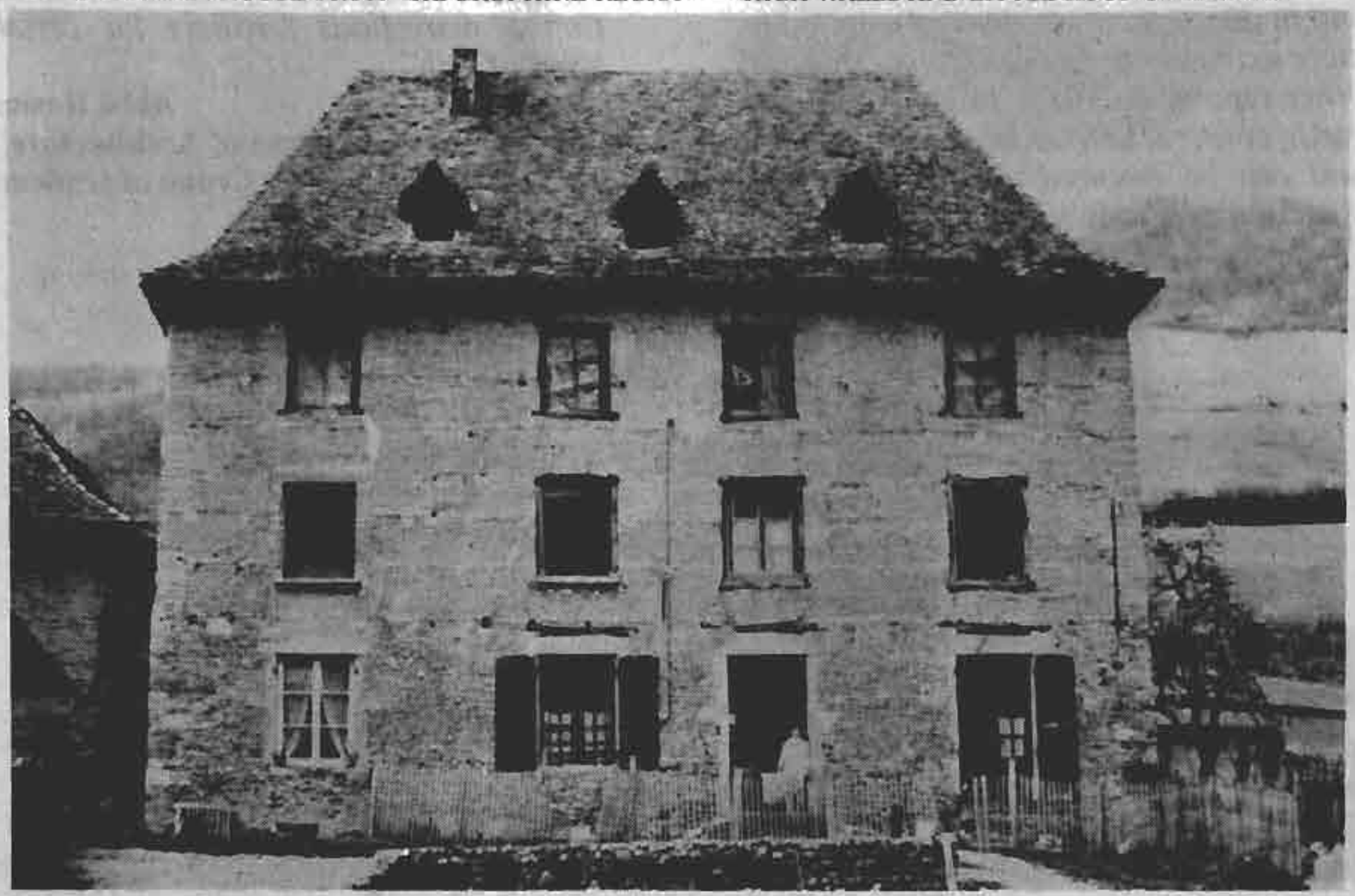
TRADITIONAL HOUSE OF THE

FIGURE 45: HOUSE FROM THE DAUPHINE REGION — HIGH WALLS AND LITTLE ROOF OVERHANG.



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LOWER-DAUPHINE REGION, (FRANCE)

We considered what might be the relationship between a family and a given space: that of their own home. In what way is this space primarily a dwelling, a cultural response to roles defined by a community and a way of life? How is this relationship physically represented in space and how does the space itself interact with it and change it? A dwelling, moreover, also reflects the circumstances and practices underlying the building process which erected it. Social custom, collective help, materials employed..., all come together to form the cohesive whole which finds expression in the completed house. This in turn not only reflects its owner, but also expresses something particular to the community which has been the silent custodian of its deeply-rooted forms. There seems to exist a common core from which are drawn and replicated the building types used. The houses of the lower Dauphin region all share a very clear family likeness, and at the same time the addition of a whole range of variants allows each individual to leave his or her mark on their home.

Our remarks are prompted by the factual material gathered in the course of a study on rural habitat begun in 1945 by G.H. Rivière who was at the time curator of the Museum of Popular Art and Tradition. The findings, which are currently being published, will form a twenty-two volume collection of which the twenty-first, designed and edited by H. Raulin, was published in 1977 by Berger Levrault. It is in this volume that the monograph which served as the basis for our own study is to be found.

The village of Brézins, in the Lower-Dauphiné, is located between St.André and St.Etienne de St.Goirs. There is nothing to differentiate this essentially agricultural community of 830 inhabitants from neighbouring villages. Its many rammed earth buildings reflect the traditional form of housing of the plain of Bièvre.

MARIE...

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Albert and Marie's House

*Albert and Marie, 80 and 79 years old respectively, live in an old rammed earth farmhouse with foundations in rough-cast river stone (**fig. 47**). A wide canopy protects the main facade from inclement weather. Until the second world war, rammed earth was the "normal" method of building in the area. Thus Albert, like most local men, used to employ this technique: he recalled for us the context of the traditional society in which it was used. "Social cohesion at the time was much stronger, everyone did their bit for nothing. We helped each other out with the tough jobs. You were obliged to help those who had helped you" ... "The owner would go round visiting all the fellows who were going to help with the building work. Come the first fine weather, we'd all get to work. We never begrudged our time and we worked long hours!"*

It took ten men or so to put up a rammed earth building. Three of them excavated the earth and broke it down finer; we used to call that "making the earth". Round here there was good earth everywhere and all you had to do was dig through the thin ploughed layer to reach the clay layer. Often we would wet the earth a little as this made it easier to tamp. Three others would transport the earth in canvas bags holding about 50 kilos and would pour it between the formwork where three strong men tamped it down. "The lads doing the tamping needed good strong arms!" Albert told us. "They would lift the tamp right over

FIGURE 47: FACADE OF THE LIVING ACCOMMODATION.

