UNIVERSITY OF SOUTHAMPTON

MESOLITHIC AND NEOLITHIC CERAMICS IN THE CENTRAL SUDAN, 8TH-3RD MILLENNIUM B.C., WITH SPECIAL REFERENCE TO THE PHYSICO-SCIENTIFIC APPROACH

VOL.II

A thesis presented for the degree of Doctor of Philosophy

by

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a. List of tables

Tables

Table: 1

Distribution of the Mesolithic and Neolithic Pottery through the Stratigraphy of Al-Qoz site (After Arkell 1953:100, with some modification)

SQUARE X 38																		
Layer cm.	Nos.	%	Nos.	%	Nos.	%	Nos.	%	Nos.	%	Nos.	%	Nos.	%	Nos.	%	Nos.	%
Surface	7	40.5	31	5.8	18	16.1	11	22.4	67	7.9	174	23.0	153	18.2	327	20.1	323	22.4
3-10	17	10.9	152	28.6	52	46.4	17	34.	238	28.1	261	34.5	249	29.6	510	31.3	454	31.5
10-25	47	30.1	134	25.2	25	22.3	10	20.4	216	25.5	140	18.5	142	16.9	282	17.3	256	17.7
25-35	95	28.8	104	19.6	11	9.8	7	14.3	167	19.6	72	9.5	109	12.9	181	11.1	155	10.7
35-45	13	8.3	42	7.9	1	0.8	1	2.0	57	6.7	36	4.7	81	9.6	117	7.2	92	6.4
45-55	14	8.9	24	4.5	2	1.8	1	2.0	41	4.8	26	2.8	46	55	82	5.0	57	3.9
55-65	8	5.1	14	2.6	3	2.6	1	2.0	26	3.1	28	2.5	29	3.4	51	3.1	39	2.7
65-75	..	..	20	3.8	..	..	1	2.0	21	2.5	16	2.1	6	0.7	32	1.9	34	2.4
75-85	4	2.5	8	1.5	..	..	..	..	12	1.4	12	1.5	21	2.5	33	2.0	30	2.1
85-100	1	0.6	2	0.4	..	..	..	..	3	0.3	7	0.9	5	0.6	12	0.7	3	0.1
TOTAL:	156	99.9	531	99.9	112	99.8	49	99.8	848	99.9	756	100	841	99.9	1627	99.7	1443	99.9

Table:2

Distribution of the Mesolithic and Neolithic Pottery through the stratigraphy of al-Qoz site (After Arkell 1953:98. with some modification)

SQUARE P 40																		
Layer cm.	Nos.	%	Nos.	%	Nos.	%	Nos.	%	Nos.	%	Nos.	%	Nos.	%	Nos.	%	Nos.	%
Surface-5	8	29	19	3.1	..	..	..	..	27	2.9	30	10.3	31	4.9	61	6.7	71	8.2
5-15	24	8.6	29	4.8	2	6.6	1	20.0	56	6.2	39	13.4	114	18.3	153	16.8	101	11.6
15-25	16	5.7	27	4.4	4	13.3	1	20.0	48	5.3	24	8.3	49	7.9	73	7.9	92	10.6
25.35	18	6.4	37	6.0	1	3.3	..	..	56	6.2	46	15.9	104	16.7	150	16.4	91	10.5
35-45	25	8.9	53	8.7	9	30.3	1	20.0	88	9.7	40	13.8	84	13.5	124	13.6	116	13.3
45-55	37	13.8	103	16.9	5	16.6	1	20.0	146	16.1	25	8.6	68	10.9	93	10.2	100	11.2
55-65	26	9.3	67	11	4	13.3	1	20.0	98	10.8	21	7.2	55	8.8	76	8.3	100	11.5
65-75	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
70	19	6.8	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
75-85	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..
85-100	33	11.8	99	16.2	2	6.6	..	..	134	14.7	31	10.7	60	9.6	91	9.9	93	10.7
100-110	22	7.9	48	7.9	1	3.3	..	..	71	7.8	10	3.4	23	3.7	33	3.6	40	4.6
110-120	11	3.9	46	7.5	..	..	..	..	57	6.3	4	1.4	8	1.3	12	1.3	15	1.7
120-130	8	2.9	2.1	3.4	1	3.3	..	..	30	3.3	9.	3.1	4	0.6	13	1.4	20	2.2
130-140	2	0.7	11	1.8	..	..	..	..	13	1.4	4	1.4	6	0.9	10	1.1	6	0.6
140-150	11	3.9	16	2.6	..	..	..	..	27	2.9	3	1.0	3	0.5	6	0.7	11	1.3
150-160	8	2.9	14	2.3	..	..	..	..	22	2.4	4	1.4	8	1.3	12	1.3	11	1.3
160-180	8	2.9	9	1.5	..	..	..	..	17	1.9	..	..	6	0.9	6	0.7	2	0.2
180-200	4	1.4	11	1.8	1	3.3	..	..	16	1.8	..	..	..	..	..	..	1	0.1
TOTAL:	220	99.9	610	99.9	30	99.8	5	100	906	99.8	290	99.9	623	99.8	913	99.9	870	99.9

Table 3

Classification of Textures according to Udden/Went worth's Scale

(After F.J.Pettijohn 1949, Fig 10 and:A. Shepard 1956, Table 5:18)

Size grades (1 micron = 0.001 mm)

Fractions	Grade	Name
64/1-4/1	64-4 mm	Pebbles
4/1-2/1	4-2 mm	Granules
2/1/-1/1	2-1 mm	Very coarse sand
1/1-1/2	1-0.500 mm	Coarse sand
1/2-1/4	0.500-0.250 mm	Medium-textured sand
1/4-1/8	0.250-0.125 mm	Fine sand
1/8-1/16	0.125-0.060	Very fine sand
1/16-1/256	0.060-0.004	Silt
1/256	0.004	Clay

Table: 4

Location and Typological Description of the Analyzed Samples from Sarurab2 Site.

Ser.No.	Sample No.	Period	Square	Level below Datum	Typology
1	SRB2-2	KM	1	80 cm	Wavy line
2	SRB2-6	KM	2	60 cm	Wavy line
3	SRB2-9	KM	51	40 cm	Dotted wavy line
4	SRB2-23	KM	21	40 cm	Dotted St.line
5	SRB2-3	KM	12	20 cm	Zigzag impressed st. line
6	SRB2-13	KM	32	10 cm	Impressed st. lines
7	SRB2-7	KM	14	20 cm	Dotted st. line
8	SRB2-8	KM	7	70 cm	Wavy line
9	SRB2-25	KM	45	30 cm	Zigzag dotted st. lines
10	SRB2-16	KM	38	80 cm	Impressed st.lines
11	SRB2-20	KM	13	60 cm	Coarse plain
12	SRB2-10	KM	16	30 cm	Finger nail impressions
13	SRB2-5	KM	50	20 cm	Zigzag dotted w.line
14	SRB2-15	KM	40	30 cm	Triangular impressions
15	SRB2-1	KM	6	10 cm	Fine plain
16	SRB2-4	KM	22	30 cm	Fine plain
17	SRB2-22	KM	27	10 cm	Dotted st.line
18	SRB2-18	KM	24	20 cm	Fine plain
19	SRB2-14	KM	19	80 cm	Wavy line
20	SRB2-12	KM	18	60 cm	Dotted wavy line
21	SRB2-24	KM	37	30 cm	Zigzag impressed st.line
22	SRB2-17	KM	42	40 cm	Impressed st.lines
23	SRB2-21	KM	31	40 cm	Mat impressions
24	SRB2-19	KM	11	60cm	Coarse plain
25	SRB2-11	KM	6	70 cm	Wavy line

Key: KM = Khartoum Mesolithic

Table:5

Location and Typological Description of the Analyzed Samples from Islang2 Site

Ser. No.	Sample No.	Period	Square	Level below Datum	Typology
1	ISG2-2	KN	1-A	10 cm	Impressed st. lines
2	ISG2-16	KN	1-A	30 cm	Semicircular panels
3	ISG2-1	KN	3-C	50 cm	Incised st.lines
4	ISG2-26	KN	(3,4)E	10 cm	Combed (scraped)
5	ISG2-8	KN	(1,4)F	20 cm	Triangles/dots
6	ISG2-9	KN	1-A	50 cm	Incised st. lines
7	ISG2-7	KN	(2,3)G	40 cm	Zigzag dotted st.line
8	ISG2-12	KN	1-A	60 cm	Zigzag dotted cu line
9	ISG2-21	KN	4-D	10 cm	Triangles/dots
10	ISG2-5	KN	4-D	50 cm	Dotted st. lines
11	ISG2-22	KN	1-A	50 cm	Zigzag dotted cu.line
12	ISG2-4	KN	1-A	30 cm	Dotted st. lines
13	ISG2-17	KN	(1,4)F	60 cm	Coarse plain
14	ISG2-3	KN	3-C	10 cm	Dotted st. lines
15	ISG2-15	KN	(4-6)	20 cm	Semicircular panels
16	ISG2-24	KN	(3,4)E	40 cm	Dotted st.lines
17	ISG2-23	KN	(3,4)E	10 cm	Triangles/dots
18	ISG2-14	KN	4-D	20 cm	Vees only
19	ISG2-11	KN	4-D	30 cm	Vees only
20	ISG2-27	KN	4-D	20 cm	Semicircular panels
21	ISG2-25	KN	4-D	50 cm	Zigzag dotted st.lines
22	ISG2-6	KN	1-A	10 cm	B.T.R.W.
23	ISG2-13	KN	(2-3)G	30 cm	Vees only
24	ISG2-18	KN	3-C	50 cm	Incised st. lines
25	ISG2-19	KN	1-A	60 cm	Zigzag impressed st. lines
26	ISG2-20	KN	(1,4)F	40 cm	Dotted st. lines
27	ISG2-10	KN	1-A	30 cm	Vees only

Key: KN= Khartoum Neolithic

B.T.R.W= Black topped red ware

Table:6

Location and Typological Description of the Analyzed Samples from Nofalab2 Site

Ser.No.	Sample No.	Period	Square	Level below Datum	Typology
1	NOF2-1	KN	(4,3)E	40 cm	Vees only
2	NOF2-16	KN	(4,6)A	70 cm	Zigzag dotted st. lines
3	NOF2-2	KN	(4,6)B	50 cm	Zigzag dotted cu. lines
4	NOF2-14	KN	(4,6)B	30 cm	Dotted st. lines
5	NOF2-13	KN	(4,6)A	30 cm	Triangles
6	NOF2-11	KN	(4,6)E	60 cm	Dotted st. lines
7	NOF2-12	KN	(4,6)C	4o cm	Impressed st. lines
8	NOF2-10	KN	(4,6)D	70 cm	Incised st.lines
9	NOF2-18	KN	(4,6)D	50 cm	Incised st. lines
10	NOF2-8	KN	(4,6)A	30 cm	combed (scraped)
11	NOF2-7	KN	(4,6)B	50 cm	Dotted st. lines
12	NOF2-23	KN	(4,6)A	60 cm	Coarse plain
13	NOF2-3	KN	(4,6)A	10 cm	Fine plain
14	NOF2-21	KN	(4,6)A	40 cm	Linear impressions
15	NOF2-4	KN	(4,6)C	20 cm	B.T.R.W.
16	NOF2-15	KN	(4,6)A	30 cm	Semicircular panels
17	NOF2-20	KN	(4,6)E	30 cm	Semicircular panels
18	NOF2-5	KN	(4,6)A	20 cm	Fine plain
19	NOF2-6	KN	(4,6)B	10 cm	Fine plain
20	NOF2-9	KN	(4,6)A	40 cm	Vees/dots
21	NOF2-21	KN	(4,6)C	30 cm	Semicircular panels
22	NOF2-22	KN	(4,6)D	5o cm	Incised st. lines
23	NOF2-17	KN	(4,6)A	20 cm	Dotted st. lines

Key: KN - Khartoum Neolithic

B.T.R.W = Black-topped red ware

Table:7

Location and Typological description of the analyzed samples from Kabbashi site (after E.A. Garcea 1991:66-67 and I. Caneva, pers. comm., 1993).

Ser. No.	Sample No.	Period	Locality	Square	Level below Datum	Typology
1	KAB-1	KM	KAB/D	D/1	20 cm	Zigzag impressed st. line
2	KAB-4	KM	KAB/D	D/1	30 cm	Zigzag dotted st.line
3	KAB-3	KM	KAB/Ea	Ea/1	50 cm	Rectilinear bands (dots)
4	KAB-9	KM	KAB/D	D/1B	60 cm	Dotted wavy line
5	KAB-10	KM	KAB/D	D/1	50 cm	Rectilinear bands
6	KAB-22	KM	KAB/D	D/1B	20 cm	Zigzag dotted st.line
7	KAB-8	KM	KAB/D	D/1	30 cm	Zigzag dotted line
8	KAB-19	KM	KAB/Ea	Ea/1	50 cm	Rectilinear bands (dots)
9	KAB-17	KM	KAB/D	D/1	20 cm	Dotted st.line
10	KAB-16	KM	KAB/Ea	Ea/1	10 cm	Wavy line
11	KAB-18	KM	KAB/D	D/1	20 cm	Zigzag impressed st.line
12	KAB-6	KM	KAB/D	D/1	50 cm	Wavy line
13	KAB-5	KM	KAB/Ea	Ea/b	30 cm	Dotted st.lines
14	KAB-2	KM	KAB/Ea	Ea/1b	40 cm	Rectilinear bands (dots)
15	KAB-1	KM	KAB/Ea/1	Ea/1	50 cm	Rectilinear bands (dots)
16	KAB-20	KM	KAB/D	D/1	20 cm	Zigzag dotted cu. line
17	KAB-21	KM	KAB/D	D/1	50 cm	Rectilinear bands (dots)
18	KAB-12	KM	KAB/D	D/1b	40 cm	Rectilinear bands (dashes).
19	KAB-14	KM	KAB/D	D/1	20 cm	Zigzag impressed cu.line
20	KAB-13	KM	KAB/D	D/1	30 cm	Rectilinear bands (dots)
21	KAB-15	KM	KAB/Ea	Ea/1	20 cm	Dotted st. line
22	KAB-7	KM	KAB/D	D/1b	10 cm	Dotted st.line
23	KAB-23	KM	KAB/Ea	Ea/1b	50 cm	Rectilinear bands (dots)

Key: KM = Khartoum Mesolithic

Table:8

Location and Typological description of the analyzed samples of Kabbashi Haitah site (after E.A. Garcea 1991: 66-67 and I. Caneva, pers. comm., 1993).

Ser. No.	Sample No.	Period	Locality	Square	Level below Datum	Typology
1	KAH- 3	KM	KAH/K	KI	10 cm	Zigzag dotted st. line
2	KAH- 18	KM	KAH/K	KI	50 cm.	Rectilinear bands (dots)
3	KAH -17	KM	KAH/K	K1	30 cm	Rectilinear bands (dots)
4	KAH-6	KM	KAH/V	V/1	50 cm	Rectilinear bands (dots)
5	KAH-5	KM	KAH/V	V/3	20 cm	Zigzag dotted. cu. lines
6	KAH-1	KM	KAH/V	V/3	60 cm	Incised wavy line
7	KAH-2	KM	KAH/V	V/1	50 cm	Incised wavy line
8	KAH-7	KM	KAH/V	V/2-2b	50 cm	Incised wavy line
9	KAH-13	KM	KAH/V	V/2 C-2d	20 cm	Zigzag dotted st. line
10	KAH-11	KM	KAH/K	K1	40 cm	Rectilinear bands (dots)
11	KAH-14	KM	KAH/V	V/1	30 cm	Zigzag dotted cu.line
12	KAH-22	KM	KAH/K	K1	50 cm	Coarse plain
13	KAH-23	KM	KAH/K	K1	60 cm	Coarse plain
14	KAH-15	KM	KAH/K	K1	30 cm	Zigzag dotted cu. line
15	KAH-16	KM	KAH/V	V/1	40 cm	Rectilinear bands
16	KAH-4	KM	KAH/K	K1	30 cm	Zigzag dotted st. line
17	KAH-8	KM	KAH/K	K1	40 cm	Zigzag dotted st. line
18	KAH-9	KM	KAH/V	V/3	20 cm	Zigzag impressed st.line
19	KAH-20	KM	KAH/V	V/1	50 cm	Coarse plain
20	KAH-12	KM	KAH/K	V/3	40 cm	Incised wavy line
21	KAH-21	KM	KAH/V	V/2-2b	50 cm	Incised wavy line
22	KAH-19	KM	KAH/V	V/2-2b	60 cm	Incised wavy line
23	KAH-10	KM	KAH/V	V/2 c-2d	50 cm	Rectilinear bands (dots)

Key: KAH = Kabbashi Haitah.
KM = Khartoum Mesolithic

Table:9

Location and Typological description of the analyzed samples from Geili site (after I. Caneva 1988:19-22 and pers. comm., 1993).

Ser. No.	Sample No.	Period	Locality	Square	Level below Datum	Typology
1	GEI-9	KN	E	E4	20 cm	Ripple
2	GEI-11	KN	E	E4	10 cm	Ripple
3	GEI-12	KN	F	F4	30 cm	Punctations
4	GEI-4	KN	D	D4	200 cm	Zigzag impressed st. line
5	GEI-17	KN	D	D4	90 cm	Dotted st.line
6	GEI-22	KN	D	D4	10 cm	Punctations
7	GEI-2	KN	E	E4	40 cm	Fine plain
8	GEI-13	KN	F	F4	20 cm	Stippled lines
9	GEI-7	KN	D	D4	60 cm	Zigzag impressed st.line
10	GEI-24	KN	E	E4	30 cm	Dotted st.line
11	GEI-21	KN	E	E4	20 cm	Stippled lines
12	GEI-25	KN	E	E4	70 cm	Zigzag dotted cu.line
13	GEI-18	KN	E	E4	180 cm	Zigzag dotted st.line
14	GEI-16	KN	D	D4	60 cm	Stippled lines
15	GEI-6	KN	F	F4	30 cm	Punctations
16	GEI-1	KN	F	F4	50 cm	Fine plain
17	GEI-15	KN	D	D4	40 cm	Stippled lines
18	GEI-8	KN	D	D4	130 cm	Zigzag dotted st.line
19	GEI-23	KN	D	D4	140 cm	Dotted st. lines
20	GEI-3	KN	D	D4	60 cm	Stippled lines
21	GEI-5	KN	F	F4	120 cm	Dotted st. lines
22	GEI-20	KN	E	E4	30 cm	Punctations
23	GEI-14	KN	F	F4	150 cm	Dotted st.line
24	GEI-10	KN	D	D4	130 cm	Dotted st.line
25	GEI-19	KN	E	E4	200 cm	Zigzag dotted cu. line

Key: KN = Khartoum Neolithic

Table:10 X-ray diffraction of sherds: Mesolithic, Neolithic and modern pottery from the Khartoum Province.

West bank of the Main Nile							Other minerals
G93-06 Sarurab2 (1)	++++	+	+	+	-	+	Anatase(+)
G93-07 Sarurab2 (5)	++++	+	+	+	-	-	Calcite (+);Anatase(+)
G93-16C Islang2 (2)	++++	+	+	+	-	+	Anatase (+)
G93-17a Islang2 (2a)	++++	+	+	+	-	-	Anatase (+);Kaolinite (7.2A)(+)
G93-16a Nofalab2(2)	++++	+	+	+	-	-	Anatase (+)
G93-16b Nofalab2(3)	++++	+	+	+	-	-	Anatase (+)
G93-10b Khartoum modern Pottery(1)	++++	++	++	-	-	+	Calcite(+)
Firing to 900° C (1h)							
G93-11a Sarurab2 (1)	++++	-	+	-	++	-	
G93-12a Sarurab2 (5)	++++	-	+	+	++	-	
G93-24a Islang2(2)	++++	+	+	+	++	+	
G93-24b Islang2(2a)	++++	++	+	+	++	+	
G93-24c Nofalab2(2)	++++	+	+	+	++	-	
G93-20c Nofalab2(3)	++++	+	+	+	++	-	
G93-10b Khartoum modern pottery(1)	++++	++	++	-	++	-	

Table:11 X-ray diffraction of sherds: Mesolithic, Neolithic and Modern Pottery from Khartoum Province

Sites in the east bank of the Main Nile							Other Minerals
G93-09 Kabbashi Haitah (3)	++++	+	+	+++	-	+	Calcite(+)
G93-09 Kabbashi Haitah (4)	++++	+	+	+++	-	-	Calcite(+)
G93-08C Kabbashi (2)	++++	+	-	++	-	-	Calcite(+)
G93-09a Kabbashi (4)	++++	+	+	++	-	-	Calcite(+)
G93-08a Geili (1)	++++	++	+	+	-	-	Anatase(+)
G93-08b Geili(3)	++++	+	+	+++	-	-	Calcite(+)
G93-20b Geili(3a)	++++	++	+	+	-	+	
G93-21b Kabbashi(2a)	++++	++	+	+	-	+	Anatase(+)
G93-20C Khartoum Modern pottery(2)	++++	+	+	+	-	-	
Firing to 900 °C							
G93-23a Kabbashi Haitah(3)	++++	+	+	+	+	+	
G93-23b Kabbashi Haitah(4)	++++	++	+	+	+	+	
G93-13c Kabbashi(2)	++++	+	+	+	++	-	
G93-21a Kabbashi(2a)	++++	+	+	+	++	-	
G93-13a Geili(1)	++++	-	+	+	++	+	
G93-13b Geili(3)	++++	+	+	+	++	-	Anatase(+)
G93-20a Geili(3a)	++++	+	+	-	++	-	
G93-20c Khartoum Modern Pottery(2)	++++	+	+	+	++	-	

Table:12

XRFS-analysis of major and minor compounds: Mesolithic, Neolithic and Modern pottery, Khartoum Province.

Locality	Si02	Ti02	Al203	Fe203	Mn0	Mg0	Ca0	Na20	K20	P205	Ba0	L.O.I.	Sum
Sarurab 2 (2)	70.04	1.27	14.05	6.96	0.09	0.96	1.72	0.35	1.23	0.16	0.11	4.35	101.3
Sarurab 2 (5)	71.59	1.28	12.35	5.83	0.05	0.95	1.65	0.51	1.68	0.12	0.13	3.11	99.26
Islang 2 (2)	66.43	1.6	14.46	7.46	0.17	0.98	1.9	3.36	1.29	0.2	0.09	3.99	98.93
Islang 2 (9)	61.72	0.62	19.48	5.28	0.06	0.51	1.28	0.43	6.6	0.56	0.2	3.54	100.2
Nofalab 2 (2)	70.08	0.17	12.77	6.65	0.1	0.87	1.70	0.28	1.22	0.14	0.23	3.92	99.21
Nofalab 2 (3)	71.59	1.16	12.11	6.9	0.09	0.77	1.56	0.57	1.22	0.14	0.17	3.66	99.84
Khartoum Prov. W.B.M.P.(1)	57.04	1.79	14.4	8.7	0.21	2.91	7.63	1.92	1.74	0.36	0.04	3.38	100.1
Khartoum Prov. W.B.M.P.(2)	52.44	1.83	15.22	8.75	0.13	2.19	3.03	0.82	1.46	0.4	0.03	14.97	101.2
Kabbashi Haitah (3)	62.77	0.46	19	2.9	0.02	0.67	1.46	0.37	6.4	0.06	0.16	4.75	99.03
Kabbashi Haitah (4)	63.83	0.6	19.76	6.86	0.08	0.78	0.71	0.2	5.44	5.1	0.15	3.26	101.7
Kabbashi (2)	60.56	0.94	19.7	8.28	0.06	0.63	1.54	0.04	4.97	0.1	0.17	3.33	100.3
Kabbashi (4)	62.07	0.95	19.64	8.25	0.06	0.58	1.51	0.04	4.56	0.06	0.17	3.35	101.2
Geili (1)	69.2	1.3	13.73	7.49	0.14	1.03	1.54	0.63	1.35	0.21	0.05	4.55	101.2
Geili (3)	62.54	0.56	19.07	3.55	0.05	0.58	1.52	0.43	6.18	0.11	0.22	4.6	99.4
Khartoum Prov. E.B.M.P. (3)	58.71	1.79	16.52	8.83	0.14	2.28	3.05	0.83	1.5	0.44	0.03	6.23	100.3
Khartoum Prov. E.B.M.P. (4)	56.06	1.75	13.51	8.42	0.19	2.81	7.19	1.87	1.72	0.36	0.03	6.31	100.2

Abbreviations

Khartoum Prov. W.B.M.P= Khartoum Province, west bank of the Main Nile modern pottery; Khartoum Prov. E.B.M.P.= Khartoum Province, east bank of the Main Nile modern pottery

Table:13

Reclculated XRFS analyses, samples of Mesolithic, Neolithic and Modern pottery: Khartoum Province. Locality

	Si02	Ti02	Al203	Fe203	Mg0	Ca0	Na20	k20	SUM
Sarurab2 (2)	72.52	1.31	14.55	7.21	0.99	1.78	0.36	1.27	100.00
Sarurab 2 (5)	74.70	1.34	12.89	6.08	0.99	1.72	0.53	1.75	100.00
Islang 2 (2)	70.31	1.69	15.30	7.90	1.04	2.01	0.38	1.37	100.00
Islang 2(9)	64.35	0.65	20.31	5.50	0.53	1.33	0.45	6.88	100.00
Nofalab 2 (2)	73.92	1.23	13.47	7.01	0.92	1.87	0.30	1.29	100.00
Nofalab 2 (3)	74.74	1.21	12.64	7.20	0.80	1.63	0.49	1.27	100.00
Khartoum Prov. W.B.M.P. (1)	59.34	1.86	14.98	0.05	3.03	7.94	2.00	1.81	100.00
Khartoum Prov. W.B.M.P. (2)	61.16	2.13	17.75	10.21	2.55	3.53	0.96	1.70	100.00
Kabbashi Haitah (3)	66.76	0.49	20.21	3.08	0.71	1.55	0.39	6.81	100.00
Kabbashi Haitah (4)	65.01	0.61	20.13	6.99	0.79	0.72	0.20	5.54	100.00
Kabbashi (2)	62.65	0.97	20.38	8.57	0.65	1.59	0.04	5.14	100.00
Kabbashi (4)	63.60	0.97	20.12	8.45	0.59	1.55	0.04	4.67	100.00
Geili (1)	71.88	1.35	14.26	7.78	1.07	1.60	0.65	1.40	100.00
Geili (3)	66.23	0.59	20.19	3.76	0.61	1.61	0.46	6.54	100.00
Khartoum Prov. E.B.M.P. (3)	62.78	1.91	17.67	9.44	2.44	3.26	0.89	1.60	100.00
Khartoum Prov. E.B.M.P. (4)	60.07	1.88	14.48	9.02	3.01	7.70	2.00	1.84	100.00

Table:14

Point counting analyses, samples of Mesolithic, Neolithic and Modern Pottery from the Central Sudan.

		Matrix	Q	Plag	Or	Micr	SUM	Total
1	Sarurab 2	556	373	25	23	0	979	423
2	Sarurab 2 (5)	842	424	25	19	264	1574	732
3	Islang 2 (2)	703	339	55	63	11	1171	864
4	Islang 2 (9)	652	358	21	113	15	1159	507
5	Nofalab 2 (2)	552	347	27	36	5	967	415
6	Nofalab 2 (3)	530	365	0	28	0	923	393
7	Khartoum Prov. W.B.M.P. (1)	424	328	24	13	0	789	365
8	Khartoum Prov. W.B.M.P. (2)	417	306	25	25	0	773	356
9	Kabbashi Haitah (3)	670	320	144	68	32	1234	564
10	Kabbashi Haitah (4)	902	335	79	104	225	1645	743
11	Kabbashi (2)	521	317	11	54	18	921	400
12	Kabbashi (4)	500	332	11	44	13	900	400
13	Geili (1)	492	362	0	56	0	910	418
14	Geili (3)	500	341	0	70	0	911	411
15	Khartoum Prov. E.B.M.P. (3)	567	348	15	8	7	945	378
16	Khartoum Prov. E.B.M.P. (4)	543	316	0	34	11	904	361
17	Shaq. (M) Meso. (4)	565	399	30	43	0	1037	472

Cont. Table:14

		Matrix	Q	Plag	Or	Micr	SUM	Total
18	Shaq. (M) Meso. (7)	876	427	0	211	110	1624	748
19	Shaq. (M) Neo. (2)	947	364	0	347	85	1770	823
20	Shaq. (M) Neo. (2a)	880	363	307	0	55	1605	725
21	Shaq. C. (5)	518	193	74	56	70	911	393
22	Shaq. C. (6)	780	400	100	71	24	1375	595
23	Butana M.P.(1)	537	360	16	16	18	947	410
24	Butana M.P.(2)	476	312	7	18	14	827	351
25	Shabona (7)	502	387	21	18	6	934	432
26	Shabona (8)	406	338	0	31	0	775	369
27	Rabak (Kh.Neo.) (6)	514	328	21	79	0	942	428
28	Rabak (Kh.Neo.) (7)	553	337	17	44	63	1024	461
29	Rabak J. M. (7)	656	339	12	115	86	1208	552
30	Rabak J. M. (9)	745	406	18	97	96	1362	617
31	White Nile Prov. M.P.(1)	748	340	113	14	0	1215	467
32	White Nile Prov. M.P.(2)	739	344	95	22	0	1200	461

Table: 15

Recalculated analyses for goethite Norm calculations, point counting analyses in percentages.

		Matrix	Q	Plag	0r	Micr	SUM
1	Sarurab 2 (2)	56.79	38.10	2.55	2.55	0.00	100.00
2	Sarurab 2 (5)	53.49	26.94	1.59	1.21	16.77	100.00
3	Islang 2 (2)	60.03	28.95	4.70	5.38	0.94	100.00
4	Islang 2 (9)	56.26	30.89	1.81	9.75	1.29	100.00
5	Nofalab 2 (2)	57.08	35.88	2.79	3.72	0.52	100.00
6	Nofalab 2 (3)	57.42	39.54	0.00	3.03	0.00	100.00
7	Khartoum Prov. W.B.M.P. (1)	53.74	41.57	3.04	1.65	0.00	100.00
8	Khartoum Prov. W.B.M.P. (2)	53.95	39.59	3.23	3.23	0.00	100.00
9	Kabbashi Haitah (3)	54.29	25.93	11.67	5.51	2.59	100.00
10	Kabbashi Haitah (4)	54.83	20.36	4.80	6.32	13.68	100.00
11	Kabbashi (2)	56.57	34.42	1.19	5.86	1.95	100.00
12	Kabbashi (4)	55.56	36.89	1.22	4.89	1.44	100.00
13	Geili (1)	54.07	39.87	0.00	6.15	0.00	100.00
14	Geili (3)	54.88	37.43	0.00	7.68	0.00	100.00
15	Khartoum Prov. E.B.M.P. (3)	60.00	36.83	1.59	0.85	0.73	100.00
16	Khartoum Prov. E.B.M.P. (4)	60.07	34.96	0.00	3.76	1.22	100.00

Cont. Table: 15

		Matrix	Q	Plag	0r	Micr	SUM
17	Shaq. (M) Meso. (4)	54.48	38.48	2.89	4.15	0.00	100.00
18	Shaq. (M. Meso. (7)	53.94	26.29	0.00	12.99	6.77	100.00
19	Shaq. (M) Neo. (2)	53.50	20.56	0.00	21.13	4.33	100.00
20	Shaq. (M) Neo. (2a)	54.83	22.62	19.13	0.00	3.43	100.00
21	Shaq. C. (5)	56.86	21.19	8.12	6.15	7.68	100.00
22	Shaq. C. (6)	56.73	29.09	7.27	5.16	1.75	100.00
23	Butana M.P. (1)	56.71	38.01	1.69	1.69	1.90	100.00
24	Butana M.P. (2)	57.56	37.93	0.85	2.18	1.69	100.00
25	Shabona (7)	53.75	41.43	2.25	1.93	0.64	100.00
26	Shabona (8)	52.38	43.61	0.00	4	0.00	100.00
27	Rabak (Kh-Neo.) (6)	54.56	34.82	2.23	8.39	0.00	100.00
28	Rabak (Kh-Neo.) (7)	54.00	32.91	1.66	4.29	6.15	100.00
29	Rabak J.M. (7)	54.30	28.06	0.99	9.51	7.12	100.00
30	Rabak J.M. (9)	54.70	29.81	1.32	7.12	7.05	100.00
31	White Nile Prov. M.P.(1)	61.56	27.98	9.30	1.15	0.00	100.00
32	White Nile Prov. M.P.(2)	61.58	28.67	7.92	1.83	0.00	100.00

Table :16 Normalized Analyses Pic. File codes from A100

			Si02	Ti 02	Al 203	Fe203	MgO	Ca0	Na20	K20
1	Sarurab 2 (2)	1	72.52	1.31	14.55	7.21	0.99	1.78	0.36	1.27
2	Sarurab 2 (5)	1	74.70	1.34	12.89	6.08	0.99	1.72	0.53	1.75
3	Islang 2 (2)	2	70.31	1.69	15.30	7.90	1.04	2.01	0.38	1.37
4	Islang 2 (9)	2	64.35	0.65	20.31	5.50	0.53	1.33	0.45	6.88
5	Nofalab 2 (2)	3	73.92	1.23	13.47	7.01	0.92	1.87	0.30	1.29
6	Nofalab 2 (3)	3	74.74	1.21	12.64	7.20	0.80	1.63	0.49	1.27
7	Khartoum Prov. W.B.M.P. (1)	4	59.34	1.86	14.98	9.05	3.03	7.94	2.00	1.81
8	Khartoum Prov. W.B. M.P.(2)	4	61.16	2.13	17.75	10.21	2.55	3.53	0.96	1.70
9	Kabbashi Haitah (3)	5	66.76	0.49	20.21	3.08	0.71	1.55	0.39	6.81
10	Kabbashi Haitah (4)	5	65.01	0.61	20.13	6.99	0.79	0.72	0.20	5.54
11	Kabbashi (2)	6	62.65	0.97	20.38	8.57	0.65	1.59	0.04	5.14
12	Kabbashi (4)	6	63.60	0.97	20.12	8.45	0.59	1.55	0.04	4.67
13	Geili (1)	7	71.88	1.35	14.26	7.78	1.07	1.60	0.65	1.40
14	Geili (3)	7	66.23	0.59	20.19	3.76	0.61	1.61	0.46	6.54
15	Khartoum Prov. E.B.M.P. (3)	8	62.78	1.91	17.67	9.44	2.44	3.26	0.89	1.60
16	Khartoum Prov. E.B.M.P. (4)	8	60.07	1.88	14.48	9.02	3.01	7.70	2.00	1.84

Table:17 Goethite Norm analyses of the fine earth fractions. Samples of Mesolithic, Neolithic and modern pottery: Khartoum Province.

Locality and sample no.	Mineral phases in weight per cent											
	Quart.	Talc.	Kaol.	Parag.	Calc.	Musc.	Hem.	Dias.	Clin.	Mg-Fe-Ch.	Fe-Ch.	Bio.
Sarurab 2 (2)	21.779	4.096	39.173	2.700	4.603	12.518	9.419	0.0	0.0	5.691	0.0	0.0
Sarurab 2 (5)	37.256	3.169	29.159	8.089	5.315	0.0	10.543	0.0	0.0	6.469	0.0	0.0
Islang 2 (2)	24.626	3.376	46.365	0.0	5.332	4.930	10.544	0.0	0.0	4.828	0.0	0.0
Islang 2 (9)	8.499	0.766	0.0	4.205	3.806	65.499	9.784	0.0	0.0	6.423	0.0	0.0
Nofalab 2 (2)	30.559	2.726	37.518	0.803	5.317	8.652	9753	0.0	0.0	4.671	0.0	0.0
Nofalab 2 (3)	29.574	2.329	27.709	9.716	4.675	11.549	10.440	0.0	0.0	5.109	0.0	0.0
Khartoum Prov.W.B.M.P. (1)	25.651	2.370	32.835	4.515	4.516	17.550	10.124	0.0	0.0	5.440	0.0	0.0
Khartoum Prov.W.B.M.P. (2)	0.0	0.0	22.564	12.605	10.719	17.520	13.814	5.550	13.814	0.0	3.577	0.0
Kabbashi Haitah (3)	21.561	0.178	18.781	0.0	5.501	45.236	9.781	0.0	0.0	0.0	0.0	0.0
Kabbashi Haitah (4)	20.481	0.194	20.161	0.0	5.671	42.312	8.981	0.0	0.0	0.0	0.0	0.0
Kabbashi (2)	0.0	0.194	25.497	0.0	4.415	52.169	10.500	0.0	0.0	0.0	0.0	0.0
Kabbashi (4)	0.0	0.0	27.284	0.0	4.469	50.725	10.509	0.880	0.0	0.0	3.516	0.0
Geili (1)	20.787	3.700	34.459	13.631	4.828	6.354	10.774	0.0	0.0	5.467	0.0	0.0
Geili (3)	0.0	2.515	0.0	5.513	5.758	74.624	8.712	0.0	0.0	0.0	1.607	1.193
Khartoum Prov. E.B.M.P. (3)	0.0	9.596	35.531	12.774	7.740	16.526	10.170	0.0	2.620	0.0	3.141	0.0
Khartoum Prov. E.B.M.P. (4)	0.0	12.541	1.453	36.137	20.540	12.601	11.095	0.0	0.749	0.0	3.883	0.0

Key: Quart.=Quartz, Kaol=Kaolinite, Parag.= Paragonite, Calc. = Calcite, Musc. Muscovite, Hem=Hematite, Clin=Clinchlor Mg-Fe-Ch.=Mg-I Chlor, Fe-Ch=Fe-Chlor., Bio=Biotite.

Table:18 Frequencies of Pottery Decorative Motifs through the Stratigraphy of Sarurab2 Site

Decorative Motifs	L1		L2		L3		L4		L5		L6		L7		L8	
	No.	%	No	%	No	%	No	%	No	%	No	%	No	%	No	%
Wavy line	58	6.5	53	5.6	59	6.9	42	6.8	55	13	29	10.3	8	11.3	4	7.5
Dotted wavy line	41	4.6	48	5.1	52	6.10	41	6.6	26	6.1	18	6.4	4	5.6	6	11.3
Dotted St.line	253	28.6	251	26.4	164	19.2	116	18.9	88	20.8	30	10.6	12	16.9	12	22.6
Zigzag imp line	102	11.5	115	12.1	90	10.6	41	6.6	27	6.4	26	9.2	0	0	0	0
Zigzag dotted line	63	7.1	136	14.3	109	12.8	91	14.8	41	9.7	28	9.9	0	0	0	0
Fingernail	6	0.7	12	1.3	14	1.64	6	1	4.	0.9	9	3.2	2	2.8	2	3.8
Linear impressions	83	9.4	65	6.8	50	5.9	40	6.5	23	5.4	9	3.2	0	0	0	0
Triangular impressions	50	5.6	30	3.2	30	3.5	19	3.1	15	3.5	12	4.3	0	0	0	0
Twine impressions	0	0	0	0	72	8.5	46	7.5	22	5.20	15	5.3	0	0	0	0
Impressed St.line	50	5.6	64	6.7	54	6.3	53	8.6	40	9.5	35	12.4	8	11.3	6	11.3
Plain	149	16.8	146	15.4	122	14.3	75	12.2	56	13.2	47	16.7	13	18.3	5	9.4
Others	31	3.5	30	3.1	36	4.3	44	7.2	26	6.1	24	8.5	24	33.8	18	33.9
Total	886	99.8	950	100	852	100	614	99.8	423	99.8	282	100	71	100	53	99.8

Table:19 Frequencies of Pottery Decorative Motifs through the Stratigraphy of Islang2 Site

Decorative Motifs	L1		L2		L3		L4		L5		L6	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Vees	11	3.7	15	4.2	22	6.4	0	0	7	8.3	0	0
Vees/dots	31	10.5	25	6.9	27	7.9	29	13.9	4	4.8	0	0
Zigzag dotted lines	85	29	58	16.1	101	29.5	43	20.6	1	1.2	8	33.3
Semicircular Panels	3	1.02	8	2.2	1	0.3	2	0.9	11	13.1	0	0
Triangles	14	4.7	40	11.1	11	3.2	9	4.3	0	0	0	0
Triangles/dots	30	10.2	62	17.2	53	15.5	12	5.7	0	0	0	0
Incised st.lines	2	0.7	7	1.9	21	6.1	2	0.9	9	10.7	0	0
Dotted st.line	23	7.8	29	8.1	13	3.8	11	5.3	1	1.2	0	0
Impressed st.line	2	0.6	3	0.8	4	1.2	6	2.9	2	2.4	0	0
Alternate hatching	0	0	1	0.3	0	0	0	0	0	0	0	0
Brushed	0	0	2	0.5	0	0	0	0	0	0	0	0
Plain	82	27.7	101	28.1	86	25.1	87	41.6	44	52.4	16	66.7
Others	12	4.1	9	2.5	3	0.9	8	3.8	5	5.9	0	0
Total	295	99.9	360	99.9	342	99.9	209	99.9	84	100	24	100

Table:20 Frequencies of Pottery Decorative Motifs through the Stratigraphy of Nofalab2 Site

Decorative Motif	L1		L2		L3		L4		L5		L6		L7	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Vees	28	5.8	74	12.2	60	9.1	25	4.7	15	4.7	8.	4.1	0	0
Vees/dots	85	17.5	84	1.38	98	14.9	90	15	71	22.1	16	8.2	13	11.3
Zigzag impressed lines	9	1.9	0	0	1	0.2	1	0.2	0	0	0	0	0	0
Zigzag incised line	1	0.2	0	0	0	0	0	0	0	0	0	0	1	0.9
Zigzag dotted lines	102	21	134	22.1	126	19.1	88	14.7	51	15.9	66	34	49	42
Semicircular Panels	14	2.9	12	2	10	1.5	28	4.7	16	4.9	1	0.5	0	0
Triangles	27	5.6	21	3.5	13	2	30	5	14	4.4	0	0	12	10.4
Triangles/dots	0	0	0	0	0	0	8	1.3	0	0	0	0	0	0
Incised st. lines	31	6.4	28	4.6	26	3.9	35	5.8	14	4.4	12	6.2	12	0.4
Dotted st. lines	30	6.2	40	6.6	80	12.2	46	7.7	27	8.4	15	7.7	12	0.4
Impressed st.lines	35	7.2	45	7.4	28	4.3	40	6.6	14	4.3	5	2.6	2	1.7
Linear impressions	0	0	0	0	I	0 .2	0	0	3	0.9	0	0	0	0
Chevrons	2	0.4	1	0.2	0	0	0	0	0	0	0	0	0	0
Scraped	9	1.9	10	1.6	15	2.3	34	5.7	0	0	15	7.7	0	0
Zoned impressed	0	0	0	0	0	0	0	0	1	0.3	0	0	0	0
Plain	74	15.3	136	22.4	196	29.7	165	27.5	73	22.7	52	66.6	7	6.1
Black topped red ware	0	0	0	0	0	0	0	0	0	0	0	0	6	5.2
Others	37	7.6	20	3.3	4	0.6	10	1.6	12	3.7	4	2.1	1	0.9
Total	485	99.9	607	99.8	658	100	600	100	321	100	194	99.8	115	100

Table:21 Pottery Decorative Motifs of Kabbashi and Kabbashi Haitah Sites.

Decorative Motifs	KAB/A/2	KAB/B/2	KAB/D/1	KAB/D/1b	KAB/Ea/1	KAB/Ea/1b	KAH/Y/1	KAH/Y/2	KAH/Y/3	KAH/K/1
Rocker: Zigzags	55.6	49.4	67.3	66.7	60.0	69.5	15.2	22.2	32.1	19.0
Dotted wavy line	18.7	1.3	6.1	4.8	0	3.4	2.2	4.1	10.7	2.6
Alternately pivoting	0	0	0	0	0	0	1.1	0.3	0	2.2
Wavy line	0	4.0	0	19.0	0	1.1	19.3	24.3	21.4	25.9
Undecorated	16.1	4.6	12.9	0	20.0	10.2	28.5	23.1	21.4	24.8
Unclassifiable	4.6	40.6	13.6	9.5	20.0	15.8	14.1	4.4	3.6	10.8
Intrusifs	5.0	0	0	0	0	0	19.6	21.6	10.7	14.7
Total %	100.0	99.9	99.9	100.0	100.0	100.0	100.0	100.0	99.9	100.0
Total number	855	1143	147	21	5	177	368	342	28	463

(After Garcea 1991:66, Table 2.1.9 and Caneva et al 1993:39, Table 7.4)

Table:22 Frequencies of Pottery Decorative Motifs: Geili Site

Decorative Motifs	No.	%
Ripples	230	4.0
Incised st.lines	338	5.9
Stippled lines	73	1.3
Dotted st. lines	827	14.5
Zigzag dotted lines	1347	23.6
Triangles	197	3.4
Triangles/dots	1231	21.6
Brushed	119	2.1
Plain	1339	23.5
Total	5701	99.9

(After Caneva 1988:65-115, Tables 1,2)

Table:23

Location and Typological Description of the Analyzed Samples from Shabona Site (after J.D. Clark, pers. comm., 1990). *

Ser. No.	Sample No.	Period	Locality	Square	Level below Datum	Typology
1	SHB1	KM	G1	D3	10 cm.	Dotted st. lines
2	SHB2	KM	G2	B2/S	30 cm.	Coarse plain
3	SHB3	KM	G1	D3	20 cm.	Coarse plain
4	SHB4	KM	G2	E2/S	40 cm.	Finger nail
5	SHB5	KM	G2	B3/S	50cm.	Coarse plain
6	SHB6	KM	G2	B2/S	30cm.	Zigzag dotted cu.lines
7	SHB7	KM	G1	A2/S	40 cm.	Coarse plain
8	SHB8	KM	G1	B2/S	10 cm.	Zigzag dotted cu.lines
9	SHB9	KM	G2	A4	40 cm.	Dotted wavy line
10	SHB10	KM	G2	B1/S	10 cm.	Dotted st.lines
11	SHB11	KM	G2	A4	70 cm.	Wavy line
12	SHB12	KM	G1	E3	50 cm.	Coarse plain
13	SHB13	KM	G2	B3/EXT.1	10 cm.	Dotted st.lines
14	SHB14	KM	G1	A2/S	30 cm.	Woven Mat
15	SHB15	KM	G2	A4	50 cm.	Dotted Wavy line
16	SHB16	KM	G2	E/6	20 cm.	Dotted st. lines
17	SHB17	KM	G1	A2	10 cm.	Zigzag dotted st. lines
18	SHB 18	KM	G1	B3/S	20 cm.	Straight lines
19	SHB 19	KM	G2	A3/S	30 cm.	Straight Lines
20	SHB 20	KM	G1	A2/S	20 cm.	Dotted st. Lines
21	SHB 21	KM	G2	B2/S	30 cm.	Zigzag dotted st.lines
22	SHB 22	KM	G2	B2/S	10 cm.	Straight lines
23	SHB 23	KM	G1	A2/N	60 cm.	Coarse plain
24	SHB 24	KM	G2	E3	10 cm.	Zigzag dotted cu. Lines
25	SHB 25	KM	G2	E3	20 cm.	Straight lines
26	SHB 26	KM	G1	B2/S	30 cm.	Coarse plain
27	SHB 27	KM	G1	B2/S	20 cm.	Finger nail impressions
28	SHB 28	KM	G2	B2/S	50 cm.	Wavy line

* The typological description was conducted by the present writer.

Key: KM = Khartoum Mesolithic.

Table:24

Location and Typological Description of the Analyzed Samples from Rabak Site (after R. Haaland 1989:359-367 and pers. comm., 1993).

Ser. No.	Sample No.	Period	Square	Level below Datum	Typology
1	RAK(K.N)1	KN	107X/100Y	90 cm	Dotted st. lines
2	RAK(K.N.)3	KN	"	40 cm	Wiped surface
3	RAK(K.N.)15	KN	"	130 cm	Zigzag dotted cu. lines
4	RAK(K.N.)18	KN	"	100 cm	Zigzag dotted cu. lines
5	RAK(K.N.) 4	KN	"	120 cm	Mat impressed
6	RAK(K.N.)7	KN	"	70 cm	Zigzag dotted st. lines
7	RAK(K.N.)8	KN	"	50 cm	linear impressions
8	RAK(K.N.)21	KN	"	110 cm	Dotted st. lines
9	RAK(K.N.)9	KN	"	60 cm	Coarse plain
10	RAK(K.N.)11	KN	"	4o cm	Wiped surface
11	RAK(K.N.)22	KN	"	40 cm	Dotted st. lines
12	RAK(K.N.)13	KN	"	60 cm	Linear impressions
13	RAK(K.N.)23	KN	"	140 cm	Coarse plain
14	RAK(K.N.)24	KN	"	70 cm	Catfish spine
15	RAk(K.N.)25	KN	"	100 cm	Zigzag dotted st. lines
16	RAK(K.N.)27	KN	"	80 cm	Wiped surface
17	RAK(K.N.)26	KN	"	60 cm	Linear impression
18	RAK(K.N.)28	KN	"	100 cm	Dotted st. lines
19	RAK(J.M..)2	JM	"	10 cm	Cord impressed
20	RAK(J.M.)6	JM	"	20 cm	Zigzag dotted st. lines
21	RAK(J.M.)14	JM	"	10 cm	Wiped surface
22	RAK(J.M.)10	JM	"	20 cm	Zoned impressed
23	RAK(J.M.)12	JM	"	10 cm	Fine plain
24	RAK(J.M.)17	JM	"	30 cm	Fine plain
25	RAK(J.M.)16	JM	"	10 cm	Wiped surface
26	RAK(J.M)20	JM	"	20 cm	Zigzag dotted cu. lines
27	RAK(J.M.)5	JM	"	10 cm	Dotted st. lines
28	RAK(J.M.)19	JM	"	20 cm	Cord impressed

Key: KN = Khartoum Neolithic Levels, JM = Jebel Moya Levels.

Table:25 X-ray diffraction of sherds: Mesolithic, Neolithic and modern pottery from the White Nile Province

							Other Minerals
G93-17b Shabona(7)	++++	++	+	++	-	+	Calcite(+)
G93-17c Shabona (8)	++++	++	+	++	-	+	Calcite (+)
G93-06c Rabak (kh-Neo.L.)(6)	++++	++	+	+	-	+	Calcite(+);Anatase(+)
G93-07c Rabak (kh-Neo.L.)(7)	++++	++	+	+	-	-	Calcite(+);Anatase(+)
G93-18a Rabak (J.M.Levels)	++++	++	+	++	-	-	Calcite (+++)
G93-10c White Nile modern pottery(1)	++++	++	+	+	-	-	Calcite (+)

Firing to 900° C(1h)

G93-22a Shabona(7)	++++	++	+	++	++	-
G93-22b Shabona(8)	++++	++	+	++	++	-
G93-11c Rabak (kh- Neo.L.)(6)	++++	+	+	+	++	-
G93-12c Rabak (kh-Neo.L.)(7)	++++	-	-	-	++	-
G93-21c Rabak (J.M.Levels)	++++	++	+	++	++	-
G93-10c White Nile modern pottery(1)	++++	+	+	+	++	-

Abbreviations

Kh-Neo.L. = Khartoum Neolithic Levels; J.M. Levels = Jebel Moya Levels

Table:26

XRFS-analysis of Major and Minor Compound: Mesolithic, Neolithic and Modern Pottery, White Nile Province.

Locality	Si02	Ti02	AL203	Fe203	Mn0	Mg0	Ca0	Na20	K20	P205	Ba0	L.O.I	Sum
Shabona	69.54	1.24	13.28	7.28	0.14	0.86	1.69	0.38	1.36	0.24	0.17	4.15	100.3
Shabona (8)	63.8	0.56	16.96	4.27	0.02	0.66	0.63	0.82	6.1	0.14	0.07	5.21	99.24
Rabak Kh. Neo.L. (6)	60.52	0.69	22.17	5.2	0.03	0.65	1.78	0.34	3.38	0.86	0.13	3.99	99.75
Rabak Kh. Neo.L. (7)	61.96	1.29	13.45	7	0.06	1.18	1.35	0.92	3.92	0.52	0.06	7.55	99.27
Rabak J.M.L.(7)	61.71	1.45	18.08	7.38	0.07	1.1	2.11	0.46	2.74	0.23	0.1	4.45	99.88
Rabak J.M.L.(9)	52.22	2.14	15.23	10.82	0.16	3.88	5.28	2.25	1.07	0.35	0.03	6.96	100.3
White Nile Prov. M. (1)	66.67	1.28	12.72	6.5	0.1	1.49	2.5	1.32	1.54	0.31	0.04	4.18	98.65
White Nile Prov. M. (2)	67.8	1.28	12.56	6.4	0.1	1.4	2.01	1.28	1.44	0.28	0.03	4.43	99

Abbreviations

Rabak Kh. Neo. L.= Rabak Khartoum Neolithic Levels; Rabak J.M. L=Rabak Jebel Moya Levels; White Nile Prov.M.P. =White Nile Province Modern Pottery.

Table:27

Recalculated XRFS analyses, samples of Mesolithic, Neolithic and Modern Pottery, White Nile Province.

Locality	Si02	Ti02	Al203	Fe203	Mg0	Ca0	Na20	K20	SUM
Shabona (7)	72.72	1.30	13.89	7.61	0.90	1.77	0.40	1.42	100.00
Shabona (8)	68.02	0.60	18.08	4.55	0.70	0.67	0.87	6.50	100.00
Rabak Kh. Neo.L.(6)	63.89	0.73	23.40	5.49	0.69	1.88	0.36	3.57	100.00
Rabak Kh. Neo.L (7)	68.04	1.42	14.77	7.69	1.30	1.48	1.01	4.30	100.00
Rabak J.M.L. (7)	64.94	1.53	19.03	7.77	1.16	2.22	0.48	2.88	100.00
Rabak J.M.L. (9)	56.22	2.30	16.40	11.65	4.18	5.68	2.42	1.15	100.00
White Nile Prov. M.(1)	70.91	1.36	13.53	6.91	1.58	2.66	1.40	1.64	100.00
White Nile Prov. M.(2)	72.00	1.36	13.34	6.80	1.49	2.13	1.36	1.53	100.00

Table: 28 Normalized Analyses Pic. File codes from A100

			Si02	Ti02	Al203	Fe203	Mg0	Ca0	Na20	K20	SU
1	Shaq. (M) Meso (4)	9	75.59	1.37	14.46	5.63	0.61	0.80	0.04	1.49	10(
2	Shaq. (M) Meso (7)	9	73.79	1.35	14.30	6.59	0.90	1.47	0.40	1.19	10(
3	Shaq. (M) Neo. (2)	9	73.34	1.22	15.78	4.79	0.96	1.41	0.08	2.42	10(
4	Shaq. (M) Neo. (2a)	9	72.41	1.49	14.71	6.92	0.93	1.63	0.28	1.63	10(
5	Shaq. C. (5)	9	63.98	0.68	23.33	5.40	0.67	1.84	0.35	3.74	10(
6	Shaq. C. (6)	9	64.79	0.68	20.35	5.80	0.69	0.88	0.25	6.57	10(
7	Butana M.P.(1)	0	75.13	1.54	14.97	6.45	0.50	0.72	0.05	0.62	10(
8	Butana M.P.(2)	0	56.53	2.32	16.35	11.84	4.19	5.19	2.39	1.20	10(
9	Shabona (7)	x	72.72	1.30	13.89	7.61	0.90	1.77	0.40	1.42	10(
10	Shabona (8)	x	68.02	0.60	18.08	4.55	0.70	0.67	0.87	6.50	10(
11	Rabak (Kh. Neo.) (6)	n	63.89	0.73	23.40	5.49	0.69	1.88	0.36	3.57	10(
12	Rabak (Kh. Neo.) (7)	n	68.04	1.42	14.77	7.69	1.30	1.48	1.01	4.30	10(
13	Rabak J.M. (7)	n	64.94	1.53	19.03	7.77	1.16	2.22	0.48	2.88	10(
14	Rabak J.M. (9)	n	56.22	2.30	16.40	11.65	4.18	5.68	2.42	1.15	10(
15	White Nile Prov. M.P. (1)	z	70.91	1.36	13.53	6.91	1.58	2.66	1.40	1.64	10(
16	White Nile Prov. M.P. (20)	z	72.00	1.36	13.34	6.80	1.49	2.13	1.36	1.53	10(

Table:29 Goethite Norm analyses of the fine earth fractions. Samples of Mesolithic, Neolithic and modern pottery: White Nile Province.

Locality and sample no.	Mineral phases in weight per cent										
	Quart.	Talc.	Kaol.	Parag.	Calc.	Musc.	Hem.	Dias.	Clin.	Mg-Fe-Ch.	Fe-Ch.
Shabona(7)	21.223	2.800	34.310	5.259	5.190	15.310	11.625	0.0	0.0	5.280	0.0
Shabona(8)	20.345	1.971	37.210	4.061	5.172	13.921	10.301	0.0.	0.0	0.0	0.0
Rabak (Kh.Neo.) (16)	0.0	0.0	41.360	3.246	7.262	29.755	8.300	5.310	3.136	0.0	1.630
Rabak (Kh.Neo.)(7)	0.0	0.0	42.671	2.720	5.252	28.910	8.300	0.0	3.146	0.0	2.201
Rabak (J.M.) (7)	11.480	5.048	52.417	8.020	0.0	0.908	10.463	0.0	0.0	0.0	5.171
Rabak (J.M.) (9)	0.0	0.0	40.104	2.250	14.430	0.0	17.586	1.528	0.0	0.0	5.250
White Nile Prov.M.P.(1)	30.543	6.797	15.481	9.710	6.517	16.830	9.412	0.0	0.0	4.710	0.0
White Nile Prov.M.P.(2)	30.269	5.475	17.740	10.679	5.116	16.121	10.161	0.0	0.0	4.439	0.0

Key: Quart.=Quartz, Kaol. = Kaolinite, Calc-Calcite, Musc.=Muscovite, Hem.=Hematite, Dias.=Diaspore, Clin=Clinochlor, Mg-Fe-Ch=Mg-Fe-Chlor, Fe-Ch=Fe-Chlor

Table :30 Frequencies of Pottery Decorative Motifs: Shabona Site

Decorative Motifs	No.	%
Wavy line	58	3.9
Dotted wavy line	210	14.2
Woven mat	171	11.5
Linear impressions	407	27.5
Dotted-sawtooth	23	1.6
Dotted-wolftooth	7	0.4
Dotted straight line	527	35.6
Herring-bone	8	0.5
Dotted/triangles	20	1.3
Fingernail	1	0.1
Plain	50	3.3
Total	1482	99.9

(After Clark 1989:403-405)

Table: 31 Rabak site:Potsherds from square 107x100y (4 square metres)

Type of decoration	Level 14-4		Level 3		Level 2		Level 1	
	Nos.	%	Nos.	%	Nos.	%	Nos	%
1. Dots	36	9,7	27	29,0	17	38,6	14	22,2
2. Vees/dots	2	0,5	0	0	0	0	0	0
3. Catfish spine	9	2,4	5	5,4	3	6,8	1	1,6
4. Dotted saw tooth	29	7,8	2	2,2	1	2,3	3	4,7
5. Saw tooth	0	0	1	1,1	2	2,5	1	1,6
6. Undecorated (wiped)	269	72,3	41	44,0	15	34	19	30
7. Decoration non Khartoum type	13	3,5	3	3,2	0	0	0	0
8. Jebel Moya type of decoration	0	0	10	10,8	4	9,1	20	31,7
9. Fingernail decoration	0	0	0	0	2	4,5	3	4,7
10. Others	0	0	1	1,1	0	0	2	3,1
11. Bases	14	3,8	3	3,2	0	0	0	0
Total	372	100.0	93	100.0	44	99.9	63	99.8

Potsherds from square 107 x /100 y (4 square metres).
Levels 14-4 classified together, since there is no difference in the ceramics between the different levels. The C-14 dates from these levels indicate the same time.
(After Haaland 1989:362).

Table: 32

Location and Typological Description of the Analyzed Samples from Shaqadud midden (after A.E. Marks, pers. comm. 1992). *

Ser.No.	Sample No.	Period	Locality	Square	Level below Datum	Typology
1	SHAG (M,M)1	KM	SI-B	J8-55	310 cm	Incised wavy line
2	SHAG (M,M)5	KM	SI-B	H7-60	300 cm	Incised wavy line
3	SHAG (M,M)8	KM	SI-B	I8-55	280 cm	Zigzag dotted st.line
4	SHAG (M,M)9	KM	SI-B	J7-96	310 cm	Coarse plain
5	SHAG (M,M)10	KM	SI-B	H7-40	250 cm	Coarse plain
6	SHAG (M,M)12	KM	SI-B	F7-59	240 cm	Coarse plain
7	SHAG (M,M)19	KM	SI-B	J7-53	290 cm	Zigzag dotted st.line
8	SHAG (M,M)20	KM	SI-B	J7-53	275 cm	Coarse plain
9	SHAG (M,M)21	KM	SI-B	J7-52	280 cm	Zigzag dotted st.line
10	SHAG (M,M)22	KM	SI-B	D9-69	200 cm	Incised wavy line
11	SHAG (M,M)23	KM	SI-B	B9-79	300 cm	Incised wavy line
12	SHAG (M,M)24	KM	SI-B	H8-59	250 cm	Coarse plain
13	SHAG (M,M)25	KM	SI-B	H7-49	270 cm	Incised wavy line
14	SHAG (M;N)2	KM/KN	SI-B	H7-5	125 cm	Zigzag dotted line (fine)
15	SHAG (M;N)3	KM/KN	SI-B	I8-4	120 cm	Zigzag st. line (fine)
16	SHAG (M,N)4	KN	SI-B	17-19	45 cm	Zigzag dotted cu. lines (fine)
17	SHAG(M,N)6	KN	SI-B	17-19	100 cm	Zigzag dotted st. lines

Cont. Table 32

Ser.No.	Sample No.	Period	Locality	Square	Level below Datum	Typology
18	SHAG (M,N)7	KN	SI-B	H7-22	110 cm	Single banded motif
19	SHAG (M,N)11	KN	SI-B	H7-B	100 cm	Single banded motif
20	SHAG (M,N)13	KN	SI-B	J7-6	60 cm	Fine plain
21	SHAG (M,N)14	KN	SI-B	H8-6	90 cm	Fine plain
22	SHAG (M,N)15	KN	SI-B	I8-8	110 cm	Triangles
23	SHAG (M,N)16	KN	SI-B	J7-5	80 cm	Irregular dotted line
24	SHAG (M,N)17	KN	SI-B	17-9	50 cm	Vees only
25	SHAG (M,N)18	KN	SI-B	I-13	35 cm	Mat impressions

Key: SIB: Shaqadud, midden; KM = Khartoum Mesolithic; KN = Khartoum Neolithic, KM/KN= Khartoum Mesolithic/Neolithic transition

* The typological description was conducted by the present author.

Table: 33

Location and Typological description of the analyzed samples from Shaqadud, Cave (after A.E. Marks 1991: 53-57 and pers. comm., 1993).

Ser. No.	Sample No.	Period	Locality	Square	Level below Datum	Typology
1	SHAG(c)6	e.3rd.mill. BC	S1-A	B5-6	300 cm	Zoned impressed
2	SHAG(c)3	I.3rd.mill. BC	S1-A	C5-6	45 cm	Cord impressed
3	SHAG(c)18	m.3rd.mill. BC	S1-A	B5-52	195 cm	Hachured-grooved
4	SHAG(c)15	e.3rd.mill. BC	S1-A	B5-53	295 cm	Coarse plain
5	SHAG(c)5	e.3rd.mill. BC	S1-A	B6-48	310 cm	Hachured-grooved
6	SHAG(c)2	I.3rd.mill.BC	S1-A	D6-48	85 cm	Red slipped
7	SHAG(c)17	I.3rd.mill. BC	S1-A	E7-49	60 cm	Wiped and burnished
8	SHAG(c)11	m.3rd.mill. BC	S1-A	B8-55	235 cm	Hachured-grooved
9	SHAG(c)14	e.3rd.mill. BC	S1-A	B9-79	290 cm	Hachured-grooved
10	SHAG(c)20	e.3rd.mill. BC	S1-A	D9-69	300 cm	Coarse plain
11	SHAG(c)19	m.3rd.mill. BC	S1-A	D6-59	195 cm	Fine plain
12	SHAG(c)9	m.3rd.mill. BC	S1-A	C7-50	230 cm	Hachured-grooved
13	SHAG(c)12	e.3rd.mill. BC	S1-A	C5-38	300 cm	Coarse plain
14	SHAG(c)21	e.3rd.mill. BC	S1-A	E6-40	295 cm	Coarse plain
15	SHAG(c)7	I.3rd.mill. BC	S1-A	E6-25	65 cm	Wiped and burnished
16	SHAG(c)23	e.3rd.mill. BC	S1-A	B5-40	310 cm	Coarse plain
17	SHAG(c)8	I.3rd.mill. BC	S1-A	F7-27	90 cm	Finger nail impressions
18	SHAG(c)10	I.3rd.mill. BC	S1-A	E6-15	135 cm	Wiped and burnished
19	SHAG(c)1	m.3rd. mill. BC	S1-A	I4-9	240 cm	Hachured-grooved
20	SHAG(c)4	m.3rd.mill. BC	S1-A	D6-17	210 cm	Hachured - grooved
21	SHAG(c)13	I.3rd.mill. BC	S1-A	G7-39	110 cm	Triangles
22	SHAG(c)14	I.3rd.mill. BC	S1-A	C5-59	60 cm	Cord impressed
23	SHAG(c)16	I.3rd.mill. BC	S1-A	F7-57	50 cm	Fine plain(red)

Key: e.= early mill. = millennium
m.= middle I = Late

Table: 34 X-ray diffraction of sherds: Mesolithic, Neolithic and modern pottery from the Western Butana Region

Shaqadud complex site							Other Minerals
G93-18b Shaq.(M) Meso.L.(7)	++++	++	+	+	-	+	Anatase(+)
G93-19b Shaq.(M) Meso.L.(8)	++++	+	+	+	-	-	
G93-06b Shaq.(M) Neo.L.(2a)	++++	++	+	+	-	+	Anatase(+)
G93-07b Shaq.(M) Neo.L.(2)	++++	++	+	++	-	+	Calcite(+),Anatase(+)
G93-18c Shaq.(C) Neo.L.(5)	++++	++	+	-	-	-	Calcite (+++)
G93-10a Butana Modern Pottery	++++	++	++	-	-	+	Calcite(+)
Firing to 700°-900° C							
G93-21C Shaq.(M) Meso.L.(8) 700° C(1h)	++++	+	+	+	-	-	
G93-20C Shaq.(M) Meso.L.(8) 750° C(1h)	++++	+	+	+	+	-	
G93-19C Shaq.(M) Meso.L.(8) 850° C(1h)	++++	+	+	+	++	-	
G93-11b Shaq.(M) Neo.L.(2a) 900°C (1h)	++++	+	+	+	++	-	Anatase(+)
G93-12b Shaq(M) Neo.L.(2) 900° C (1h)	++++	+	+	+	++	-	
G93-14a Butana modern pottery 900° C (1h)	++++	+	++	-	++	-	

Abbreviations

Shaq. (M) Meso.L. = Shaqadud midden, Mesolithic Levels; Shaq. (M) Neo.L.= Shaqadud midden, Neolithic Levels; Shaq. (c) Neo.L. = Shaqadud Cave Neolithic Levels.

Table: 35 X-ray identification of sherds: northern Sudan and central Sahara

Area	Site No.	mcl	ill	m
Khartoum	K-2,K-11, K-23	+	+	-
Second Cataract	626-1,626-10, 1045,D1W-5,D1W-50	+	?	+
Dongola Reach	N 13-4-17, N 13-4-22, N 40-2	+	-	+
Kashm el Gibra	N 100,N 114-6, N 128	+	?	+
Wanyanga	WAN-K	-	+	+
Amekni	AM-1-F, AM-1-S	+	+	+

(After Hays, T.R. and F.A. Hassan, 1974 : 77)

m/cl - montmorillonite-chlorite mixed structure.
+ ill = illite

+ m=montmorillonite

TABLE: 36 X-RAY IDENTIFICATION OF THE PRINCIPAL CLAY MINERALS (<2 MICRONS) IN AN ORIENTED MOUNT OF A SEPARATED CLAY FRACTION FROM SEDIMENTARY MATERIAL

Mineral	Basal d spacings (001)	Heating effect 1hour
Kaolinite	7.15A (001); 3.75A (002)	Becomes amorphous 550-660 C
Kaolinite, disorder	7.15A (001) broad; 3.75A broad	Becomes amorphous at lower temperatures than Kaolinite
Halloysite, 4H 0	10A (001) broad	Dehydrates to 2H O at 110 C
Halloysite, 2H 0	7.2.A (001) broad	Dehydrates at 125-150 C: becomes amorphous 560-590 C
Mica, 2M	10A (002 : 5A (004 generally referred to as (001) and (002)	(001) becomes more intense on heating but structure is maintained to 700 C
Illite, 1Md	10A (002), broad, other basal spacings present but small	(001) noticeably more intense on heating as water layers are removed: as higher temperatures like mica
Montmorillonite Group	15A (001) and integral series of basal spacings	At 300 C (001) becomes 9A
Vermiculite	14A (001) and integral series of basal spacings	Dehydrates in steps
Chlorite, Mg-form	14A (001) and integral series of basal spacings	(001) increases in intensity; <800 C shows weight loss but no structural change
Chlorite, Fe-form	14A (001) less intense than in Mg-form;integral series of basal spacings	(001) scarcely increases; structure collapses below 800 C
Mixed-layer minerals	Regular, one (001) and integral series of basal spacings	Various, see descriptions of individual minerals
	Random, (001) is addition of individual minerals and depends on amount of those present	Depends on minerals present in inter-layered mineral

(After Caroll, D., 1970 Table 9 with some modifications)

Table:37

XRFS-analysis of major and minor compounds: Mesolithic, Neolithic and Modern Pottery, Western Butana Region.

