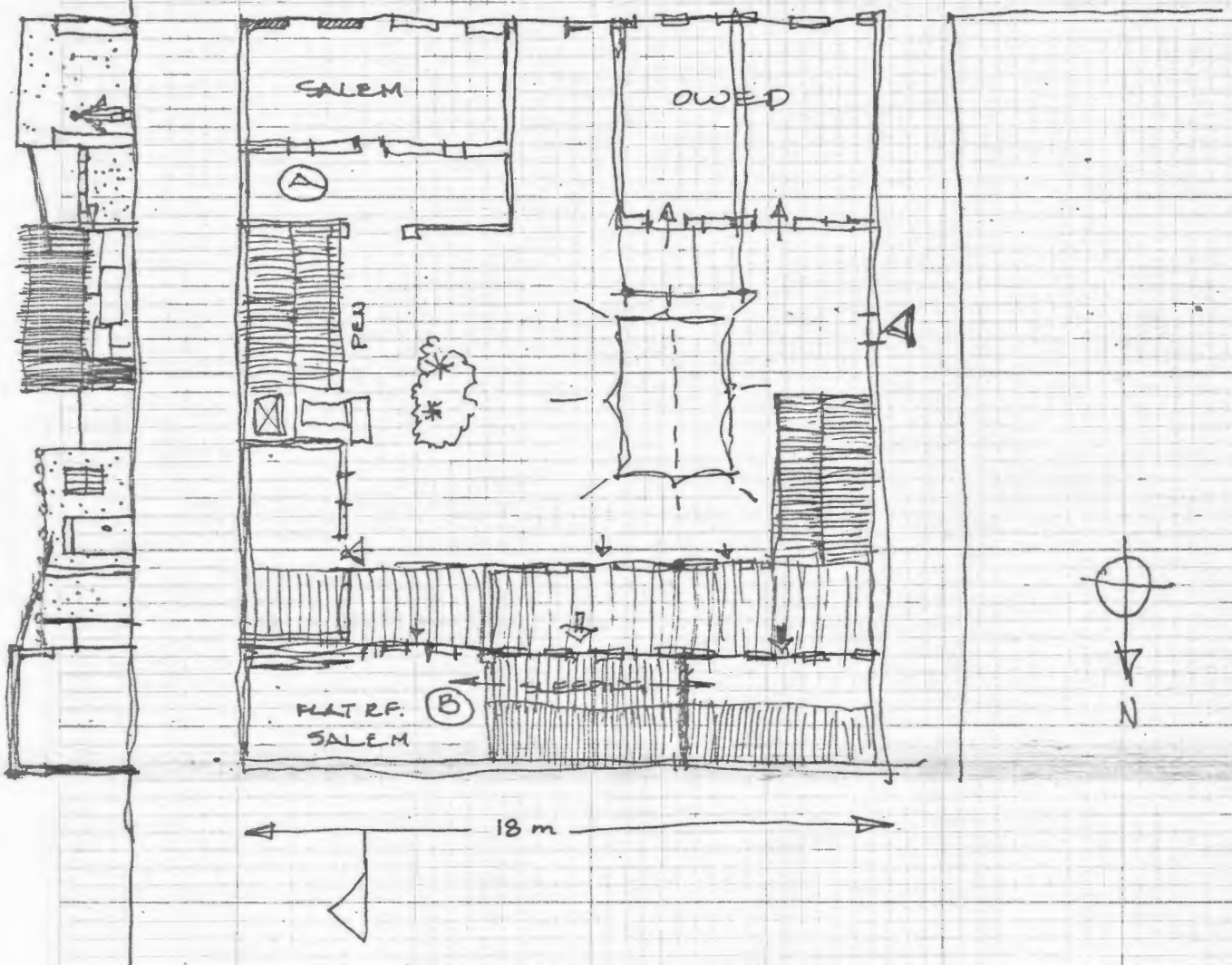
BARASTI FOR BUILDING SHOULD BE COLLECTED FROM DEAD WOOD OF PALM: CREED WOOD SHOULD NOT BE USED BECAUSE IT WILL SHRINK & TIES WILL LOOSEN AS BARASTI DRYES. CUTTING GREEN BARASTI RATHER THAN COLLECTING ALREADY DEAD STOCKS WILL DAMAGE THE TREES BUT CUTTING DEAD BRANCHES AIDS GROWTH.

29
OCT 30 -73
SALEM BUROR 12.00

	MAX	MIN	
OUTSIDE	31	18	(A)
INSIDE	29	24	(B)



THE OWNERS CLAIM THAT THE TRADITIONAL ROOFING SYSTEM AS DESCRIBED IS SUPERIOR TO CONCRETE ROOFS. (COMPARING THEM TO NEW RECENT BUILDINGS DEVELOPING LEAKS.

IN THE FALL SEASON THERE ARE OCCASIONALLY SEVERE STORMS (LAST ONE 8 YEARS AGO) WHICH DESTROY PARTS OF SOME HOUSES. IN VERY BAD RAINS THE OWNER USES AN IRON PIKE TO MAKE EXTRA HOLES IN HIS ROOF TO HELP WATER RUN OFF. (MAKES OPENINGS SO THAT WATER CAN RUN OFF TO GROUND FLOOR WHERE THE FAMILY HELPS BAIL IT OUT. THE RAINS 8 YEARS AGO WASHED AWAY ROOMS ON THE EAST SIDE TOP TWO FLOORS.

THESE RAIN STORMS CAN COME FROM EAST OR WEST (LIKELY CYCLONIC) MOST HEAVY RAIN STORMS COME IN SEPT-OCT. (8-10 YR. INTERVALS - UNPREDICTABLE) BUT VERY-VERY OCCASIONALLY IN APRIL.

IN THE MONSOON SEASON - JUNE - JULY - AUGUST THERE IS GENERAL CLOUD COVER & LIGHT RAIN.

IN THE WINTER JAN.-FEB. THERE ARE DRY DUST-SAND STORMS BLOWING FROM THE NORTH LASTING A FEW DAYS TO SEVERAL WEEKS. (LAST YEAR ABOUT 15 DAYS)

COPRA

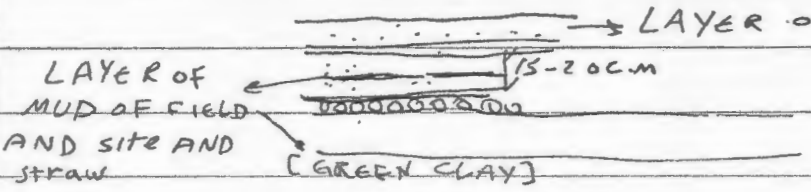
COCANUT PALM WOOD IS VERY STRONG
1 TRUNK = 16 PIECES TRUNKS APROX- @ 20 meters
½ TRUNKS 3m long cost 1 RIAL.
¼ " " " " ½ RIAL

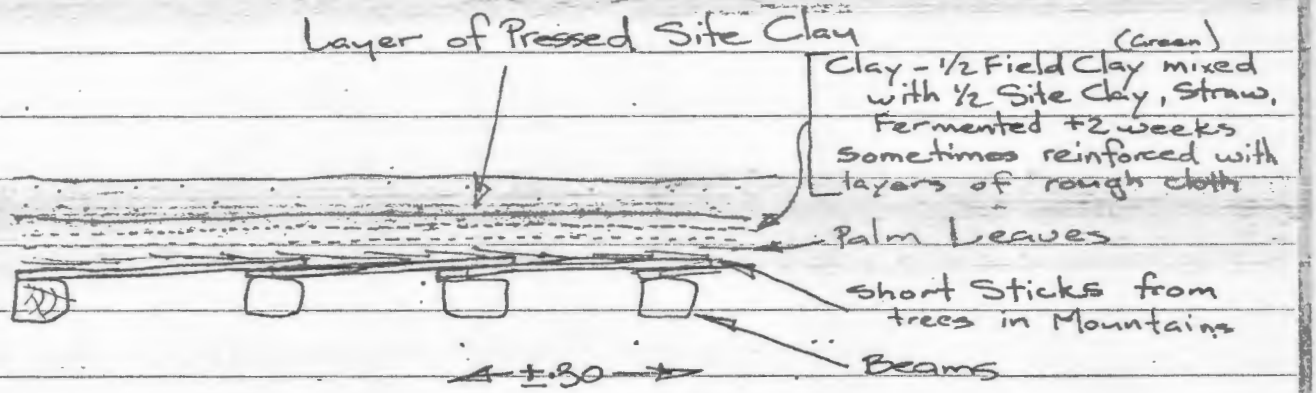
COPRA - EXTRACTED FROM COCANUT SHELL
- EXCELENT PRESERVATIVE
- FOUND IN WOOD OF COCANUT PALM AS WELL
- MARKETABLE
- SETTING UP PROCESSING (CHEMICAL) PLANT IN SALALAH
  - M. HARCRO - DUTCH COMPANY
  - CRUSH COCANUTS & EXTRACTED

TRADITIONALLY OLD COCANUTS AFTER FALLEN FROM TREE GROUND DOWN & BOILED WITH WATER UNTIL OIL REMAINS - (USED AS HAIR OIL)

USED IN PRODUCTION OF P.U.C.

October 26, 1973 – Ahmad Amer Abdul Aziz





[Floor
Roof Section

Note the same method is used for both Roofing and Flooring above ground level. In the case of roofing the fermented clay and pressed clay layers are much thicker.

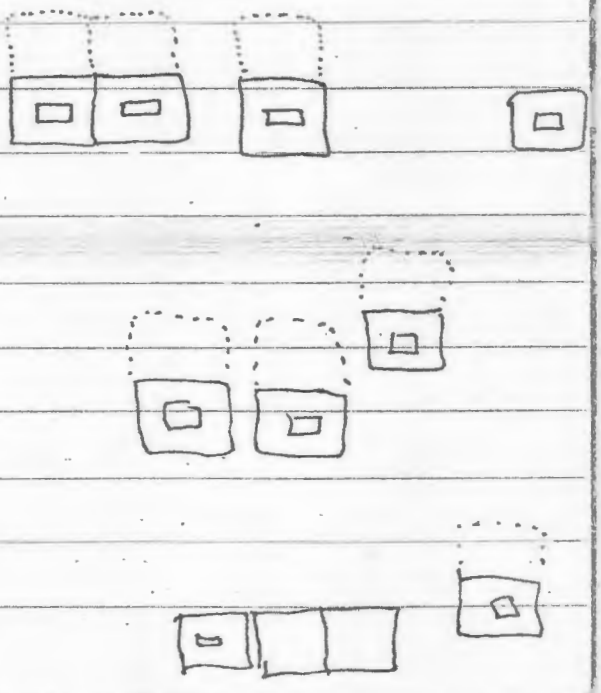
In the house studied the system was in good repair being 55 years old. The same system used in the governors house ~~that~~ visited the day before 150 years old was in good condition on interior floors where it was protected & maintained but in bad repair on roofs exposed unmaintained parts of house.