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their heads and then let it go letting their arms drop down with it," and so on. "If they worked all day they would manage to complete 7 or 8 sections. We would put up two courses without stopping and then we would cover the walls with tiles to keep the rain off and let them dry out for a fortnight. Then we'd start up again."

Usually three months would elapse between starting and finishing the major building work. Once the walls were up and the roof truss was in place, the "ravola" would not be far off: a bouquet of fir decked with ribbons was tied to the apex of the roof and the owner would treat everyone to a meal with plenty of wine to drink. The evening would be a jolly affair with plenty of drinking and singing.

The role of the carpenter

Albert drew our attention to the particular part played by the carpenter during the various stages of the building work. He was the first craftsman on whom the owner would call, discussing with him the site, the orientation of the building and its design. The carpenter would then sort and square off the timber assembled on the site for the roof trusses. His advice and presence there were indispensable. His role was akin to that of a contractor as his opinions, the fruit of his long experience, were generally sound and his advice was much sought after. As the owner of the shuttering, (Brézins had 3 pairs), the carpenter would set it up himself. Officially the owner was directing the works, but in practice it was the carpenter who was in charge, and it was to him that one would turn with tricky problems.

Any new building work was given a lot of thought beforehand and required a great deal of preparation. It also provided the opportunity to strengthen family ties, as well as professional and friendly relations, amongst members of the community and occasionally to reassert the owner's social status. The owner was responsible for providing the necessary materials. The stones would come from his own fields, collected and piled up during ploughing, and he would transport them by cart to the site of the new building. Timber for the roof and for the wood-work would often be donated by the parents when they were in a position to help their children. Some materials had also to be purchased, in particular lime and local tiles from St.Pierre de Bressieux.

A walk round one man's home ...

Marie and Albert did not build their house, they inherited it, but they had been living there for the last thirty years. The farm used to belong to Albert's grandparents. In their day, the buildings originally formed a single rectangle, facing full south, and an open barn separated the living accommodation, then already over 200 years old, from the various outbuildings. The second barn, which gave the buildings their present L-shape, was built by Albert's grandfather. Less significant changes followed. His father rebuilt the house openings in brick, a common local practice. When the path of the road alongside the property was modified leaving a gap between it and the house, his father filled it in with the present store-room and attic. Albert made no significant changes to the buildings which despite the successive modifications retained a strong sense of cohesion.

Before penetrating further into the house, let us retrace our steps a little, and view the property as a whole with its house, barns, attics, hen-coops, hay-loft, open barn and courtyard, all essentially devoted to agricultural activities **(fig. 49).** *The family lived on a mixed farming system and bred cows for milk production. In 1945 the property covered 35*

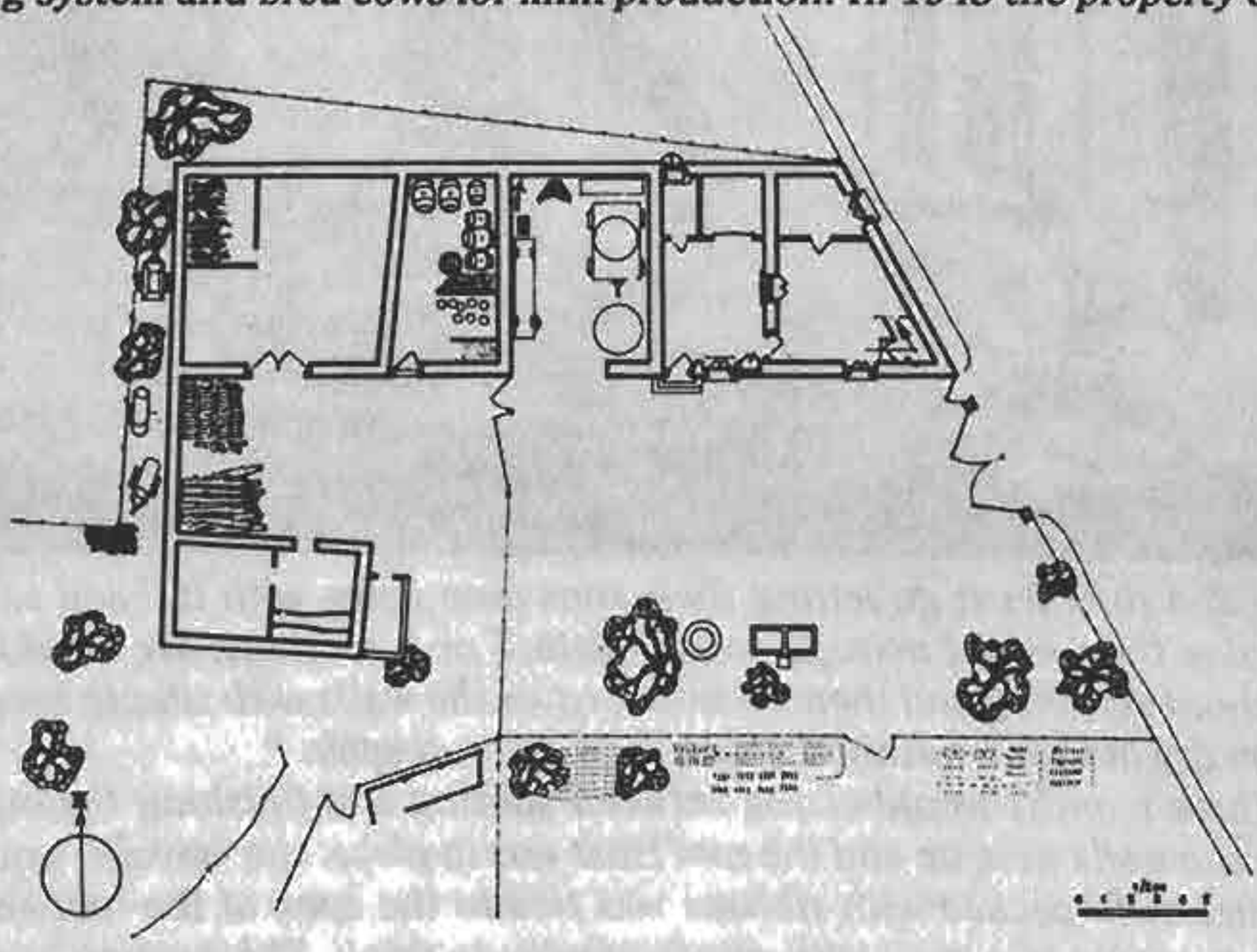

FIGURE 49: SITE PLAN

Charles Boyer de Bouillane

hectares and could boast 2 mules, 8 calves, 4 sheep, 30 hens, 10 rabbits and a dog. When we began our study the land had been leased out for over 20 years and the animals had gradually disappeared; only a few hens and three hunting dogs were left. The buildings remained unused and the old agricultural machinery stood idle in the barn. Only the house still lived, condensing all the relationships between the inhabitants and their home **(fig. 50).**