Locality	Si02	Ti02	Al203	Fe203	Mn0	Mg0	Ca0	Na20	K20	P205	Ba0	L.O.I.	Sum
Shaq. (M) Meso. (4)	71.86	1.3	13.75	5.35	0.05	0.58	0.76	0.04	1.42	0.37	0.03	3.95	99.37
Shaq. (M) Meso. (7)	71.11	1.3	13.78	6.35	0.09	0.87	1.42	0.39	1.15	0.12	0.07	4.72	101.3
Shaq. (M) Neo. (2)	69.72	1.16	15	4.55	0.06	0.91	1.34	0.08	2.3	0.1	0.04	4.07	99.33
Shaq. (M) Neo. (2a)	67.93	1.4	13.8	6.49	0.11	0.87	1.53	0.26	1.53	0.12	0.11	4.79	98.96
Shaq C. (5)	58.99	0.63	21.51	4.98	0.02	0.62	1.7	0.32	3.45	0.88	0.14	6.31	99.55
Shaq C. (6)	62.37	0.65	19.59	5.58	0.05	0.66	0.85	0.24	6.32	0.19	0.09	2.92	99.51
Butana M. P. (1)	68.71	1.41	13.69	5.9	0.04	0.46	0.66	0.05	0.57	5	0.03	3.88	100.3
Butana M. P. (2)	54.26	2.23	15.69	11.37	0.17	4.02	4.98	2.29	1.15	0.38	0.03	3.75	100.3

Abbreviations

Shaq. (M) Meso.= Shaqadud midden, Mesolithic Level; Shaq. (M) Neo.=Shaqadud Midden Neolithic Levels; Shaq.C. = Shaqadud Cave; Butana M.P. = Butana Modern Pottery.

Table:38

Recalculated XRFS analyses, samples of Mesolithic, Neolithic and Modern Pottery: Western Butana Region

Locality	Si02	Ti02	Al203	Fe203	Mg0	Ca0	Na20	K20	SUM
Shaq. (M) Mcso. (4)	75.59	1.37	14.46	5.63	0.61	0.80	0.04	1.49	100.00
Shaq. (M) Mcso. ((7)	73.79	1.35	14.30	6.59	0.90	1.47	0.40	1.19	100.00
Shaq. (M) Nco. (2)	73.34	1.22	15.78	4.79	0.96	1.41	0.08	2.42	100.00
Shaq. (M) Nco. (2a)	72.41	1.49	14.71	6.72	0.93	1.63	0.28	1.63	100.00
Shaq. C. (5)	63.98	0.68	23.33	5.40	0.67	1.84	0.35	3.74	100.00
Shaq. C. (6)	64.79	0.68	20.35	5.80	0.69	0.88	0.25	6.57	100.00
Butana M.P.(1)	75.13	1.54	14.97	6.45	0.50	0.72	0.05	0.62	100.00
Butana M.P.(2)	56.53	2.32	16.35	11.84	4.19	5.19	2.39	1.20	100.00

Table:39 Goethite Norm analyses of the fine earth fractions. Samples of Mesolithic, Neolithic and modern pottery: Western Butana.

Locality and sample no.	Mineral phases in weight per cent											
	Quart.	Talc.	Kaol.	Parag.	Calc.	Biot.	Hem.	Neph.	Clin.	Dias.	Mg-Fe-Ch.	Fe-Ch.
Shaq(M) Meso(4)	32.943	2.505	34.780	8.485	6.516	0.0	9.445	0.0	0.0	0.0	7.325	0.0
Shaq(M) Meso(7)	30.815	5.704	36.891	9.616	8.782	0.0	16.691	0.0	0.0	0.0	5.927	0.0
Shaq(M) Neo (2)	34.871	4.148	44.307	1.460	4.336	0.0	7.365	0.0	0.0	0.0	3.512	0.0
Shaq(M) Neo(2a)	35.910	3.982	45.416	1.962	3.969	0.0	5.028	0.0	0.0	0.0	3.633	0.0
ShaqC(5)	35.831	3.615	29.960	6.830	5.961	0.0	10.334	0.0	0.0	0.0	7.369	0.0
ShaqC(6)	34.923	5.212	31.871	6.310	4.899	0.0	11.237	0.0	0.0	0.0	5.448	0.0
Butana M.P.(1)	0.0	0.0	0.0	31.470	15.161	7.875	16.646	5.362	13.315	6.945	0.0	3.225
Butana M.P.(2)	0.0	0.0	0.0	33.356	13.979	10.789	14.235	0.0	14.921	7.710	0.0	4.721

Key:- Quart.=: Quartz, Kaol=Kaolinite, Calc.=Calcite, Biot.=Biotite, Hem.=Hematite, Neph.=Nepheline, Clin.= Clinchlor, Dias.=Diaspore, Mg-Fe=Ch.=Mg-Fe-Chlor, Fe-Ch.=Fe-Chlor.

Table:40 Grouping of sherds according to the mineralogy and texture of temper

Group	Area	Site no.	Mineralogic composition	Size	Shape	Amount
I	Khashm el Girba	N 110 N 114-0 N 114-6 N 128	Ca-plagioclase, quartz, diabase and basalt rock fragments, and small amounts of augite, hypersthene and hornblende	fine to medium grained	subangular to rounded	high
II a	Dongola Reach, Second Cataract	N 40-4 1045 277	Quartz, Na-plagioclase, microcline, and muscovite	fine to coarse grained	subangular to rounded	high
II b i	Khartoum	K-23	Quartz, microcline, Na-plagioclase, These sherds have a considerable amount of vegetal fiber	fine to very fine grained	subangular to rounded	high
II b ii	Wanyanga	Wan-K	Quartz, microcline, Na-plagioclase. These sherds have a considerable amount of vegetal fiber.	fine grained	subrounded to rounded	low
II b iii	Dongola	N-13-4-17	Quartz, microcline, Na-plagioclase. These sherds have a considerable amount of vegetal fiber.	very fine grained	subrounded to rounded	high (may be part of paste)
II c i	Khartoum	K-25 K-11	Quartz, microcline	medium (fine to coarse)	subangular to subrounded	high
II c ii	Dongola Second Cataract Amekni	N 13-4-22 N 40-2 N 41-1 1045 DIW-50 AM-1-s-1 AM-1-s-2	Quartz, microcline, Na-plagioclase, and small amounts of schist and gneiss rock fragments, hornblende, and iron oxides	medium to coarse grained	subrounded to rounded	high
III a i	Second cataract	626-10	Quartz haematite inclusions	fine to medium grained	subrounded to rounded	high
III a ii	Second Cataract	626-1	Quartz and small amounts of orthoclase and granophyre fragments	fine to medium grained	subrounded to rounded	high

(After Hays, T.R. and F.A. Hassan 1974:74)

Table: 41

Percentage Distribution of Sherds by Ware and Motiffor the Khartoum Mesolithic Group Levels at Shaqadud Midden

	Hard Coarse Ware							Friable Coarse Ware							Fine Ware	
Levels	Pl	Bnd	WL	DSL	Mt	DZ		PL	Bnd	DWL	DSL	Mt	DZ		CSL	Sample
31-32	0	0	0.6	0	0	0		26.2	19.5	3.1	11.0	29.9	9.1		0.6	164
33-34	0	0	0.8	0	0	0		23.1	31.7	0	11.1	23.0	23.0		0	126
35-36	0	0	0	0	0.8	0		16.4	40.6	2.3	15.6	18.0	6.3		0	128
37.38	0	19.4	0	0	0	0		19.3	39.8	0.9	14.8	6.5	4.6		0	108
39-40	6.6	50.8	0.8	0	0.8	1.6		1.6	22.1	0	10.6	1.6	3.3		0	122
41-42	9.7	75.4	0	0.5	1.0	5.8		0	2.4	0	5.3	0	0		0	207
43-44	7.0	85.7	0.4	0.8	1.9	4.3		0	0	0	0	0	0		0	258
45-46	14.8	75.8	0.6	2.2	1.9	4.7		0	0	0	0	0	0		0	318
47-48	15.5	75.5	0.8	1.6	1.8	4.6		0	0	0	0	0	0.3		0	387
49-50	16.7	59.2	1.1	3.4	6.5	13.0		0	0	0	0	0	0		0	353
51-52	14.7	51.6	0.8	4.8	8.3	19.1		0	0	0	0	0	0		0	252
53-54	12.2	28.0	4.4	5.2	17.0	33.2		0	0	0	0	0	0		0	271
55-56	17.2	14.0	7.2	10.9	14.9	35.7		0	0	0	0	0	0		0	221
57-58	39.0	2.0	3.0	5.0	12.0	39.0		0	0	0	0	0	0		0	100
59-60	39.6	1.8	4.5	1.8	12.6	39.6		0	0	0	0	0	0		0	111
61-62	27.3	1.5	18.2	0	12.1	40.9		0	0	0	0	0	0		0	66
63-64	41.4	3.4	20.7	0	6.9	27.6		0	0	0	0	0	0		0	29
65-66	100.0	0	0	0	0	0		0	0	0	0	0	0		0	14

Key:	Pl	=Plain Undecorated	Mt	=Mat
	Bnd	=Banded	DZ	=Dotted Zigzag
	WL	=Wavy Line	DWL	=Dotted Wavy Line
	DSL	=Dotted Straight Line	CSL	=Continuous Straight Line

(After Mohamed - Ali 1991:90, Table 5:2)

Table:42 The Distribution of Sherds by Ware and Motif for the Khartoum Neolithic Levels at Shaqadud Midden, as Percentages of Grouped Levels

	Friable Coarse Ware									Fine Ware							Sample
Levels	Pl	Bnd	DWL	DSL	Mt	DZ	TR	LZ		CSL	DSL	DZ	LZ	FN	TR	Pl	V	
5-6	20.6	0	0	0	0	3.5	1.3	0.5		1.8	25.0	4.3	4.3	0.2	3.3	34.8	1.0	600
7-8	14.3	0	0	0.6	0	3.6	1.7	0.9		0.8	3.5	34.2	5.9	0.2	7.0	25.9	1.5	884
9-10	0	0	0	0.6	0	4.8	1.7	0.9		1.0	4.4	32.5	9.3	0.4	7.8	22.5	1.1	966
11-12	16.3	0	0	0.7	1.3	6.2	1.8	0.9		1.3	2.8	29.0	8.7	0.5	8.3	21.4	0.7	1057
13-14	17.6	0	0.4	0.6	3.3	7.0	1.6	1.7		1.7	2.4	28.1	6.0	0.7	6.7	21.6	0.8	1009
15-16	19.7	0	0.8	0.9	4.5	5.2	2.2	1.6		1.6	2.2	21.5	8.3	0.7	4.2	25.5	1.2	738
17-18	14.2	0	4.6	2.1	10.8	9.0	2.1	0.4		1.9	1.7	25.2	4.8	0.6	2.9	18.3	1.4	520
19-20	18.3	0	4.8	2.8	18.3	6.8	0.9	0		0.4	1.1	26.8	4.1	0.4	2.4	12.4	0.6	541
21-22	21.2	0.5	4.2	6.3	27.9	9.1	0.9	0.5		1.2	0.2	10.9	2.6	0	0.9	13.7	0	430
23-24	26.1	0.5	5.3	12.0	31.4	6.7	0.5	0.5		0.7	0.2	7.8	1.6	0	1.1	5.8	0	449
25-26	28.0	2.0	2.8	13.6	30.8	7.8	0.3	0.3		0.3	0	5.1	0.3	0	0.3	3.8	0	396
27-28	22.4	7.3	4.5	13.8	33.5	8.5	0.4	0		0	0	3.7	0	0	0	5.7	0	246
29-30	32.1	13.3	4.0	9.6	27.7	9.9	0	0		0.4	0	1.6	0	0.4	0.4	0.4	0	249

Key:	Pl	=Plain Undecorated	TR	=Triangles and "Vees"
	Bnd	=Banded	LZ	=Lined Zigzag
	DWL	=Dotted Wavy Line	CSL	=Continuous Straight Lines
	DSL	=Dotted Straight Line	FN	=Fish Net
	Mt	=Mat	V	=Varia (may be either ware)
	DZ	=Dotted Zigzag		

(After Mohamed -Ali 1991:92, Table 5-5)

Table:43 Pottery of Shaqadud Cave by types and grouped levels

Depth (M)	A	B/C	D/E	F/G/H	K/L	M	Sample size
0.55-0.70	5.7	20.2	16.3	6.7	7.6	43.3	104
0.70-0.85	14.4	13.5	13.8	1.1	6.8	50.4	355
0.85-1.0	12.3	10.3	12.3	3.9	8.3	52.7	203
1.0-1.15	11.9	11.9	11.1	1.4	4.1	59.4	143
1.15-1.3	13.1	11.6	14.9	4.1	11.6	44.5	267
1.3-1.45	11.9	13.6	15.7	1.4	9.1	49.6	294
1.45-1.6	13.2	10.6	13.1	2.5	10.1	50.3	664
1.6-1.75	12.8	11.1	15.9	3.5	17.1	37.6	5661
1.75-1.9	13.1	12.5	27.8	3.9	16.8	25.7	607
1.9-2.05	9.7	19.6	28.5	5.6	17.6	18.8	729
2.05-2.2	8.4	20.7	29.8	6.6	18.3	16.2	580
2.2-235	10.6	19.7	33.9	4.8	16.6	14.3	587
2.35-2.50	10.9	23.3	28.7	5.1	15.6	16.4	275
2.50-2.65	32.4	24.3	16	3.3	1.6	8.7	185
2.65-2.80	52.5	17.4	17.4	6.9	2.5	3.2	276
2.80-2.95	43.1	27.1	12.1	9.5	3	5.2	232
2.95-3.10	37.2	22.5	21.4	15.2	2.3	1.1	177
3.10-3.25	46.1	18.1	21.6	12.2	0	1.7	171
3.25-3.40	35.1	16.6	33.1	13.6	0	1.5	205
3.40-3.55	31.1	24.2	36.1	8.4	0	0	119
3.55-3.70	21.8	40.6	37.5	0	0	0	32
Total	1188	1134	1512	354	776	1807	6771

Key: A, Thick Black Slipped; B/C, all thin Black Slipped; D/E Thin Impressed; F/G/H, Red Slipped; K/L, Wiped and burnished; M, Grooved Unslipped.(After Robertson 1984:Figs.2,3, 1991:126-127, Tables 7-1, Fig. 7-1 and Marks et al 1985:274, Fig.13).

Table:44

Non-plastic mineral inclusions: Sarurab2 Mesolithic ceramics, west bank of the Main Nile, Khartoum Province.

Non-plastic mineral inclusions	G1		G2		G3		G4		G5		G6	
	0.0039-0.062 mm		0.062-0.125 mm		0.125-025 mm		0.25-0.5 mm		0.5-1.0 mm		1.0-2.0 mm	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Quartz	1	0.0	6	0.3	49	2.4	369	18.2	1282	63.1	325	16.0
Orthoclase	0.0	0.0	0.0	0.0	2	3.5	9	15.8	44	77.2	2	3.5
Microcline	0.0	0.0	3	0.3	70	6.9	246	24.2	583	57.3	115	11.3
Palagioclase	0.0	0.0	0.0	0.0	0.0	0.0	9	11.1	168	84.0	4	4.9
Rock fragments	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3	60.0	2	40.0
Mica-Biotite	0.0	0.0	0.0	0.0	4	6.9	10	17.2	36	62.1	8	13.8
Mica-Muscovite	13	38.2	0.0	0.0	4	5.9	4	11.8	15	44.1	0.0	0.0
Iron	0.0	0.0	6	2.5	17	7.9	30	12.4	188	77.7	1	0.4

The above classification is based on Udden-Wentworth scale of sedimentary petrology (see Pettijohn 1957:18, Fig.1 and Table 12).

Table:45

Non-plastic mineral inclusions: Islang2 Mesolithic ceramics, west bank of the Main Nile, Khartoum Province.

Non-plastic mineral inclusions	G1		G2		G3		G4		G5		G6	
	0.0039-0.062 mm		0.062-0.125 mm		0.125-025 mm		0.25-0.5 mm		0.5-1.0 mm		1.0-2.0 mm	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Quartz	7	0.3	12	0.5	23	0.9	116	4.7	1991	79.9	342	13.7
Orthoclase	0.0	0.0	0.0	0.0	5	6.8	8	10.8	59	79.7	2	2.7
Microcline	0.0	0.0	2	0.3	4	0.7	6	1.0	538	92.3	33	5.7
Rock fragments	0.0	0.0	0.0	0.0	0.0	0.0	1	16.7	3	50.5	2	33.3
Mica-Biotite	0.0	0.0	0.0	0.0	6	5.0	33	27.5	80	67.7	1	0.8
Mica-Muscovite	0.0	0.0	0.0	0.0	4	3.4	10	8.5	101	86.3	2	1.7
Iron	2	0.7	3	1.1	11	3.9	57	20.4	191	68.5	15	5.4

The above classification is based on Udden-Wentworth scale of sedimentary petrology (see Pettijohn 1957:18, Fig.1 and Table 12).

Table:46

Non-plastic mineral inclusions: Nofalab2 Mesolithic ceramics, west bank of the Main Nile, Khartoum Province.

Non-plastic mineral inclusions	G1		G2		G3		G4		G5		G6	
	0.0039-0.062 mm		0.062-0.125 mm		0.125-025 mm		0.25-0.5 mm		0.5-1.0 mm		1.0-2.0 mm	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Quartz	16	0.7	363	15.0	781	32.2	1237	50.9	28	1.2	3	0.1
Orthoclase	13	5.6	67	28.8	110	47.2	39	16.7	4	1.7	0.0	0.0
Microcline	0.0	0.0	0.0	0.0	20	66.7	10	33.3	0.0	0.0	0.0	0.0
Palagioclase	7	6.9	15	14.9	50	49.5	29	28.7	0.0	0.0	0.0	0.0
Rock fragments	0.0	0.0	0.0	0.0	0.0	0.0	6	66.7	3	33.3	0.0	0.0
Mica-Biotite	0.0	0.0	0.0	0.0	10	25	30	75	0.0	0.0	0.0	0.0
Mica-Muscovite	0.0	0.0	0.0	0.0	9	75	3	25	0.0	0.0	0.0	0.0
Iron	17	4.6	155	41.8	118	31.8	71	19.1	6	1.6	4	1.1

The above classification is based on Udden-Wentworth scale of sedimentary petrology (see Pettijohn 1957:18, Fig.1 and Table 12).

Table:47

Non-plastic mineral inclusions: Kabbashi Haitah Mesolithic ceramics, east bank of the Main Nile, Khartoum Province.

Non-plastic mineral inclusions	G1		G2		G3		G4		G5		G6	
	0.0039-0.062 mm		0.062-0.125 mm		0.125-025 mm		0.25-0.5 mm		0.5-1.0 mm		1.0-2.0 mm	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Quartz	0.0	0.0	9	0.6	69	4.6	164	10.8	877	58.0	394	26.0
Orthoclase	00.	0.0	0.0	0.0	2	2.6	8	10.8	31	40.3	36	46.8
Microcline	0.0	0.0	3	2.0	3	2.0	9	6.1	59	39.9	74	50.0
Palagioclase	0.0	0.0	2	1.2	9	5.4	13	7.8	127	76.0	16	9.6
Rock fragments	0.0	0.0	0.0	0.0	0.0	0.0	6	13.6	28	63.6	10.	22.7
Mica-Biotite	0.0	0.0	1	1.5	2	2.9	10	14.7	42	61.8	13	19.1
Mica-Muscovite	0.0	0.0	2	1.1	5	2.8	25	14.1	135	76.3	10	5.6
Iron	1	0.5	5	2.7	11	5.9	19	10.2	124	66.3	27	14.4
Perthite	0.0	0.0	0.0	0.0	3	3.0	3	3.0	50	50.5	43	43.4

The above classification is based on Udden-Wentworth scale of sedimentary petrology (see Pettijohn 1957:18, Fig.1 and Table 12).

Table:48

Non-plastic mineral inclusions: Kabbashi Mesolithic ceramics, east bank of the Main Nile, Khartoum Province.

Non-plastic mineral inclusions	G1		G2		G3		G4		G5		G6	
	0.0039-0.062 mm		0.062-0.125 mm		0.125-025 mm		0.25-0.5 mm		0.5-1.0 mm		1.0-2.0 mm	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Quartz	0.0	0.0	11	0.5	10	0.5	71	3.4	1728	86.8	272	13.0
Orthoclase	0.0	0.0	0.0	0.0	0.0	0.0	2	10.5	17	89.5	0.0	0.0
Microcline	0.0	0.0	1	1.1	0.0	0.0	22	23.4	70	74.5	1	1.1
Palagioclase	0.0	0.0	0.0	0.0	2	6.5	7	22.6	22	71.0	0.0	0.0
Rock fragments	0.0	0.0	0.0	0.0	0.0	0.0	6	54.5	3	27.3	2	18.2
Mica-Biotite	0.0	0.0	0.0	0.0	2	7.1	4	14.3	20	71.4	2	7.1
Mica-Muscovite	0.0	0.0	0.0	0.0	6	4.5	20	15.2	105	79.5	1	0.8
Iron	0.0	0.0	2	2.7	2	2.7	6	8.0	65	86.7	0.0	0.0
Perthite	0.0	0.0	1	0.3	0.0	0.0	12	3.9	280	91.8	12	3.9

The above classification is based on Udden-Wentworth scale of sedimentary petrology (see Pettijohn 1957:18, Fig.1 and Table 12).

Table:49

Non-plastic mineral inclusions: Geili Neolithic ceramics, east bank of the Main Nile, Khartoum Province.

Non-plastic mineral inclusions	G1		G2		G3		G4		G5		G6	
	0.0039-0.062 mm		0.062-0.125 mm		0.125-025 mm		0.25-0.5 mm		0.5-1.0 mm		1.0-2.0 mm	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Quartz	72	4.1	292	16.5	508	28.8	870	49.3	23	1.3	0.0	0.0
Orthoclase	2	14.3	5	35.7	3	21.4	2	14.3	2	14.3	0.0	0.0
Microcline	9	9.9	23	25.3	39	42.9	20	22.0	0.0	0.0	0.0	0.0
Palagioclase	9	10.3	31	35.6	27	31.0	18	20.7	2	2.3	0.0	0.0
Rock fragments	4	6.5	12	19.4	20	32.3	20	32.3	4	6.5	2	3.2
Mica-Biotite	5	8.8	13	22.8	24	42.1	15	26.3	0.0	0.0	0.0	0.0
Mica-Muscovite	5	2.7	20	10.9	16	8.7	142	77.2	1	0.5	0.0	0.0
Iron	17	7.5	56	24.8	79	35.0	73	32.3	1	0.4	0.0	0.0

The above classification is based on Udden-Wentworth scale of sedimentary petrology (see Pettijohn 1957:18, Fig.I and Table 12).

Table:50

Non-plastic mineral inclusions:Shabona Mesolithic ceramics: White Nile Province.

Non-plastic mineral inclusions	G1		G2		G3		G4		G5		G6	
	0.0039-0.062 mm		0.062-0.125 mm		0.125-025 mm		0.25-0.5 mm		0.5-1.0 mm		1.0-2.0 mm	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Quartz	3	0.1	3	0.1	1	0.0	44	2.1	1704	82.9	301	14.6
Orthoclase	0.0	0.0	2	3.3	7	11.7	7	11.7	44	73.3	0.0	0.0
Microcline	0.0	0.0	0.0	0.0	2	1.4	4	2.8	128	90.1	8	5.6
Palagioclase	0.0	0.0	0.0	0.0	8	25.8	9	29.0	12	38.7	2	6.5
Rock fragments	0.0	0.0	0.0	0.0	0.0	0.0	2	18.2	8	72.7	1	9.1
Mica-Biotite	2	20.0	0.0	0.0	2	20.0	1	10.0	5	50.0	0.0	0.0
Mica-Muscovite	0.0	0.0	2	12.5	2	12.5	2	12.5	6	37.5	4	25.0
Iron	2	0.5	0.0	0.0	3	0.8	38	10.2	324	86.6	7	1.9

The above classification is based on Udden-Wentworth scale of sedimentary petrology (see Pettijohn 1957:18, Fig.1 and Table 12).

Table:51

Non-plastic mineral inclusions: Rabak (Kh. Neo.L.) ceramics, White Nile Province.

Non-plastic mineral inclusions	G1		G2		G3		G4		G5		G6	
	0.0039-0.062 mm		0.062-0.125 mm		0.125-025 mm		0.25-0.5 mm		0.5-1.0 mm		1.0-2.0 mm	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Quartz	37	2.4	174	11.3	341	22.2	931	60.7	49	3.2	3	0.2
Orthoclase	0.0	0.0	2	10.0	7	35.0	9	45.0	2	10.0	0.0	0.0
Microcline	2	1.0	13	6.5	54	26.9	129	64.2	2	1.0	1	0.5
Palagioclase	5	4.3	15	13.0	61	53.0	31	27.0	3	2.6	0.0	0.0
Rock fragments	0.0	0.0	4	20.0	3	15.0	9	45.0	2	10.0	2	10.0
Mica-Biotite	2	5.9	3	8.8	11	32.4	17	50.0	1	2.9	0.0	0.0
Mica-Muscovite	1	3.0	3	9.1	13	39.4	15	45.5	1	3.0	0.0	0.0
Iron	4	1.4	35	12.4	57	20.1	180	63.6	7	2.5	0.0	0.0
Perthite	1	0.7	14	9.5	36	24.5	94	63.9	1	0.7	1	0.7

The above classification is based on Udden-Wentworth scale of sedimentary petrology (see Pettijohn 1957:18, Fig.1 and Table 12).

Table:52

Non-plastic mineral inclusions: Rabak (J.M.L.) ceramics: White Nile.

Non-plastic mineral inclusions	G1		G2		G3		G4		G5		G6	
	0.0039-0.062 mm		0.062-0.125 mm		0.125-025 mm		0.25-0.5 mm		0.5-1.0 mm		1.0-2.0 mm	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Quartz	39	2.3	317	19.1	556	33.5	715	43.1	31	1.9	2	0.1
Orthoclase	3	7.9	10	26.3	20	52.6	5	13.2	0.0	0.0	0.0	0.0
Microcline	10	5.6	44	30.9	55	30.9	66	37.1	2	1.1	1	0.6
Palagioclase	11	7.5	47	32.0	69	46.9	20	13.6	0.0	0.0	0.0	0.0
Rock fragments	1	2.5	8	20.0	20	50.0	10	25.0	0.0	0.0	1	2.5
Mica-Biotite	7	7.4	34	36.2	39	41.5	14	14.9	0.0	0.0	0.0	0.0
Mica-Muscovite	9	7.7	47	40.2	35	29.9	22	18.8	4	3.4	0.0	0.0
Iron	8	4.9	43	26.2	85	51.8	26	15.9	2	1.2	0.0	0.0
Perthite	2	3.7	6	11.1	13	24.1	32	59.3	1	1.9	0.0	0.0

The above classification is based on Udden-Wentworth scale of sedimentary petrology (see Pettijohn 1957:18, Fig.1 and Table 12).

Table:53

Non-plastic mineral inclusions: Shaqadud midden-Mesolithic levels-Western Butana.

Non-plastic mineral inclusions	G1		G2		G3		G4		G5		G6	
	0.0039-0.062 mm		0.062-0.125 mm		0.125-025 mm		0.25-0.5 mm		0.5-1.0 mm		1.0-2.0 mm	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Quartz	2	0.1	12	0.8	16	1.1	78	5.4	1057	73.4	275	19.1
Orthoclase	0.0	0.0	0.0	0.0	0.0	0.0	10	50.5	10	50.5	0.0	0.0
Microcline	0.0	0.0	0.0	0.0	1	0.7	4	2.8	110	78.0	26	18.4
Palagioclase	0.0	0.0	1	0.6	0.0	0.0	4	2.5	135	84.4	20	12.5
Rock fragments	0.0	0.0	0.0	0.0	0.0	0.0	9	9.1	57	75.8	15	15.2
Mica-Biotite	0.0	0.0	0.0	0.0	1	0.9	3	11.7	75	67.6	22	19.8
Mica-Muscovite	0.0	0.0	0.0	0.0	0.0	0.0	16	10.3	105	67.7	34	21.9
Iron	0.0	0.0	0.0	0.0	1	0.9	6	5.5	84	77.1	18	16.5
Perthite	0.0	0.0	1	0.3	2	0.7	18	5.9	226	73.9	59	19.3

The above classification is based on Udden-Wentworth scale of sedimentary petrology (see Pettijohn 1957:18, Fig.1 and Table 12).

Table:54

Non-plastic mineral inclusions: Shaqadud midden-Neolithic levels-Western Butana.

Non-plastic mineral inclusions	G1		G2		G3		G4		G5		G6	
	0.0039-0.062 mm		0.062-0.125 mm		0.125-025 mm		0.25-0.5 mm		0.5-1.0 mm		1.0-2.0 mm	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Quartz	40	2.9	191	13.7	326	23.4	823	59.2	9	0.6	2	0.1
Orthoclase	0.0	0.0	3	30.0	3	30.0	4	40.0	0.0	0.0	0.0	0.0
Microcline	2	2.0	10	10.0	38	38.0	48	48.0	2	2.0	0.0	0.0
Palagioclase	1	0.6	8	4.9	82	50.3	69	42.3	2	1.2	1	0.6
Rock fragments	0.0	0.0	0.0	0.0	10	50.5	10	50.5	0.0	0.0	0.0	0.0
Mica-Biotite	0.0	0.0	1	4.2	9	37.5	14	58.3	0.0	0.0	0.0	0.0
Mica-Muscovite	0.0	0.0	4	5.7	34	48.6	32	45.7	0.0	0.0	0.0	0.0
Iron	1	1.0	6	6.0	48	48.0	45	45.0	0.0	0.0	0.0	0.0
Perthite	14	2.6	100	18.2	170	31.0	260	47.4	5	0.9	0.0	0.0

The above classification is based on Udden-Wentworth scale of sedimentary petrology (see Pettijohn 1957:18, Fig.1 and Table 12).

Table:55

Non-plastic mineral inclusions: Shaqadud Cave, Western Butana.

Non-plastic mineral inclusions	G1		G2		G3		G4		G5		G6	
	0.0039-0.062 mm		0.062-0.125 mm		0.125-025 mm		0.25-0.5 mm		0.5-1.0 mm		1.0-2.0 mm	
	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%	Freq.	%
Quartz	22	1.4	116	7.6	221	14.6	1158	76.3	1	0.1	0.0	0.0
Orthoclase	8	7.3	25	22.7	55	50.5	21	19.1	1	0.9	0.0	0.0
Microcline	24	8.8	74	27.0	105	38.3	61	22.3	8	2.9	2	0.7
Palagioclase	6	2.9	40	19.6	90	44.1	66	32.4	1	0.5	1	0.5
Rock fragments	5	3.2	12	7.6	67	42.7	61	38.9	8	5.1	4	2.5
Mica-Biotite	4	3.1	15	11.7	94	73.4	14	10.9	1	0.8	0.0	0.0
Mica-Muscovite	11	9.8	48	42.9	33	29.5	16	14.3	3	2.7	1	0.9
Iron	4	2.9	32	23.2	88	63.8	13	9.4	1	0.7	0.0	0.0
Perthite	11	8.9	42	34.1	57	46.3	12	9.8	1	0.8	0.0	0.0

The above classification is based on Udden-Wentworth scale of sedimentary petrology (see Pettijohn 1957:18, Fig.1 and Table 12).

Table:56

T-tests for independent samples: non-plastic mineral inclusions of Sarurab2 Mesolithic and Islang2 Neolithic ceramics, western bank of the Main Nile, Khartoum Province.

Variable		Number of cases	Mean	Standard Deviation	Standard Error	F Value	2-tail Prob.	Pooled t value	Variance Degrees of Freedom	Estimate 2-tail Prob.
Q	GROUP 1	2032	726.3209	386.603	8.177	1.90	.000	2.05	4521	.040
	GROUP 2	2491	706.8844	267.377	5.357					
O	GROUP 1	57	647.1053	311.259	41.227	2.40	.004	1.09	129	.279
	GROUP 2	74	596.8514	217.711	25.308					
M	GROUP 1	1017	674.3943	386.117	12.108	3.02	.000	2.21	1598	.027
	GROUP 2	583	635.8799	222.153	9.201					
P	GROUP 1	181	631.4815	218.243	24.249	2.09	.000	2.42	81	.025
	GROUP 2	90	490.20	213.6	18.421					
R	GROUP 1	5	869.0000	345.876	154.680	1.97	.474	.72	9	.488
	GROUP 2	6	740.0000	246.252	100.532					
MB	GROUP 1	58	722.3621	376.912	49.491	4.82	.000	4.74	176	.000
	GROUP 2	120	527.6250	171.701	15.674					

Table:56 Contin.

IR	GROUP 1	242	506.8140	143.628	9.233	2.63	.000	-6.49	519	.000
	GROUP 2	279	618.8387	232.865	13.9411					
MS	GROUP 1	34	319.7059	280.075	48.032	3.00	.000	-7.30	149	.000
	GROUP 2	117	595.7778	14.949						

Key: Group1= Sarurab2, Group2= Islang2
Q= Quartz, O=Orthoclase, M=Microcline, P=Plagioclase,
R=Rock fragment, MB=Mica-Biotite, MS = Mica-Muscovite,
IR=Iron.

Table: 57

T-tests for independent samples: non-plastic mineral inclusions of Sarurab2 Mesolithic and Nofalab2 Neolithic ceramics, western bank of the Main Nile, Khartoum.

Variable		Number of cases	Mean	Standard Deviation	Standard Error	F Value	2-tail Prob.	Pooled t value	Variance Degrees of Freedom	Estimate 2-tail Prob.
Q	GROUP 1	2032	726.3209	368.603	8.177	10.49	.000	59.84	4458	.000
	GROUP 2	2428	253.8834	113.797	2.309					
O	GROUP 1	57	647.1053	311.259	41.227	11.25	.000	19.90	288	.000
	GROUP 2	233	174.9013	92.797	6.079					
M	GROUP 1	1017	674.3943	386.117	12.108	27.73	.071	2.27	1018	.023
	GROUP 2	3	167.333	73.323	42.333					
P	GROUP 1	81	631.4815	218.243	24,249	7.28	.000	18.80	180	.000
	GROUP 2	101	189.8317	80.893	8.049					
R	GROUP 1	5	869.0000	345.876	154.680	11.15	.005	4.14	12	.001
	GROUP 2	9	368.3333	103.562	34.521					
MB	GROUP 1	58	722.3621	376.912	49.491	36.37	.012	2.65	60	.010
	GROUP 2	4	218.7500	62.500	31.250					

Table:57 Contin.

IR	GROUP 1	242	506.8140	143.628	9.233	1.42	.003	24.69	611	.000
	GROUP 2	371	178.2776	171.412	8.899					
MS	GROUP 1	34	319.7059	280.075	48.032	17.28	.000	1.51	44	.137
	GROUP 2	12	195.1667	67.379	19.451					

Key: Group1=Sarurab2, Group2=Nofalab2
Q=Quartz, O=Orthoclase, M=Microcline, P=Plagioclase,
R=Rock fragment, MB=Mica-Biotite, MS=Mica-Muscovite,
IR=Iron.

Table: 58

T-tests for independent samples:non-plastic mineral inclusions of Islang2 and Nofalab Neolithic ceramics, Western bank of the Main Nile, Khartoum Province.

Variable		Number of cases	Mean	Standard Deviation	Standard Error	F Value	2-tail Prob.	Pooled t value	Variance Degrees of Freedom	Estimate 2-tail Prob.
Q	GROUP 1	2491	706.8844	267.377	5.357	5.52	.000	76.96	4917	.000
	GROUP 2	2428	253.8834	113.797	2.309					
O	GROUP 1	74	596.8514	217.711	25.308	5.50	.000	23.64	305	.000
	GROUP 2	233	174.9013	92.797	6.079					
M	GROUP 1	583	635.8799	222.153	9.201	9.18	.206	3.65	584	.000
	GROUP 2	300	167.3333	73.323	42.333					
P	GROUP 1	90	540.20	213.6	18.421	5.60	.000	25.65	101	.000
	GROUP 2	101	189.8317	80.893	8.049					
R	GROUP 1	6	740.0000	246.252	100.532	5.65	.02	4.08	13	.001
	GROUP 2	9	368.3333	103.562	34.521					
MB	GROUP 1	120	527.6250	171.701	15.674	7.55	.119	3.58	122	.000
	GROUP 2	14	218.7500	62.500	31.250					

Table:58 Contin.

IR	GROUP 1	279	618.8387	232.865	13.941	1.85	.000	27.78	648	.000
	GROUP 2	371	178.2776	171.412	8.889					
MS	GROUP 1	117	595.7778	161.693	14.949	5.76	.003	8.48	127	.000
	GROUP 2	12	195.1667	67.379	19.451					

Key: Group1=Islang2, Group2=Nofalab2
Q=Quartz, O=Orthoclase, M=Microcline, P=Plagioclase,
R=Rock fragment, MB=Mica-Biotite, MS=Mica-Muscovite, IR=Iron.

Table:59

T-tests for independent samples: non-plastic mineral inclusions of Kabbashi-Haitah and Geili ceramics, Khartoum Province, east bank of the Main Nile.

Variable		Number of cases	Mean	Standard Deviation	Standard Error	F Value	2-tail Prob.	Pooled t value	Variance Degrees of Freedom	Estimate 2-tail Prob.
Q	GROUP 1	1513	860.3437	464.478	11.941	16.24	.000	54.12	3276	.000
	GROUP 2	1765	240.8601	115.243	2.743					
O	GROUP 1	77	1010.5584	504.353	57.476	6.33	.001	5.73	89	.000
	GROUP 2	14	244.5714	200.533	53.595					
PE	GROUP 1	99	1014.9495	435.576	43.777	.	.	.	99	.
	GROUP 2	0	.	.	.					
M	GROUP 1	148	966.1081	460.244	37.832	25.38	.000	16.14	237	.000
	GROUP 2	91	177.7473	90.991	9.538					
P	GROUP 1	167	589.8563	293.816	22.736	7.10	.000	12.71	252	.000
	GROUP 2	87	174.6322	110.265	11.822					
R	GROUP 1	44	774.4773	390.811	58.917	2.46	.001	8.11	104	.000
	GROUP 2	62	270.0968	249.062	31.631					
MB	GROUP 1	168	699.7059	434.524	52.694	22.13	.000	8.77	123	.000
	GROUP 2	157	185.2632	92.373	12.235					

Table 59: Contin.

IR	GROUP 1	187	636.7219	418.825	30.627	16.62	.000	15.28	411	.000
	GROUP 2	226	195.8496	6.831						
MS	GROUP 1	177	608.4463	260.008	19.543	7.91	.000	16.19	359	.000
	GROUP 2	184	278.3424	92.425	6.814					

Key: Group =Kabbashi Haitah, Group2=Geili
Q=Quartz, O=Orthoclase, PE=Perthite, M=Microcline, P=Plagioclase,
R=Rock fragment, MB=Mica-Biotite, MS=Mica=Muscovite, 1R=iron.

Table:60

T-tests for independent samples: non-plastic mineral inclusions of Kabbashi-Haitah and Kabbashi ceramics, Khartoum Province, West bank of the Main Nile.

Variable		Number of cases	Mean	Standard Deviation	Standard Error	F Value	2-tail Prob.	Pooled t value	Variance Degrees of Freedom	Estimate 2-tail Prob.
Q	GROUP 1	1513	860.3437	464.478	11.941	2.68	.000	9.38	3603	.000
	GROUP 2	2092	743.0703	283.465	6.198					
O	GROUP 1	77	1010.5584	504.353	57.476	52.73	.000	4.34	94	.000
	GROUP 2	19	505.3158	69.457	15.935					
PE	GROUP 1	99	1014.9495	435.576	43.777	4.91	.000	11.70	402	.000
	GROUP 2	305	643.2262	196.483	11.251					
M	GROUP 1	148	966.1081	460.244	37.832	4.78	.000	5.26	240	.000
	GROUP 2	94	700.0106	210.462	21.707					
P	GROUP 1	167	589.8563	293.816	22.736	2.22	.012	.50	196	.618
	GROUP 2	131	562.3871	197.123	35.404					
R	GROUP 1	44	774.4773	390.811	58.917	1.80	.179	.58	53	.566
	GROUP 2	11	692.8182	524.311	158.086					
MB	GROUP 1	68	699.7059	434.524	52. 694	2.71	.005	.70	94	.486
	GROUP 2	28	638.0000	264.011	49.893					

Table: 60 Contin.

IR	GROUP 1	187	636.7219	418.825	30.627	22.81	.000	3.01	260	.003
	GROUP 2	75	489.6933	87.689	10.125					
MS	GROUP 1	177	608.4463	260.008	19.543	1.77	.001	1.41	307	.158
	GROUP 2	132	570.2576	195.611	17.026					

Key: Group 1= Kabbashi Haitah, Group 2= Kabbashi
Q= Quartz, O=Orthoclase, PE=Perthite, M=Microcline,
P=Plagioclase, R=Rock fragment, MB=Mica-Biotite, MS=Mica-Muscovite,
1R=Iron.

Table:61

T-tests for independent samples: non-plastic mineral inclusions of Geili and Kabbashi ceramics, Khartoum Province, east bank of the Main Nile.

Variable		Number of cases	Mean	Standard Deviation	Standard Error	F Value	2-tail Prob.	Pooled t value	Variance Degrees of Freedom	Estimate 2-tail Prob.
Q	GROUP 1	1765	240.8601	115.243	2.743	6.05	.000	-69.73	3855	.000
	GROUP 2	2092	743.0703	283.465	6.198					
O	GROUP 1	114	224.5714	200.533	53.595	8.34	.000	-5.68	31	.000
	GROUP 2	119	505.3158	69.457	15.935					
PE	GROUP 1	0	.	.	.	.	.	.	305	.
	GROUP 2	305	643.2262	196.483	11.251					
M	GROUP 1	91	177.7473	90.991	9.538	5.35	.000	-21.78	183	.000
	GROUP 2	94	700.0106	210.462	21.707					
P	GROUP 1	187	174.6322	110.265	11.822	3.20	.000	-13.43	116	.000
	GROUP 2	131	562.3871	197.123	35.404					
R	GROUP 1	62	270.0968	249.062	31.631	4.43	.000	-4.26	71	.000
	GROUP 2	11	692.8182	524.311	158.086					
MB	GROUP 1	57	185.2632	92.373	12.235	8.17	.000	-11.63	83	.000
	GROUP 2	28	638.0000	264.011	49.893					

Table: 61 Contin.

IR	GROUP 1	226	195.8496	102.696	6.831	1.37	.113	-22.23	299	.000
	GROUP 2	75	489.6933	87.689	10.125					
MS	GROUP 1	184	278.3424	92.425	6.814	4.48	.000	-17.68	314	.000
	GROUP 2	132	570.2576	195.611	17.026					

Key: Group1= Geili, Group2=Kabbashi
Q=Quartz, O=Orthoclase, PE Perthite, M=Microcline, P=Plagioclase,
R=Rock fragment, MB=Mica-Biotite, MS=Mica-Muscovite, 1R=Iron

Table:62

T-tests for independent samples: non-plastic mineral inclusions of Shabona and Rabak (Kh.Neo.L.) ceramics, White Nile Province.

Variable		Number of cases	Mean	Standard Deviation	Standard Error	F Value	2-tail Prob.	Pooled t value	Variance Degrees of Freedom	Estimate 2-tail Prob.
Q	GROUP 1	2056	728.6138	313.857	6.922	6.50	.000	53.12	3589	.000
	GROUP 2	1535	279.2560	123.093	3.142					
O	GROUP 1	60	522.4000	187.122	24.157	1.72	.190	4.92	78	.000
	GROUP 2	20	297.1500	142.619	31.891					
PE	GROUP 1	0	.	.	.	.	.	.	147	.
	GROUP 2	147	285.1837	148.624	12.258					
M	GROUP 1	142	659.4296	248.595	20.862	2.96	.000	17.42	341	.000
	GROUP 2	201	288.2139	144.451	10.189					
P	GROUP 1	31	484.4516	297.072	53.356	5.36	.000	7.25	144	.000
	GROUP 2	115	224.4870	128.315	11.965					
R	GROUP 1	11	671.7273	255.431	77.015	4.46	.020	1.19	29	.244
	GROUP 2	20	465.8000	539.242	120.578					
MS	GROUP 1	16	702.3750	591.844	147.961	19.57	.000	4.27	47	.000
	GROUP 2	33	244.2727	133.778	23.288					

Table:62 Contin.

MB	GROUP 1	10	355.5000	241.310	76.309	4.05	.003	1.87	42	.069
	GROUP 2	34	251.9706	119.932	20.568					
IR	GROUP 1	374	614.4412	194.206	10.042	3.02	.000	25.99	655	.000
	GROUP 2	283	278.8799	111.818	6.647					

Key:Group1=Shabona, Group 2=Rabak (Kh.Neo.L.).
Q=quartz, O=Orthoclase, PE=Perthite, M=Microcline, P=Plagioclase,
R=Rock fragment, MS=Mica-Muscovite, MB=Mica-Biotite, 1R=Iron.

Table: 63

T-tests for independent samples: non-plastic mineral inclusions of Rabak (J.M.L.) and Rabak (Kh.Neo.L) ceramics, White Nile Province.

Variable		Number of cases	Mean	Standard Deviation	Standard Error	F Value	2-tail Prob.	Pooled t value	Variance Degrees of Freedom	Estimate 2-tail Prob.
Q	GROUP 1	1660	234.7849	125.993	3.92	1.05	.353	-10.08	3193	.000
	GROUP 2	1535	279.2560	123.093	3.142					
O	GROUP 1	38	166.0000	84.664	13.734	2.84	.006	-4.40	56	.000
	GROUP 2	20	297.1500	142.619	31.891					
PE	GROUP 1	54	236.5370	114.134	15.532	1.70	.029	-2.18	199	.030
	GROUP 2	147	285.1837	148.624	12.258					
M	GROUP 1	178	199.7191	123.133	9.229	1.38	.030	-6.38	377	.000
	GROUP 2	201	288.2139	144.451	10.189					
P	GROUP 1	147	165.5102	77.375	6.382	2.75	.000	-4.61	260	.000
	GROUP 2	115	224.4870	128.315	11.965					
R	GROUP 1	40	231.4000	212.892	33.661	6.42	.000	-2.41	58	.019
	GROUP 2	20	465.8000	539.242	120.578					
MS	GROUP 1	117	170.8632	119.650	11.062	1.25	.391	-3.03	148	.003
	GROUP 2	33	244.2727	133.778	23.288					

Table:63 Contin.

MB	GROUP 1	94	163.8085	86.096	0.880	1.94	.014	-4.58	126	.000
	GROUP 2	34	251.9706	119.932	20.568					
IR	GROUP 1	164	181.1707	95.495	7.454	1.37	.026	-9.38	445	.000
	GROUP 2	283	278.8799	111.818	6.647					

Key: Group 1=Rabak (J.M.L), Group2=Rabak (Kh.Neo.L.).
Q=Quartz, O=Orthoclase, PE=Perthite, M=Microcline,
P=Plagioclase, R=Rock fragment, MS=Mica-Muscovite, MB=Mica-Biotite.

Table:64

T-tests for independent samples:non-plastic mineral inclusions of Shabona and Rabak (J.M.L.) ceramics, White Nile Province.

Variable		Number of cases	Mean	Standard Deviation	Standard Error	F Value	2-tail Prob.	Pooled t value	Variance Degrees of Freedom	Estimate 2-tail Prob.
Q	GROUP 1	2056	728.6138	313.857	6.922	6.21	.000	60.30	3714	.000
	GROUP 2	1660	234.7849	125.993	3.092					
O	GROUP 1	60	522.4000	187.122	24.157	4.88	.000	11.03	96	.000
	GROUP 2	38	166.0000	84.664	13.734					
PE	GROUP 1	0	.	.	.	.	.	.	54	.
	GROUP 2	54	236.5370	114.134	15.532	.	.			
M	GROUP 1	142	659.4296	248.595	20.862	4.08	.000	21.58	318	.000
	GROUP 2	178	199.7191	123.133	9.229					
P	GROUP 1	31	484.4516	297.072	53.356	14.74	.000	11.41	176	.000
	GROUP 2	147	165.5102	77.375	6.382					
R	GROUP 1	11	671.7273	255.431	77.015	1.44	.000	5.82	49	.000
	GROUP 2	40	231.4000	212.892	33.661					
MS	GROUP 1	16	702.3750	591.844	147.961	24.47	.000	8.68	131	.000
	GROUP 2	117	170.8632	119.650	11.062					

Table:64 Contin.

MB	GROUP 1	10	355.5000	241.310	76.309	7.86	.000	5.28	102	.000
	GROUP 2	94	163.8085	86.096	9.880					
IR	GROUP 1	374	614.4412	194.206	10.042	4.14	.000	27.16	635	.000
	GROUP 2	164	181.1707	95.459	7.454					

Key: Q=Quartz, O=Orthoclase, PE=Perthite, M=Microcline, P=Plagioclase, R=Rock fragment
Group2=Rabak (J.M.L.) MS=Mica-Muscovite, MB=Mica-Biotite, 1R=Iron.

Table: 65

T-tests for independent samples: non-plastic mineral inclusions of Shaqadud midden-Mesolithic and Neolithic levels-ceramics, Western Butana.

Variable		Number of cases	Mean	Standard Deviation	Standard Error	F Value	2-tail Prob.	Pooled t value	Variance Degrees of Freedom	Estimate 2-tail Prob.
Q	GROUP 1	1440	727.3521	393.329	10.365	13.41	.000	43.21	2829	.000
	GROUP 2	1391	255.4853	107.415	2.880					
O	GROUP 1	2	547.5000	201.525	142.500	.	.	.	10	.
	GROUP 2	10	227.7000	116.948	36.982					
PE	GROUP 1	306	790.2745	307.688	17.589	8.02	.000	38.08	853	.000
	GROUP 2	549	237.2659	108.649	4.637					
M	GROUP 1	141	744.5035	286.406	24.120	6.83	.000	16.41	239	.000
	GROUP 2	100	250.4300	109.598	10.960					
P	GROUP 1	160	734.2562	234.212	18.516	3.63	.000	22.97	321	.000
	GROUP 2	163	257.4294	122.78	9.625					
R	GROUP 1	99	764.1212	348.938	35.070	14.89	.000	6.20	117	.000
	GROUP 2	20	275.5500	90.428	20.220					
MB	GROUP 1	111	733.1802	409.490	38.867	32.44	.000	5.69	133	.000
	GROUP 2	24	254.3750	71.899	14.676					

Table:65 Contin.

IR	GROUP 1	109	748.0550	272.320	26.084	9.22	.000	17.76	207	.000
	GROUP 2	100	240.7300	89.704	8.970					
MS	GROUP 1	155	804.4323	400.338	32.156	22.54	.000	11.31	233	.000
	GROUP 2	70	257.3571	84.327	10.079					

Key: Group1=Shaqadud midden-Mesolithic levels, Group2=Shaqadud midden-Neolithic levels.
Q=Quartz, O=Orthoclase, PE=Perthite, M=Microcline, P=Plagioclase,
R=Rock fragment, MB=Mica Biotite, MS=Mica-Muscovite, 1R=Iron.

Table: 66

T-tests for independent samples: non-plastic mineral inclusions of Shaqadud midden-Neolithic levels-and Shaqadud Cave ceramics, Western Butana.

Variable		Number of cases	Mean	Standard Deviation	Standard Error	F Value	2-tail Prob.	Pooled t value	Variance Degrees of Freedom	Estimate 2-tail Prob.
Q	GROUP 1	1391	255.4853	107.415	2.880	1.98	.000	-4.63	2907	.000
	GROUP 2	1518	271.3860	76.281	1.958					
O	GROUP 1	10	277.7000	116.948	36.982	1.49	.324	1.08	118	.284
	GROUP 2	110	192.9545	95.952	9.149					
PE	GROUP 1	549	237.2659	108.649	4.637	1.46	.012	6.90	670	.000
	GROUP 2	123	164.6585	90.050	8.119					
M	GROUP 1	100	250.4300	109.598	10.960	2.21	.000	2.91	372	.004
	GROUP 2	274	199.1971	162.899	9.841					
P	GROUP 1	163	257.4294	122.878	9.625	1.28	.096	3.81	365	.000
	GROUP 2	204	211.3873	108.626	7.605					
R	GROUP 1	20	275.5500	90.428	20.20	7.54	.000	-.19	175	.849
	GROUP 2	157	286.2166	248.303	19.817					
MB	GROUP 1	24	254.3750	71.899	14.676	1.07	.897	3.59	150	.000
	GROUP 2	128	195.2500	74.310	6.568					

Table:66 Contin.

IR	GROUP 1	100	240.7300	89.704	8.970	1.05	.805	6.75	236	.000
	GROUP 2	138	160.0435	91.885	7.822					
MS	GROUP 1	70	257.3571	84.327	10.079	6.18	.000	2.90	180	.004
	GROUP 2	112	181.0446	209.680	19.813					

Key: Group 1=Shaqadud midden-Neolithic, Group 2 = Shaqadud Cave.
Q=Quartz, O=Orthoclase, PE=Perthite, M=Microcline, P=Plagioclase,
R=Rock fragment, MB=Mica-Biotite, MS=Mica-Muscovite, IR=Iron.

Table:67

T-tests for independent samples: non-plastic mineral inclusions of Shaqadud midden-Mesolithic levels and Shaqadud Cave ceramics.

Variable		Number of cases	Mean	Standard Deviation	Standard Error	F Value	2-tail Prob.	Pooled t value	Variance Degrees of Freedom	Estimate 2-tail Prob.
Q	GROUP 1	1440	727.3521	393.328	10.365	26.59	.000	44.30	2956	.000
	GROUP 2	1518	271.3860	76.281	1.958					
O	GROUP 1	2	547.5000	201.525	142.500	.	.	.	110	.
	GROUP 2	110	192.9545	95.952	9.149					
PE	GROUP 1	306	790.2745	307.688	17.589	11.68	.000	22.16	427	.000
	GROUP 2	123	164.6585	90.050	8.119					
M	GROUP 1	141	744.5035	286.406	24.120	3.09	.000	24.71	413	.000
	GROUP 2	274	199.1971	162.899	9.841					
P	GROUP 1	160	734.2562	234.212	18.516	4.65	.000	28.25	362	.000
	GROUP 2	204	211.3873	108.626	7.605					
R	GROUP 1	99	764.1212	348.938	35.070	1.97	.000	12.78	254	.000
	GROUP 2	157	286.2166	248.303	19.817					
MB	GROUP 1	111	733.1802	409.490	38.867	30.37	.000	14.59	237	.000
	GROUP 2	128	195.2500	74.310	6.568					

Table:67 Contin.

IR	GROUP 1	109	748.0550	272.320	26.084	8.78	.000	23.72	245	.000
	GROUP 2	138	160.0435	91.885	7.822					
MS	GROUP 1	155	804.4323	400.338	32.156	3.65	.000	15.05	265	.000
	GROUP 2	122	181.0446	209.680	19.813					

Key: Group 1=Shaqadud midden-Mesolithic levels, Group 2=Shaqadud Cave
Q=Quartz, O=Orthoclase, PE=Perthite, M=Microcline, P=Plagioclase,
R=Rock fragment, MB=Mica-Biotite, MS=Mica-Muscovite, 1R=Iron.

Table:68

T-tests for independent samples: aplastic mineral inclusions of groups' combinations, Khartoum-east and west bank of the Main Nile

Variable		Number of cases	Mean	Standard Deviation	Standard Error	F Value	2-tail Prob.	Pooled t value	Variance Degrees of Freedom	Estimate 2-tail Prob.
Q	GROUP 1	6951	554.3320	344.043	4.127	1.40	.000	-8.37	12319	.000
	GROUP 2	5370	611.0467	407.147	5.556					
O	GROUP 1	364	334.6264	275.149	14.422	3.58	.000	-12.92	472	.000
	GROUP 2	110	823.2545	520.945	49.671					
PE	GROUP 1	0	.	.	.	.	.	.	404	.
	GROUP 2	404	734.3168	317.624	15.802	.	.			
M	GROUP 1	1603	659.4379	336.579	8.407	1.89	.000	-.74	1934	.459
	GROUP 2	333	675.5556	462.784	25.360					
P	GROUP 1	272	386.3901	270.385	20.042	1.29	.063	-2.65	465	.008
	GROUP 2	285	460.1158	307.005	18.185					
R	GROUP 1	20	605.0000	310.301	69.385	1.80	.141	1.08	135	.281
	GROUP 2	117	499.5214	416.278	38.485					
MB	GROUP 1	182	582.8956	274.543	20.351	2.09	.000	2.34	333	.020
	GROUP 2	153	496.7582	396.532	32.058					

Table:68 contin.

IR	GROUP 1	892	405.2085	270.625	9.061	1.57	.000	-.28	1378	.777
	GROUP 2	488	409.9508	399.168	15.353					
MS	GROUP 1	163	508.6994	235.080	18.413	1.10	.469	1.53	654	.127
	GROUP 2	493	475.0183	246.685	11.110					

Key: Group1=Khartoum-east bank of the Main Nile, Group2=Khartoum=west bank of the Main Nile
Q=Quartz, O=Orthoclase, PE=Perthite, M=Microcline, P=Plagioclase,
R=Rock fragment, MB=Mica-Biotite, 1R=Iron, MS=Mica-Muscovite.

Table: 69

T-tests for independent samples: aplastic mineral inclusions for groups' combinations, Khartoum-west bank of the Main Nile and Western Butana.

Variable		Number of cases	Mean	Standard Deviation	Standard Error	F Value	2-tail Prob.	Pooled t value	Variance Degrees of Freedom	Estimate 2-tail Prob.
Q	GROUP 1	6951	554.3320	344.043	4.127	1.13	.000	21.08	11298	.000
	GROUP 2	4349	417.2755	323.369	4.903					
O	GROUP 1	364	334.6264	275.149	14.422	6.44	.000	5.20	484	.000
	GROUP 2	122	201.6148	108.390	9.813					
PE	GROUP 1	0	.	.	.	.	.	.	978	.
	GROUP 2	978	401.1616	326.721	10.447					
M	GROUP 1	1603	659.4379	336.579	8.407	1.19	.019	18.00	2116	.000
	GROUP 2	515	358.4427	308.907	13.612					
P	GROUP 1	182	386.3901	270.385	20.042	1.09	.500	.08	707	.933
	GROUP 2	527	384.3738	282.175	12.292					
R	GROUP 1	20	605.0000	310.301	69.385	1.37	.426	1.78	294	.077
	GROUP 2	276	456.8659	363.225	21.864					
MB	GROUP 1	153	496.7582	396.532	32.058	1.11	.477	1.77	441	.078
	GROUP 2	263	427.6806	377.116	23.254					

Table:69 contin.

IR	GROUP 1	488	409.9508	339.168	15.353	1.20	.075	1.82	833	.068
	GROUP 2	347	368.0029	310.203	16.653					
MS	GROUP 1	493	475.0183	246.685	11.110	2.93	.000	-.37	828	.712
	GROUP 2	337	483.6172	422.022	22.989					

Key: Group1=Khartoum-west bank of the Main Nile, Group2=Western Butana
Q=Quartz, O=Orthoclase, PE=Perthite, M=Microcline, P=Plagioclase,
R=Rock fragment, MB=Mica-Biotite, IR=Iron, MS=Mica-Muscovite

Table:70

T-tests for independent samples: aplastic mineral inclusions of groups' combinations, Khartoum-west bank of the Main Nile and White Nile

Variable		Number of cases	Mean	Standard Deviation	Standard Error	F Value	2-tail Prob.	Pooled t value	Variance Degrees of Freedom	Estimate 2-tail Prob.
Q	GROUP 1	6951	554.3320	344.043	4.127	1.17	.000	18.57	12200	.000
	GROUP 2	5251	441.1409	318.578	4.396					
O	GROUP 1	364	334.6264	275.149	14.422	1.53	.007	-1.25	480	.212
	GROUP 2	118	369.4492	222.622	20.494					
PE	GROUP 1	0	.	.	.	.	.	.	201	.
	GROUP 2	201	272.1144	141.578	9.986					
M	GROUP 1	1603	659.4379	336.579	8.407	1.74	.000	18.69	2122	.000
	GROUP 2	521	359.1555	255.366	11.188					
P	GROUP 1	182	386.3901	270.385	20.042	2.67	.000	8.20	347	.000
	GROUP 2	293	222.4027	165.559	9.672					
R	GROUP 1	20	605.0000	310.301	69.385	1.47	.350	2.60	89	.011
	GROUP 2	71	365.6479	376.012	44.624					
MB	GROUP 1	182	582.8956	274.543	20.351	4.81	.000	15.25	318	.000
	GROUP 2	138	199.4203	125.122	10.651					

Table 70: Contin.

IR	GROUP 1	892	405.2085	270.625	9.061	1.25	.001	-.56	1711	.573
	GROUP 2	821	412.2241	242.346	8.458					
MS	GROUP 1	163	508.6994	235.080	18.413	.	.	.	163	.
	GROUP 2	0	.	.	.	.	.	.	.	.

Key: Group1=Khartom-west bank of the Main Nile, Group2=White Nile
Q=Quartz, O=Orthoclase, PE=Perthite, M=Microcline, P=Plagioclase,
R=Rock fragment, MB=Mica-Biotite, 1R=Iron, MS=Mica-Muscovite.

Table: 71

T-tests for independent samples: aplastic mineral inclusions of groups' combinations, Khartoum-east bank of the Main Nile and Western Butana.

Variable		Number of cases	Mean	Standard Deviation	Standard Error	F Value	2-tail Prob.	Pooled t value	Variance Degrees of Freedom	Estimate 2-tail Prob.
Q	GROUP 1	5370	611.0467	407.147	5.556	1.59	.000	25.53	9717	.000
	GROUP 2	4349	417.2755	323.369	4.903					
O	GROUP 1	110	823.2545	520.954	49.671	23.10	.000	12.88	230	.000
	GROUP 2	122	201.6148	108.390	9.813					
PE	GROUP 1	404	734.3168	317.624	15.802	1.06	.509	17.38	1380	.000
	GROUP 2	973	401.1616	326.721	10.447					
M	GROUP 1	333	675.5556	462.784	25.360	2.24	.000	11.97	846	.000
	GROUP 2	515	358.4427	308.907	13.612					
P	GROUP 1	285	460.1158	307.005	18.185	1.18	.101	3.54	810	.000
	GROUP 2	527	384.3738	282.175	12.292					
R	GROUP 1	117	500.0214	416.278	38.485	1.31	.073	1.02	391	.309
	GROUP 2	276	456.8659	363.225	21.864					
MB	GROUP 1	153	496.7582	396.532	32.058	1.11	.477	1.77	414	.078
	GROUP 2	263	427.6806	377.116	23.254					

Table:71 contin.

IR	GROUP 1	488	409.9508	339.168	15.353	1.20	.075	1.82	833	.068
	GROUP 2	347	368.0029	310.203	16.653					
MS	GROUP 1	493	475.0183	246.685	11.110	2.93	.000	-.37	828	.712
	GROUP 2	337	483.6172	422.022	22.989					

Key: Group1=Khartoum-east bank of the Main Nile, Group2=Western Butana.
Q=Quartz, O=Orthoclase, PE=Perthite, M=Microcline, P=Plagioclase,
R=Rock fragment, MB=Mica-Biotite, 1R=Iron, MS=Mica-Muscovite.

Table: 72

T-tests for independent samples: aplastic mineral inclusions of groups' combinations, Khartoum-east bank of the Main Nile and White Nile.

Variable		Number of cases	Mean	Standard Deviation	Standard Error	F Value	2-tail Prob.	Pooled t value	Variance Degrees of Freedom	Estimate 2-tail Prob.
Q	GROUP 1	5370	611.0467	407.147	5.556	1.63	.000	23.92	10619	.000
	GROUP 2	5251	441.1409	318.578	4.396					
O	GROUP 1	110	823.2545	520.954	49.671	5.48	.000	8.65	226	.000
	GROUP 2	118	369.4492	222.622	20.494					
PE	GROUP 1	404	734.3168	317.624	15.802	5.03	.000	19.68	603	.000
	GROUP 2	201	272.1144	141.578	9.986					
M	GROUP 1	333	675.5556	462.784	25.360	3.28	.000	12.85	852	.000
	GROUP 2	521	359.1555	255.366	11.188					
P	GROUP 1	285	460.1158	307.005	18.185	3.44	.000	11.63	576	.000
	GROUP 2	293	222.4027	165.559	9.672					
R	GROUP 1	117	499.5214	416.278	38.485	1.23	.375	2.22	186	.028
	GROUP 2	71	365.6479	376.012	44.624					
MB	GROUP 1	153	496.7582	32.058	10.04	.000	8.44	289	.000	
	GROUP 2	138	199.4203	125.122	10.651					

Table:72 contin.

IR	GROUP 1	488	409.9508	339.168	15.353	1.96	.000	-.14	1307	.888
	GROUP 2	821	412.2241	242.346	8.458					
MS	GROUP 1	493	475.0183	246.685	11.110	.	.	.	493	.
	GROUP 2	0	.	.	.					

Key: Group1=east bank of the Main Nile, Group2=White Nile
Q=Quartz, O=Orthoclase, PE=Perthite, M=Microcline,
P=Plagioclase, R=Rock fragment, MB=Mica-Biotite,
1R=Iron, MS=Mica-Muscovite.

Table:73

T-tests for independent samples: aplastic mineral inclusions of groups' combinations, Western Butana and White Nile.

Variable		Number of cases	Mean	Standard Deviation	Standard Error	F Value	2-tail Prob.	Pooled t value	Variance Degrees of Freedom	Estimate 2-tail Prob.
Q	GROUP 1	4349	417.2755	323.369	4.903	1.03	.303	-3.63	9598	.000
	GROUP 2	5251	441.1409	318.578	4.396					
O	GROUP 1	122	201.6148	108.390	9.813	4.22	.000	-7.46	238	.000
	GROUP 2	188	369.4492	222.622	20.494					
PE	GROUP 1	978	401.1616	326.721	10.447	5.33	.000	5.49	1177	.000
	GROUP 2	201	272.1144	141.578	9.986					
M	GROUP 1	515	358.4427	308.907	13.612	1.46	.000	-.04	1034	.968
	GROUP 2	521	359.1555	255.366	11.188					
P	GROUP 1	527	384.3738	282.175	12.292	2.90	.000	9.00	818	.000
	GROUP 2	293	222.4027	165.559	9.672					
R	GROUP 1	276	456.8659	363.225	21.864	1.08	.686	1.87	345	.062
	GROUP 2	71	365.6479	376.012	44.624					
MB	GROUP 1	263	427.6806	377.116	23.254	9.08	.000	6.91	399	.000
	GROUP 2	138	199.4203	125.122	10.651					

Table:73 Contin.

IR	GROUP 1	347	368.0029	310.203	16.653	1.64	.000	-2.61	1166	.009
	GROUP 2	821	412.2241	242.346	8.458					
MS	GROUP 1	337	483.6172	422.022	22.989	.	.	.	337	.
	GROUP 2	0	.	.	.					

