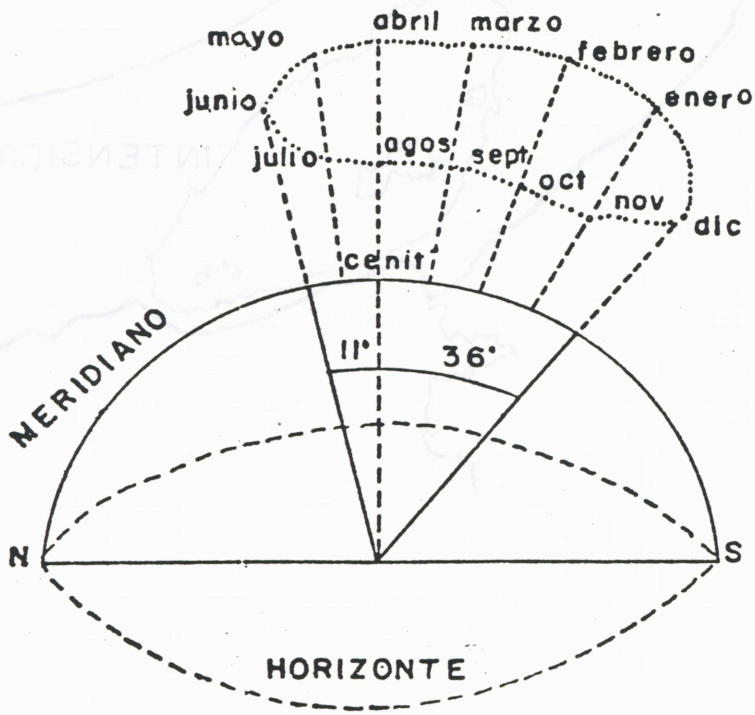


CLIMATE

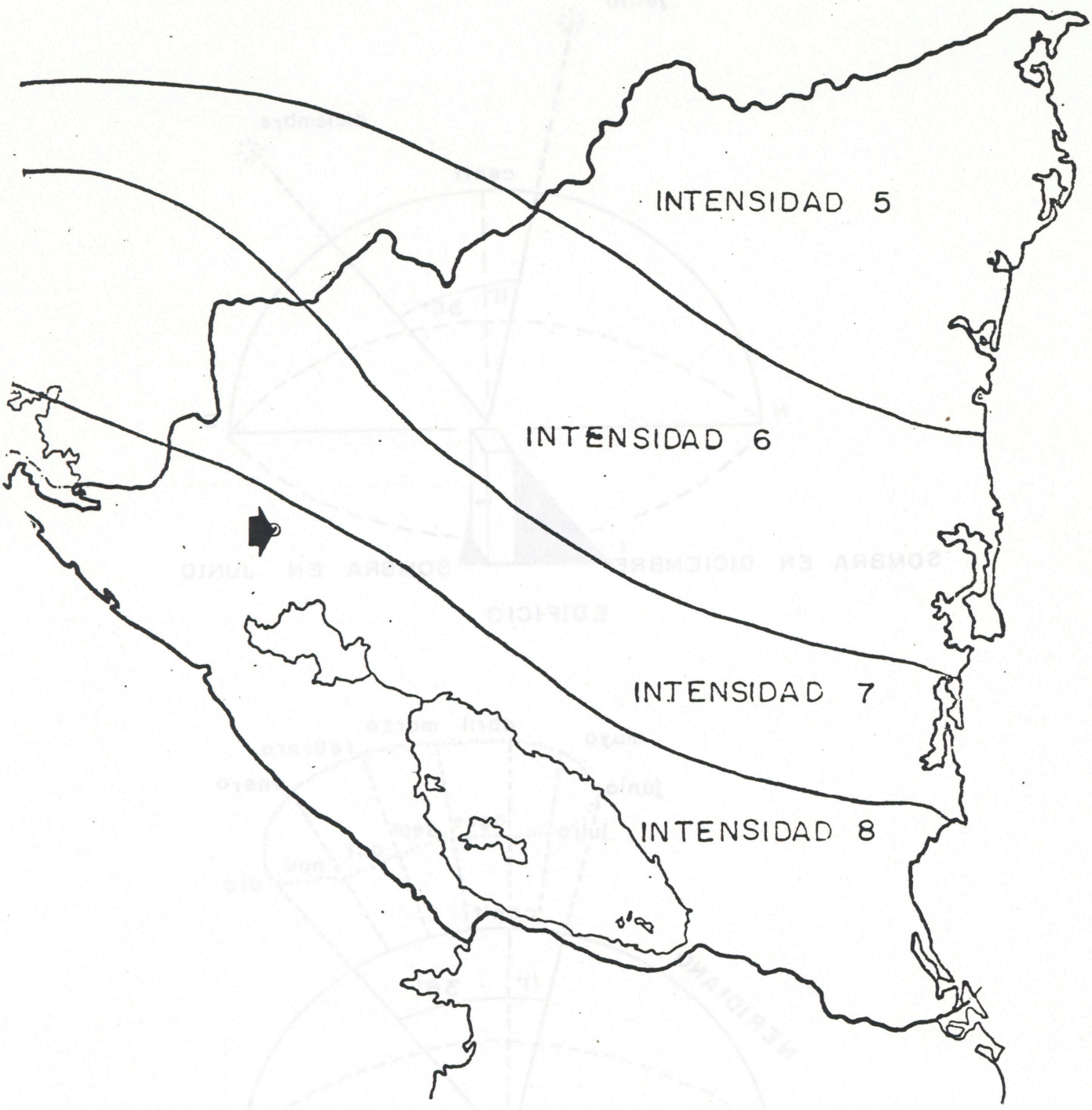

TROPICAL DE SELVA
(TROPICAL JUNGLE)
TROPICAL MONZONICO
(TROPICAL "MONSOON")
SABANA TROPICAL
(TROPICAL SAVANNA)
TROPICAL DE ALTURA
(TROPICAL MOUNTAINS)

SOLAR INCIDENCE

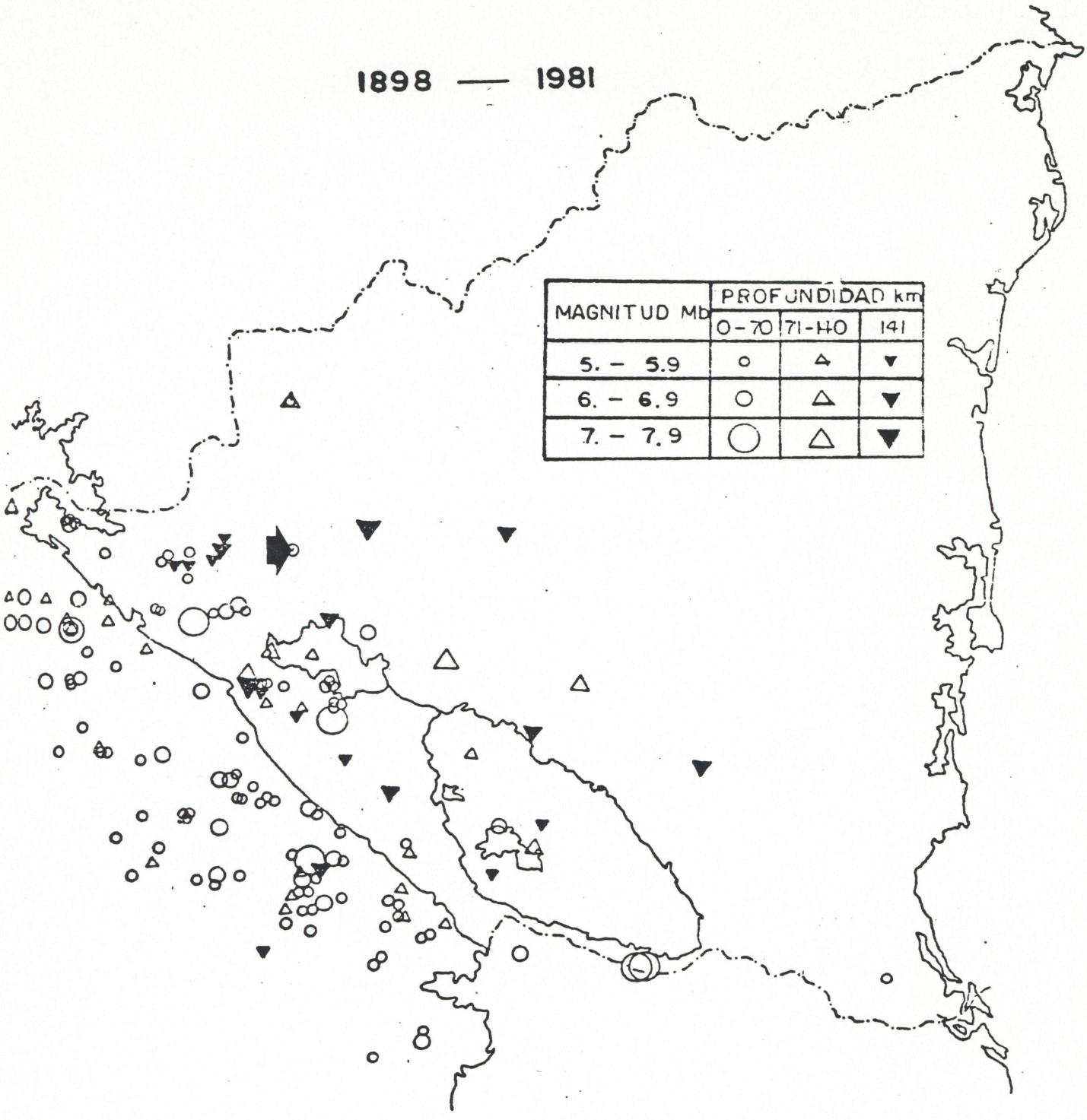




ISOINTENSITIES



EPICENTERS OF NICARAGUA



APPENDIX B

NOTES ON SITE/REGION—ARMENIA COOPERATIVE

Closest City--El Sauce

Region II—Leon

"The cooperative of production (CAS) Luis Velasquez Palma located at the ranch of "Armenia," Department of Leon, Municipality of El Sauce, 5 km to the East

The city of El Sauce is the principal urban center of the Municipality, with approximately 6,000 inhabitants.

The cooperative of Luis Velasquez Palma is composed of 25 members of semi-proletariats, who have not possessed land with the exception of one member who had 5 "manzanas."

The cooperative became owners of the "Armenia" ranch by authorization of MIDINRA on March 3, 1983. The land constitutes 1,049 manzanas.

The "finca" is located in a zone with precipitation that oscillates between 1,500 and 2,000 mm anually distributed fundamentally during 6 months during the rainy season; the altitude is 120 M.S.N.M. (metres above sea level) and the average temperature is 27°C.

The property is located in a zone of great potential for cattle production as it is the Zone of Development Cooperative... The "finca" has the infrastructure necessary for good production, which is vital for this region. The state of affairs for full use of the potential requires strong investment for development.

The technicians of MIDINRA have determined that the Cooperative Project Perspective should be oriented towards the production of "bovina," integrated with the production of milk and cheese. Agriculture is a secondary activity; they are considering the production of basic grains (corn, rice, "sorgo") vegetables (tomatoes, watermelon, etc.) Also the production of animals of a farm (pigs, chickens) destined for both personal and commercial consumption.

To consolidate the group of cooperative members and to guarantee the viability of the project we contemplate the construction of 35 houses and school as the members do not originate from this municipality (76%) and there is not a school in a 5 km. radius.

The total investment required by the project is C$18,847,029 of which C$11,842,740 (63%) is for the cattle production, C$405,900 (2%) for agriculture and C$6,598,388 (35%) for social investment.

The project is feasible to recover the investment within 15 years.
The project employs 33 men in the first year and 48 divided during the first six years. This indicates that the conditions allow absorption of more members and also the employment of local labor.

II. Diagnosis

1. Physical Characteristics

The cooperative is situated in a property broken into 54 lots or parcels for exploitation—these constitute together a total of 1,049 manzanas, and the topography is primarily (70%) going from plains to hills, presently only 30% is cultivated.

The predominate soil of the area is of clay.

The rainy season (w/1800 mm of rain) is May to October except the dry season period (from July 15 to August 15). The dryest part of the year is during February, March, and April.

The property is crossed South to North by the river, "Rio El Portillo" that is filled only during the rainy season.

Bordering upon the north-east part of the finca is the "Quebrada Seca" which is a river with water year-around, and with a small dam (in bad condition) which divides the part for use in a system of irrigation by gravity for an area of approximately 40 manzanas.

The property also has a well (perforated well) which supplies water to the corrals and troughs, and to the existing buildings in the center of the finca.

2. Social Characteristics

The cooperative was founded with 30 members in March of 1983. It should be noted that of the nucleus base of initial members only 63% (or 25) of them remain.

FAMILIES

The cooperative members and their families constitute a total population of 166 people, formed as such:

Type		Number
Members (Socios)		25
Men	24	
Women	1	

Husband of members		1
Wives of members		24
Children (Girls)		60
14 years or older	21	
14 or younger	39	
Children (boys)		56
14 and above	11	
14 and below	45	
TOTAL		166

Members with families 25

Member/Family ratio 6.6

Assets/Family ratio 1.89

Considers that the older males (14+) constitute 100% Active and the younger males (<14) represent only 25% of Active.

ORIGIN

Of the total membership (25) 96% are of "Campesino" origin without land. In the present time only 6 families of the membership inhabit the Cooperative, the rest (19) live and work at the small town of "Achuapa" 26 km north of "El Sauce"

EDUCATION

The level of learning, for all members (25) present the following composition: 40% (10) can write, read, and use math; 12% (3) can read and write; 4% (1) only uses math, and 44% are illiterates.

The social participation of the members at the cooperative and community level, can be described as such: 36% of members participate in the centers of Adult Education; 100% (25) help in the reconstruction of roads; 100% (25) are in the Popular Sandinista Militia; which consists of participating in the health and the reserve battalions in the Popular Sandinista Army.

ORGANIZATION

— General Assembly, a meeting with all members. They hold general meetings each 30 days and for extraordinary reasons as the case merits. This is the final organ of decision.

— The Group of Directors, with 4 members. In charge of fulfilling the decisions and limitations which emanated from the General Assembly, they meet every 15 days.

— Financial Commission, made of 3 members coordinating activity. They meet every 8 days and give a financial report every 30 days to the general assembly.

— Production Commissions, with 4 members coordinating activity. Meet every 8 days and give a work report to the G.A. each 30 days.

— Education Commission (2 members) meet every 8 days and give an education report to the G.A. every 30 days.

3. Inventory of Resources

3.1 Social Infrastructure

The members and their families confront serious problems of housing with only 6 of the 25 families inhabiting the property, those 6 are housed in the buildings of the ranch (stable, storehouse). The suggested solution to the problem is 25 houses in the first years of the project and the rest (10) for new members in later years.

Other aspects include the Educational Services (primary, secondary, university (bachelor studies) or a basic level of animal husbandry); Health (a health center with beds, dental clinic); Production Services (technical assistance, supplies, "insumnos") and Commercialization.

The cooperative property includes a network of paths usable year-around, and electricity appropriated by the Institute of Energy (INE) and portable water by a "perforated well."

3.2 Inventory of Productive Resources

3.2.1. Inventory of Cattle

The cooperative has 784 head of bovine cattle of commercial grade; consisting of 5 bulls, 186 cows, and 46 calves. The estimated value of the cattle is C$9,590,200

3.2.2. Inventory of the Productive Infrastructure

Constructions	Value
—1 house (hacienda) 2 stories	300,000.00
—1 house (communal, dining storage)	150,000.00
—1 small house	30,000.00

—1 "Galeron" (for cattle)		150,000.00
—1 "Galeron" with 3 feeding bins		50,000.00
—1 "Galeron" with feeding bins in the country side		30,000.00
—Corral (2500 v^2)		85,000.00
—"Manga" (cattle chute) with iron stalk		100,000.00
—"Embaleadoro" for cattle		20,000.00
—Cement Trough (2x3x2)		15,000.00
—Cement Trough (2x4x1)		15,000.00
—Cement Waterer with 22 individual stalls		100,000.00
—Water tank (100 gals.)		25,000.00
	TOTAL	C$1,070,000.00
Fences (perimeter)		16,643 mts.
—Good condition	6,500 mts.	
—Bad condition	10,543 mts.	
Fences (internal)		51,680 mts.
—Good condition	26,280 mts.	
—Bad condition	25,400 mts.	
Total Fence		68,323 mts.

