1. Research and development of the Indigenous building methods, materials, local skills and resources.

b) Selseleh, Luristan, Iran.

by

John Norton

April 1980

1b LURISTAN, IRAN

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Illustrations

DEVELOPMENT WORKSHOP

The Development Workshop is a team of architects, planners and researchers from a number of countries who work collectively on the development of indigenous building and planning methods in the Third World. Projects have been undertaken in African, Middle Eastern and Asian countries. Members of the Workshop believe that appropriate solutions to human settlement problems can be developed from indigenous methods which have evolved from and remain in the hands of Third World communities. The Workshop works in the field of rural and urban human settlements. The development of small scale construction industries, technical training and local participation are integral to the Workshop's approach.

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THE SELSELEH INTEGRATED DEVELOPMENT PROJECT (S.I.D.P.)

The S.I.D.P. was set up as an experimental project to investigate and apply a policy of rural development based upon a concept of 'endogenous' or internalised development. This aimed for the improvement of living conditions within the project area through active participation of the community and by the use of local resources. The S.I.D.P. worked on the development of Health, agriculture and education and building, as well as the infra structure and creation of new job opportunities.

An essential part of the programme was the training of 90 'Front line Workers' in the fields of health, agriculture and education. Specific training was also conducted for other activities in the area. The trainees later took on the task of assisting the villagers in meeting their basic health, education, agriculture and building needs. The S.I.D.P. was based in 400 km^2 of the Selseleh Region of Luristan, western Iran. This is a high basin ringed by the Zagros Mountains.

The Development Workshop were the Architects and Planners for the S.I.D.P. from 1975-78.

RESEARCH & DEVELOPMENT OF THE INDIGENOUS BUILDING METHODS, MATERIALS, LOCAL SKILLS AND RESOURCES.