For Albert, a war veteran who now had outside work, the house seemed to be a safe haven where he could enjoy some peace and quiet. The man of the house would return

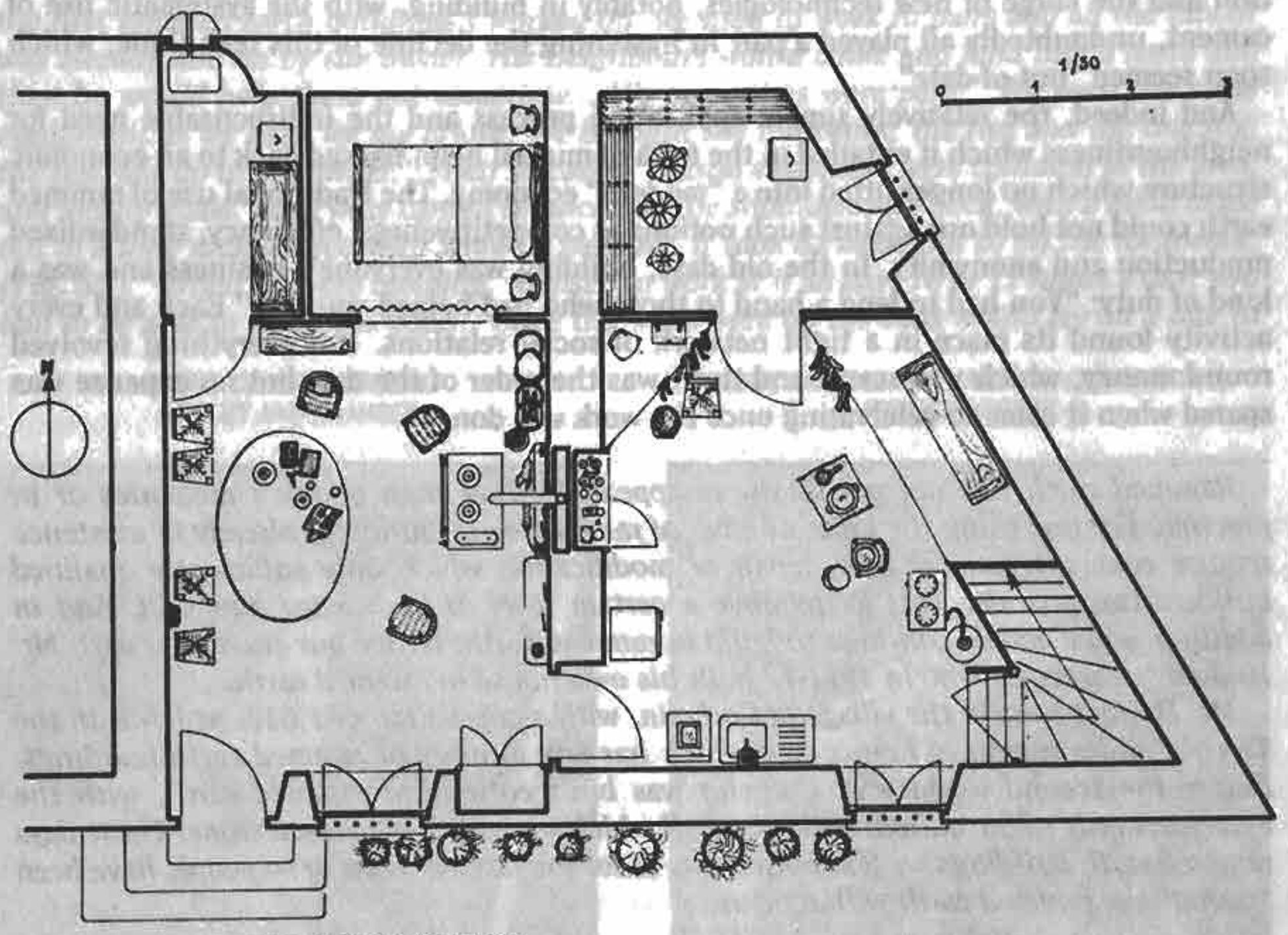

FIGURE 50: THE LIVING ACCOMMODATION

from work, his wife served him his meal, the newspaper would be waiting for him on the table together with his glass of wine, an essential ingredient in "cheering things up a bit". The walls bore witness both to Albert's personal souvenirs and to the typical masculine values of hunting and war: a pair of shells converted into a vase and a frame of war decorations from the '14-'18 war. Two shot guns and an air-gun hanging on a rack, together with the scenes depicted on the waxed table cloth, evoked a permanent hunting tableau.

But the inside of the house was Marie's territory. The first thing she did when she moved in was throw everything out and redecorate. "It was all dirty and rotten." In an attempt to remove all traces of the past, she wanted to "start with a clean sweep." Marie, as we all do, carried with her both her own story and that of her family. The bed, the wardrobe, the table and the cooking stove were after all her dowry in 1917. Marie lost no time in staking her claim by moving her own things in: the table was placed in the middle of the room, the stove in the unused fireplace, the wardrobe set back a little, and the bed, half-hidden, in an alcove with a white lace curtain hinting at its presence. The way the furniture was arranged had remained unchanged (in 1975) since 1940. Pregnant with meaning and polished with oft-repeated gestures, these objects seemed to have fused with the walls and the floor, to have taken root in the house. Only little souvenirs, photos and trinkets came and went over the years according to the shifting patterns of human emotions.

RAMMED EARTH BUILDING IN 1972

In France until the 1950's traditional rammed earth building as we have just described it was commonly used by a certain section of the rural population. There followed its rapid decline and then virtual disappearance, perhaps linked to the breaking up of rural society. Post-war changes, the drive towards industrialization and modernization, rural depopulation and the surge of new technologies, notably in building, with the systematic use of cement, undoubtedly all played a part in hastening the decline of this technique, which soon seemed "out-of-date".

And indeed, the relatively simple application process and the indispensable need for neighbourliness which it entailed in the form of mutual help, harked back to an economic structure which no longer fitted into a "modern" economy. The traditional use of rammed earth could not hold out against such notions as competitiveness, efficiency, standardized production and anonymity. In the old days, building was everyone's business and was a kind of duty: "You had to lend a hand to those who had helped you out." Each and every activity found its place in a tight network of social relations. Not everything revolved round money, which was scarce and thrift was the order of the day, but no expense was spared when it came to celebrating once the work was done.