3.2.3. Machinery and Equipment

—Tractor MTZ-80	C$442,000.00
—"Arado" of 4 discs	100,000.00
—Grader of 32 discs	60,000.00
—"Chapadora"	54,000.00
—"Segadora"	180,000.00
—"Hicadora"	150,000.00
—"Embaladora" M-420T	350,000.00
—"Bascula morse" (1500 kgs)	50,000.00
—Pump (water) 3 h.p.	40,000.00
—Pump (water) 15 h.p.	250,000.00
—Motor (electric) 25 h.p.	20,000.00
TOTAL	C$1,875,000.00

One of the fundamental problems of the group is the dispersion of families, that is causing physical and organic instability both in the members and in

their families. The suggested solution of this problem: the construction of 35 houses in the first four years at a value of C$6,377,256.00; including also the construction of a school and the reactivation of the existing potable water system.

UNIT COST FOR CONSTRUCTION OF A HOUSE

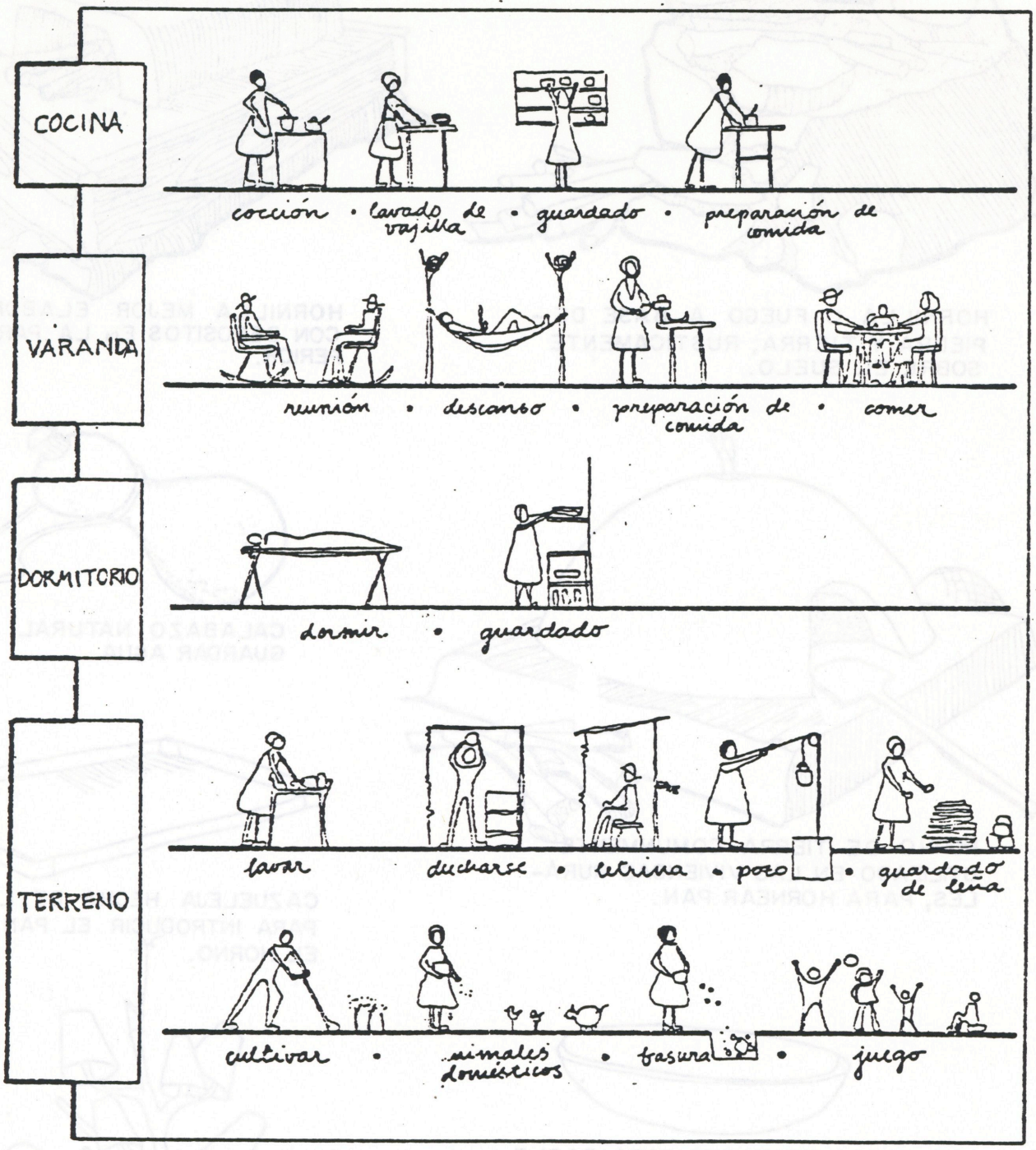
Type	Unit of Measure	Quantity	Characteristics	Unit Cost	Total Cost
LABOR	D/H	87		150	13,050
-Masonry (Albanileria)	D/H	71			
-Transport of (Acarreo) Materials		16			
MATERIALS OF CONSTRUCTION (Insumos)					118,993
-Reinforcing Steel (Hierro)	QQ	3	DE 3/8" Y 1/4"	3,000	9,000
-Wire (Alumbre)	LB.	10	No. 8	60	600
-Nails (Clavos) "Grande"	LBS.	19	DE 2 Y 1/2"	62.5	1,188
-Nails "Medianos"	LBS.	10	DE 4"	62.5	625
Wood (Cut)					
-Alfajillas (2" X 4")	VRS.	180	DE 2" X 4"	95	17,100
-Reglas (1" X 2")	VRS.	600	DE 1" X 2"	25	13,000
-Beam (Tablas)	VRS.	50	DE 16" X 3 1/4"	150	7,500
-Brick (Ladrillos)	UNID.	5,000	Barro 6" X 4" X 2 1/2"	5	25,000
-Tiles (Tejas)	UNID.	4,000	De Barro	5	30,000
-Cement (Cemento)	QQ	80	Portland Cement	225	18,000
-Stone (Piedras)					
-Sand (Arena)	M^3	15			
-Transportation (Transporte)	WW	83		60	4,980
-Sewer (Albanil)	D/H	71		600	42,600
TOTAL					174,643

UNIT COST FOR CONSTRUCTION OF ONE SCHOOL

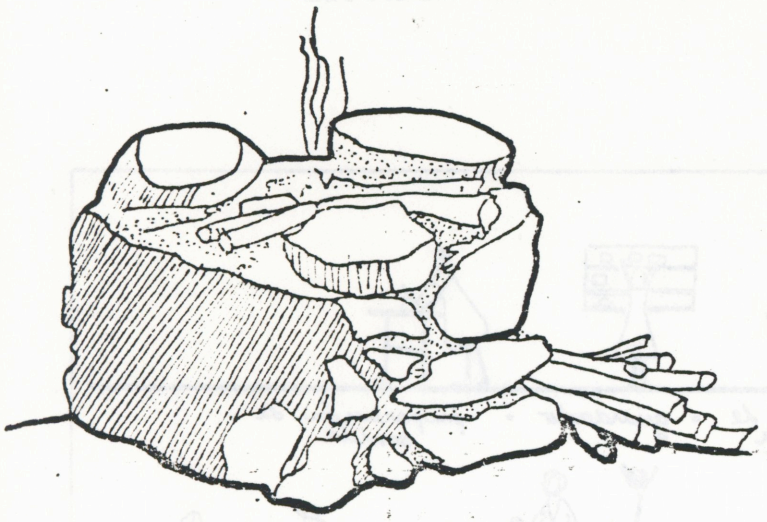
Type	Unit of Measure	Quantity	Characteristics	Unit Cost	Total Cost
LABOR	D/H	441			63,300
-Contracted	D/H	48	From plans until const.	500	34,000
-Cooperative	D/H	393	Additional help to the settlement	150	58,950
MATERIALS					116,480
-Reinforcing Steel	QQ	6	%5, DE 3/8" Y 1/4"	1,000	6,000
-Wire	LBS.	10	Wire Ties	60	600
-Nails (large)	LBS.	10	4"	62.5	625
-Nails (medium)	LBS.	10	2 1/2"	62.5	625
-Alfajillas	VRS.	274	2" X 4"	95	26,030
-Reglas	VRS.	800	12" X 2"	25	29,000
-Beams	UNID.	60	16" X 5" VRS.	150	9,000
-Brick	UNID.	6,000	6" X 2 1/2" X 4"	3	18,000
-Cement	LBS.	90	Portland Cement	140	12,600
-Sand	M^3	20		200	4,000
-Tiles	UNID.	5,000		3.5	17,500
-Gravel	--	--		--	11,500
Transportation		250		65	16,250
TOTAL					196,030

APPENDIX C

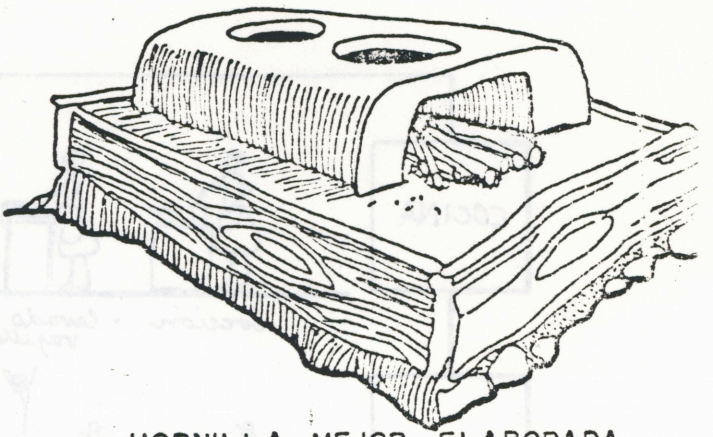
USE OF DISTINCT AREAS OF THE HOUSE



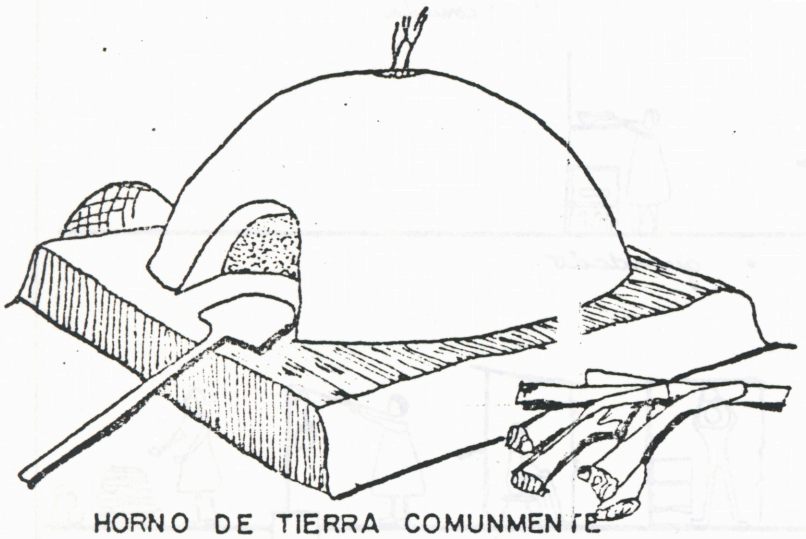
FROM "NICARAGUA PROJEKTER"
TECHNICAL UNIV. OF LUND, SWEDEN



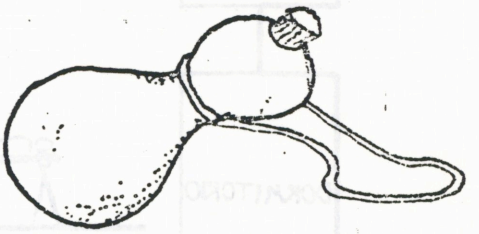
HORNILLA O FUEGO A BASE DE - PIEDRA Y TIERRA, RUSTICAMENTE SOBRE EL SUELO.



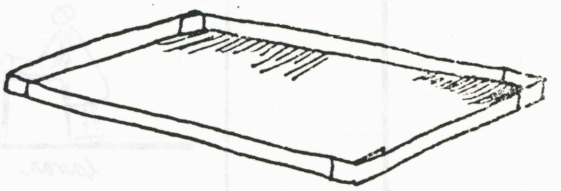
HORNILLA MEJOR ELABORADA, CON DEPOSITOS EN LA PARTE SUPERIOR.



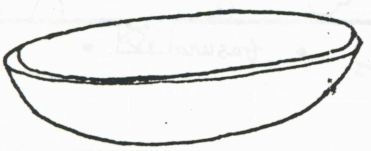
HORNO DE TIERRA COMUNMENTE UTILIZADO EN LAS VIVIENDAS RURALES, PARA HORNEAR PAN.



CALABAZO NATURAL PARA GUARDAR AGUA.



CAZUELEJA HECHA DE LATAS. PARA INTRODUCIR EL PAN EN - EL HORNO.

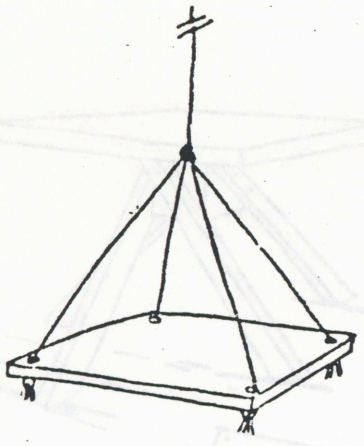


GUACAL DE BARRO PARA DARLE - AGUA A LAS AVES DE CORRAL.

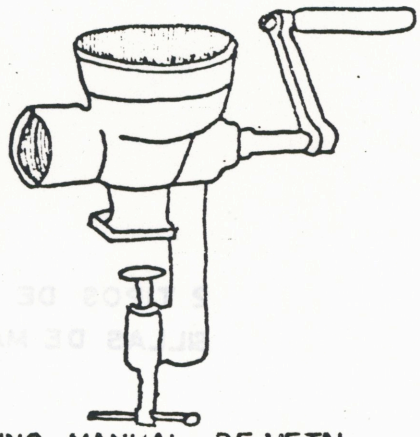


JICARERO DE MADERA COLGADO DEL TECHO.

NOTE: REMAINDER OF APPENDIX C IS BY GARCIA & TORRES, MANAGUA, NICARAGUA, 1982.



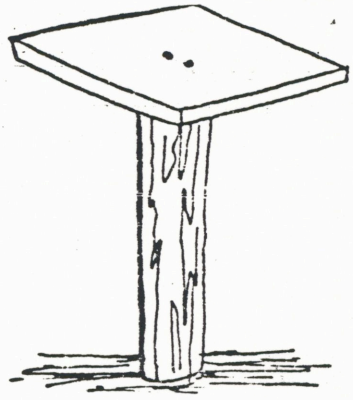
TAPESCO PARA GUARDAR ALIMENTOS, DE MADERA COLGADO DEL TECHO.



MOLINO MANUAL, DE METAL.



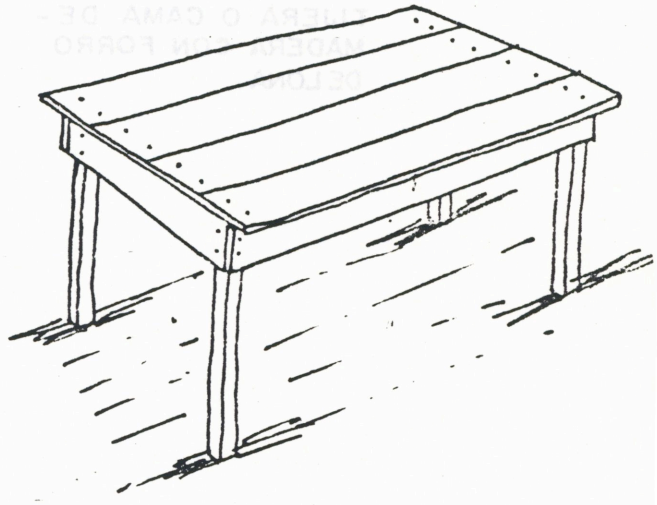
CANTARO O TINAJA DE METAL, PUEDE SER DE BARRO, EN EL SE GUARDA AGUA.



BASE DE MADERA PARA FIJAR EL MOLINO MANUAL.