B IRAN LURISTAN

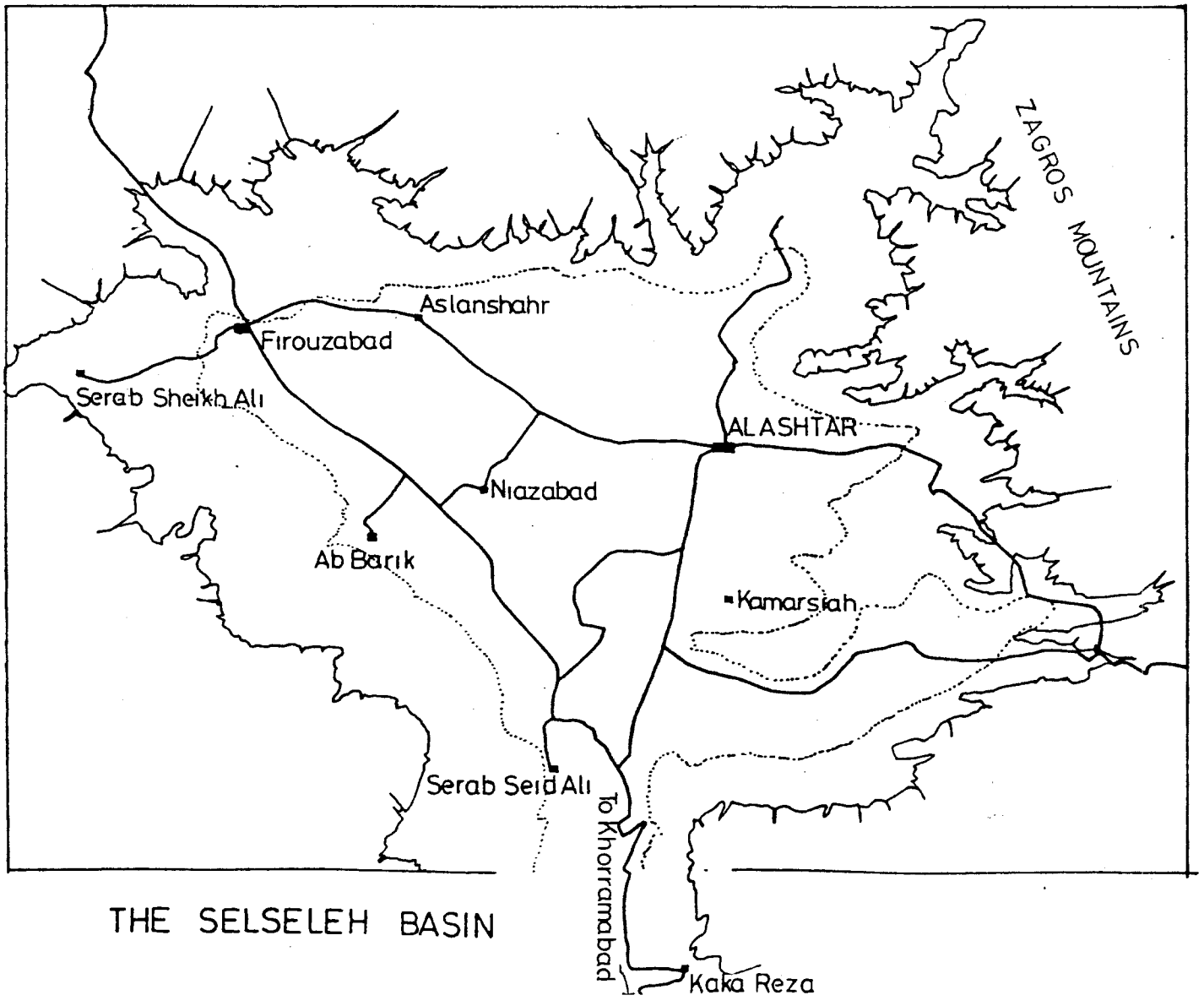
A. INTRODUCTION

In 1974 the Selseleh Integrated Rural Development Project was set up in Western Iran. Selseleh is a high plain, ranged by the Zagros Mountains. The project area was approximately 400 km^2 and contained a population of 40,000 living in about 250 villages and homesteads. These settlements are scattered over the plain, which was the main agricultural land, and the foothills, used for dry farming and animal husbandry. The settlements in the plain were wealthier than those on the foothill slopes, where it was harder to make a living. (Fig. B 1)

Although this part of Luristan Province, within which Selseleh lies, has a history of settlement, in the more recent past up to 1930, there were few sedentary villages with the exception of Alashtar, the regional centre and the site of ancient settlement. The Lurs lived off agro pastoral activities and sold their animals and products to the main market centres. Their existence was primarily nomadic and their experience in providing for their shelter needs was best developed in the nomadic tents and responded to a nomadic way of life. Since 1930, through a process of political and economic restraints, the majority of the population became, at least in part, settled. Villages and extended family units developed in the areas traditionally belonging to each specific tribe.

The aim of the Selseleh Integrated Development Project (S.I.D.P.), in relationship to the rural development policies being pursued nationally and in other parts of the country, was to put into operation an alternative rural

Fig B1 LOCATION OF SELSELEH & DETAIL



THE SELSELEH BASIN

development policy based upon the concept of 'endogenous' or internalised development, which called for the improvement of living conditions within the region through active participation of the community and by the use of local resources wherever possible. This approach implied a process of ongoing research and discussion with the indigenous population.

Development Workshop employed as the group primarily responsible for the development of the built environment programme within the S.I.D.P. framework. From the beginning of the programme the demand for immediate building activity was great. Very few public facilities existed in the region; of those that did, most had fallen into disrepair. However, before any building work could be undertaken, a much greater understanding of the built environment of the region needed to be acquired, as well as finding out what skills were available in the region. Even though recent experience of building had been limited, the forms and basic uses of materials were responsive to the local conditions.

Early research showed that the region's built environment was poorer than it had been even 30 or 40 years ago. There were still people who claimed to remember skills and techniques which had been in more common use but had died out as demand and the finance had disappeared.

The research required to understand the requirements, potentials and problems of the built environment in the region divided up as follows:

1. Analysis of climatic information and other existing documents concerning the area.
2. Research and analysis of house form.

3. Research and analysis of building materials, skills and resources in the area.
4. Investigation into the possibilities of building material production.
5. Investigation of specific problems related to public building with particular reference to public baths.