Rammed earth has not yet totally disappeared either from people's memories or in practice. For one thing the great number of rammed earth buildings already in existence require constant maintenance, repair or modification which only sufficiently qualified builders can provide. This keeps alive a certain level of knowledge and skill. And in addition, some people continue to build in rammed earth. Hence our encounter with Mr. Huguet, a carpenter who in 1971-72 built his own house in rammed earth.

Mr. Huguet lives in the village of Corbelin, with a population of 1,612, which is in the Terres-Froides region of France and which has any number of rammed earth buildings. Before the second world war, Corbelin was built entirely of rammed earth, with the exception only of the church and town hall which were built of dressed stone! These days rammed earth buildings are less noticeable, as for the last ten years or so people have been "facing" the rammed earth with renders.

FIGURE 51: MR. HUGUET'S RAMMED EARTH HOUSE

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Conversation with a carpenter

Mr. Huguet had learnt not only carpentry from a local tradesman in Corbelin, but also how to build in rammed earth, as in that area, "it was the carpenters who did the rammed earth building". He had been involved in and subsequently supervised traditional rammed earth building works. He had observed the decline of this technique and with the exception of his own house, which he thought would be the last of its kind, had not constructed a single rammed earth building in the previous ten years.

30 years or more before, there was plenty of rammed earth building still going on. "For the first rammed earth buildings I worked on, we used to work in pairs and all the labour was already laid on by the owner. His neighbours would come and lend him a hand and then he would help them out sometime... We carpenters were paid... We used the same equipment as we used for my house. We brought the formwork, the ties and the bracing; the rest was up to the owner." Their so-called "mason's baskets" were common in the area, and locally made. They were carried balanced on the shoulders and neck, with a hood made out of a lime sack stuffed with straw as padding. It took 82 basketful to fill the formwork. **(Fig. 53)**. *"When we were tamping, we used to work at it all day, 10 or 11 hours a day; you had to be able to stand the pace... Once the walls were up the boss would lay on a bite to*

FIGURE 52: TRADITIONAL BASKET AND RAMMER

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FIGURE 53: HOW THE EARTH IS CARRIED IN A WICKER BASKET

Nathalie Sabatier

eat for us. The second time we'd raise our glasses was when the roof was on: in these parts it's the carpenters who lay the roof tiles... There was no shortage of people to carry the tiles up for us, and we've have a really good celebration!"

Mr. Huguet had never tried to modernize an old rammed earth house because "it's as expensive as building a new one. You can't expect too much from old buildings! ... You need fellows who are used to working with rammed earth or they'd have the whole bloody lot down. Then again, you can't just make a hole in there like in a concrete wall. You have to shore it up. Openings have to be done in two goes: you cut away half, then put in the

lintel, then finish the rest... Restoring a rammed earth building is a mason's work and I'm no mason."

On the other hand, Mr. Huguet had always had the idea of building in rammed earth: "I always said that the day I built a house it would be in rammed earth... it keeps you cool in summer and warm in winter. No need for any insulation. Otherwise... There's nothing to touch it."

With its handsome white render and its openings all round the walls, his house is indistinguishable from modern detached houses. The roof is pitched for reasons of economy since two rooms have been built under the eaves. Slate was selected in preference to overlapping tiles which retain too much powdery snow.

Building the house

To build his house, Mr. Huguet and his team used the same wooden formworks used in the past, 3 metres long by 0.96 m high. They weren't his own, as he no longer had any; he had to borrow them from his former boss, also a carpenter, who had held onto his. They didn't significantly modify the technique. As this area had good earth everywhere, they simply used the earth excavated to build the foundations. There was therefore no need to do any extra digging and there was plenty of earth with some to spare. The loan of the mason's crane, which he didn't need for a while, to transport the earth, reduced their workload by half.

Five of them, Mr. Huguet and four of his carpenters, built the walls from June to September, working in slack periods when the demands of the carpentry workshop permitted. The workers were paid, "it was a job like any other". Two of them had already worked with rammed earth.

They raised four courses of rammed earth plus the gable-ends on concrete foundations, starting by building two courses, then waiting a fortnight for them to dry out. Mr. Huguet stressed the importance of protecting the finished walls from rain. "If it rains, the whole lot will come down!" Each section takes in all one and a half to one and a quarter hours. With five of them working, they tamped about 20 m² per day.

The door and window frames were made of concrete. They put a little mortar into the formwork to bond the joints. Only the external walls of the house are in rammed earth; the inside walls are not load-bearing.

The external render was done by a mason, since that was not a carpenter's job, according to Mr. Huguet. A carpenter is one kind of specialist, a mason another. Nevertheless he did go so far as to say that a lime render was better than cement. "If you put processed cement onto rammed earth, it holds! If it doesn't hold, it's because it's mixed too thick. In the old days, when they used a light lime coating, it would hold for perhaps ... several generations! ... I think you need two wheelbarrow loads of sand for each sack of lime."

Mr. Huguet hadn't calculated the exact cost of his house. But he did mention the saving in insulation. He stressed the problems of trying to cost the time spent on site by his own team, but added that in any case "it takes longer and you need more people... but you gain on one thing, the raw material doesn't cost you a penny!..." On the other hand he said that he had just managed to get by with the roofing and used copper guttering because with the slate overhang, he could dispense with zinc. "So that's all I had and I said to myself why not copper guttering, it's as good an idea as any other and it's stronger."

Mr. Huguet is sceptical about the possibility of local or other companies taking up this type of building again. It is not so much the material obstacles, such as the time needed and the number of workers, stopping them, as the problem of protecting the walls. "It's just not possible these days. It's impossible to put covers on all round and ... it would be more trouble moving the covers (each time a new section was started) than doing the work ... and when it rains, the water runs off the consoles onto the walls and spoils all the fresh earth!"

Even if he were asked to build he is not sure he would accept. "You have to consider costs... it's no small undertaking nowadays...". On the other hand, Mr. Huguet thinks that "in poor countries where there is plenty of labour available, that's fine! .. but here this building method is finished for good," he concluded. Traditional rammed earth has failed to survive our society's balance sheet mentality.

RAMMED EARTH CONSTRUCTION IN MOROCCO: ANOTHER DIMENSION

In contrast to rammed earth as practised in France, which we have just reviewed, earth building in Morocco is of monumental proportions.