Climatic –

Soomoom – (poison) or Chemal (north) are the dry dusty strong winds from north.
Gale fore '5' – Jan, Feb, March.
Garden dries up in 2 hours. Wind breaks effective
When old sultan cut downs gardens to the north the chemal became dangerous.
Every 8 or 10 years there is a flood on shore.
Over the last 8 or 10 years it was much colder in Salalah. During this time of year one used to need heavy blankets to sleep at night & in summer in evening sweaters were worn.
In Saudia Arabia the climate is becoming cooler.

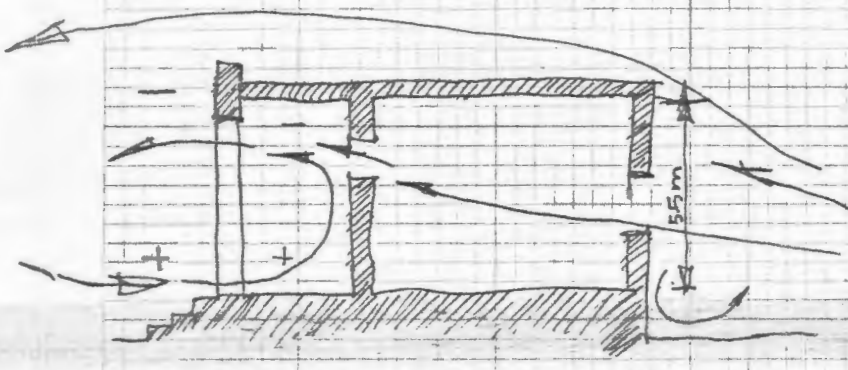
Settlement Pattern –

Although the houses are grouped in tribal & family areas, the pattern overall is wide spaced, allowing each house to have a southern exposure allowing wind sufficient "fetch".
Houses have a large walled off yard to the south to ensure open space.

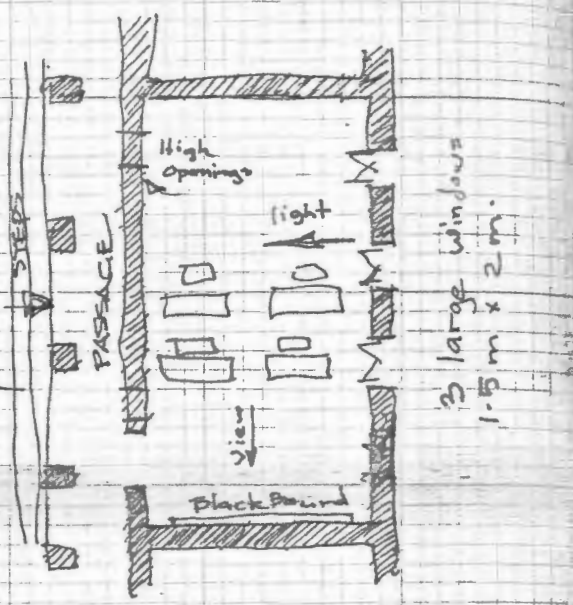


Primary & Middle School – Salalah.

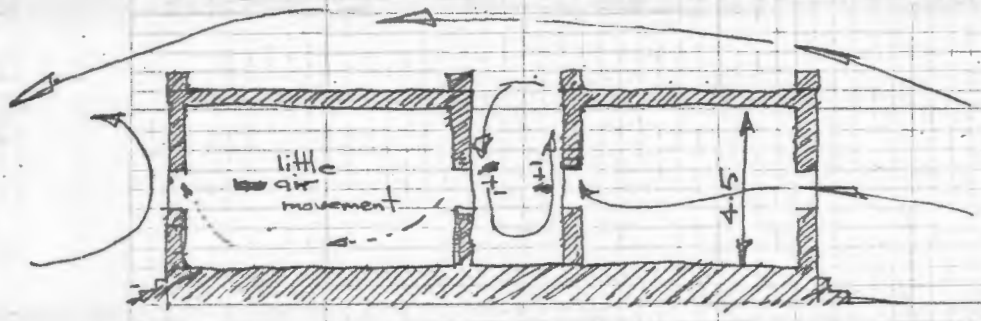
SCHOOL BLDG. COMPLETED 1945
BUILT & DESIGNED BY
LOCAL PEOPLE – LIMESTONE



NORTH ⟷ SOUTH
SECTION

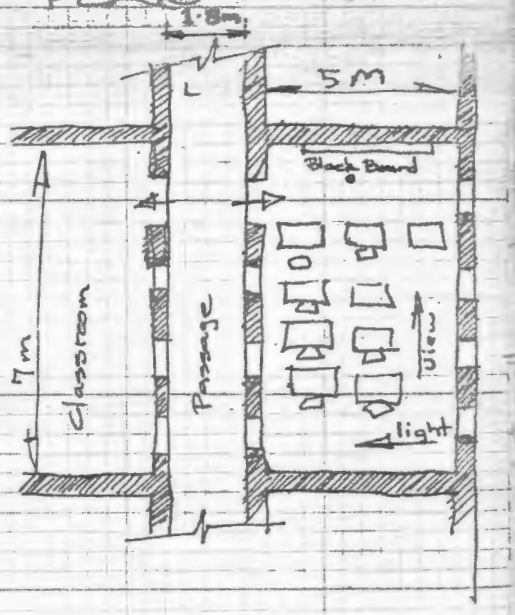


NORTH ⟷ SOUTH
PLAN



NORTH ⟷ SOUTH

SCHOOL BLDG. 1971
GOV'T DESIGN & CONTRACTED



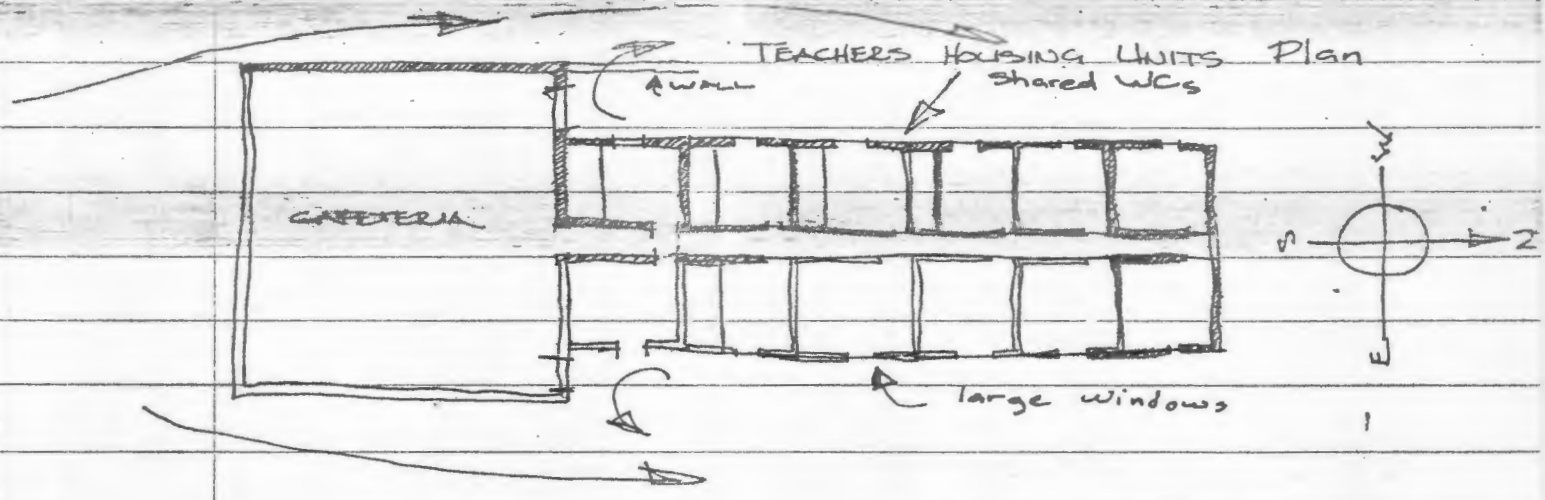
AHMED COMPLAINS
THAT SOUND TRAVELS
ACROSS THE PASSAGE
& CLASSES BOTHER
EACHOTHER

Wm. Halcrow — consultants for Dofar 5 yr. plan.
Mother Cat built - new teachers accomodation.

TEACHER'S HOUSING COMPLEX - Mother Cat
Concrete Block Construction Gov't Design

South ⟷ North Section of
Teachers Housing Complex

Cafeteria blocks the south prevailing winds. Housing units in the lee.



THE BUILDING COMPLEX IS ORIENTED ON AN EAST-WEST AXIS. SINCE THE PREVAILING WIND IS FROM THE SOUTH THE CAFETERIA STOPS NATURAL VENTILATION OF HOUSING UNITS.
THE ORIENTATION ALSO RESULTS IN BUILDING RECEIVING EAST SUN IN MORNING & WEST SUN IN AFTERNOON.

Meteorological Data – Salalah R.A.F.

Knots moderate

Sea Breaze 9:00-1100 – S. to SW. 10-20

Early Hours

18. -1900 North — light. less 10

-9 morning

Mid November – Jan. — moderate to strong.

North (NW) Breaze throughout gale.

Day up to 34K

5 day interval sand storms.

Monsoon – more wind S.-SW influence | light to mod.