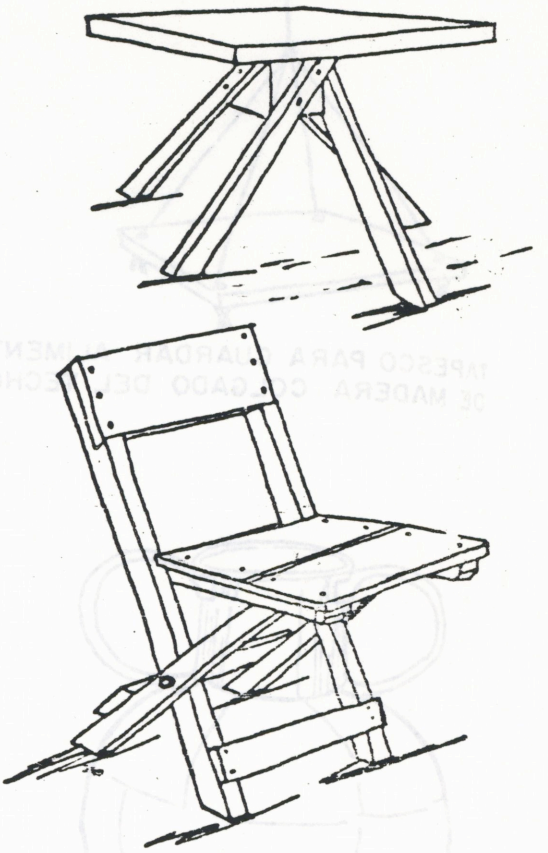


PIEDRA PARA MOLER MAIZ, MANUAL.

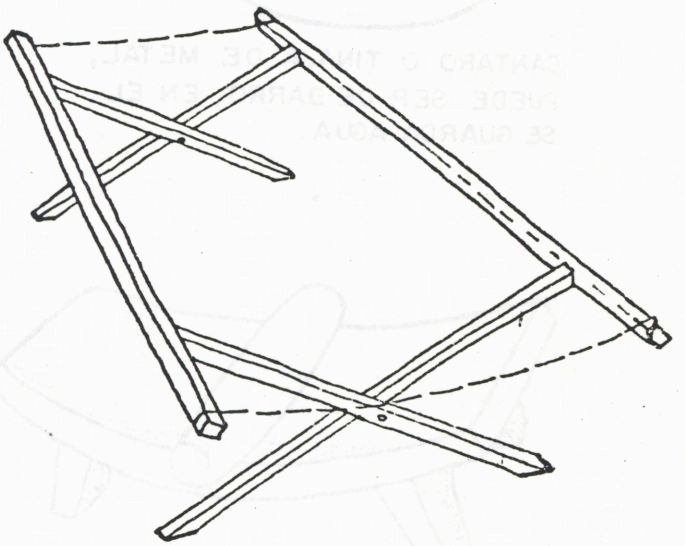


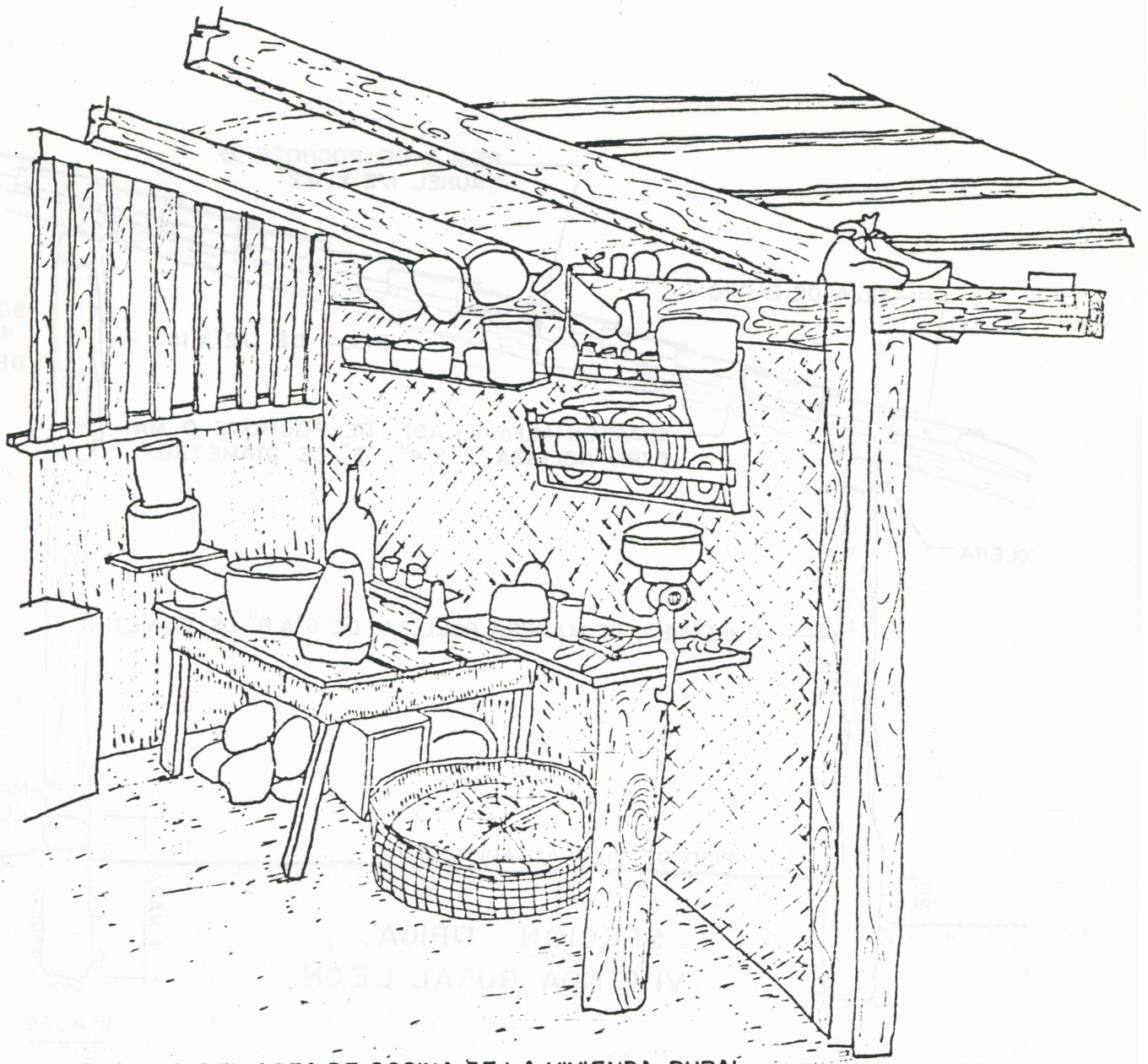
MESA DE MADERA PARA COMEDOR.

2 TIPOS DE
SILLAS DE MADERA.

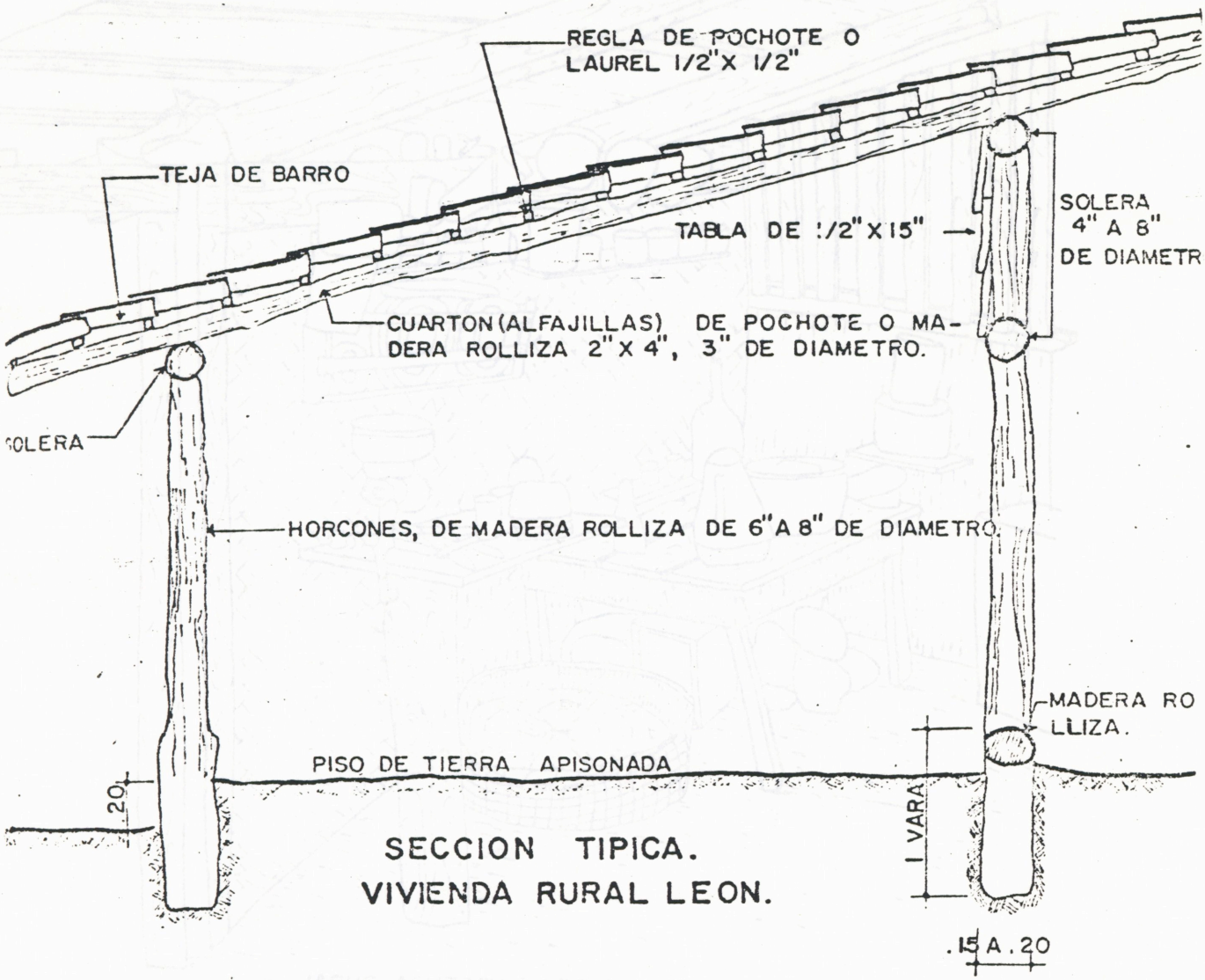


TIJERA O CAMA DE-
MADERA CON FORRO
DE LONA.



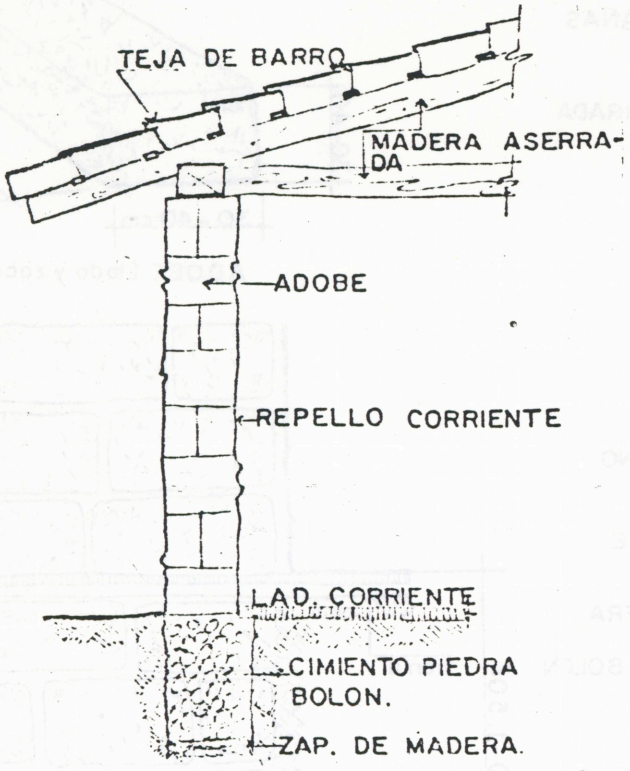


EJEMPLO DEL AREA DE COCINA DE LA VIVIENDA RURAL .

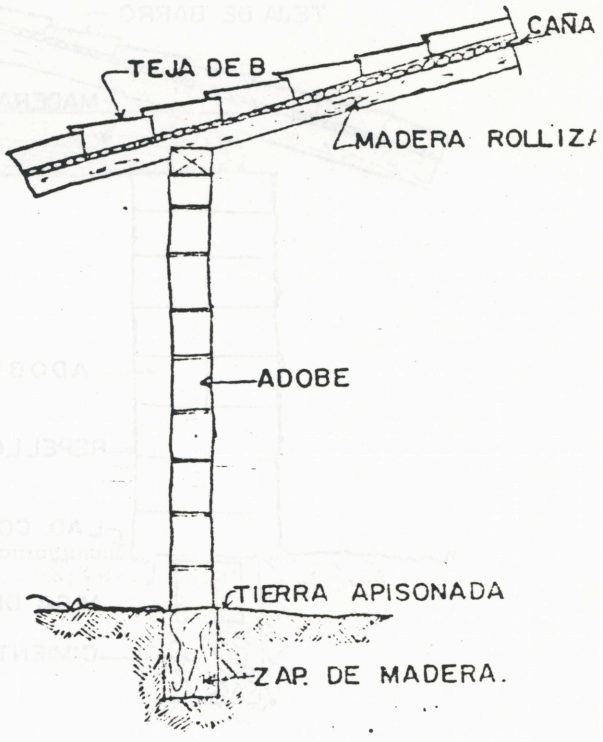


SECCION TIPICA.
VIVIENDA RURAL LEON.

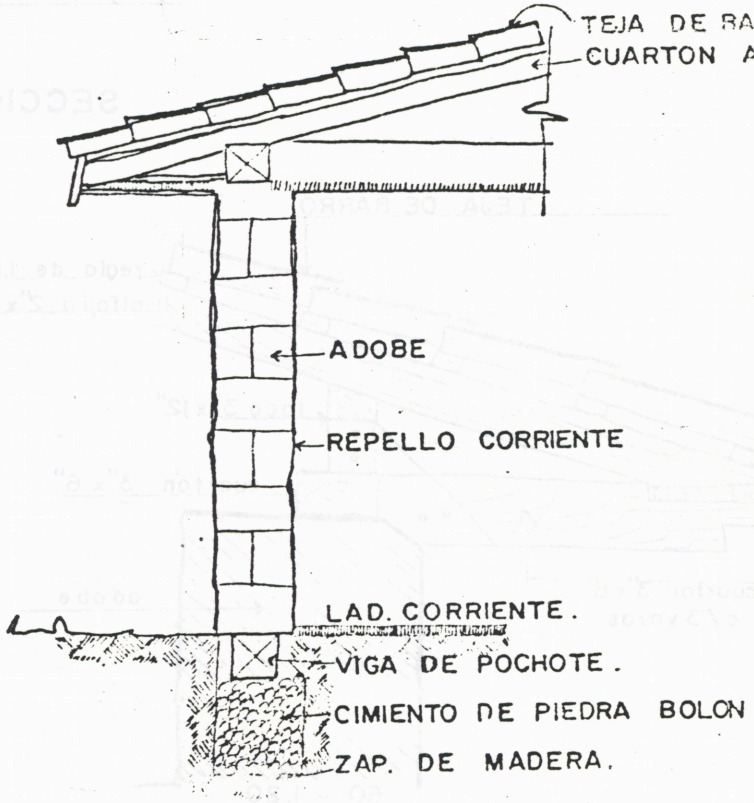
ADOBE DE TIERRA APISONADA.



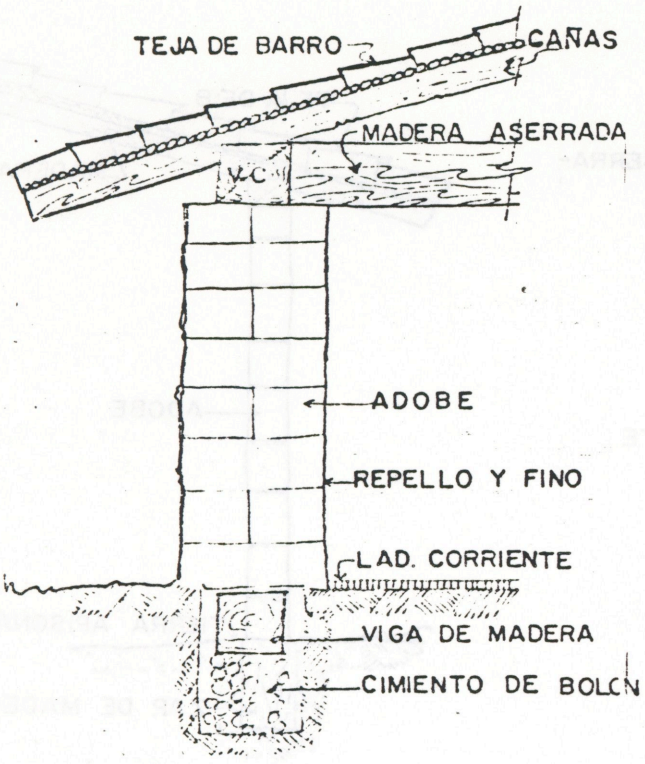
TERCERA VARIANTE.