Key: Group1=Western Butana, Group2=White Nile
Q=Quartz, O=Orthoclase, PE=Perthite, M=Microcline, P=Plagioclase,
R=Rock fragment, MB=Mica-Biotite, IR=Iron, MS=Mica-Muscovite.

b - List of illustrations

b1- Figures

Figures

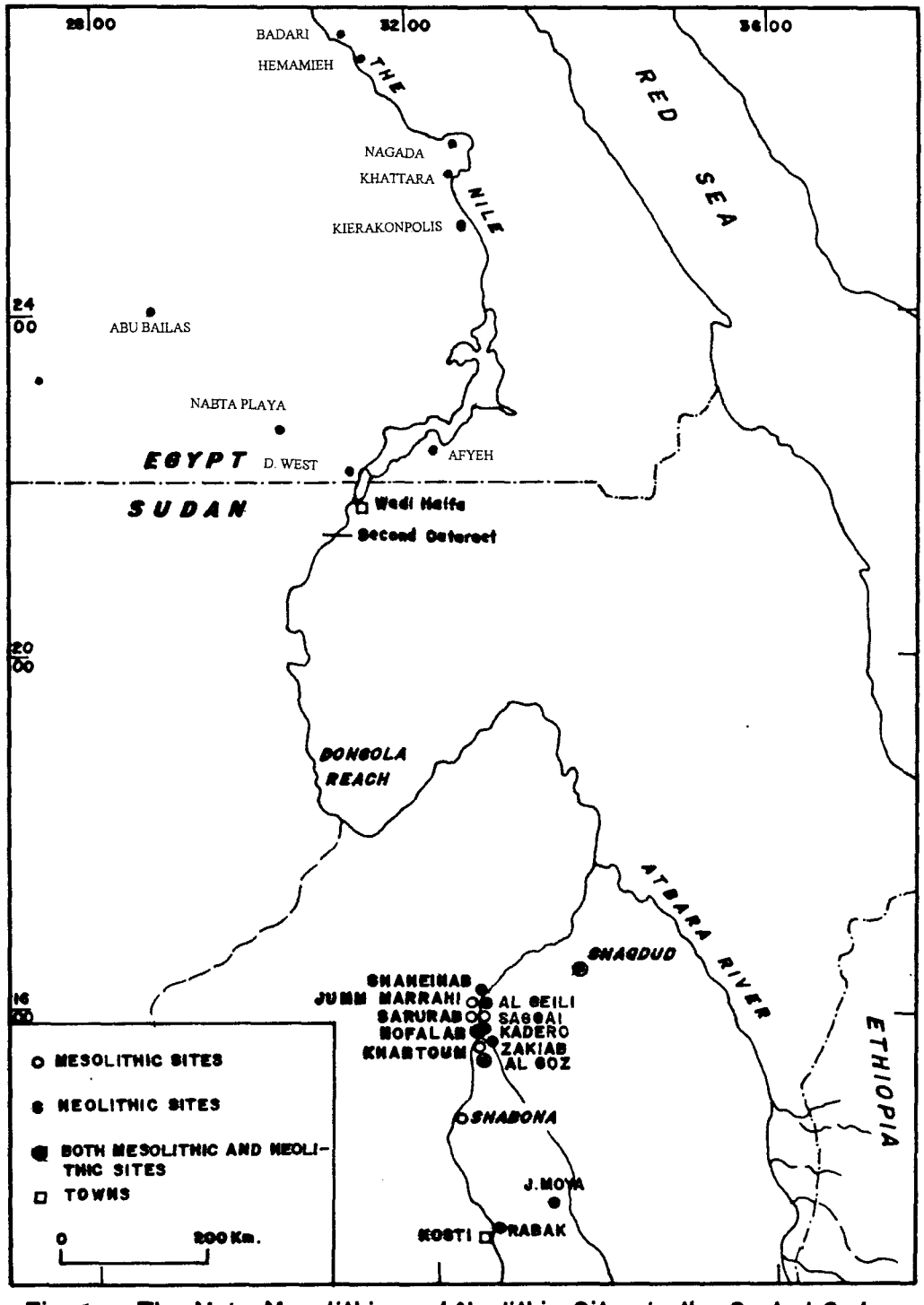


Fig. 1 The Main Mesolithic and Neolithic Sites in the Central Sudan.

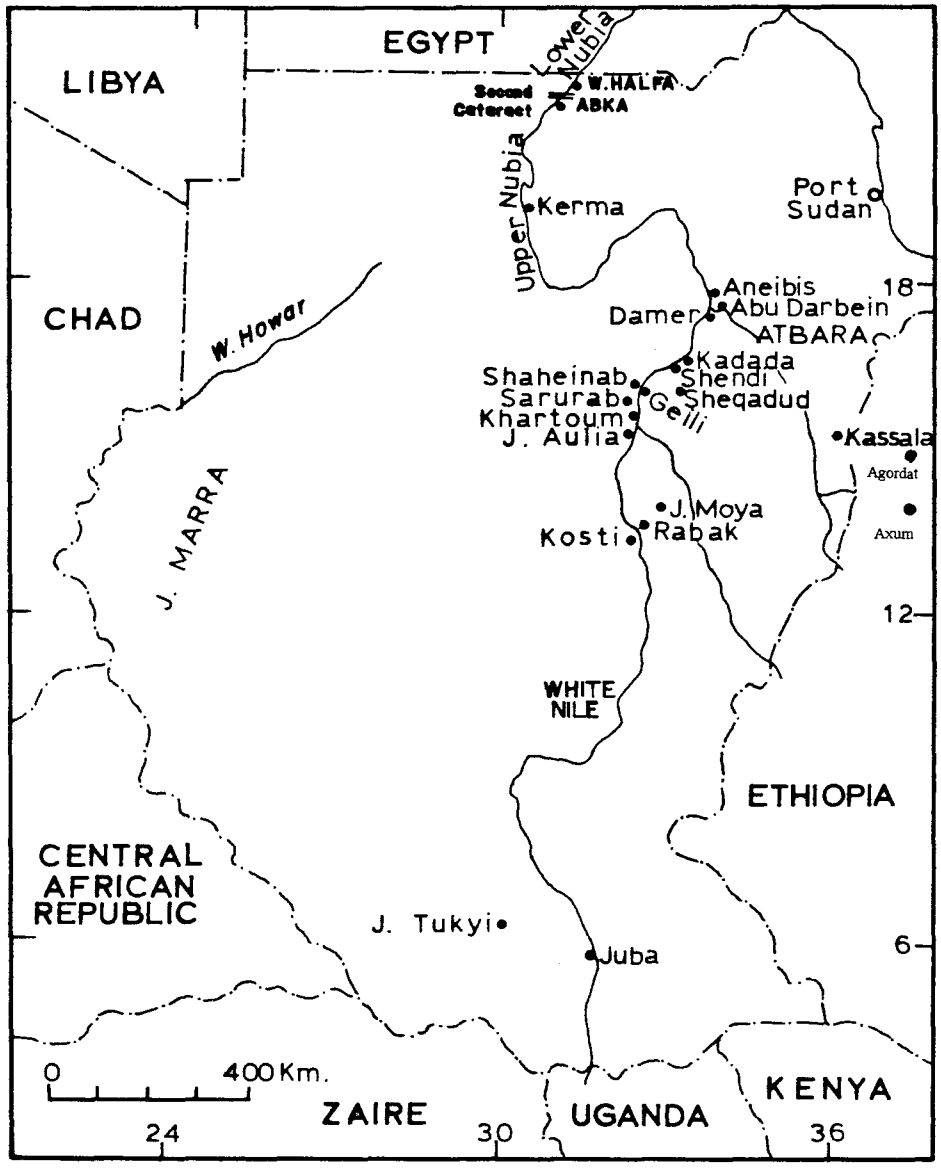


Fig. 2 Map of Sudan and neighboring areas, showing sites and places mentioned in the text.

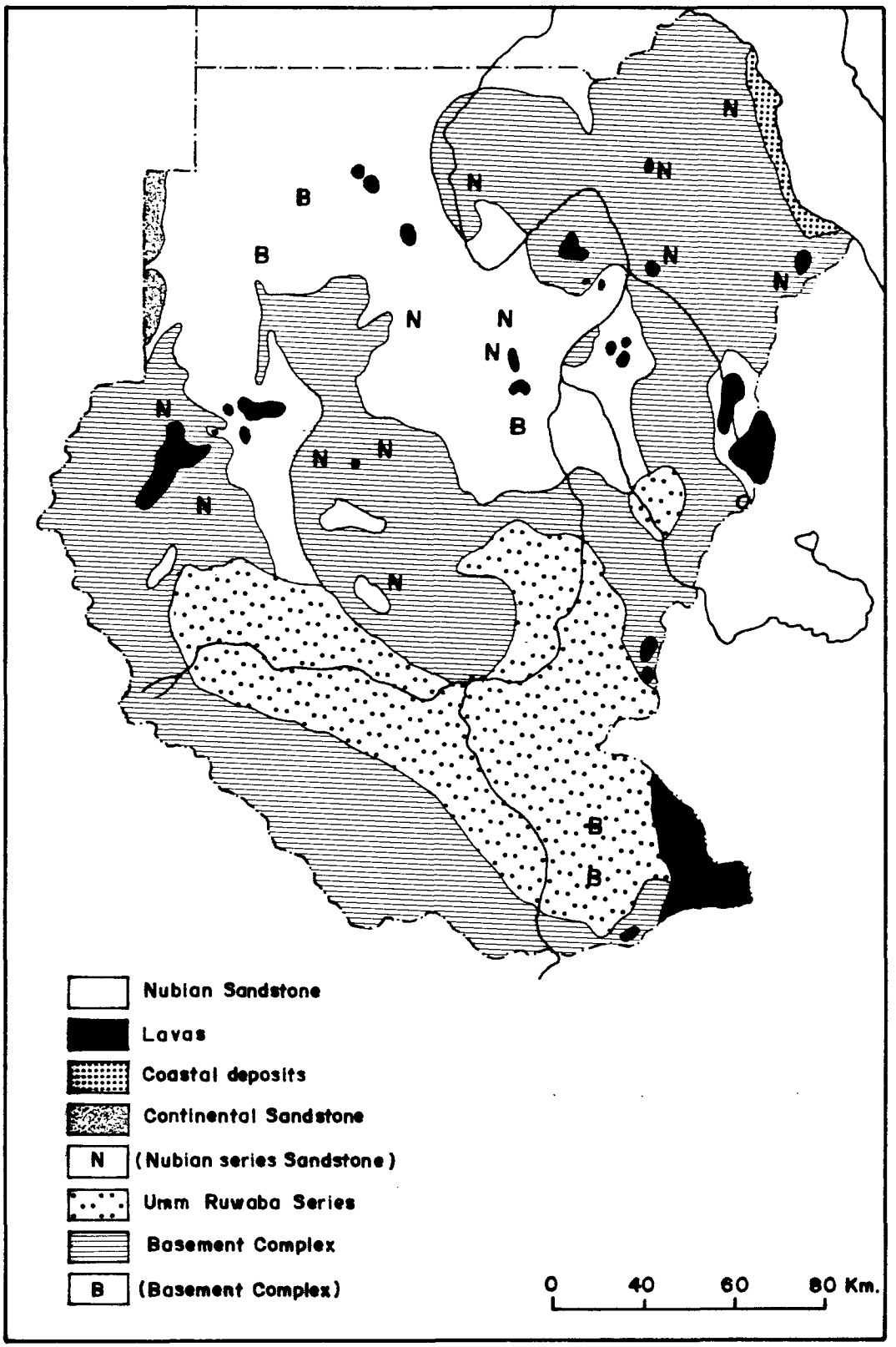
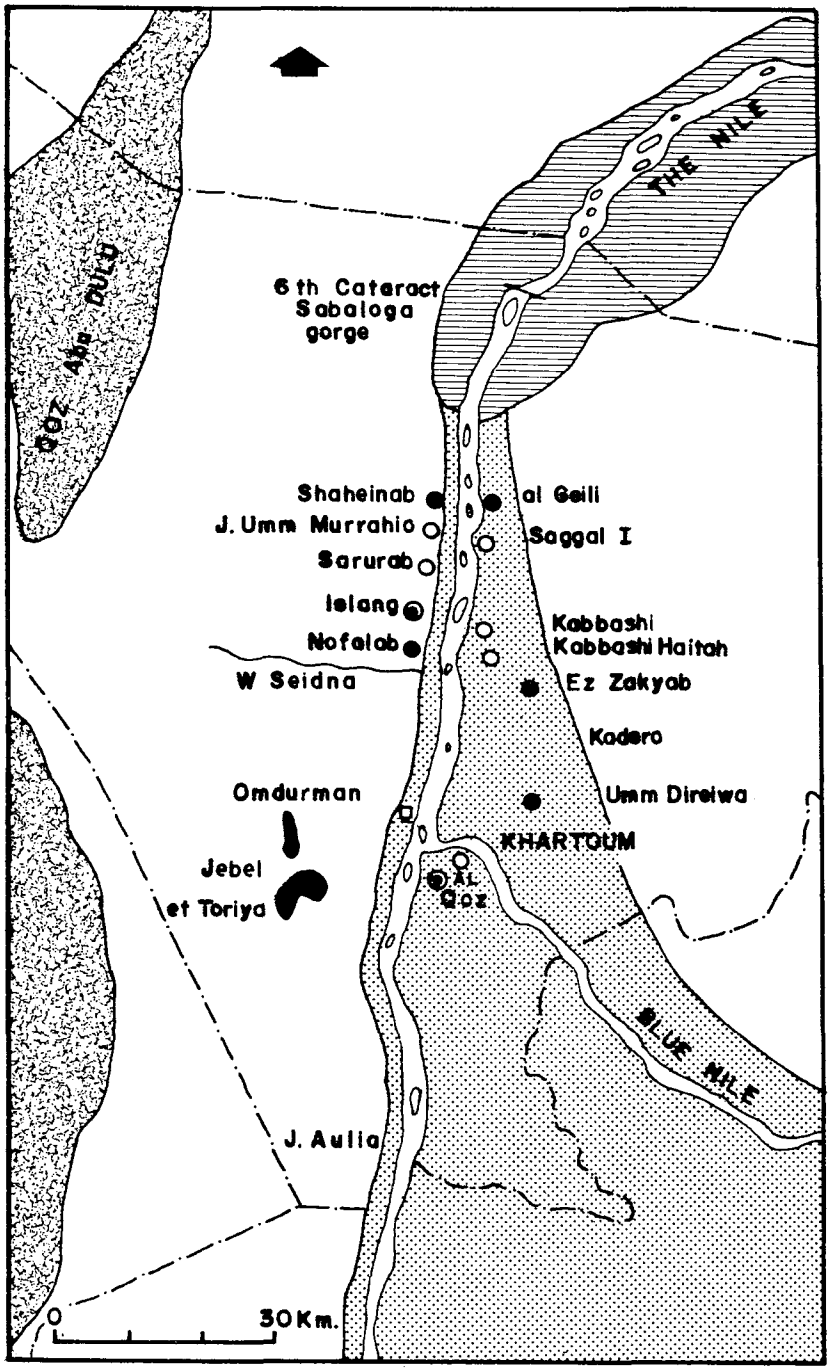


Fig. 3 Geological Map of the Sudan Republic.
(AFTER WHITEMAN, A.J., 1971: 6-7)



BASALT
ALLUVIAL SOIL
NUBIAN FORMATION
BASEMENT COMPLEX
SAND

MESOLITHIC SITES
NEOLITHIC SITES
BOTH MESOLITHIC AND NEOLITHIC SITES
TOWNS
PROVINCIAL BORDER

Fig. 4 DISTRIBUTION OF MESOLITHIC AND NEOLITHIC SITES IN KHARTOUM PROVINCE, IN RELATION TO THE GEOLOGICAL FORMATIONS (After Mohamed Ali, A.S., 1982: 39, with some modifications)

FIG. 5 CONTOUR MAP OF SARURAB 2 SITE

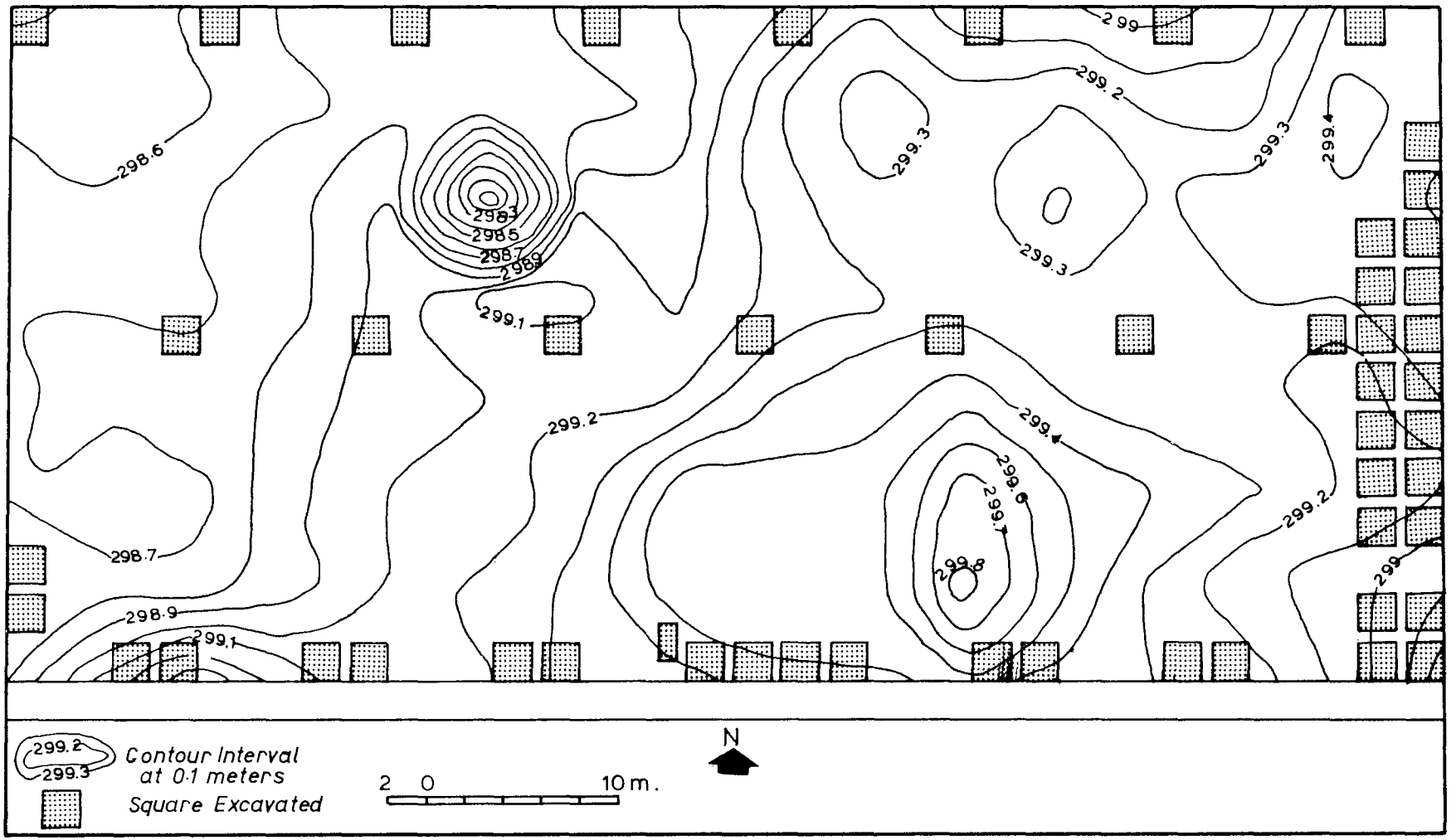


FIG. 6 ISLANG 2 SITE

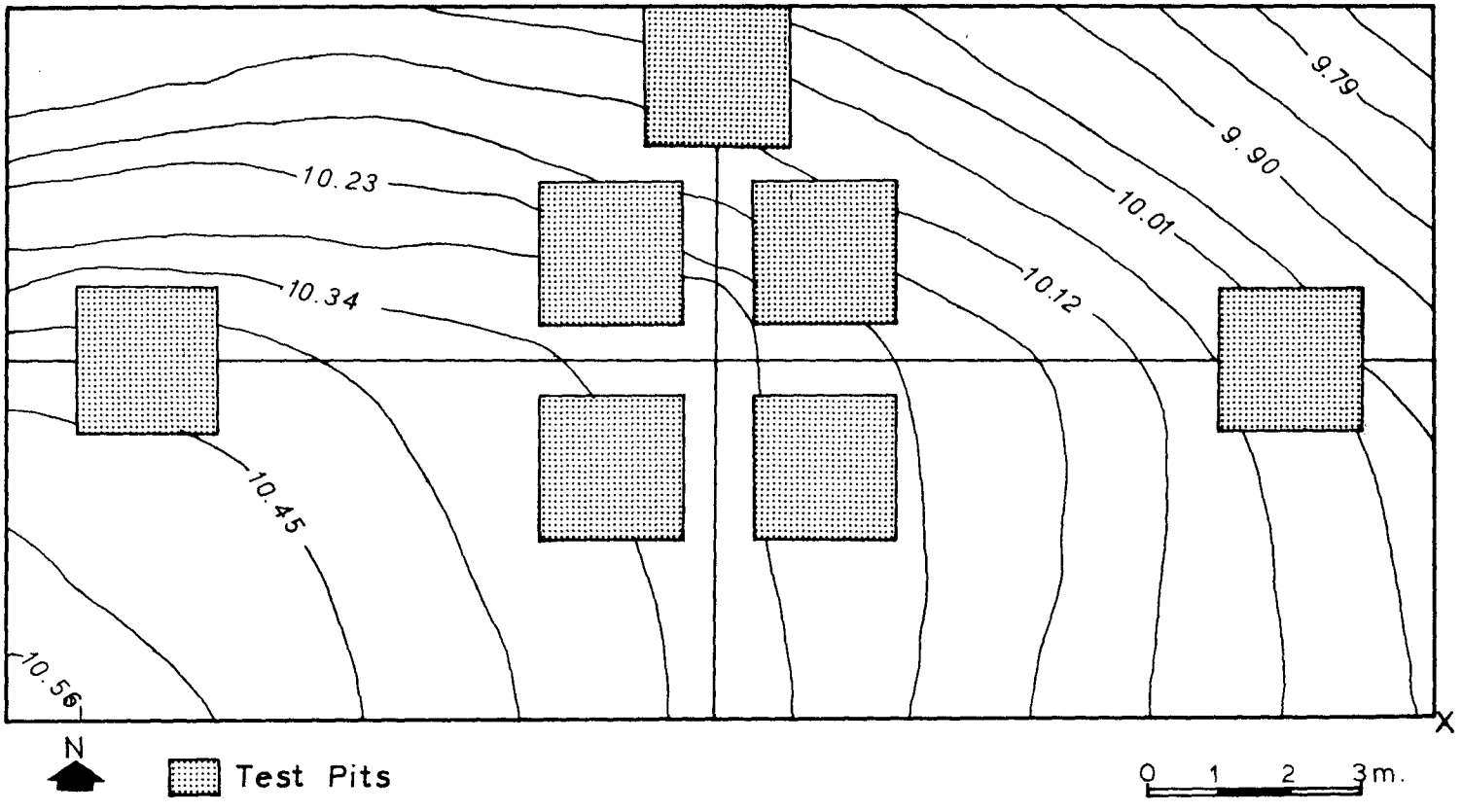


FIG. 7 PLAN OF ISLANG 2 SITE

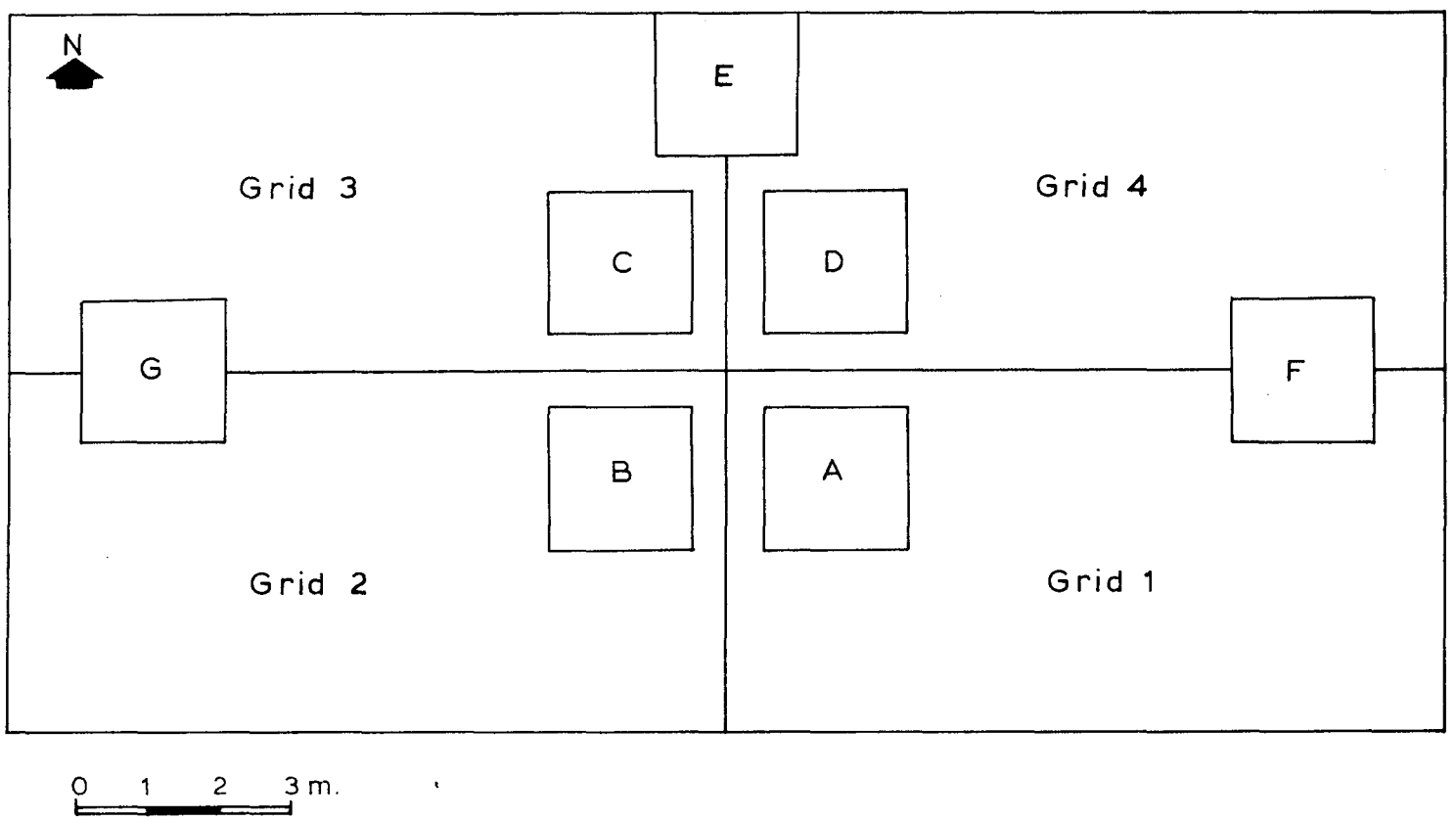


FIG. 8 CONTOUR MAP OF NOFALAB 2 SITE

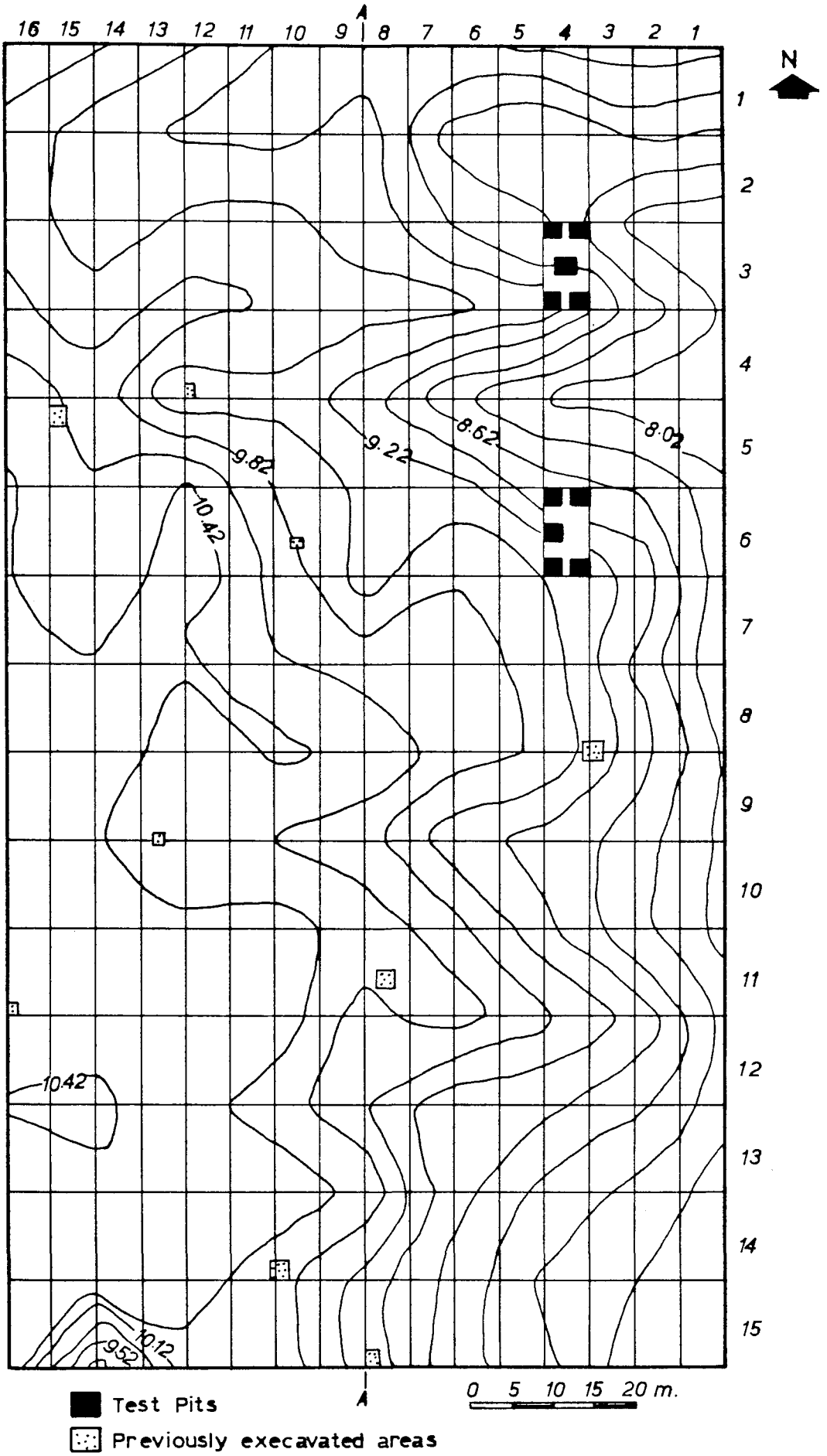
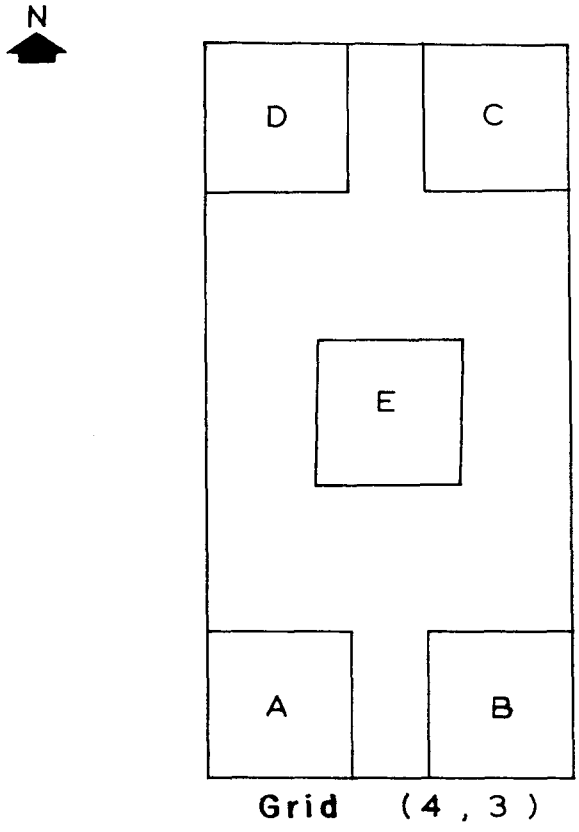
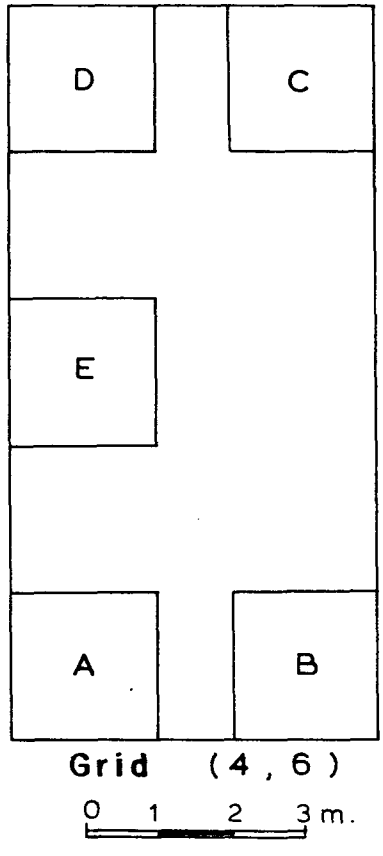


FIG. 9 NOFALAB 2 SITE





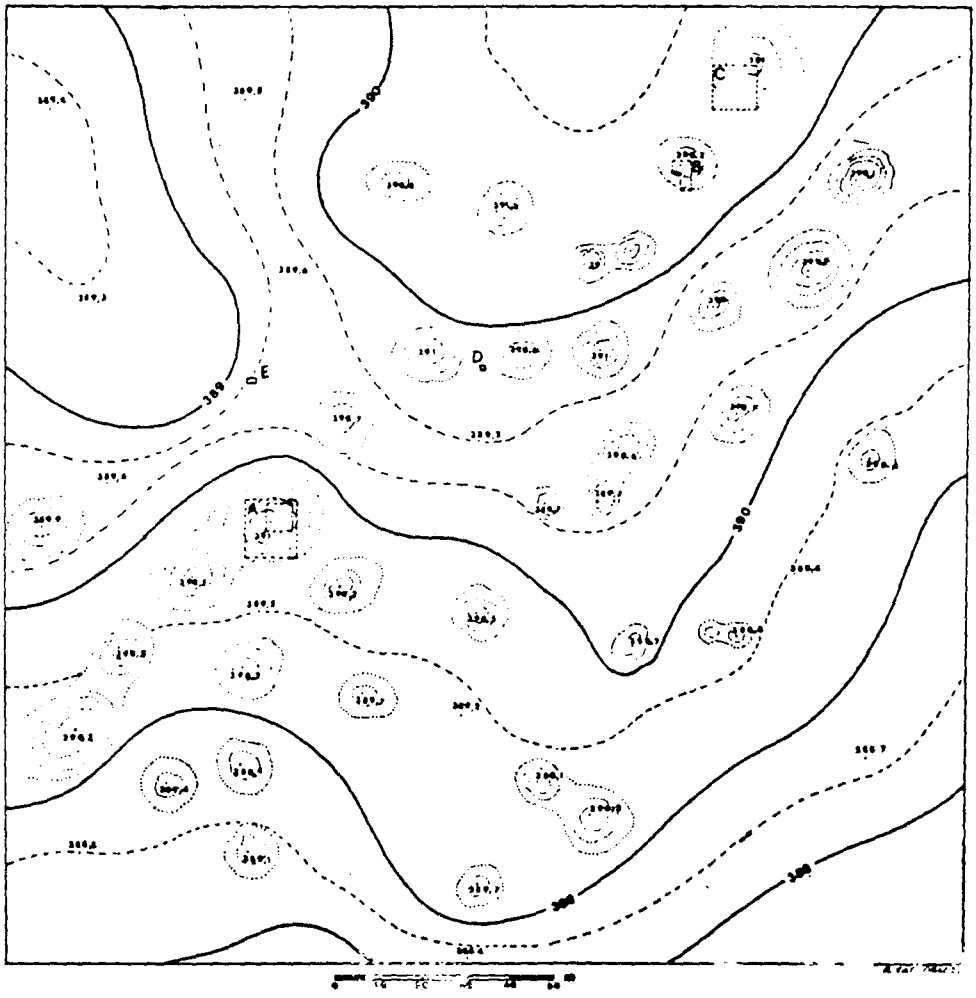


Fig-10: The site of Kabbashi (after Caneva , I. 1993:7)

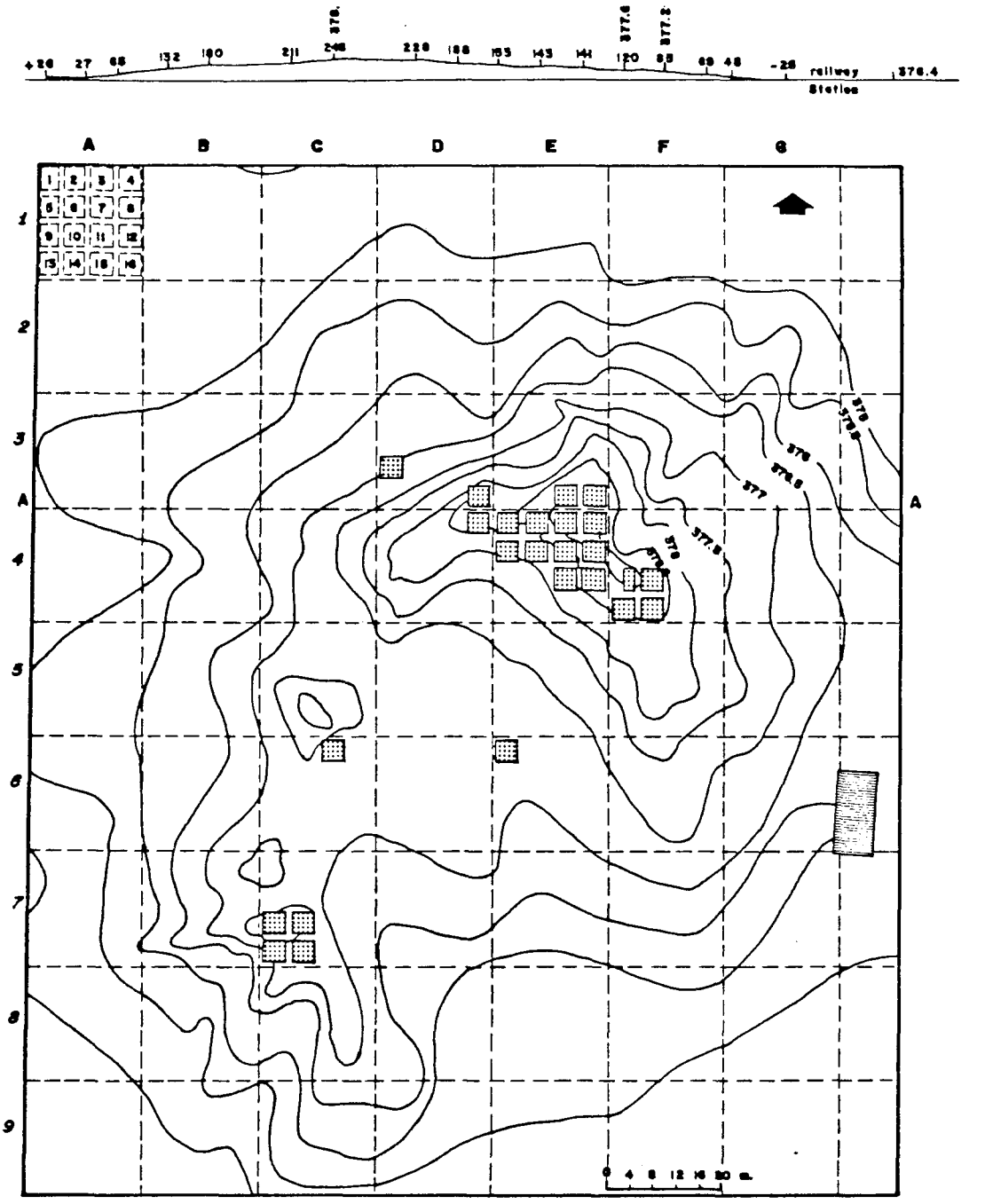


Fig. 11 Geili. Contour lines, Topographic grid and profile of the mound
(After Caneva, I. 1987: 25)

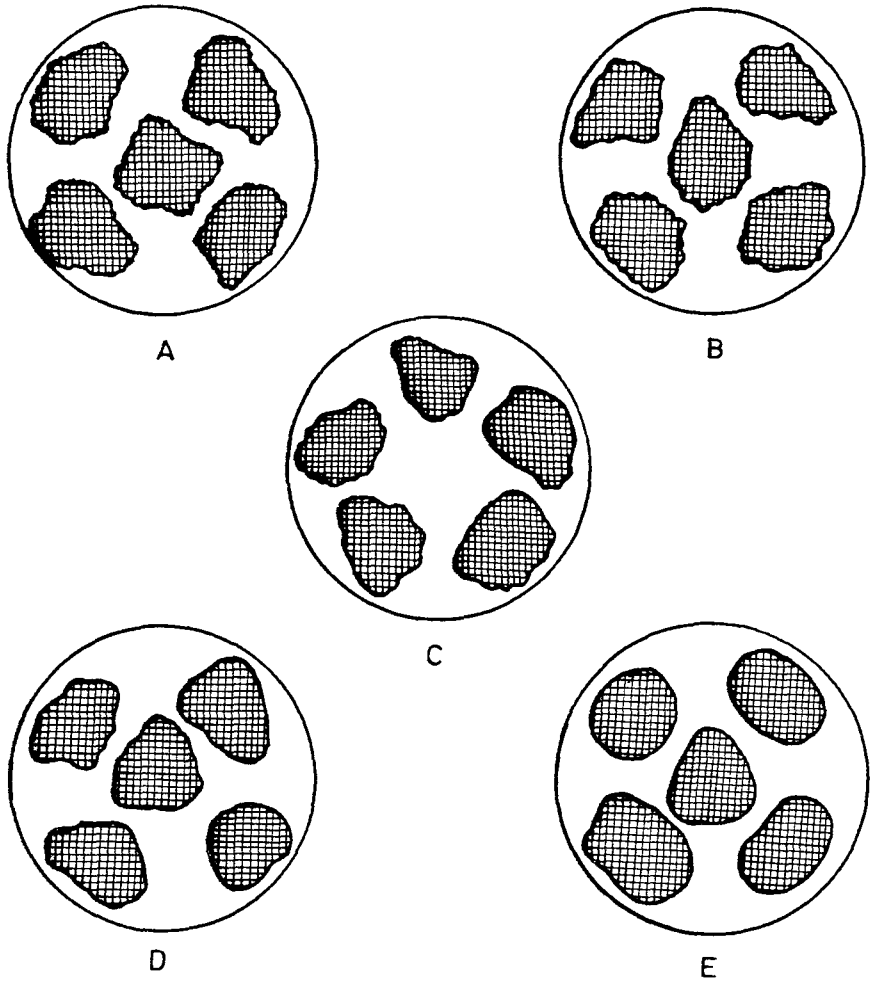


Chart to show roundness classes of minerals.
A, angular; B, subangular; C, subrounded;
D, rounded; E, well rounded.

(Fig. 12) [Fig. 24 Sedimentary Rocks (1948) by F. J. Pettijohn.]

Fig.13 **Fabric Groups of Sarurab2 Pottery**

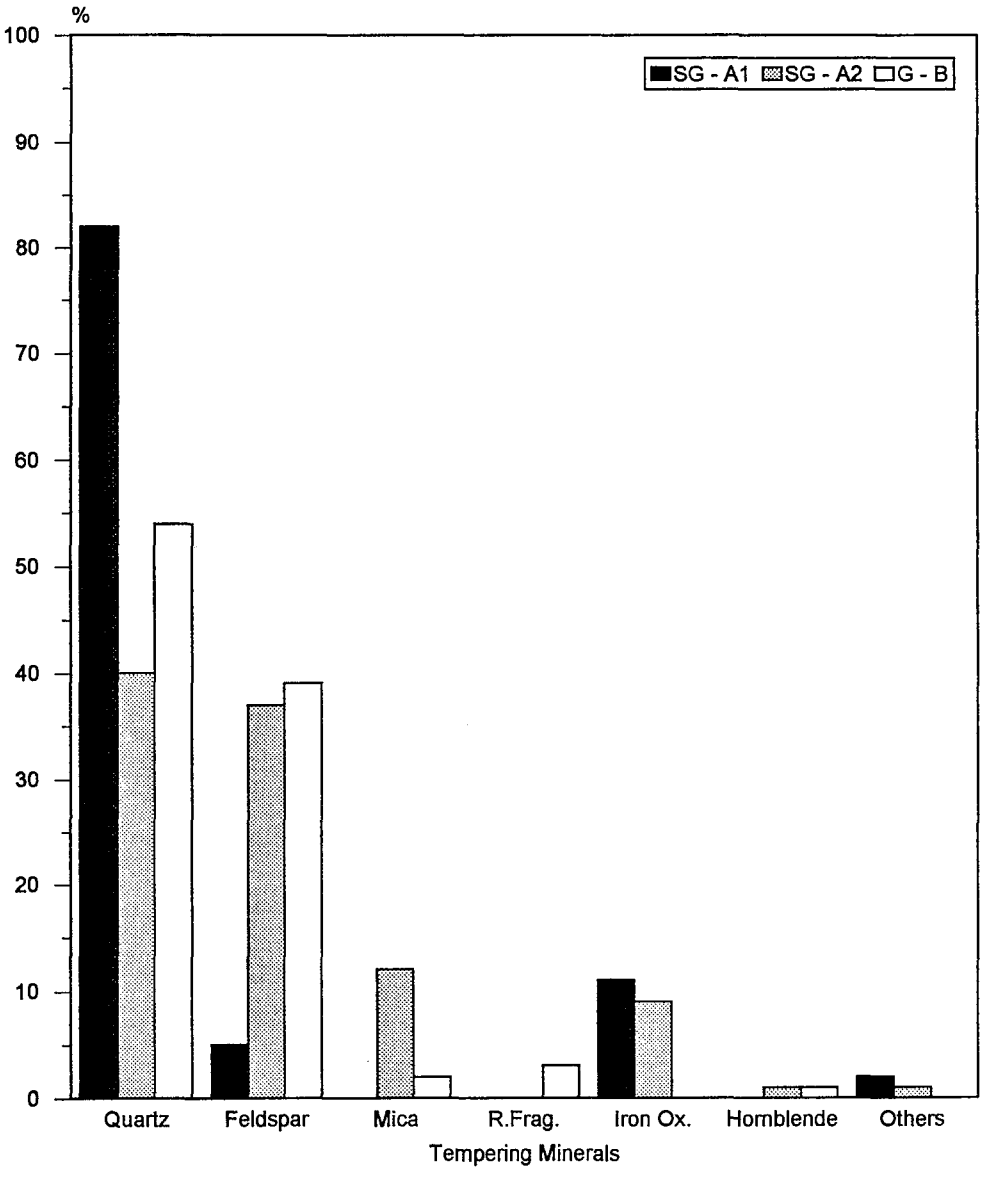


Fig.14 **Fabric Groups of Islang2 Pottery**

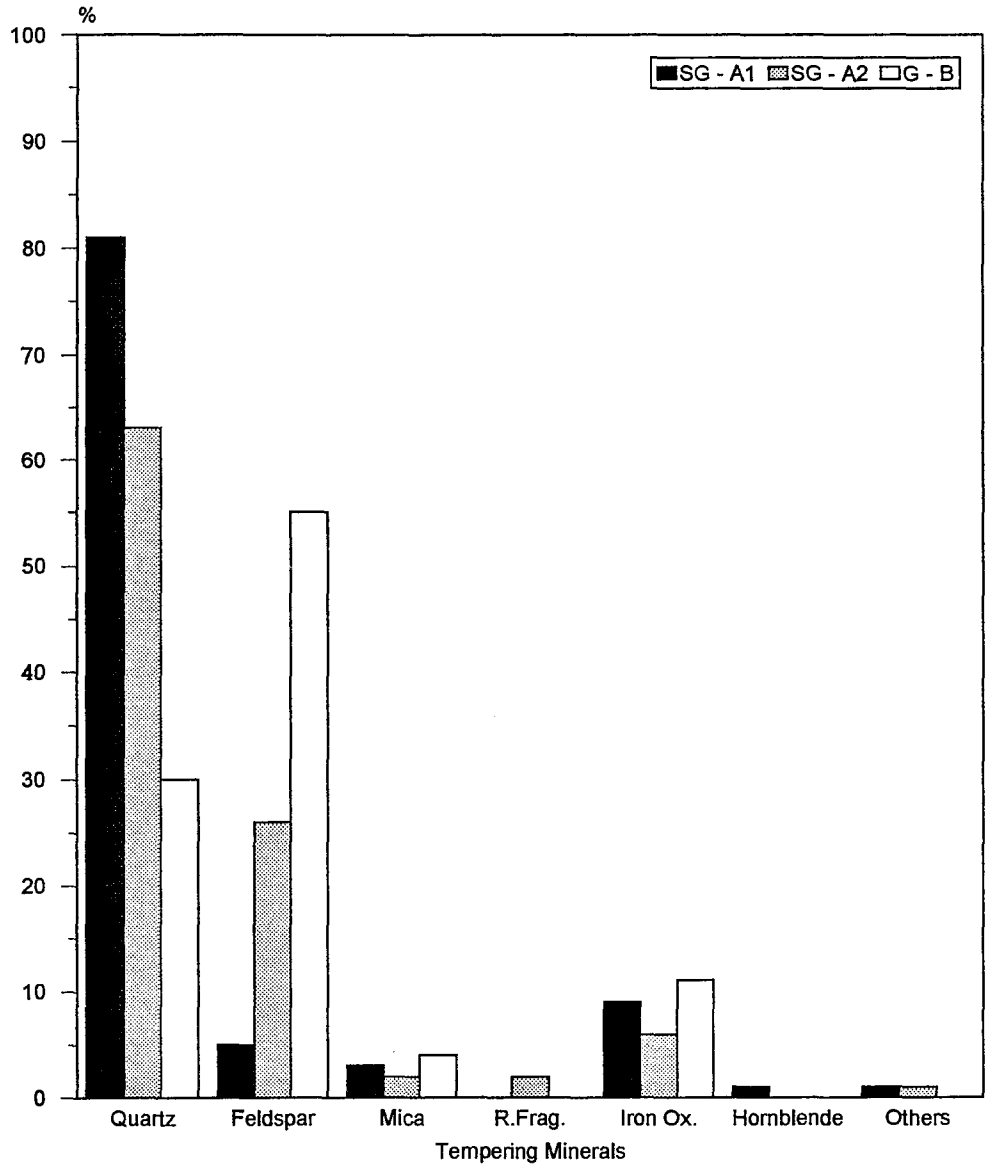


Fig.15 **Fabric Groups of Nofalab2 Pottery**

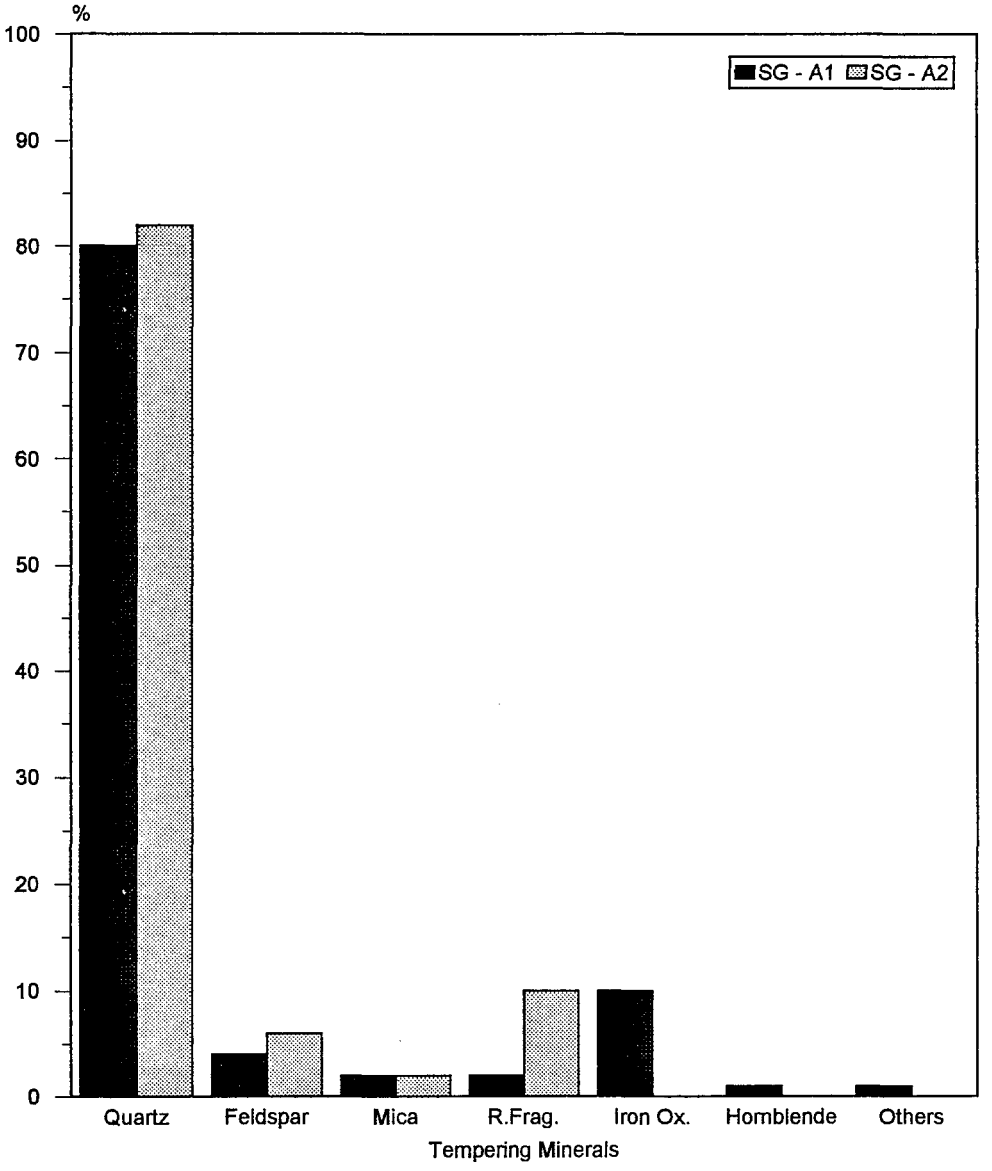


Fig.16 **Fabric Groups of Kabbashi Haitah Pottery**

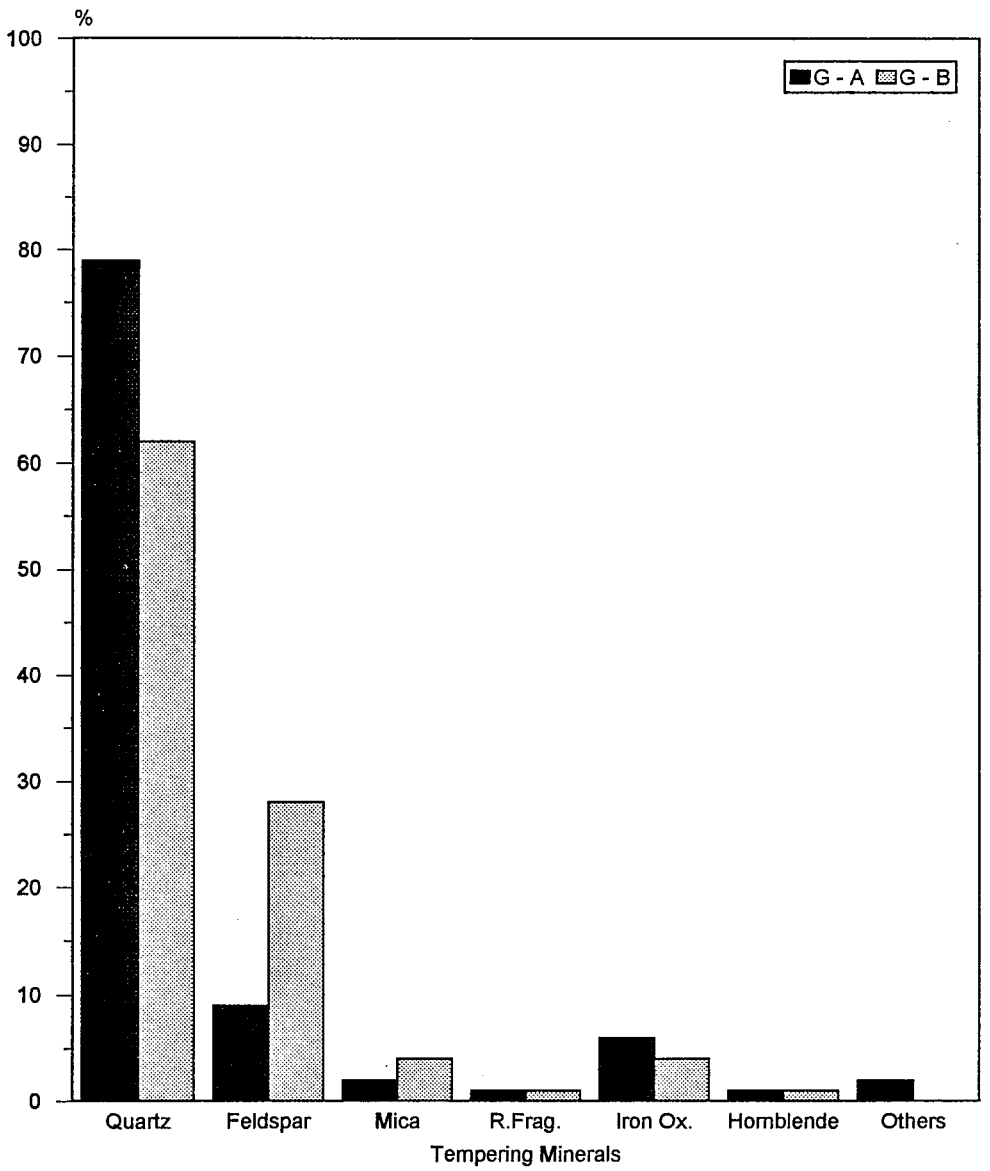


Fig.17 **Fabric Groups of Kabbashi Pottery**

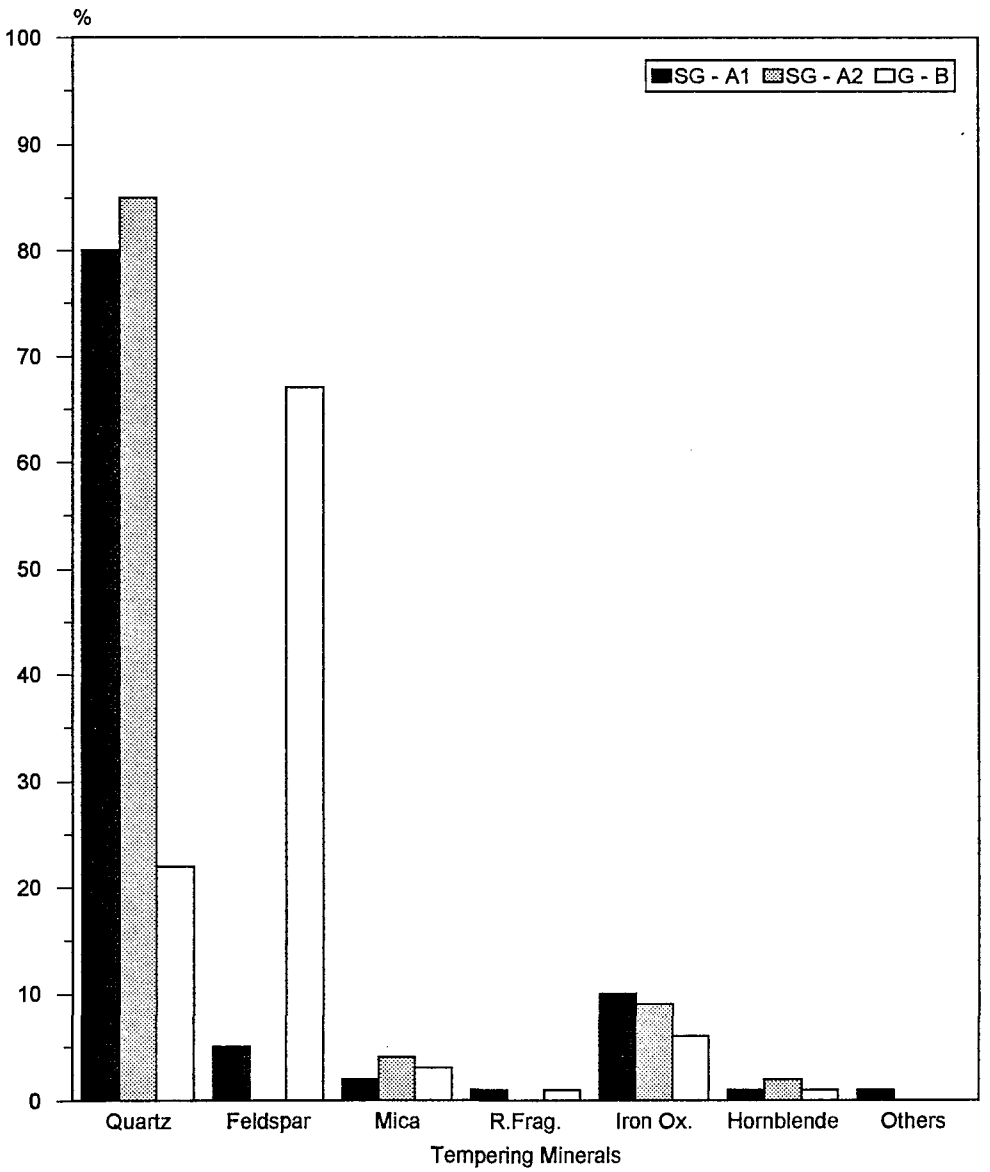
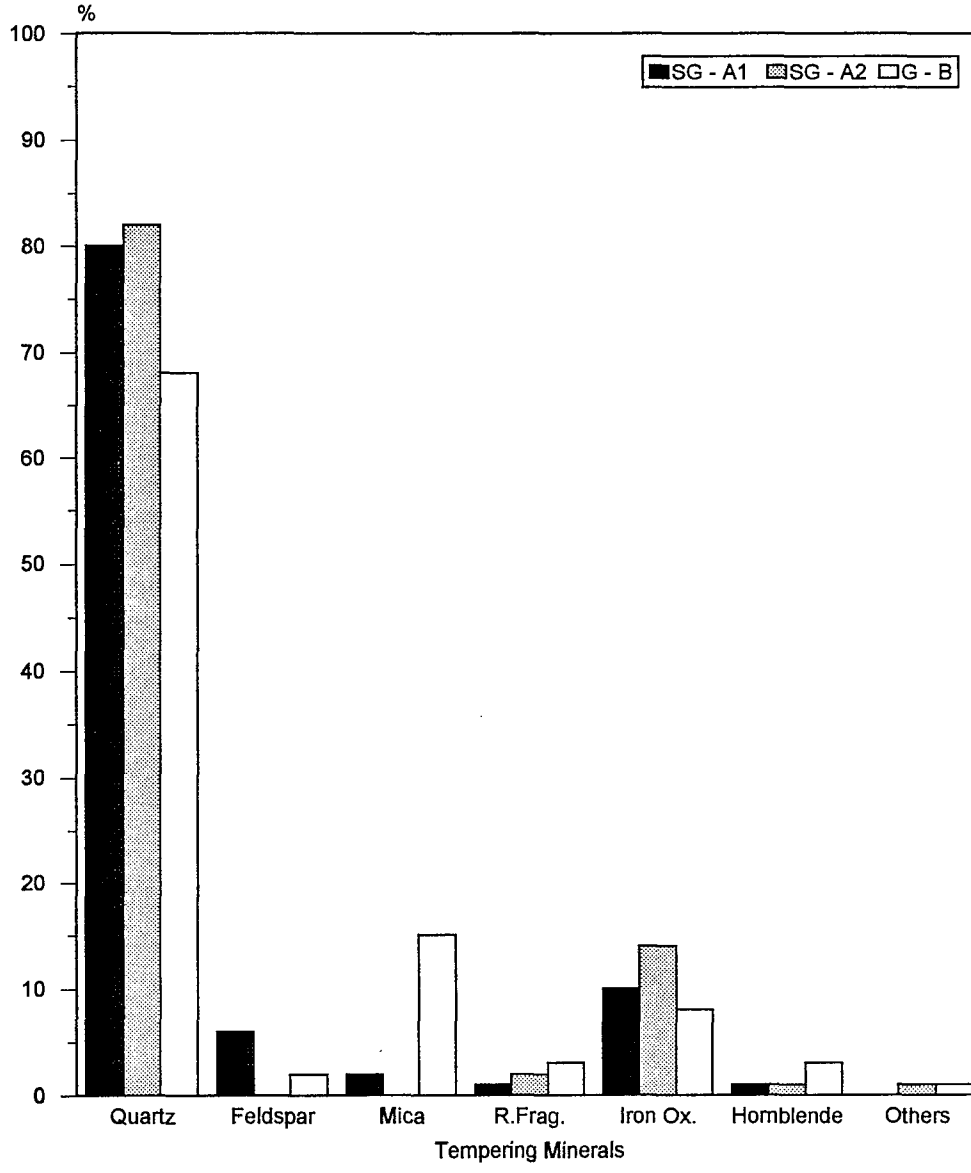


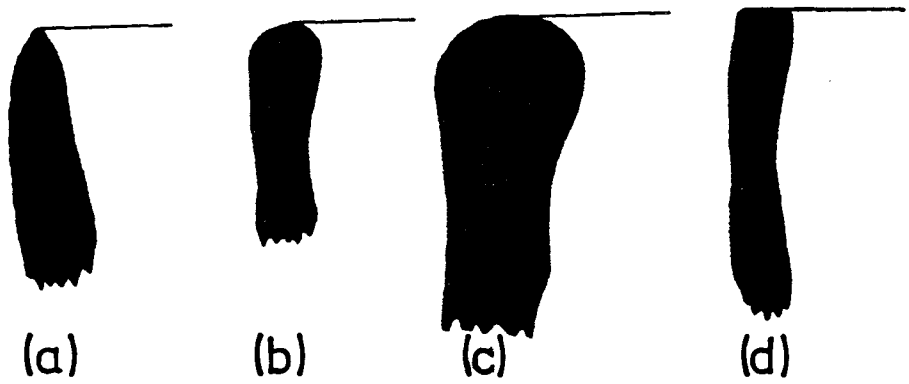
Fig.18 **Fabric Groups of Geili Pottery**



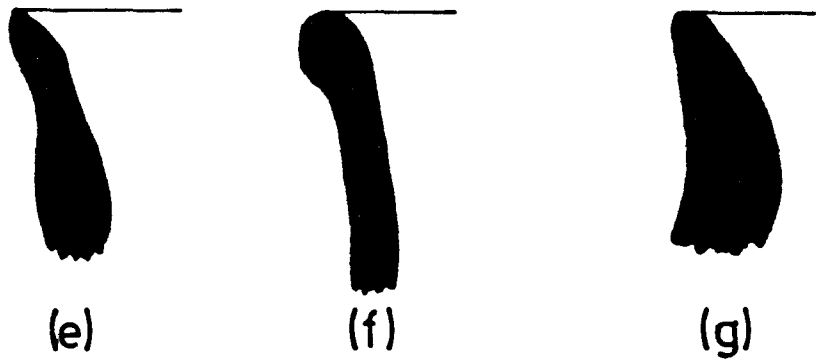
(Fig. 19)

Rim Shapes: Sarurab - 2 Pottery.

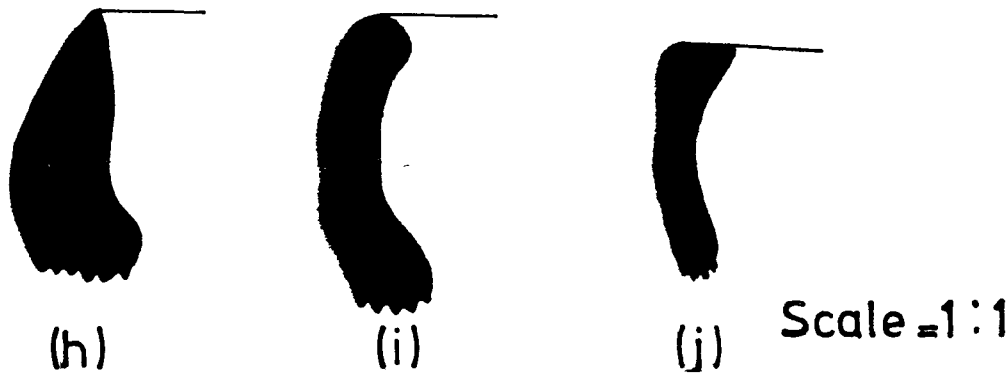
Direct Rims.



Everted Rims.