1 ANALYSIS OF CLIMATIC INFORMATION AND OTHER DOCUMENTS CONCERNING THE AREA

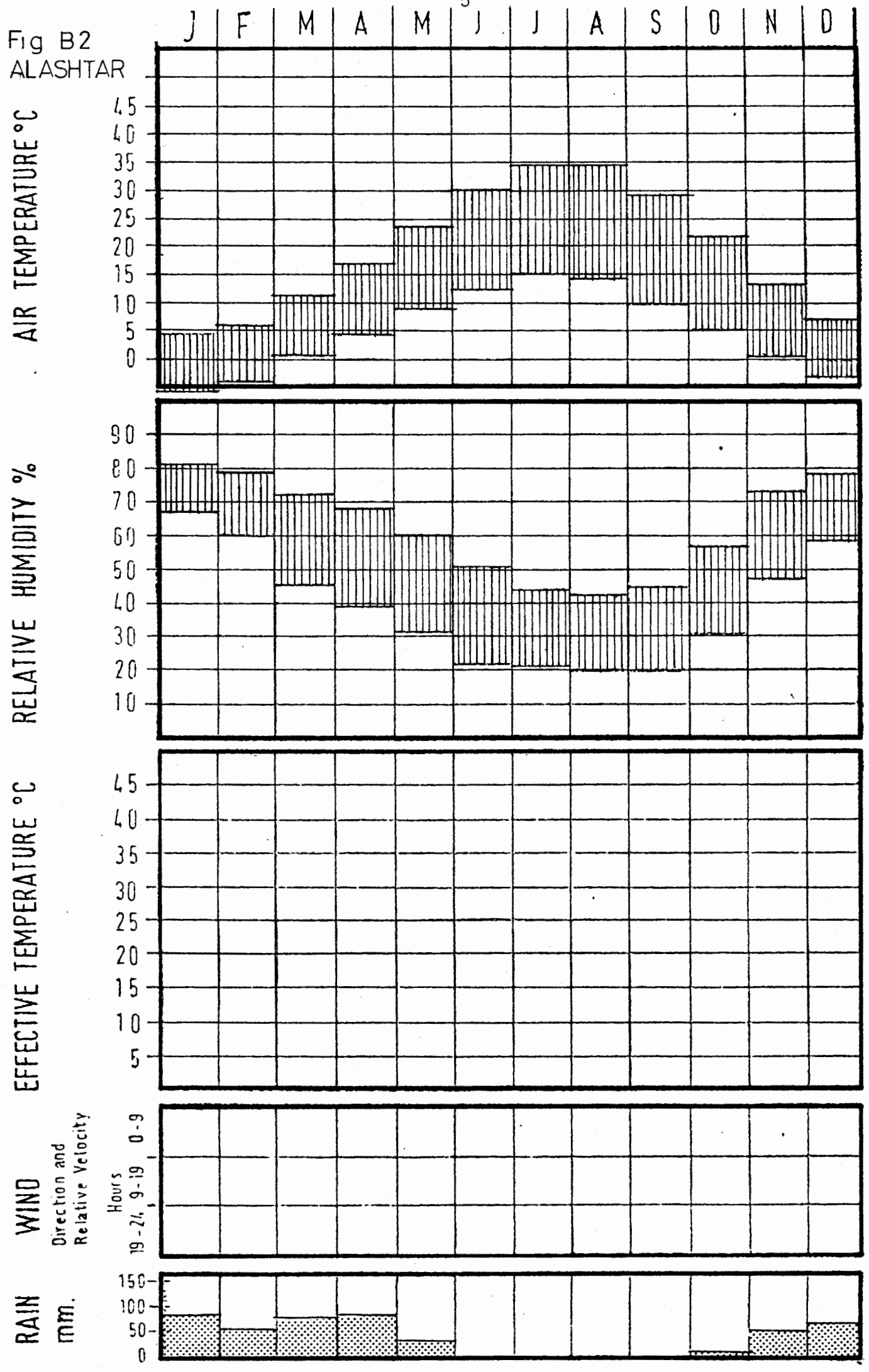
1.1 Climate

No reliable climatic data was available for the Selseleh Region. Climatic data had to be extrapolated from meteorological stations in Khorramabad, Arak, Desful and Kermanshahr, with consideration taken for different altitudes and location. This information was updated and checked against local recordings made during the following 4 years. The climatic data chart gives an indication of the basic pattern. There are cold wet winters and warm, but seldom uncomfortable, dry summers. The rainfall during the winter and spring is at times extremely heavy. Much of the plain is waterlogged during the spring months and movement around the region is restricted. In winter there are short periods of heavy snow. Local inhabitants agree that the prevailing wind is from the south-west, with small local variations due to topography. The mountains surrounding the Selseleh Basin to a certain extent protect it from extremely bad weather in winter. (Fig. B 2)