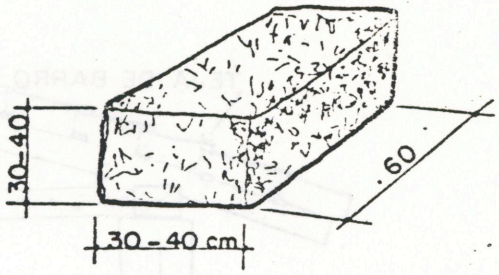
SEGUNDA VARIANTE.



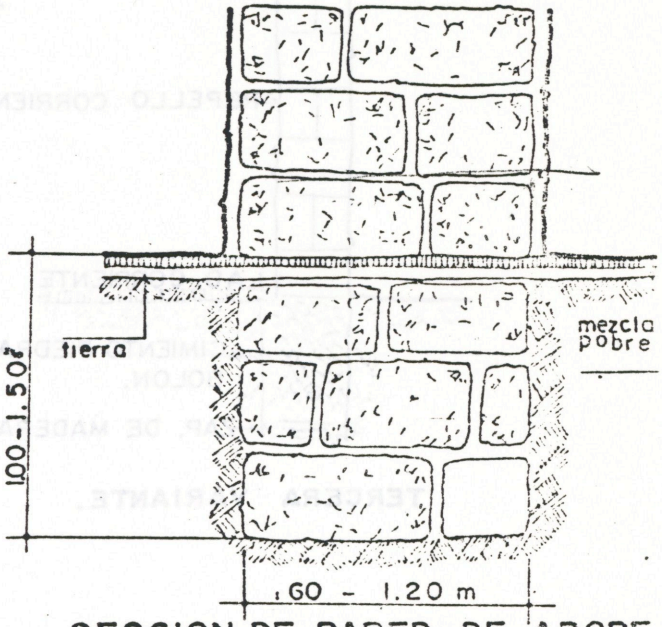
CUATA VARIANTE.



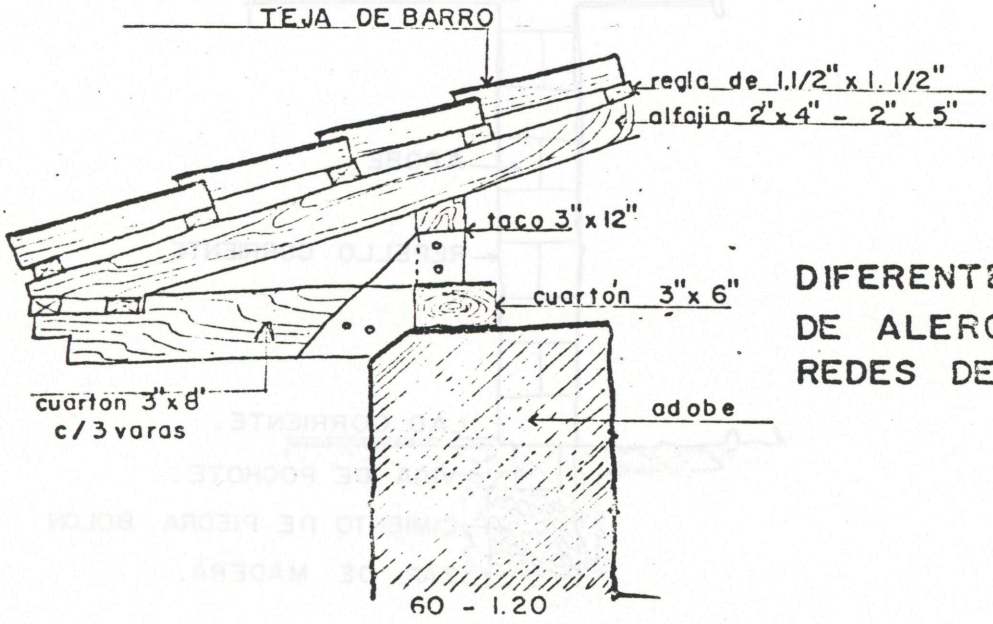
QUINTA VARIANTE



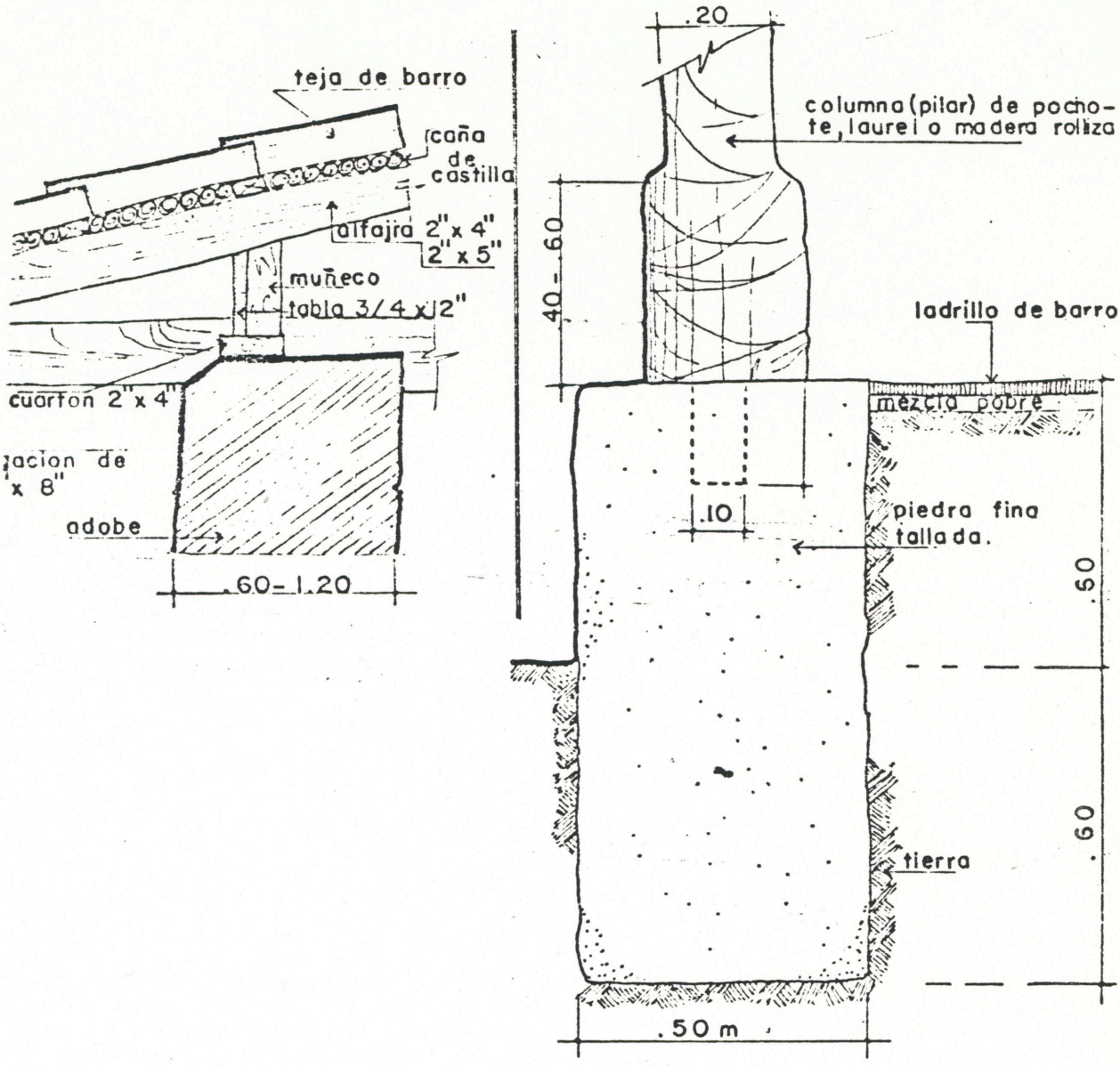
ADOBE (lodo y zacate jaragua

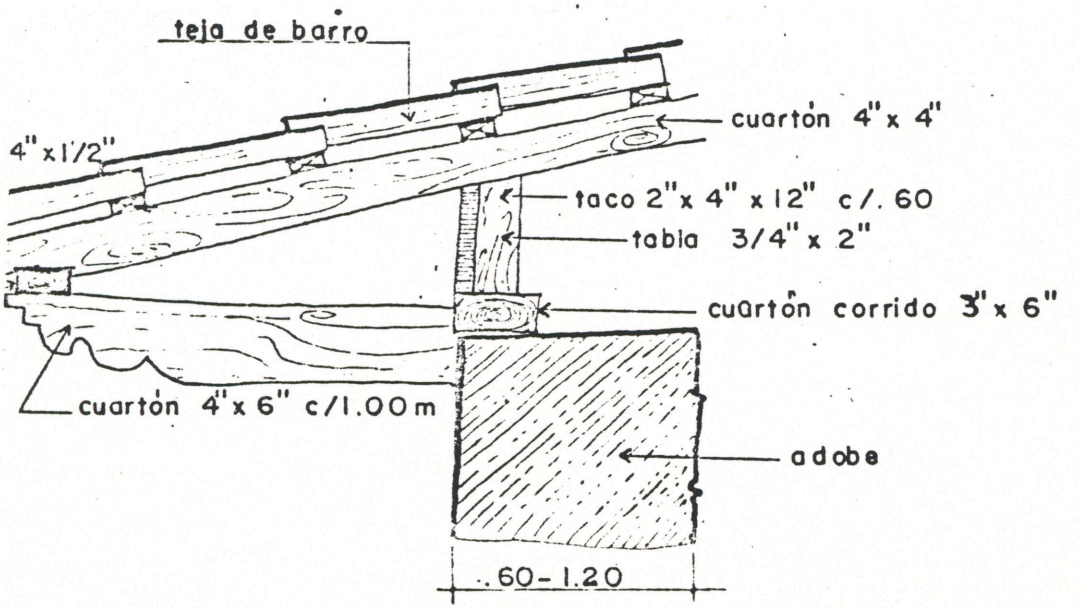


SECCION DE PARED DE ADOBE



DIFERENTES TIPOS DE ALEROS EN PAREDES DE ADOBE.


teja de barro
caña de castilla
alfajía 2"x 4" 2"x 5"
muñeco
tabla 3/4 x 12"
cuartón 2"x 4"
adobe
.60-1.20
.20
columna (pilar) de pochote, laurel o madera rolliza
40-.60
ladrillo de barro
mezcla pobre
.10
piedra fina tallada.
.60
.60
tierra
.50 m


teja de barro
4"x1/2"
cuartón 4"x 4"
taco 2"x 4" x 12" c/. 60
tabla 3/4" x 2"
cuartón corrido 3"x 6"
cuartón 4"x 6" c/1.00m
adobe
.60-1.20

APPENDIX D

ADOBE DESIGN GUIDELINES IN SEISMIC ZONES

1. Symmetric plan—minimize extraneous loads
2. Uniform and symmetric distribution of mass and stiffness
3. Minimize height—recommendation 7.8' (2.4 m) walls
4. Openings: Located far away from corners
   Minimal width
   Symmetrical arrangement
5. Moisture-proofing: Maximize adobe strength
   Possible asphalt emulsion added to plaster
6. Patient Construction: Lower courses can settle in walls during rapid construction.
7. Minimize wall unsupported length—buttress every 4 meters
8. Buttressed walls—.9 meter projection from walls
9. Right angles at corners
10. Isolate walls from ground.
11. Lightweight roof—adequately tied to walls (problem with traditional tiles)
12. Horizontal dowels every 60 cm.—wire mesh or possibly bamboo.
13. Solid interlocking of blocks—at crossings, corner, and intersections.
14. Collar Beam (box-like action)—wood or bamboo, connected to columns then foundation.
15. Continuous wall footing: -With vertical dowel reinforcement to footing
    -More than 1½ times thickness of wall (minimum width 14"; minimum depth: 18")

Source: "Earthquakes and Adobe," William L. Ford, Tucson: University of Arizona.

SPECIFICATIONS OF ADOBE CONSTRUCTION

Translated from: MANUAL FOR THE CONSTRUCTION OF HOUSING WITH ADOBE

by Mario Vasconez

Mexico, June 1979

Causes of faults in construction of adobe:

1. Poor quality of adobe in either material or technique of construction.
2. Inadequate dimensions for adobe, especially in height, which in the majority of cases is excessive.
3. Horizontal overlap insufficient
4. Horizontal overlap inadequate and insufficient at connections between walls, producing vertical joints of 3 or more courses.
5. Deficient manner of building in the arrangement of adobes.
6. Incorrect dimensions of the walls: small thickness and excessive length and height.
7. Overly large window and door openings with undersized lintels.
8. Many openings.
9. Lack of tie beam.
10. Heavy roofs with poor connection at wall.
11. Little or no protection against erosion by rain.
12. Construction of multi-story structures.
13. Exaggeration of lateral instability "a hilo" (along the thread). Due to use of long dimension of the block lengthwise with the wall.

Dimensions Of Traditional Adobe

-Varies greatly

-The longitudinal length of the block should not be greater than double the width plus the thickness of one joint (2 cm)

-height should not be greater than 10 cm(!) in the optimal measure.

Siting Adobe Structures

Location: Should be elevated as dry terrain is very important (!)—dry, solid and planar.

Conditions of Site

Site should avoid the proximity of rivers, or the ocean, the zones of gravel or of disturbed uncompacted earth, also low zones or zones on steep inclines.

Materials of the Foundation

Mixed Concrete

-Preferred method

-Cement, sand, gravel, stones (large stone)

Stone and Clay:

-last resource

-Foundation must be 2 times thickness of wall, and minimum of 60 cm. deep.

PROTECTION OF WALL BASE

The first courses of adobe should be protected against erosion.

a) Placing a layer of concrete over the foundation which is the same width as the wall.

b) Making a covering of medium stone with mortar or lime.

c) Dig a canal before the wall for drainage away from wall.

JOINTS

-Joints both vertical and horizontal should be filled with the clay of the adobe.

-2 cm. wide.

-Mortar can be improved by adding cement or the clay mortar mixture.

$\frac{\text{2 parts cement}}{\text{20 parts clay}}$ Mixed well, dry before adding water.

ADOBE CONFIGURATION

-All block should be laid with an overlap of 1/2 block.

PLACEMENT

-To allow for drying blocks, the maximum height that should be laid in one day is one meter.

Wall Recommendations

a) Do not use oblique angles between walls.

b) The length between laterally unsupported walls should be no greater

than 10 times the wall width.

c) The maximum height of the wall should be not greater than 8 times the wall width.

d) Window openings--the width of opening: maximum 1.2 m. and 1/3 total wall length. Distance between corner and opening: Minimum 1.2 m.

e) Lintel overlap: Minimum 50 cm.

TIE-BEAMS

The top of the wall should have a continuous horizontal tie-beam or reinforcement that, if possible, coincides with lintels of windows and doors.

CORNERS

All the elements should go together firmly united in the corners to avoid breaks and the corner connections should all utilize the same clay as the clay of the adobe.

TERMINATION OF WALL

In load-bearing walls there should be no less than two courses and no greater than four courses over the tie-beam.

ROOF CONNECTION

If it is possible, the roof should be light and with a minimal overhang. If a beam is bearing over an opening, the lintel should be doubled. But this condition should be avoided.

ROOF SUPPORT

To spread roof load through the adobe a wood bearing plate should extend the length of the wall.

THE BLOCK

Design Dimensions

C.C.→ 40 cm X 40 cm x 10 cm (2 cm mortar)

Maximum height: 8 x width = (8)(.38)=3.0 m

Maximum unsupported length = 10 x width = 10 (.38) = 3.8 m.

APPENDIX E

APPROPRIATE TECHNOLOGY NOTES

Source: Appropriate Technology for Water Supply and Sanitation, World Bank, February 1982, by Witold Rybczynski, Chongrak Polprasert, and Michael McGarry

"Developing countries today cannot simply repeat the development process of the developed countries, and nowhere is this more clear than in technological development."