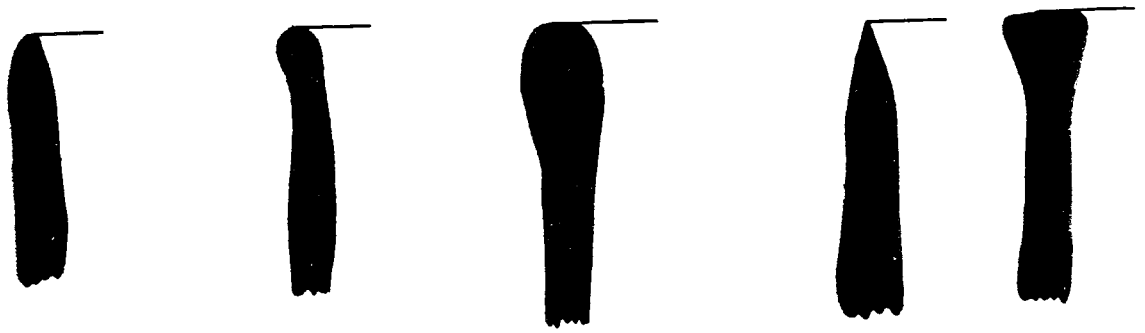


Reverted Rims.



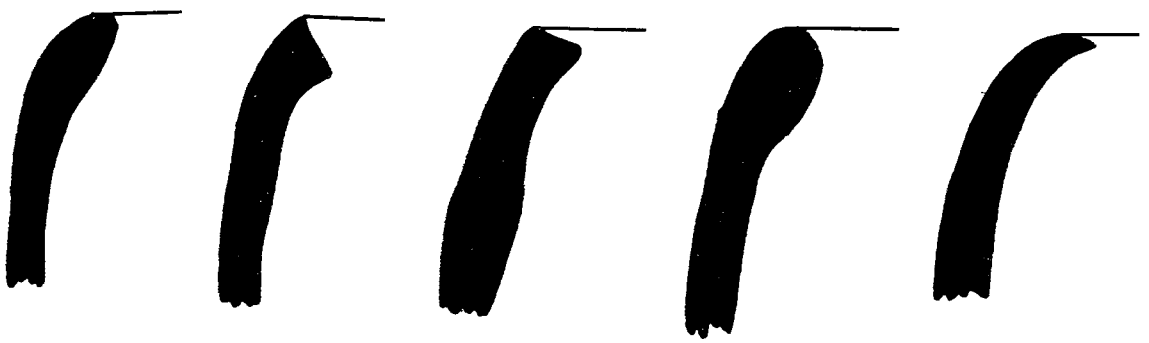
(Fig. 20) Rim Shapes: Islang 2 Pottery

Direct Rims



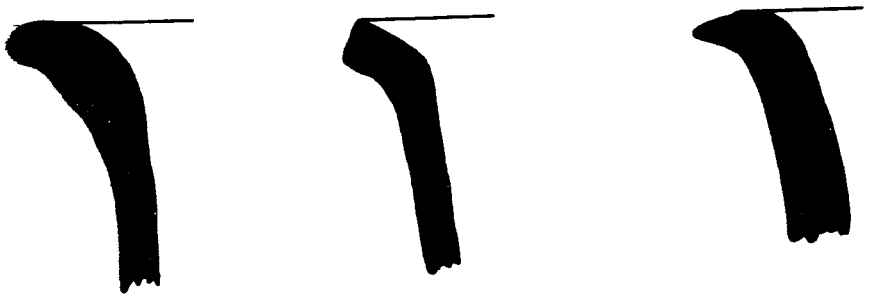
a1 a2 a3 a4 a5

Everted Rims



b1 b2 b3 b4 b5

Reverted Rims

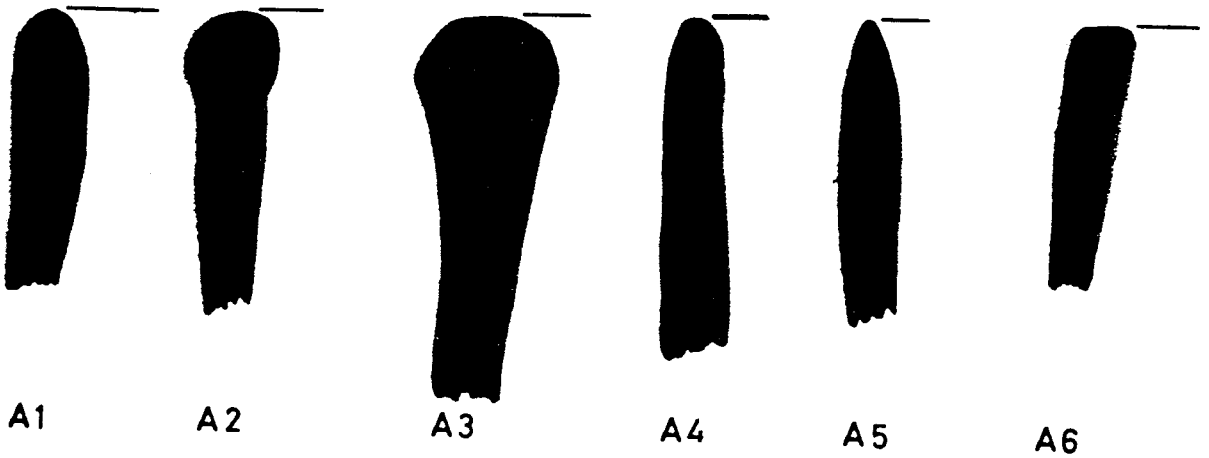


c1 c2 c3

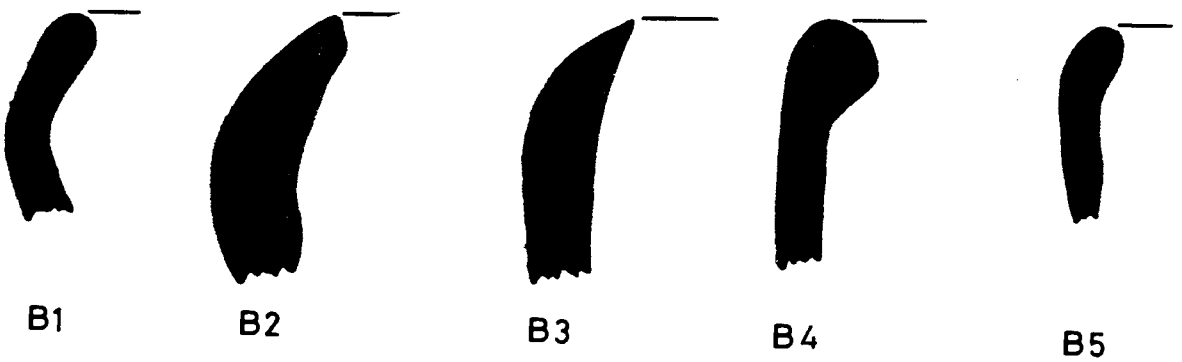
Scale 1 : 1

(Fig. 21) Rim Shapes: Nofalab 2 Pottery

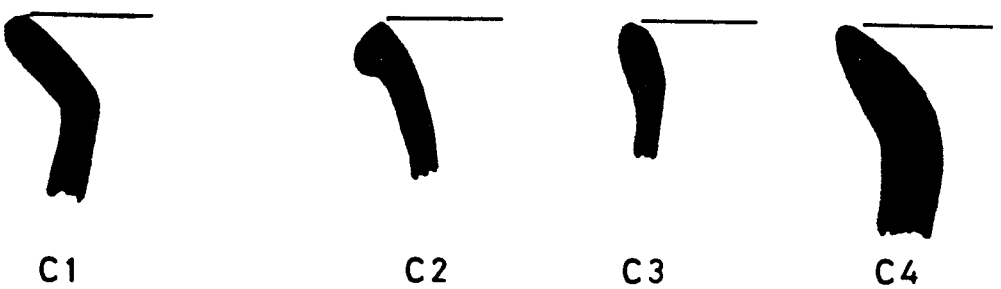
Direct Rims



Everted Rims



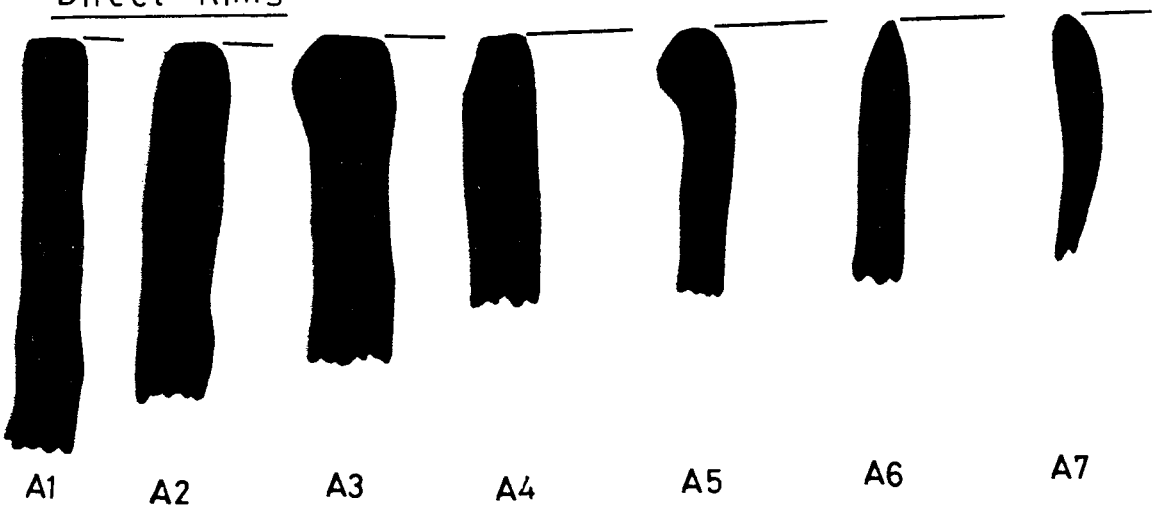
Reverted Rims



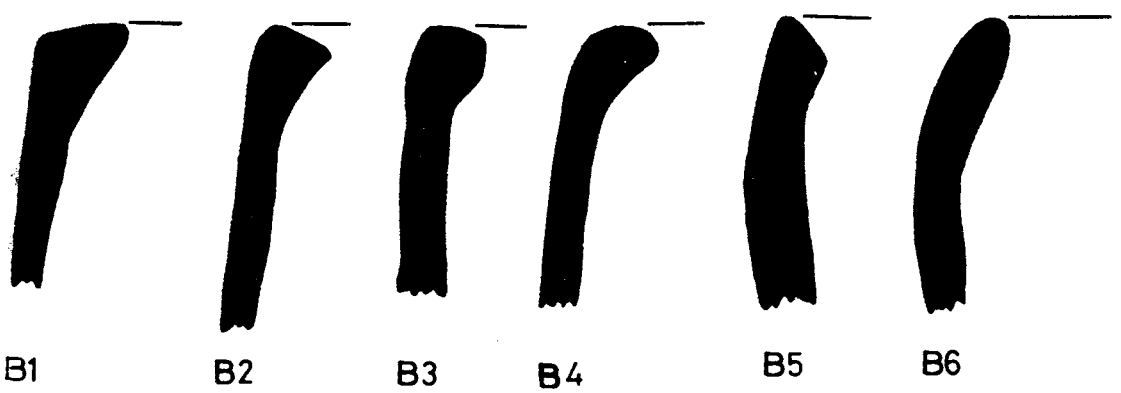
Scale 1 : 1

(Fig. 22) Rim Shapes: Kabbashi Haitah Pottery

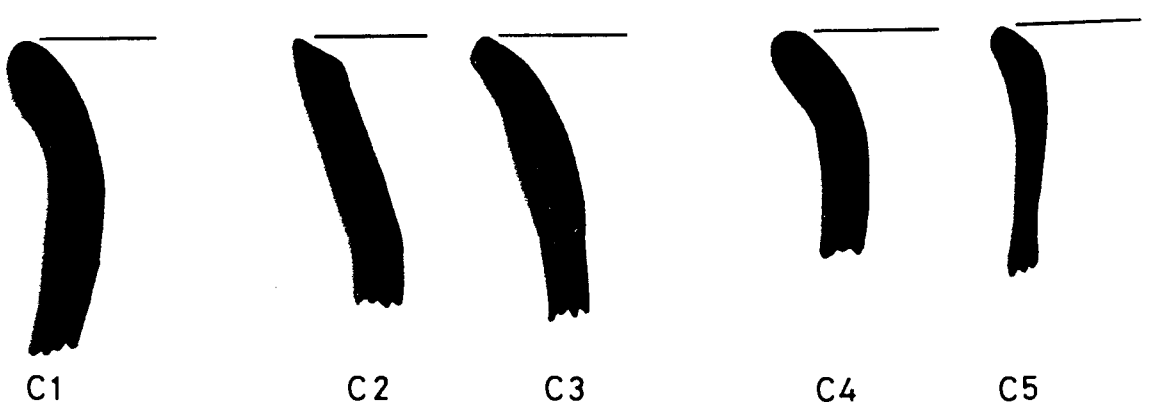
Direct Rims



Everted Rims



Reverted Rims



Scale 1 : 1

(Fig. 23) Rim Shapes: Kabbashi Pottery

Direct Rims

A1 A2

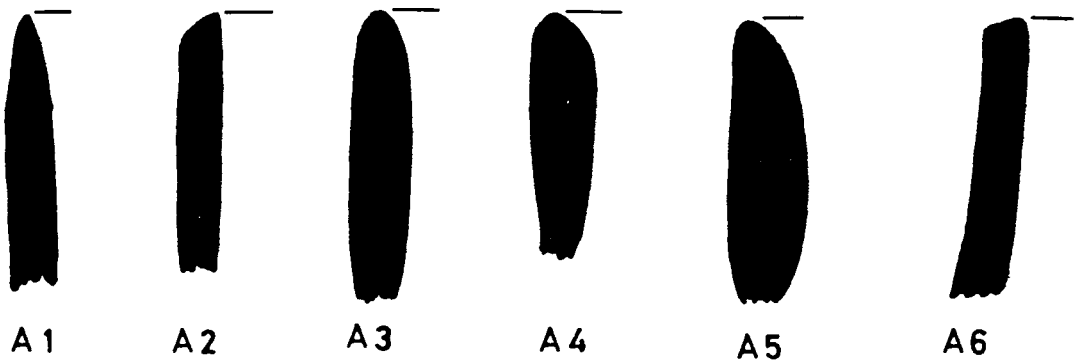
Everted Rims

B

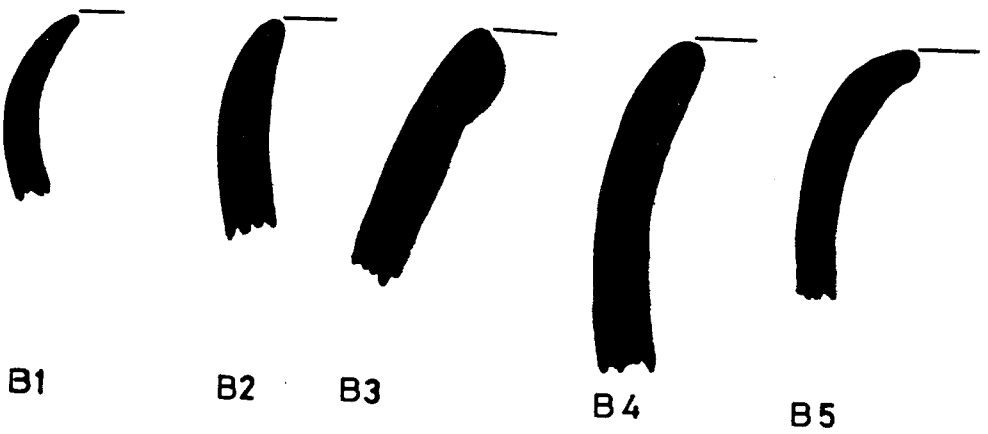
Scale 1 : 1

(Fig. 24) Rim Shapes: Geili Pottery

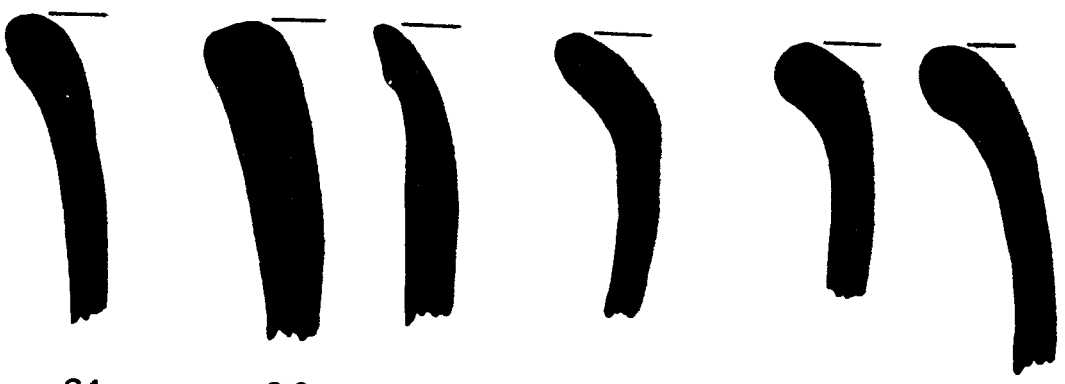
Direct Rims



Everted Rims

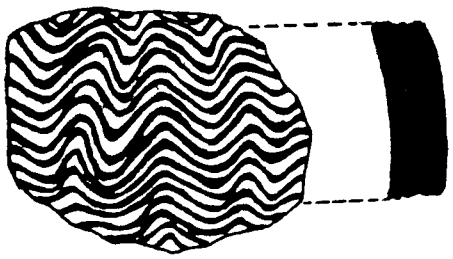


Reverted Rims



Scale 1 : 1

(Fig.25) Sarurab 2 Pottery



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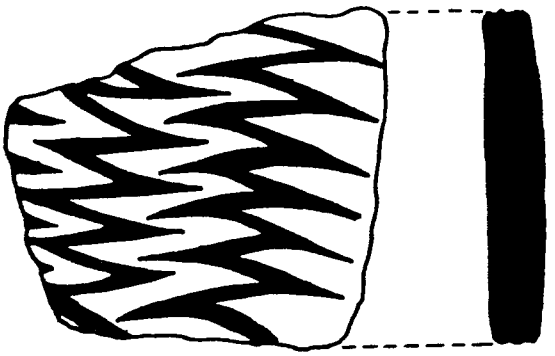

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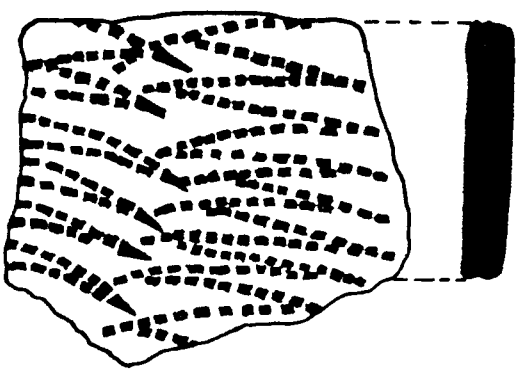
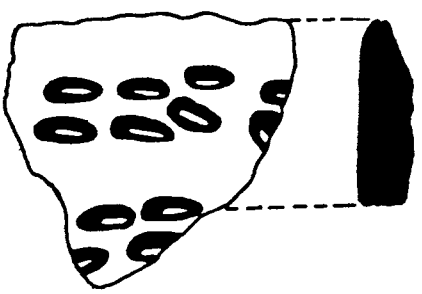
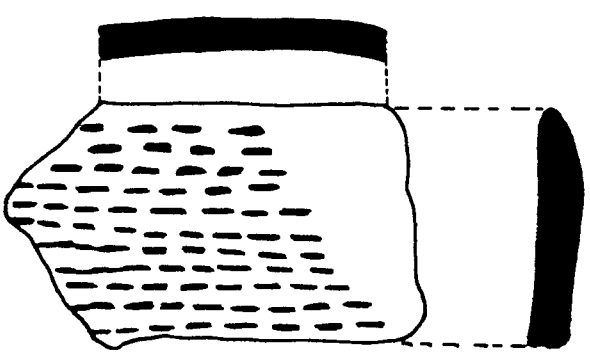


(c)



(d)



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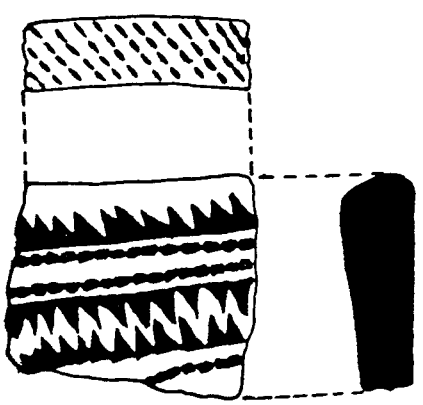
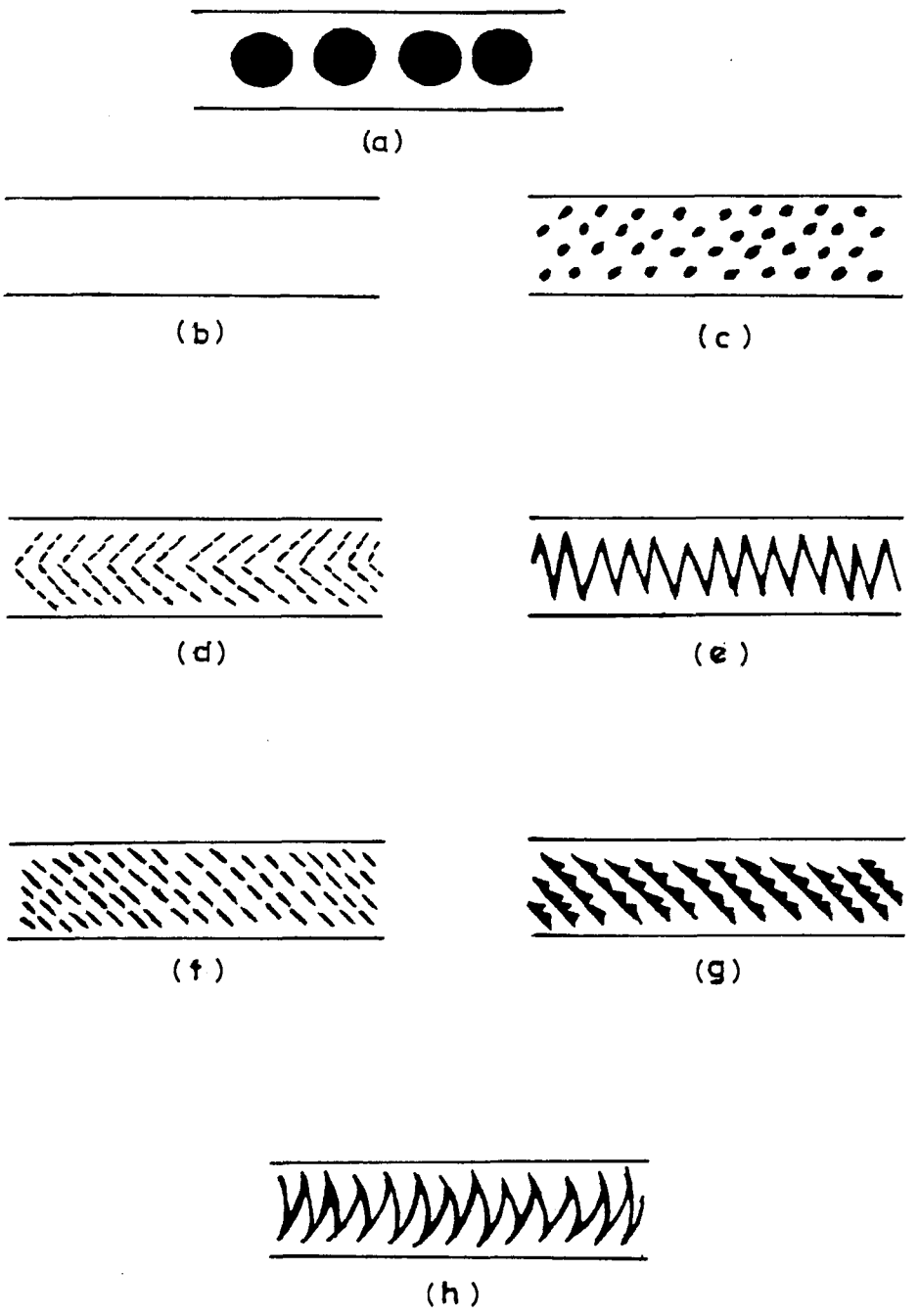


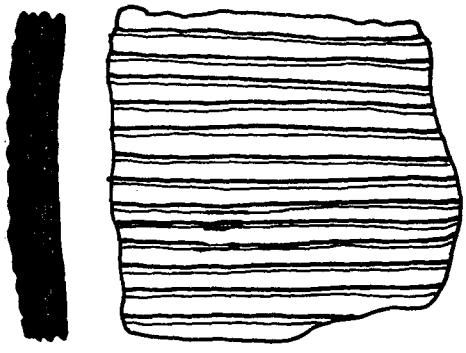
(f)

Scale 1 : 1

(Fig. 26) Sarurab 2 Pottery



(Fig. 27) Islang 2 Pottery



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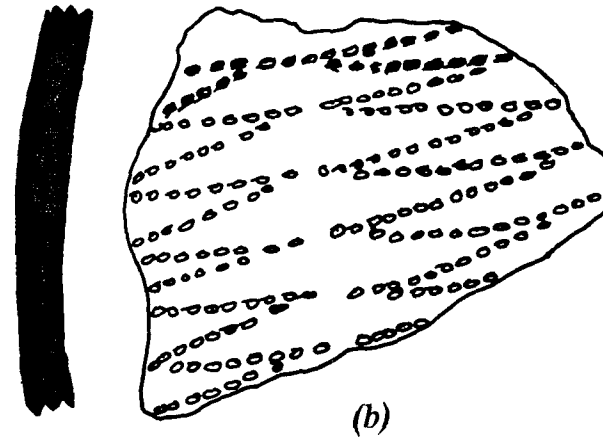

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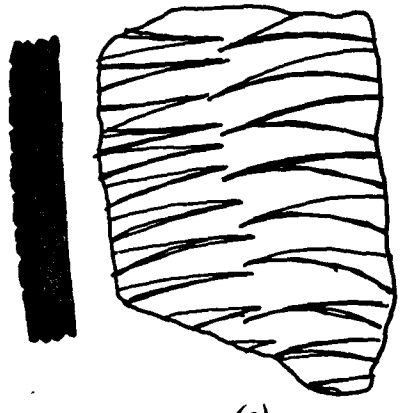

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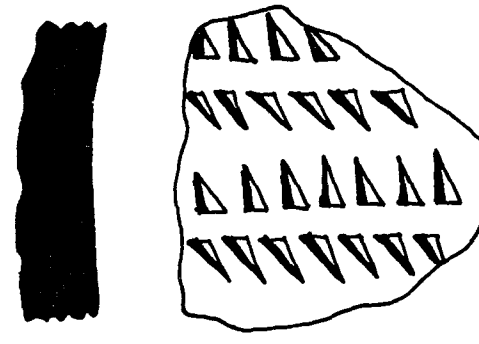
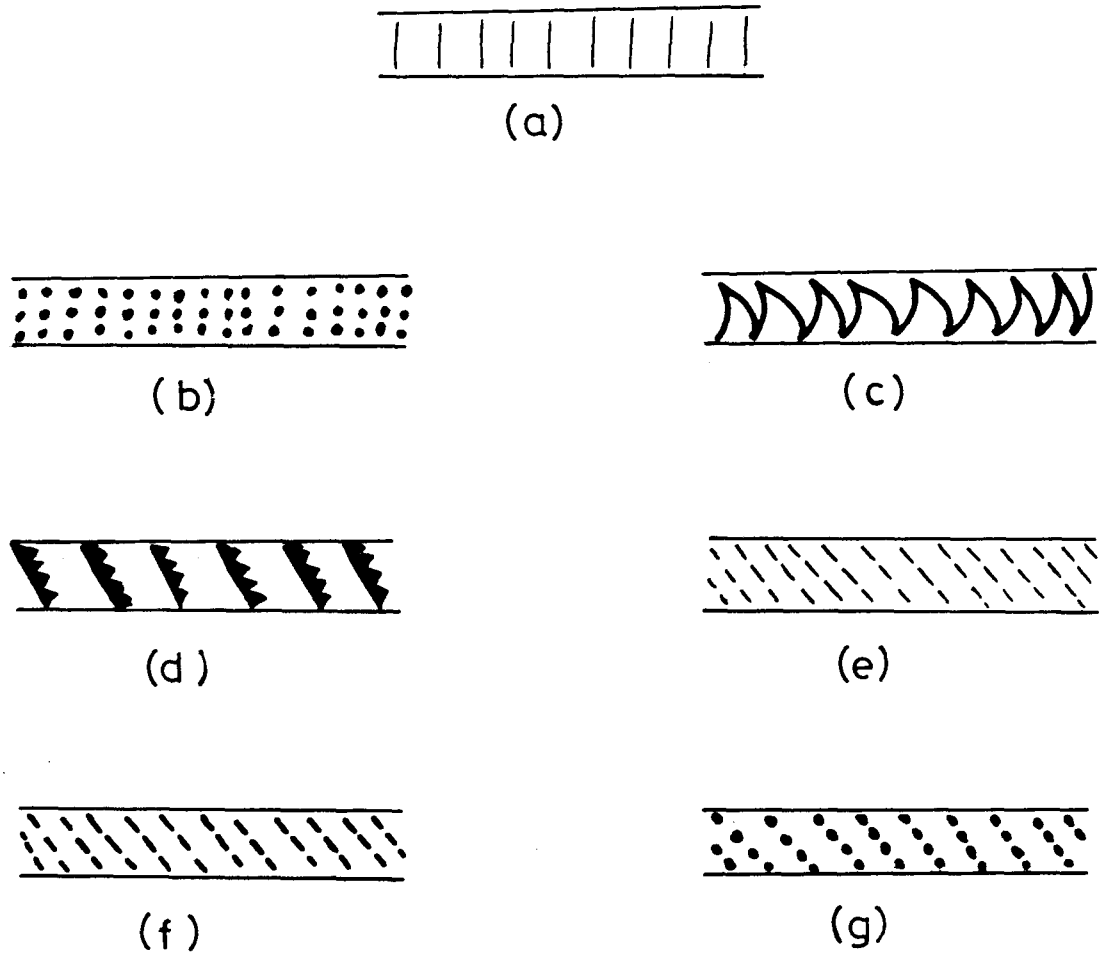


(d)

Scale 1 : 1

Fig. 28 Islang 2 Pottery: Rim Top Decoration



(Fig. 29) Nofalab 2 Pottery

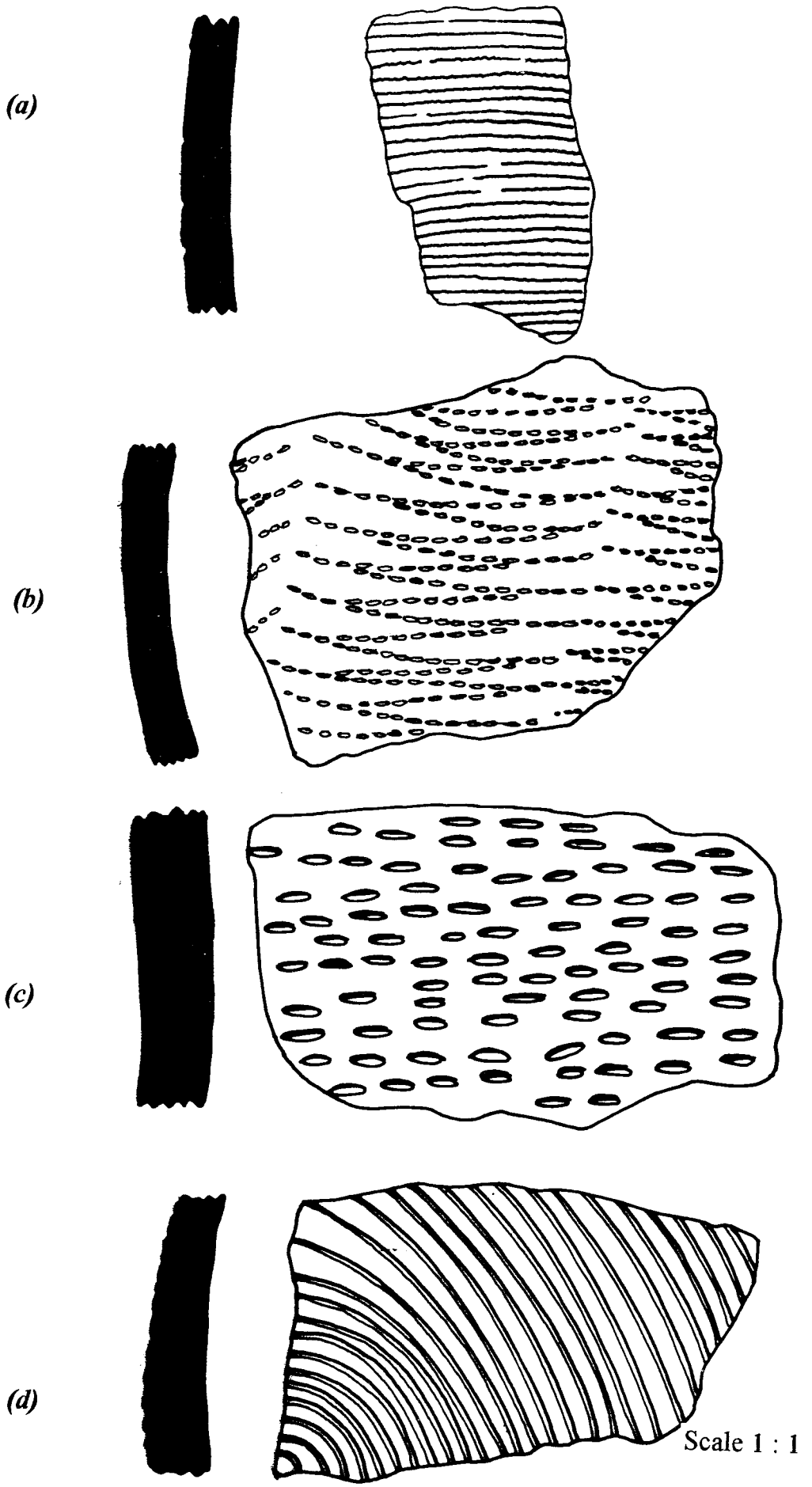
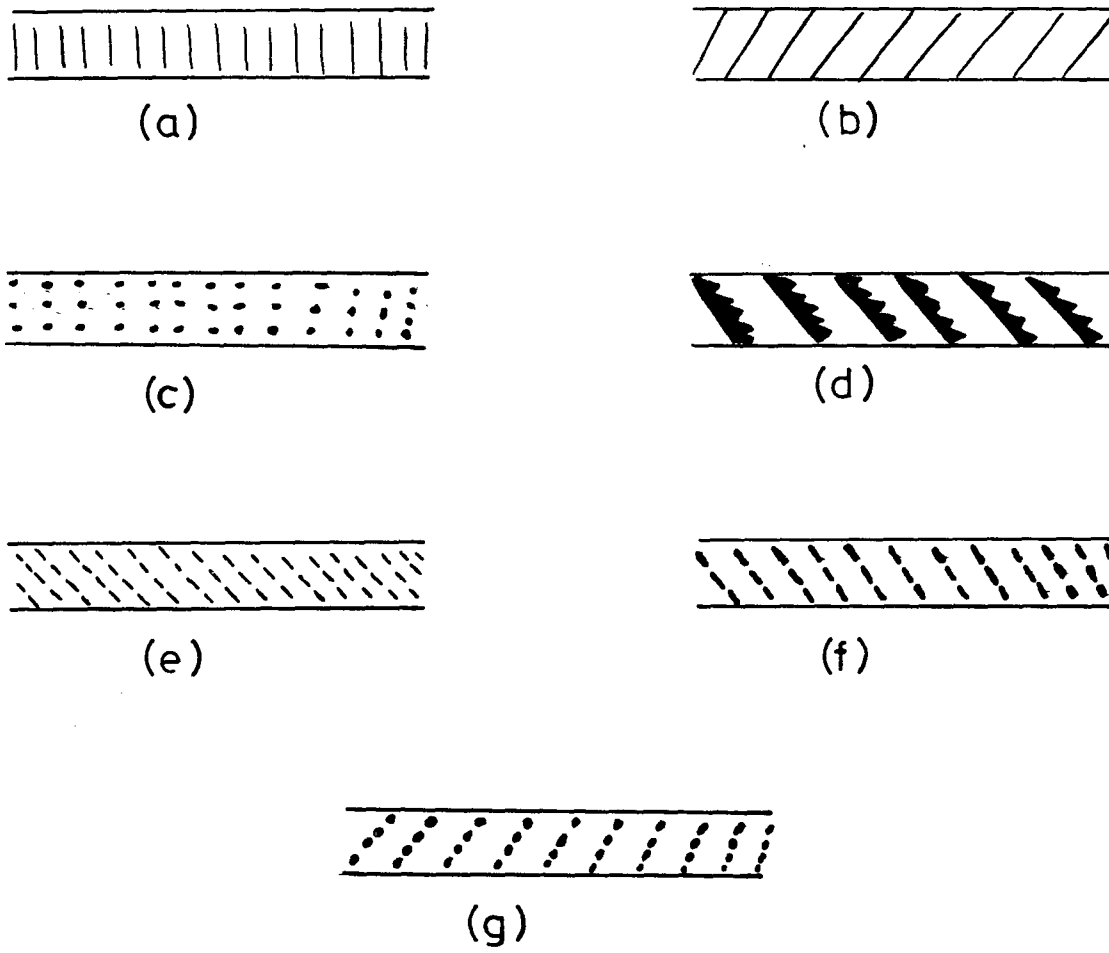
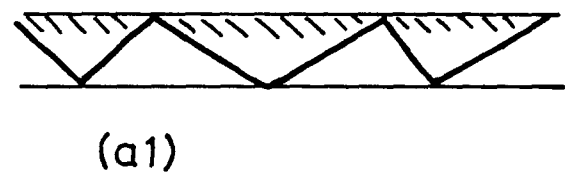


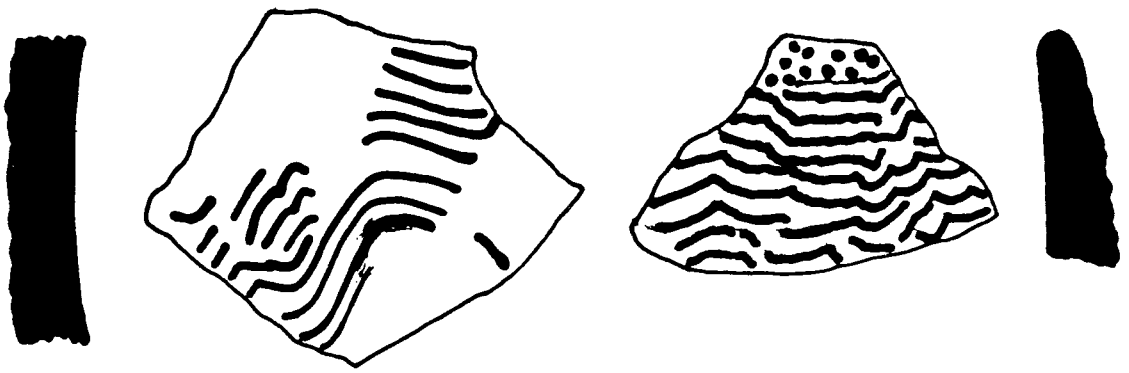
Fig. 30 Nofalab 2 Pottery: Rim–Top Decoration



Rim– Band



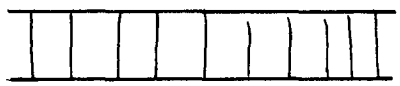
(Fig.31) Kabbashi Haitah Pottery



(a) (b)

(c) Scale 1 : 1 (d)

Fig.32 Kabbashi Haitah Pottery: Rim Top Decoration

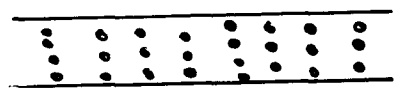


(a)

(b)

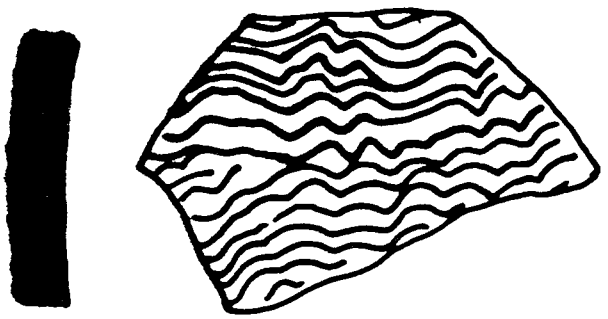
(c)

(d)

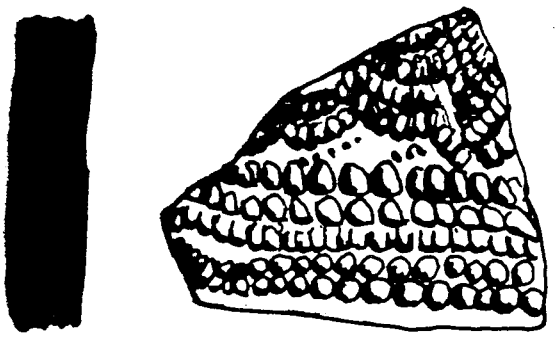


(e)

(Fig. 33) Kabbashi Pottery



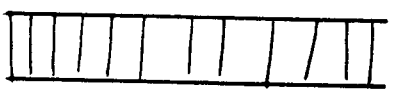
(a)



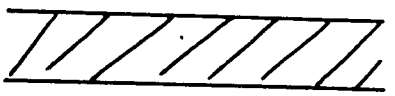
(b)

Scale 1 : 1

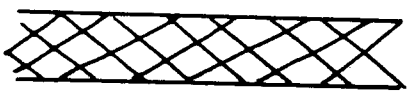
Fig. 34 Kabbashi Pottery: Rim Top Decoration



(a)



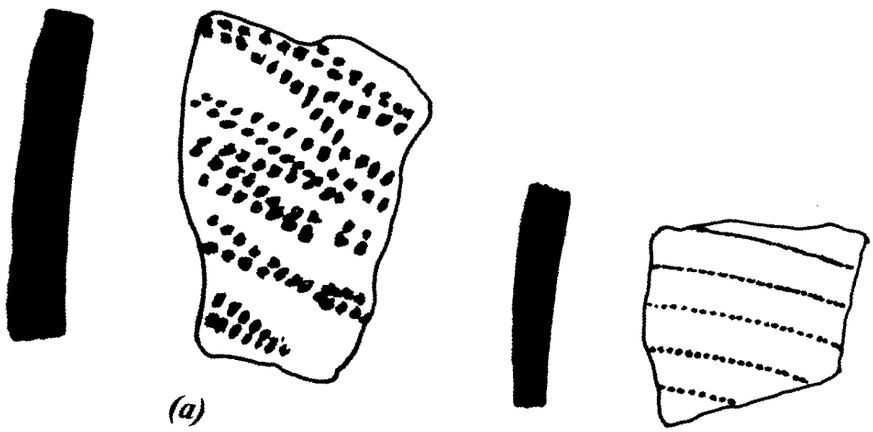
(b)



(c)

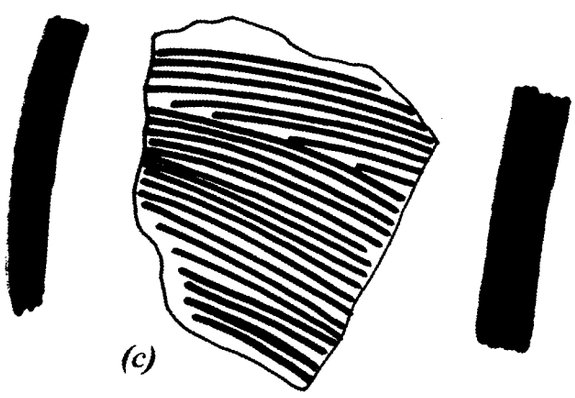
(d)

(Fig.35) Geili Pottery



(a)

(b)

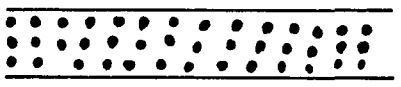


(c)

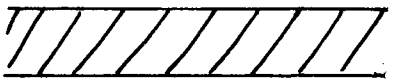
(d)

Scale 1 : 1

Fig. 36 Geili Pottery: Rim Top Decoration



(a)



(b)

(c)

(d)

(e)

(f)

Rim Band

(a1)

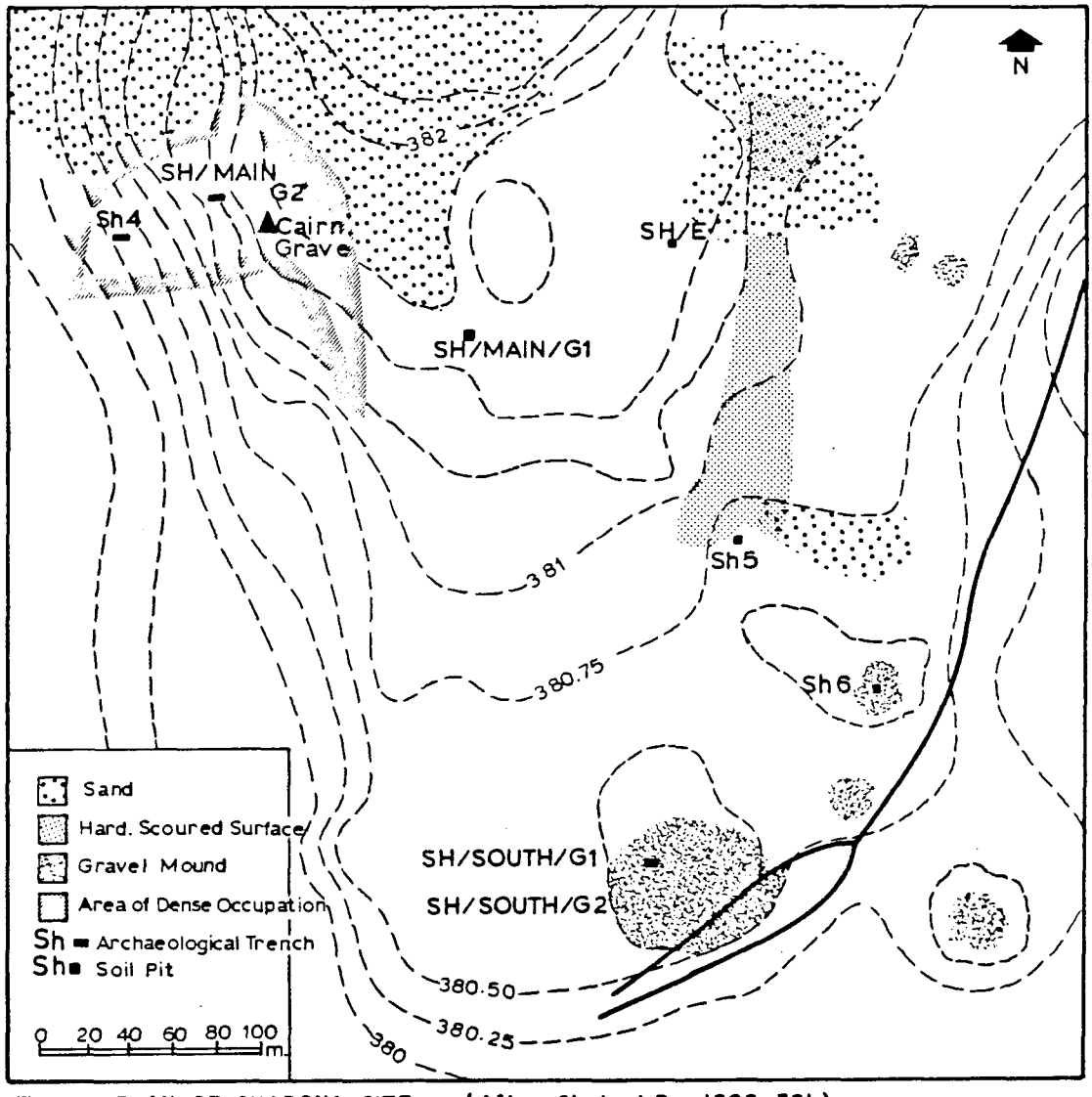
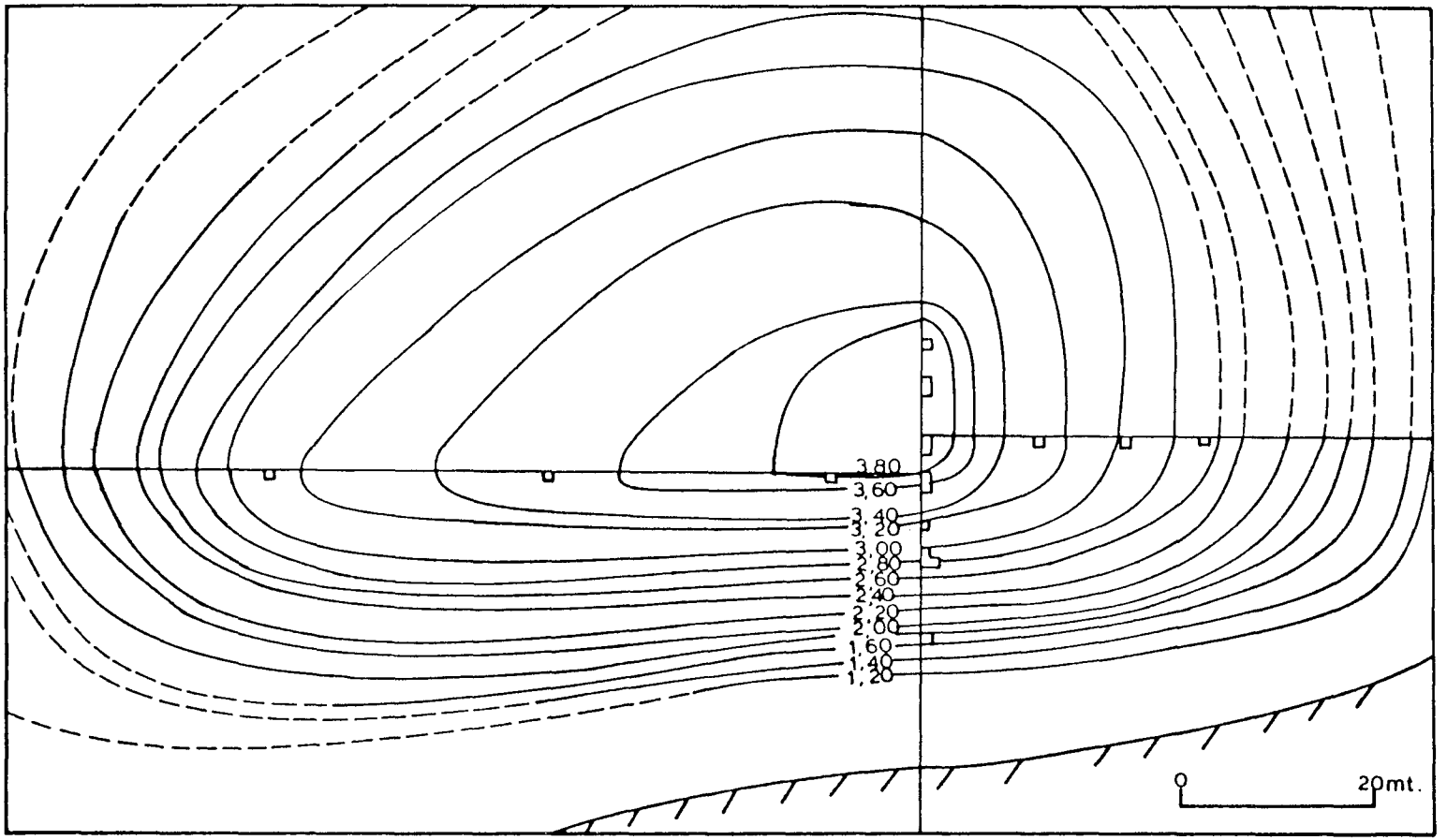


Fig. 37 PLAN OF SHABONA SITE (After, Clark, J.D., 1989: 391)



Excavated Trenches & Squares

Flood Plains

Fig.38 Contour Map of Rabak Site (After Haaland, R. 1987 : 54)

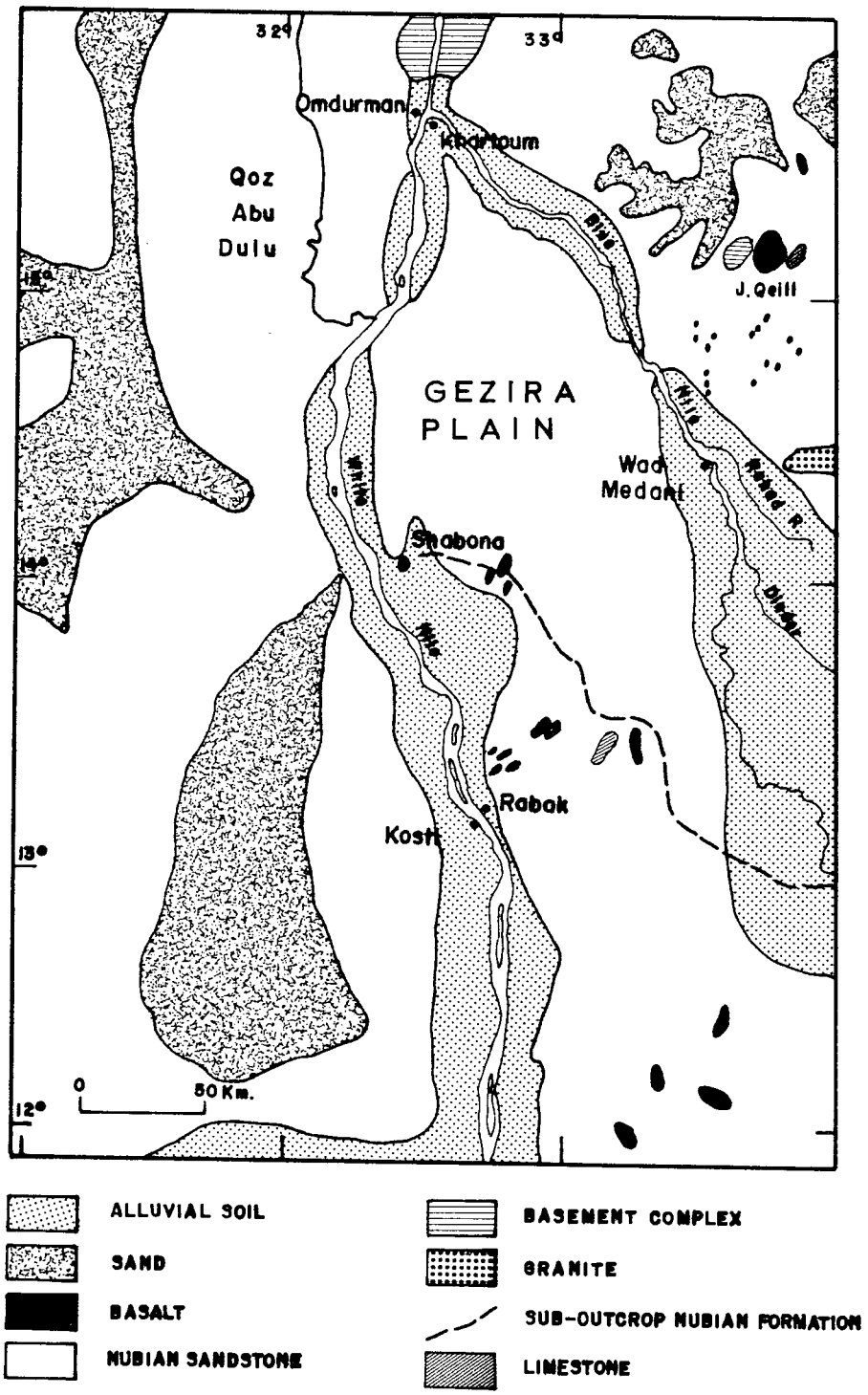


Fig. 39 Geological Map of the White Nile Region of Central Sudan (After Vail, J. R. 1982 : 52, with some modification).

Fig.40 Fabric Groups of Shabona Pottery

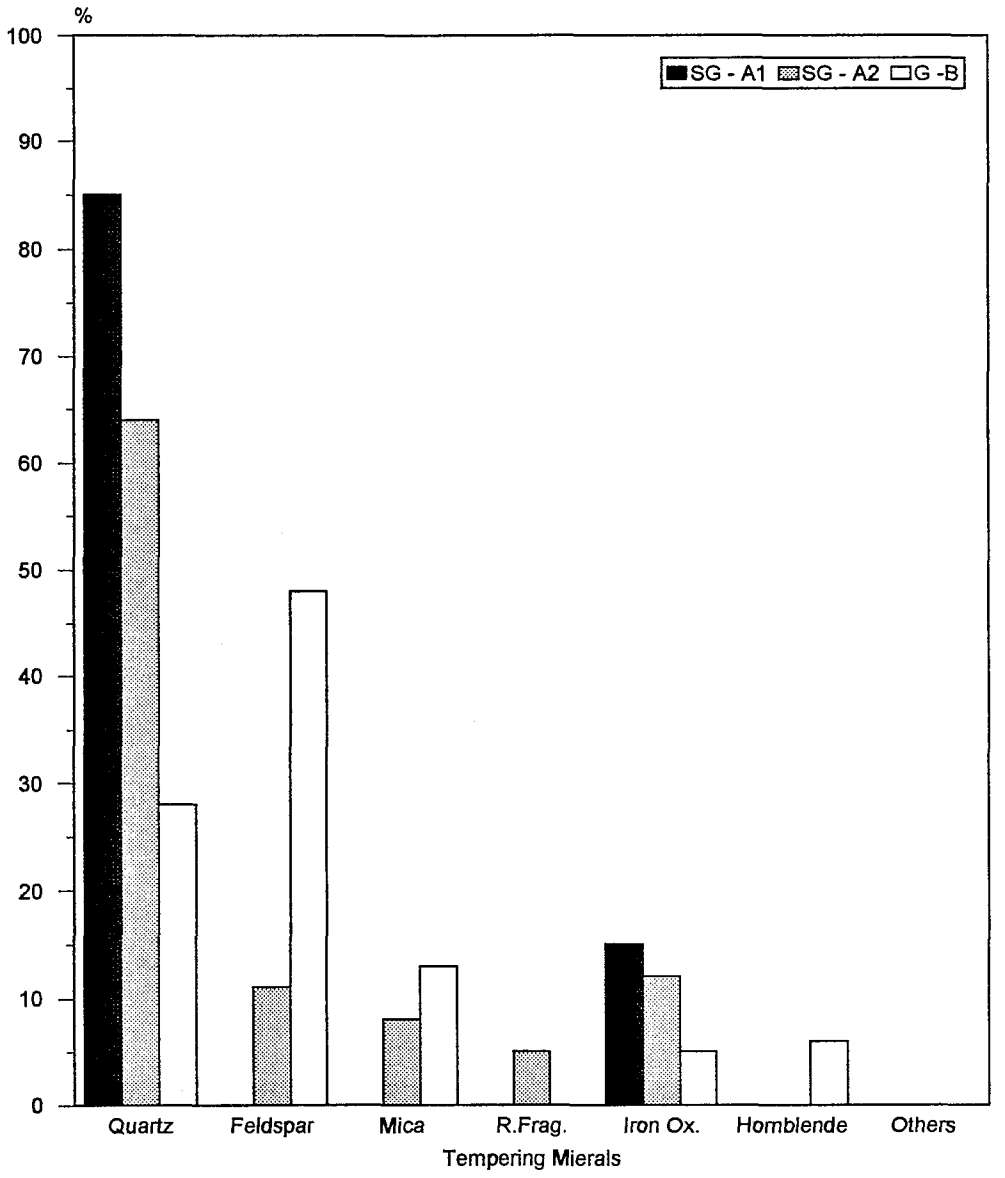


Fig.41 **Fabric Groups of Rabak (K.N.) Pottery**

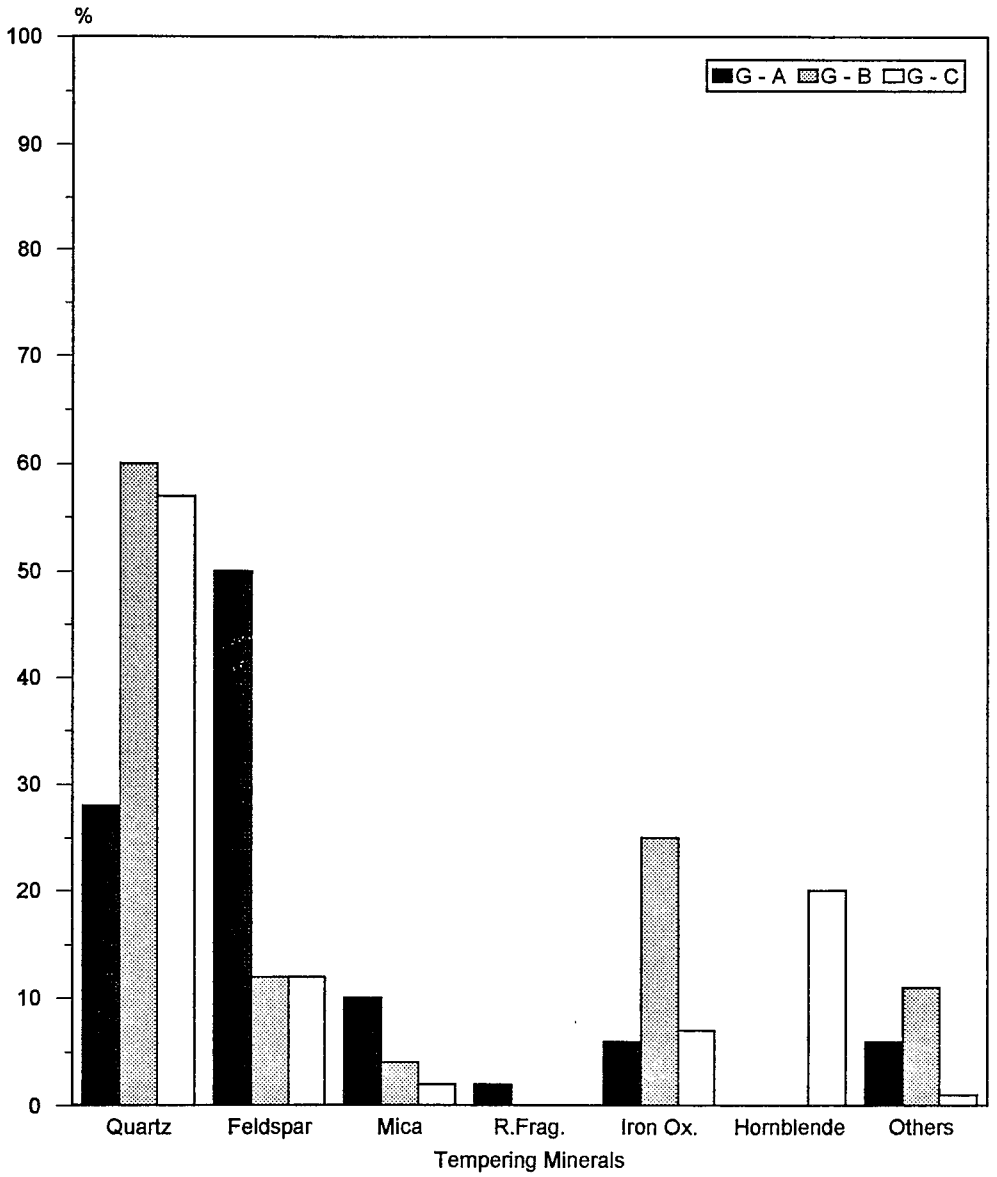
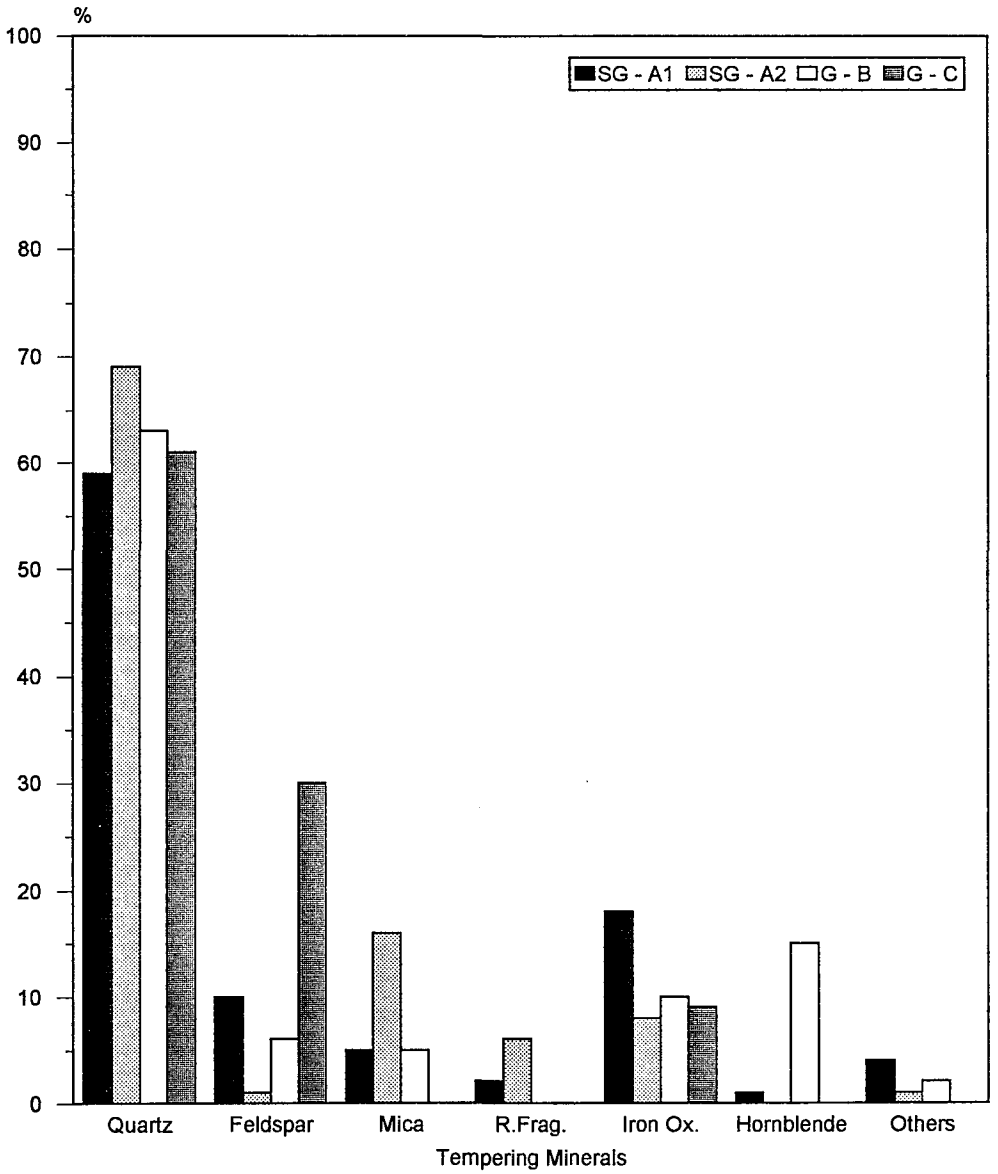
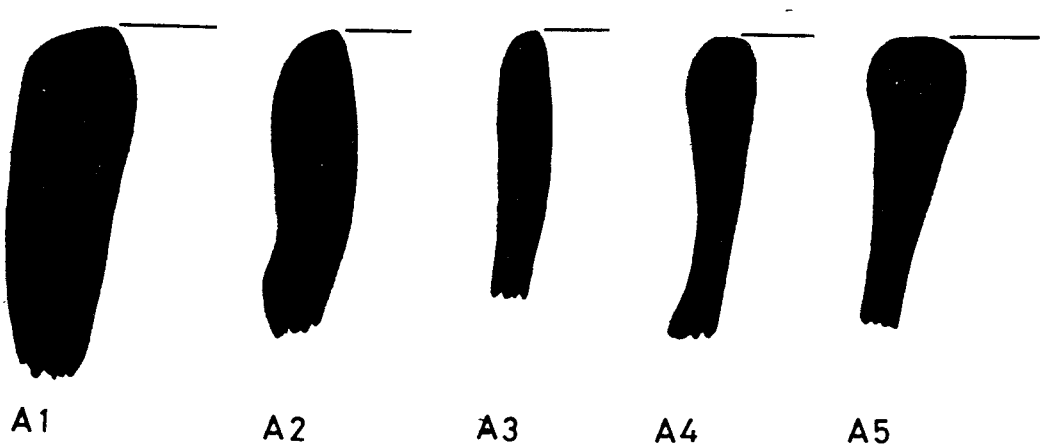


Fig.42 **Fabric Groups of Rabak (J.M.) Pottery**

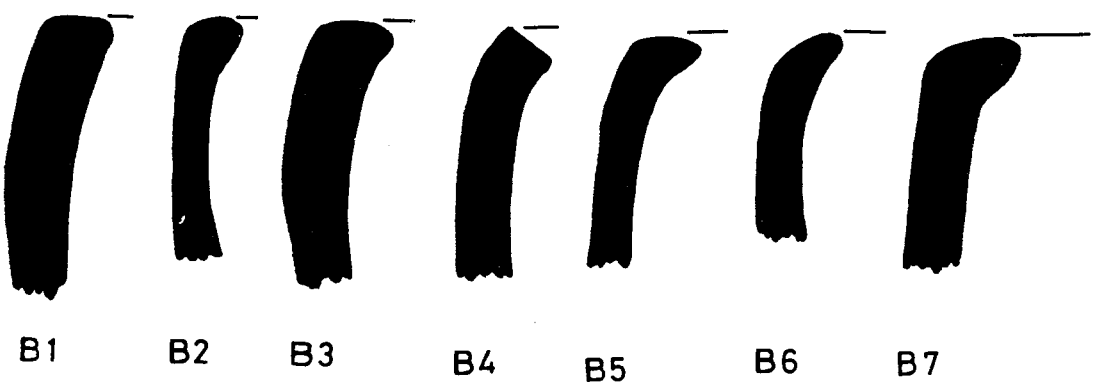


(Fig. 43) Rim Shapes: Shabona Pottery

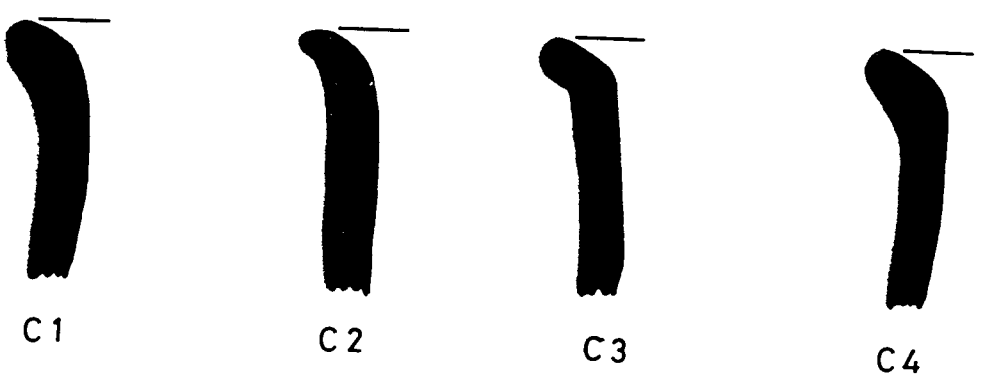
Direct Rims



Everted Rims

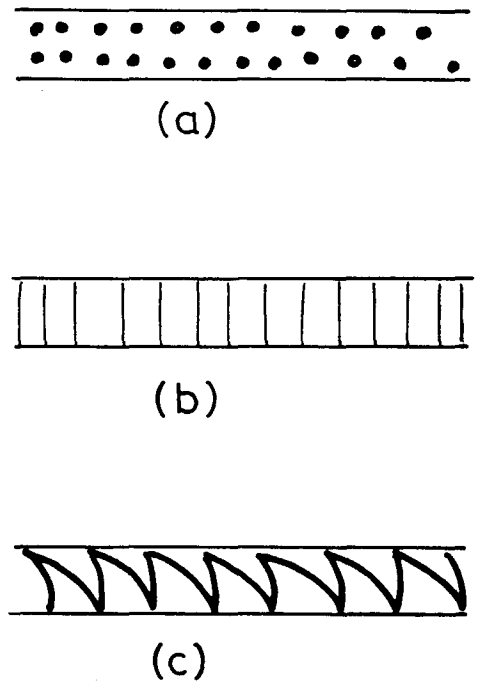


Reverted Rims



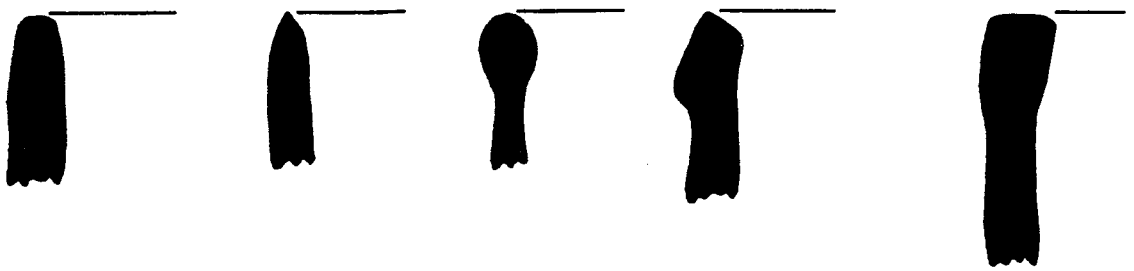
Scale 1 : 1

Fig.44 Shabona Pottery: Rim Top Decoration



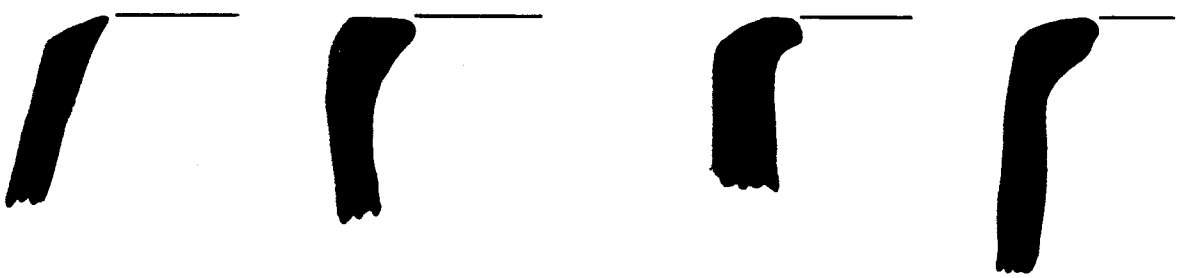
(Fig. 45) Rim Shapes : Rabak (Kh. Neo. L.)