1.2 Documentation

Very little recent contemporary information existed regarding the built environment. Few writers had travelled in the area and studied the people. Most documentation focusses upon the archeological interest in the area. Luri Bronzes have been found within the Selseleh

Fig B2
ALASHTAR



CLIMATIC DATA: SELSELLEH REGION.

Plain and there are a number of unexcavated sites in the neighbourhood of Alashtar.

2. RESEARCH AND ANALYSIS OF HOUSE FORM

2.1 House form

Houses in the Selseleh region are single storey, but usually have semi underground basements, below the living rooms, where animals are kept. Walls are made of stone or mud and support flat roofs held up by timber beams. The size and length of the available timber is a major factor dictating the dimensions of rooms. Few rooms are wider than 3 to 3.5 metres and are usually 5 - 6 metres from front to back.

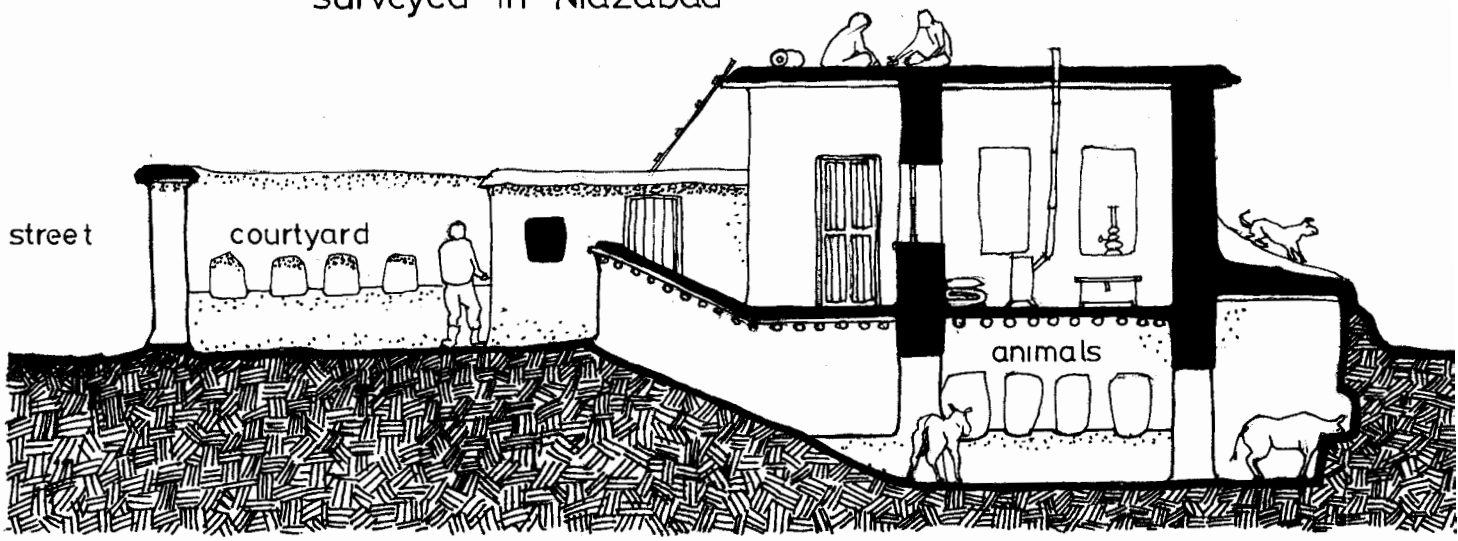
Roofs are covered with mud and, as with walls, require constant maintenance during the rainy season.