One might be tempted to believe that earth architecture is restricted to individual dwellings only a few floors high: the fortified communal "villages" - in the original Berber "ksour" or "irherm" - which shelter the entire local population in a veritable bee-hive world of enclosed corridors and simple-beaten earth chambers, provide living proof that it is quite possible for a technique such as rammed earth to produce very varied spaces and, in the present instance, to create architectural structures of most imposing proportions **(fig. 55)**.

In general the building of a ksour uses rammed earth for the walls and adobe bricks for the mural decorations on the facade, around the openings and on the stairways, and requires a dozen men for a modest sized building, and up to a hundred for a large one. There is strictly speaking no architect, but there is a site-foreman (the "mohandes"), and two different master masons ("muallem") are responsible for the rammed earth and the adobe work.

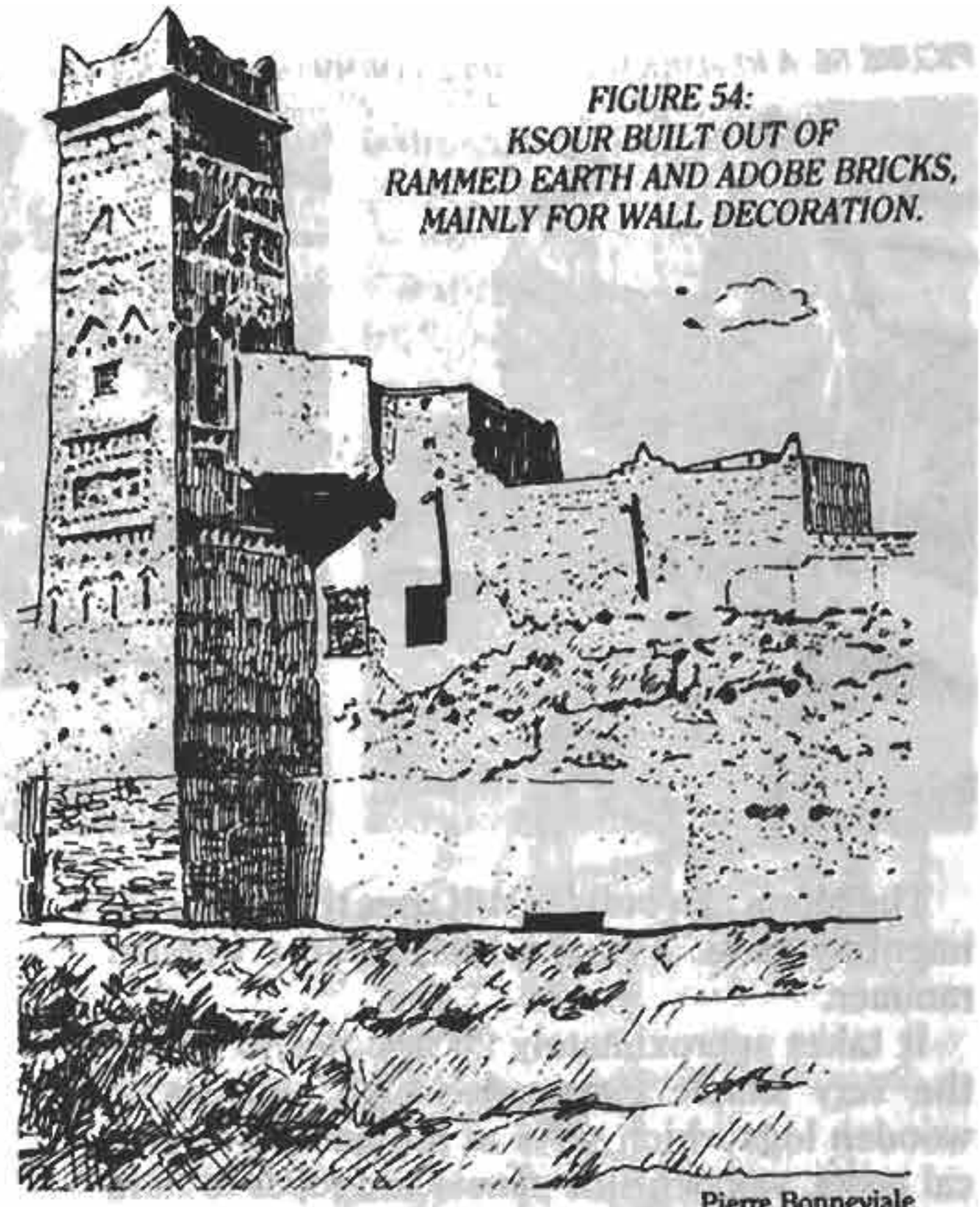


FIGURE 54: KSOUR BUILT OUT OF RAMMED EARTH AND ADOBE BRICKS, MAINLY FOR WALL DECORATION.