Direct Rims



A1 A2 A3 A4 A5

Everted Rims



B1 B2 B3 B4

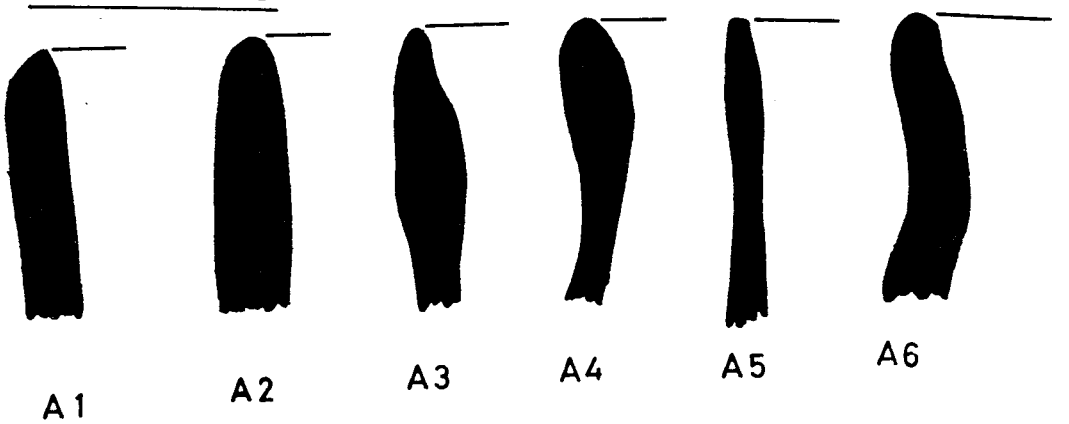
Reverted Rims

C1 C2 C3 C4

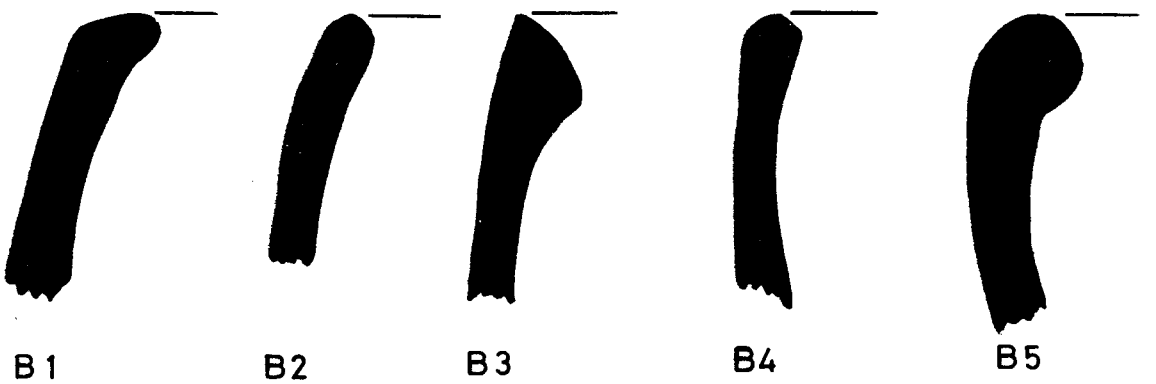
Scale 1 : 1

(Fig. 46) Rim Shapes: Rabak (J.M.)

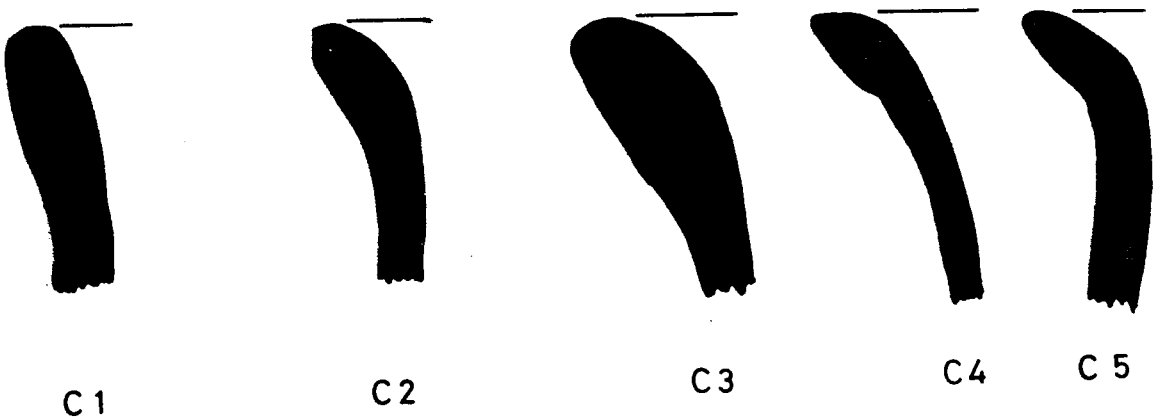
Direct Rims



Everted Rims

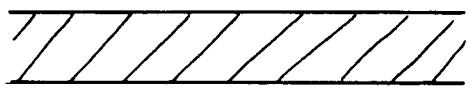


Reverted Rims



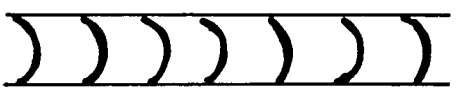
Scale 1 : 1

Fig.47 Rabak Pottery: Rim Top Decoration



(a)

(b)

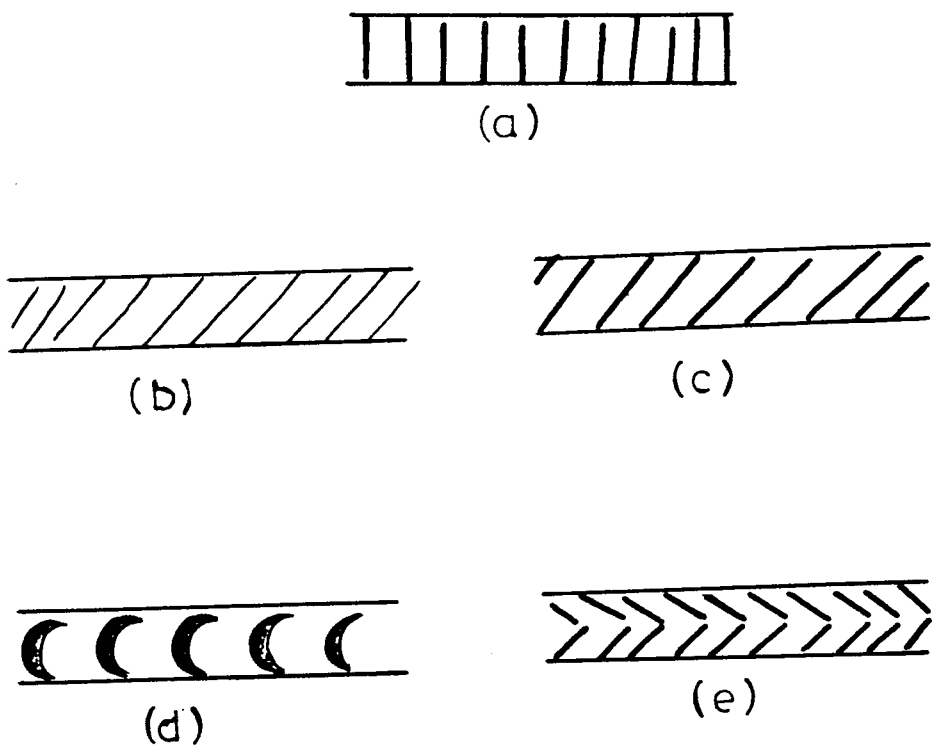


(c)

(d)

(e)

Fig. 48 Rabak Pottery: Rim Band Decoration



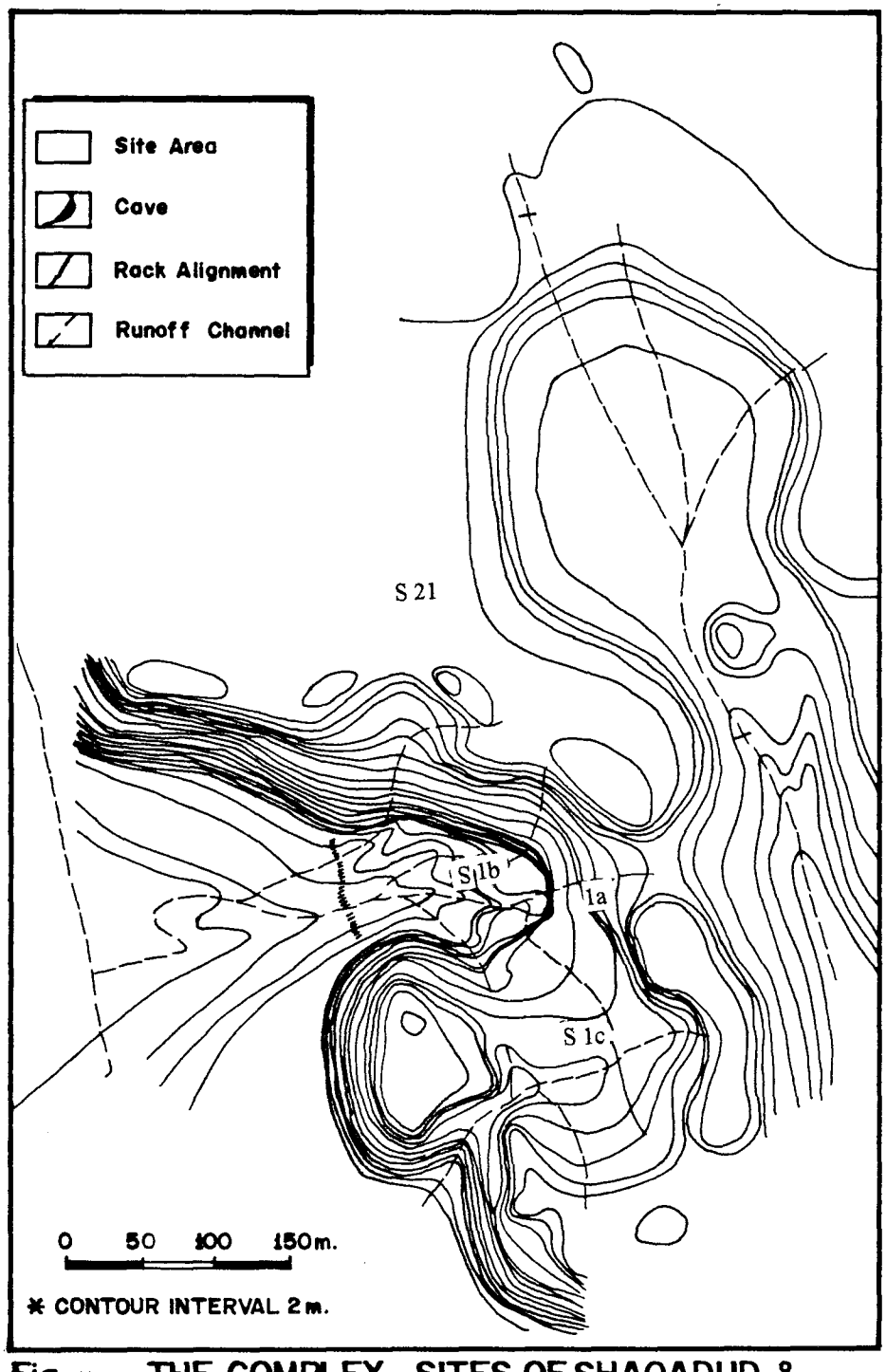


Fig 49 THE COMPLEX-SITES OF SHAQADUD : CONTOUR MAP (AFTER MARKS, A.E AND MOHAMED-ALI, A.S., 1991 : 37)

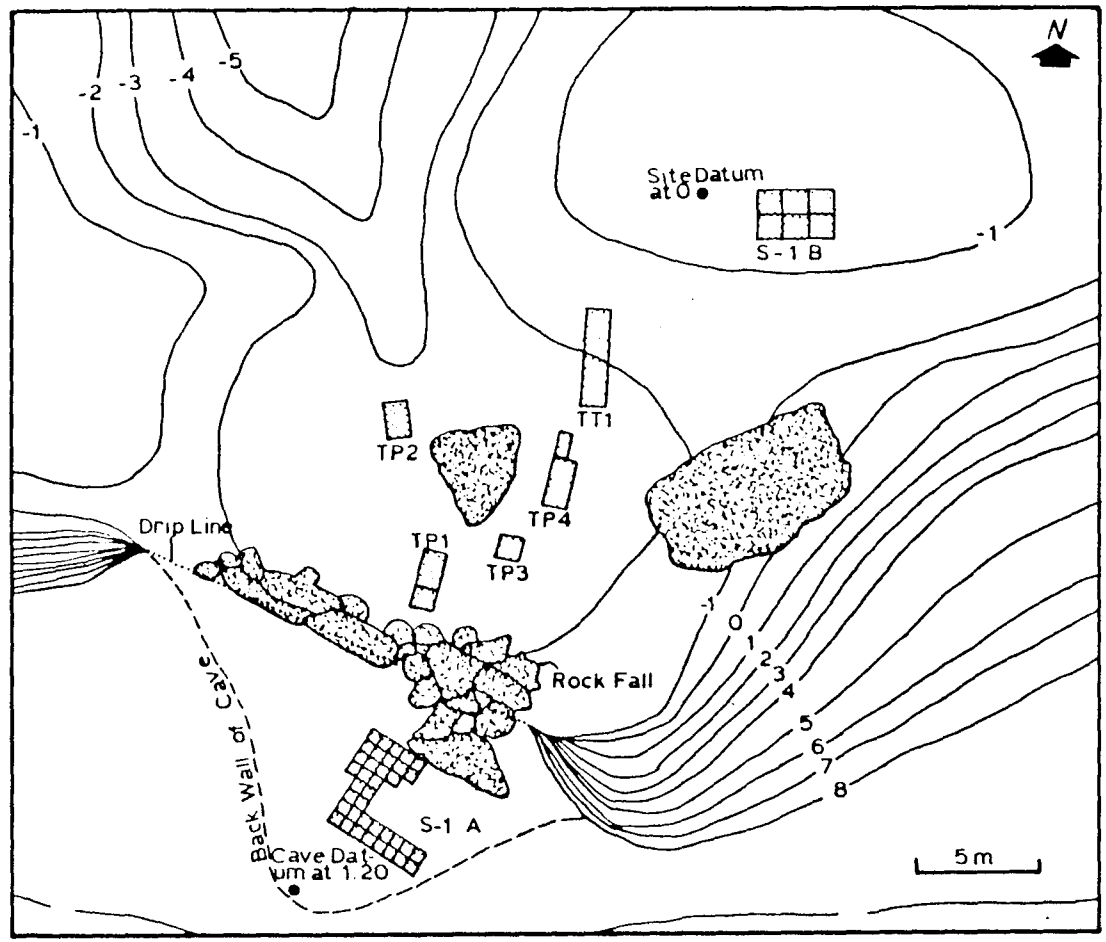


Fig. 50 Map of basin area, midden, and cave, showing the various test excavations and large pieces of rock fall. (AFTER MARKS, A.E. AND MOHAMED ALI, A.S., 1991:46)

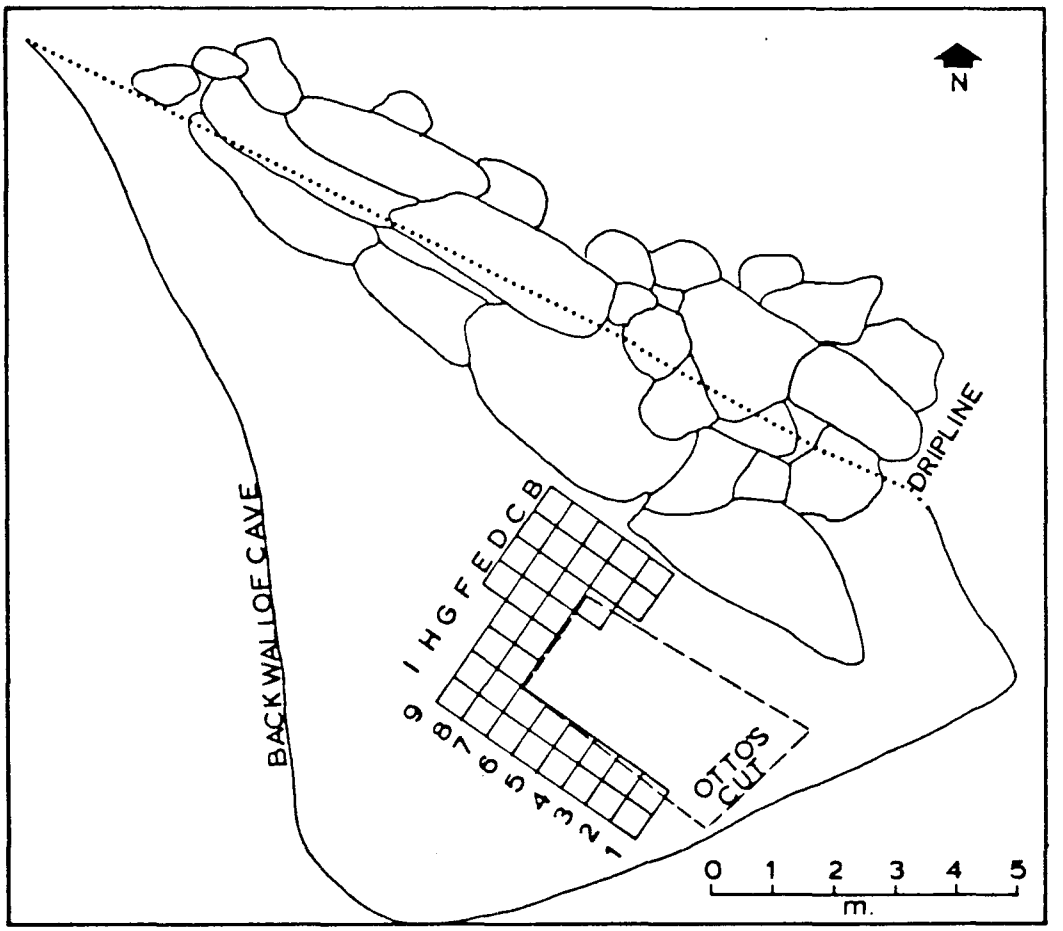


Fig. 51 Map of the excavation units in Shaqadud Cave and the approximate position of Otto's test excavations. (AFTER MARKS, A.E. AND MOHAMED ALI, A.S., 1991: 51).

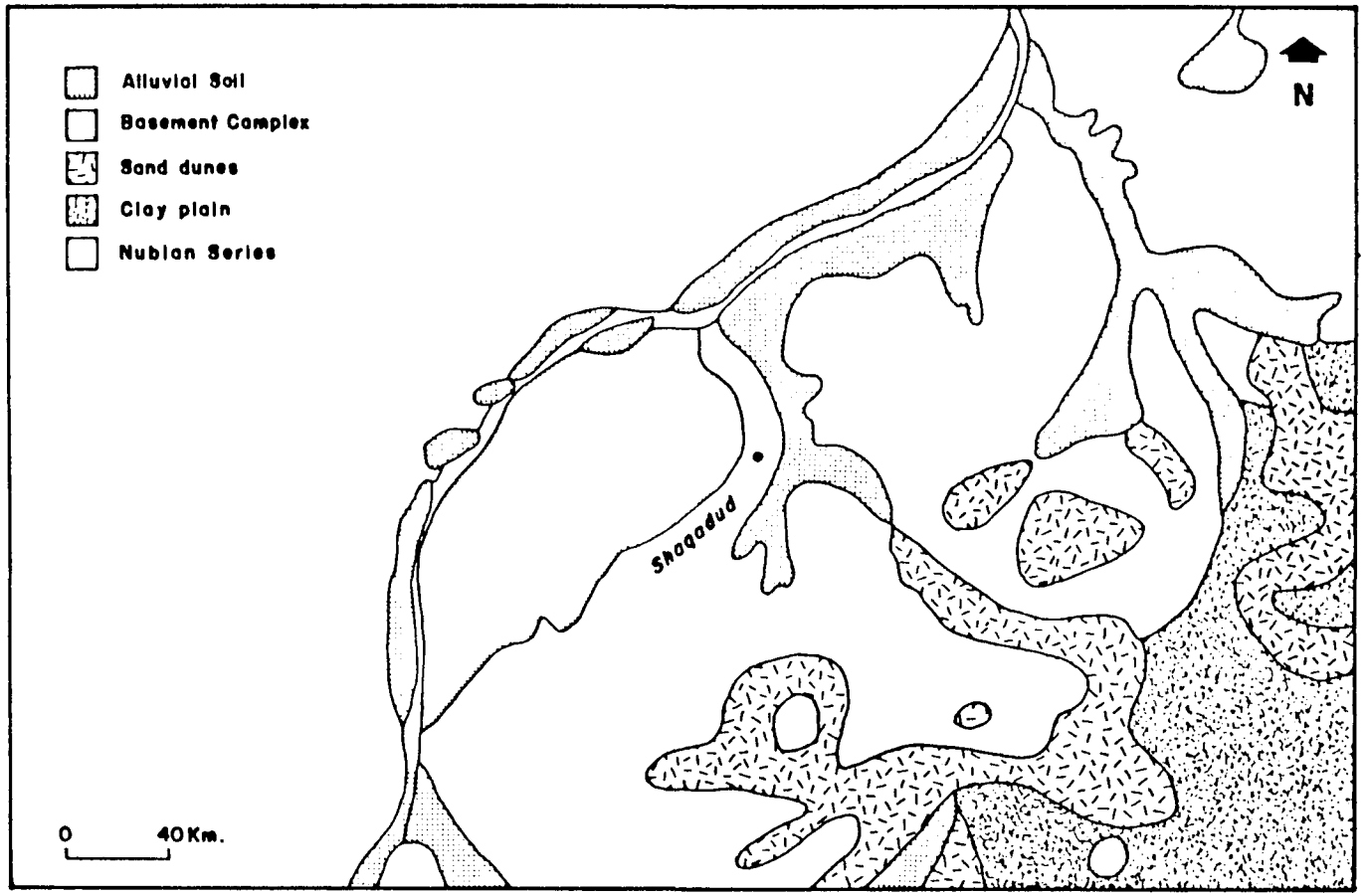


Fig. 52 Geological map of the Western Butana and the Shendi Reach (After Ahmed, K.A., 1984 : 17)

Fig.53 **Fabric Groups of Shaqadud Midden Pottery :Mesolithic Levels**

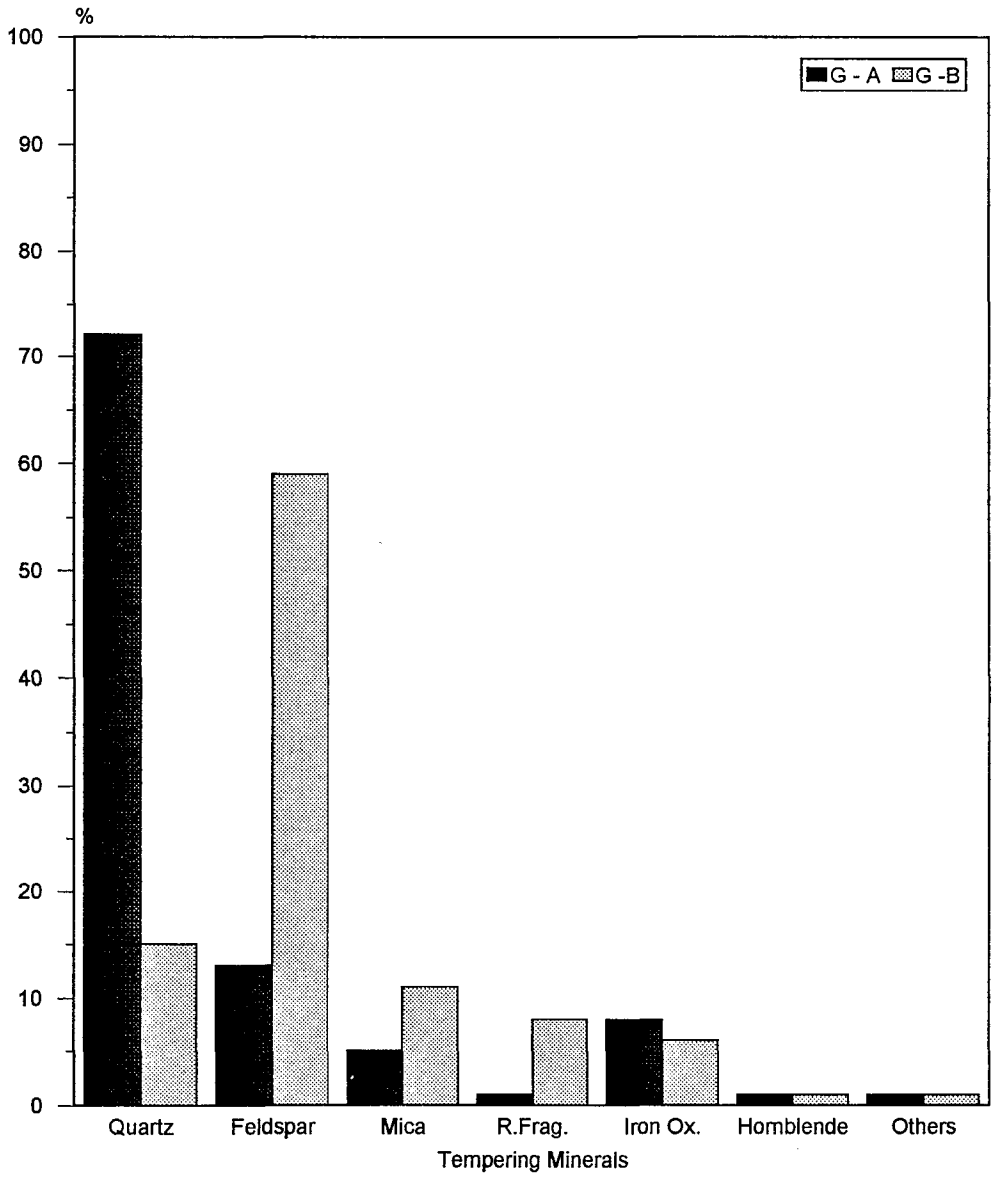


Fig.54

Fabric Groups of Shaqadud Midden Pottery : Neolithic Levels

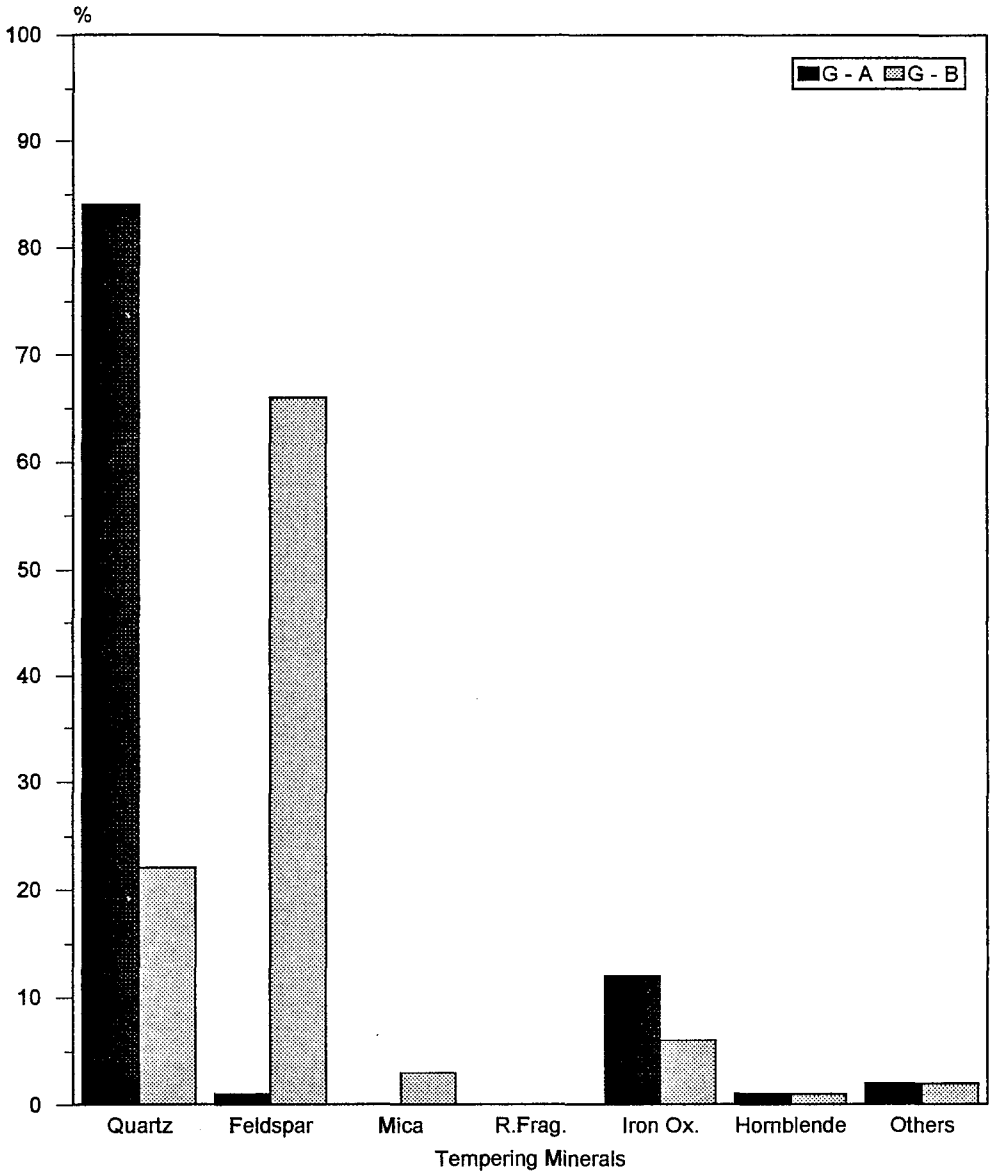
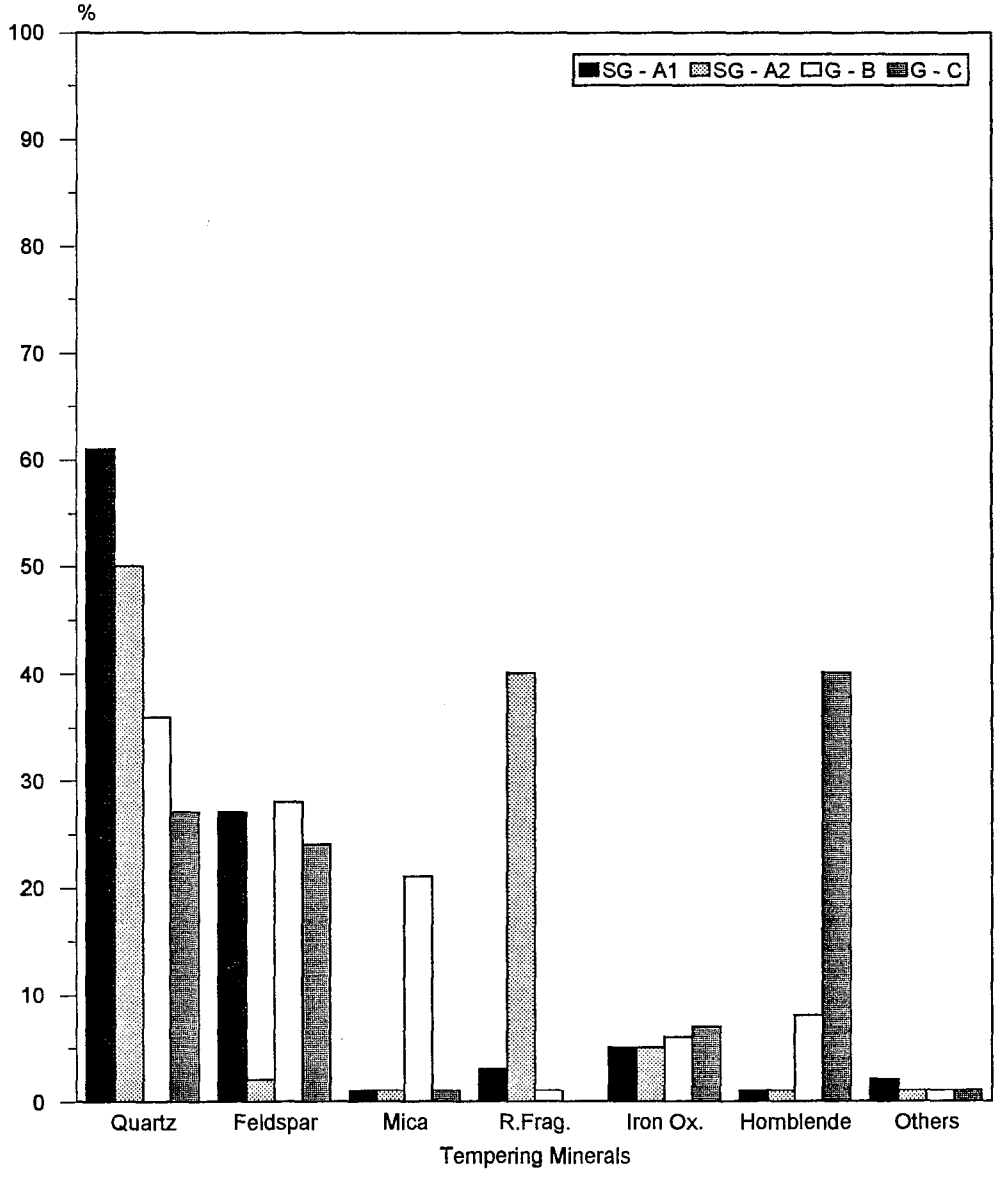
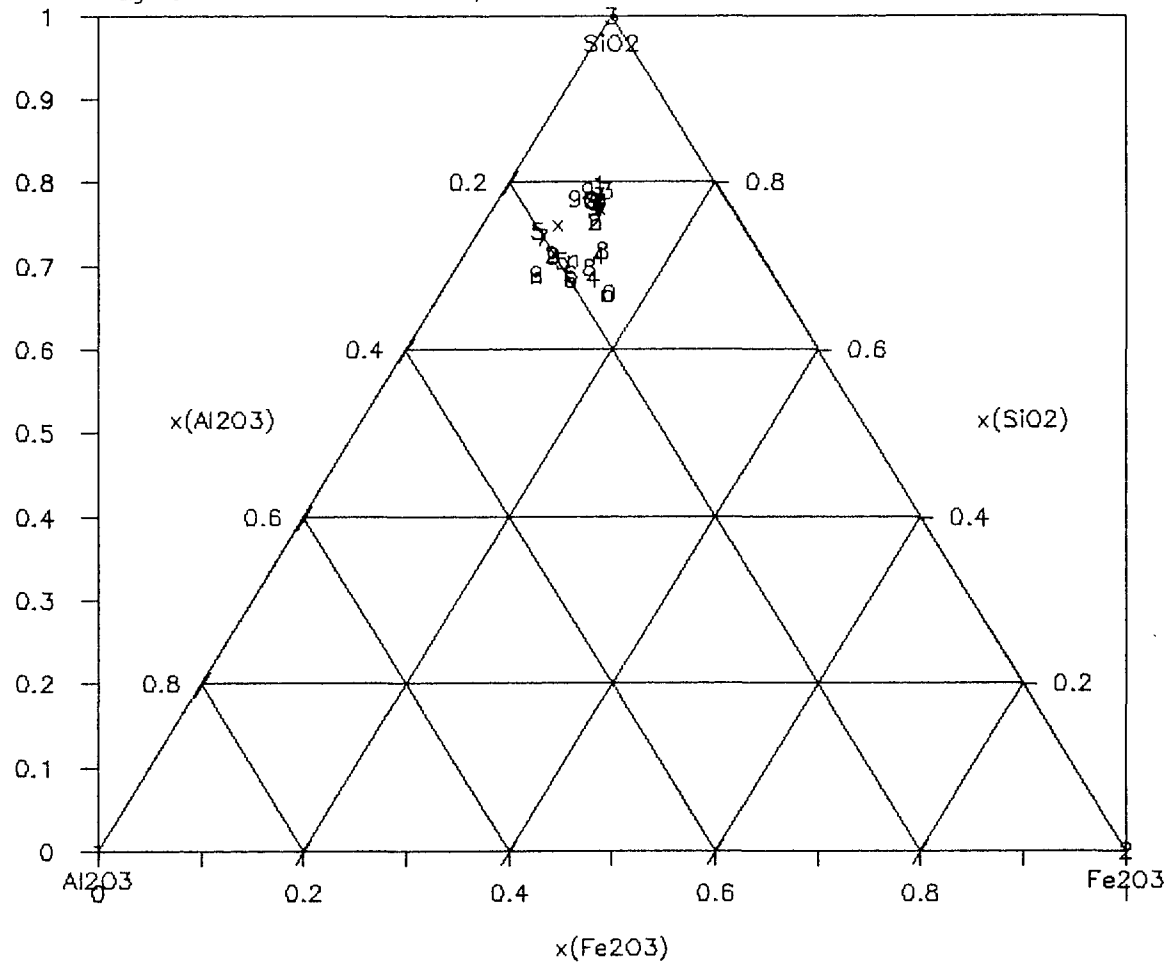


Fig.55 **Fabric Groups of Shaqadud Cave Pottery**



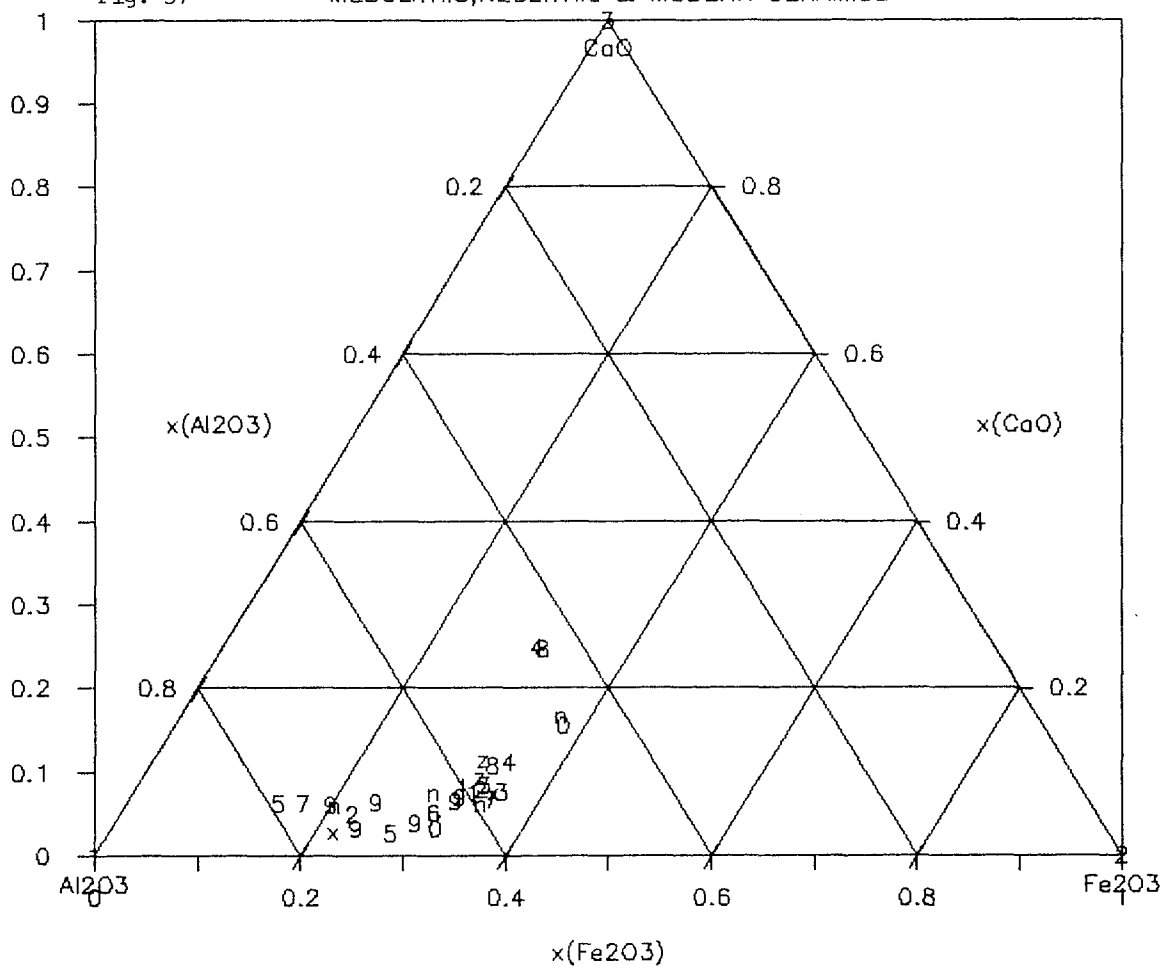
PLOT FOR Al2O3–Fe2O3–SiO2

Fig. 56 MESOLITHIC,NEOLITHIC & MODERN CERAMICS



PLOT FOR Al2O3–Fe2O3–CaO

Fig. 57 MESOLITHIC,NEOLITHIC & MODERN CERAMICS



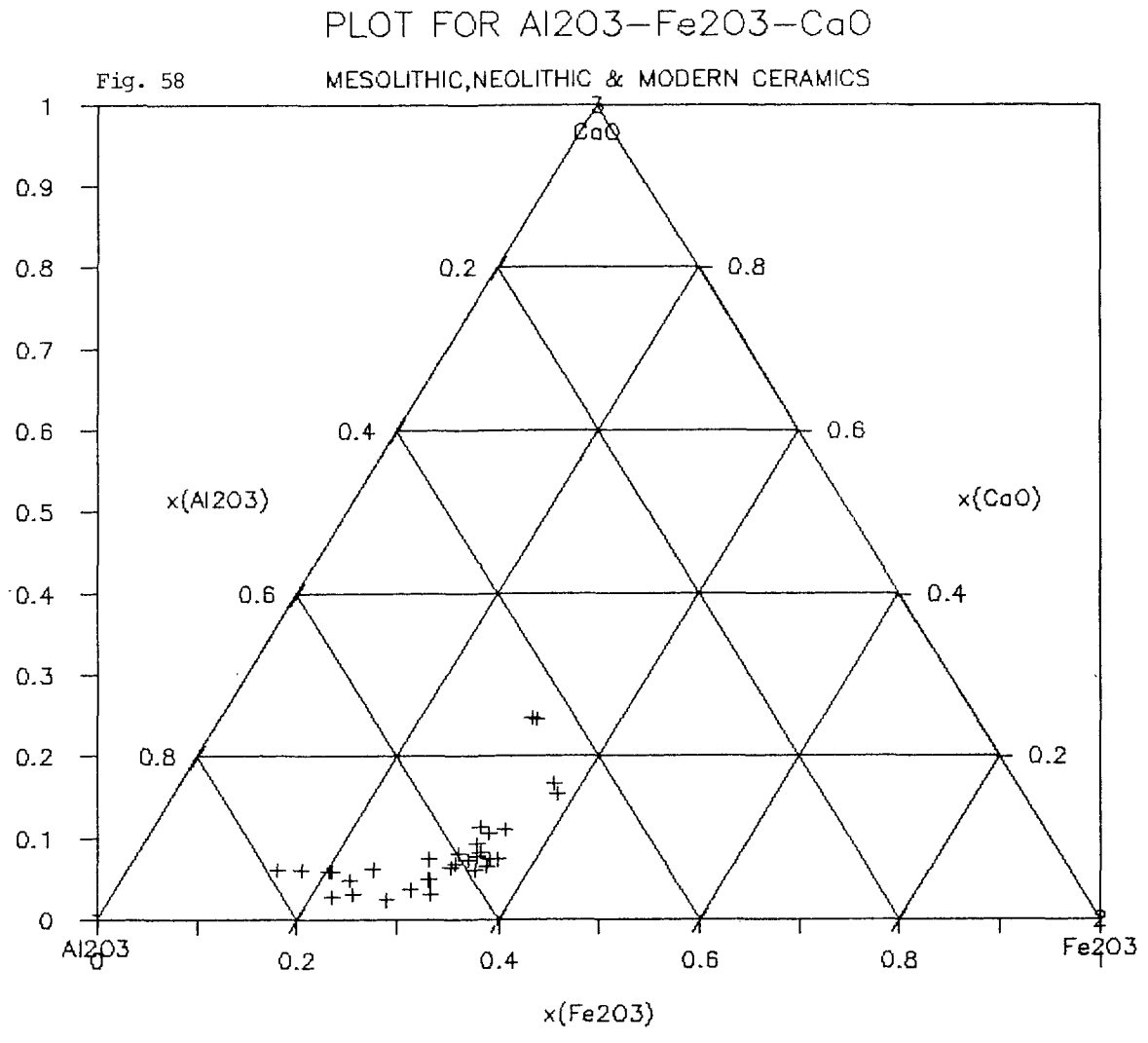
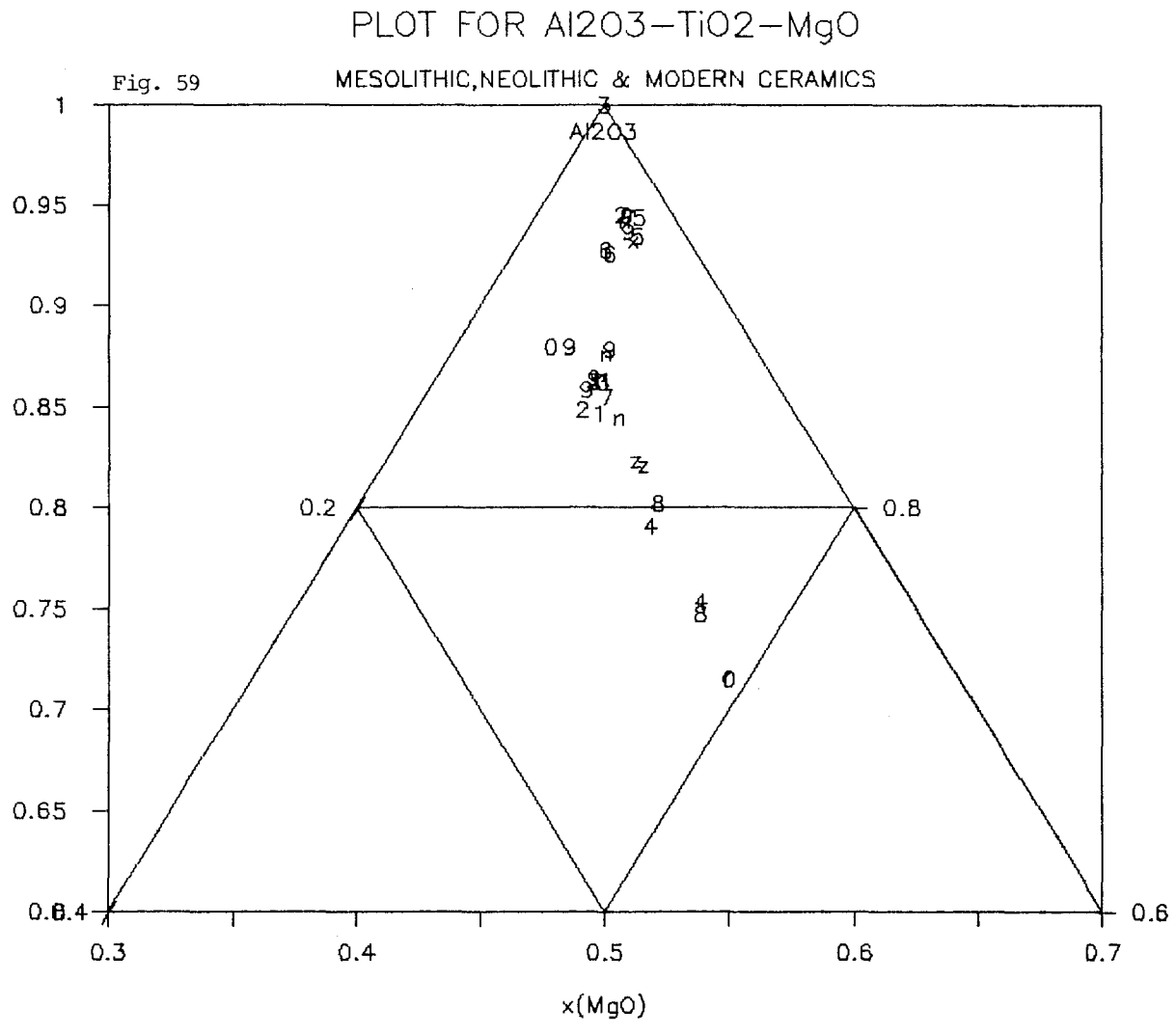
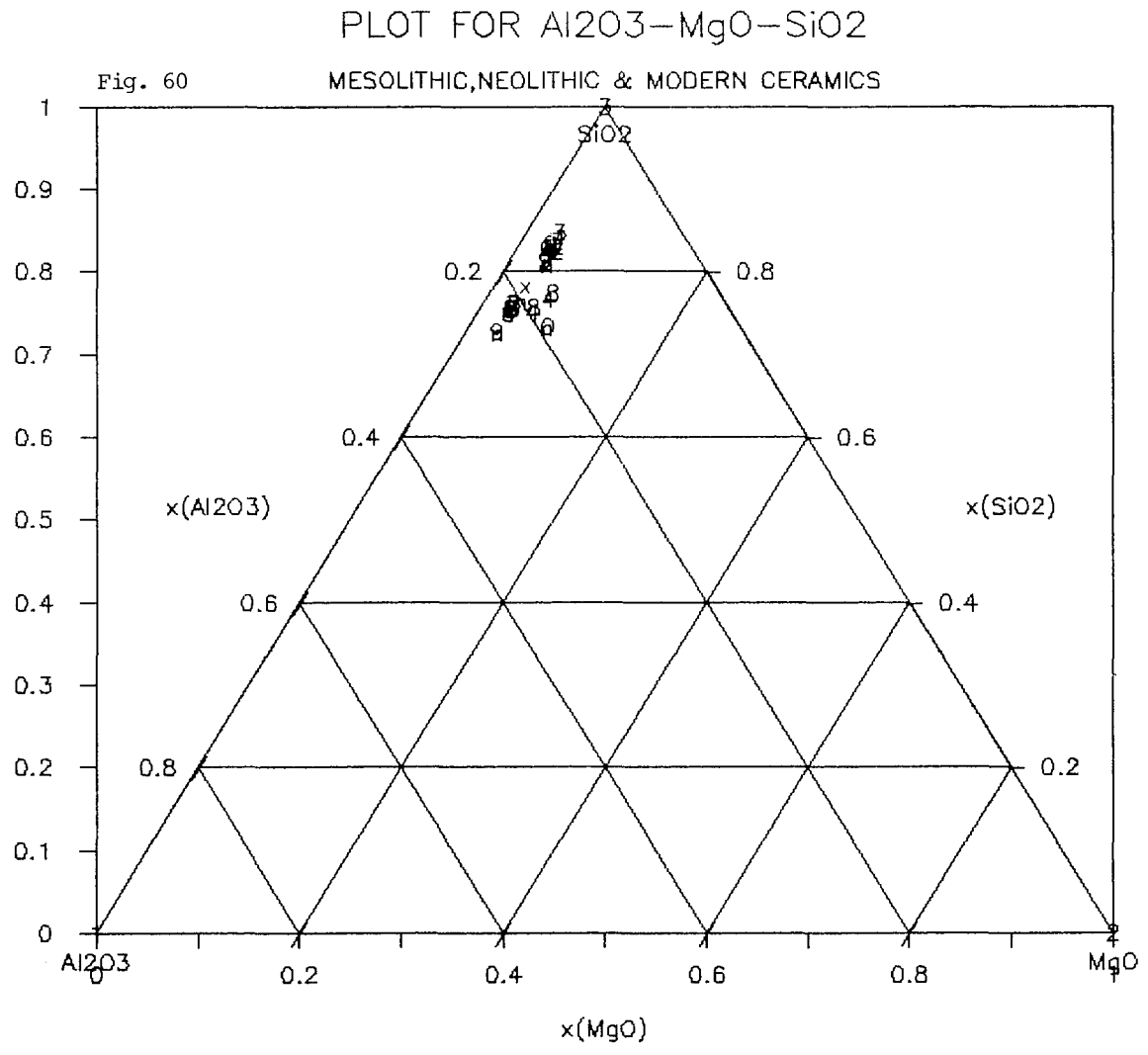

PLOT FOR Al2O3–Fe2O3–CaO
Fig. 58
MESOLITHIC,NEOLITHIC & MODERN CERAMICS
CaO
x(Al2O3)
x(CaO)
Al2O3
Fe2O3
x(Fe2O3)
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1

Fig. 59


PLOT FOR Al2O3–TiO2–MgO
MESOLITHIC,NEOLITHIC & MODERN CERAMICS
Al2O3
1
0.95
0.9
0.85
0.8
0.75
0.7
0.65
0.6
0.2
0.8
0.3
0.4
0.5
0.6
0.7
x(MgO)


PLOT FOR Al2O3–MgO–SiO2
Fig. 60
MESOLITHIC,NEOLITHIC & MODERN CERAMICS
SiO2
Al2O3
MgO
x(Al2O3)
x(SiO2)
x(MgO)
0.2
0.4
0.6
0.8
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1

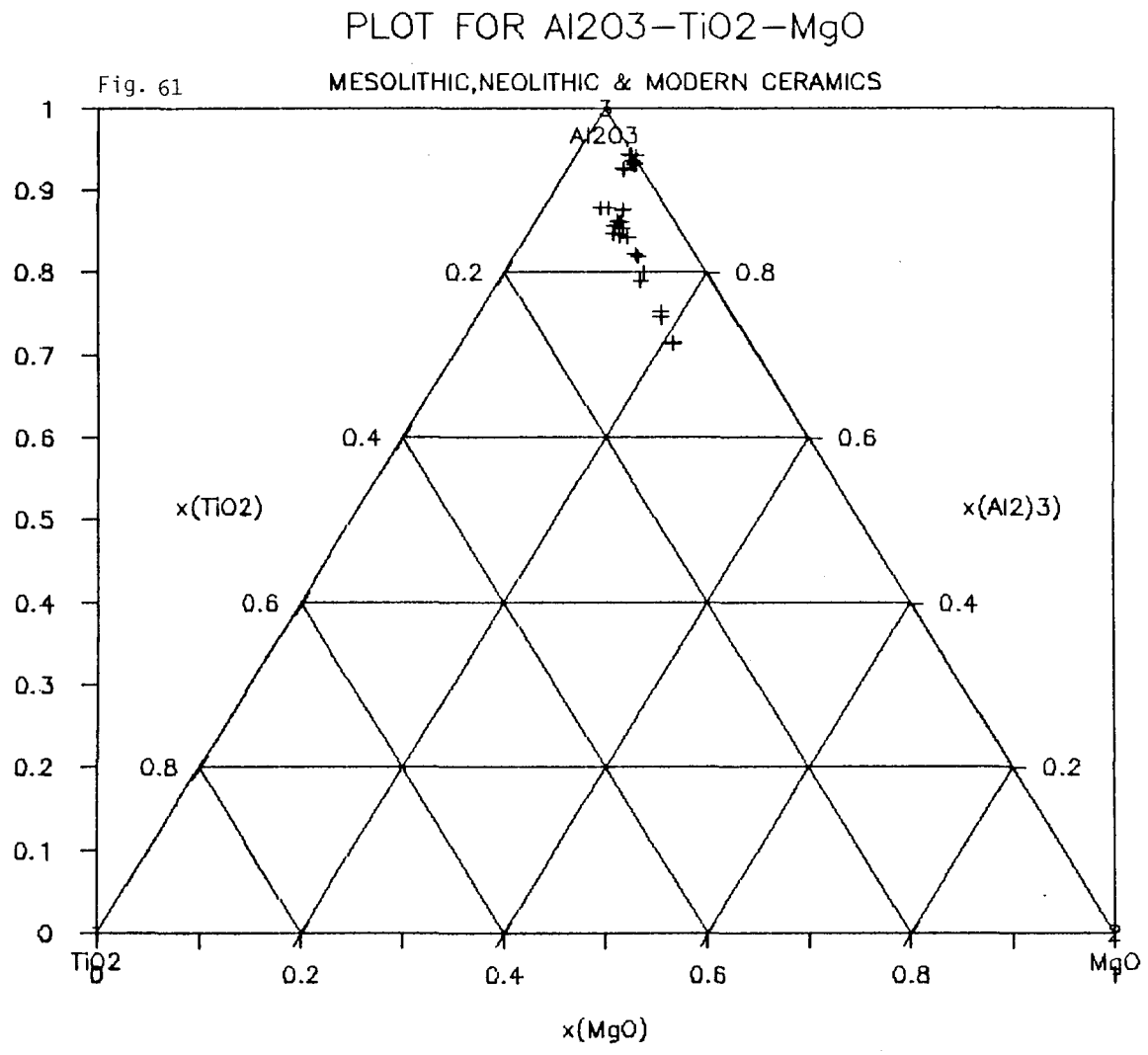
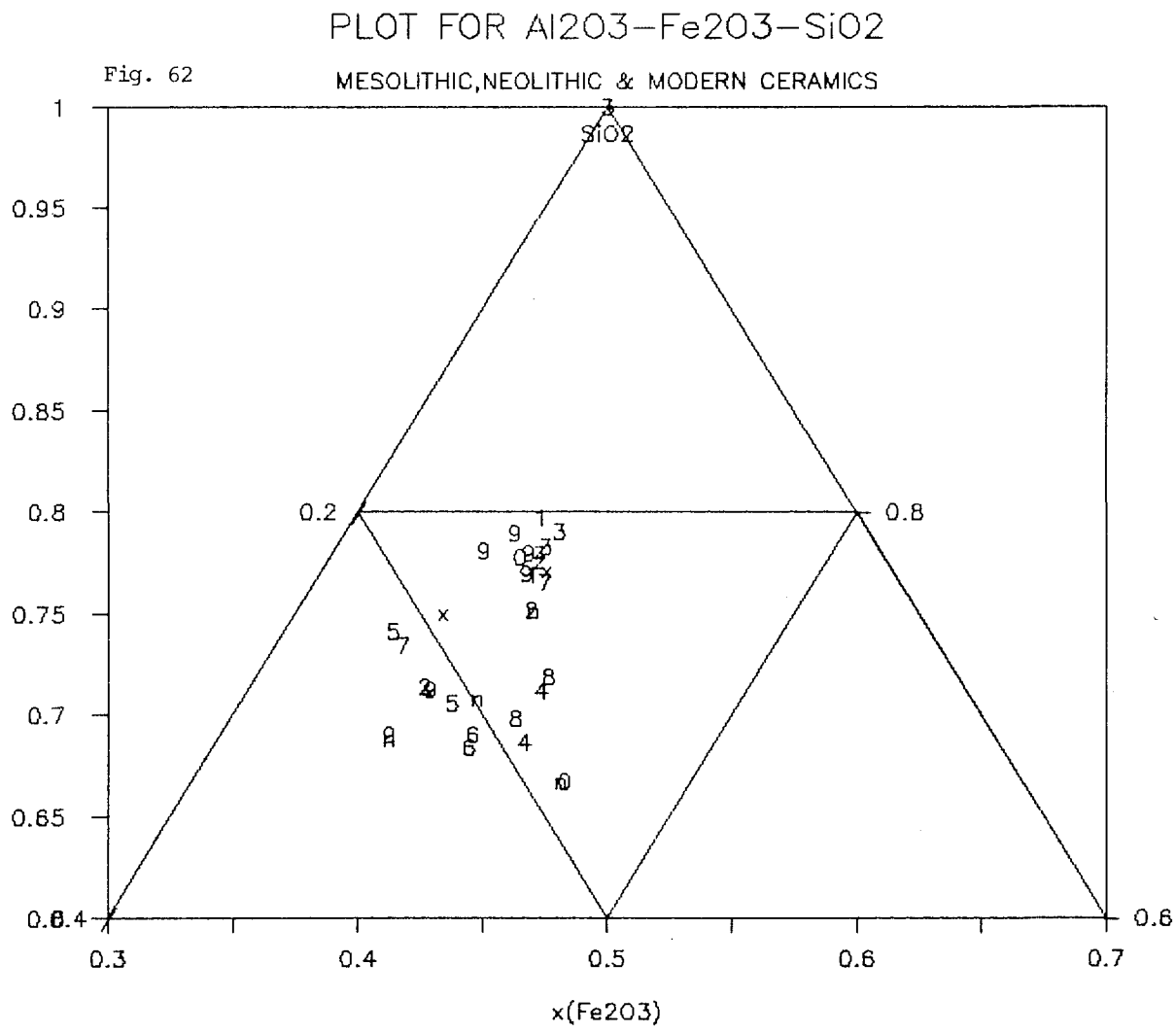

PLOT FOR Al2O3–TiO2–MgO
MESOLITHIC,NEOLITHIC & MODERN CERAMICS
Al2O3
x(TiO2)
x(Al2)3)
x(MgO)
TiO2
MgO
0
0.1
0.2
0.3
0.4
0.5
0.6
0.7
0.8
0.9
1
0.2
0.4
0.6
0.8

Fig. 61

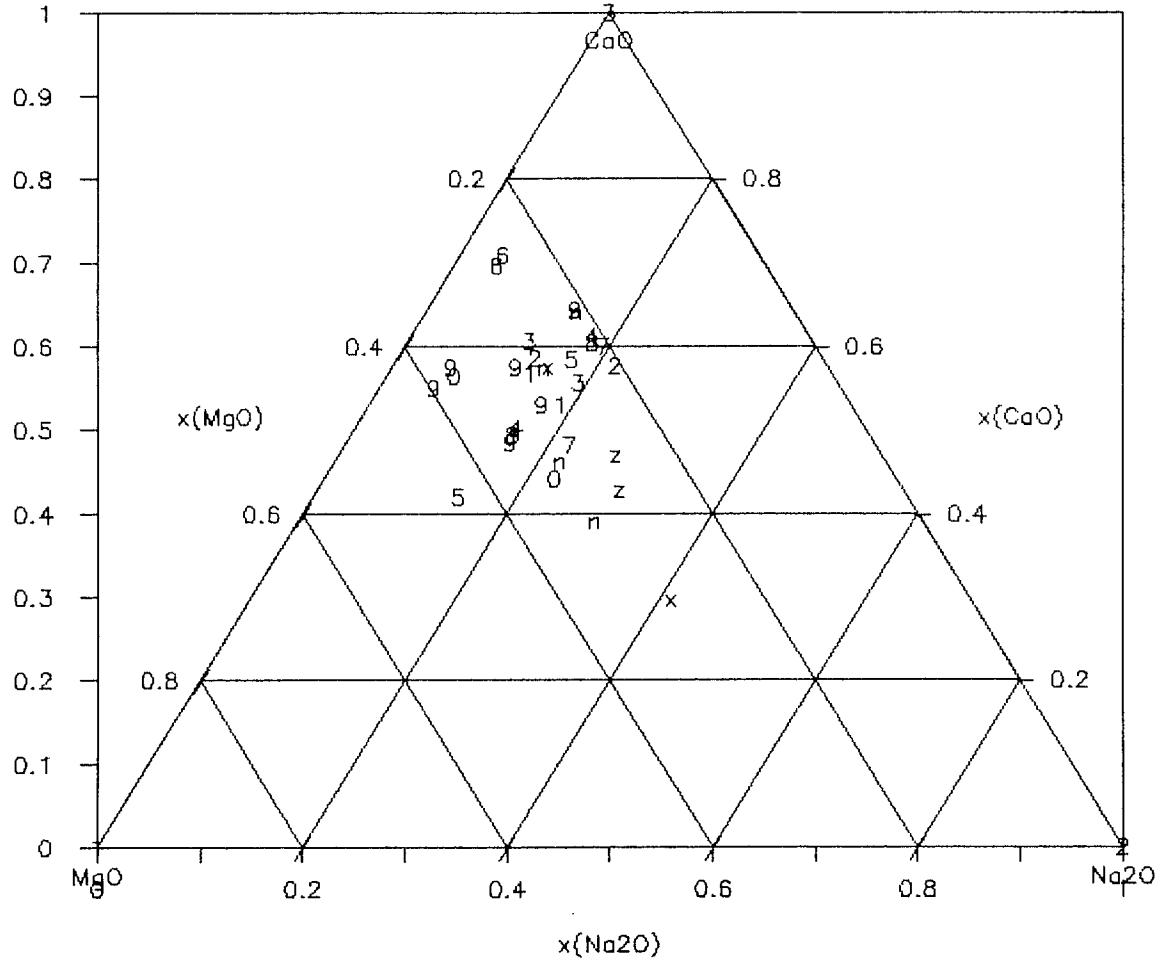
Fig. 62


PLOT FOR Al2O3–Fe2O3–SiO2
MESOLITHIC,NEOLITHIC & MODERN CERAMICS
SiO2
0.2
0.8
0.6
1
0.95
0.9
0.85
0.8
0.75
0.7
0.65
0.6
0.3
0.4
0.5
0.6
0.7
x(Fe2O3)

PLOT FOR MgO–Na2O–CaO

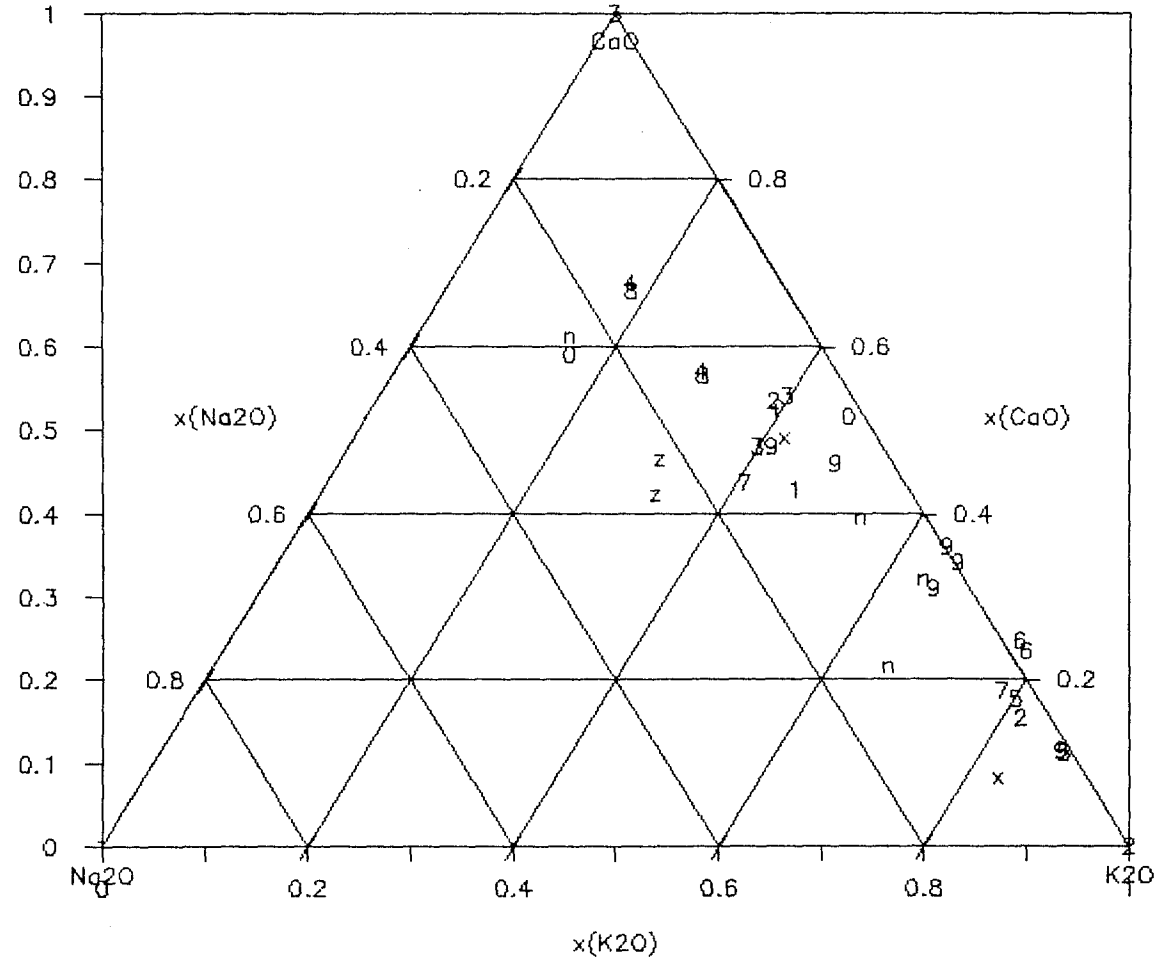
Fig. 63

MESOLITHIC,NEOLITHIC & MODERN CERAMICS



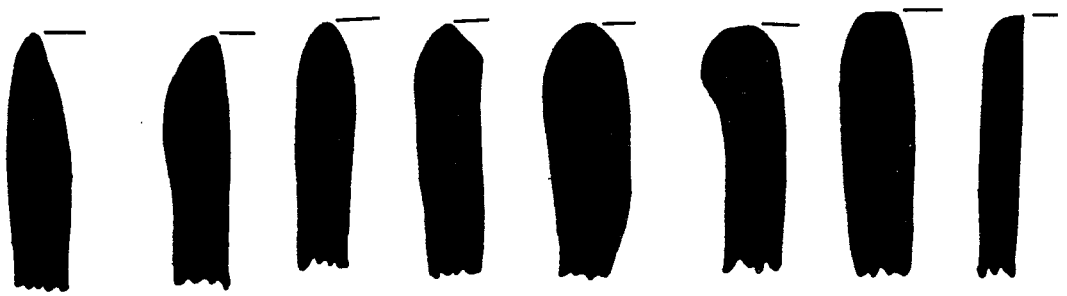
PLOT FOR Na2O–K2O–CaO

Fig. 64 MESOLITHIC,NEOLITHIC & MODERN CERAMICS



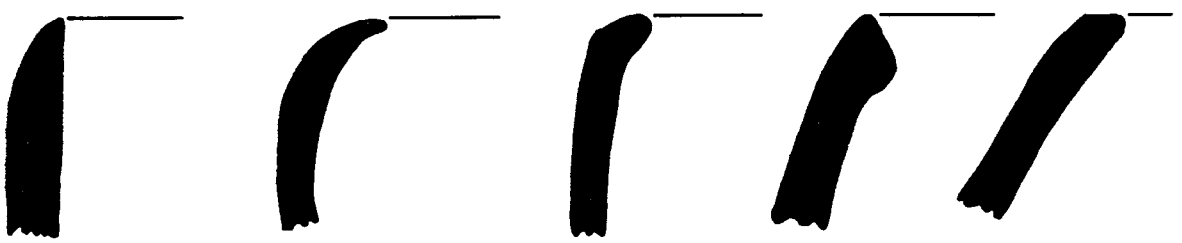
(Fig. 65) Rim Shapes : Shaqadud Midden (Meso.L.)