Except where the local physical features make it unsuitable, all houses face towards the south, and windows are positioned in the south facing walls.

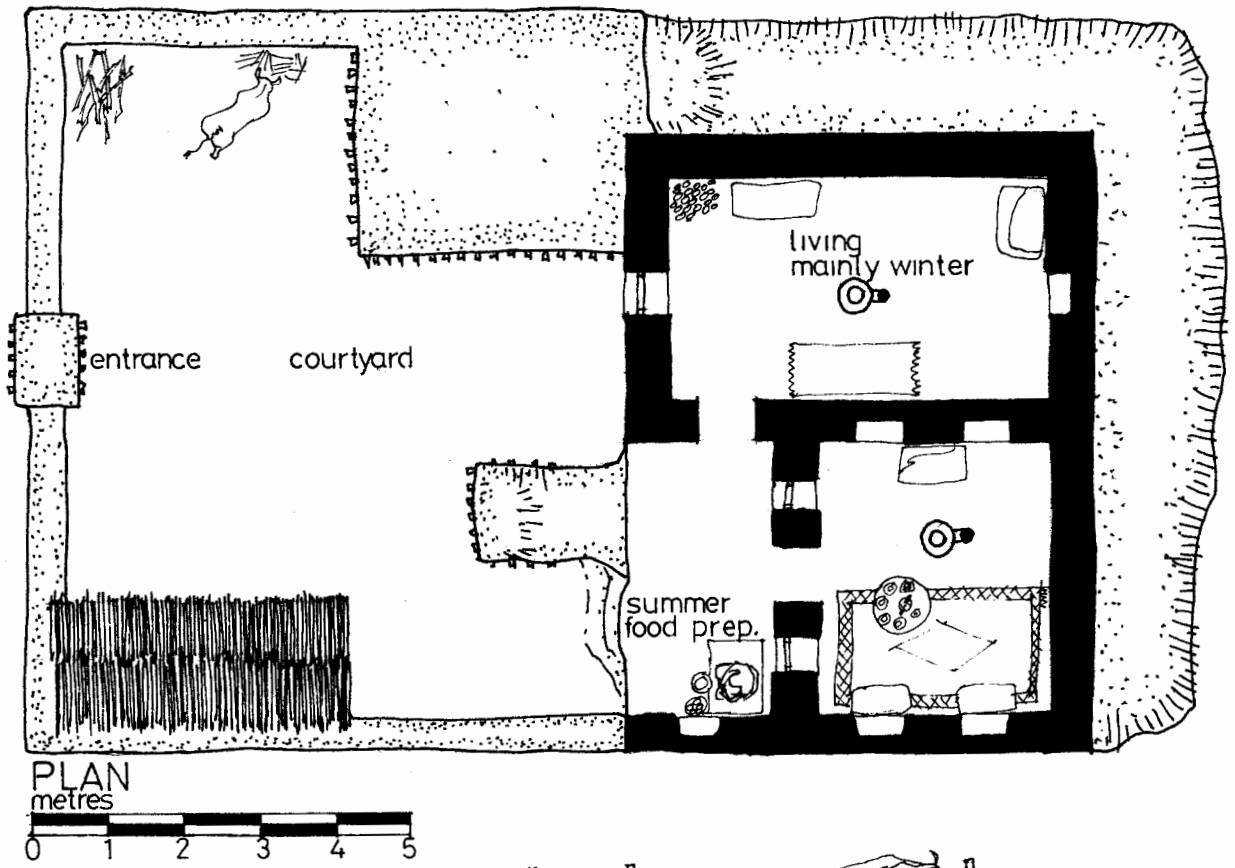
There are two basic plan forms, one an extension of the other. The basic house consists of two rooms, one at right angles to the other. In front of the room with its longest side facing south is a covered open verandah (aivan) which provides shade in the summer, access from one room to the other where interconnection is not provided, and, by its overhanging roof, stops summer sunshine from penetrating into the room behind. This is basically an 'L' shape house with verandah. (Fig. B 3) Its extension adds another room to the other side of the verandah, symmetrically matching the room on the original side.