Pierre Bonneviale

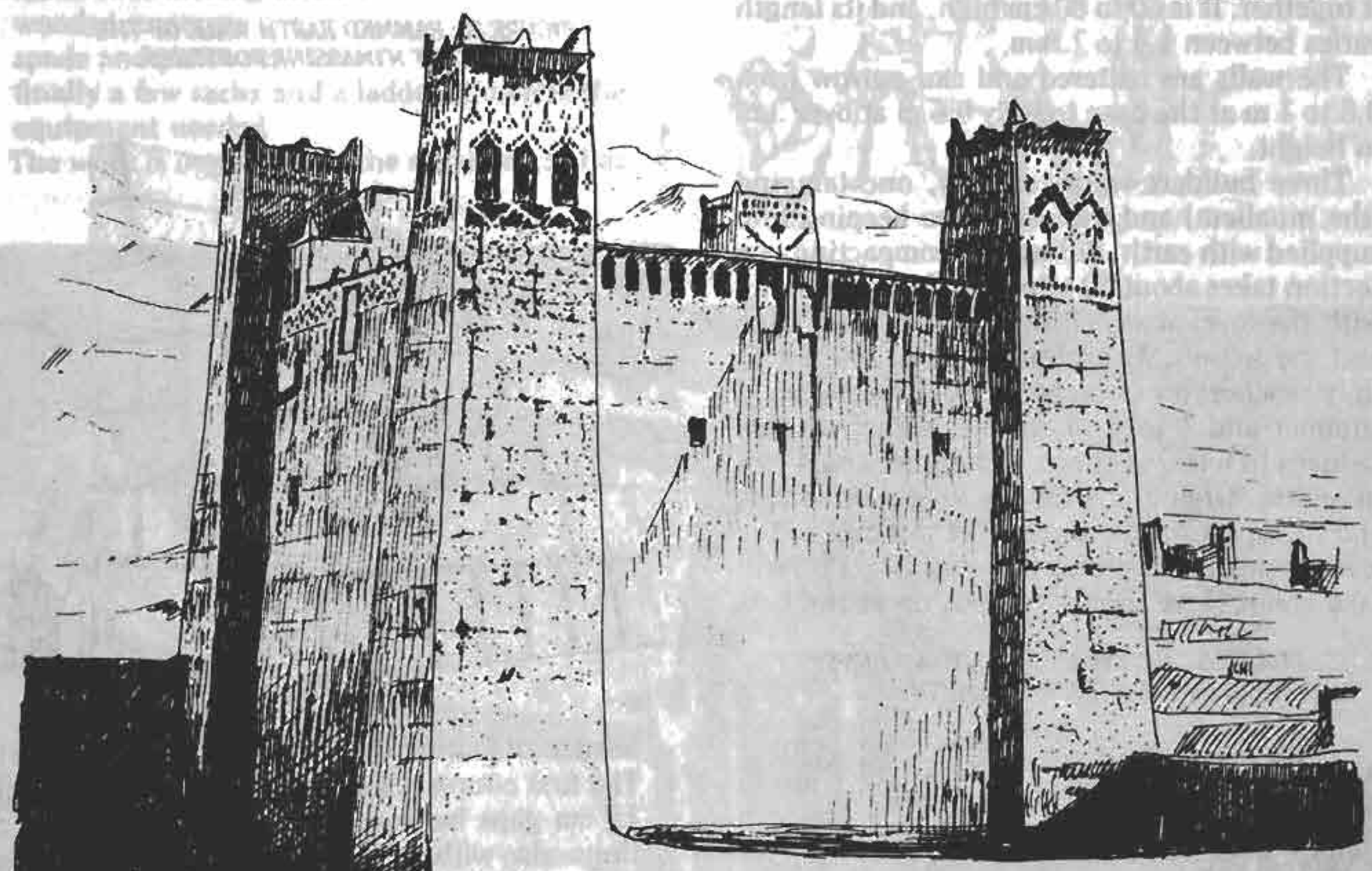


FIGURE 55: KSOUR

Pierre Bonneviale

The foundations, 50 cm deep, are filled with stone rubble (lime and earth mortar), and extend into a footing 20 to 50 cm high on which the first formworks will be set up.

FIGURE 56: A REMARKABLY SIMPLE FORMWORK GIVES A VERY NEAT FINISH.

Dirk Belmans

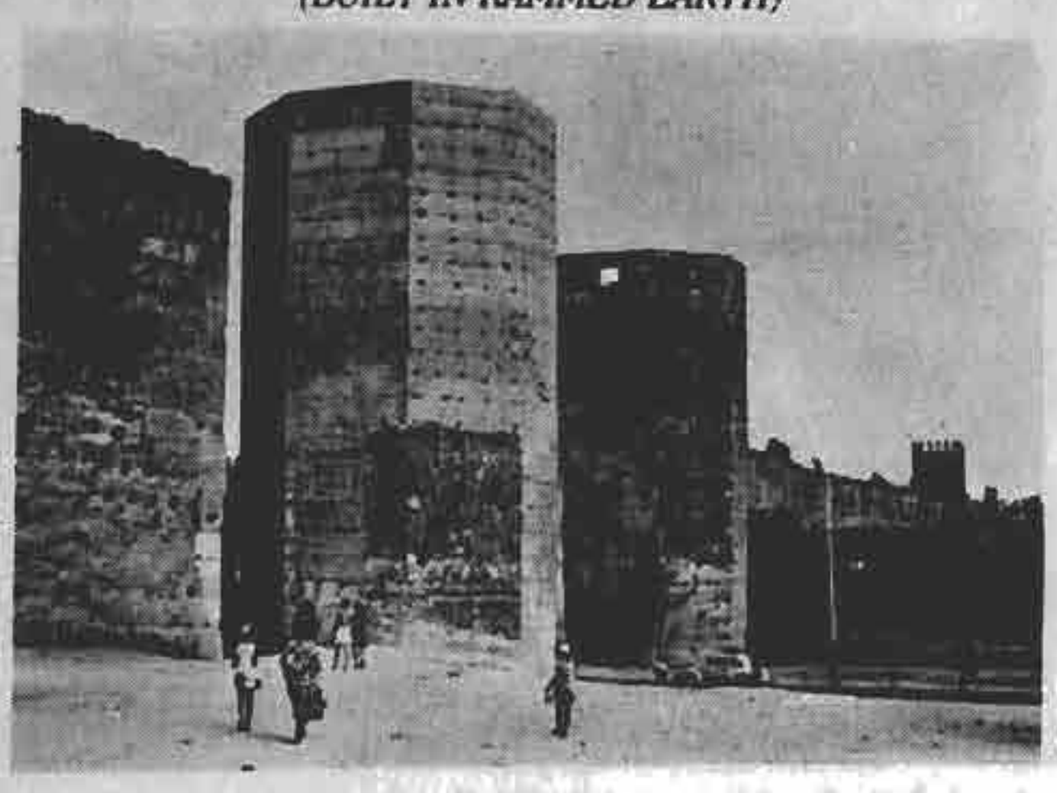
The Moroccan builder still uses the most rudimentary tools: a hoe, a basket and a wooden rammer.

It takes approximately 20 minutes to set up the very simple formwork which consists of wooden logs which serve as putlocks and vertical posts, wooden side-panels and ropes to hold it together. It is 60 to 80 cm high, and its length varies between 1.4 to 1.8 m.

The walls are battered and can narrow from 0.8 to 1 m at the base to only 0.6 m at over 3 m in height.

Three builders work together, one tamping (the muallem) and the other two keeping him supplied with earth. Filling and compacting one section takes about 40 minutes, the rate varying with the level at which the work is being done and the season. At ground level, daily production reaches on average 8 to 10 sections in summer and 4 to 6 in winter; higher up this reduces to 6 to 7 sections in summer and 4 to 5 in winter. Drying out time is longer in winter, and transporting the earth more difficult as the walls go up. A two-storey building 12 × 12m will take about three months to put up at the best time of year (March to October) and will require 700 to 800 hours work.