Also—in my reading of appropriate technology materials I am constantly confronted with the underlying assumption that the goal or final outcome of the "development process" is to become a developed country on the model of the U.S. or Western European or even Eastern European nations. The question I have is: Is this really a desirable goal? Does the world really need 200 U.S.s, and further, could the world's resources ever accomodate this desired mass-industrialization? I am not suggesting a stagnation of agro-cultures at all, but instead I'm suggesting that there must be alternative futures other than mass techo-industrialization.

Perhaps one aspect of such an alternative would require a "digression" in the industrialized nations with the accompanying progression of underdeveloped nations so that they can meet at an entirely different level of development which both allows for a well-fed, well-clothed, educated, healthy world community and that fits into the limited framework of the world's resources.

...Just a thought

Back to Toilets

2 Questions:

- "What were the options available in mid-19th century to then-developing countries?
- Is the option that was adopted then the optimal solution for countries beginning their development today?

MID-19TH CENTURY OPTIONS:

- Cesspools, bucket systems, pit latrines, open ditches——>water closet,

flush toilet.

-Horse-drawn tank trucks for transport of sewage

-Total or partial on-site biological treatment (not yet invented—septic tank—1897)

-"Composting was brought to the West from China in 1909 by the U.S. Dept. of Agriculture, pioneer work by Sir Albert Howard was not completed until the 1930s—too late. Water closet took over before dry-disposal option could get off the ground."

-"Population explosion is a formidable obstacle to development (today)" thus solutions and paths to "progress" must be much different by necessity.

-"At the time that London opted to use underground sewers, it had a population of approximately 2,000,000, all other major cities initiated sewer construction with less than 1,000,000 people."

-"Today most of the primary cities in Asia surpass 5 million inhabitants."

-Also—southern hemisphere nations suffer from frequent water shortages.

-Poor sanitation is one of the chief causes of spread of hookworm, diarrhea, enteritis, cholera, and typhoid. Destruction of these pathogens is top priority in any waste-disposal system. (Problem greatly increased in tropical regions.)

-Before sewer adoption in the west, "night soil" was collected from cities, by bucket or pump systems, and used by farmers as fertilizer.

-World Health Organization Survey

1970—27% Urban population in developing countries had sewage connections

1975—only 25% had those same connections, a 2% drop.

-"The most widely used method of disposal, the pit latrine, has been studied very little. Particularly in the rural areas, disposal is based on a combination of rules-of-thumb and folk tradition."

-"6.5% of population of developing countries have sewers."

Pit Latrine

-Most widely used technique in tropics with exception of "indiscriminate defecation in the fields"

-Peasant reluctant to build and use latrines

Reasons: Lack of education
Traditions
Poor soil (cave ins)
abandonment due to smell, flies, uncleanliness

-"One of the few technologies affordable by rural population"
-Improvements of standard
-Sturdier construction/reinforcement of pit
-Larger pits
-Ventilation pipes
-Hole covers

HANDLING AND COMPOSTING HUMAN WASTES

Composted human manure can be safely used if the following precautions are taken:

1. Its use should be confined to fertilizing the soil in orchards and to the culture of upright berry bushes (e.g., raspberries), of corn and other plants, the edible portion of which is well above the surface of the soil. (Remember rainfall and other watering may splash soil particles on the base of plants as high as a foot above ground level.)
2. Any fruit, berry, or vegetable which may accidentally touch the ground should be cooked. The reason for the strict precaution is that the minute size of these organisms permits them to become lodged in the numerous pores, the waxy coating, or the corky outer layers of vegetables and fruits in such a manner that even repeating washing fails to dislodge the organisms.
3. Tilling the soil should be separated from harvesting the fruits by a thorough washing of the hands.
4. Human manure should be used only after it has been composted and thoroughly aged. As Bob Rodale wrote in February 1972 Organic Gardening and Farming: "We recommend turning the pile at least three times in the first few months, and then once every three months thereafter for a year. Then wait until fall to apply the compost to land you'll plant in the spring." It is well to avoid the use of this compost on ground from which root crops will be eaten raw. If you farm, you can use privy compost on pasture, allowing some time for the material to settle into the soil before grazing.
5. Do not rely upon an isolated bacteriological examination. It takes but a single contribution by a carrier to contaminate the feces being collected.

As far as the actual conduct of an operation involving composting human manure is concerned, these precautions should be observed: Use an "approved" compost process, one that heats the pile sufficiently. Be extremely meticulous about personal hygiene before, during, and after setting up or working the compost pile. If possible, a set of clothing should be reserved for use when working the

pile. The shovel (or fork) used to manipulate the manure should be reserved solely for that job. It is extremely important that flies be excluded from the operation. Remember that flies are important vectors (carriers) of disease organisms.

Until the compost process has been completed—at least six to eight weeks—the pile should be sealed from the environment. It should be protected from rainfall, and no seepage should be allowed to escape. This precaution is especially important if the operation takes place on a hillside. It has been demonstrated that runoff water can carry salmonella and other pathogens for distances as much as 1,500 to 1,800 feet. Coming under the category of nuisance rather than health hazard is the matter of odor.

If a privy is vented the vent can be a channel not only for venting air, but also of odors. The important point here is that while a well-motivated individual may become inured to objectionable odors arising from his operation, his neighbors may not. Odors may be kept down if they arise by covering the excrement with dirt, peat moss, or wood ashes after each use.

As a closing note, i would like to refer to Bob Rodale's recent account of his observations on agriculture in China. He noted that human manure is used extensively in Chinese agriculture. However, he also observed a quite widespread incidence of intestinal diseases, of which the various forms of dysentery were the most common. Proper composting and lengthy exposure to the elements are the two cornerstones of purification.

Clarence Golueke, Research Biologist, Sanitary Engineering Research Laboratory, University of California.

THE CLIVUS MINIMUS

We had been concerned, at the Minimum Cost Housing Group, with developing an on-site design for a one-household toilet that would use little or no water and could be used in high density settlements. It was our intention to produce a design which could be adapted to slums and squatter settlements in underdeveloped countries, and which could be realized in a variety of materials.

We started this work in 1972 with a survey of existing alternative sanition systems, which grew into the publication, Stop the Five Gallon Flush, still being updated and enlarged. It seemed to us at the time that composting would be the ideal basis for our work. This had been a traditional system for handling human waste in south Aisa for centuries, in the rural areas. It usually consisted of a hole in the ground into which excreta and organic waste were thrown. When the hole was full, additional organic matter would be added and the whole covered up, to be dug up some time later. The humus was used as fertilizer in the fields. This avoided the handling of fresh fecal matter, which was the cause of so much disease in countries such as China and India.

The question was, "Could composting be 'urbanized' and used in high density settlements?" We found that in fact someone had already begun work in this direction. The system developed was called the Clivus Multrum. We become convinced that the Clivus Multrum was the most promising of the "composting toilets," a number of which were being marketed both in Europe and the United States. The two problems that had to be resolved were: (1) Could the Clivus be built in an on-site version at a low enough cost, and could it be made out of locally available materials in underdeveloped countries; and (2) Would the Clivus operate in various tropical climates?

The Clivus Multrum is made out of fiberglass, a much too expensive material for poor countries. The first prototype we built in 1974 was out of asbestos cement, factory molded. This proved to be still too costly and extremely heavy. We next built two on-site toilets out of cement blocks in owner-built houses in Quebec in 1975. These have been operating successfully since. A third unit was just completed in a house north of Ottawa. All of these Clivuses, now christened the Clivus Minimum, were in cellars.

The first installation in an underdeveloped country was completed in Magsaysay Village in the Tondo area of Manila. The Tondo is a squatter settlement of 160,000 people, three-quarters of whom have no waste disposal

facilities at all. The prevalent system is euphemistically called "wrap and throw"! The Minimus chamber was built out of cement blocks, plastered inside, and has a concrete bottom. The vent pipe is galvanized metal, and the air ducts are PVC. The total material cost (not including labor) wa U.S. $55. The construction time was six man-days. Half a dozen Clivus Minimus toilets have been built, both in Tondo and in a resettlement area outside Manilla.

At the moment it seems that, for the Philippines at least, the cost of construction is acceptable. We will be trying the Minimum in India and adapting it to local materials and conditions. The Manila Minimus is built above ground, as a high water table and seasonal floods make burial too expensive. In other situations the Minimus would be buried, and humus retrieved through a "manhole."

The operation of the Minimus in hot climates remains to be seen, and the Manila models will show the problems, if any, of ventilation in hot/humid situations. It is too early yet to tell, though the fact that hot temperatures will certainly speed up the composting process itself is promising.

It should be stressed that there is no one "design" for the Minimus. It must be adapted to meet local climatic conditions, available building materials, local skills, and conditions. The application of composting sanitation technology to developing countries cannot be on a piecemeal basis. It must be done on a community (not individual) scale and integrated with social and educational development. It was precisely in such a way that rural composting toilets were introduced to North Vietnam during the years 1961-1965. As a result of this program of rural sanitation it has been reported that over 600,000 tons of fertilizer were produced annually in this fashion!

It is for this reason that the Minimum Cost Housing Group has not produced do-it-yourself plans for the Minimus and does not contemplate doing so in the near future. The use of the Minimus represents a significant shift in cultural patterns and habits and must be clearly understood by the users in order to be successful.

Source: Stoner, Carol H. (ed.) Goodbye to the Flush Toilet. Emmaus, PA: Rodale Press, 1977.

CALCULATING THE SIZE OF YOUR PRIVY COMPARTMENTS

Feces should constitute no more than 20-25 percent of the composting material. Human waste per person per day averages ½ pound feces (moist weight) plus one quart urine. A yearly average equals about 180 pounds feces, 80 gallons urine. At 11 pounds/gallon and 7 gallons/cubic foot, this equals 3 cubic feet feces, 10 cubic feet urine. Decomposition reduces this raw wet volume to 1/20 its original volume, or about one cubic foot per person per year. (We use 7,000 - 10,000 gallons of water per person per year to flush away what naturally reduces to something you could lug around in a five-gallon can!) Government sources say to size a privy at 2 cubic feet/person/year. Figuring a volume of other organic waste five times that of human waste, two 3-foot x 3-foot compartments would serve a family of four for a year.

Calculations based on a six-month use by four persons:

Daily input

Feces: ½ pound/person/day (0.15 pound dry weight) 6% Nitrogen C/N ratio=7

Urine: 1 quart/person/day (0.15 pound dry solids) 16% Nitrogen C/N ratio=1

Kitchen garbage: 1 pound (dry basis) 2% Nitrogen C/N ratio=25

Sawdust and peat moss: 100 pounds/month 0.15% Nitrogen C/N ratio=400

Quantities for 150 days (six-month period) for four people:

Feces: .15 x 4 x 150=90 pounds x 6%=5.4% Nx7=37.8 pounds C

Urine: .15 x 4 150=90 pounds x 16%=14.4 pounds N x 1=14.4 pounds C

Garbage: 1.0 x 150=150 pounds x 2%=3.0 pounds N x 25 =75.0 pounds C

Sawdust/peatmoss: 600 pounds x .15%=0.9 pound N x 400=360.0 pounds C

Total: 23.7 pounds N 487.2 pounds C

C/N=21 (toilet paper raises this closer to 25)

Total mass @ 50 pounds/cubic foot=1 cubic yard.

Farallones Institute

WATER

Rainwater potential:

Rainfall: 1,500 - 2,000 mm annually May - October

(Dry season: February, March, April)

Rain Stats: $\frac{1 \text{ mm rainfall}}{1 \text{ m}^2 \text{ of roof}}$ = .8 litres water collected

Therefore 5 m x 8 m roof (in plan)

5 x 8 x 1800 x .8 = 57,600 litres/year (!)

or $\frac{57,600}{365}$ = 158 litres/day average

Typical domestic water usage

	Litres/Capita/Day	Range
With Communal Standpipe (250 m walking distance)	30	20-50
Yard Collection	40	20-80
House Connection:		
Single Tap	50	30-60
Multi. Tap	150	70-250

Family Average = 8

320 litres/day; therefore 2 x [5 x 8m^2 roof collection area] = 316 litres/day.

Source: Small Community Water Supplies

CENTRAL AMERICA: THE LORENA COOKSTOVE

INTRODUCTION

The Lorena cookstove is in use throughout Central America, especially in Guatemala, by people in the highlands. With its efficient design and durable construction, the Lorena cookstove offers a low-cost, fuel-saving alternative to those who have to live in a wood-scarce environment. The stove uses 50 percent less wood than the conventional open fire. It is hoped that the use of the stove will eventually cause a significant change in fuel demands of the high-landers and contribute to the reversal of the severe deforestation that is plaguing Guatemala.

BACKGROUND

Guatemala, where 50 percent of the population lives in the rural highlands, is a small, mountainous country about the size of the state of Kentucky in the United States. As the population increases, so does the demand for firewood, both of which contribute to the problem of deforestation that besets not only Guatemala but other Central America countries as well.

The shortage of firewood means that people must travel long distances in search of their cooking fuel source—wood. The backbreaking labor not only consumes considerable time, but also up to 25 percent of the monthly family income. The time is ripe for reconsidering cooking habits, or else a family may face spending 100 percent of its income on fuel.

This was the situation faced by Ianto Evans and Donald Wharton when they began their work to design a cookstove that would save wood. They also accepted the challenge of designing a stove that would fit into the cultural life-style of the highlanders and that would eliminate other problems plaguing the cooks (e.g., smoke, open fire hazards for children, intolerable heat generation in the summer, and backbreaking labor). With $1,000 and six months of experimentation time, Evans and Wharton went to the Choqui Experiment Station in Quezaltenango, Guatemala, to develop a stove. During 1976 and 1977, the stove was designed and tested, after which the experiment station started to promote it.

Several problems had to be considered in the planning and designing of the Lorena cookstove; all of them were related to the existing cooking methods. First, many poorer women cook over an open fire, using three rocks or "tituates" on which to place the cook pot. This method is very inefficient in terms of

fuel requirements: only prime-quality wood can be used, excluding sawdust, cornstalks, and so on; also the combustion is poor due to the high altitude, causing smoke to permeate the room and house and finally escape through cracks in the roof. Second, in the conventional cooking method, food pots are placed on the ground, all within reach of rats, children, dogs, and cats. The practice results in burn accidents, food loss, back breaking labor for the cook, and unsanitary conditions. Third, most Guatemalan highlanders have very little money and no access to money sources. This means that even the most inexpensive stoves (cast-iron plate on a brick platform) are beyond the reach of most families. Fourth, few tools beyond the machete and cooking utensils are available. Any construction of stoves would have to employ these tools, for the people have no financial resources to rent or buy other items.

With these problems in mind, Evans and Wharton began to experiment. The solution was based on knowledge of other stoves in operation through the world, e.g., Ghanaian and Indian stoves. These were rejected due to their nondurable construction and inability to contain heat very well. The result was the Lorena cookstove, a smokeless, heat-conserving, fuel-saving, modern-looking device that is spreading rapidly throughout Guatemala. Its success is credited to the fuel-saving design.

The final design was the result of trial-and-error prototypes. The designers worked closely with rural Guatemalans, who patiently gave suggestions for revisions. One such suggestion was to reject the low stoves, even though sociologists stressed the cultural importance of families crouching around the open fire in cold mornings and evenings. The people wanted a modern-looking stove of "proper" height.

Test stoves were built at the Choqui Experiment Station in Quetzaltenango. Tests of local clay and sand mixtures were made to find a combination that would be resistant to cracking and deterioration. Also, the designers tried to build the stove exclusively with tools available to all Guatemalans. Simplicity in terms of money, technical design, tool requirements, and materials was the underlying philosophy of the project.

THE STOVE

The Lorena cookstove offers unique design characteristics that make it very desirable to the Guatemalans. The stoves are carved from a high monolithic block of clay and sand, resulting in a great structural strength and

heat retention. The fire is totally enclosed, preventing burns and inefficient heat transfer as are common with open, "three rock" fires. Also, the Lorena stove has a high proportion of sand to clay, thus preventing shrinkage, the common cause of cracking. The Spanish name "Lorena" comes from the sandy mixture used to construct the stove—"lodo" meaning "mud" and "arena" meaning "sand."

The Lorena stove is wood-burning, with each stove being designed to fit the location and needs of its users. Because the stove is custom-built, various designs and shapes ranging from bakery stoves to small family stoves exist throughout commercial Guatemala, Honduras, and Mexico. Three basic shapes are promoted: square, round, and L-shaped (for corners).