– rains more in night

dies out mid morn

picks up mid afternoon

19 days per year of northerly breaze

Phone # 229 – RAF Met. Office 222 Signal Squadron

Film To london With John

8 colour 1 BW Slide

17 Blk & Wt. print

		Velocity	Dir		
28	6.00	02	340	20.2	40
	8:00	—	—	24.7	37
	10:00	06	200	28.8	38
	12:00	09	210	29.2	55
	14:00	10	200	29.6	46
	16:00	07	170	29.0	46
	18:00	03	170	27.6	57
	19:00	—	—	27.0	62
29	6:00	08	360	22.8	53
	8:00	—	—	23.7	52
	10:00	—	—	29.7	39
	12:00	08	150	29.6	34
	14:00	06	200	29.5	43
	16:00	06	180	29.0	52
	18:00	05	150	27.1	64
	19:00	—	360	26.6	72
	6	09	350	22.4	39
	8	03	360	25.0	38
	10	03	130	31.1	22
	12	07	170	31.5	23

Surveys & Investigations
Land and Water Resources Development
in Dhofar — Sir William Halcrow & Partners
July 1973

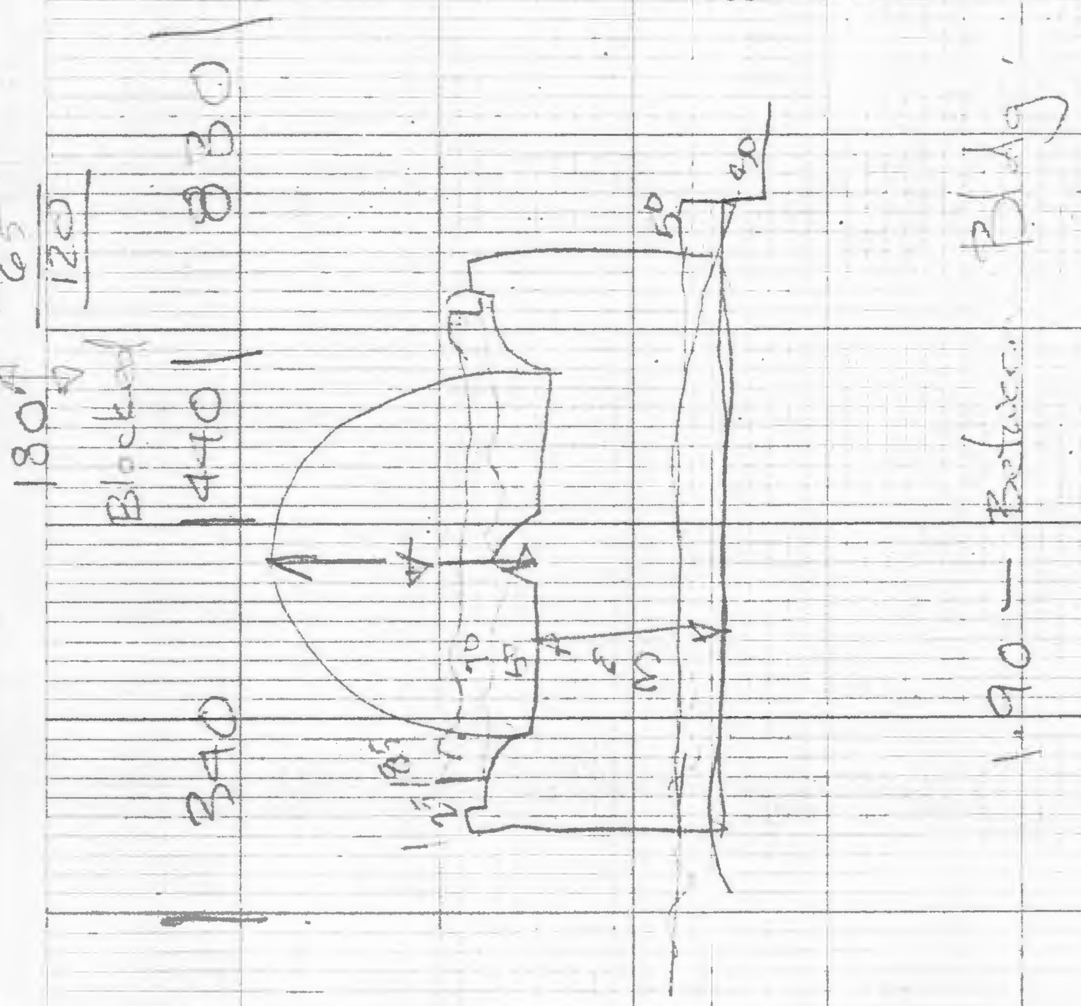
11:00	11	140	31.5	18

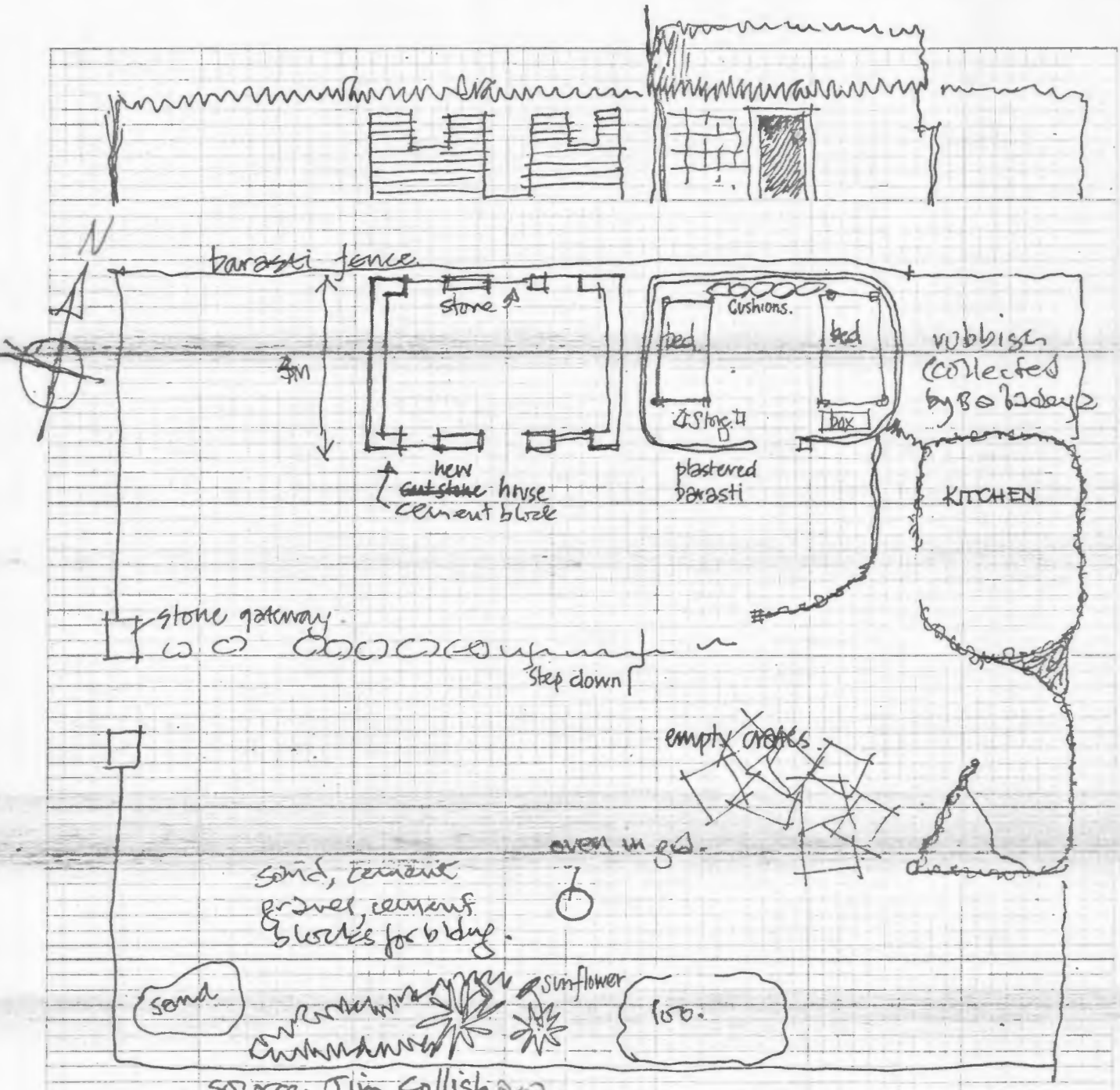
		Velocity	Direction	Temp	R.H.
25	6:00	—	—	20.6	49
	8:00	—	—	23.4	41
	10:00	—	—	31.1	37
	12:00	12	200	30.7	51
	14:00	15	200	30.5	60
	16:00	11	200	29.8	76
	18:00	05	200	27.7	69
	~~19~~:00	06	130	27.0	76
26	6:00	0.5	350	22.0	47
	8:00	—	—	25.6	53
	10:00	—	—	28.9	59
	12:00	12	170	29.0	67
	14:00	06	200	29.0	63
	16:00	10	170	28.7	64
	18:00	04	160	27.3	70
	19:00	02	140	26.8	74
27	6:00	04	030	20.1	58
	8:00	03	330	23.2	41
	10:00	05	210	28.6	39
	12:00	10	190	29.9	31
	14:00	15	200	29.2	52
	16:00	11	210	29.5	53
	18:00	05	220	27.6	54
	20:00	02	180	26.0	64

80
190A

770 | 40/80 440 | 320

FRONT





source. Jim Collishaw.

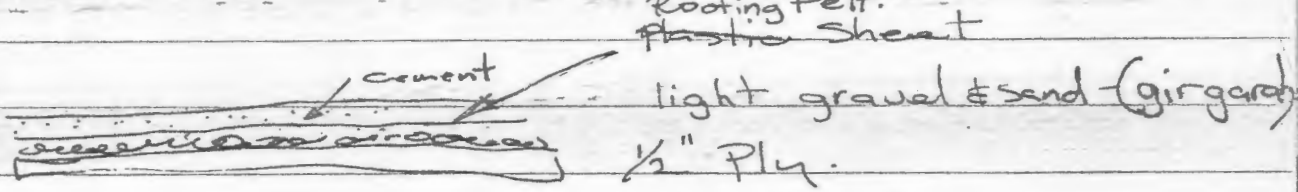
OCT. 25 - 26

Outside MAX - 33
MIN 17

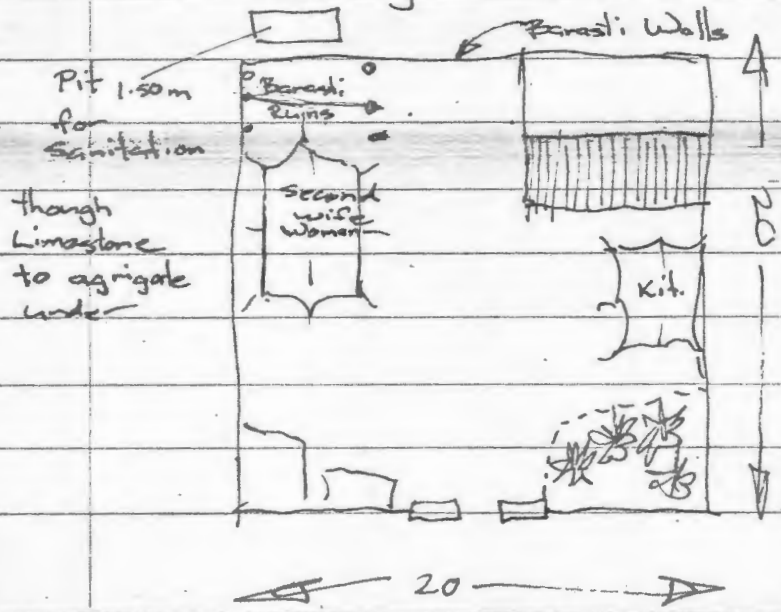
plots allotted free.
1 w. bo. per 200 houses
initial layout allowed for public sp.'s but with increased demand Soltan ordered all space to be allotted.