FIGURE 57: GATEWAY TO THE TOWN OF FEZ (BUILT IN RAMMED EARTH)



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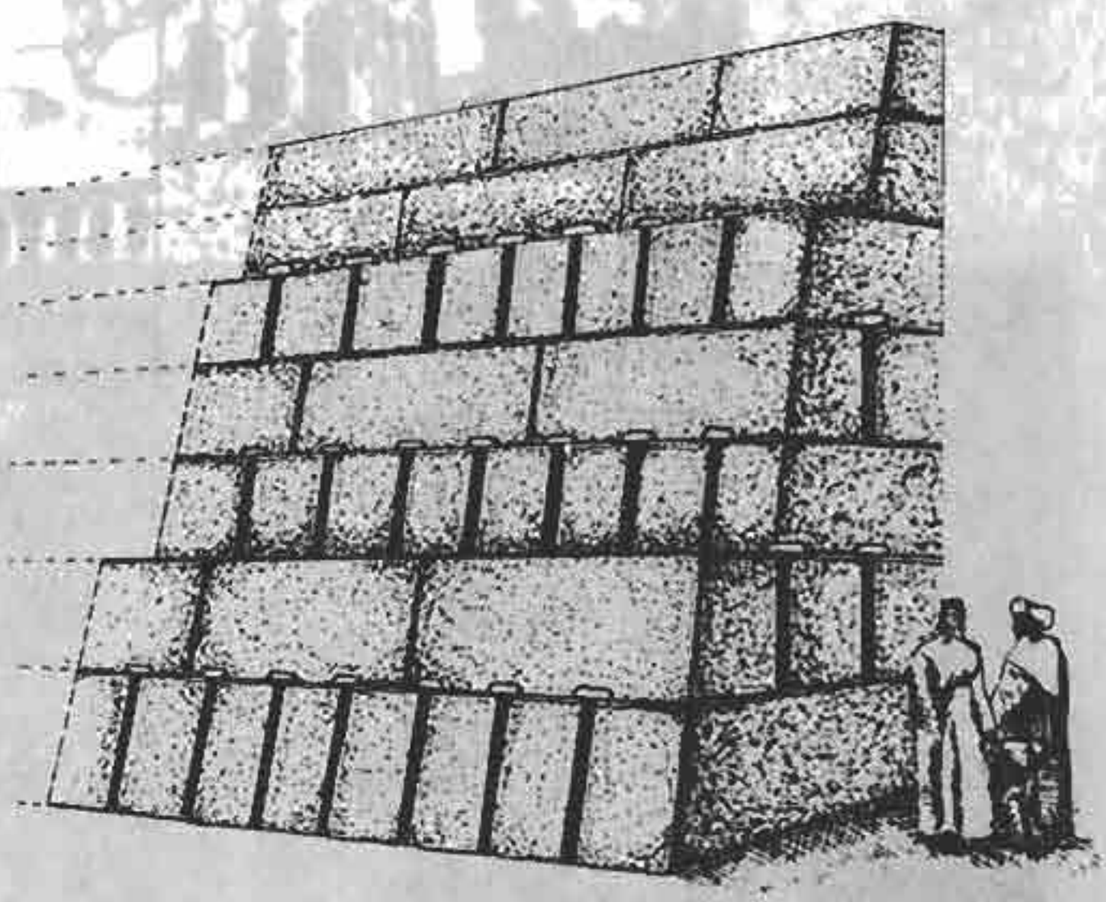
Morocco also has a few rare surviving examples reflecting a particular way of building with rammed earth, such as the Tirhermt n'Imassine fortress: here the walls are built up in alternating courses of rammed earth sections forming a header and stretcher bonding pattern **(fig. 58)**. The first course is built of parallel sections with 15 cm gaps between them. Three rows of sections, also with gaps between them, are added at 90o to the first course. The third course covers only two of the three sections immediately below. The overall effect is of a massive stepped lower wall on top of which is built an ordinary rammed earth wall. The sections were some 0.9 to 1 m high and 0.45 to 0.55 m wide. This costly and time-consuming construction method, dictated by military considerations, has now been completely abandoned.

FIGURE 58: RAMMED EARTH WALL OF THE TIRHERNT N'IMASSINE FORTRESS.



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RAMMED EARTH IN THE ANDES CORDILLERA: TAPIA

Earth buildings make up 60% of the Peruvian built environment. Most are in rammed earth or adobe, which seems to predominate in the coastal areas. Although it is difficult to be specific about where rammed earth buildings are to be found, they are very common in the mountainous areas.

Our description of the application of rammed earth in France used personal accounts and writings from the past; in this case it is illustrated thanks to documents from Huancavelica where the peasants traditionally build in rammed earth. Here, in contrast to other countries, the technique is very much alive and well.

The equipment used **(fig. 59)** is very similar to that used in France, including:

- side-panels of the wooden formwork (160 × 55cm);
- end-board;
- metal rods serving as ties;
- wooden rammer;
- spade and pick-axe;
- finally a few sacks and a ladder complete the equipment needed.

The work is organized in the same way as has already been described **(fig. 60)**:

1 The earth is directly excavated near the site for the building (no transport problems).
2. After excavation it is shoveled into sacks.
3. The builder carries it up on his back.
4. It is emptied into the form and spread around.
5. A rammer, sometimes made out of a large

FIGURE 60: SITE ORGANISATION.