Direct Rims



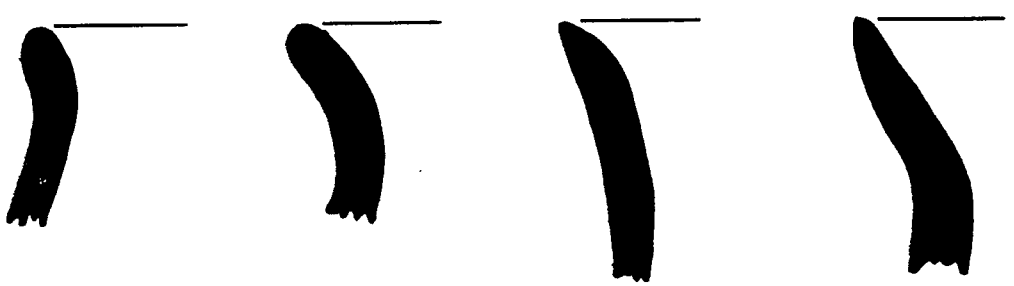
A1 A2 A3 A4 A5 A6 A7 A8

Everted Rims



B1 B2 B3 B4 B5

Reverted Rims

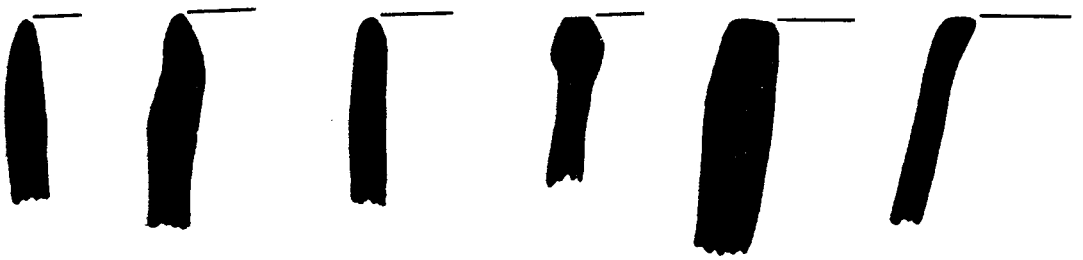


C1 C2 C3 C4

Scale 1 : 1

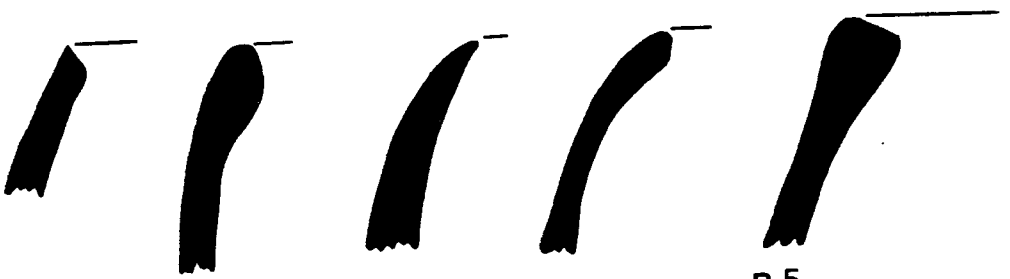
(Fig. 66) Rim Shapes : Shaqadud Midden (Neo.L.)

Direct Rims



A1 A2 A3 A4 A5 A6

Everted Rims



B1 B2 B3 B4 B5

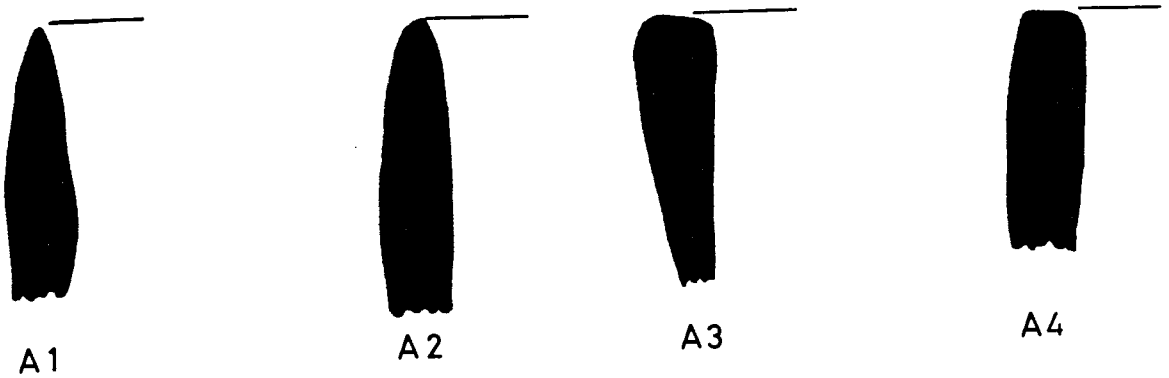
Reverted Rims

C1 C2 C3 C4

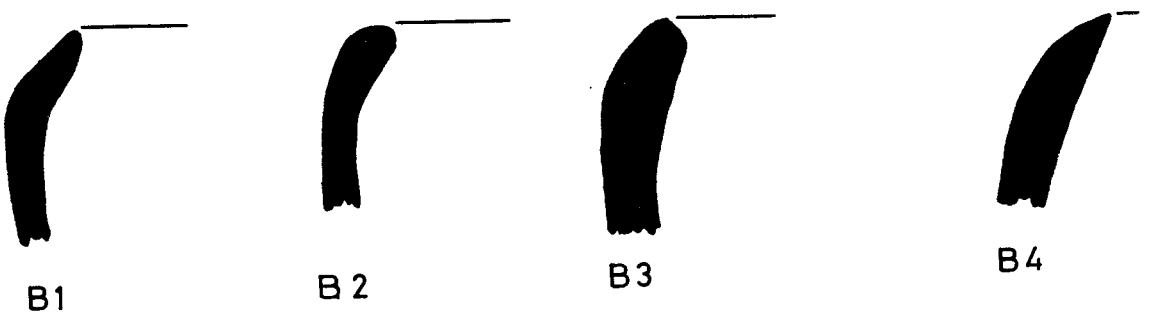
Scale 1 : 1

(Fig. 67) Rim Shapes: Shaqadud Cave

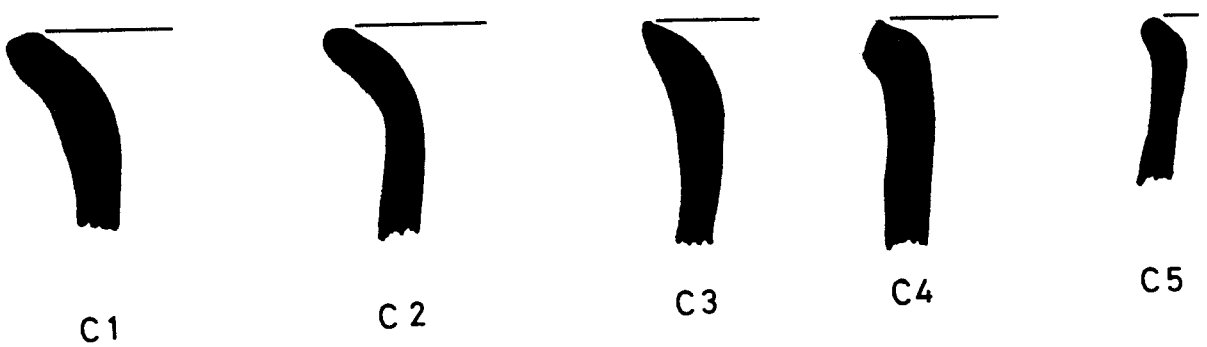
Direct Rims



Everted Rims

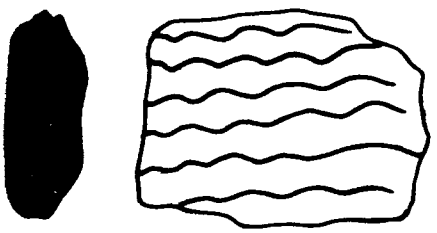


Reverted Rims

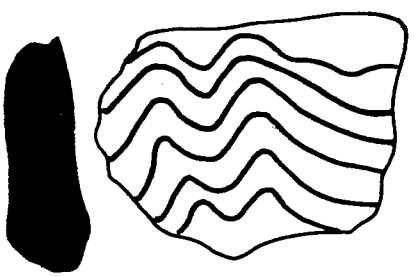


Scale 1 : 1

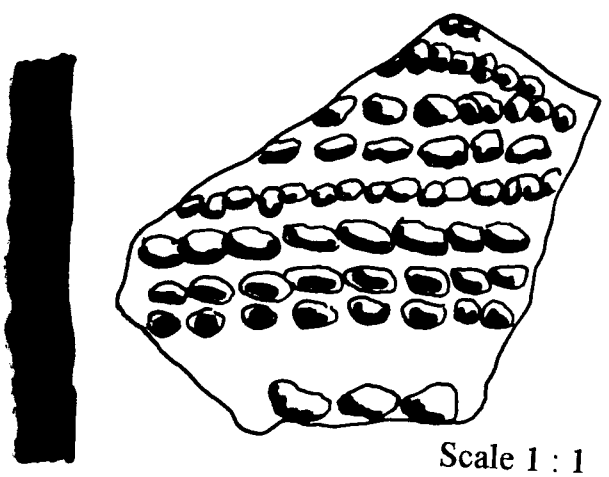
(Fig. 68) Shaqadud Midden (Meso.L.) Pottery



(a)



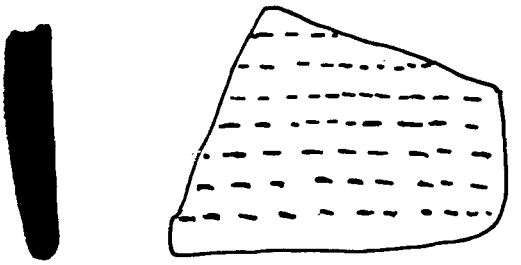
(b)



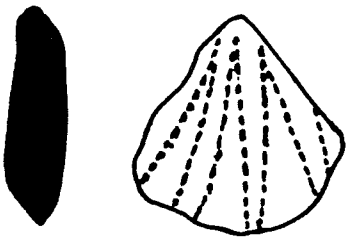
Scale 1 : 1

(c)

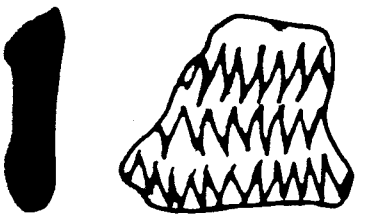
(Fig. 69) Shaqadud Midden (Neo.L.) Pottery



(a)



(b)



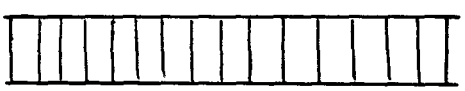
(c)

Scale 1 : 1

Fig. 70 Shagadud Midden Pottery: Rim Top Decoration

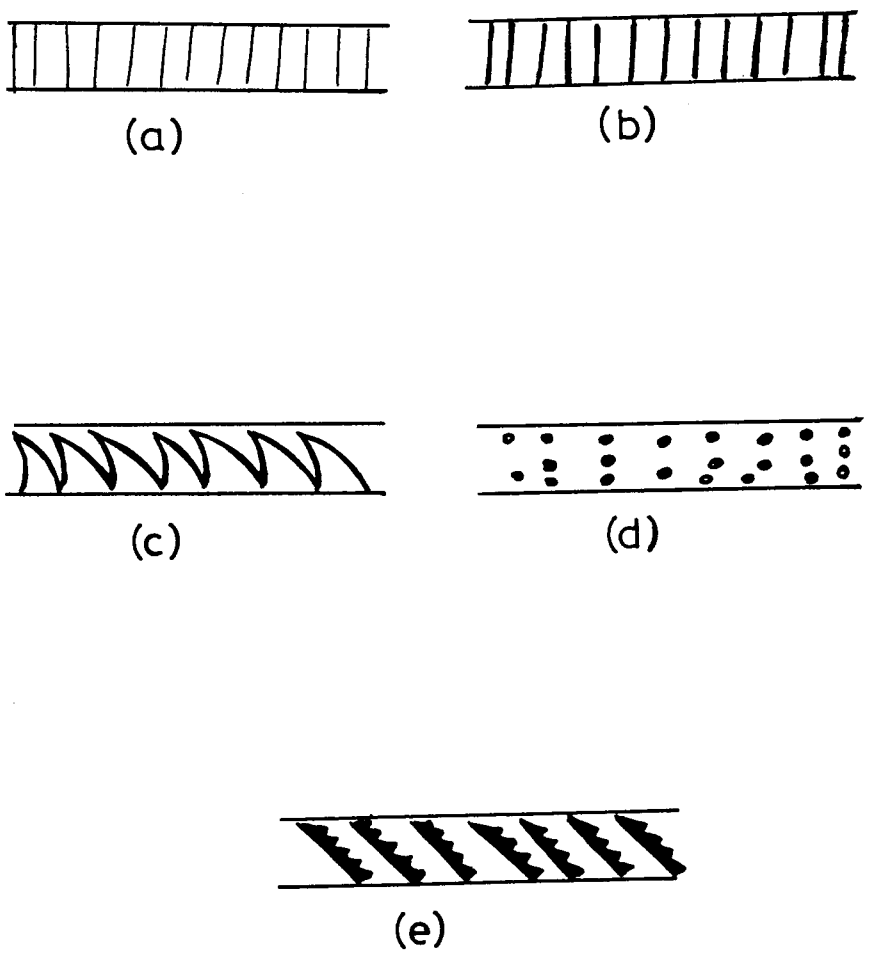
(a)

(b)

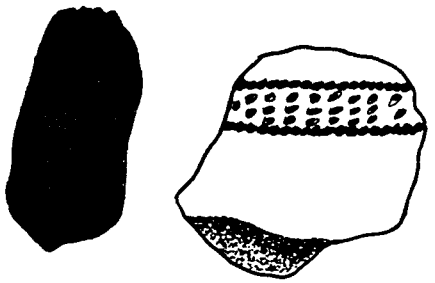


(c)

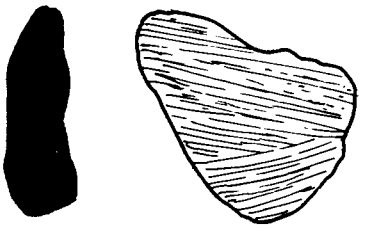
Fig. 71 Shagadud Midden : Rim Bands



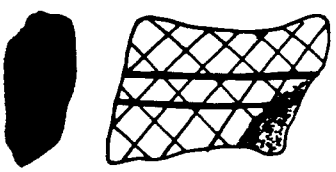
(Fig. 72) Shaqadud Cave Pottery



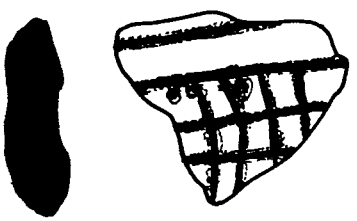
(a)



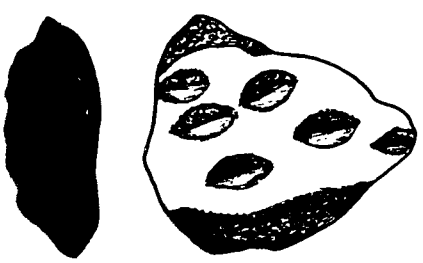
(b)



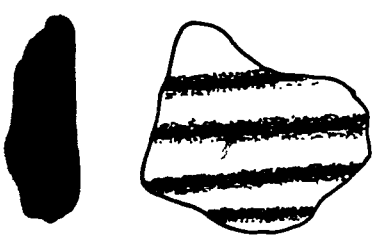
(c)



(d)



(e)



(f)

Scale 1 : 1

Fig. 73 Shagadud Cave Pottery: Rim Top Decoration

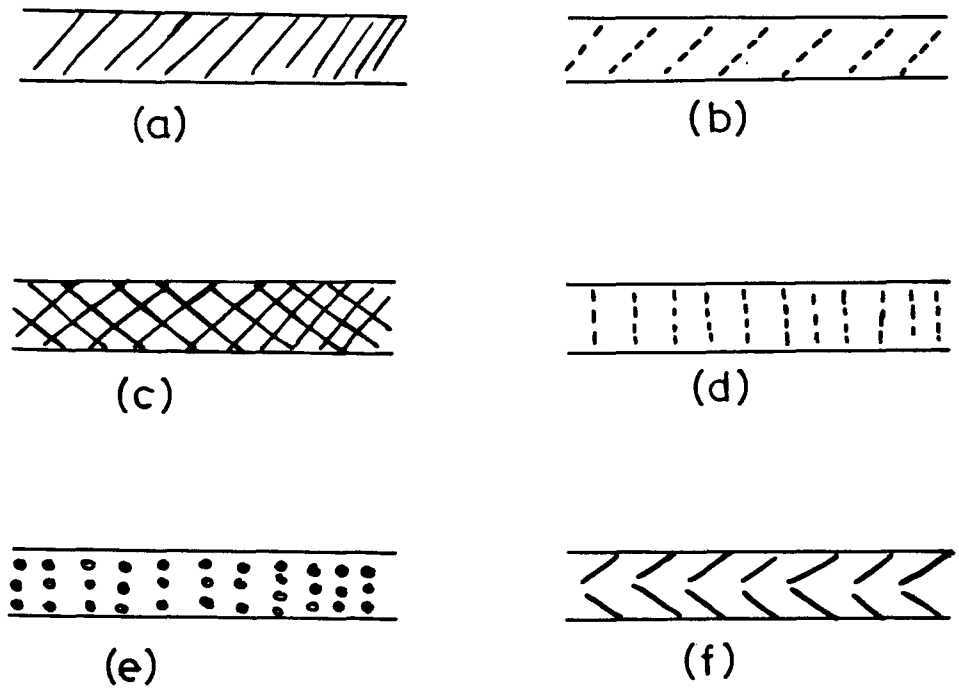
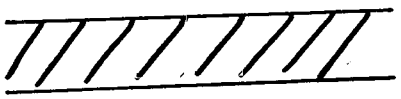
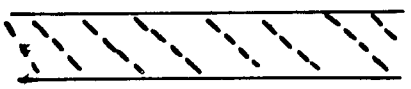


Fig.74 Shagadud Cave Pottery: Rim Bands

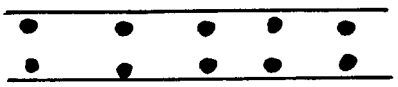


(a)

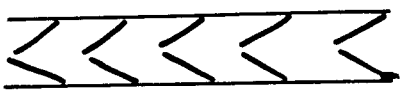


(b)

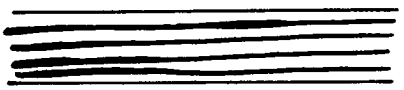
(c)



(d)



(e)

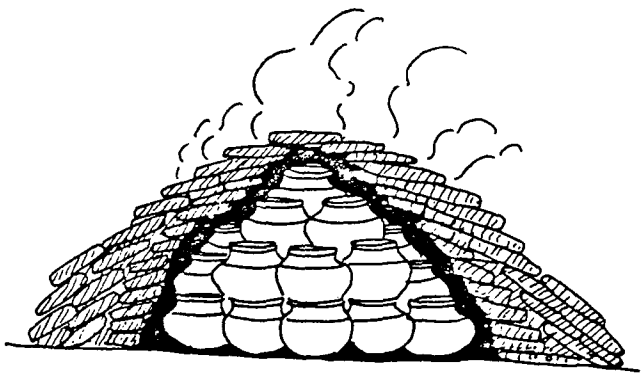


(f)

(g)

(h)

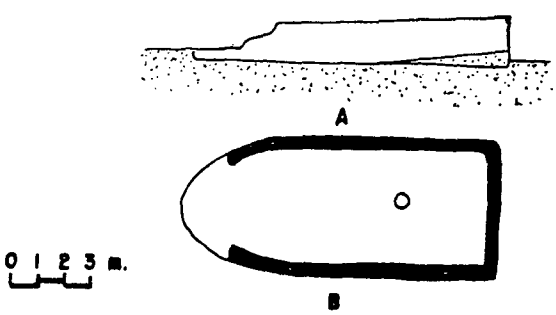
Fig. 75



Simple Kiln. Bonfire

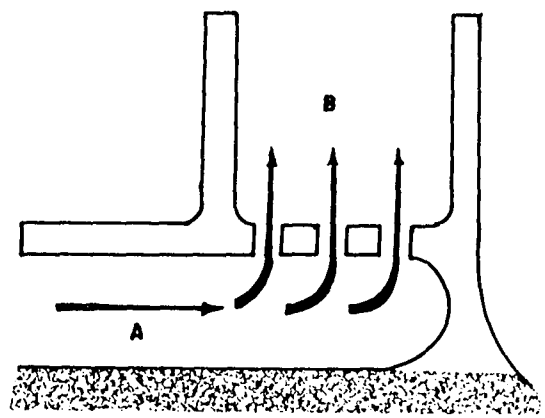
(After Hodges, H., 1981:37)

Fig. 76

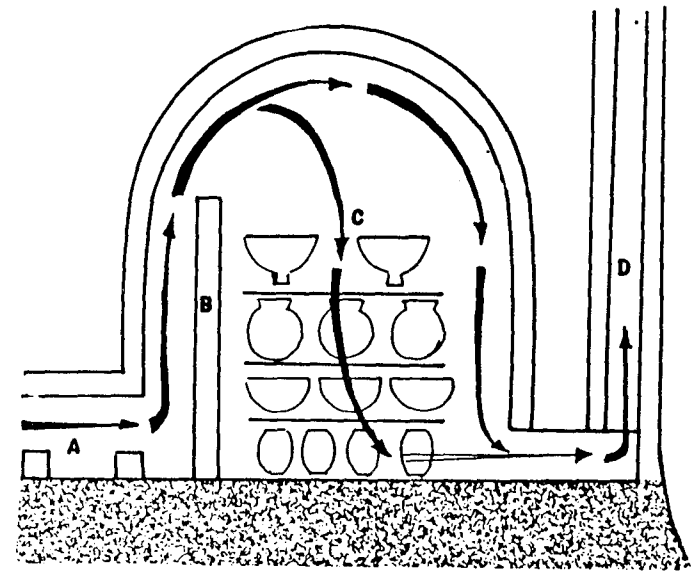


Open pit kiln at Musazi,
Pakistan: a, cross section;
b, plan-circle indicates size of large water jar for comparison.
(After Rye and Evans 1976, fig. 7.)

Fig. 77



1. Schematic cross section of an updraft kiln, a, firebox. b. Chamber



2. Schematic cross section of downdraft kiln., Firebox, b, Bagwall. c, Chamber.d, Chimney.

(After Rye, O.S, 1981:104)

TCKI DE STEEG

Fig.78

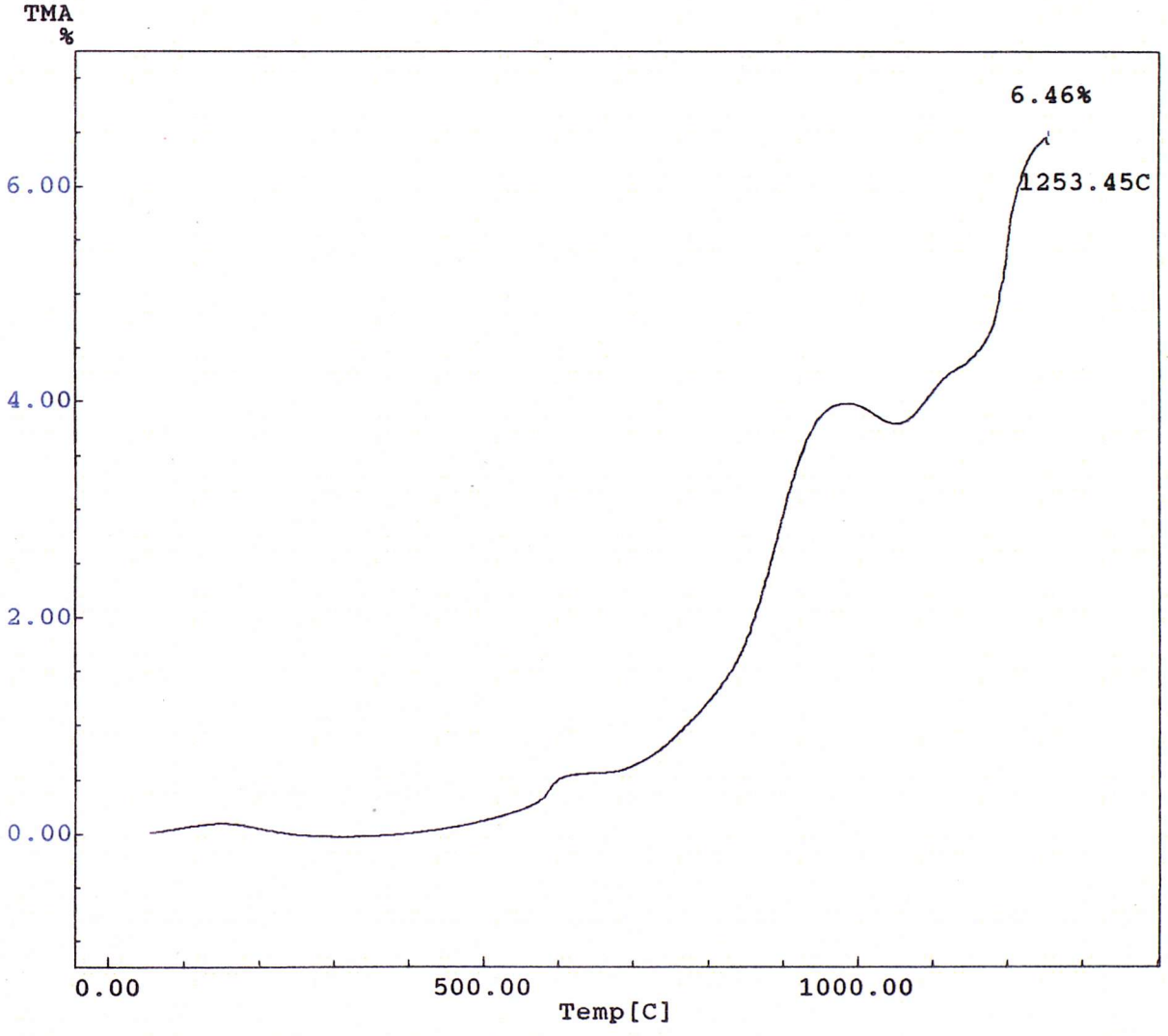
File Name: LUW005.D00
Acquisition Date: 93/12/13
Acquisition Time: 11:02:51
Sample Name: SARURAB 2 SITE sa.1
Length: 7.180[mm]
Operator: jvl

Temp Program

Rate [C/min]	Hold Temp [C]	Hold Time [min]
10.0	1250.0	0.0
-99.0	20.0	0.0

Load Program
Initial Load -10.0[g]

Hold Rate [g/min]	Time [g]	Hold Time [min]
0.0	-10.0	0.0



TCKI DE STEEG

Fig.79

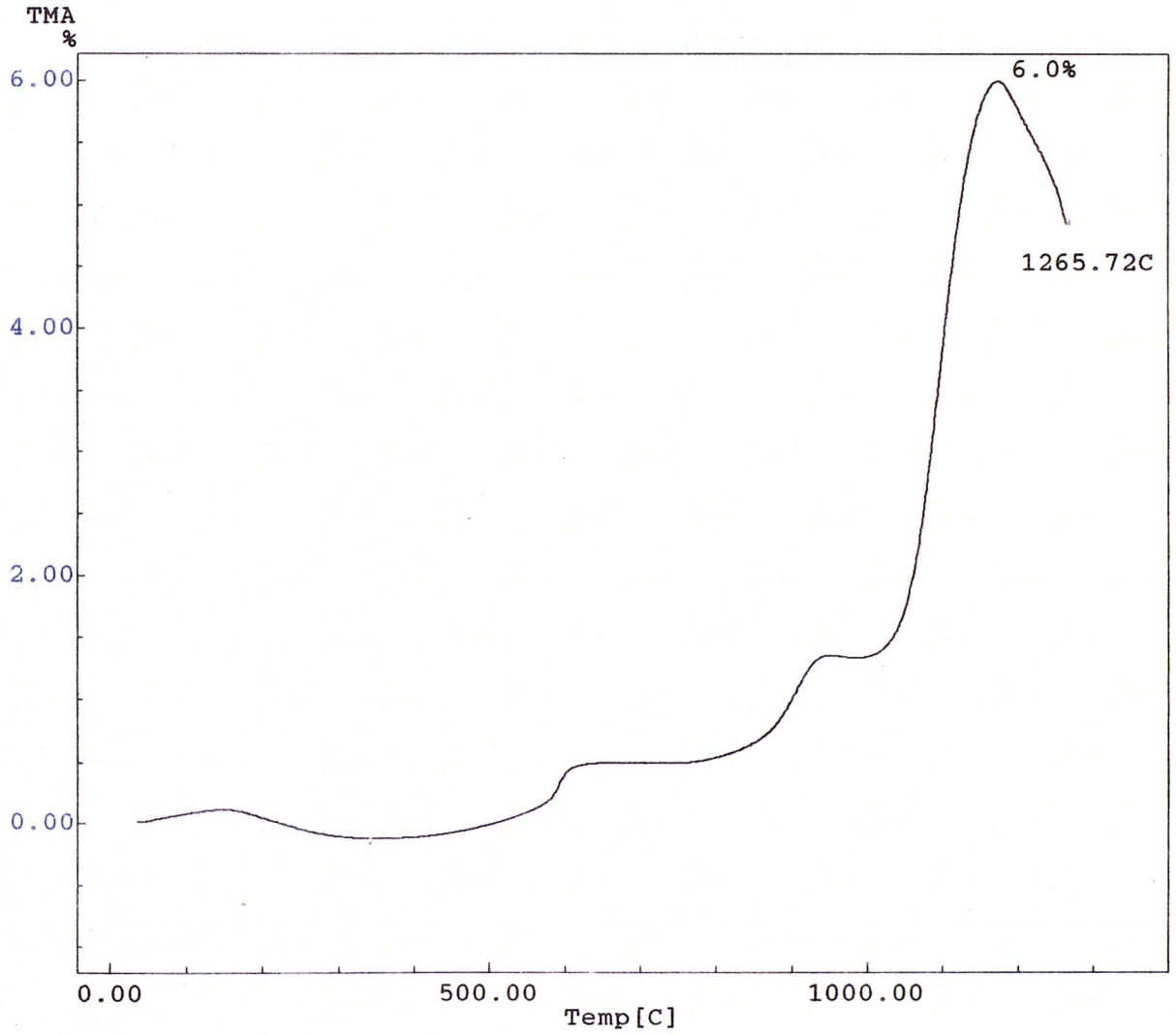
File Name: LUW008.D00
Acquisition Date: 93/12/20
Acquisition Time: 12:22:54
Sample Name: ISLANG sa.3
Length: 8.000[mm]
Operator: JvL

Temp Program

Rate [C/min]	Hold Temp [C]	Hold Time [min]
10.0	1250.0	0.0
-99.0	20.0	0.0

Load Program
Initial Load -10.0[g]

Hold Rate [g/min]	Time [g]	Hold Time [min]
0.0	-10.0	0.0

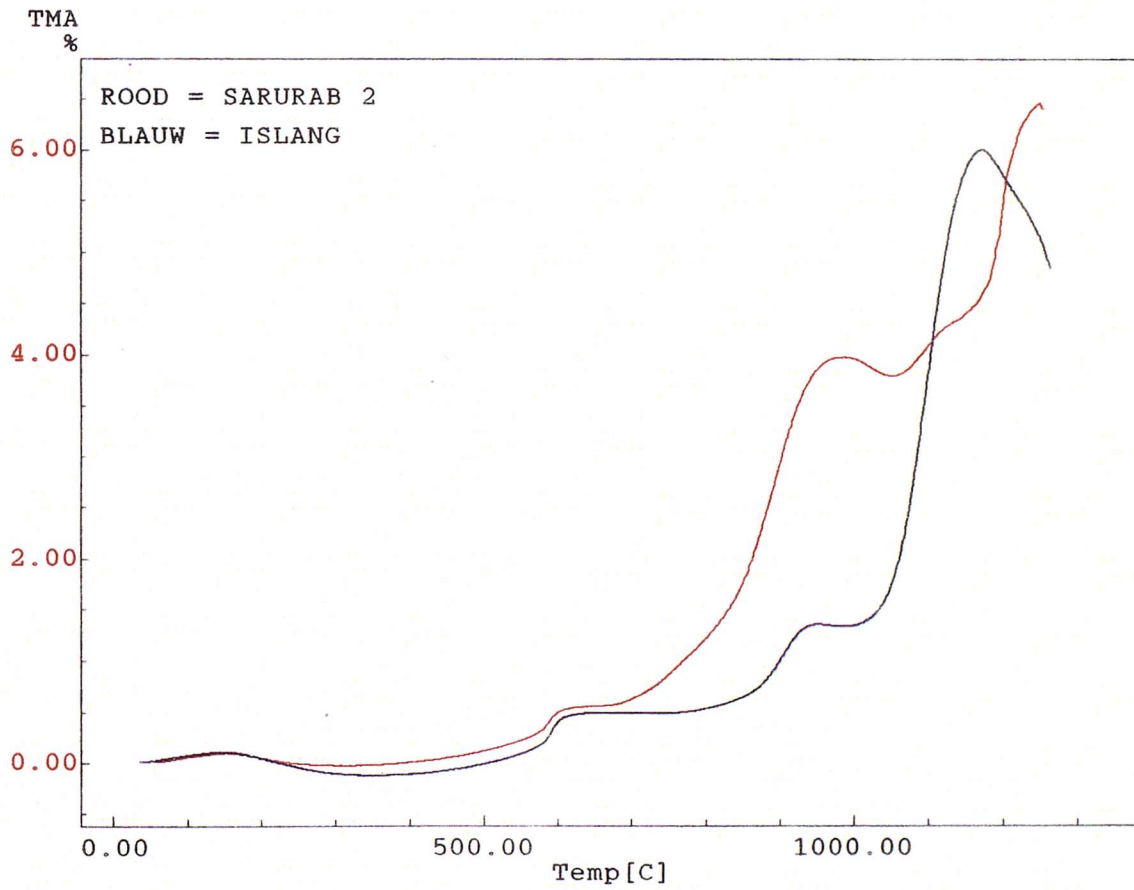


TCKI DE STEEG

Fig.80

File Name: LUW005.D00
Acquisition Date: 93/12/13
Sample Name: SARURAB 2 SITE sa.1
Length: 7.180[mm]

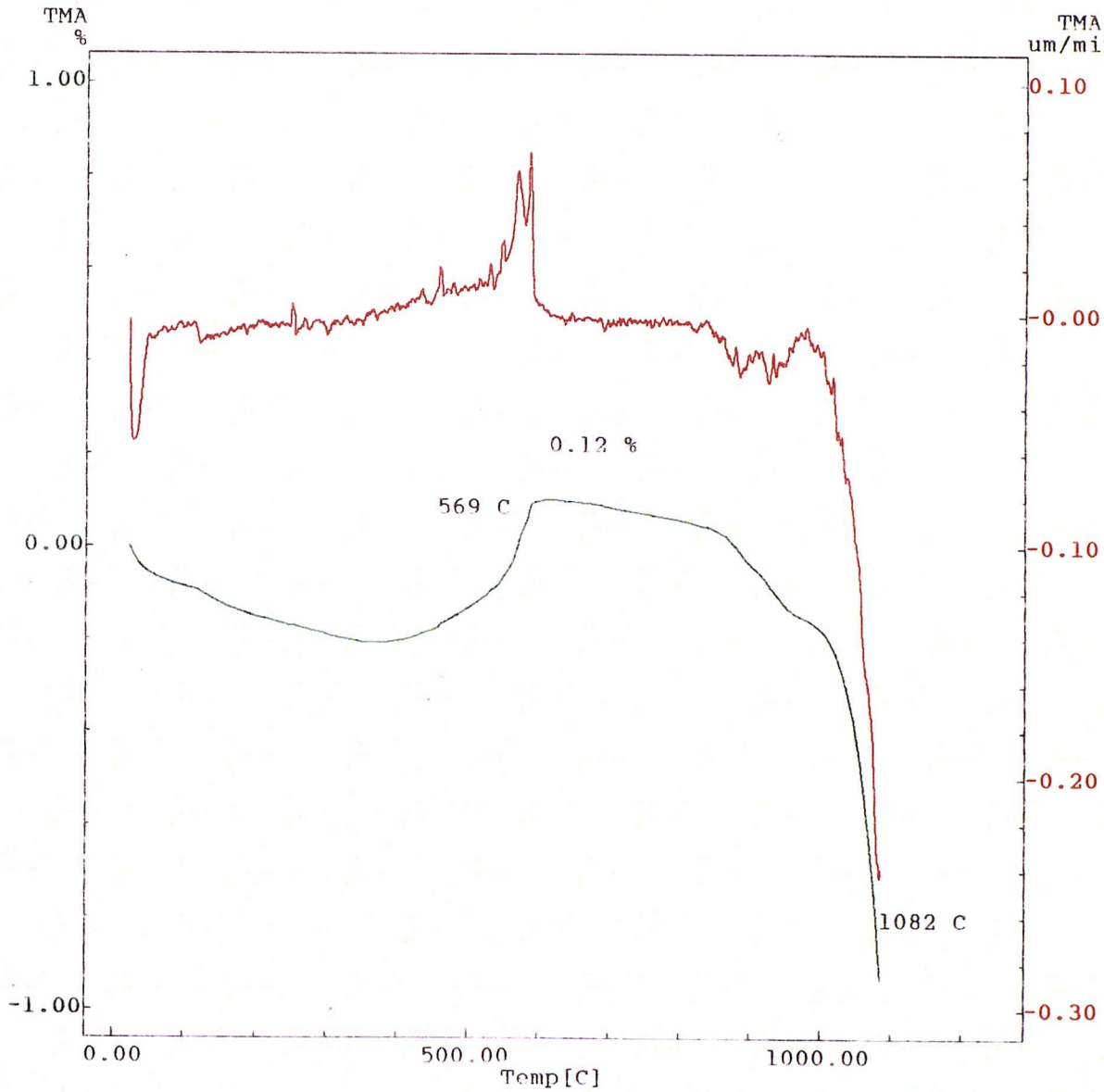
File Name: LUW008.D00
Acquisition Date: 93/12/20
Sample Name: ISLANG sa.3
Length: 8.000[mm]



TCKI DE STEEG

Fig.81

File Name: LUW.D20
Acquisition Date: 93/04/13
Acquisition Time: 13:01:03
Sample Name: Nofalab 2(2)
Length: 6.870 [mm]
Atmosphere: AIR



TCKI DE STEEG

Fig.82

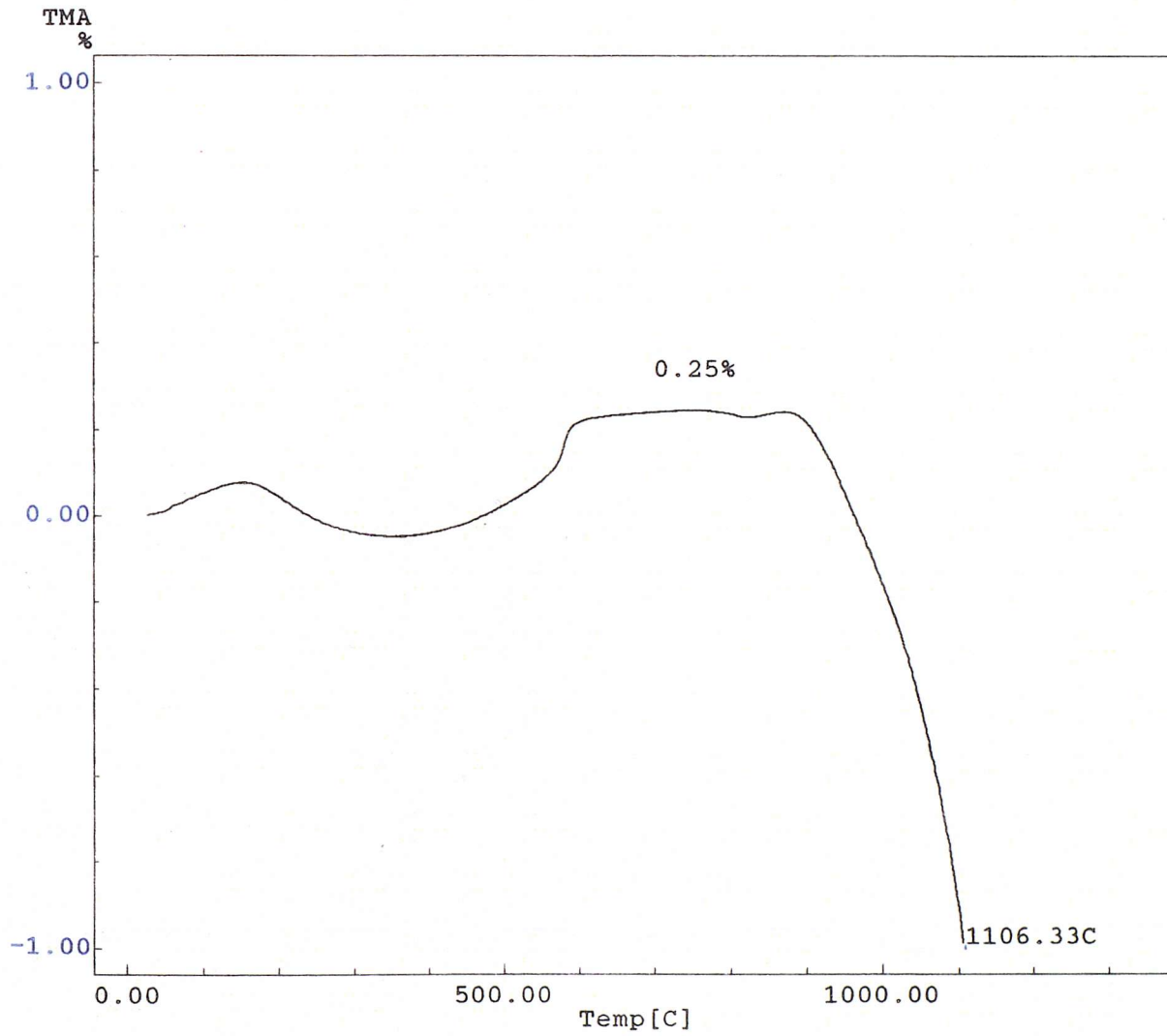
File Name: LUW007.D00
Acquisition Date: 93/12/14
Acquisition Time: 13:32:22
Sample Name: KABBASHI HAITAH sa.1
Length: 12.63[mm]
Operator: jvl

Temp Program

Rate [C/min]	Hold Temp [C]	Hold Time [min]
10.0	1250.0	0.0
-99.0	20.0	0.0

Load Program
Initial Load -10.0[g]

Hold Rate [g/min]	Time [g]	Hold Time [min]
0.0	-10.0	0.0



TCKI DE STEEG

Fig.83

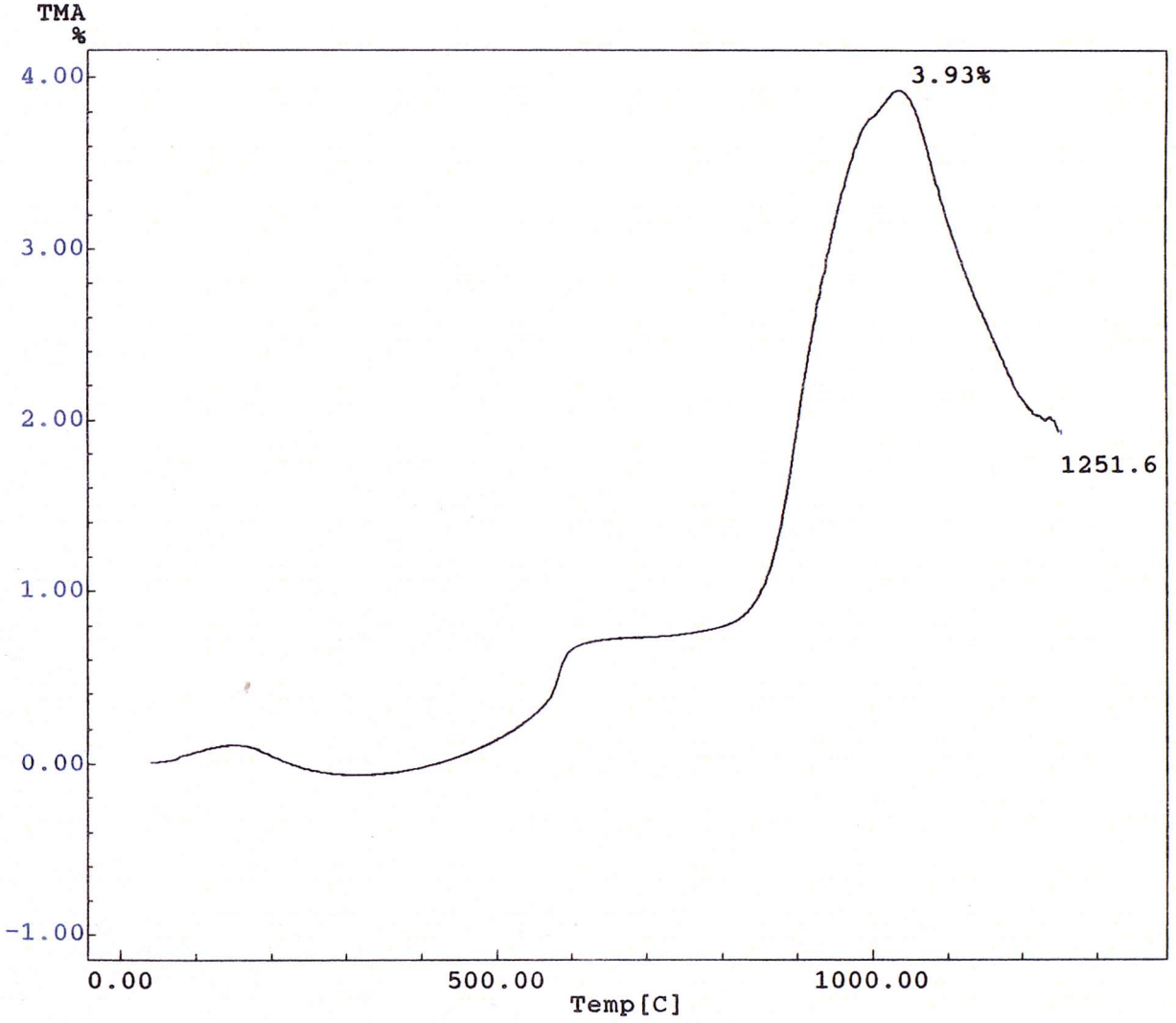
File Name: LUW006.D00
Acquisition Date: 93/12/13
Acquisition Time: 13:29:54
Sample Name: KABBASHI sa.2
Length: 10.66[mm]
Operator: jvl

Temp Program

Rate [C/min]	Hold Temp [C]	Hold Time [min]
10.0	1250.0	0.0
-99.0	20.0	0.0

Load Program
Initial Load -10.0[g]

Hold Rate [g/min]	Time [g]	Hold Time [min]
0.0	-10.0	0.0

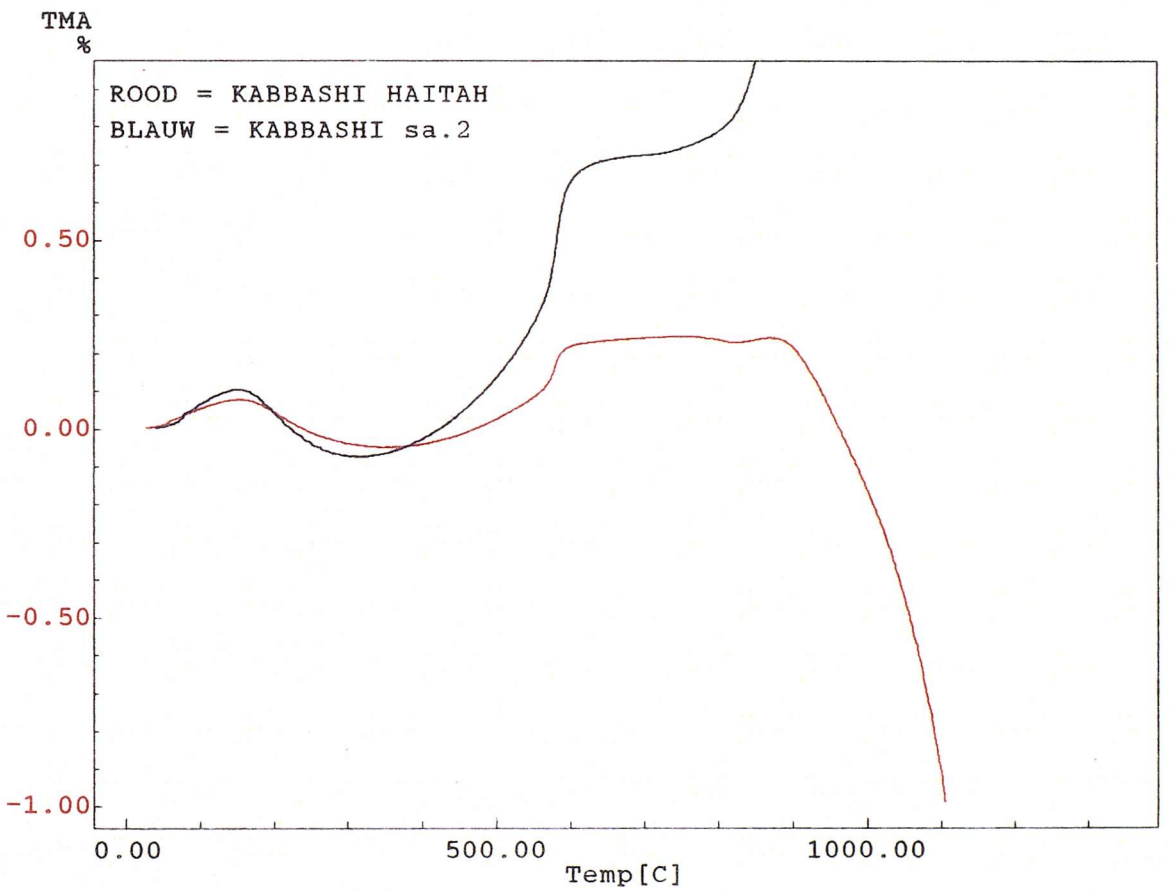


TCKI DE STEEG

Fig.84

File Name: LUW007.D00
Acquisition Date: 93/12/14
Sample Name: KABBASHI HAITAH sa.1
Length: 12.63[mm]

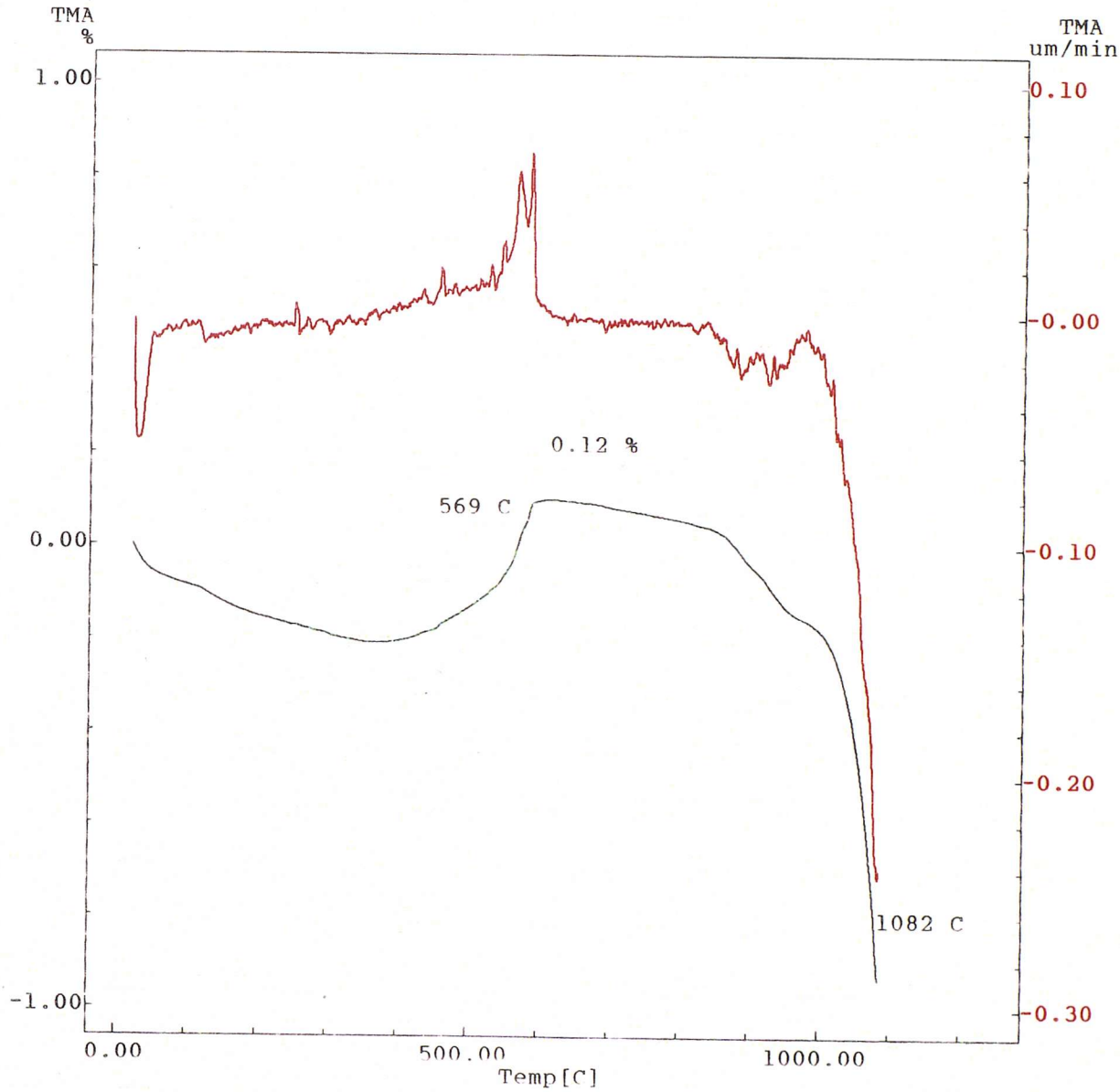
File Name: LUW006.D00
Acquisition Date: 93/12/13
Sample Name: KABBASHI sa.2
Length: 10.66[mm]



TCKI DE STEEG

Fig.85

File Name:	LUW.D20	Temp Program		
Acquisition Date:	93/04/13	Rate	Hold Temp	Hold Time
Acquisition Time:	13:01:03	[C/min]	[C]	[min]
Sample Name:	GEILI 1	10.0	1250.0	0.0
Length:	6.870[mm]	-99.9	100.0	0.0
Atmosphere:	AIR			
Operator:	J. v. LITH	Load Program		
		Initial Load	-10.0[g]	
		Hold Rate	Time	Hold Time
		[g/min]	[g]	[min]
		0.0	-10.0	0.0



TCKI DE STEEG

Fig.86

File Name: LUW003.D00
Acquisition Date: 93/12/12
Acquisition Time: 09:16:26
Sample Name: SHABONA sa1
Length: 13.05[mm]
Operator: jvl

Temp Program

Rate [C/min]	Hold Temp [C]	Hold Time [min]
10.0	1250.0	0.0
-99.0	20.0	0.0

Load Program
Initial Load -10.0[g]

Hold Rate [g/min]	Time [g]	Hold Time [min]
0.0	-10.0	0.0

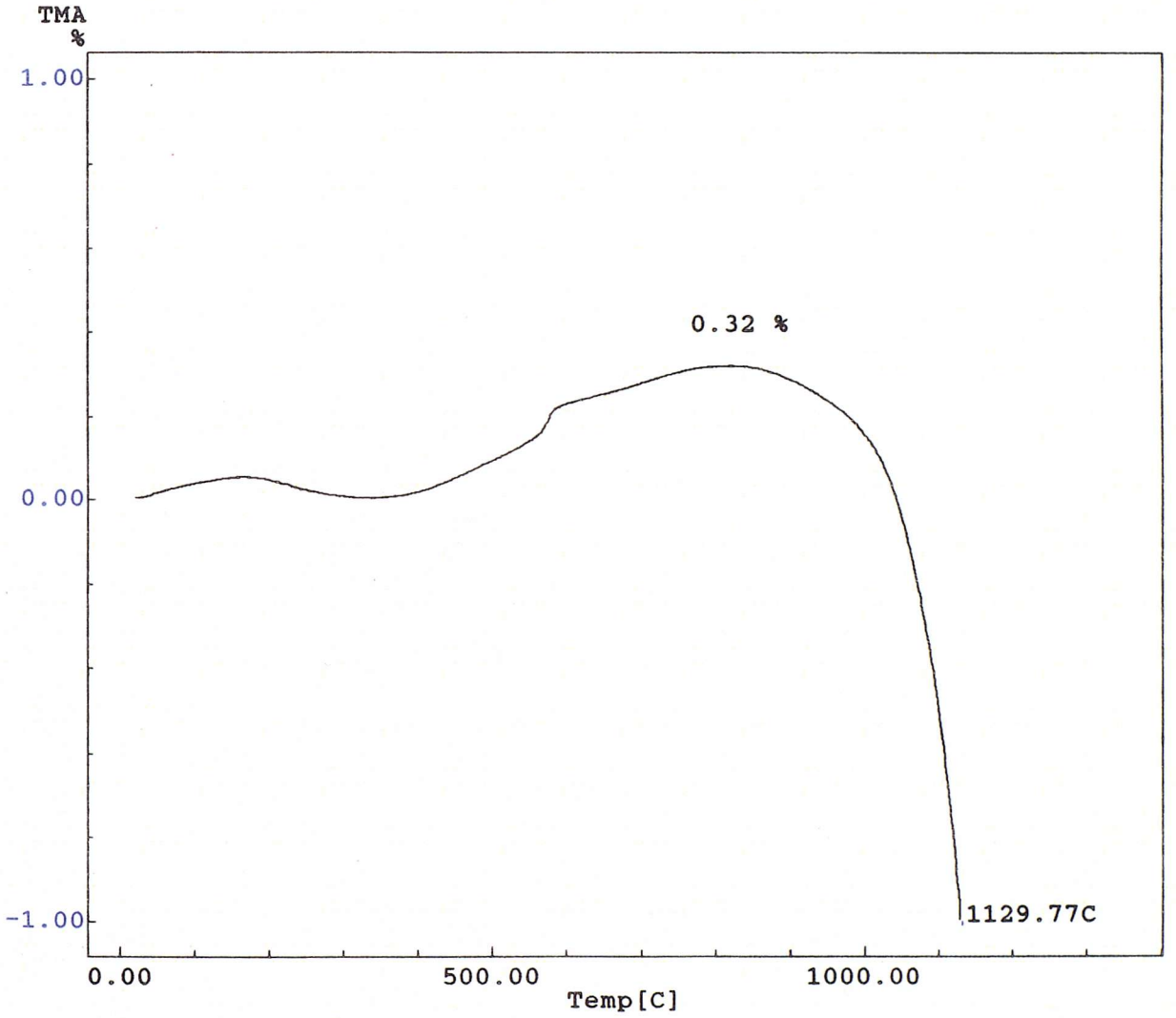


Fig. 87 TCKI DE STEEG

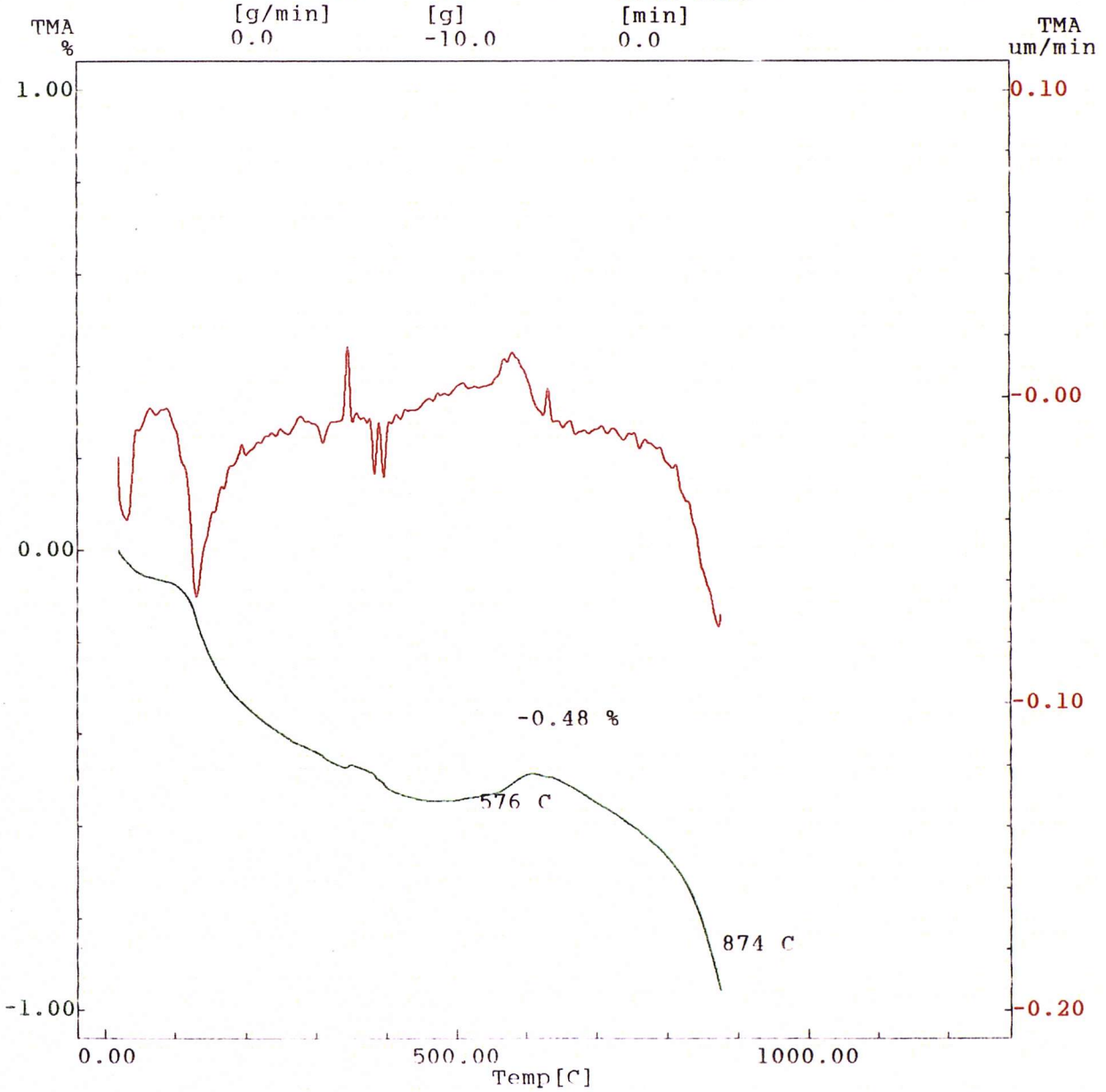
File Name: LUW.D20
Acquisition Date: 93/04/13
Acquisition Time: 08:52:05
Sample Name: RABAK - K.N.6
Length: 7.030[mm]
Atmosphere: AIR
Operator: J. v. LITH