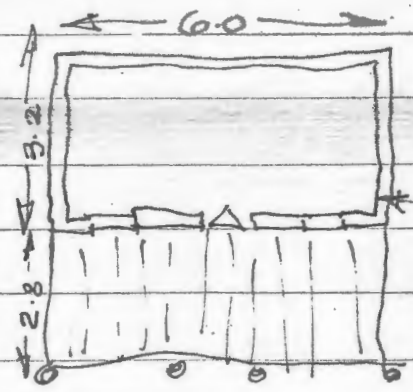
this is not to scale.

Concrete Block house - Thanifarag
Built by hired Indians masons - total cost 450 Rials
wood roof.
one room - The corregated metal to
cover the portch - 30 Rials
Barasti self built. 140 Rials



Limestone house in Salalah 3Rial/month
Owner - Askari for Municipality 30 R/month
Land alloted by Municipality
He said that he built with concrete because
he was poor & could not afford stone. If
he had more money he would will build
the rest of the house in stone because
it is stronger & cooler in summer.





OMAN REPORT.

Notes: Sallala. Lime-stone Cutting Machine: (26.10.73.)

Machine Type. FAS/TR. ERALDO GAROFOL. TERNI (RIVO)
VERABOLO BRECCIAOLO. (150-151)

Vertical & Horizontal cutting.
Vertical cuts upto depth of 30 c.m.
Horizontal depths upto 25 c.m.
Use horizontal blades for 10 c.m. width blocks & over. Less than 10 c.m. width ~~blocks~~ will ruin blocks.

Max. production would be 700 blocks per day if all conditions perfect. Target seldom reached.
Work 12 hrs. a day.
On a good site need 10 worker + machine

Hard pebbles/stone ruin machine, particularly the blade which then needs to be

replaced.
Blade is main spare often required.
A spare axle is also useful.

Track is supplied with machine.

Process of cutting:

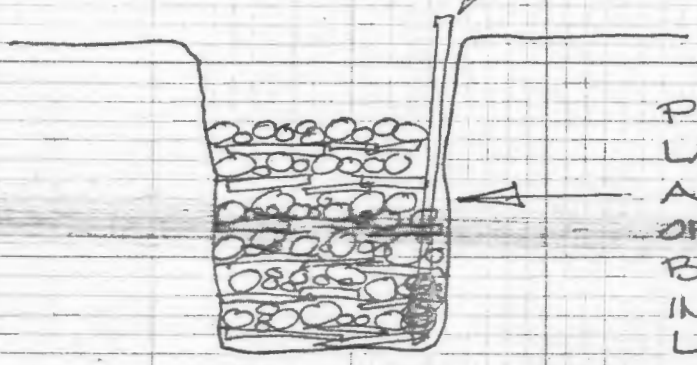
1. Line up site with chalk.
2. lay tracks along lines & position machine.
3. Cut along line.
4. a. Reposition track for next line.
   b. Or if several tracks available and laid out - put machine on to next track.
5. etc.

machine moved 15 m. in 4 mins.

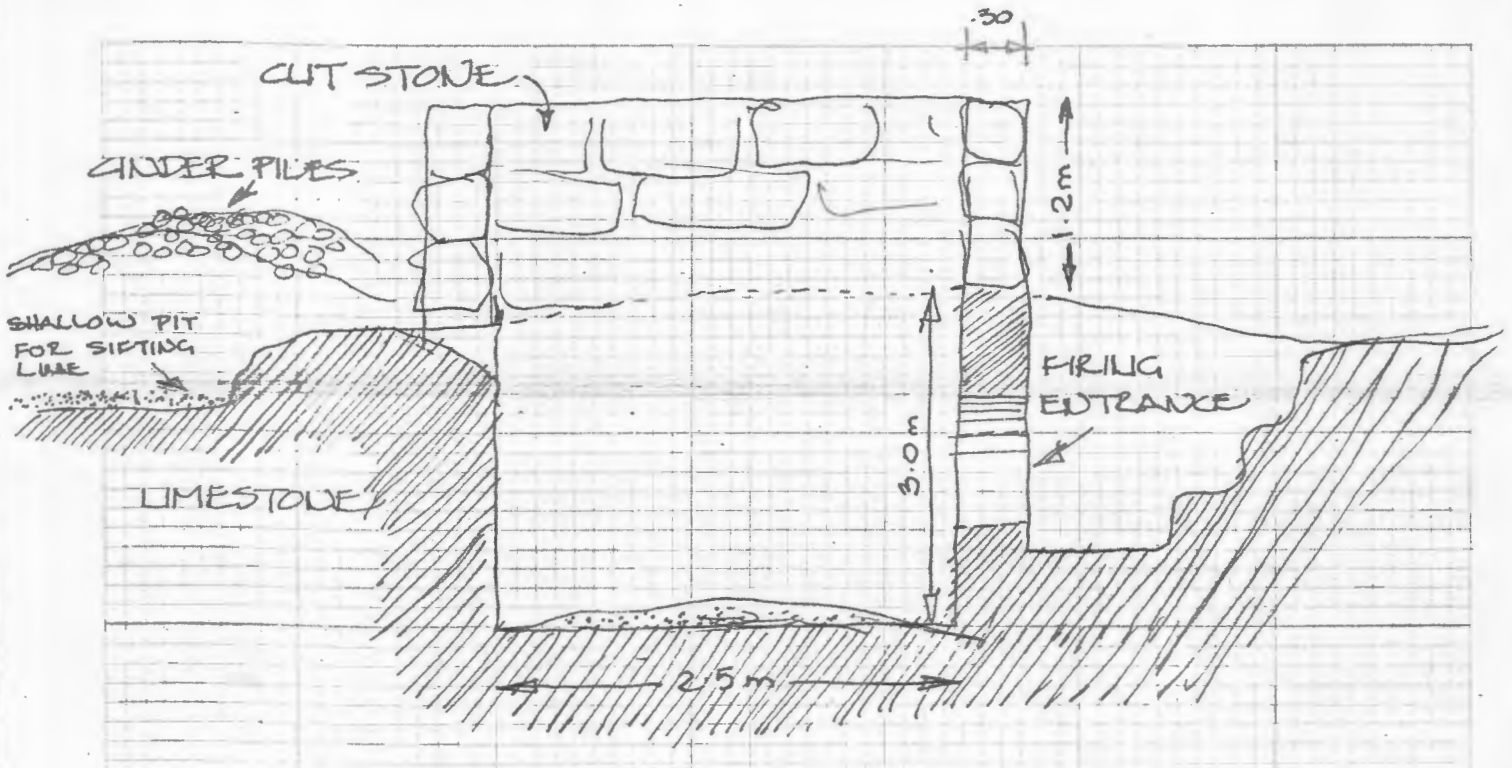
75% waste blocks; unstandard, or broken blocks on a bad site.

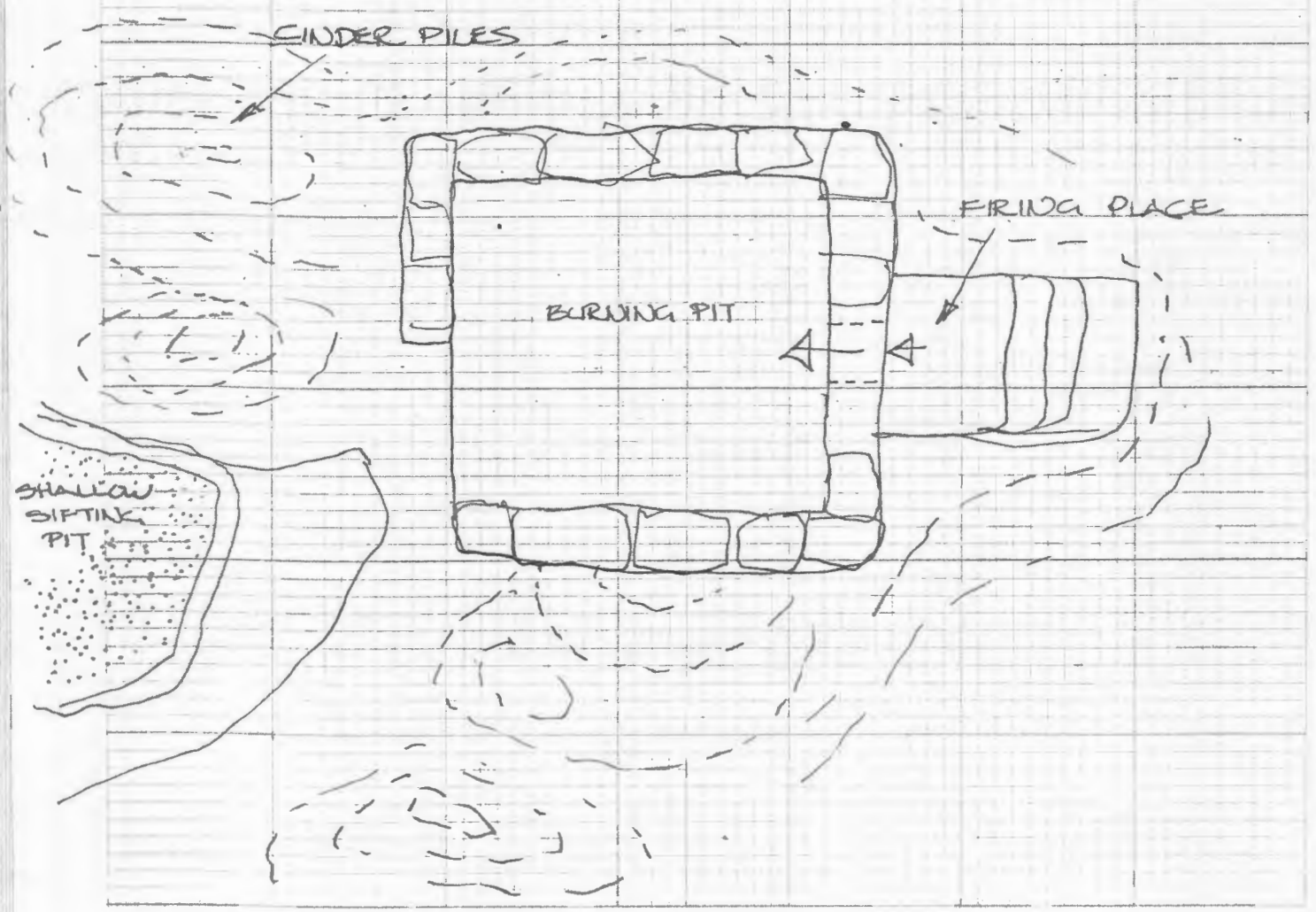
Foreman was George Shibayak - working for MOTHERCAP. Lebanese firm.