Very few washing facilities are provided, except where a well or pool is situated in the courtyard which in nearly all houses encloses the space in front of the house. In summer food is prepared outside or under the shade of the verandah. In winter on days when conditions make it

Fig B3 TYPICAL LURI HOUSE
surveyed in Niazabad



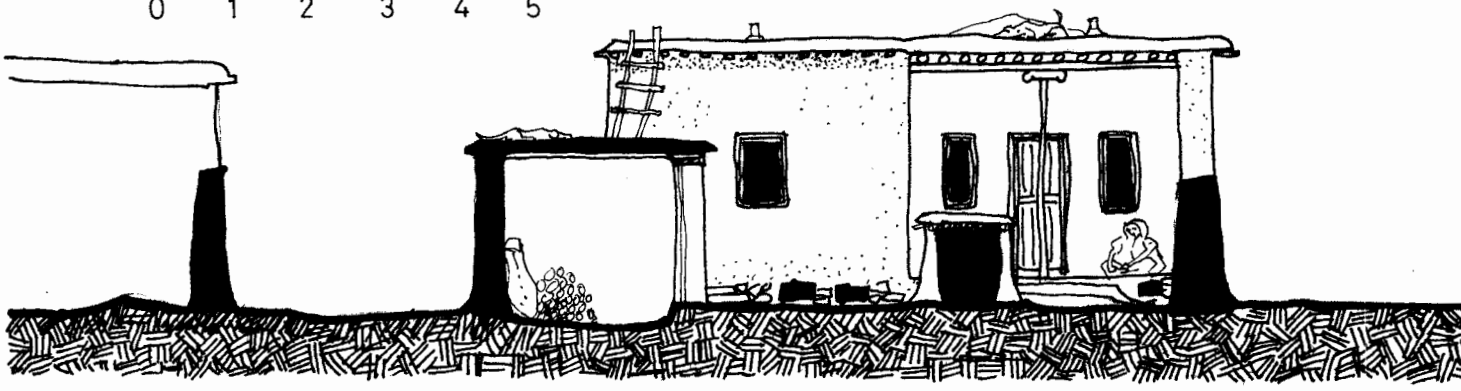
SECTION



PLAN

metres

0 1 2 3 4 5



ELEVATION

necessary, food is prepared in one of the rooms. There is very little fixed furniture. Bedding and belongings are stored in alcoves in the walls. Sitting and eating is done on the floor. Winter heating is by woodfired or more recently oil/parafin fired stoves. Chimneys are metal and are erected when needed but are not permanent. Much of the summer living takes place outside, and responsive to the nomadic background, many people move into tents during the summer, sometimes at some distance from the house.

Rooms are used primarily for privacy (not a major factor amongst Lurs), security and warmth in winter.

Animals live in the basement and the heat generated by their bodies is appreciated as a source of warmth by the humans upstairs.

All houses have some form of access to the roof, since it is used for drying crops in the summer, whilst during the winter the compacted mud needs to be rolled after every rain storm, and snow has to be cleared away.

2.2 Climatic performance

The massive construction of walls helps to store heat during the winter and to keep interiors cool during the summer. The windows are positioned to let sunshine into rooms during the winter when the sun is low in the sky and its heat is needed. Because of the overhanging roof and the depth of the window opening, little sun penetrates the house during the summer. Openings on the East or West elevation of the building would not provide this control. Some new houses in Alashtar have paid less attention to the position of windows, but in general it is a well understood principle in the region and Iran in general.

Roofs, made of 15 - 20 cms of mud on top of the supporting timber framework, have a good insulation value.

One noticeable change in housing in recent years has been the size of windows. Fuel oils have become more readily available and winter heating is less of a problem than in the past. Windows have in consequence become larger, which, whilst allowing heat to escape at night, does let in more heat during the sunny winter days.

2.3 Improvements in design and layout

It was felt that two areas required particular attention in terms of the design of houses. a) Provision of lavatory and washing facilities, b) Cooking and food storage facilities.

During the period of the survey (covering the years 1975-1978) very few houses visited had any form of lavatory, and in the absence of public baths in villages, people used the neighbouring open spaces/fields. This led to unhealthy conditions, and attempts were made to provide running water in villages, and to introduce, by example, suitably designed excreta disposal systems.