The materials required to build each stove cost four to five dollars, and the average labor time is three to four days. The simplicity of design and minimum tool requirements are no accident; they are the result of calculated design revisions by Evans and Wharton. The basic materials needed to build a Lorena stove include clay, sand, water, scrap sheet metal, chimney pipe, twenty to thirty adobe bricks, a machete, and a spoon. Construction proceeds more quickly with the use of a sifting screen, a shovel, a large how, a bucket, and a mason's trowel. These are not essential, however.

A stove is constructed in the following manner:

1. Determine the size, shape, and design of the stove (e.g., number of pot holes, room for eating space, cutting board, location, etc.).
2. Mark the full size of the stove on the ground.
3. Construct the base support with bricks or stones ten centimeters in from the mark, leaving the center empty. The indentation creates a foot space for the cook.
4. Add the second layer of bricks so that it protrudes five centimeters farther than the first layer. Add a third and fourth layer of bricks and rocks. (Additional layers can be added depending upon the desired height of the finished stove.) Forty to forty-five centimeters is standard for the base height.
5. Fill the center space with stones, debris, soil, or broken adobe; pack it down. Allow the base to dry overnight.
6. To make the body of the stove:
   a. Mix sand and clay. A high proportion of and prevents shrinkage of clay, the cause of most stove cracking (a good ratio is 60

to 80 percent sand to 20 to 40 percent clay). It is difficult to prescribe the exact clay/sand mixture because of the differences in clay from region to region. The one important detail is that the clay must fire to prevent crumbing and subsequent firebox collapse.

b. Sift the sand and soil to remove rocks.

c. Mix twelve to twenty buckets at a time. This is enough for one layer of the stove. Do not add too much water, only enough to hold the mixture together.

7. Build the body of the stove layer by layer. Do not add the next layer until the first stops glistening and is firm. Work from the outside to the inside; the drying of each layer may take as long as one day, depending on the location of the stove.

8. When the layers measure forty centimeters, work a board across the top to level the stove. A machete or trowel can be used to even up the sides or to shape them.

9. Allow the body to dry until a finger pressed into the side leaves only a slight depression.

10. To design the layout of the cooking surface, it is necessary to have all the pots that will be used in cooking. Place the pots on the surface of the body. The heat "tunnels" will be carved out of this monolithic block. The idea is to have two tunnels from the firebox meet beneath the final pot before exiting to the chimney. The placement of dampers on either side of the final pot and at the opening of the firebox allows for heat control.

11. To carve out the inside, a machete and spoon are needed. (The metal chimney can be used to start the holes for the pots.) Cut the damper slots with a wet machete, making a groove that slopes into the slot.

12. After making the initial holes for the pots and the firebox opening, allow the body to dry. (The length of time varies from several hours to one day.) If it is soft inside, allow a longer drying time.

13. Use a spoon and the pots that will be used to make the final pot holes. Wet the pot sides and twist with slight downward pressure; enlarge the hole with the spoons.

14. It is necessary to get a good fit between the pot and the pot hole; the farther down the pot sits in the stove, the better the heat transfer.

15. Excavate the firebox and the tunnels using a machete, spoot, or trowel. The entrance to the firebox is an arch higher than it is wide. The water box hole should be about the same depth as the cook's height. The tunnels circulate the hot air and therefore should be wide enough to accomodate a hand holding three eggs.

16. The chimney should be fitted with the tapered end down. The hole for the chimney should be deeper than the tunnel inside the stove (to avoid clogged passageways).

17. The final details of damper doors and finishing the outer surface of the stove are not difficult but are necessary to insure proper operation and optimization of the stove. The outside of the stove should be whitewashed or varnished to prevent deterioration.

STOVE EFFICIENCY AND ADVANTAGES

The Choqui Experiment Station has conducted efficiency studies under different cooking conditions. The stove consumed 50 percent less wood than the traditional open fire system. Tests by other groups record the wood consumption at 20 to 75 percent less than conventional stoves. The wood consumption figure does not reflect the total savings to the owner for the Lorena also can burn cornstalks, bagasse, sawdust, and organic wastes. This allows the owner to further reduce the time and money spend on finding or buying wood. The open-fire system requires prime wood because of poor combustion at the altitude of the Guatemalan highlands. The average fuel bill now is five to eight dollars, a 50 percent reduction. For a family whose total monthly income is fifty to sixty dollars, the savings are significant.

Not only does the stove same money for the owner in initial capital investment and fuel bills, it also provides the cook with advantages. The stove is smokeless. With open-fire cooking there is constant exposure to smoke, creating eye, lung, and sinus irritations. Many older women in Guatemala have bronchitis, emphysema, and lung defects, and some women are blind due to a lifetime of smoke in the eyes. Another aspect of the stove that contributes to its attractiveness is its height. The stoves are built to an eighty-centimeter height, eliminating backbreaking work for the cook. This height also keeps

the cook pot out of the reach of children, dogs, cats, and rats. The Lorena stove keeps the heat inside the stove, providing the cook with an exterior work surface and eliminating the suffocatingly hot kitchens with open fires.

Lastly, the surface design, i.e., sinking the pots in the surface of the stove, increases the efficiency of the stove. Little heat loss to the cool atmosphere occurs since the stove sits directly in the stream of hot air. The stove also allows for slow, overnight cooking without additional stoking. This is accomplished by closing the dampers all night; enough heat remains to simmer food and heat coffee.

The airflow in the Lorena stove is notably different from the Ghanaian and Indian stoves in which the air flows under successive pot holes in a direct path to the chimney. The Lorena circulates the air through tunnels under each pot and finally through the chimney. This type of routing has two important effects: maximum dispersion of heat within the stove and reduction of draft (which draws much of the heat out through the tunnel in the Ghanaian stove).

Sources: Suellen Sebald Edwards

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APPENDIX F

NOTE: Underlining is for emphasis in this thesis book.

PRELIMINARY REPORT ON A PROPOSED PROGRAM FOR HOUSING AND DEVELOPMENT OF LOCAL RESOURCES IN NICARAGUA

Prepared for:

Ministerio de Desarollo Agropecuario y Reforma Agraria

and

Direccion de Asentamientos

Nicaragua

by:

Groundwork Institute

Huck Rorick, Executive Director

SUMMARY AND INTRODUCTION

The people of Nicaragua are faced with serious housing problems including lack of adequate shelter, improper or non-existent sanitation systems (sewage) and poor or non-existent water systems. These problems cannot be resolved using the conventional methods employed in the past by the industrialized nations. The Ministry of Agricultural Development and Agrarian Reform (MIDINRA, Miguel Barrios, Director Region VI) has proposed initiating, with assistance from Groundword Institute, a pilot program in low cost housing and community development based on utilization of local materials, indigenous energy sources and skills. The program would include development of local small scale industries, a training program for local workers, and utilization of self-help construction assisted by professional builders trained in the program. Participation of the local community is integral to all parts of the program including design as well as construction of the housing.

At the invitation of the Directorate of Settlements (Eduardo Bernheim, Director) two representatives of GROUNDWORK INSTITUTE (Huck Rorick, Director and Steve Sears, Planning Associate) made a preliminary visit to the Matagalpa-Jinotega region of Nicaragua to assess the feasibility of such a project.

The visit was conducted from September 3-14, 1985. It included discussions with government officials, architects and engineers working in the area, local builders, materials producers, local residents, cooperatives, visits to production facilities (saw mills, brick factories) and sites of raw materials (wood, reed, stone, clay, etc.).

The result of the visit was the decision to undertake a pilot project aimed at improving living conditions for the members of the new agricultural cooperative Jose Benito Escobar in San Dionisio. The project would serve as a model for future projects.

The members of the cooperative have moved onto land given to them by the agrarian reform, but have no housing and are currently living in very bad conditions. The pilot program would construct about 75 houses, sewage handling (latrines), and water supply. The project would incorporate a training program for local builders. Members of the cooperative would work on the construction of their own homes with assistance from the trained builders. The project would also be used as a lever in the development of small scale local industries which would supply materials for the project.

This report reviews the results of the visit and proposed plan of action.

CURRENT CONDITIONS—THE PROBLEM

Nicaragua is faced with serious housing problems. In 1982 there was an estimated housing deficit of 240,000 units, about 60% of the country's housing stock. Over 80% of the population was without sewage systems. In 1976 42% of illnesses were related to sanitary conditions of sewage and water supply.

These historical problems have been exacerbated by several current situations, both negative and positive. The attacks by the Contras in the border regions have displaced many families and have left them without homes. Some of the housing built by the government for these people has been subsequently destroyed by the contras. Although many of these people lived in substandard conditions before, they are now in even more severe circumstances.

Some positive developments have also carried problems with them. Many campesinos have received land as part of the agrarian reform. In many cases they have had to move to their new land, leaving their former houses behind. So while they have land and hope, they have no place to live. In the case of the Jose Benito Escobar Agricultural Cooperative with which we will be working,

there are about 75 families. They have one large residence, a barn, and several small huts. They are living with 3 and 4 families crowded into a single room. The huts have dirt floors and provisional walls of reeds. These walls do not keep out the wind or driving rain. The huts are without water, sewage, or electricity.

OBSTACLES AND NON-SOLUTIONS

Conventional middle class approaches to urban infrastructure and housing are completely incapable of meeting the housing needs of the majority of the people of Nicaragua.

Consider for example that in 1982 there was an estimated housing deficit of 240,000 units. An additional 17,000 units/year were needed to meet population growth and a further 6,000 units/year were needed to replace deteriorating units.

Using conventional construction and infrastructure MINVAH expected to produce about 5,000 housing units that year. If this were the only source of housing, the housing deficit would not be reduced but would be increasing by 18,000 units per year. This is without the effects of the war.

Why can't these systems solve the problem? First the expense is too great. Neither individuals nor the government has the money to build enough of these types of houses. Second, these systems have a very high imported component in their cost. Third, the skills for using these systems are perhaps not widely enough spread.

Even if exports could be increased to get more hard currency, this road is not terribly appealing because of the terms of international trade. By one estimate, the product of 1 hour's work in the developed countries is exchanged for the product of 10 hours' work in the underdeveloped countries. With respect to energy and equipment, from 1973 to 1982 the price of oil went up from US$3.22 per barrel, up to US$7.80 per barrel and the price of an 180 HP bulldozer went from about US$25,000 to about US$70,000. During this same period, the price of many agricultural exports from the developing countries stayed the same or dropped. In short, with current terms of international trade, you get much more for your labor by producing locally for local consumption than you do by producing items for export and trading them for what imported items. Because of the very unfavorable terms of trade, this is true even when foreign

producers are several times more efficient.

It is important to realize that even if imported products are cheaper it may still make sense to use local ones. Why? Because the money spent on these products helps build local industry, develops local skills, increases capital investment in the country, and increases local wealth (it is paid to local people who can spend this money again within the country). Furthermore, the quantitiy of products which can be imported is limited by the hard currency available to buy them and as a result they are often in short supply. It makes little sense to talk about buying a "cheaper" product when there is none to buy.

The import component of building materials is not always immediately evident. Consider for example cement. Although Nicaragua has a cement factory and the raw materials are available in the country, cement is still fundamentally an imported product. This is because cement production requires a large amount of energy, and the fuel used to produce it in Nicaragua is oil. In addition, heavy machinery is required and thi is also imported. In 1982, these two components accounted for 85% of the cost of production of cement.

SOLUTIONS AND OPPORTUNITIES

This project proposes to emphasize:

*Utilization of Local Materials

*Development of Local Small Scale Industry

*Improving Traditional Building Systems

*Training Programs Combined With Utilization of Local Skills

*Self-Help Construction Assisted By Trained Builders

This is a preliminary report based on a short initial visit and cannot thoroughly cover the opportunities for this type of development. We can, however, give a few examples.

Developing Local Small Scale Industry

Let us take roofing as an example since it is one of the more difficult problems to solve. The common current solution is corrugated metal (zinc) which is fundamentally an imported product (although there is a plant that does the corrugation in the country). Solving this problem with local materials

not only provides the possibility of producing more housing but also of developing local industries. One possible solution is with wood shingles and shakes.

Wood shingles and shakes make excellent roofs. They have a long history of use in the U.S. They have been used in regions ranging from cold northern parts of the country such as Washington and Oregon to hot humid areas such as Florida. When properly installed, they are highly weatherproof and durable. They have an expected life from 15-40 years. They are used without treatment, but may also be treated chemically to increase their durability and to make them resistant to fire. In the U.S. they are considered an expensive but high quality roof.

There already exists some experience with shakes in the Matagalpa region although it is not extensive. They are used occasionally by the campesinos in the mountains who make their own by cutting sections of a log with an axe or cross cut saw and then splitting them with a machete. According to the local builders these roofs last from 15 to 25 years depending on the kind of wood.

Shakes have a number of characteristics which make them highly appropriate for development in Nicaragua.

- -The material is local. There are a number of appropriate local species including ones which are resistant to decay and insect attack.
- -It is renewable. This is important in terms of the long term use of the material and its use as part of a new materials industry.
- -The tools required for production are simple being as little as a saw and machete.
- -Efficiency can be increased drastically with a small capital investment. In particular a chain saw for cutting the logs into lengths and specially made tools for hand splitting.
- -The material is light and easy to transport.
- -Techniques of installation are relatively simple to teach.
- -There already exists some experience with the material to build upon.

Although there is some experience with the use of material, there does not currently exist a shake production industry. This has probably discouraged their use. For example, the emergency housing for those displaced by the war is being built with corrugated metal roofs. The reason for this is that they can be quickly and easily purchased and erected. All that is required

is a call to Managua to order so many hundred sheets and they are shipped out (although they are not always available). Everybody knows that they are, where to get them, how much they cost.

Doing a roof out of shingles would require locating a person who know how to make them, making arrangements for their production, checking quality, locating timber to cut, arrnaging delivery, etc. If there were an organized shingle producing industry, then one could simply order them the way they do with metal.

We will use one of our projects as a lever for getting just such an industry started. With a large number of houses to build, we can make a contract with local people to produce the shingles. They will have guaranteed work for a period of time and our project will provide the necessary training. The size of the contract justifies an investment in tools that will make the operation more efficient. In the case of shingles this investment is quite small. Neverthelesss, the results are significant enough to make these people efficient producers.

Improving Traditional Building Systems

Traditional building systems have a number of advantages. They are based on local materials. There already exists a body of knowledge about using them. Most people know something about their use and execution. They are usually integrated with traditional ways of living. They often have appropriate climatic adaptations. People know what their problems are.

They also have disadvantages. These will depend on the specific system involved. However, the most general failing of these systems is that they are poorly used. Consider for example a wall system called tarquesal.

Tarquesal is a wall construction system consisting of vertical wood posts covered on each side with wood, bamboo, or reed lath (reglas) which is then filled with mud and rocks. The outside is then plastered with a clay-sand mixture. Finally it is painted with a coating of lime and cement. This sytem of construction can produce very high quality buildings. We have seen many buildings with tarquesal walls in Matagalpa and its surroundings that have been standing for several hundred years. The walls are of high quality and durable. Similar systems have been used in Japan (Bamboo & Clay walls) and England (Wattle & Daub) where they are highly prized when properly done.

This system is used very widely by the poor campesinos in the countryside. The walls they make are generally of poor quality. Basically this is for two reasons: 1) They are not using proper techniques in constructing the walls (the adobe mixture is not correct, craftsmanship is not always careful, etc.), 2) They do not have the lime and cement for the finish coat. Although they have produced at very low cost 90% of an excellent wall, the remaining 10% leaves a product that is highly unsatisfactory.

We propose to solve both of these problems as follows. The lime and cement necessary to finish the walls (which is a small amount) will be provided either by providing credit for the purchase of the material or as an outright grant as part of the government's program for providing adequate housing for the poor, war refugees, etc. The techniques of execution will be improved through a training program, demonstrations (the houses being built), and a picture manual (if funds allow) showing the best techniques for this type of building.

For the production of the houses in our initial project we will look for and interview the best craftspeople of this type so as to compile the local knowledge. We will combine this with the knowledge of our own specialists in earth materials (headed by Pliny Fisk). These ideas will be discussed with the local craftspersons and set a high quality specifications developed for the first buildings. We will then contract with one or more of the local craftspeople to do the work, assuring that they employ a certain number of apprentices as assistants who will learn the work. In the case of self-help projects, the craftsperson will be employed to supervise the work with the users providing as much of the labor as is possible consistent with producing a high quality result.

Self-Help Construction

Self-help construction has disadvantages as well as advantages. The disadvantages are:

- Knowledge gained by building is lost since once the person completes their own house they stop building. This is especially serious when there is no investment in training and education as we are planning.
- Advanced training is discouraged and long experience with a consequent development of refined skills is inhibited since a person does not work

at the same job over a number of years.