LIME MAKING - EXPLAINED BY MATTOE



SIFTING TO SEPARATE THE STONE OUT FROM THE POUDED AS LIQUID COOLS.
MIXED TO FORM THE BASE FOR PLASTERING BUILDINGS.


.30
CUT STONE
CINDER PILES
1.2m
SHALLOW PIT FOR SIFTING LIME
FIRING ENTRANCE
3.0m
LIMESTONE
2.5m


CINDER PILES
FIRING PLACE
BURNING PIT
SHALLOW SIFTING PIT

Lime Burning Pit - Oct. 29, 73

This pit was located on the plain half way between the mountains and the sea.
The hard stones 4"-8" ø which make the best lime are found at the foot of the mountain. (weathered lose stones). Local cut stone can also be burned but is not as good. Good stones will produce 2/3 their volume in lime. (remainder is a core of hard cinder). The wood burned is in large (slow burning) pieces, ie roots of trees, from Mountains. For the moment there is little lime making because fuel is hard to get from the Jebbell. The fuel must be very dry.
The lime is burned in the pit as described earlier (in layers - alternating with fuel) & ignited from opening in side of pit as shown. Fired stones are sifted (after slow burning for 2 weeks) in screens, while still hot. Leaving only cinders. Bits of charcoal are sorted out of the lime and used in silver smith's burners.
Lime Mixed with sand & water to form paint & thicker mixture for plaster. This mixture (according to locals) adhered better & lasted longer than cement. But now because raw materials are unavailable imported gypsum is used.

Stone Cutting

Technique:

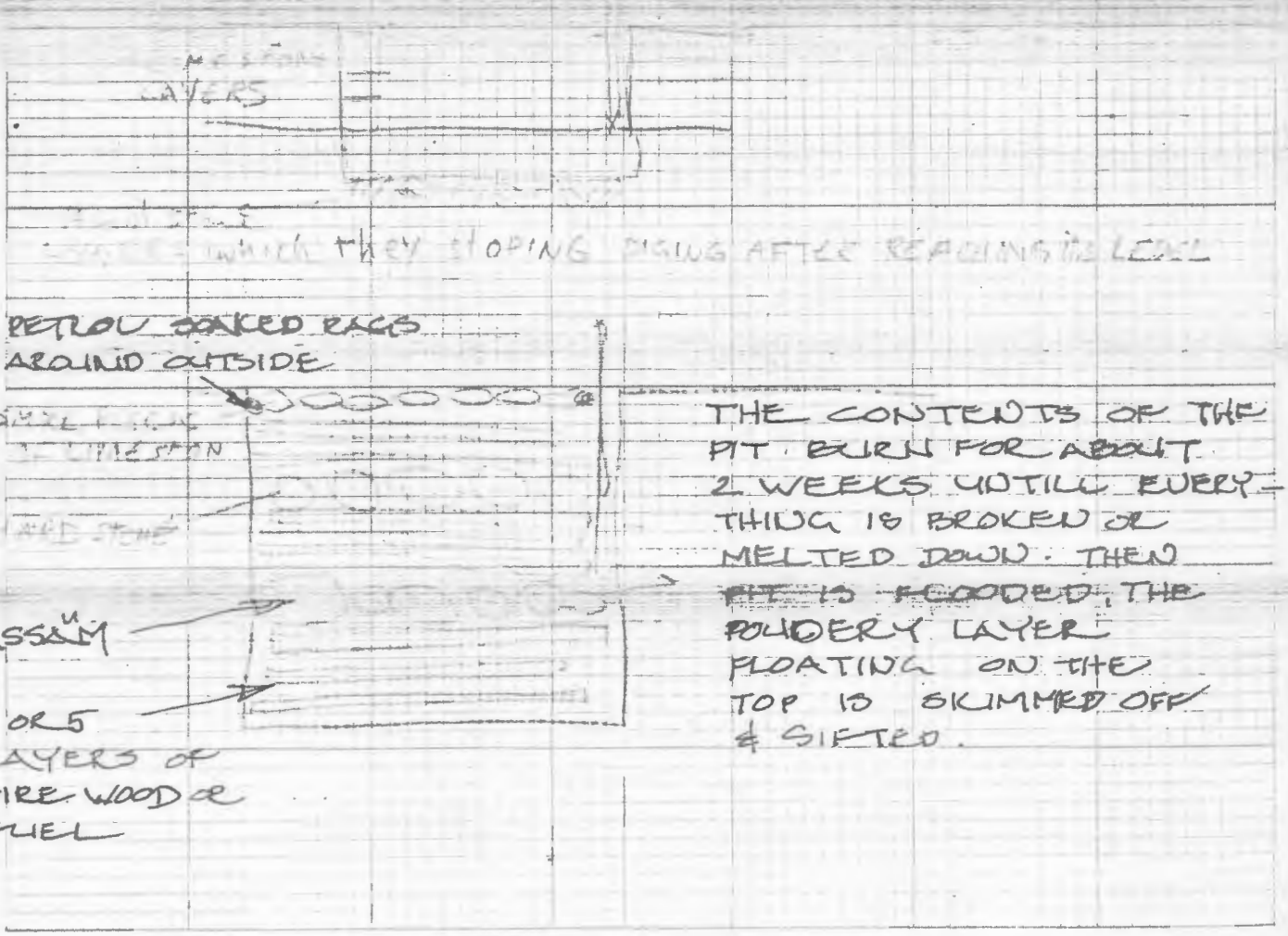
2 Places - inland or near Coast.

Near COAST = Feels where to ~~coast~~ cut by feel - sometimes cuts under water - cut large peices then it floats to the surface. Then cut it up on shore.

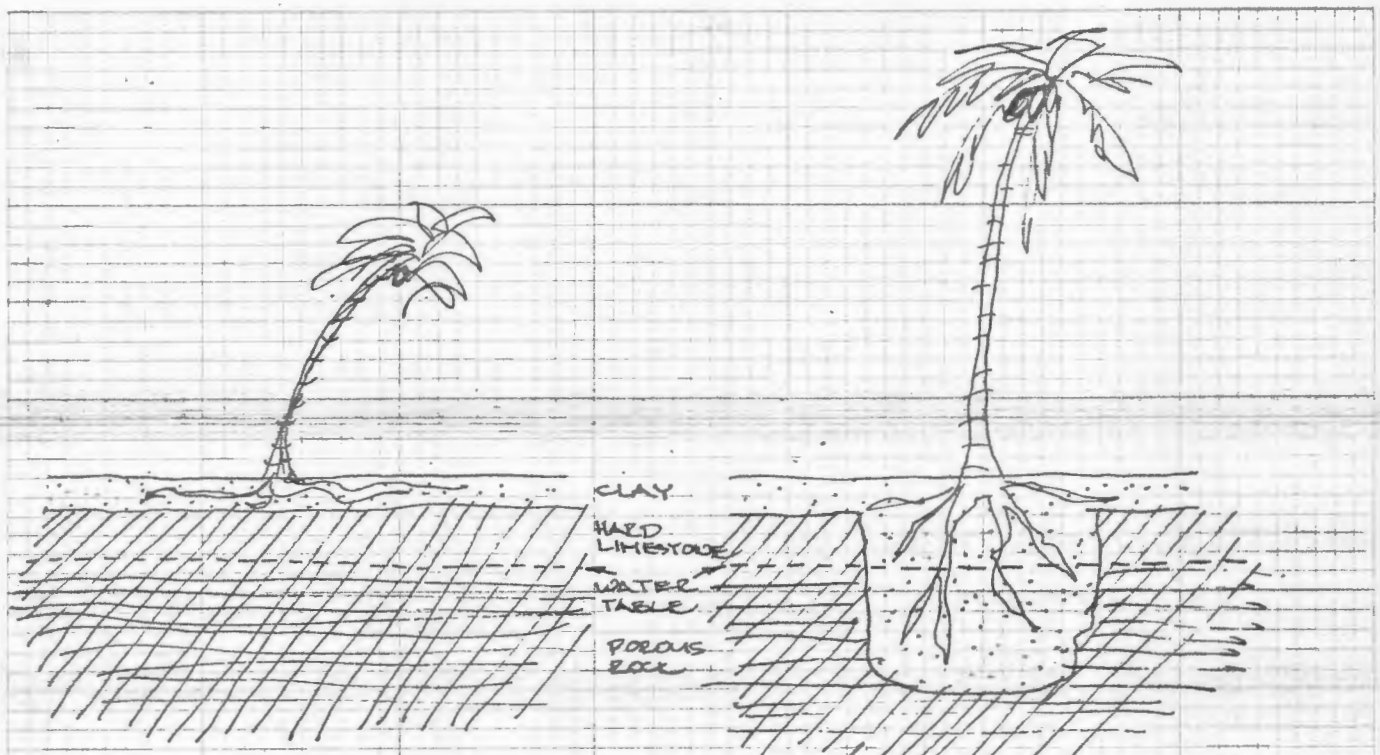
SAUDONI = NEW CUTTER ABOUT 20 / DAY
100 sets for 25 RIALS.

~~60~~ 20 x 20 m House Plot: Walled Perimiter
2 Rooms = 8500 stone blocks
Cost 2500 Rials for Stone Alone

The stones FROM INLAND ARE STRONGER & WEATHER BETTER..



THE CONTENTS OF THE PIT BURN FOR ABOUT 2 WEEKS UNTILL EVERY-THING IS BROKEN OR MELTED DOWN. THEN ~~PIT IS FLOODED~~. THE POWDERY LAYER FLOATING ON THE TOP IS SKIMMED OFF & SIFTED.