Whilst nobody objected to certain types of food preparation outside, very often food was prepared and stored in unhygenic conditions, and, again by examples, suggestions were made to improve food preparation and storage areas.

3 RESEARCH AND ANALYSIS OF BUILDING MATERIALS AND RESOURCES IN THE AREA

3.1 Walls

In the Selseleh region, walling materials in the villages are stone, mainly on the foothills, and mud, in the agricultural plain. Both of these, but particularly mud, needed improvement to protect them against rainfall, snow and impact damage. The method of laying stone walls was also potentially unstable, especially mud mortars were used for building with stone. The area is an earthquake high risk zone, and the introduction of measures

to resist the effect of earthquakes was essential. Especially in the regional market town, fired brick was in fairly widespread use, but most commonly as a facing material backed by mudbrick. The cost of fired bricks, brought in from outside the region, restricted its more widespread use.

Because of its cheapness and availability, as well as its good thermal performance, it was felt worthwhile to encourage the use of mud, especially mud brick, whilst attempting to overcome the problems that its use involved. The following suggestions were made, and through example and builders training programmes, disseminated to the villagers:

a. Mud brick should be stabilized to make it stronger and more water resistant, and stabilized wall renders should be used. Various different methods were researched and used on S.I.D.P. buildings with local builders.
b. Where stone or fired brick are used, they should use proper mortars, of which the most readily available was a lime/sand mortar. Very little additional expense was involved in its use. Many people had already turned to using cement for mortars at much greater expense.
c. All walls using mud bricks, fired bricks or stone should be laid with proper bonding between different parts of the wall.
d. Where possible, reinforcement, (timber framing within the structure) should be used to resist movement in a building in the event of an earthquake.

3.2 Roofs

The traditional roofing system on houses used large timber beams (15 - 20 cms diameter) at very close intervals,

with boards or cardboard between to support a layer of mud, 13 - 20 cms thick. The mud provided the protection against rain and insulation. These roofs needed constant attention during the winter, and in addition were expensive in their use of timber and extremely heavy.

Based upon experiments conducted, the following suggestions were made:

a. The use of a stabilized mud finish would reduce the amount of maintenance required. The most practical stabilizing material locally was bitumen. This was already being used as a waterproof barrier on public buildings, but in quantities which would be expensive for most private building.

b. The roof structure used large numbers of expensive timber beams. Alternative methods of laying the timber were suggested and demonstrated, which would reduce a) the amount of timber being used and consequently the cost, and b) the number of trees being felled. Timber for roofing was grown specially for the purpose in plantations in the region.

3.3 Development and dissemination of new or improved solutions. The builders training programmes which were organised as part of the S.I.D.P. activities were used as the main medium for developing solutions to the local problems in building, and for spreading the information.

4 RESEARCH INTO THE NEEDS AND POTENTIALS OF BUILDING MATERIALS PRODUCTION UNITS.

Analysis of the regions potentials showed that there was the capability for locally producing lime, chalk and fired brick. All three materials were being brought in from outside the region. Before any implementation of

this part of the programme took place, we visited production centres in neighbouring regions, especially those where the people were acquainted with our region. The purpose of these visits was to find out if there were any local problems in the processing of the materials mentioned. At the same time, through discussion with local builders and by visiting the areas near older settlements in the region, particularly near Alashtar, traces of old kilns were found, including bricks of considerable age produced locally. (The establishment of small scale production centres will be discussed in Case Study 3.)