- Production per person hour is lower than with specialized labor.
- Self-help may inhibit the development of local industries and the skilled craftspeople because of the reduced demand for these services on the cash market.

The advantages are:

- People may have time when they don't have money, so they can afford self-help housing.
- Self-help can be used by large numbers of people right away without the lag implied by development of a cash economy.
- Most rural housing is already done this way.
- It increases people's involvement and sense of ownership. They may take better care of their homes. They can provide personal touches and adaptations that probably cannot be provided in any other way.

It seems clear that some amount of self-help is always desireable. In cases where people have been able or required to pay for their houses and have not participated in their design and construction, it seems that something has been lost. The issue should not be whether to use self-help, but how much to use and where. What is the right mixture.

There is however one deciding argument in favor heavy use of self-help housing in Nicaragua as well as much of the developing world. There is no other way to improve the living conditions of a large number of people in the short term. When the internal economy is more developed it may be desireable to have more professional builders and a more specialized division of labor. At this moment, however, the system of trade does not exist, people don't have the cash to support a large professional building force. This will have to come later. Our work in training builders and developing local industries should help the process.

We plan to resolve some of the drawbacks of self-help building by integrating professional builders into the process. We will train some people who will then work with the users on the construction of their houses. These people will be paid, and when they finish with one group of users they will move on to another project. They will gain experience both in construction and in working with self-help groups.

PLAN OF ACTION

As its first step the project proposes to construct a settlement for the Jose Benito Escobar Agricultural Cooperative, located in San Dionisio. This would include about 75 homes, sewage system (latrines), water supply, and community buildings. Financing would be obtained by MIDINRA and made available to the cooperative either in the form of a loan or a grant. Members of the cooperative would work on the construction of the settlement. The cooperative which has about 75 families is very enthusiastic about such a project and is prepared to devote 15-18 of its members to working on the housing.

The construction will have a number of important effects in addition to providing decent living conditions for the cooperative. First it will serve as a demonstration of the kinds of results that can be obtained with local materials and will demonstrate the building techniques involved. Second, it will provide an impetus to development of local small scale industries. The contracts for supplying particular parts of the buildings will provide a guaranteed source of work to help in starting up the businesses. The specifications of the contract will help guarantee the quality of product and can be combined with training of the producers. Thirdly, training programs for construction personnel will be conducted in conjunction with the construction. Because of the practical application these will be highly effective, and will provide trained people for the next project.

DESIGN

The design will be tightly interlaced with the construction. It will be in effect a series of construction contracts developed with local producers and craftspeople. Each of the building elements will be worked out with the local producer. The best ideas of local craftspeople will be taken and combined with advice from project technicians. In this way the final plans and specifications will be created and incorporated into the contracts for producing the housing and its parts. The fact that there is a paid contract involved makes it desireable (as well as mandatory) for the producer to incorporate changes. The size of the contract allows him to invest in improved equipment or facilites where necessary.

For example, if we used wood shingles in the project the order for the materials would allow a local producer to set up a production facility as earlier

described. If we use clay tile we can use our steady contracts as a way of improving quality of products, or as the justification for building a covered facility that would allow year round production of tile.

Since the producers are intimately involved in the decisions about improvements, and since the project provides an economic incentive for incorporating these improvements (the contracts of course require them), we can expect increased quality and decreased cost with the introduction of more efficient and improved methods of production.

CONSTRUCTING THE FIRST BUILDING

Following the development of the plans, specifications, and contracts a first test house would be built as a trial run. It would serve to bring out any problems with the system and to provide a model from which the remainder of the buildings can be patterned (or altered in response to noted problems).

It is possible that this first house could be used to house the technicians on the projet making them the "guinea pigs" for the firs test, and at the same time allowing for introduction of some innovations which local people had not seen before and which they could evaluate better after seeing a build example.

Following completion of the project, this building could become a permanent facility for MIDINRA staff working in the area.

SMALL LOCAL REGIONS

We were very much struck by the rapid variations in conditions from one place to the next. Significant changes could take place in distances as small as 40 kilometers. For example, field stone is readily available in the area around San Dionisio. Dario has clay deposits and many brick and tile factories, but little wood. In the mountains wood is available. Waslala has bamboo, other areas have palm. There are also rapid changes in topography and climate. San Dionisio is mountainous and rainly while Dario 40 km away is relatively flat and dry.

These variations imply differences in the design of buildings and the materials and construction systems used. They also imply a much more varied and fine grained approach to planning than is usual. Centralized planning conducted at a distance would be difficult and would almost certainly produce

inappropriate results.

Climatic and topographic variations must always be dealt with on an individual basis, but under most circumstances one would imagine transporting materials from one region to another. However, current conditions make this very uneconomical, at least for some time to come. This is due to the high costs of transportation. The road in many of these areas are very poor and a trip of only 40 km can translate into a one day round trip by truck. In any event vehicles and fuel are both in limited supply and imply an expenditure of hard currency both for the vehicles and for fuel. For projects of any significant size, especially considering the scope that could be made possible with self-help construction, availability and cost of transport is apt to be a limiting factor. This situation may change in the future, but for the moment we will take a very local view with adaptations expected within quite short distances.

For this reason it is impossible to immediately generalize the solutions suggested. For example, bamboo offers some very good possibilities in construction. However, since it is not available in San Dionisio, it is unlikely that our first project will develop bamboo. Subsequent projects will. On the other hand, San Dionisio has field stone which we will use for retaining walls, foundations, and floors as well as parts of walls. We would not expect to employ stone in some other ares.

HOW TO BUILD IN SAN DIONISIO

The form of building in the pilot project for San Dionisio cannot be described definitely until substantially more work is done surveying local materials, working with local producers and craftspeople, planning with the people from the cooperative, etc. However, it is clear that we can build houses and communities that will greatly improve people's lviing conditions and at the same time decrease the use of imported materials. We can do this through major emphasis on local materials and development of local skills.

Here are some examples of how we might solve parts of the construction for the Jose Benito Escobar Cooperative in San Dionisio.

Floors. Floors in many houses in the countryside are made of dirt. The floor inside is level with the outside ground. During rains water runs into the houses making the floors muddy. A great improvement can be made here simply by

assuring that the floor is raised above the adjacent ground with proper drainage around the outside. This will limit the entry of water, keeping the floor drier and cleaner. We would also consider the use of local stone for floors. The stone can be laid in a bed of gravel and sand. The sand makes the stone easy to position and combined with the gravel prevents moisture from being drawn up from wet soil below. It also provides drainage for any water that might enter the house. If the budget allows, we wioll mortar the joints with cement. If not, a greatly improved floor will still result even without mortar.

Walls. As discussed earlier, tarquesal walls of high quality can be produced simply by improving construction techniques somewhat and providing the lime-cement topping. A number of other improvements can be introduced into these walls. They can be given earthquake resistance by introducing lateral bracing and by assuring that the wood framing constitutes a secondary support system for the roof, with the clay and stone serving principally as an enclosing material. The base of the walls can be faced with stone providing protection where more wear occurs and also from water that is used to clean down the stone floors.

Roof. Three local options for roofing are clay tile, wood shingles, and straw thatch (palm is not available in the San Dionisio area). It would be possible to design houses with a central core roofed with clay tile which is highly durable, entirely local, but somewhat expensive. Auxiliary areas, porches and protected sitting or work areas would be covered with straw thatch. The thatch, when properly constructed can provide an excellent roof that is cool in the summer and warm in the winter. If constructed with adequate thickness and slope, it will also last a long time. In some cases the bottom of the roof might be covered with thin plastic sheeting to prevent easy passage of insects and the plastic covered with a finished ceiling of reeds (bamboo could be used in areas where it is available).

Wood shingles, as mentioned earlier are also an option. These could come from wood currently being cut in the Matiguas area. These and other options will be compared in more detail during the design and development phase.

Sanitation. Much housing currently has no sanitary facilities. We would provide latrines (outhouses), properly designed and located. The primary expense here is in labor. Proper location of latrines on the site, combined with proper

operation, can greatly improve the functioning of these units.

Water. The type of water system will depend greatly on the budget since pipes for a piped system would be a limiting factor. With either carried water or a piped system the water source must be properly protected. The use of water both at the source and in the home can be made more convenient by appropriate planning.

Stoves. Most campesinos cook over an open or semi-open fire with no vent for the smoke. The kitchens fill with smoke which is uncomfortable and contributes to health problems. In addition, these stoves are wasteful of fuel. This means more labor to gather wood and incrased problems with deforestation. Cheap clay stoves can be built (such as the Lorena stoves that have been constructed by CITA) which are much more efficient in the use of fuel and which can be fitted with a flue to carry off the smoke. The provision of the flue would provide an important improvement in the quality of life.

Showers. A very cheap shower with hot water can be constructed. These can function either with carried or with piped water. The water part consists of a black plastic bag which hangs or lies overhead. The black bag heats up from the sun during the day and provides a hot shower for the evening. The bag can be filled with a bucket or with pipes when available. The floor of the shower can be stone or gravel arranged so that the drain water goes to the garden. Privacy can be provided by bamboo or reed screens. Our technical team wanted this shower for thier own use. Perhaps local people would enjoy a similar one. Probably the best way to find out is to build it and let people see it.

Walkways & Paths. During the rainy season the paths in front of the houses tend to turn into mires that it is impossible to cross without getting covered with mud. If labor and energy permits we will try to construct raised paths of stone and gravel that will provide people with a more pleasant entry to their homes.

Cabinets & Shelves. Excellent possibilities exist for weaving shelves from bamboo and reeds using techniques developed for basket making (a local skill in some parts of Nicaragua) and wicker furniture making.

Doors & Windows. These can also be made with woven construction as well as with wood.

Other Options: There are numerous other options which we developed in the

early phase of the project. They include Japanese clay walls, palm thatch, bamboo framing, woven bamboo, reeds, shingle walls, adobe, wood and plant fibre products, improved bricks and tiles, glazing, sawn and roundwood construction, etc.

Site Planning. This will be dealt with in the next report

These comments are made to suggest possible directions and the feasibility of building improved housing with local materials. These are not the final choices. This would depend on talking with people about their needs and desires, further investigation of local conditions, availability of materials, etc. It is quite likely that new ideas will arise during the development process and that other ideas will be discarded. Nevertheless, we are convinced that the project is quite feasible.

CONCLUSION

Nicaragua faces both severe problems and great opportunities. It is rich in raw materials and in traditional skills in construction ranging from wood to stone to brick and clay to thatch and earth materials. These resources have not been exploited to their maximum. A relatively small investment could produce a rather large result. In particular, a program emphasizing the use and development of local materials and skills can have a significant impact on living conditions not only for the people in this pilot project but for a large number of people throughout the country.

APPENDIX G

Sandinist Housing Policy after Five Years

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DRAFT: not for citation

Presented at the 25th Annual Convention
of the International Studies Association
Atlanta, Georgia 30 March 1984

The period following the 1979 revolution in Nicaragua provides an opportunity for assessing the relationship between governmental policy formation and the realization of its objectives. This paper describes the development of housing policy within the revolutionary process in Nicaragua, and discusses the circumstances which have lead to its modification. using data from official records, from interviews of government officials and low-income residents, and from personal observations. Political, economic and social factors which have kept the new government from accomplishing its original objectives are analyzed. The findings concerning housing are consistent with other analyses of social policy and social change. They support the contention that policy influences rather than dictates change, and that policy development and implementation are dynamic processes of action and reaction to social realtiy.

Rapid growth and urbanization in developing countries have put considerable strain on the economic and political organizations concerned with providing basic necessities to an expanding and shifting population. The area of provision of shelter and services, requiring extensive capital expenditures and providing little direct or immediate economic return, has presented a

particularly difficult challenge. Nicaragua, with its recent history of natural and social upheavals, provides an interesting case for examination. In this paper we have traced the development of housing policy under the Sandinist government, examining circumstances which have impeded its full realization and have led to its modification over the first five years since the triumph.

General Background

The housing situation in Nicaragua had been a cause for serious concern for many years before the revolution (Williams, 1982). As with many other developing countries, the pressures of rapid demographic growth and migration to urban centers had accentuated the problems of inadequate shelter and services. Natural disasters such as flooding from tropical storms and the Managua earthquake of 1972 increased the calculated urban housing deficit at that time to 115,720 units (Inter-American Development Bank, 1974: 358). Effort was directed at responding to this need, and in particular at replacing the more than 40,000 housing units destroyed in the earthquake. An analysis of the Managua post-earthquake housing development reveals that an estimated 85,000 units were completed. Of course, about 10 percent was fully serviced housing constructed by the formal private sector for upper and middle income families, 20 percent was fully serviced public-sector housing for middle and lower income families, and 15 percent was temporary, marginally serviced emergency public-sector housing for low-income families. The remaining approximately 55 percent was accounted for by the informal private sector, and consisted primarily of low-income owner construction and occupied units with limited services (Williams, 1982; Ministerio de Vivienda, 1983b).

However, even these activities did little to reduce the calculated housing deficit, while other factors made the situation worse. Following the 1979 triumph, the new Ministry of Housing and Human Settlements (MINVAH) reported that 4,149 houses in urban centers were damaged severely or destroyed during the war (Ministerio de Vivienda, 1979), and heavy flooding in the northeast coastal area left 30,000 persons homeless in late 1979. Thus the new Government of National Reconstruction and MINVAH faced an extremely serious housing situation.

Urban Development and Housing Policy under the Government of National Reconstruction

Following the defeat of the Somoza regime, the Government of National Reconstruction developed policies that implemented programs directed toward the defense, consolidation, and advancement of the revolutionary process. The following were identified as major objectives for MINVAH:

(a) To initiate a territorial ordering of human settlements with the goal of reinforcing production and improving the life conditions of the population centers of the interior of the country....

(b) To plan and initiate massive construction of popular housing in the city of Managua in order to attend in part to the deficit inherited from the Somoza dictatorship....

(c) To impel an Urban Reform that permits the distribution of the benefits of urbanization to all social sectors... (Ministerio de Planificacion, 1980: 109-110).

When MINVAH policies were examined at the end of the first year of the new government, the most evident fact was that the policies were still in the state of development. Both within the Ministry and in its relationships with other sectors of the government, policies were still being discussed and developed, and organizational relationships and responsibilities were still being formalized. As it followed the major objectives set by the Ministry of Planning, MINVAH directed its attention to developing policies in three major areas: national development, urban reform, and housing.

National Development

MINVAH recognized its responsibilities within the programs of national and regional development. These programs were directed toward economic reactivation and development, particularly in the agricultural and agro-industrial fields. The Ministry of Agricultural Development and the National Institute of Agrarian Reform had been identified as the agencies of primary responsibility for these programs. MINVAH described its role as one of cooperating with these institutions in the overall planning, and of taking the responsibility for the planning and development of the actual housing developments and their supportive infrastructure.

Urban Reform

MINVAH identified urban reform as a key element in the Sandinist program. Urban reform policies were described as having two key components: the regulation of urban and suburban land use, and the resolution of the immediate housing needs of the urban popular sectors.

Regulation of Urban and Suburban Land. Urban reforms were defined as an instrument of the State which would be used to alter the system inherited from the previous regime so that the benefits of urbanization would be accessible to all. In particular, MINVAH identified the free-market system of property ownership and exchange as the basic factor responsible for irrational urban development. It declared that urban land represents a social need to which everyone has a right, and that it should not be a commodity subject to the vagaries of the market place. For that reason, policies were to be developed which would strengthen the State's control over urban land use, tenure, and transfer. The several policies included reforms which would tax the value added to property through urban development and capital investment by the state, appropriate land for the common benefit of the people, establish limits of private ownership of land, regulate urban growth and land utilization, and create a land bank. Although private property ownership would continue to be legitimate, MINVAH cited as the principal goal of urban land regulation the elimination of private profit generated from increases in market value.

One goal of the government was to promote the redevelopment of the urban center which still had intact much of the pre-earthquake infrastructure. In order to promote this policy, the government issued Decree No. 138, the Law Concerning Donations of Property within the Remains of the City of Managua. Although this law provided strong encouragement and incentivies for the donation to the state of properties within the nearly destroyed city center, it had only a moderate effect. Although the state controlled almost half of the urban core area by the end of the first year, only about 10 percent of this had come from donations. During the next four years, only a few projects would be undertaken in the urban core. There was some restoration of surviving buildings, continued clean-up of rubble and the establishment of a large park and playground. Two small scale housing projects were completed: a 64 unit

low-rise apartment complex, and 24 duplex units.