PALM GROVE HAD DIFFICULTY DEVELOPING BECAUSE OF LIMESTONE NEAR THE SURFACE

TO IMPROVE GROVE. LIMESTONE WAS QUARRIED OUT TO PROVIDE A PIT TO BE FILLED WITH EARTH ALLOWING ROOTS TO REACH WATER TABLE

SINCE THE SITE WAS NEAR THE SHORE THE WATER TABLE WAS HIGH. WE WERE TOLD THAT QUARRING STONE UNDER WATER WAS MUCH EASIER. THE CUTTER FEELS FOR THE GRAIN OF THE STONE WITH HIS PIKE. WHEN CUT THE LIGHT STONE FLOATS TO THE SURFACE. THE GROUND WATER REMAINS FRESH EVEN NEAR THE SHORE.

THE STONE CUTTER GIVES 1 STONE IN 10 TO THE OWNER OF THE GROVE.
THE STONES ON THESE SITES IS MORE MALIABLE BECAUSE OF PREVIOUS IRRIGATION & THE ACTION OF THE PALM ROOTS ON LOOSENING THE STONE.

Oct. 28, 1973 – Ali Omar

15 YEARS AGO – IN TRIBAL GROUPING OF SALALAH THE SHEIKS MADE ALL THE DECISIONS.
SARDINE SEASON STARTING NOW.--
THE WHOLE PROCESS OF SARDINE FISHING HAD DIVIDED RESPONSIBILITIES. ONE TRIBE MADE BOATS, ONE MADE NETS, ONE FISHED, ONE DID DRYING. ETC. THIS WAS THE PRINCIPAL ACTIVITY INVOLVING THE WHOLE COMMUNITY YOUNG & OLD. IN MOST OTHER CASES ONLY THE FAMILY HEAD WORKED OR HAD ANY RESPONSIBILITY. THE SARDINES WERE USED FOR FERTALIZER, ANIMAL FODDER & HUMAN CONSUMPTION. NOW SARDINES ARE LOSING IMPORTANCE BECAUSE OF CHEMICAL FERTALIZERS, IMPORTED CANNED GOODS. DURING THE REST OF THE YEAR THE FATHERS INVOLVED IN AGRICULTURE, SMALL TRADING & SENDING SARDINES INLAND BY CAMMEL.
EVEN 20^{25} YEAR OLD SONS WERE NOT REQUIRED TO WORK – LARGE COURT IN FRONT OF HOUSE FOR PLAYING. = CHILDREN.
NOW WITH JOBS AVAILABLE IN GULF THE YOUNG ARE WORKING & MAKING MORE MONEY THAN THEIR FATHERS. NOW THE YOUNG ARE SUPPORTING THE FAMILY. THE SOCIAL SYSTEM HAS REVERSED ITSELF. THE YOUNG SONS BUILD THEIR OWN HOUSES THOUGH STILL SUPPORTING THEIR PARENTS HOUSE. BEFORE THEY WOULD HAVE LIVED IN THE FATHERS HOME.
THE OLD FAMILY HOUSE REPRESENTING THE ACCUMULATED WEALTH OF GENERATIONS AND WAS THEREFORE MULTI STORIED & LARGE.
THE SON'S HOUSE IS NATURALLY SMALL – ONE STORIED

THE PROBLEM OF NEW SETTLEMENT IN SALALAH IS THE DEMAND FOR BUILDING SITES, INFLUX OF POPULATION & THE BOUNDARY OF TOWN DEFINED BY SECURITY. THERE IS A DEMAND TO BUILD IN THE OPEN SPACES THROUGHOUT THE OLD TOWN NECESSARY FOR NATURAL VENTALATION OF EXISTING BLDG. PRESSURE TO GO AGAINST THE NATURAL SETTLEMENT PATTERN.

Salalah - Oct. 23

Jim Galishaw

Cement Blk - 22 R. per 100

Stone - 32 R. per 100 & old per 100.

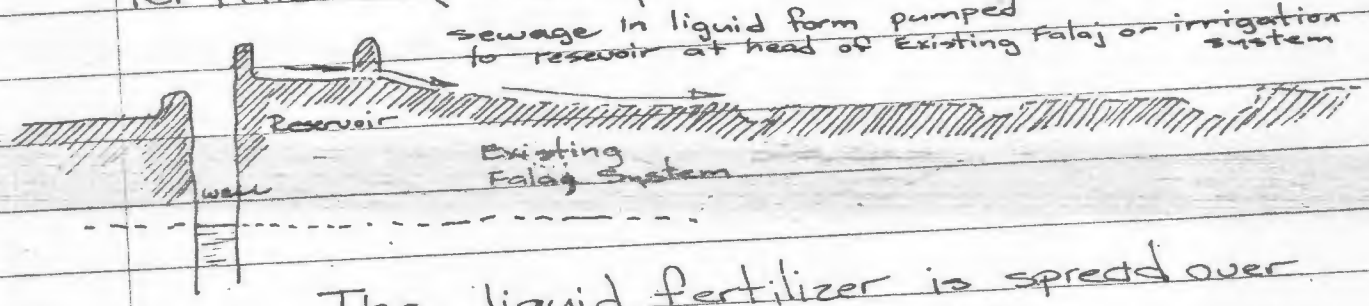
3 yrs ago. stone was 3R/100

Canadian Consortium of Consulting Eng.

Cansult..

Building Materials Found in indiginous use in Salalah are Barasti, Barasti with mudplaster, and Stone (cut, & uncut) set in clay mortor or layed dry. The building like suggested (stone & clay) is 30 years (structurally) and sanitarily. Because the houses are built on a solid rock bed there is no place for sewage to drain to. Combined with the fact that through most of the are the water table is only 1m or less from the surface sanitation is a major problem. Ses-pools are dug or cut into the rock but are a health hazzard & must be drained regularly.

Raw sewage colected by Municipalities 2000gal tank truck from septic tanks (8'x4'x4') (charge of 1 Rial to drain tank). Given immidiately to garden owner for use as fertilizer (usually before planting).



The liquid fertilizer is spredd over the leveled garden plot before plowing & planting. Initially the sewage/fertalizer is pumped into an existing resevoir at the head of the irrigation system (whether falaj or well pump type). The water is then allowed to carry the fertalizer through the system. Vegetable garden plots are irrigated in this way. There is a demand in the area for an extention of this system.

In other cases the sewage is spredd or pumped into shallow beds to dry for 6 months & to be used or plowd into Agriculture Dept. farms

Dangers of Using raw sewage? (ring worm etc.)

Possibly better used for fertalizing animal fodder or Palm Groves (where fruit is not in direct Contact with ground).

Oct. 24

Saied Bin Gia – Firkah Leader

Dofaris

Mixer – 2.5 R. Master Mason – 4.0 R (– 0.5 before)
Labour – 2.0 R Labour before 1/4 rial.
Labour Pakastan – 300 rupees in India – 1000 rupees – here
1 rial before better than 5 rials
Whole house – 250 Rials – before
15,000 " now
2 Rials 1 bag of rice before now 21 R.
Goats before 0.5 rial now 35–40 R!
Cattle " 6.0 rial now 150 R. min.
Sheep brought by traders now from Soumail: 12R.
Cammel 300R. but now 150 R.
because now only the Bedu are interested.
The trad. local black cloth same price
Indian cloth 0.25 Rials now 4.0 rials.
Now too much money too few goods
Bananas .300 for 100 now 15 for 100
Saied worked for Franco 17 years

Mosque & Mosoleum – Salalah – Oct. 24.

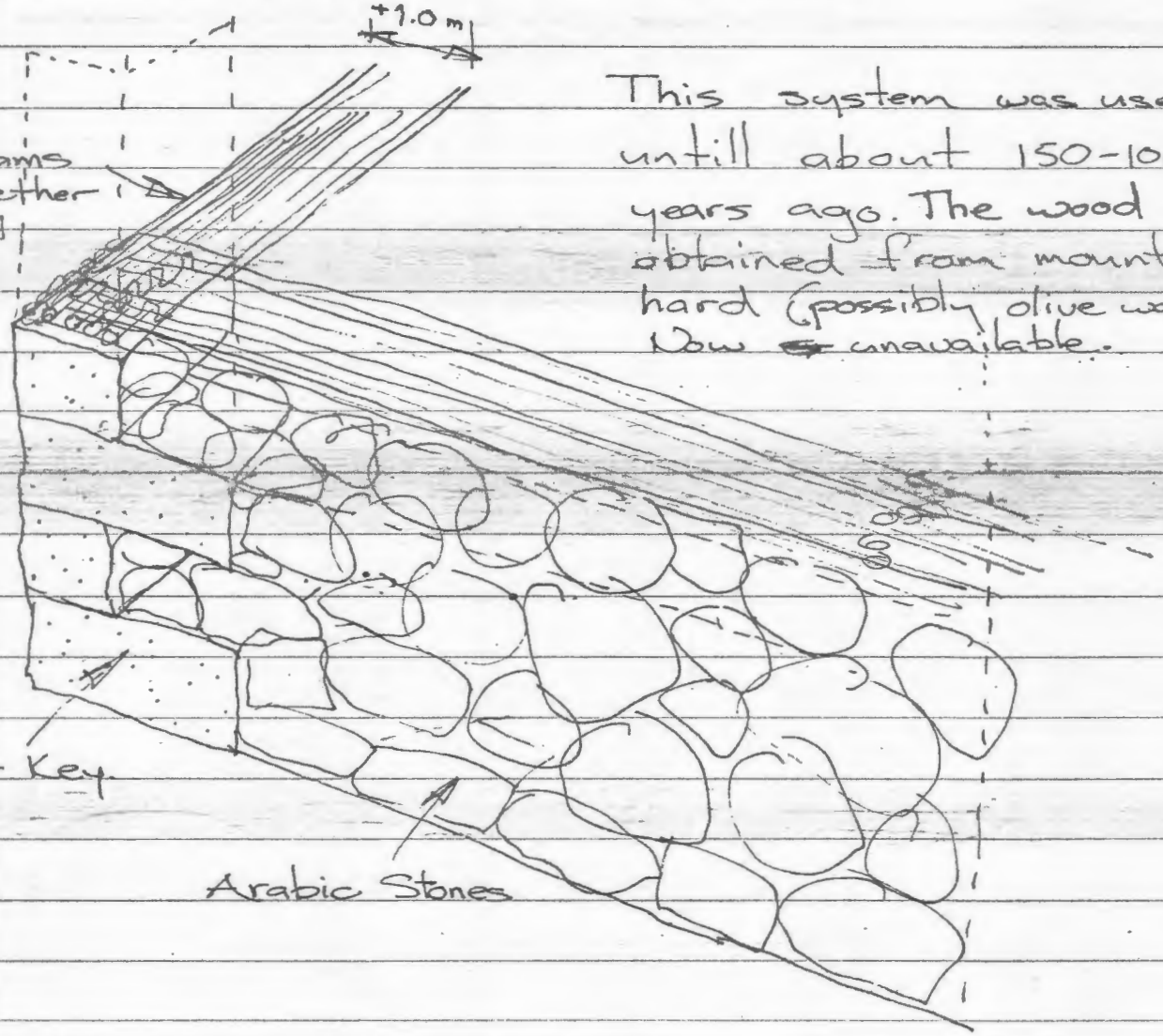
Mosque – 600 years old – local stone – plastered