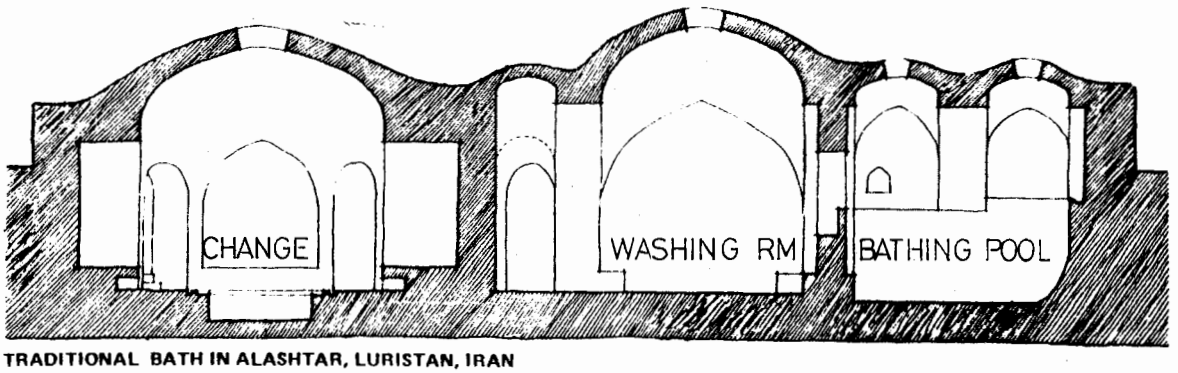
In addition to the more obvious resources of the region, it became apparent that considerable sums of money were leaving the region in order to purchase doors, windows, hot water boilers, simple furniture etc. A further aspect of the research was to investigate what skills and equipment was available locally for the production of these items, and through discussion, to find out what sort of assistance was required to stimulate any local capability that existed.

5 INVESIGATION OF SPECIFIC PROBLEMS RELATED TO PUBLIC BUILDING WITH PARTICULAR REFERENCE TO PUBLIC BATHS.
Whilst the shelter needs of the region were being met with local resources and skills, the public building of the area was mainly built by contractors coming from outside the region, using non-local materials. This was proving both expensive and did not allow the local population to participate in the public building process, nor learn how to.

A particular aspect involved in the building of public baths illustrates some of the difficulties faced.

Government sponsored public baths were built using rolled steel joists to support the roof. Whilst this was the standard technique for modern roofing in urban building in Iran, in the hot humid atmosphere of the baths these R.S.J's rust and the building deteriorates. On the other hand, the local system of roofing used timber and mud, which, whilst being much cheaper, also deteriorates quickly in the bath's atmosphere.

It was necessary to find a roofing system that was cheap, suitable, within the range of local skills and locally acceptable. Two traditional baths were found in the area, one in Aslanshahr, the other in Alashtar, both of which used vaults and domes to roof the bath, providing a roof which will not be seriously affected by the bath's dampness. (Fig. B.4)



TRADITIONAL BATH IN ALASHTAR, LURISTAN, IRAN

Fig. B.4 SECTION

However, initially there was no evidence in the Selseleh area that anyone knew how to build either vaults or domes.

Through further investigation, villages were found where mud brick vaults were still being built, to cover the basements of houses, and through discussions with local builders in the Selseleh area, it transpired that one or two of them had known how to build both vaults and domes in the past, but that through lack of practice had lost the skill over the years.

Lack of finance in the area had greatly reduced the occasions when a builder had been called upon to demonstrate or maintain his skill. In general a low standard of building skill had been sufficient for most of the work being undertaken.

In order to create a team of local builders capable of building baths (and other public buildings needed in the area) a training programme was required, to re-introduce a skill that had died out.

Two master masons were brought from Central Iran (Yazd), where vault and dome technologies are highly developed and very much in current use. These master masons were hired on the understanding that they were prepared to teach and share their knowledge with the 'trainee' builders in Selseleh. All the S.I.D.P. building work was undertaken on a basis of training through practical experience, with the more skilled passing on their knowledge to people from the villages.

6 CONCLUSION

The understanding of conditions in the Selseleh region, and the difficulties that existed, was not achieved through a comprehensive research programme. Demands to start the work of building public facilities took up much of the time. The basic knowledge of the area and its indigenous built

environment was complemented in the following years by the knowledge that builders and others from the area already had. Many of the ideas that were later put into practice were based upon their suggestions, and equally, systems developed elsewhere were adapted to meet local requirements through the builders' understanding of their own locality and building needs.

The local people began to develop an investigative attitude towards meeting their own shelter needs, and through this an ability to find solutions to new problems when they arise. Underlying this was a renewed belief that it was possible to solve many of the local problems through the use of their own skills and resources.