It was not until 1982 that MINVAH completed a complex series of regulations containing the policies for urban reform in the municipality of Managua. The document, Plan Regulador de Managua (Ministerio de Vivienda, 1982) contained an overview of the urban reform, plus copies from the official government gazette of the regulations for: zoning and land use, urban development, construction permits, and gasoline stations.

The overview presented the Plan as a midrange effort to influence the growth of Nicaragua's major urban center toward more rational development. It defined the role of Managua within the context of national development. The Plan was not intended to transform the socioeconomic factors which determined urban development. Furthermore, while much time and effort had gone into the development of the regulations, and many other ministries and agencies were consulted, it was acknowledged that the plan was to be considered flexible, and subject to periodic revision and to "substantial changes...according to the dictates of the dynamic of revolutionary change" (Ministerio de Vivienda, 1982:2).

The 1980 population for Nicaragua was estimated at 2.7 million, with 53.3% residing in urban areas. The 1980 population of Managua was reported as 667,000 persons, or 46.1% of the total urban population. The estimates for the year 2000 were a total population of 5.1 millions (68.6% urban) for Nicaragua, and 2.3 millions (65.7% of total urban) for Managua. The estimates were based on an annual growth rate of 3.1% for the nation and 6.04% for Managua. The MINVAH recongized these as probable, though not necessarily desirable, conditions within which policies must be proposed.

The major policy goal was stated to be "the saturation of the urbanized area in order to optimize the use of existing investments in infrastructure and urban services" (Ministerio de Vivienda, 1982:11). This was especially important for Managua, which has had a unusual growth history which left much undeveloped land scattered throughout the city (Williams, 1982). This saturation process was scheduled to take place in three steps, beginning with the central core area, followed by the outer partially developed areas, and terminating with expansion into previously underdeveloped outer areas. It was calculated that the central core area, which contained about one-half of the 1980 population, would absorb less than 15% of the projected new growth.

Programs for the Satisfaction of Immediate Housing Needs. MINVAH proposed several policies in response to the needs of the low-income urban residents. Only two months after the triumph, the government announced Decree No. 97, the Law of Illegal Subdivisions. This law placed all illegal subdivisions under the control of the state, to be administered by MINVAH. Thenceforth all land-purchase payments were to be made to MINVAH rather than to the subdivider. An account was established for each subdivider. The law stated that although the subdividers had no futher jurisdiction over the land, they were to be held responsible for complete infrastructure costs, the subdivider was to be held liable. (In the unlikely case that payments exceed costs, the surplus was to be returned to the subdivider.)

In January 1980, the government issued Decree No. 2, the Rental Law, which established rent contols. All rentals were reduced significantly, and a maximum allowable annual rent was set. The law restricted the landlord's ability to evict tenants and prohibited collection of rent in advance or suspension of electrical or water services. Houses without sanitary facilities could not be rented. A later decree restructured mortgages owed to the National Financial System, reducing the interest, excusing up to eighteen months of nonpayment and allowing an extension of the repayment ot a maximum of twenty years.

Proposed policies of MINVAH placed a very heavy emphasis on the participation of the residents through the mass organizations, particularly the CDSs (Sandinist Defense Committees). Each neighborhood had a central committee made up of the representatives of the many block CDSs. The proposed policies required that all requests for support for community improvements be processed through the CDS. It was the responsibility of the CDS to promote the cooperation of all residents in the planning and installation of community improvements.

Housing Policy

Housing policy was seen as an integral part of the broader national program for social and economic reforms. Housing was defined broadly to include not only shelter, but also "the infrastructure, the material, the streets and other urban services and spaces which serve them and which articulate them to the rest of the community and to the urban structure" (Ministerio de Vivienda, 1980). At the same time, MINVAH took care to clarify the relative positions

of housing within the range of national economic and social needs. It was accepted that items of higher priority in social and economic reforms (particularly health and agrarian reform) would leave relatively few financial resources with which to confront the tremendous and growing housing deficit, and the similarly expanding need for creation and improvement of a broad range of supportive infrastructure.

The new policy strongly emphasized integrated planning and programs which complemented each other as well as those of other inistries and agencies. Thus housing programs were not to be developed in isolation, but rather were to be parts of long-range plans for economic, social, and political development. Although a similar approach had been articulated under Somoza's regime, very little of that planning had become reality (Gelman and Hinajosa, 1976).

General Policy Aims. Most of the housing policy aims reflected two principles: integrated planning and maximization of limited resources. Housing programs which addressed the needs of the workers in the productive sectors were emphasized, as were programs which integrated urban marginal populations and which reinforced the political development of the mass organizations.

Rather than proposing extensive construction of housing by the public sector, the policies of the MINVAH proposed structural reforms and long-range developments which would not require massive capital expenditures. While some public-sector housing was proposed to meet immediate emergency needs, most policy stressed planning to reduce the costs of self-help community construction and to promote efficient use of available resources. Projects and programs which reinforced community support and interaction, such as apartment units and individual units with communal social and recreational aras, were to be given priority over those which followed the traditional separation and individuality of the residences.

MINVAH proposed programs that would investigate the development of appropriate technology, which would encourage utilization and adaptation of local materials and by-products for construction, and which would promote the development of local industry for the production of construction materials. Programs were proposed for research and the training of technicians who would be made available to CDSs for assistance in planning and implementing community development.

Several proposals for structural innovations were made by MINVAH. A

Land Bank was proposed for the better control of land use. It was propsoed that the resources of the National Financing System (SNF) be extended to a broader range of housing and that the SNF be responsible for the development of financing policies which would be rational, effective, flexible and low-interest. Support for a Materials Bank was proposed in order that construction materials could be made available at reasonable prices. In addition, MINVAH proposed continued support for the development of Urban Service Centers--satellite aggregations of health services, schools, child care centers and other social services.

Program Implementation

Five years having passed since the overthrow of the Somoza regime, it was possible to examine the process of policy formation as it was modified and translated into program implementation. While there had been severe limitations placed on this process, much progress had been made.

National development. As a part of the national government, MINVAH committed to a cooperative working relationship with other government policies, and agencies in the design and implementation of national development policies. MINVAH's involvement was focused in three areas: regional organization, integrated economic development and rational settlement planning. The process of regionalization was a long-planned administrative restructuring of the government, replacing a system of department and municipal governments with a diversified regional structure. This organization, realized toward the end of 1982, at once formalized a hierarchical system and deemphasized the importance of Managua as the decision making center. It facilitated the two-way flow of information and encouraged decentralized responsibility. For MINVAH this meant the establishment of regional offices and closer cooperation with the regional offices of other ministries and agencies.

The role of MINVAH in integrated economic development was to provide for the planning and development of housing and settlements in those areas where production was being initiated or improved. Thus, among its first efforts, MINVAH developed housing projects for the workers in a sugar refinery and in the mines of Zelaya. Other housing projects were developed in support of agrarian programs throughout the nation.

Rational settlement planning was part of the Sandinist policy to increase

production (particularly in the rural areas), impede excessive urban migration, and reduce the cost of improvement of settlements which concentrated the population so as to achieve economies of scale in the provision of services. It was believed that this policy would discourage urban migration by increasing the attractiveness of the rural areas on both a social and an economic level. Consistent with the U.N. declared princples (Abu-Lughod & Hay, 1977) MINVAH maintained that it would not forcibly relocate persons to achieve this end. A notable exception to this policy was the resettlement of the Miskito Indians from the northern boarder to Tasba Pry, an action forced by extenuating circumstances (Ministerio de Vivienda, 1983b).

Urban reform. It was MINVAH's responsibility to regulate urban and suburban land use, to administer individual property held under collective decrees, to reduce real estate speculation considerably and to increase government control over urban growth and development. But there were some problems to be resolved. While rent control reduced the cost to the renters, it seemed to be overly protective of them. Indeed, the majority of the cases brought for adjudication involved owners attempting to regain possesion of their houses for their own personal use (Ministerio de Vivienda, 1983b). As several apsects of the new land tenure and housing laws were unclear, unpopular or dysfunctional, the government proposed a new Law for the Regulation of Housing which was completed in late 1983 (Ministerio de Vivienda, 1983b).

In 1981, the government established as a new priority the provision of land titles to the occupants of urban holdings. They excused the residents of the illegal subdivisions for further payments, and assigned to MINVAH the responsibility of verifying, processing and issuing land titles. This was a significant and complex task, requiring extensive investigation of records, certification and field assessment. During 1981, 1776 titles were issued, and in 1982 there were 3088 (Ministerio de Vivienda, 1983b).

Housing policy. By far the greatest effort of MINVAH was in the area of housing policy. Policies had been developed concerning financing, provision of materials, and the selection of beneficiaries. Funds for the purchase of housing and improvements were to be made available to low income families in ways that were both flexible and encouraged repayment. In most cases, housing payments were to be between 10% and 15% of family income, and the loans were to be at low interest for 20 years.

To facilitate low cost construction, a Materials Bank was developed. This program was initiated in 1983, and made a notable positive impact. Utilizing "locally available materials" (wood cement, and asbestos-cement panels), basic prefabricated models were made available at low cost. In addition, MINVAH provided technical assistance and tools for construction. Their acceptability was demonstrated by the fact that demand exceeded supply.

Both in the purchase of public housing and in the purchase of housing materials, a selection process was developed which utilized the participation of the mass organizations, particularly the CDSs and the various unions. Within the financial guidelines established by MINVAH, the local groups were given the responsibility of selecting those who should have the benefits of the government programs. This local control was seen as a key element in the cooperative relationship between the government and the people.

Notably absent from early policies of MINVAH were "sites and services" strategies, suggested by many as one of the most reasonable and efficient ways of developing low-income housing (Dwyer, 1975). In these programs, the government is responsible for the provision land and minimal infrastructure, while the new owners provide the shelter and its improvements. MINVAH was intially hesitant to initiate such a program because of the inherent potential to promote individualism and discourage community participation (Herbert, 1979; Lea, 1980). But the increased land invasions and the displacement of nearly 10,000 families during floods following a serious tropical storm in May 1982, precipitated a change. In 1982 MINVAH initiated the "progressive urbanization" program (Ministerio de Vivienda, 1983a).

The progressive urbanizations program is typical of the sites and services model. In the Nicaraguan case, MINVAH utilized the Law of Expropriation to acquire unutilized land for subdivision. Following the strategy of densification, these subdivisions were selected from vacant properties toward the inner part of the cities, especially in Managua. Streets were laid out, and small lots were delimited (approximately 150 square meters each). Water and latrines were provided for communal use, and provision was made for the future extension of electricity and sewerage. The subdivisions were selected to guarantee adequate drainage, and to minimize damage from flooding or earthquake.

In the selection of residents, priority was given to those who were living

in precarious conditions, such as those who lived in areas frequently flooded or with unhealthy environmental conditions. The CDSs and the unions also particpated in the selection process for lots and, as noted above, in the selection of households who would receive assistance from the Materials Bank.. MINVAH placed great faith in the CDSs to carry forward the work of organizing the progressive urbanizations so that they would be true communities, and to this end established a section within the ministry for the education and support of community organizers.

Problems and Prospects

The success of the programs of MINVAH, as those of other ministries, was limited by several factors. Many of the early problems of poor organization and coordination (Williams, 1982) were overcome after the first years. However, there still remained some evidence of internal opposition and divergent policies (Arruda, 1981; Fagan, 1981; Harris, 1981), and the "necessary tension" (Kuttner and Howard, 1981: 51) which existed between the Sandinist party, the state and the mass organizations. While these factors may have contributed positively to the revolutionary process, they sometimes impeded bureaucratic organization and program efficiency.

At the end of the first year there was noted some deficiencies in popular support and participation (Williams, 1982). While progress had been made in many neighborhoods and support seemed to be increasing, there was still evidence that continued efforts would be necessary to maintain and improve community participation.

The most serious problems confronting MINVAH at the end of 1983 were limitations to financial resources and the scarcity of trained personnel. Although the budget for MINVAH had increased significantly (e.g., the budget for housing construction for 1983 was equal to that of the preceeding three year period), the supply of housing and materials could not meet the demand. These limitations were due in part to the lower priority of MINVAH, but also reflected the severe difficulties generated by the economic and military agression of the United States and some of its allies. Extensive government financed and constructed housing projects were significantly reduced, rather than expanded as had been originally proposed.

Trained personnel, particularly planners, topographers and engineers,

continued to be difficult to hire and retain. Not only were these skills scarce, but many government entities were experiencing loss of skilled personnel to private enterprise or other opportunities.

Conclusions

The Sandinists inherited from the Somoza regime a housing deficit which had increased under the previous government despite considerable expenditures and international assistance. The situation of the low-income population, largely neglected by the Somoza government, was particularly difficult. During the first four years of their administration, the Sandinists confronted the problem by developing policies and intitiating programs of national development, urban reform and housing. These policies and programs, the responsibility of the Ministry of Housing and Human Settlements, were seen as integral parts of the plan for economic recovery, and were identified as having a long range goal of bringing the benefits of urbanization and modernization to the masses. The new policies stressed governmental control and emphasized redistributive programs using strong mass organization support and involvement.

Several government decrees had been issued in support of these policies, including rent control, the nationalization of squatter settlements and illegal subdivisions, and expropriation of unutilized urban land. During the first four years of the new government, MINVAH modified its policies and programs in reaction to constraints imposed by political, social and economic realities. In spite of increasing expenditures for housing construction and the development of progressive urbanizations, various problems and impeded significant reduction of the housing deficit. Even though the Sandinist response represented a considerable improvement over the performance of the Somoza regime, it seemed unlikely that the housing situation would improve dramatically in the near future. The tremendous pressures created by international economic and military aggression, by natural disasters and a very high natural population growth rate, placed additional severe constraints on progress in this area. In spite of a very strong commitment and such innovative programs as the progressive urbanizations, past experience and the current situation suggested that the housing deficit would continue to be one of the most difficult challenges to the Sandinist government.

APPENDIX H

TEACHINGS OF ARCHITECTURE AND IDEOLOGY IN REVOLUTIONARY CUBA

"DETERMINANTS OF REVOLUTIONARY ARCHITECTURE"

Determining principles that define conceptually revolutionary architecture in the Third World.

1) "The necessity of producing an extraordinary volume of construction in a very brief period—more than 800 million houses, that constitutes optimally 45% of the total of required construction, in 30 years—to satisfy the accumulated necessities of the underdeveloped countries, using the production of today.

2) "The revolutionary transformation of the society and of the economy—characteristic worldwide in our epoch—with the creation of new forms of social organization, of new institutions, with the flow of physical changes and profound transformations in the use, the functions and the spaces necessary...

3) "The creation through the social revolutionary process of a new individual, of human characteristics developed fully, with profound conscience of their responsibilities before the world and the new society, developing a superior culture in liberty for "quien trabajamos," and that has utilized state of the art technology.

4) The peculiar conditions of our climate and our means.

5) The cultural peculiarities of our peoples of the entire world.

6) A dialectic vision of the world and an attitude and appropriate action for a revolutionary ideology, in the creators of the new architecture.

"It is evident that the architecture of our villages, that which is produced today, with its heavy construction with the static and rigid form of its proportions with its lack of flexibility, adaptation and costly and difficult maintenance, with their craft technique and feeble expression of individuality, is ill-suited to solving the problems which confront us.

"From the general determinants enumerated above, some of the principles that define the view form of architecture can be derived:

1) From the necessity of multiplying production to elevate productivity

in contradiction with the limited resources in labor, materials, and technical level, there is derived the principal of producing the maximum number of possibilities with the minimum resources and effort.

—"The Central Principle of Economy"

—The Principle of Change and Growth

—The Principle of Transformation

—Economical Maintenance

2) "The application of these principles to real conditions of architecture, determine the use of modulation, normalization and typification and the investigation through the use of new lighter materials and elements, prefabrication, laminated structures, repetition of elements, simplicity in construction , details which speed the process of construction, the development of joints between the elements of construction that permit easy building, finishes, etcetera."

—The Principle of Flexibility

3) The principle of variety within the unity

"...Through the ingenious combination of repeated elements results in varieties that fit the particular characteristics of the individual or group that utilizes the structure."

"This requires the development of the science and the art of combination in architecture, to divide a minimum number of different elements and avoid uniformal repetition, typical of machined elements that have represented until today the majority of industrial production in the world, to split from a sterile, technocratic, and dehumanized form of architecture."

"...The modularity and repetition considered in this style, do not constitute a limitation to individuality, on the contrary, they are an instrument of liberation of the possibility of individual solutions on a massive scale."

Source: "Revolutionary Architecture in the Third World." Fernando Salinas, School of Architecture, Havana, Cuba, 1978.

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