Oct. 29, 73

Limestone Wall Construction

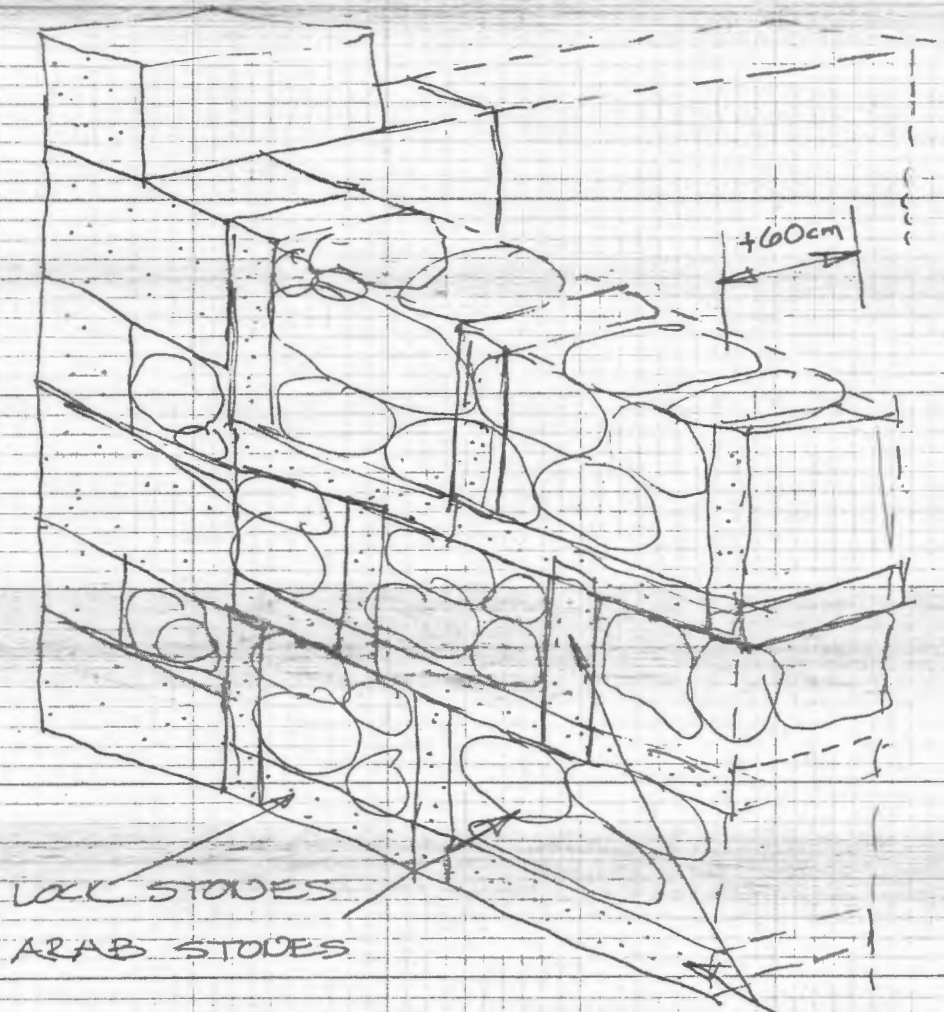
Old ~~Wall~~ Wall Construction - 2½ Arms @ 18"
= 1.0 - 1.20 m.

New Wall = 22" = 0.60 m.



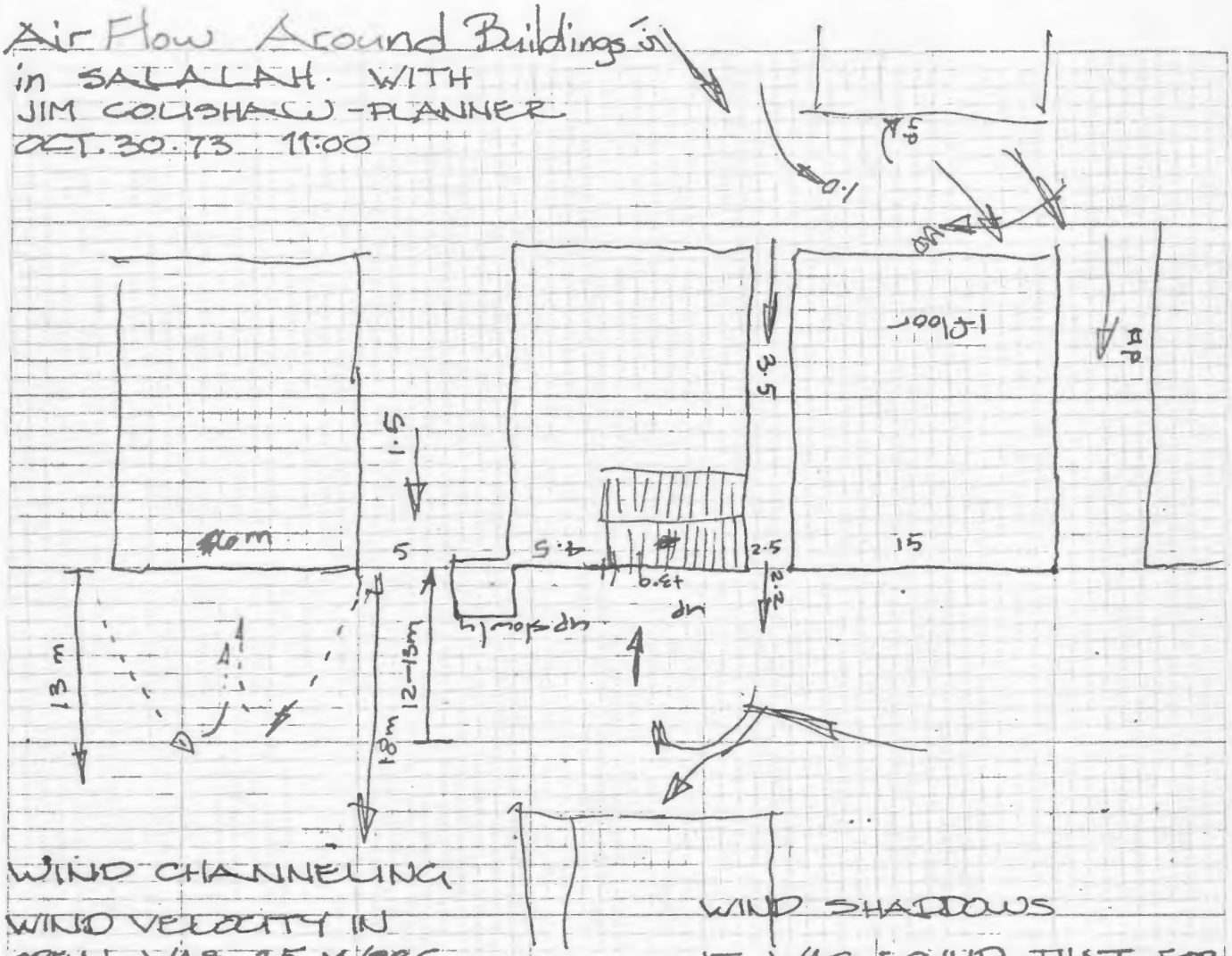
This system was used untill about 150-100 years ago. The wood obtained from mountains hard (possibly olive wood) Now ~~is~~ unavailable.

LOCK STONE SYSTEM
RECENT SYSTEM USED DUE
TO LACK OF WOOD. (PAST 100-150 YEARS)
WALLS BEING THINER ~~BEC~~ LIMITED
BY DEPTH OF ONE LOCK STONE



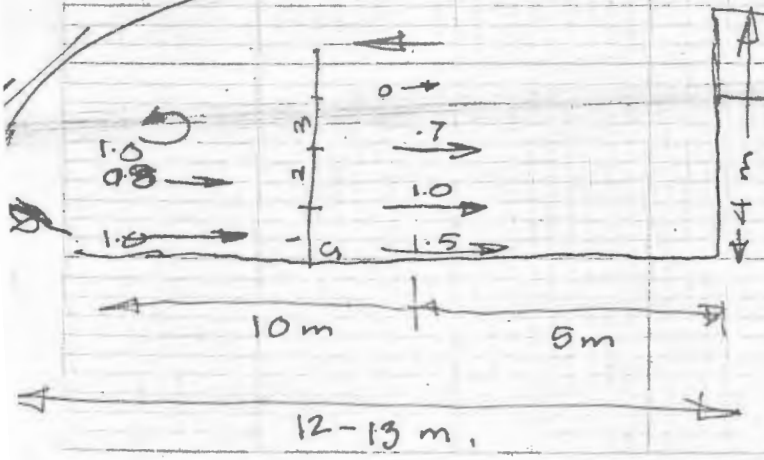
Air Flow Around Buildings in

in SALALAH. WITH
JIM COLSHAW - PLANNER
OCT. 30. 73 11:00



WIND CHANNELING

WIND VELOCITY IN OPEN WAS 1.5 M/SEC.
VELOCITY IN 2.5 m SPACE BETWEEN BLDG = 2.5 m/sec
VELOCITY IN 5.0 m SPACE SAME ORIENTATION = 1.5 m/sec.



WIND SHADOWS

IT WAS FOUND THAT FOR A ONE STOREY BUILDING 3 ON ITS LEE SIDE THE WIND REVERSED ITSELF TO A POINT 12-13 m FROM THE END WALL. AT PLUS 13 m THE WIND VELOCITY HAD REGAINED APROX. 1 M/SEC. OF PREVAILING (~~OPEN SPACE~~) VELOCITY OF 1.5 - 1.8 m/sec. SIMILARLY FOR A 2 STORY BLDG. THE CRYTICAL REVERSAL POINT WAS ABOUT 18-19 METERS. THIS CONFIRMED COLSHAW'S EARLIER FINDINGS USING A CANDLE & FINDING THE POINT AT WHICH IT WAS BLOWN OUT.