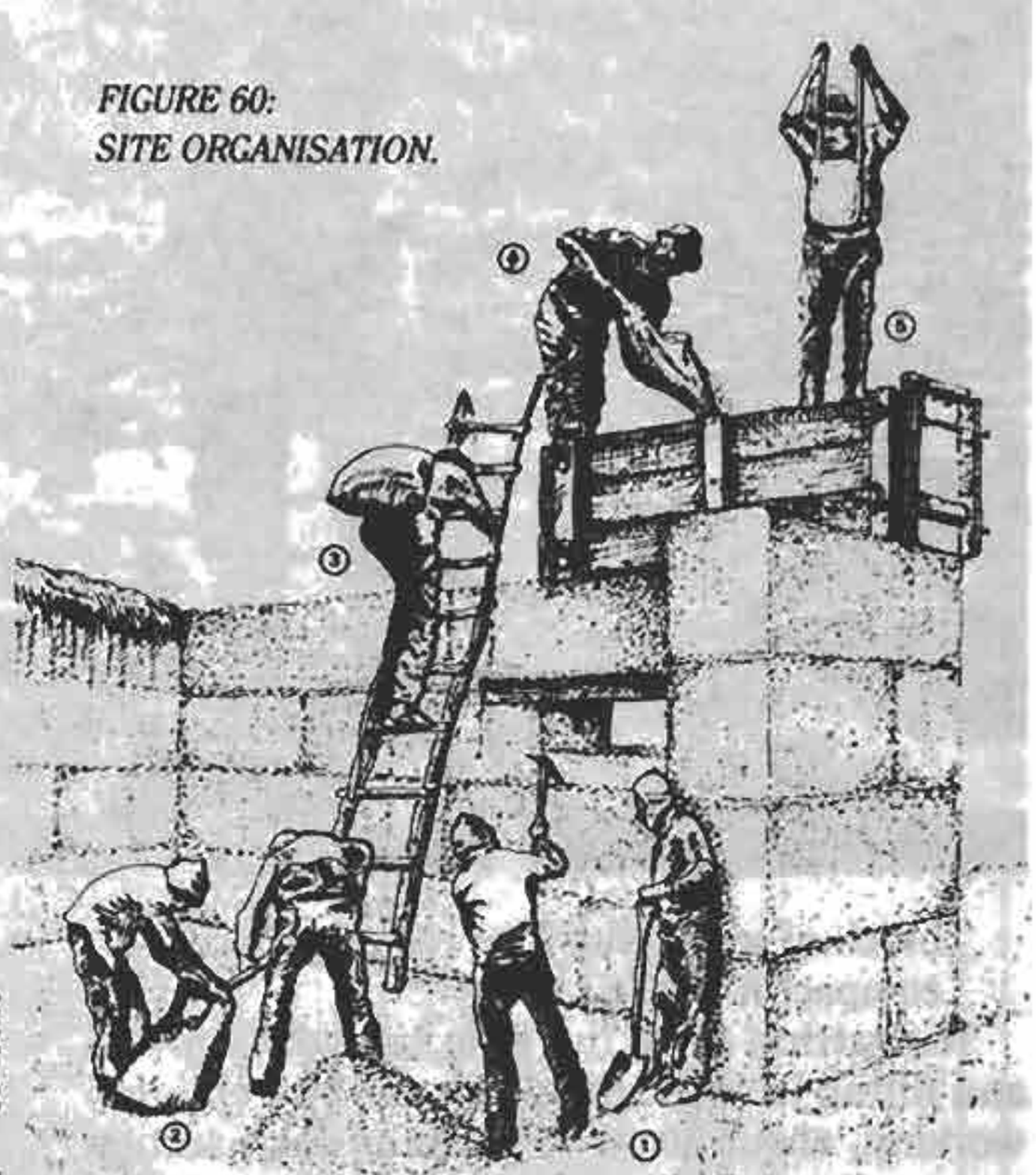

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FIGURE 59: TOOLS USED FOR RAMMED EARTH IN PERU (HUANCAVELICA)

FIGURE 61: USING A TWO-HANDLED RAMMER

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block of wood with two handles, is used to compact it **(fig. 61)**.

The setting up of the form takes 20 minutes and filling it, with three men and two children working, about 40 to 50 minutes; each section measures 140 × 45 cm, and the wall is 40 cm thick. The finished walls are covered with Ichu thatch before the roof is put on both to protect them from rain and to prevent them from drying out too quickly **(fig. 62)**.

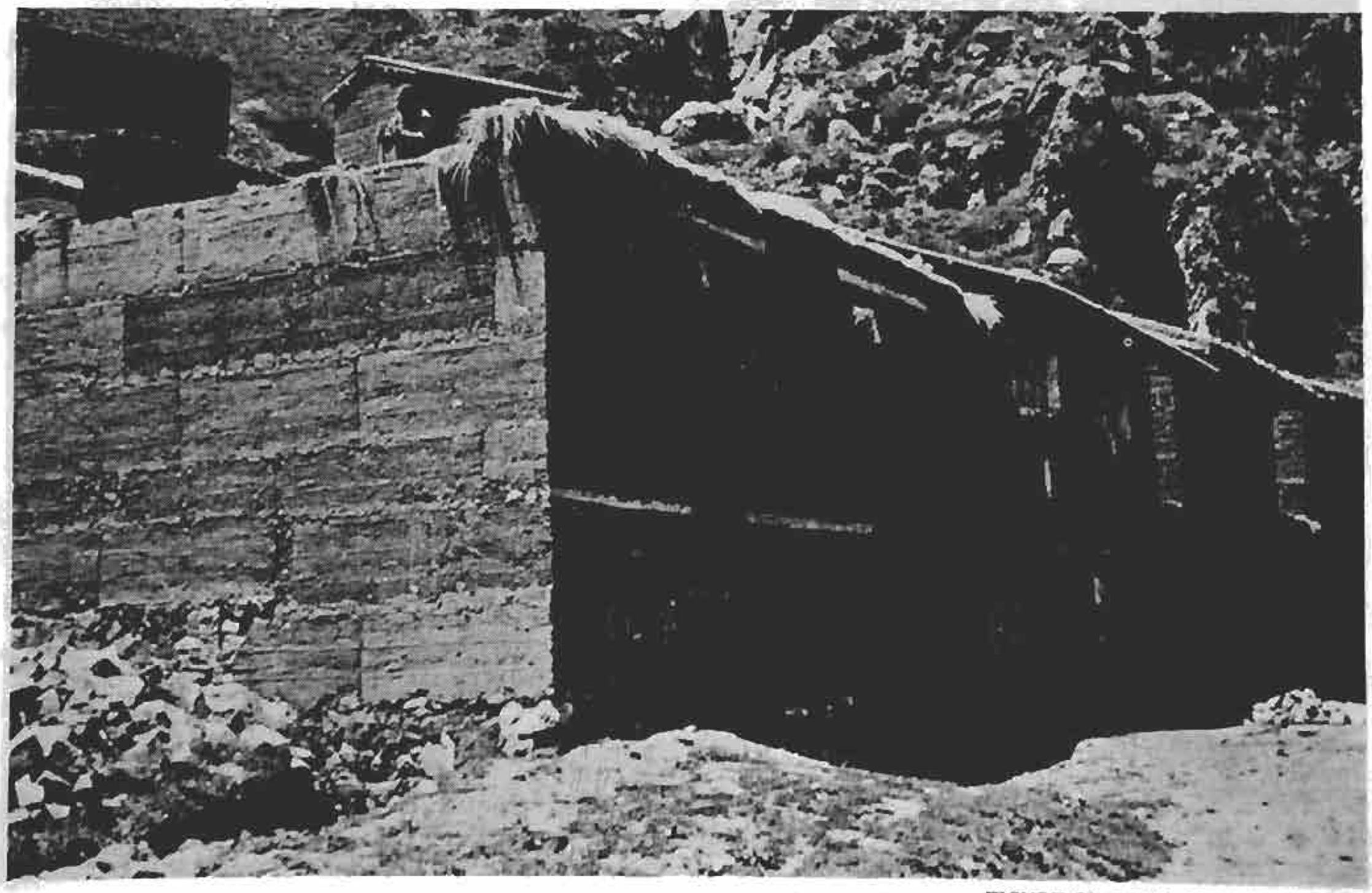

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FIGURE 62: PERU (HUANCAVELICA)