Temp Program

Rate [C/min]	Hold Temp [C]	Hold Time [min]
10.0	1250.0	0.0
-99.9	100.0	0.0

Load Program
Initial Load -10.0[g]

Hold Rate [g/min]	Time [g]	Hold Time [min]
0.0	-10.0	0.0



TCKI DE STEEG

Fig.88

File Name: LUW001.D00
Acquisition Date: 93/12/08
Acquisition Time: 09:36:49
Sample Name: RABAK J.M. sa.3 10g
Length: 6.010[mm]
Atmosphere: Air
Operator: JVL

Temp Program

Rate [C/min]	Hold Temp [C]	Hold Time [min]
10.0	1300.0	0.0
-99.0	20.0	0.0

Load Program
Initial Load -10.0[g]

Hold Rate [g/min]	Time [g]	Hold Time [min]
0.0	-10.0	0.0

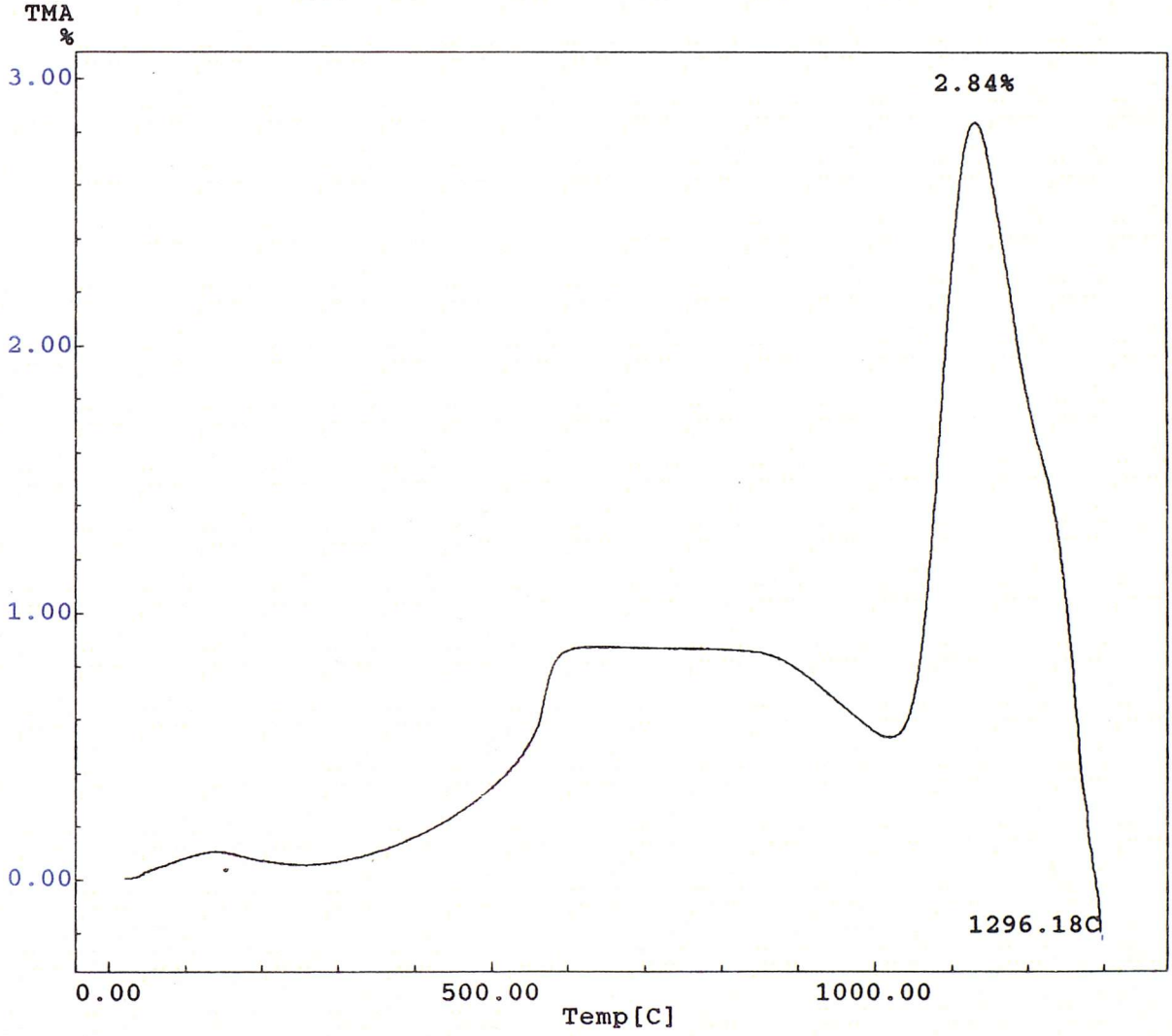


Fig.89

File Name: LUW003.D00
Acquisition Date: 93/12/12
Sample Name: SHABONA sa.1
Length: 13.05[mm]

File Name: LUW001.D00
Acquisition Date: 93/12/08
Sample Name: RABAK J.M. sa.3 10g
Length: 6.010[mm]

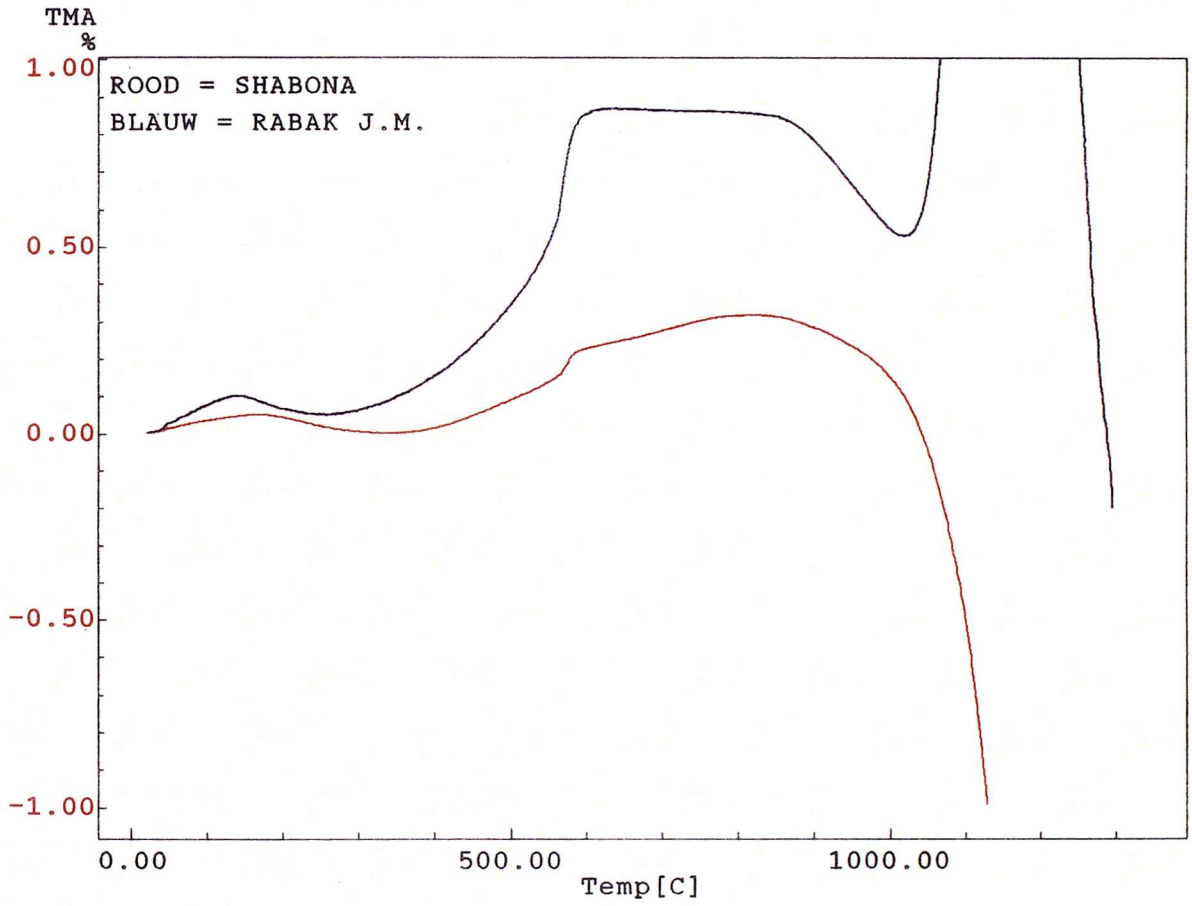


Fig.90 TCKI DE STEEG

File Name: LUW004.D00
Acquisition Date: 93/12/12
Acquisition Time: 11:43:26
Sample Name: SHAQADUD MIDDEN sa.2
Length: 5.600[mm]
Operator: jvl

Temp Program

Rate [C/min]	Hold Temp [C]	Hold Time [min]
10.0	1250.0	0.0
-99.0	20.0	0.0

Load Program
Initial Load -10.0[g]

Hold Rate [g/min]	Time [g]	Hold Time [min]
0.0	-10.0	0.0

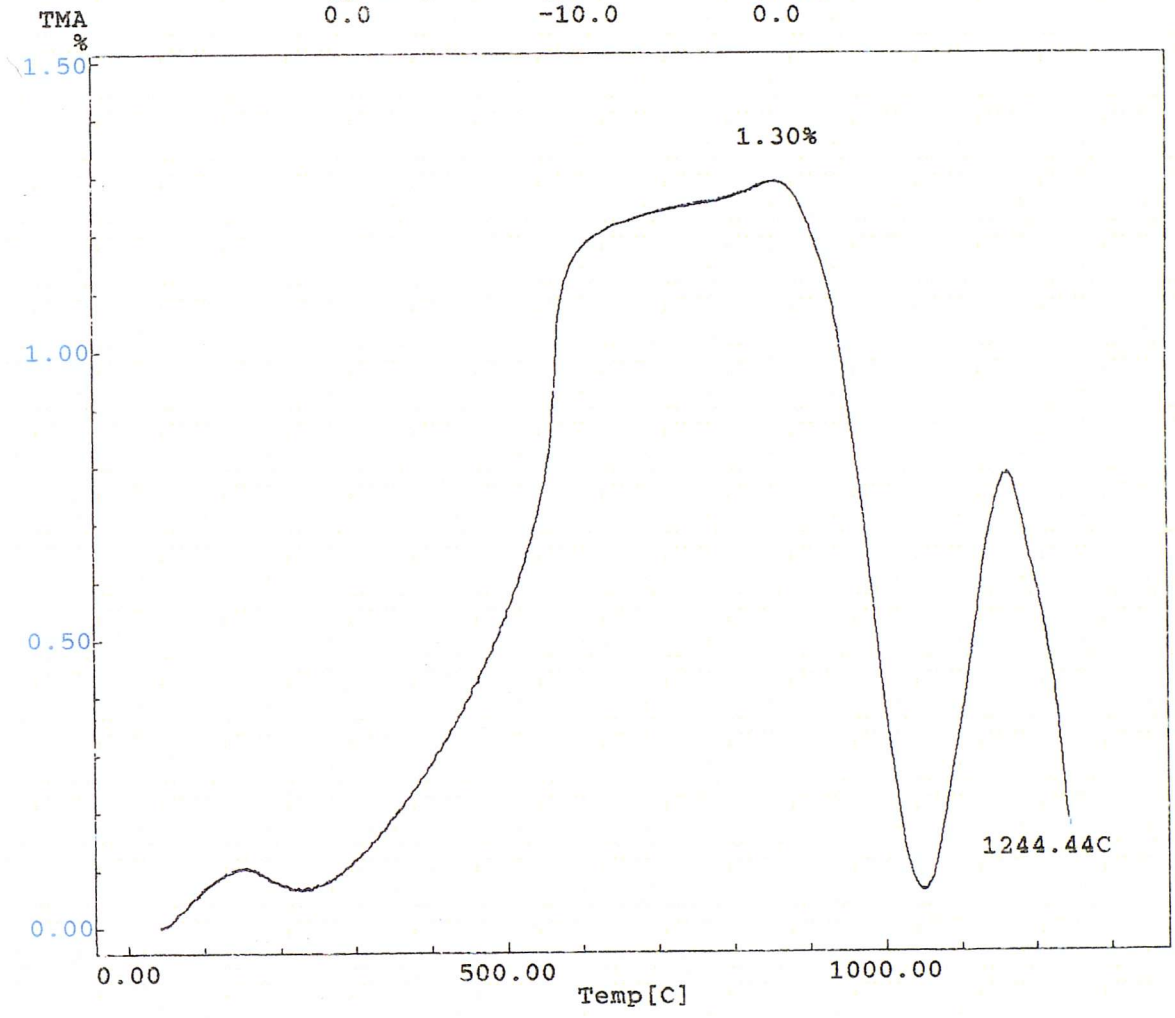


Fig.91 TCKI DE STEEG

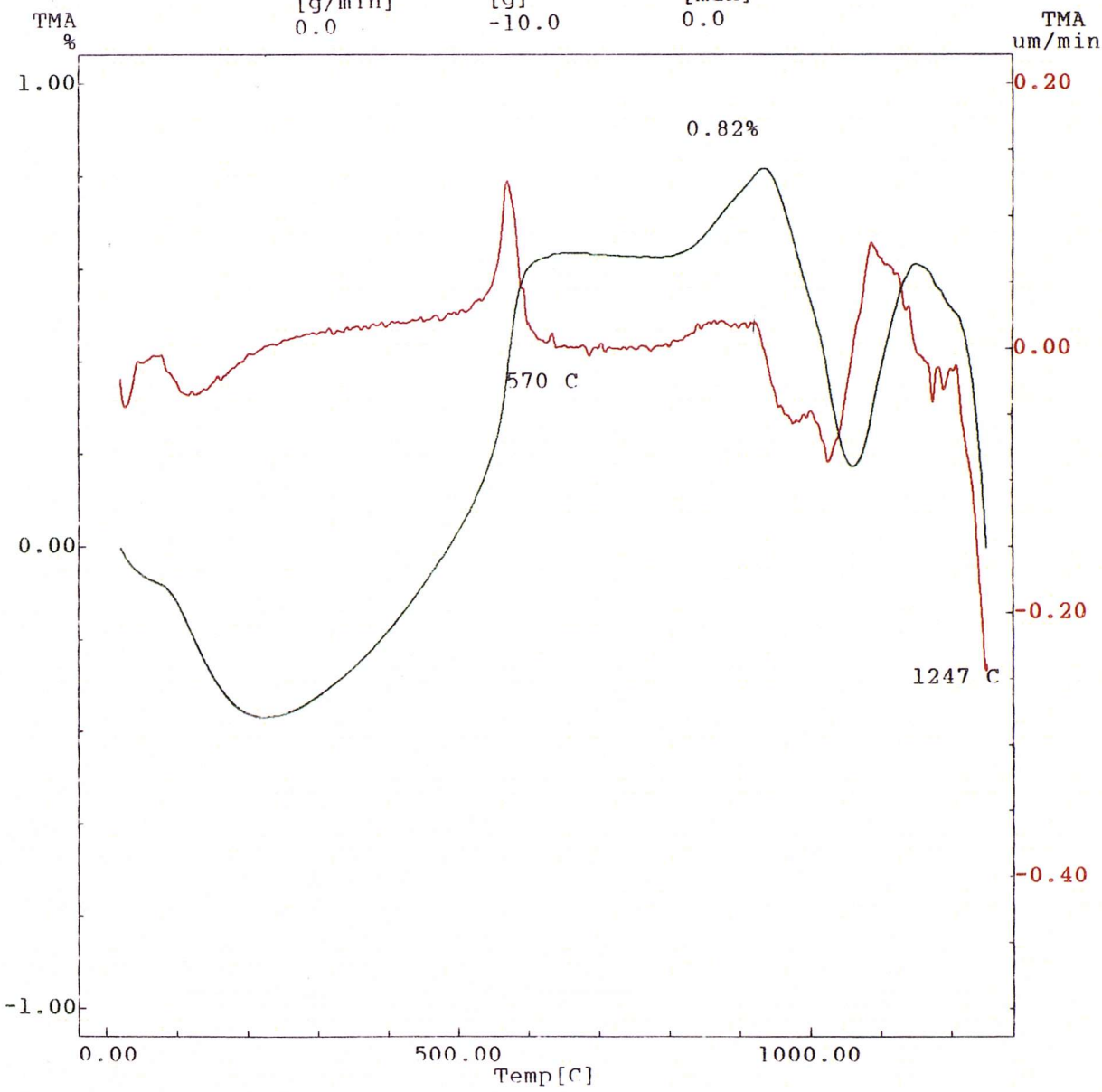
File Name: LUW.D20
Acquisition Date: 93/04/15
Acquisition Time: 08:16:50
Sample Name: shagadud
Length: 5.900[mm]
Atmosphere: air

Temp Program

Rate [C/min]	Hold Temp [C]	Hold Time [min]
10.0	1250.0	0.0
-99.9	100.0	0.0

Load Program
Initial Load -10.0[g]

Hold Rate [g/min]	Time [g]	Hold Time [min]
0.0	-10.0	0.0



TCKI DE STEEG

Fig.92

File Name:	LUW002.D00
Acquisition Date:	93/12/08
Acquisition Time:	12:25:44
Sample Name:	SHAQADUD CAVE sa.3
Length:	6.670[mm]
Atmosphere:	Air
Operator:	JVL

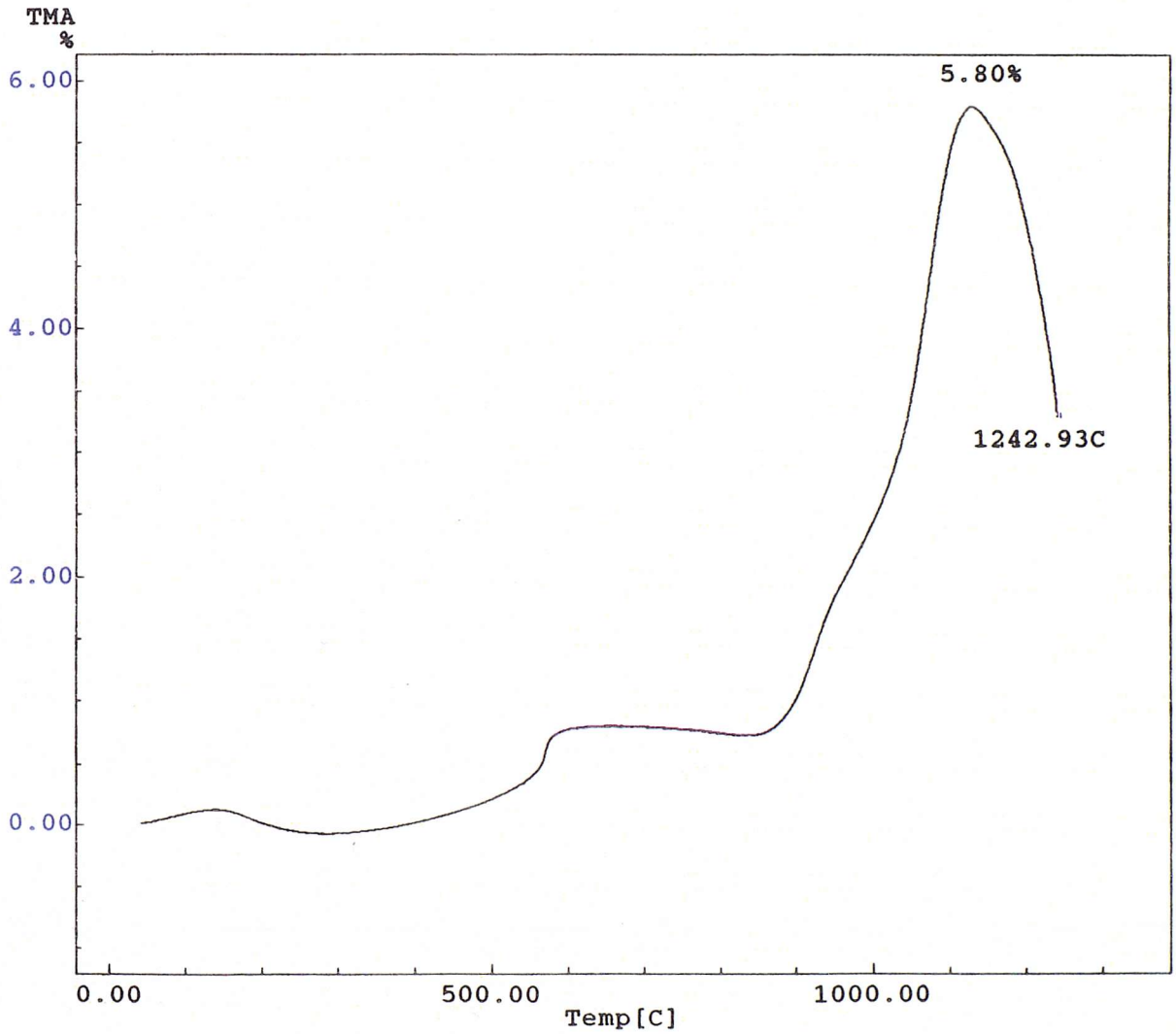
Temp Program

Rate [C/min]	Hold Temp [C]	Hold Time [min]
10.0	1250.0	0.0
-99.0	20.0	0.0

Load Program

Initial Load -10.0[g]

Hold Rate [g/min]	Time [g]	Hold Time [min]
0.0	-10.0	0.0



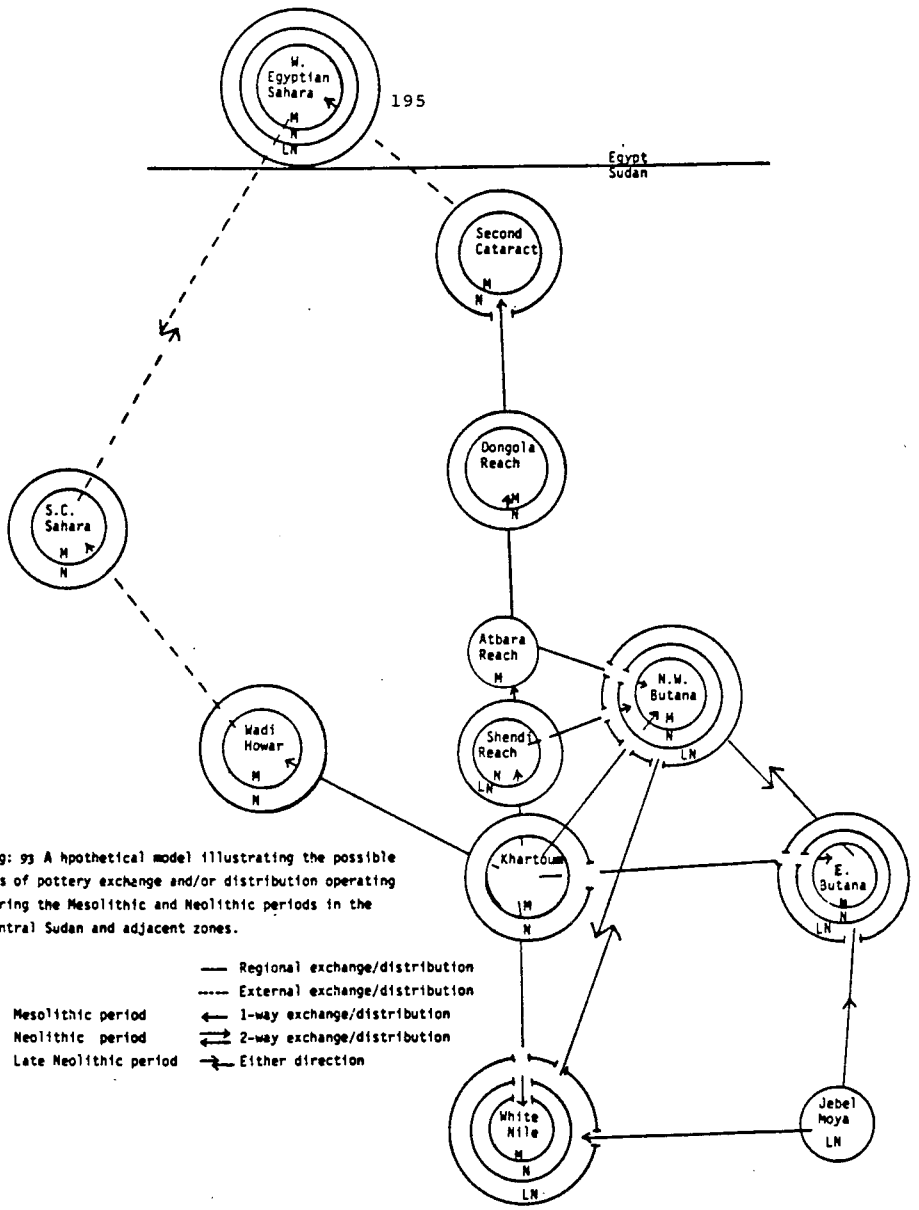


Fig: 93 A hpothetical model illustrating the possible ways of pottery exchange and/or distribution operating during the Mesolithic and Neolithic periods in the Central Sudan and adjacent zones.

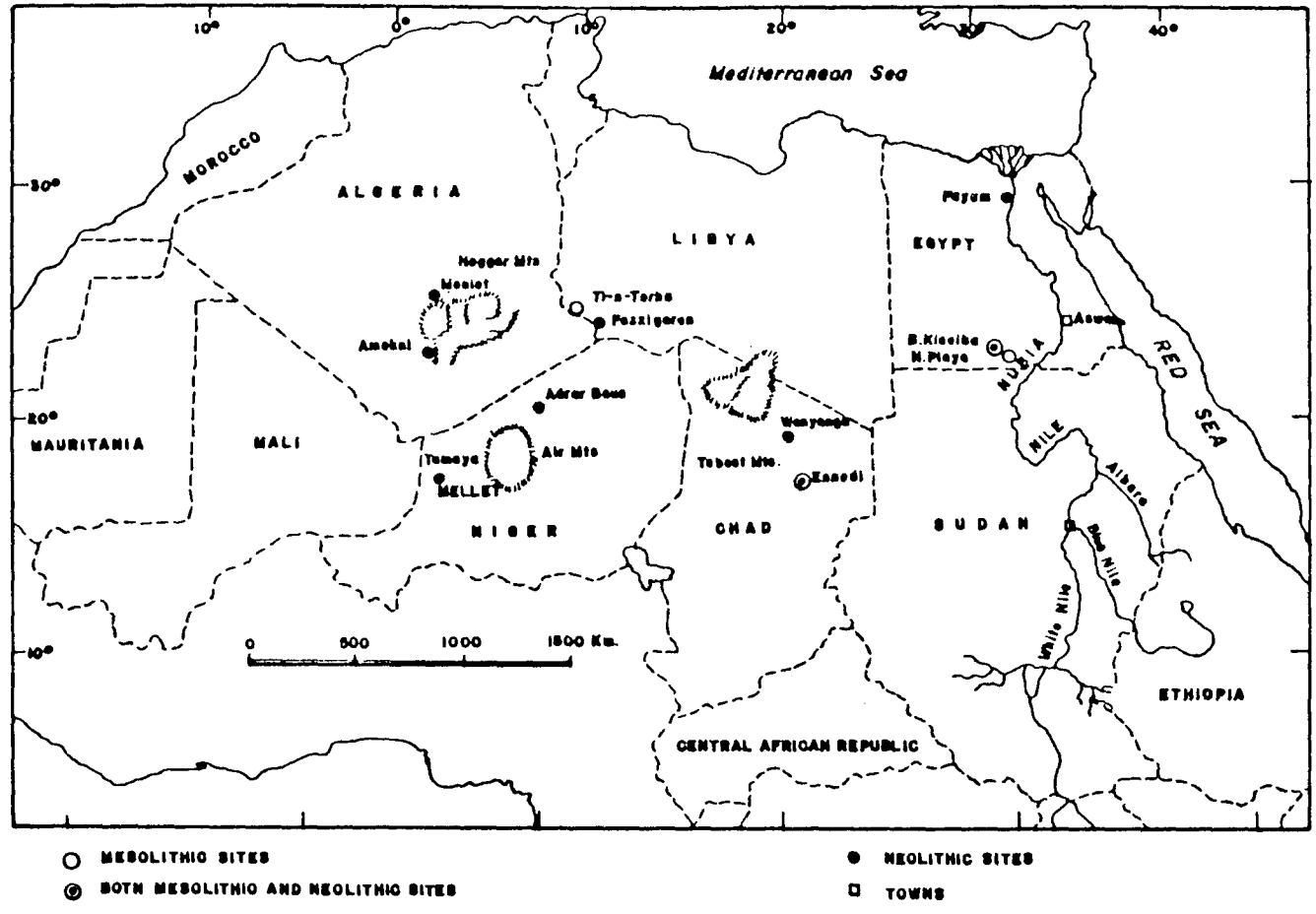
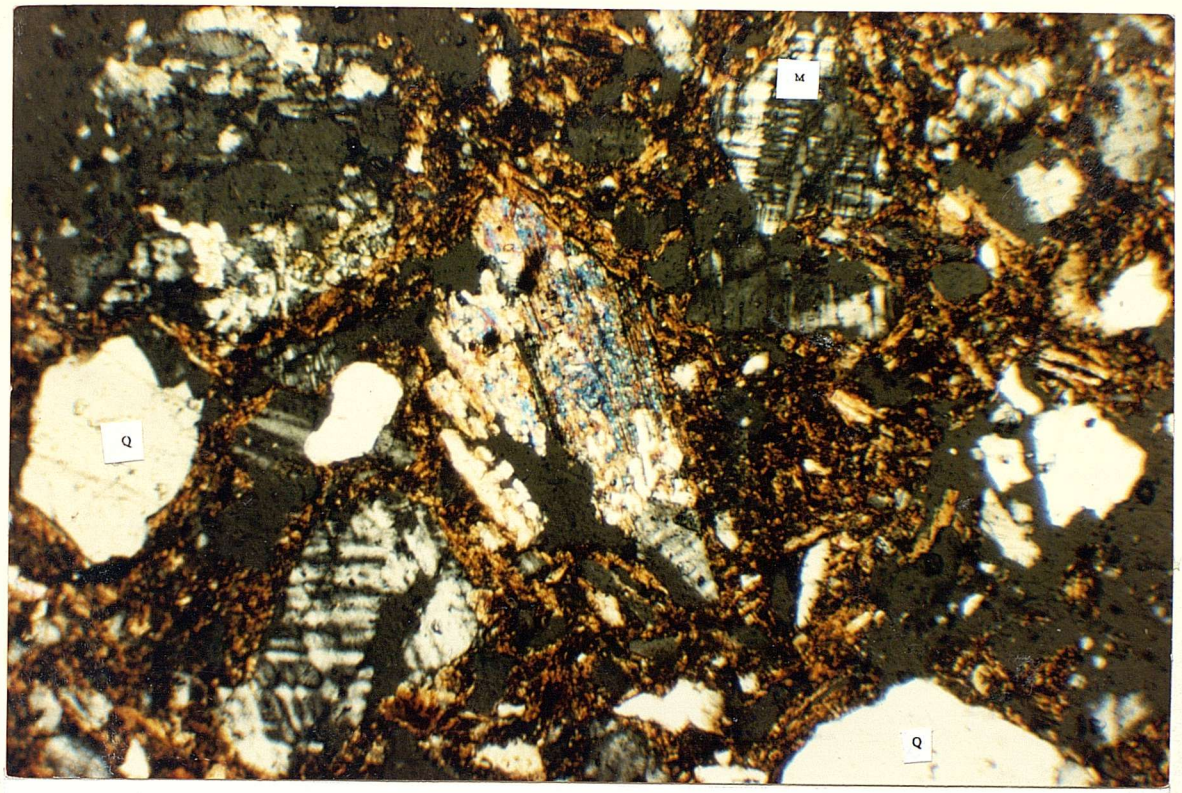


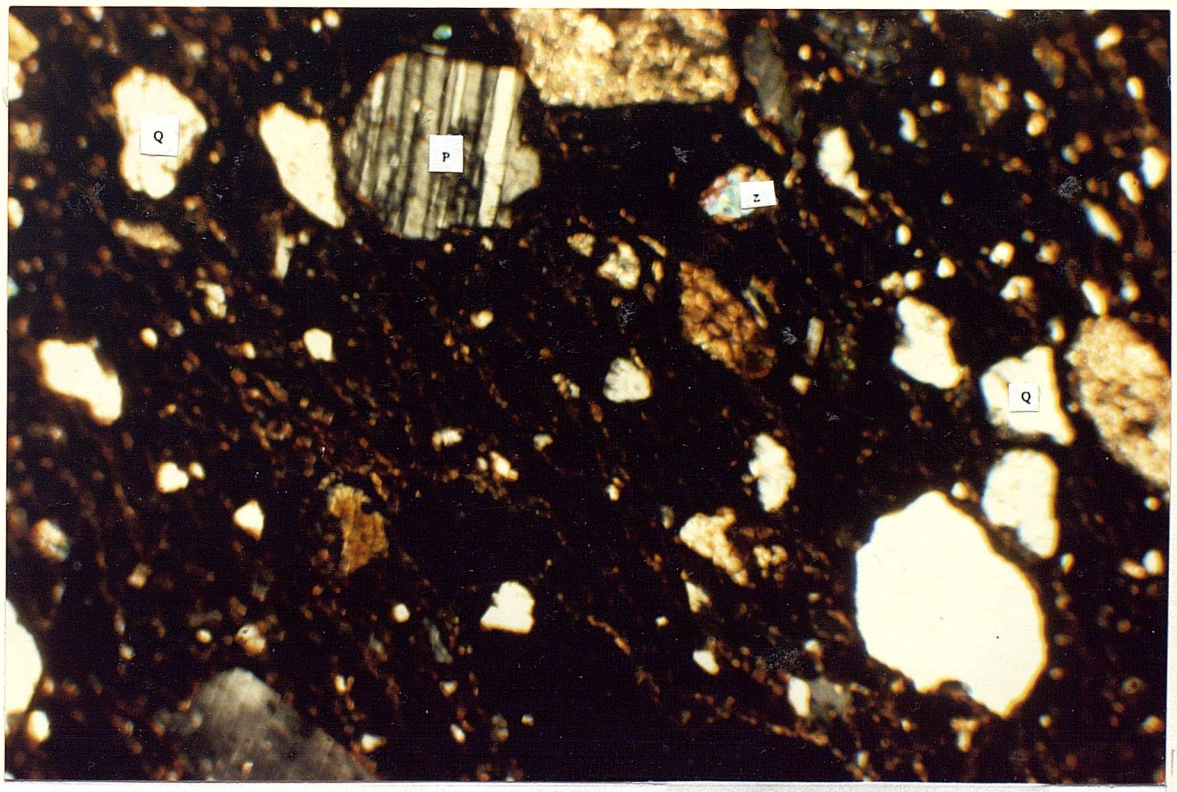
Fig. 94 Map of Northern Africa showing Location of Mesolithic and Neolithic Sites. (AFTER CLARK, J.D., 1980: 554 AND MARKS, A.E AND MOHAMED-ALI, A.S., 1991 : II WITH SOME MODIFICATIONS).

b2- List of Plates

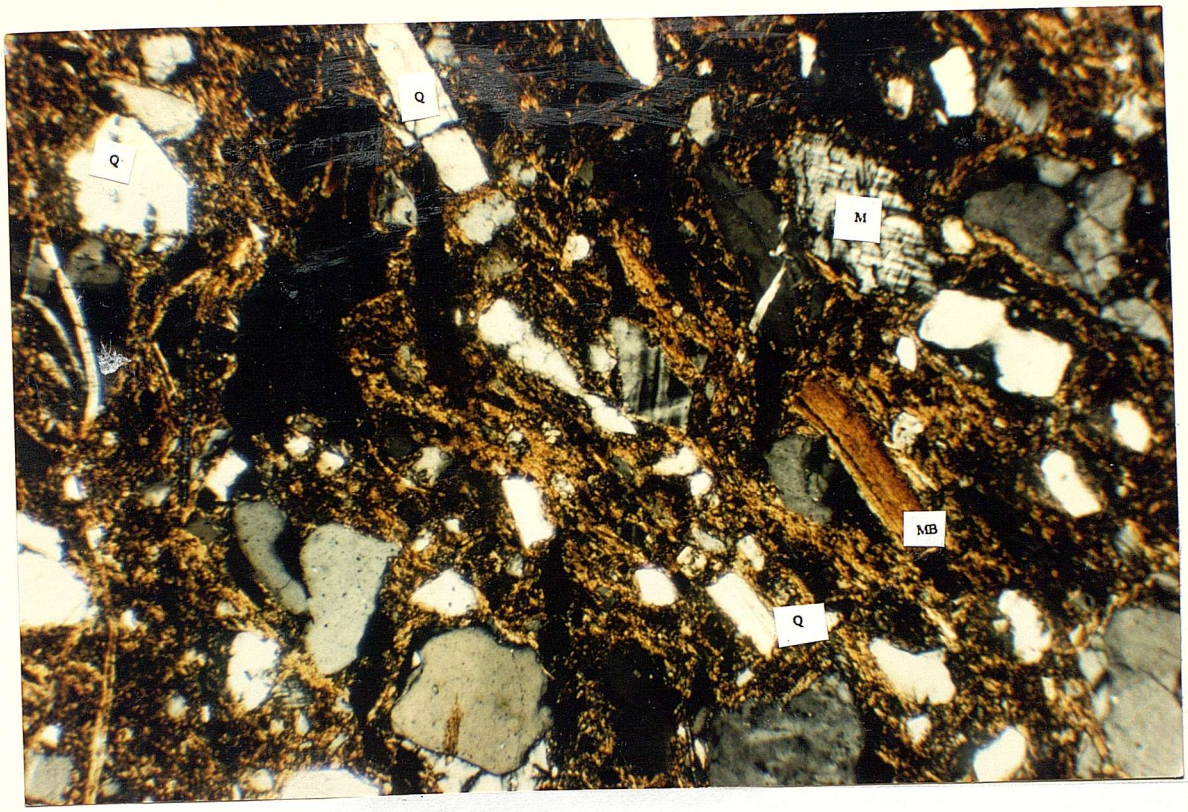
Plates



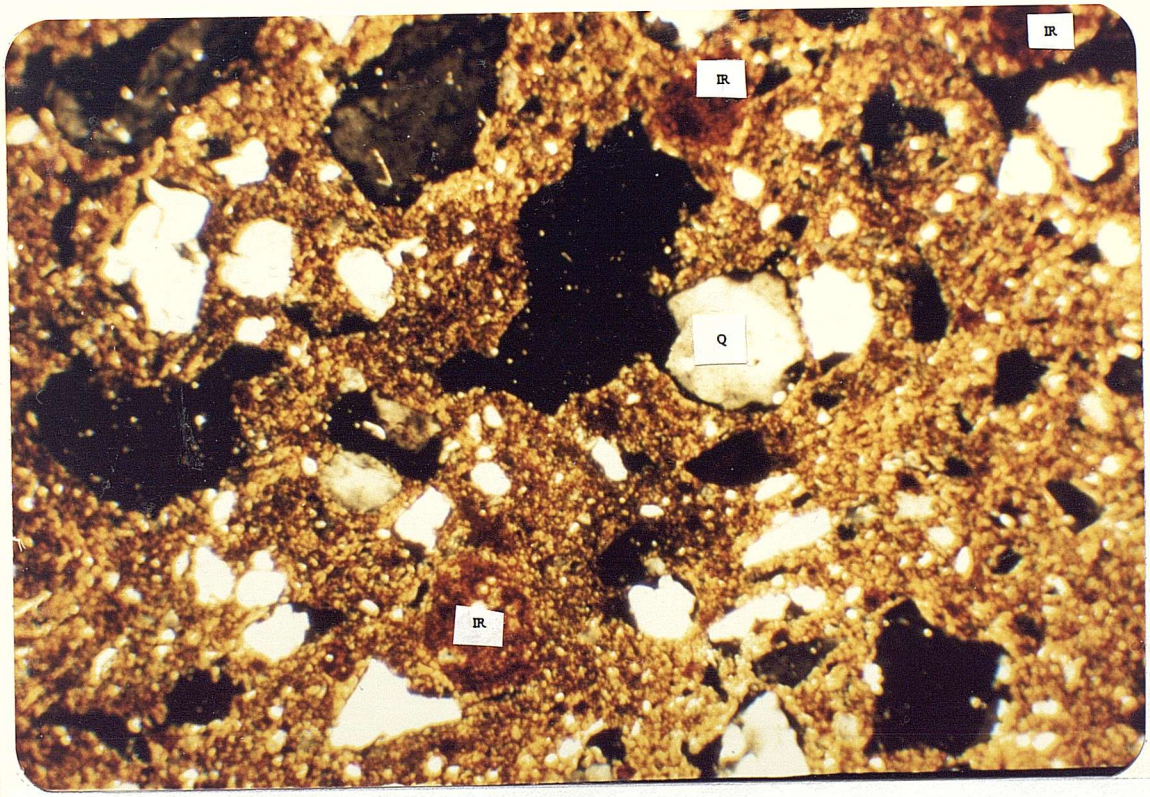
Pl.1 Sarurab2 site: example of fabric subgroup A1 shows mineral grains, quartz (Q), microcline feldspar (M), muscovite mica (MS). (Crossed polars. Field width 5.15 mm)



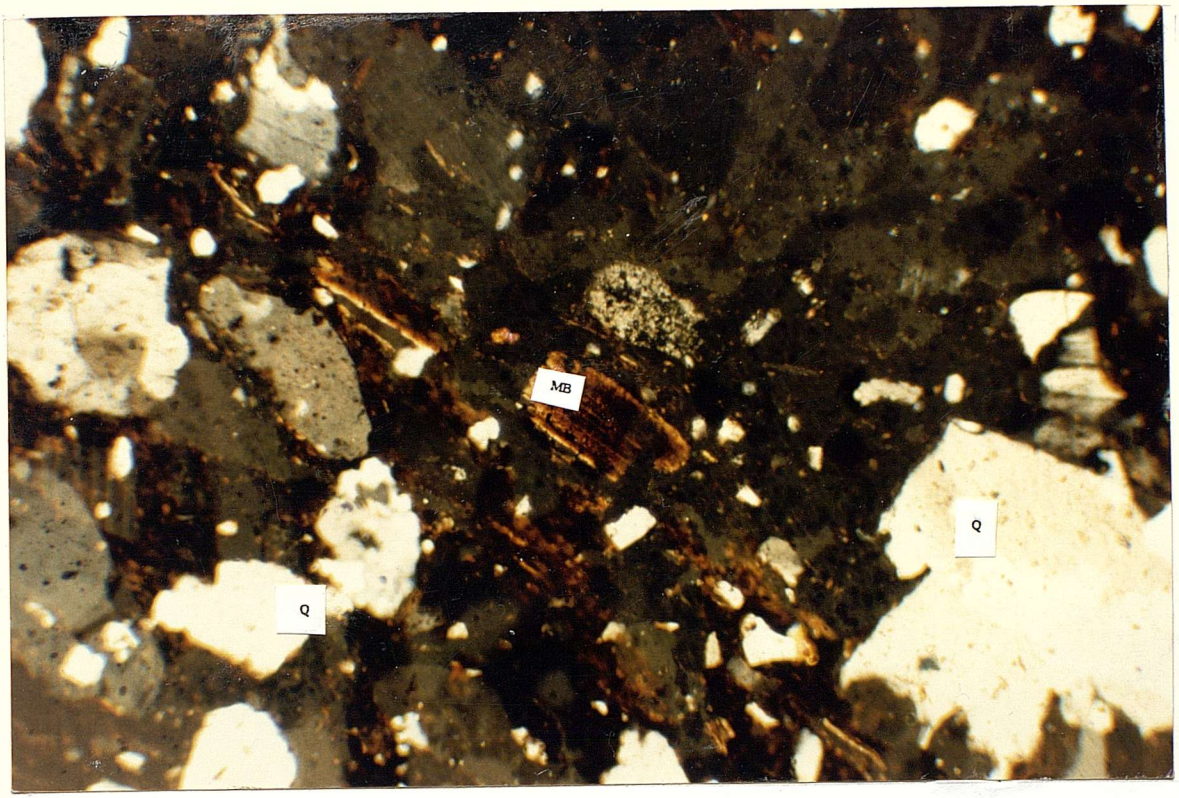
Pl.2 Sarurab2 site: example of fabric subgroup A2 indicates mineral constituents, quartz (Q), plagioclase (P), Zircon (Z). (Crossed polars. Field width 5.15 mm)



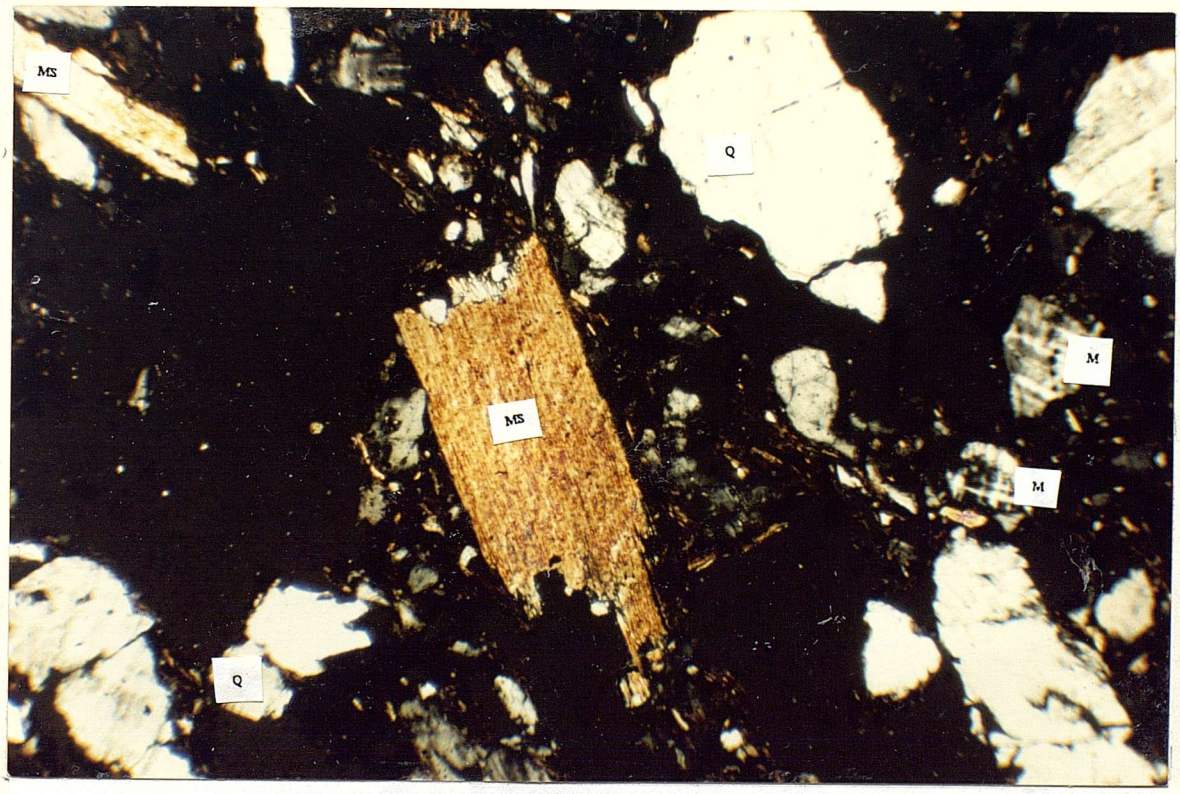
Pl.3 Sarurab2 site: example of fabric group B shows mineral grains, microcline (M), biotite mica (MB). (Crossed polars. Field width 5.15 mm)



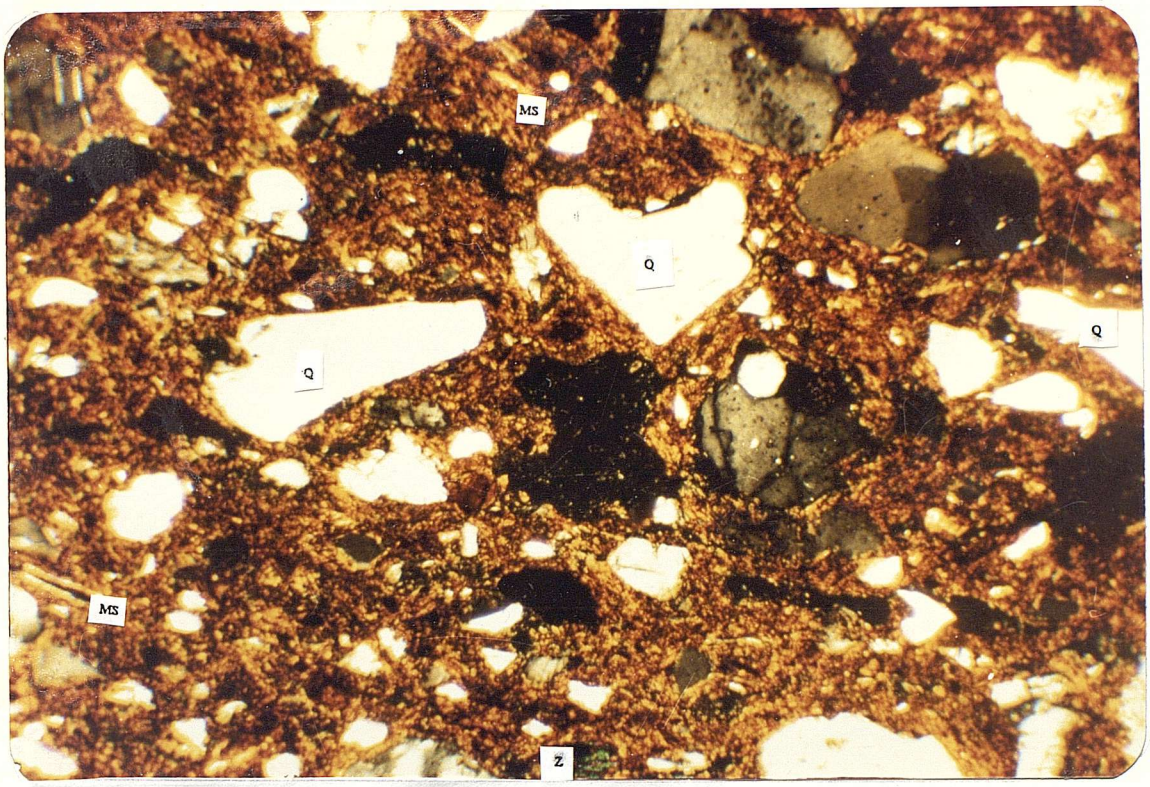
Pl.4 Fabric subgroup A1 of Islang2 pottery shows ill-sorted quartz (Q) inclusions and iron (1R) oxides. (Crossed polars. Field width 5.15 mm).



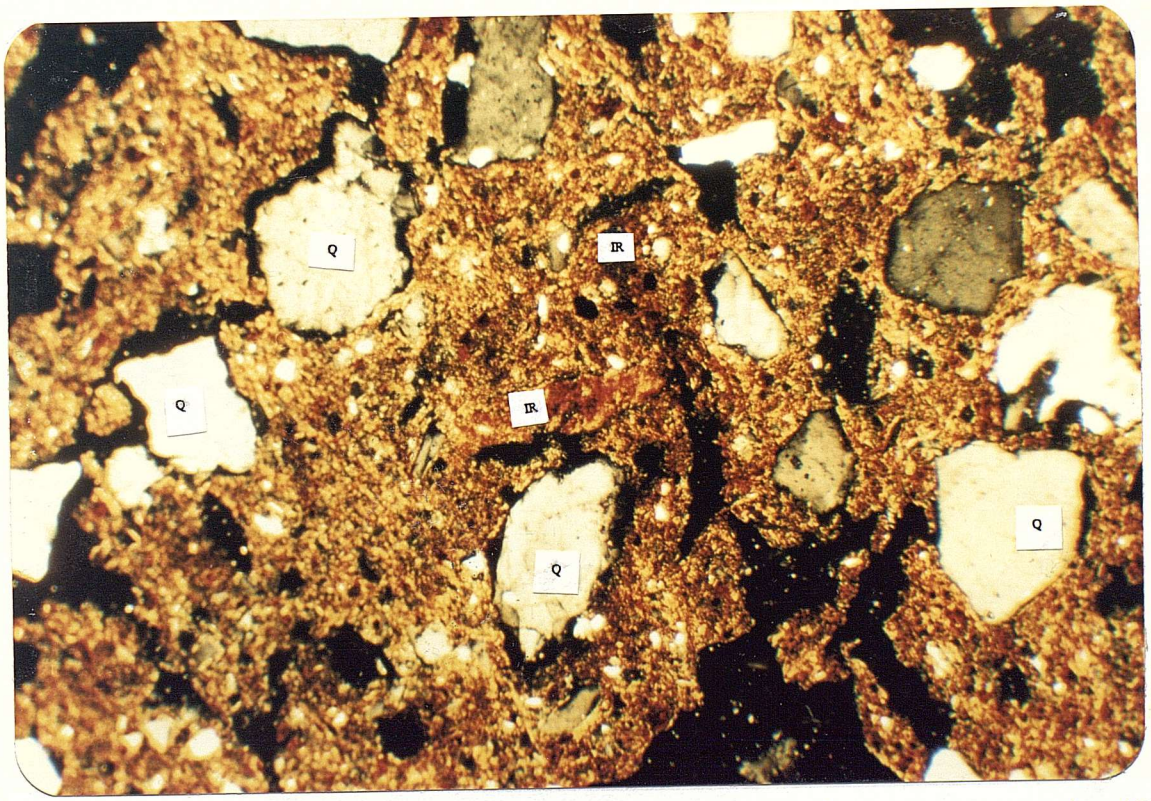
Pl.5 Islang2 site: example of fabric subgroup A2 indicates mineral grains, biotite mica (MB) and quartz (Q). (Crossed polars. Field width 5.15 mm).



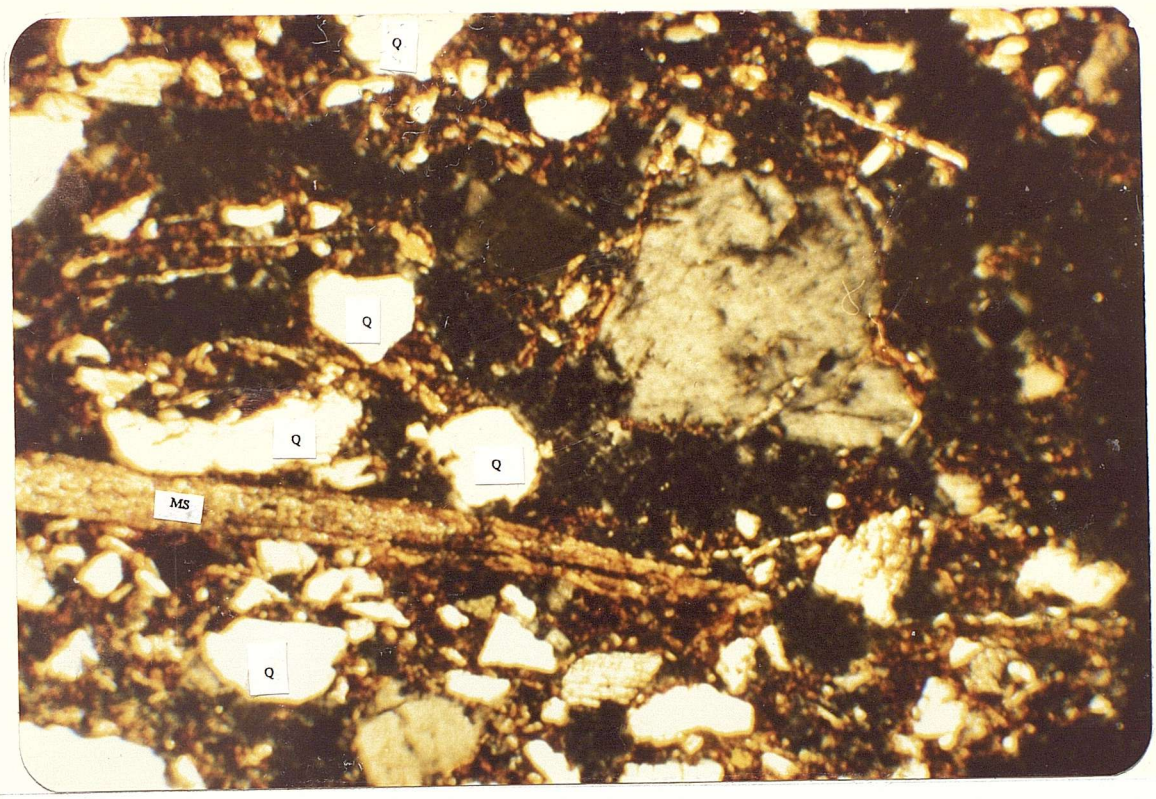
Pl.6 Islang2 site: example of fabric group B shows microcline (M), muscovite mica (MS) and quartz (Q). (Crossed polars. Field width 5.15 mm).



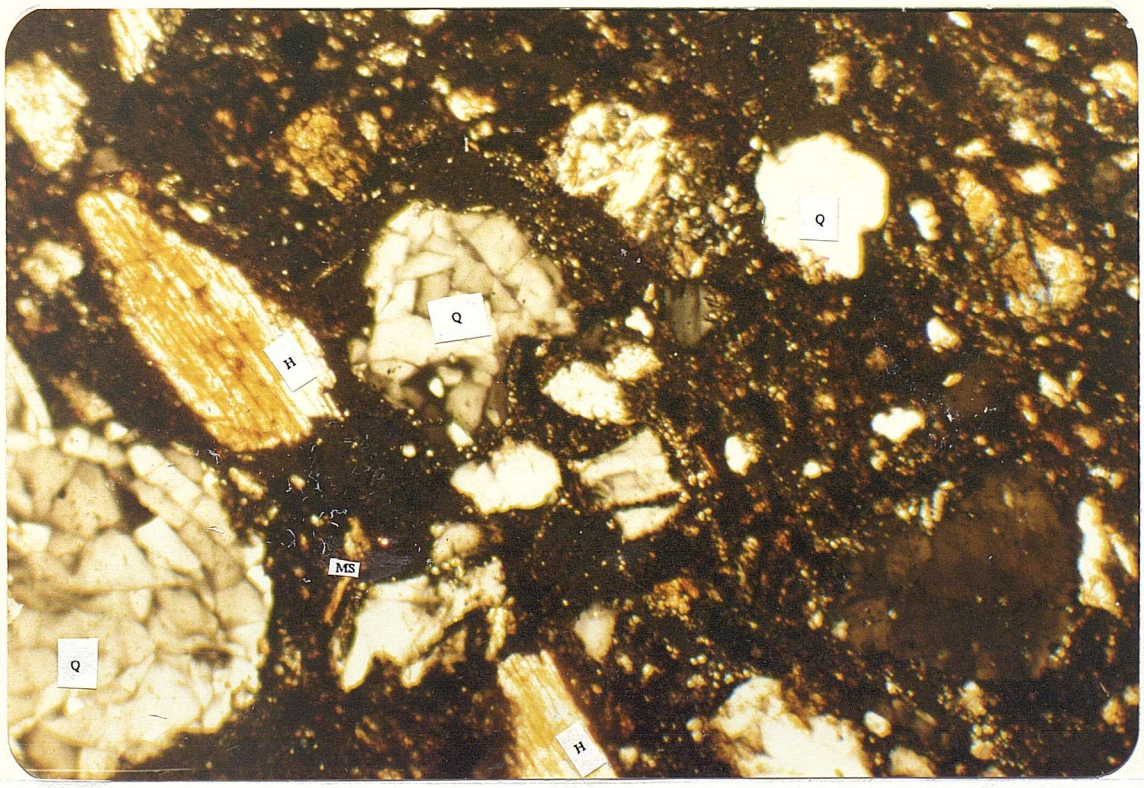
Pl.7 Nofalab2 site: example of fabric subgroup A1 indicates ill-sorted quartz (Q), muscovite mica (MS), zircon (Z). (Crossed polars. Field width 5.15 mm).



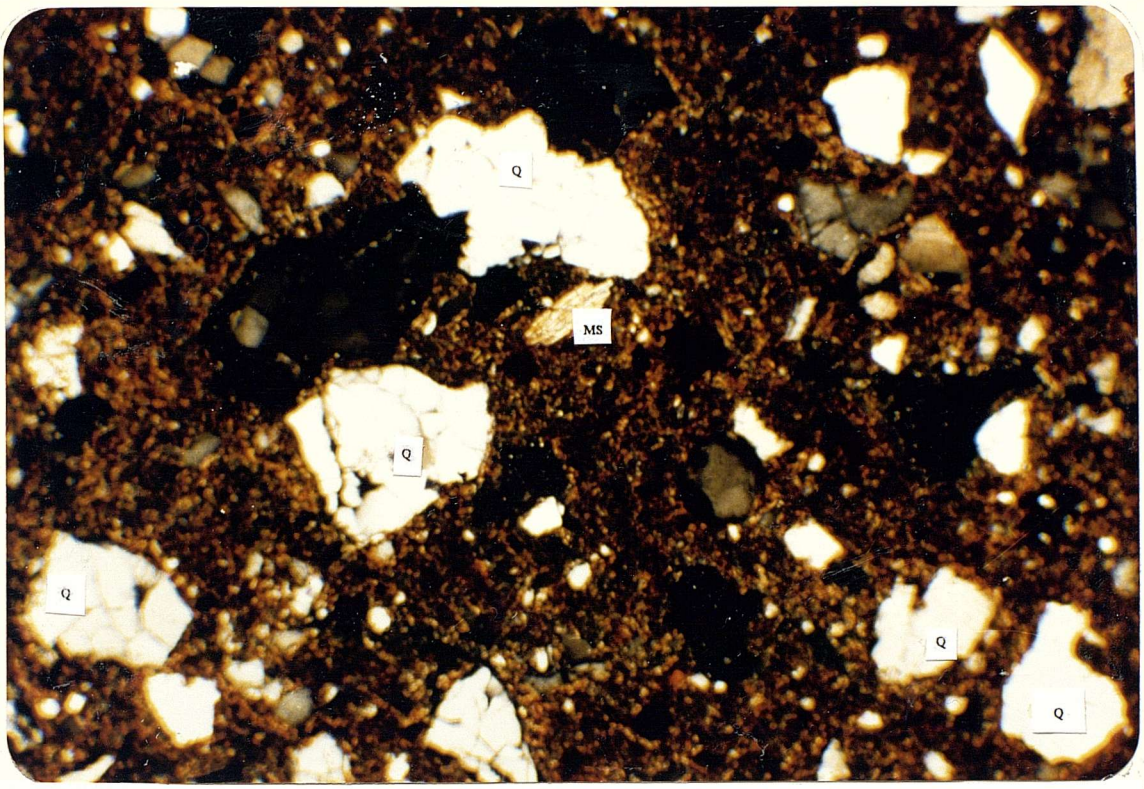
Pl.8 Nofalab2 site: example of fabric subgroup A2 shows quartz grains (Q) embeded in a reddish-brown matrix of iron (1R). (Crossed polars. Field width 5.15 mm).



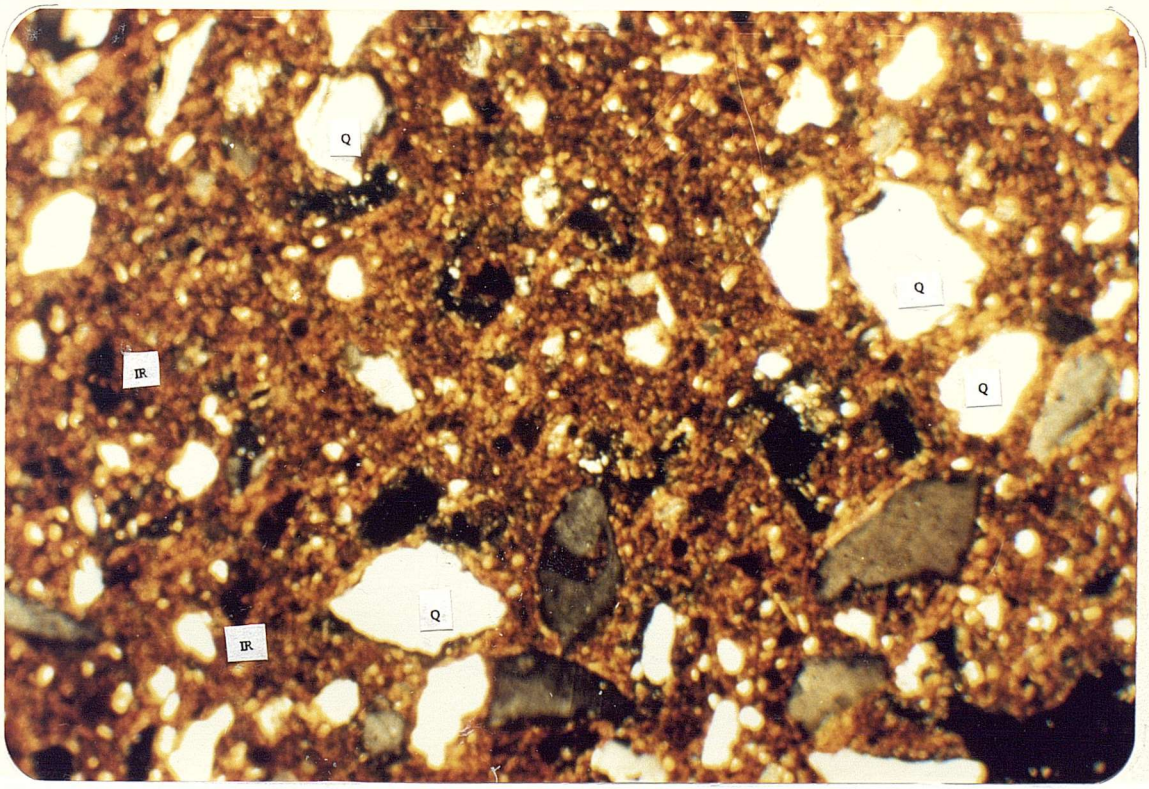
Pl.9 Kabbashi Haitah site: example of fabric group A indicates muscovite mica (MS) and a dense scatter of quartz (Q) grains. (Crossed polars. Field width 5.15 mm).