SALALAH — CATTLE / SARDINE INDIGINOUS SYSTEM

RELATIONSHIP OF JEBBEL & TOWNS PEOPLE FROM SALALAH = CATTLE / SARDINES. THE JEBBEL IS A VERY PRODUCTIVE CATTLE RAISING AREA. THE PRE-ISLAMIC CULTURE STILL FOUND IN PARTS OF DHOFAR PUTS GREAT IMPORTANCE [EVEN SACRED] ON CATTLE [BLOOD DRINKING] MUST HAVE CONNECTIONS WITH EARLY GREEK & EARLY BIBLICAL REFERENCES AND CONTEMPORARY CULTURES I.E. MASAI OF SOMALI EAST AFRICA. THE JEBBEL AREA OF DHOFAR PROVIDES GOOD GRAZING EXCEPT FOR 2 OR 3 DRY MONTHS IN SPRING BEFORE THE MONSOON. DURING THIS PERIOD JEBBELIZE COME DOWN TO SALALAH TO BUY [ON CREDIT] SARDINES TO TAKE BACK TO THE HILLS TO FEED THEIR CATTLE. AFTER THE MONSOON [OR DURING] THE TOWNSPEOPLE GO TO THE HILLS & LIVE FOR 2 OR 3 MONTHS OFF THEIR DEBTORS [AND ARE TREATED WELL OUT OF GRATITUDE] THE TOWNS PEOPLE THEN RETURN TO SALALAH WITH CATTLE AS PAYMENT. IN THIS SYSTEM THE JEBBELIZE ARE CONTINUALLY IN DEBT TO THE TOWNSPEOPLE.

THE WAR HAS HINDERED THIS TRADE BUT JEBBEL - SALALAH TRADE STILL EXISTS. SARDINE PRODUCTION IS FALLING

↳ CONTINUE

Table 45: MONTHLY MAXIMUM AND MINIMUM TEMPERATURES
(in centigrades)

	Location					
	Azaiba/1		Muscat/2		Salalah/3	
	Max.	Min.	Max.	Min.	Max.	Min.
January	24.9	14.7	21.9	18.2	27.2	17.9
February	27.3	16.6	24.2	19.6	27.9	18.5
March	30.2	18.3	26.2	22.3	29.6	20.5
April	33.3	21.6	31.6	26.8	31.3	22.7
May	39.1	26.3	37.1	30.7	32.3	25.0
June	39.9	28.0	37.1	30.9	31.8	26.1
July	38.9	28.5	37.6	32.6	28.0	24.2
August	37.1	26.7	33.9	29.6	26.9	23.2
September	36.4	24.5	33.7	28.9	29.0	23.4
October	35.4	22.4	29.8	24.6	30.4	21.1
November	29.7	18.3	27.8	23.1	30.2	20.4
December	25.7	14.6	24.7	20.4	28.4	18.9

1/ For April 1962-August 1967.
2/ For January-December 1971.
3/ For November 1942-December 1971.

Source: Secretary of Finance, Muscat.
Department of Development (Dhofar).
Harold Whitehead and Partners (Economic Survey 1972).

3. DATA, INVESTIGATIONS AND PRELIMINARY ASSESSMENT

3.1 Aerial Photography Surveys and Mapping

One preliminary copy of the aerial mosaic of the Salalah at a scale of 1/8,000 was received in time for the commencement of the reconnaissance soil survey but the contracted copies of the aerial mosaics (5 No) at a scale of 1/10,000 were not received until the end of June instead of the the end of April.

Authority to place an order for an uncontrolled aerial mosaic at a scale of 1/50,000 of the Salalah Plain and the important catchments which recharge its main aquifers was given by the Director of the Dhofar Development Department. This mosaic should assist with our assessment of the water resource potential of the plain.

3.2 Meteorology and Hydrology

Meteorology: Rainfall north of the main Jebel watershed is spasmodic with intervals of several years between effective storms. Small electric storms seem to occur annually over most of the Jebel but are not often sufficient to recharge the wadi beds. These storms are said to most frequently form just before the monsoon during the month of April.

Monsoon is a misleading description as it has little in common with the weather pattern of this name that effects India. It seems likely that the stronger winds that start in mid May cause cool water to be drawn to the surface of the sea and this lowering of temperature results in an almost saturated air. This cool damp air moves up over the Jebel as a thick mist which rapidly dissipates as it passes over the watershed. The boundary of the area which benefits from this mist is clearly defined by vegetation and soil changes.

The drying up of many usually reliable waterholes in wadi beds during the past five years suggests that either the period between storms of note is of the order of 7 - 10 years or the weather pattern has entered a drier period of its cycle. Evidence from other parts of Arabia, India and Africa indicates that the latter is probably true. Climatic data gathered from the station at Salalah has been analysed and the results are indicated at Figs. 6 to 11 inclusive.

Hydrology: There is very little, if any, hydrological data available on this region. We have not so far discovered any record of run-off in the Dhofar. In the Jebel the wadis are deeply incised with steep bed gradients. The thickness of the sediments in the wadi beds varies but it is rarely more than 10' and in many places bare rock is visible. Cobbles of between 1" and 6" diameter predominate with only isolated small pockets of sand and silt.

As the wadis leave the Jebel their gradients flatten and their characters vary considerably. Some continue with cobble beds while others become ill defined with fine sandy floors.

The absence of any true "Falaj" either north or south of the Jebel is notable. This may be due to the generally coarse nature of the sedimentary areas which would make tunnelling hazardous.

...occur in the...
...in area...not be visited and
...or efficacy.

3.3 Soils and Land Capability

The soils over the majority of the coastal plain are very stony with a good proportion of boulders, both in the profile and at the surface. The texture of the interstitial finer material is variable, ranging from coarse loamy sands to light sandy clay loams, and rarely comprises more than 25% of the profile. Relatively stone free soils have been found only around and to the north west of Salalah, west of Arzat, South of Umran and in a fragmented area exposed outcrop immediately behind the coastal sands. This discontinuous outcrop appears to be of lagoonal origin and the soils are characteristically saline/alkali. All the soils so far examined are very calcareous. The C.E.C.s of the lagoonal deposits are extremely high and the remainder of the soils have C.E.C. values that range from low to high. The geographical distribution of saline/alkali characteristics is presently being examined. Typical results of the investigations are shown on the land and soil data sheets at appendix' 2 and 3.

Only a very small fraction of the Salalah plain has soils having a significant irrigation potential. These are chiefly in those areas which are relatively stone free and are indicated on Fig. 4. Of the land that is presently cleared, some 500 ha. north west of Salalah and about 400 ha. west of Arzat are likely to be suitable for row crops. The soils in the latter area are somewhat shallow in places and may present some salinity problems. South of Umran only 30 - 50 ha. out of an overall 150 ha. may prove to be suitable for row crops, the remainder being restricted to pasture or hay crops. There would appear to be possibly 100 - 200 ha. of additional land having some irrigation potential situated immediately east of this outcrop and extending towards Taqa. The security situation did not permit this area to be visited. The saline/alkali soils behind the coastal sands should prove to be reclaimable in at least part of their outcrop, provided suitable water and adequate drainage are available. Present estimates, based on the reconnaissance survey, suggest that between 100 and 200 ha. may ultimately be utilized. The very stony soils are largely non-irrigable but include some areas that may be useable for irrigated pasture or tree crops. This is particularly the case where such areas are found contiguous to better land that is clearly suitable for irrigation. The investigations already carried out suggest that several hundred hectares of these marginal lands may be located by the semi detailed survey. Adjacent to Salalah there are up to 500 ha. of irrigable land all of which is apparently under some kind of irrigation regime at present.

There would therefore appear to be slightly less than 1000 ha. of land likely to be suitable for irrigated row crops. In addition up to 200 ha. of saline/alkali soils may be reclaimable, initially for pasture or forage crops and possibly later for row crops. Up to 200 ha. of stony soils containing a relatively high proportion of fine material(2 mm) may also be located for irrigated pasture or tree crops adjacent to the more stone free soil outcrop.

3.4 Water Resources Investigations

3.4.1 Well & Borehole Inventory

A considerable number of boreholes exist north of the Jebel whose whereabouts are not shown on the land use map. Pertinent to this are people at Midway who have worked with the oil companies in that area and who can point out many of these locations.

If possible, [illegible] should be done under fully adequate overhead irrigation applied at frequent intervals. Possibly some of the existing equipment at Belad could be transferred to Robat and possibly some more could be duplicated at Beleed. If overhead irrigation cannot be installed at Robat, then strict supervision must be given to the surface irrigation system.

It must be noted that much effort is being devoted to the rehabilitation and extension of the Coconut Plantations in the Salalah area. The practicability and profitability of the coconut has yet to be demonstrated; for example, the total yield of oil from double cropping of safflower and groundnut may be of the order of double the annual yield of oil from coconuts, and triple cropping of soybean could produce a similar yield of oil plus a very valuable by-product in the residual cake. It may be advisable to review the terms of the coconut rehabilitation programme until the results of current surveys are obtained. Coconuts can, of course, be grown as a marginal crop on the shore-fringe of fresh groundwater.

The facilities for experimentation with livestock should also be utilized to the maximum along the following lines:-

Feeding and Management Trials.

Extend ongoing trials at Bir Bint Ahmed to include wider range of bulk feeding stuffs, especially Rhodes grass and Coastal Bermuda Grass.

As soon as possible establish comparative optimum data for management and feeding of improved crossbred cattle, including cows, heifers and steers/bulls.

Crossbreeding Cattle.

Import a total batch of 3 Sahiwal and 3 Boran bulls and transfer [illegible] of the existing Red Sindhi bulls from the experimental farm in Northern Oman. These bulls being divided between Bir Bint Ahmed and a centre to be established at Salalah. They should be freely available for local farmers to bring their cows. Assess the optimum time to ensure conception by the local cows and the feeding and management regime during pregnancy.

Fattening Steer Cattle.

Establish a scheme for buying crossbred steers from farmers for subsequent rearing and fattening under intensive feeding regime at Bir Bint Ahmed.

Assess the optimum feeding and management for this stock.

Improved Milk Production.

Increase the herd of indigenous cows at Bir Bint Ahmed,

(a) to allow sufficient numbers to be able to assess the value, in terms of increased milk production and improved calves, from cows crossbred local breed with Boran/Sahiwal/Red Sindhi bulls and

(b) to establish the optimum age for breeding these cows and for subsequent management system.

Exotic Dairy Breeds.