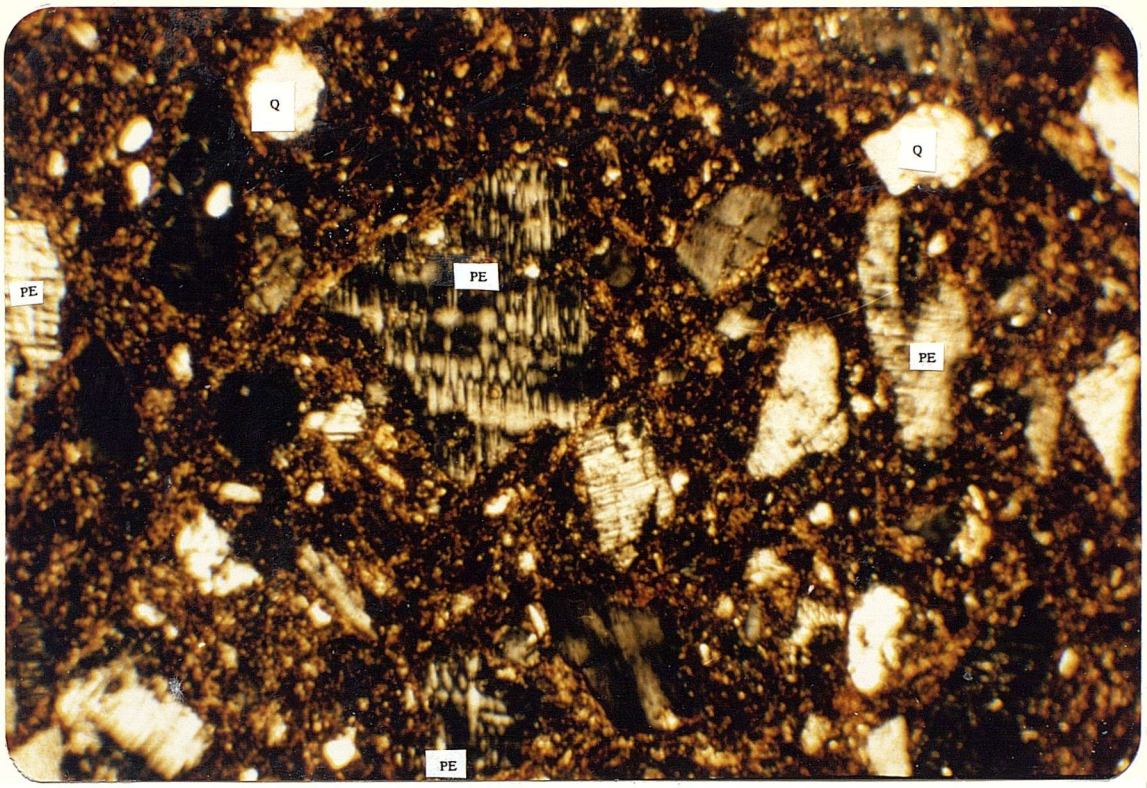
Pl.10 Kabbashi Haitah site: example of fabric group B shows hornblende (H) and cracking quartz (Q), muscovite mica (MS). (Crossed polars. Field width 5.15 mm).



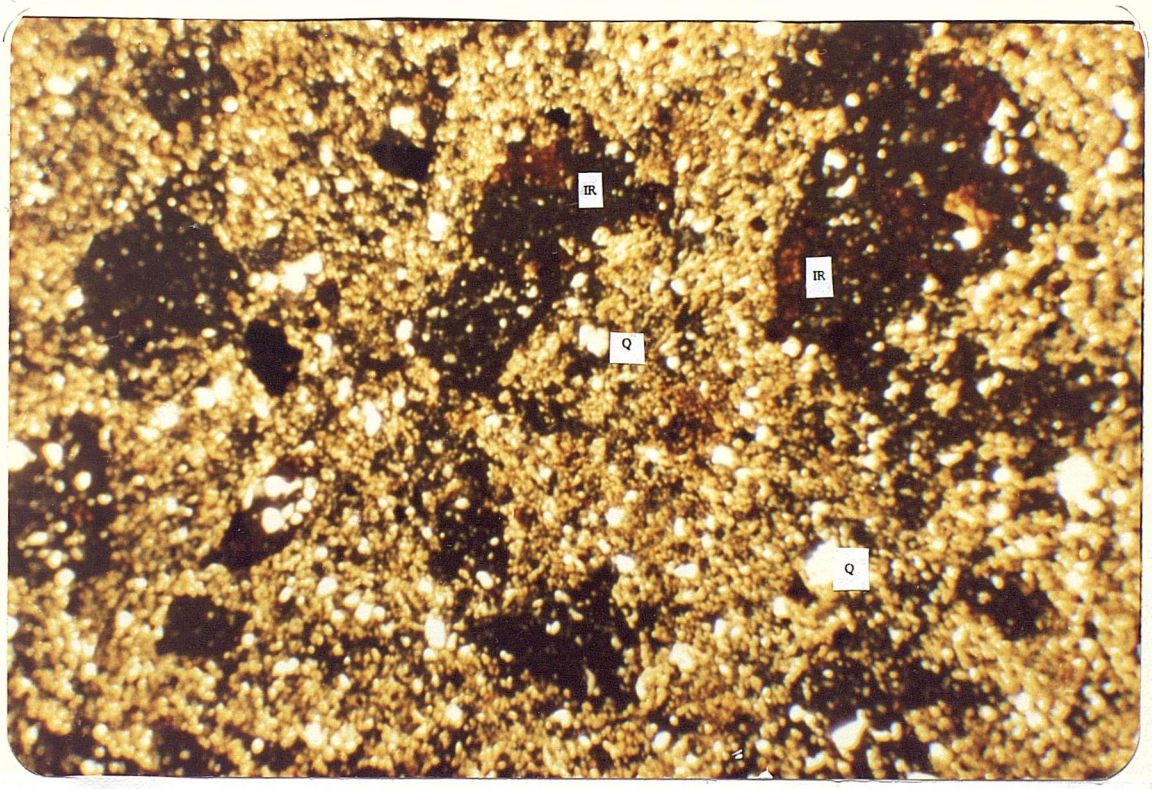
Pl.11 Kabbashi site: example of fabric subgroup A1 shows quartz (Q) grains, sparse muscovite mica (MS) embeded in a medium-dark brown matrix. (Crossed polars. Field width 5.15 mm).



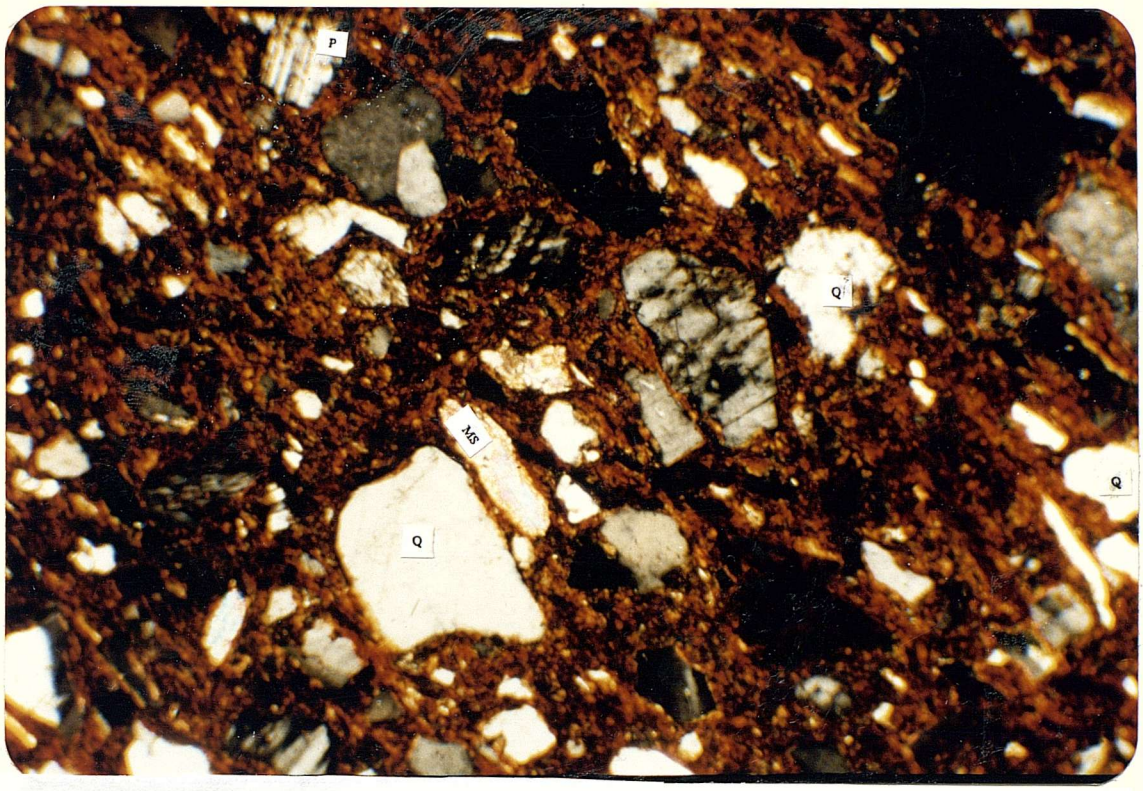
Pl.12 Kabbashi site: example of the main mineral constituents of fabric subgroup A2 shows abundant quartz (Q) and frequent iron (1R). (Crossed polars. Field width 5.15).



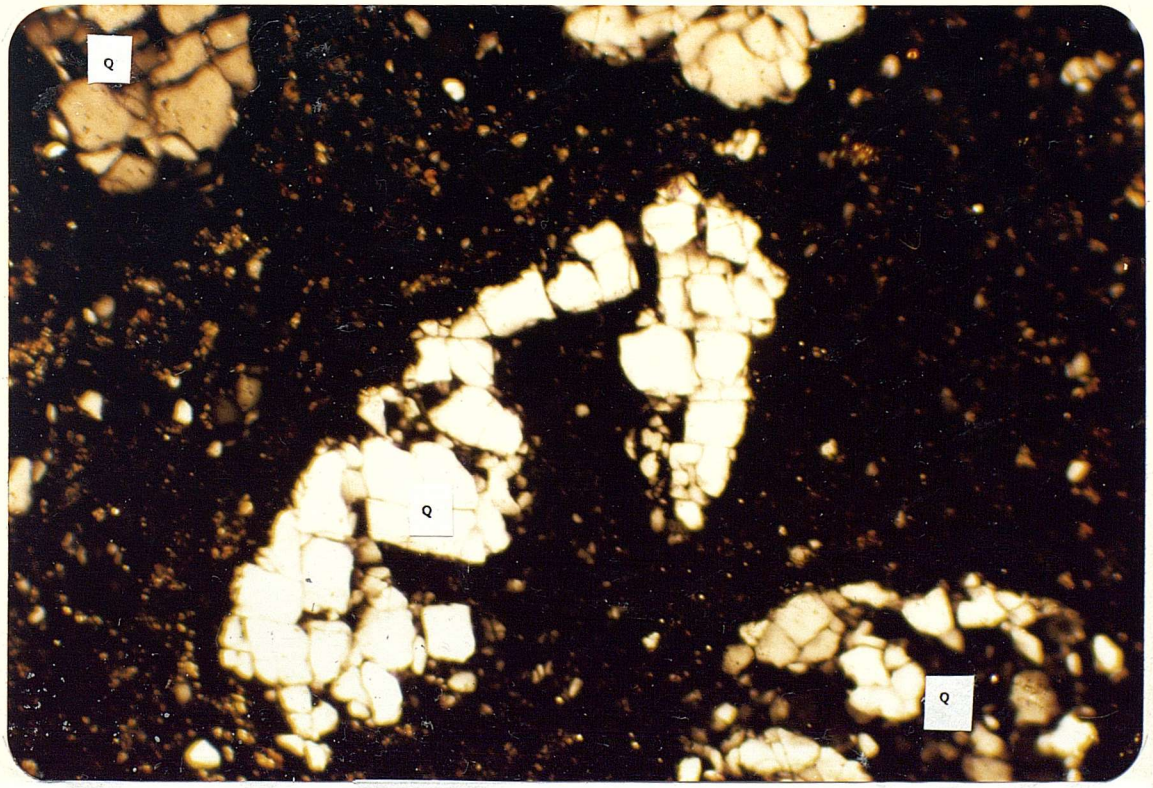
Pl.13 Kabbashi site: example of the major minerals of fabric group B shows perthite (PE) and quartz (Q) grains. (crossed polars. Field width 5.15 mm).



Pl.14 Main constituents of fabric subgroup A1 of Geili site are quartz (Q) and iron (1R) inclusions. (Crossed polars. Field width 5.15 mm).

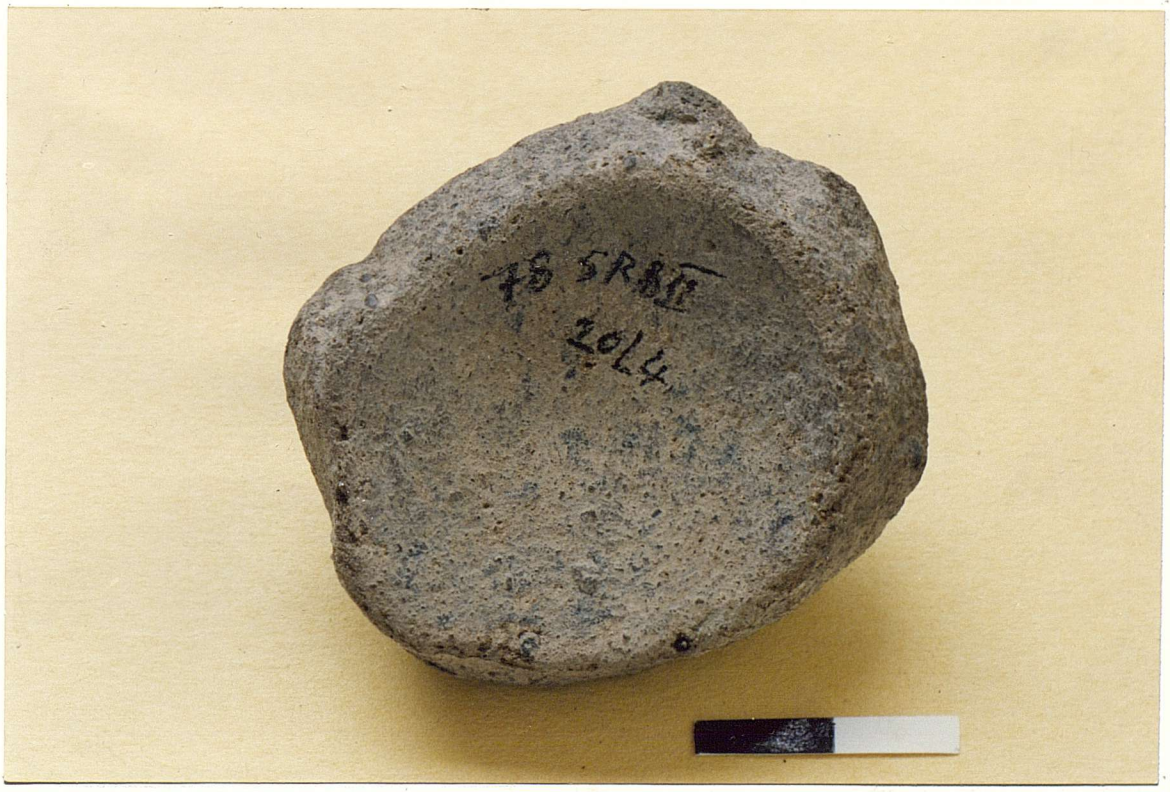


Pl.15 Geili site: example of fabric subgroup A2 shows quartz (Q), frequent muscovite mica (MS), Plagioclase (P) and reddish-brown iron (IR) matrix. (Crossed polars. Field width 5.15 mm).



Pl.16 Specimen GE1, 20 shows quartz grains in cracked condition embeded in a dark-brown matrix. (Crossed polars. Field width 5.15 mm).

Pl. 17: Conical base from Sarurab2 (outside view)



Pl. 18: Conical base from Sarurab2 (inside view)

Pl.19: Wavy line (arched wave): Sarurab2

Pl.20: Wavy line (continuous wave) : Sarurab2

Pl.21: Dotted wavy line: Sarurab2

Pl.22: Dotted straight line: Sarurab2

Pl.23: Dotted straight line: Islang2

Pl.24: Dotted straight line: Nofalab2

Pl.25: Zigzag impressed line: Sarurab2

Pl.26: Zigzag dotted lines: Islang2

Pl.27: Zigzag dotted lines: Nofalab2

Pl.28: Fingernail impressions: Sarurab2

Pl.29: Linear impressions: Sarurab2

Pl.30: Triangular impressions: Sarurab2

Pl.31: Triangular impressions: Islang2

Pl.32: Triangular impressions: Nofalab2

Pl.33: Incised horizontal lines: Islang2

Pl.34: Incised horizontal lines: Nofalab2

Pl. 35: Incised horizontal lines: Sarurab2

Pl.36: Impressed straight lines: Sarurab2

Pl.37: Impressed straight lines: Nofalab2

Pl.38: Impressed straight lines : Islang2

Pl.39: Vees/dots : Islang2

Pl.40: Vees/dots : Nofalab2

Pl.41: Semicircular panels : Nofalab2

Pl.42: Semicircular panels : Islang2

Pl.43: Brushed decoration : Islang2

Pl.44: Scraped decoration: Nofalab2

Pl.45: Zoned impressed : Nofalab2

Pl.46: Black-topped red ware : Nofalab2

Pl.47: Serrated decoration : Nofalab2

Pl.48: Slanting/triangles decoration: Nofalab2

Pl.49: Wavy lines : Kabbashi Haitah

Pl.50: Wavy lines : Kabbashi

Pl.51: Dotted wavy lines: Kabbashi Haitah

Pl.52: Dotted wavy lines: Kabbashi

Pl.53: Zigzag imp. cu.lines : Geili

Pl.54: Vees/dots decoration: Geili

Pl.55: Dotted straight line:Geili

Pl.56: Rippled decoration: Geili

Pl.57: Stippled decoration : Geili

Pl.58: Brushed decroation : Geili

Pl.59: Fracture-colours: Sarurab2

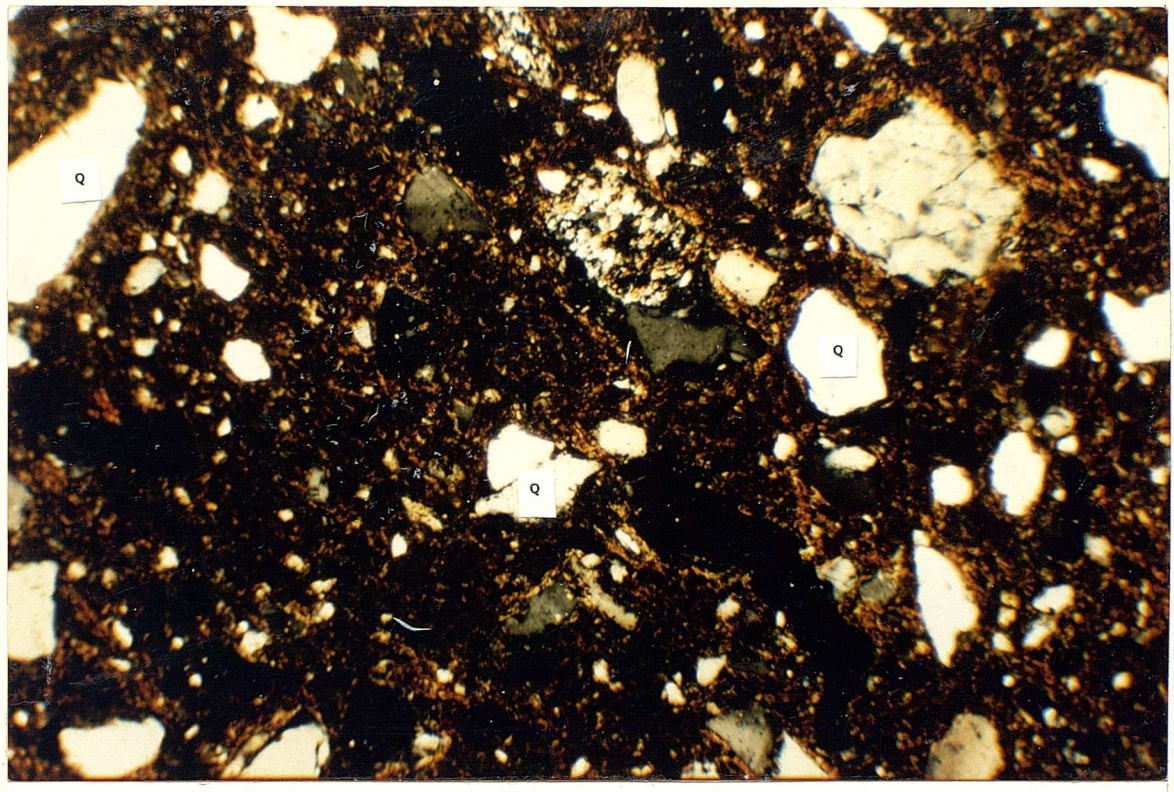
Pl.60: Fracture-colours: Islang2

Pl.61: Fracture-colours: Nofalab2

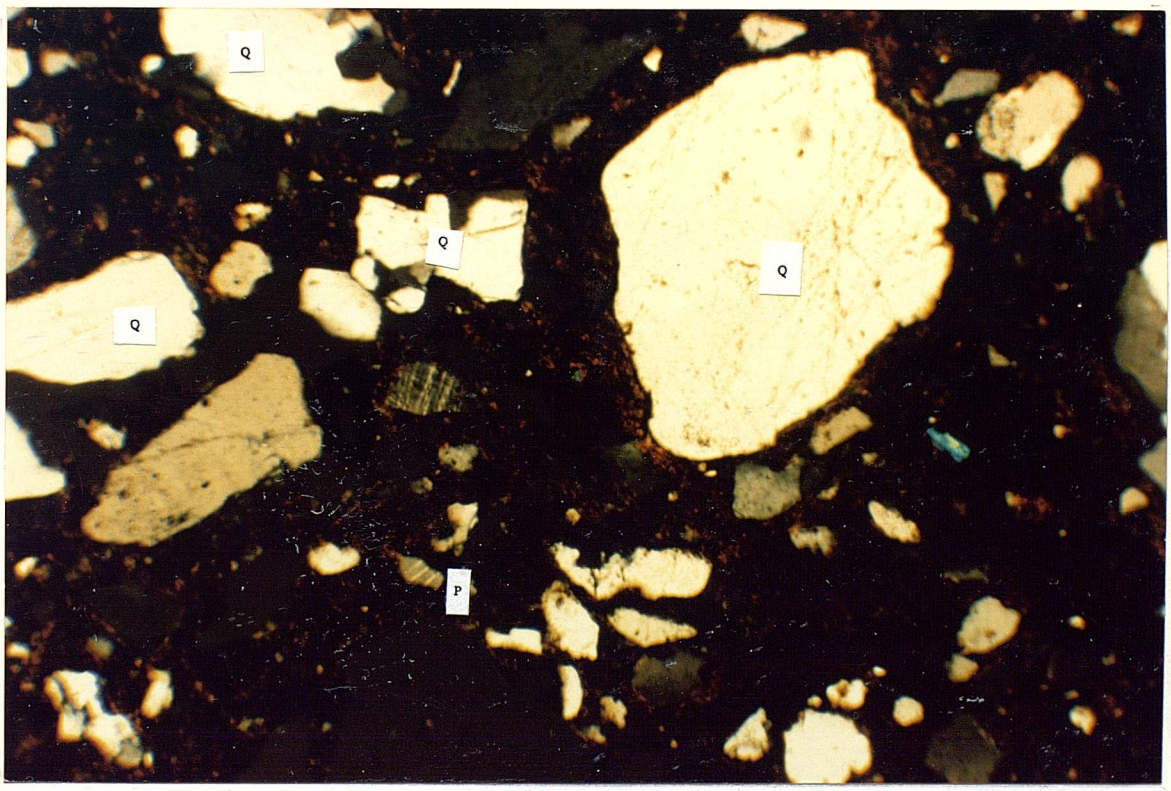
Pl.62: Fracture-colours: K. Haitah

Pl.63: Fracture colours: Kabbashi

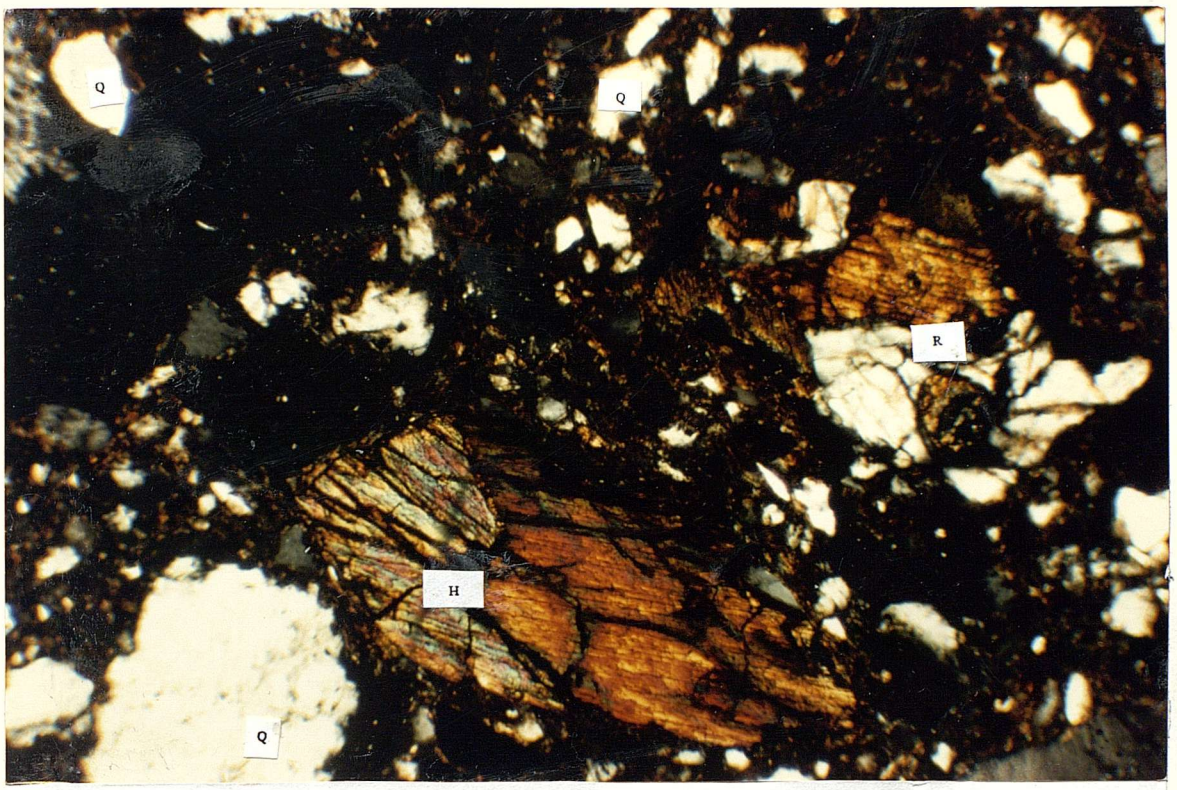
Pl.64: Fracture colours: Geili



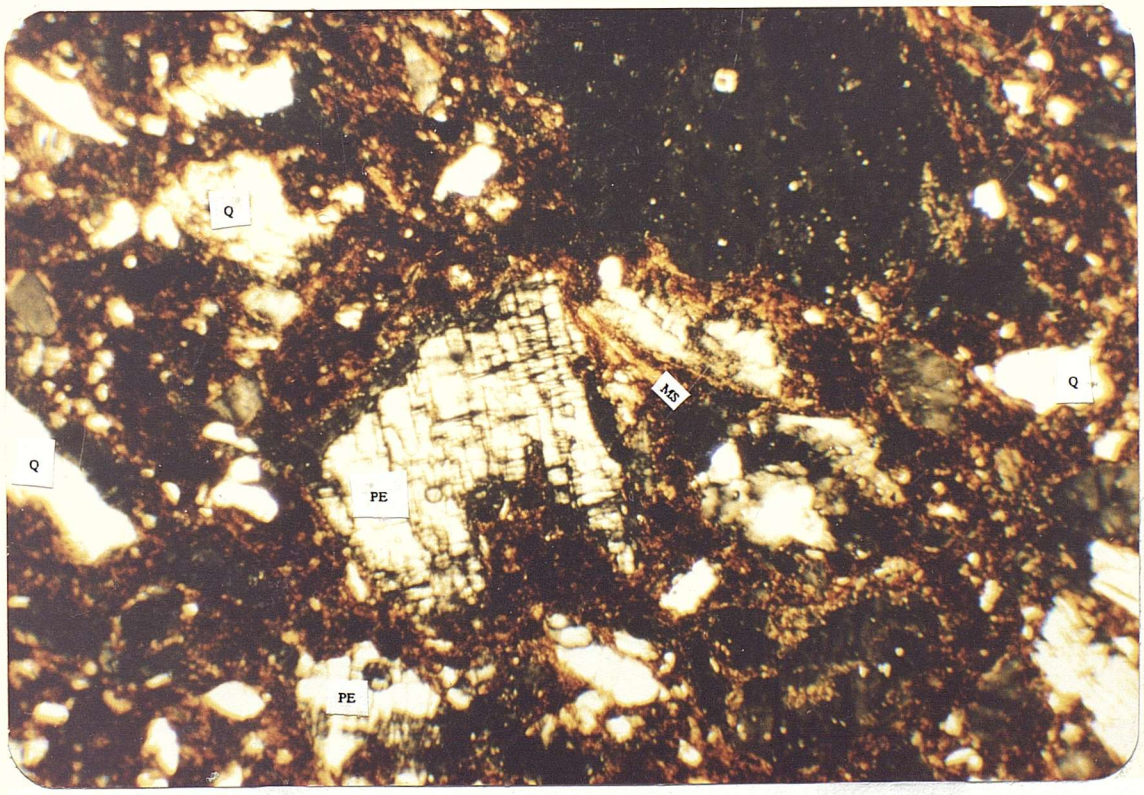
Pl.65 Shabona site: example of fabric subgroup A1 indicates a dense scatter of quartz (Q; QT) grains embeded in a rather dark-brown matrix. (Crossed polars. Field width 5.15 mm).



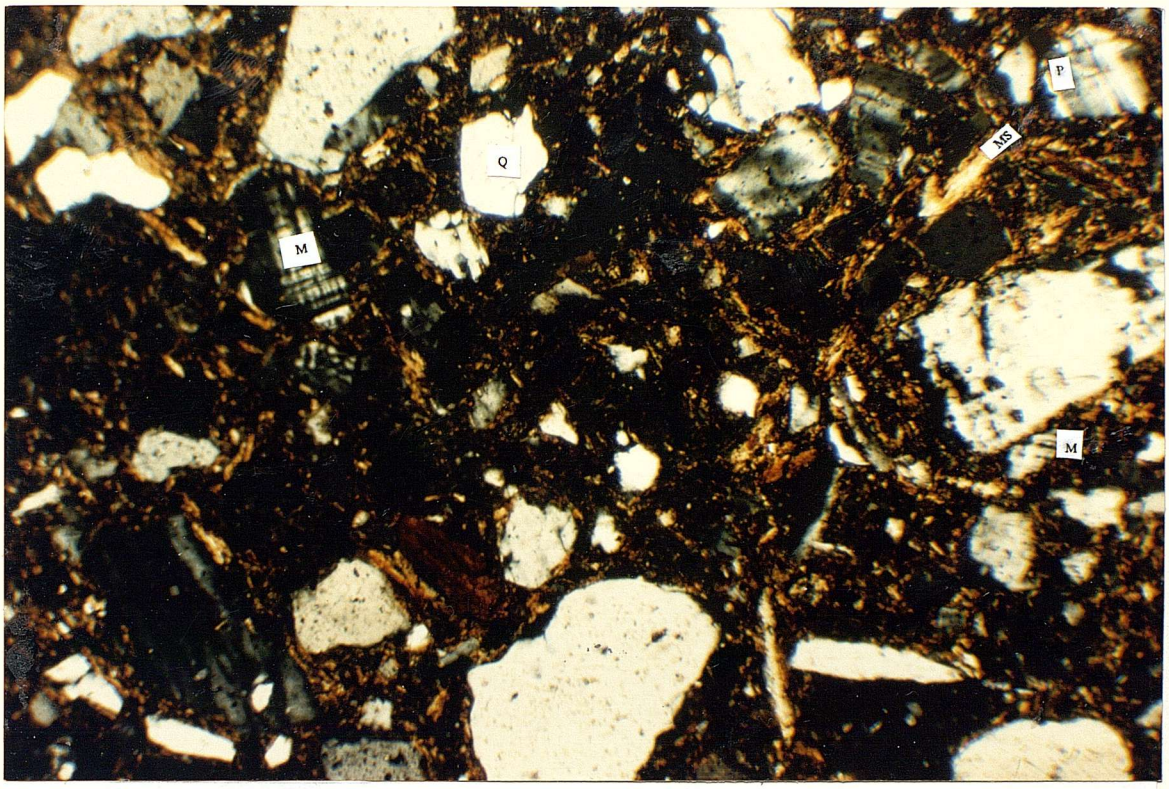
Pl.66 Shabona site: example of fabric subgroup A2 shows ill-sorted quartz (Q), plagioclases (P). (Crossed polars. Field width 5.15 mm).



Pl.67 Shabona site: example of fabric group B shows hornblende (H), rock fragment (S) and scattered grains of quartz (Q). (Crossed polars. Field width 5.15 mm).

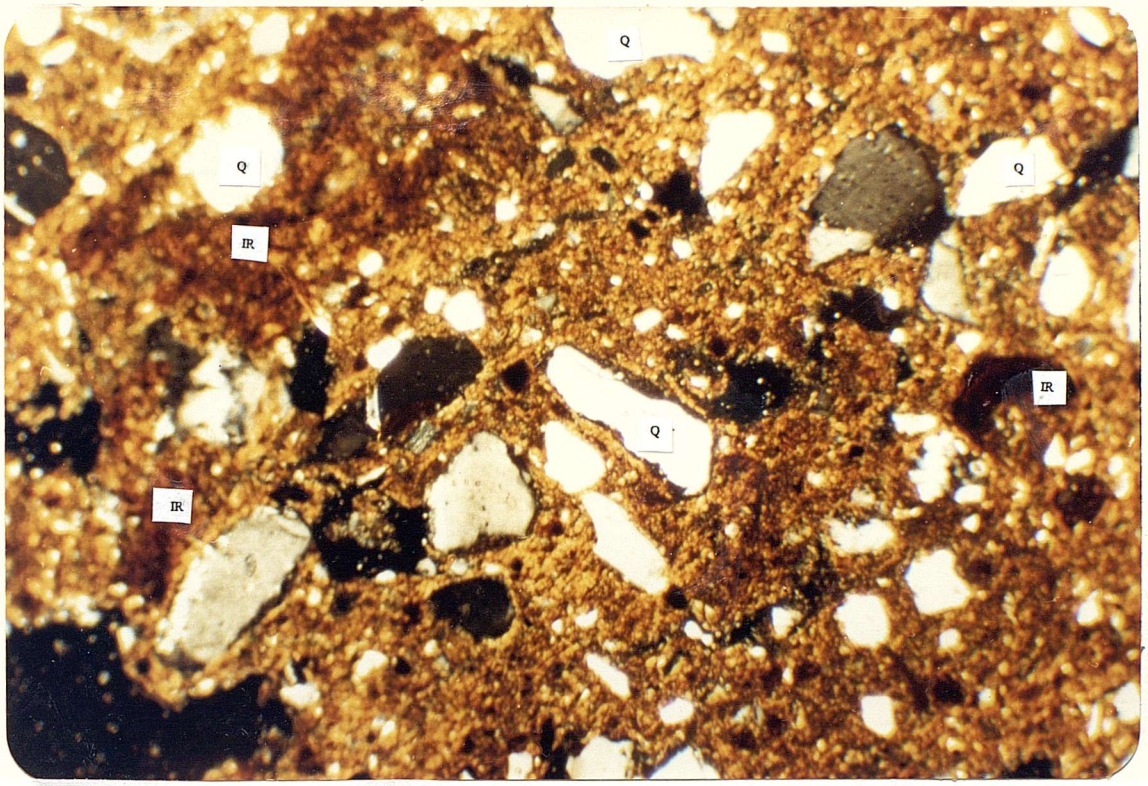


Pl.68 Rabak (Kh. Neo.L.): example of fabric A illustrates perthite (PE), muscovite mica (MS) and quartz (Q). (Crossed polars. Field width 5.15 mm).

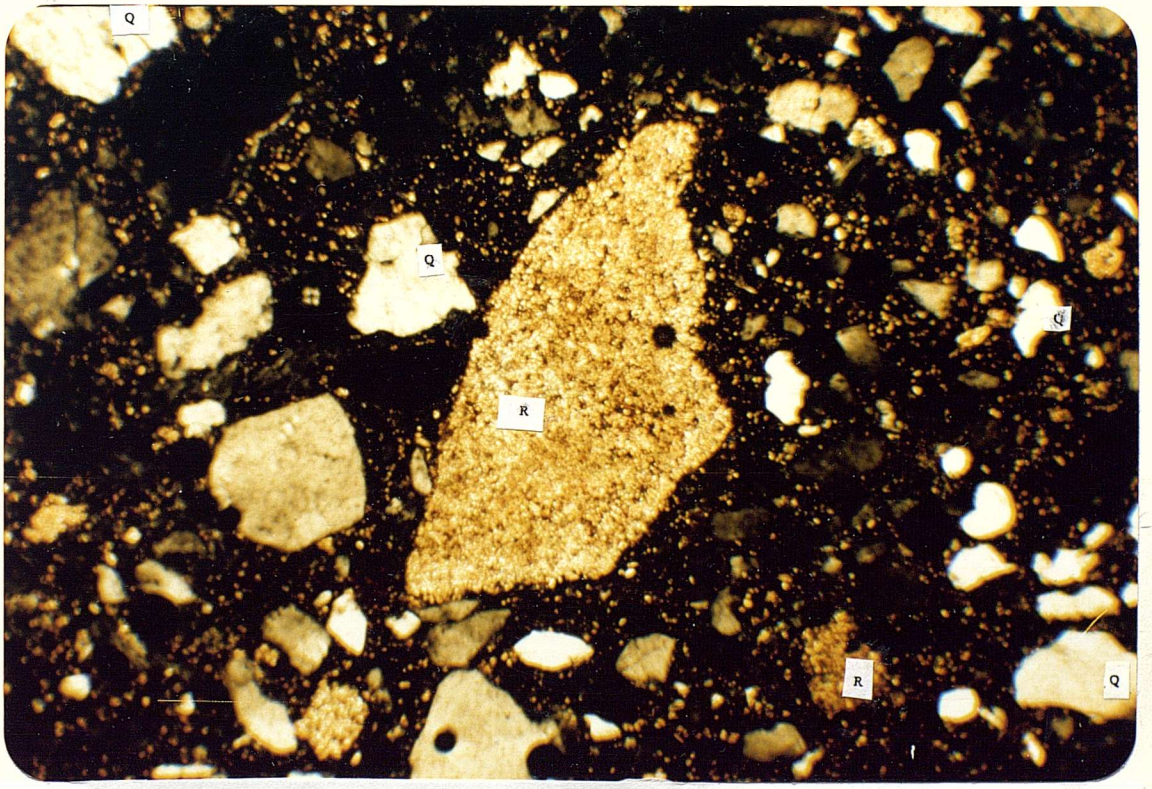


Pl.69 Rabak (Kh. Neo.L.): example of fabric group A shows microcline (M), plagioclase (P), muscovite mica (MS) and quartz (Q). (Crossed polars. Field width 5.15 mm).

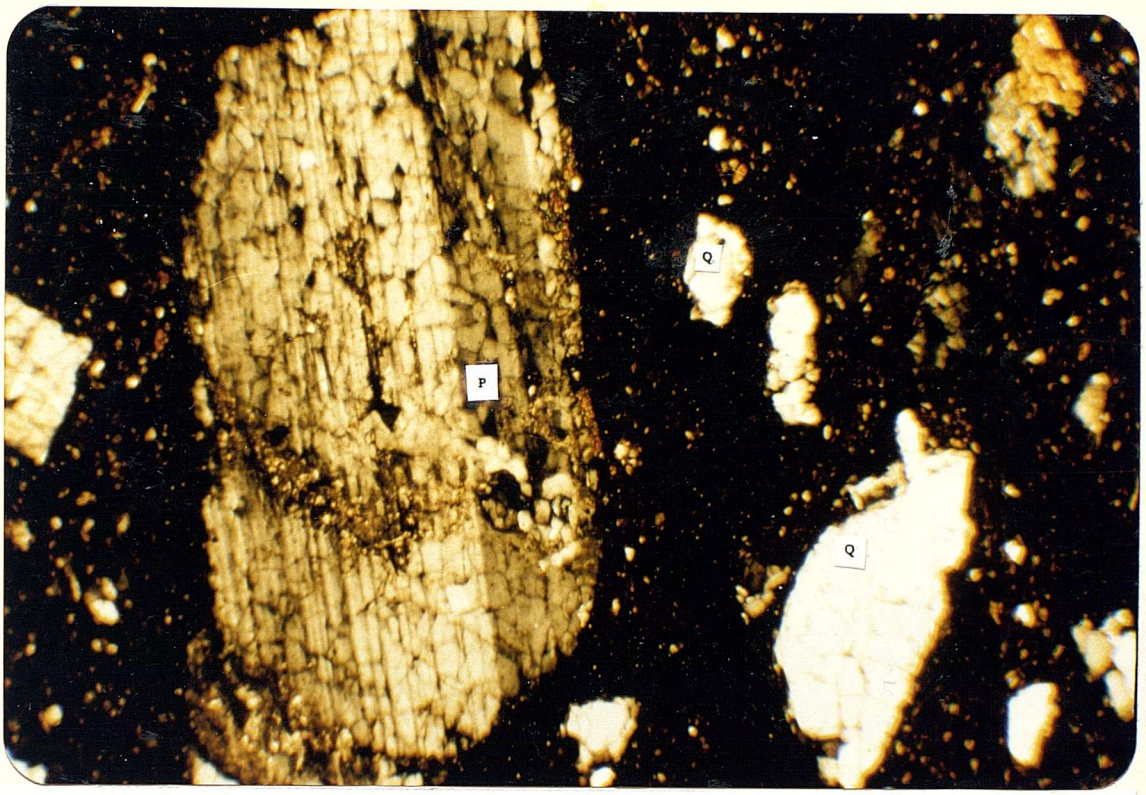
Pl.70 Rabak (Kh. Neo. L.): example of fabric group B shows hornblende (H), plagioclases (P) and quartz (Q). (Crossed polars. Field width 5.15 mm).



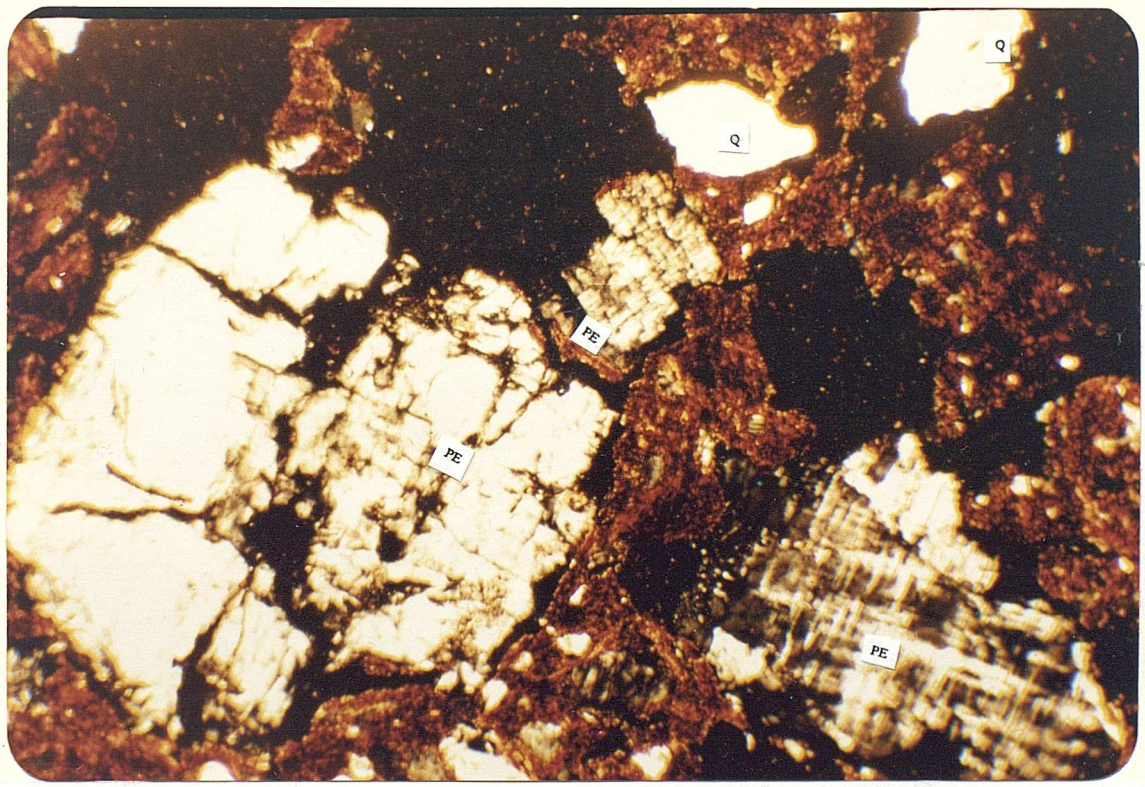
Pl.71 Rabak (J.M.L.): example of fabric subgroup A1 shows scattered grains of quartz embeded in a reddish brown matrix of iron (1R). (Crossed polars. Field width 5.15 mm).



Pl.72 Rabak (J.M.L.): example of fabric subgroup A2 shows limestone rock fragments (R) and scattered grains of quartz (Q). (Crossed polars. Field width 5.15 mm).



Pl.73 Rabak (J.M.L.): specimen (RAK-J.M.L.19) shows alteration (seriticization) at the edges of a feldspar crystal (P) and grains of quartz (Q). (Crossed polars. Field width 5.15 mm).



Pl.74 Rabak (J.M.L.): example of fabric subgroup C shows perthite inclusions (PE) and quartz (Q). (Crossed polars. Field width 5.15 mm).

Pl.75: Horizontal breakage of coiling : Shabona

Pl.76: Dotted sawtooth : Shabona

Pl.77: Dotted sawtooth : Rabak-Khartoum Neolithic levels

Pl.78: Dotted sawtooth : Rabak-Khartoum Neolithic levels

Pl.79: Wavy line : Shabona

Pl.80: Dotted wavy line : Shabona

Pl.81: Dotted rectilinear bands ; Rabak -Jebel Moya levels

Pl.82: Linear impressed : Shabona

Pl.83: Linear impressed : Rabak - Khartoum Neolithic levels

Pl.84: Mat impressions: Shabona

Pl.85: Mat impressions: Rabak - Khartoum Neolithic levels

Pl.86: Fingernail impression : Rabak-Jebel Moya levels

Pl.87: Dotted/triangles : Shabona

Pl.88: Wiped surface : Rabak - Jebel Moya levels

Pl.89: Dotted/horizontal lines : Rabak - Khartoum Neolithic levels

Pl.90: Slanting linear lines/herring-bone imp.: Rabak-Khartoum Neolithic levels

Pl.91: Catfish impressions : Rabak-Khartoum Neolithic levels

Pl.92: Dotted-wolf tooth: Rabak-Khartoum Neolithic levels

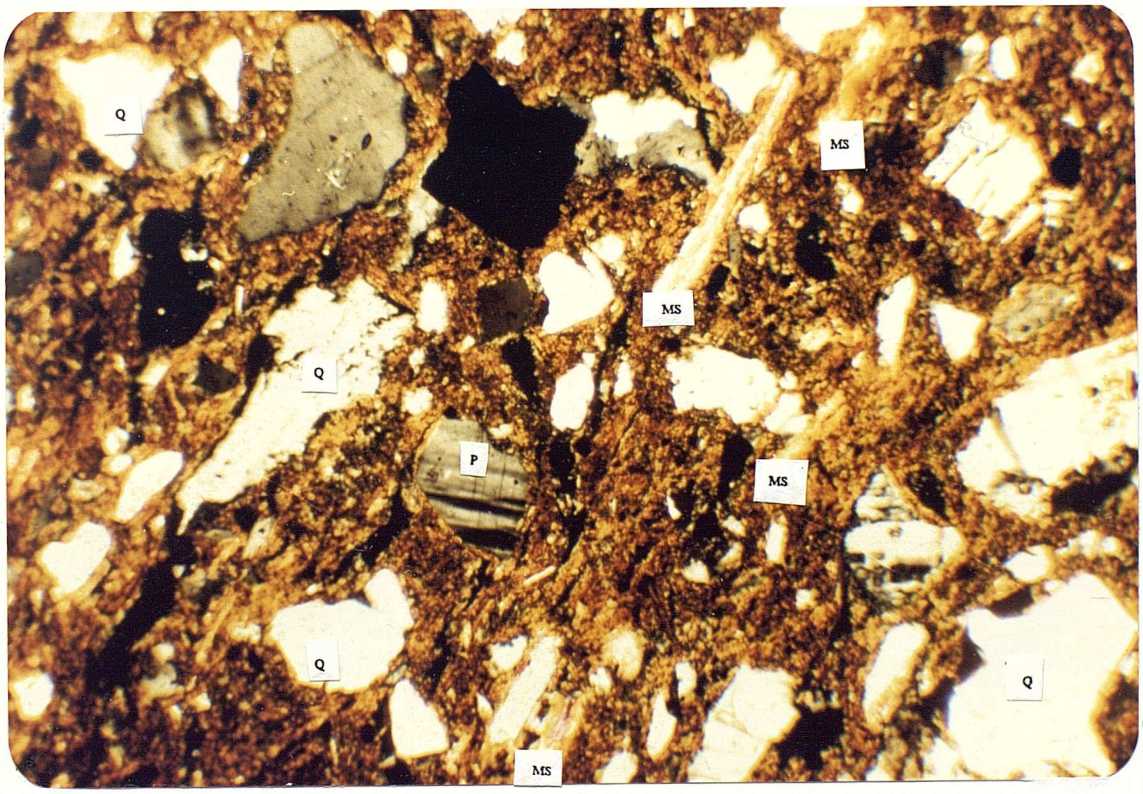
Pl.93: Hachured grooves: Rabak-Jebel Moya levels

Pl.94: Zoned impressed: Rabak-Jebel Moya levels

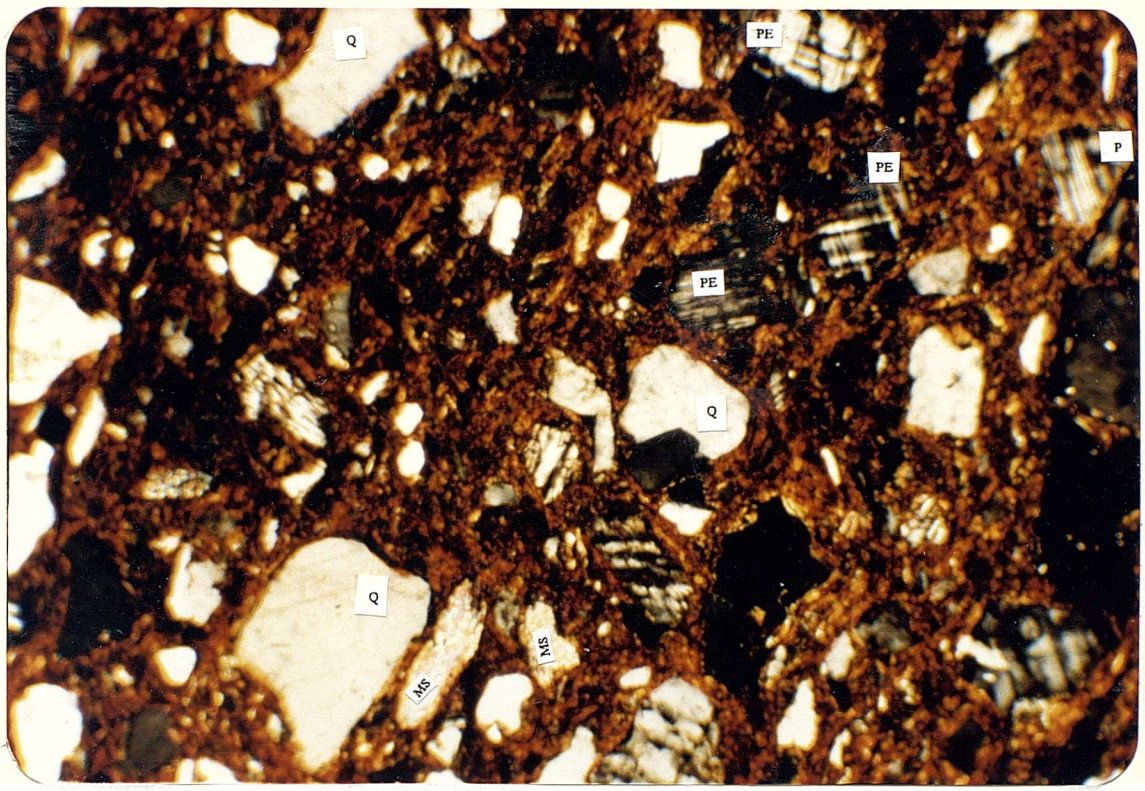
Pl.95: Fracture - colours: Shabona

Pl.96: Fracture-colours: Rabak-Khartoum Neolithic levels

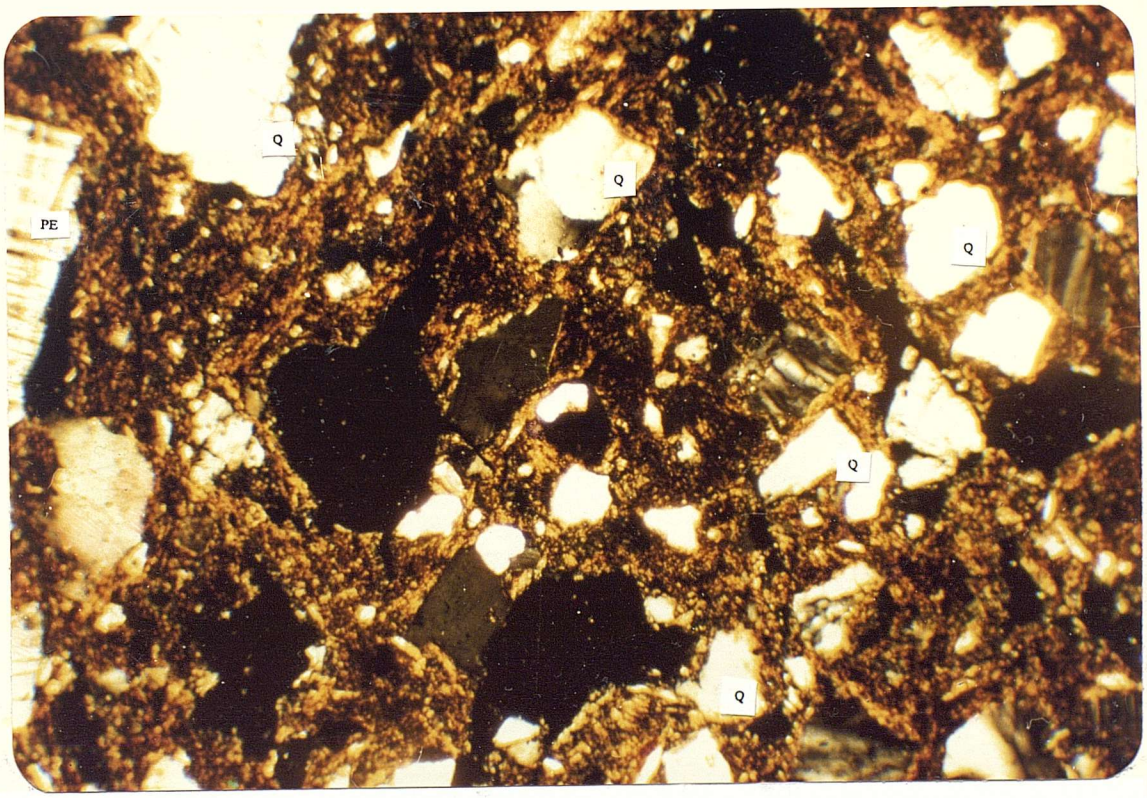
Pl.97: Fracture-colours: Rabak-Jebel Moya levels



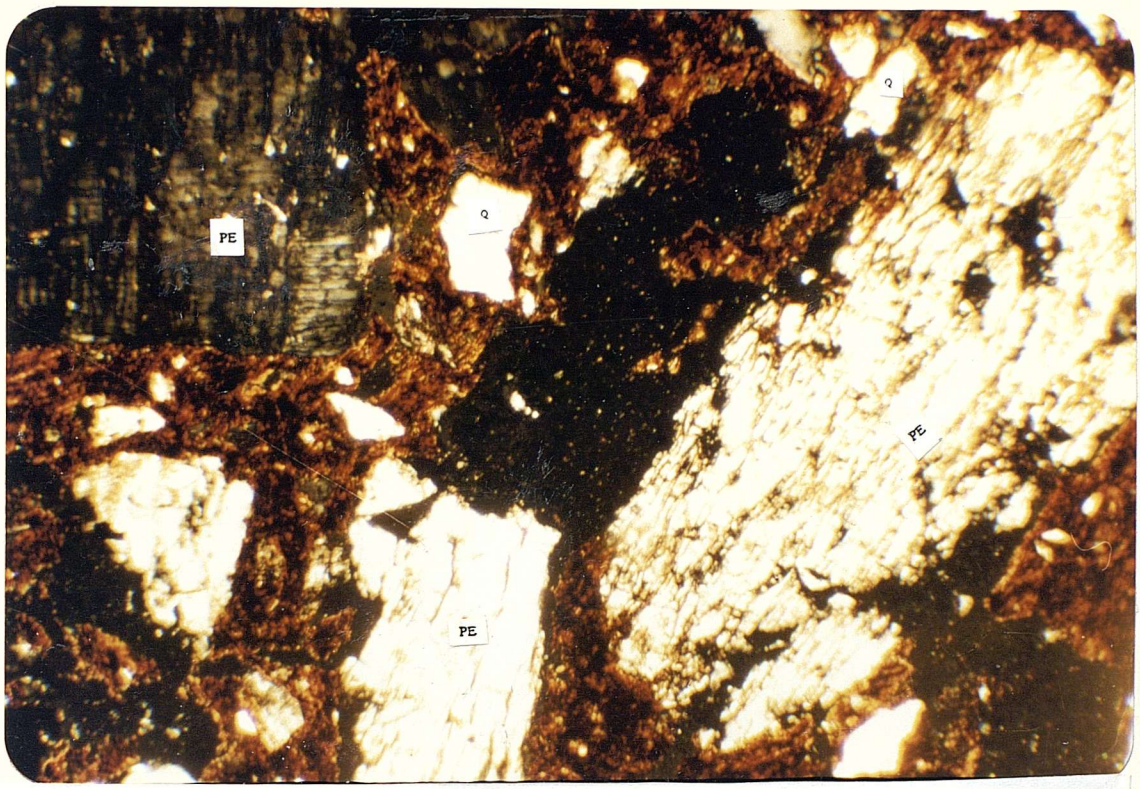
Pl.98 Shaqadud midden-Mesolithic levels: example of group A shows quartz (Q), muscovite mica (MS) and plagioclase (P). (Crossed polars. Field width 5.15 mm).



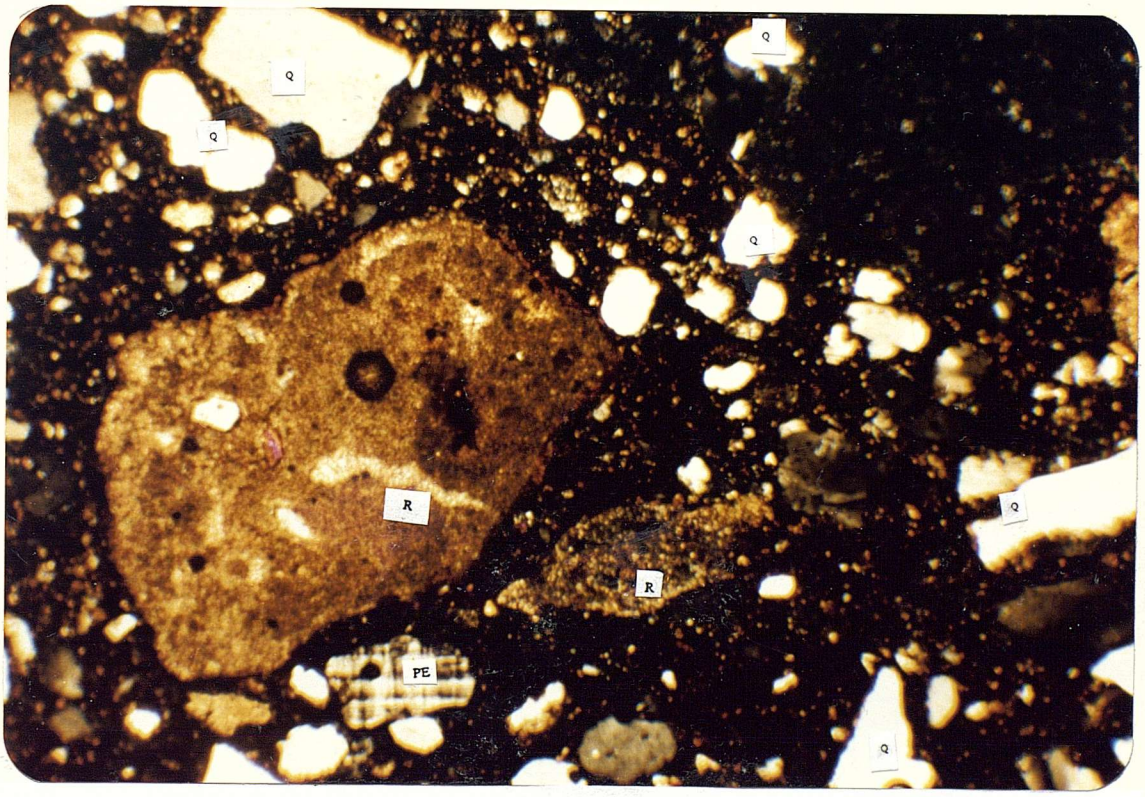
Pl.99 Shaqadud midden-Mesolithic levels: example of fabric group B shows perthite (PE) microcline, plagioclases (P) and muscovite mica (MS). (Crossed polars. Field width 5.15 mm).



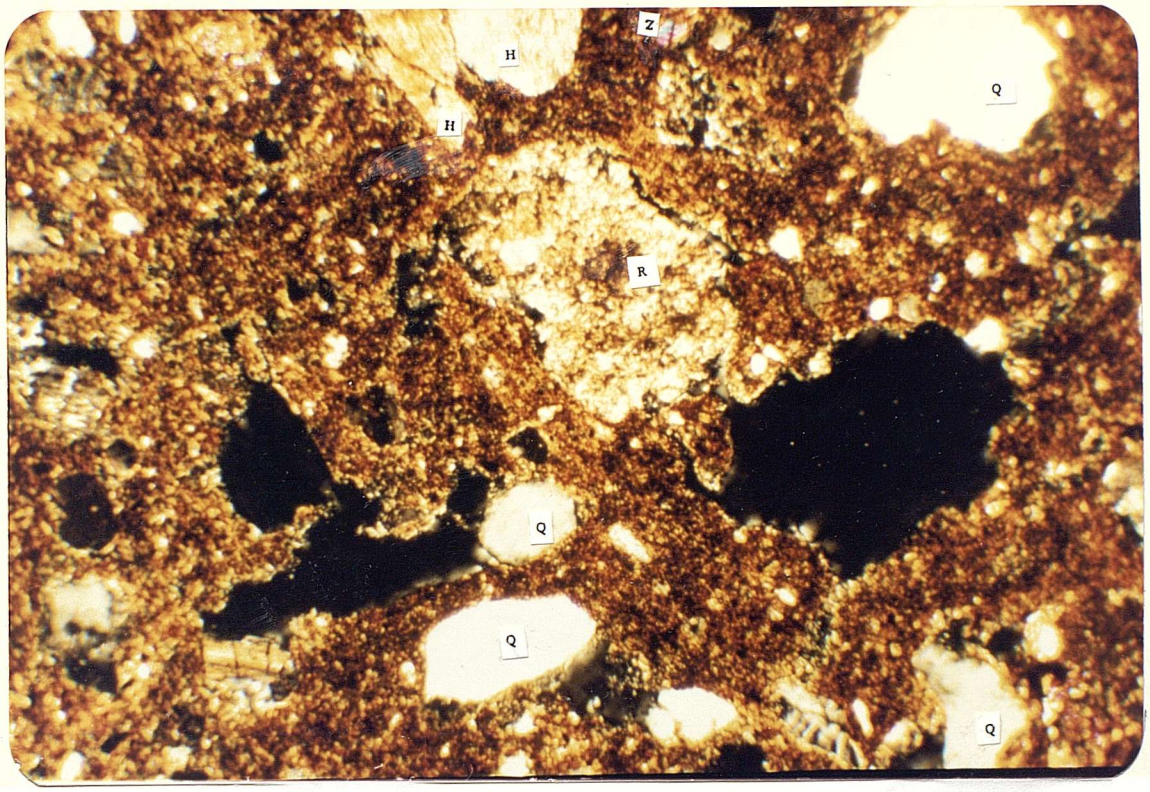
Pl.100 Shaqadud midden-Neolithic levels: example of fabric group A shows quartz grains (Q) and feldspar (M). (Crossed polars. Field width 5.15 mm).



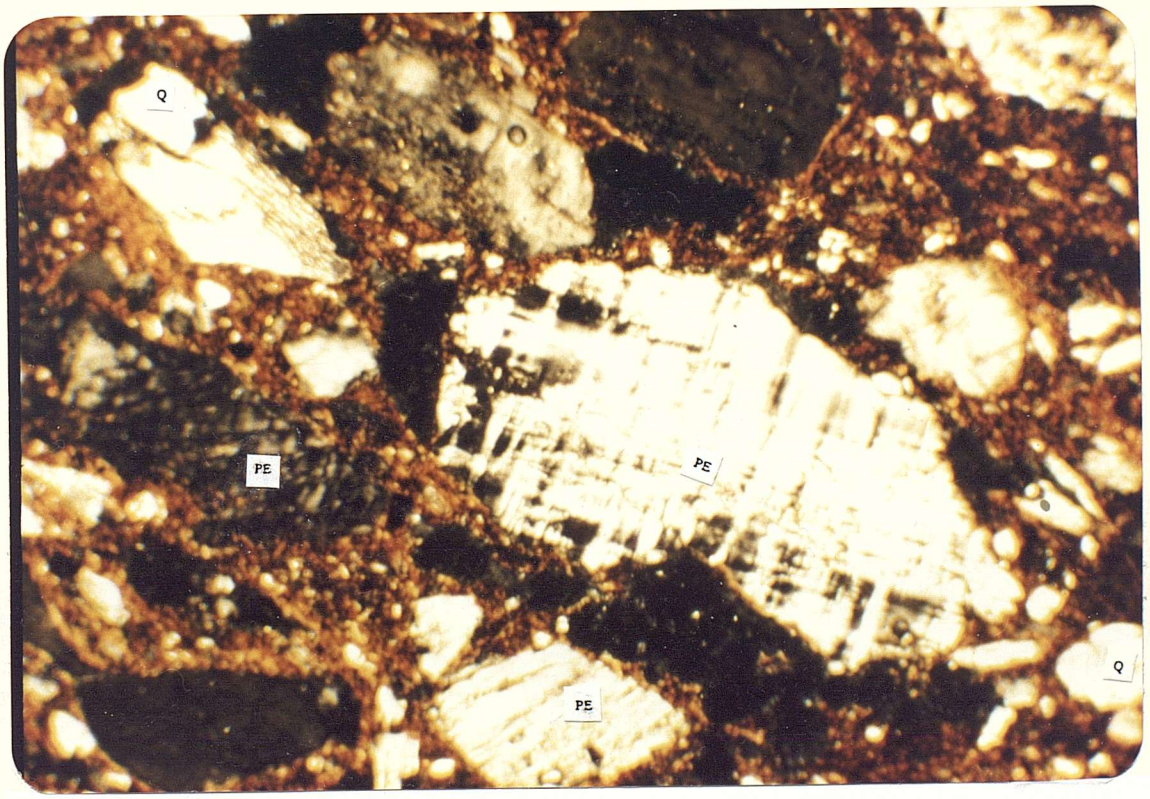
Pl.101 Shaqadud midden - Neolithic levels: example of fabric group B shows perthitic feldspar (PE) and quartz (Q). (Crossed polars. Field width 5.15 mm).



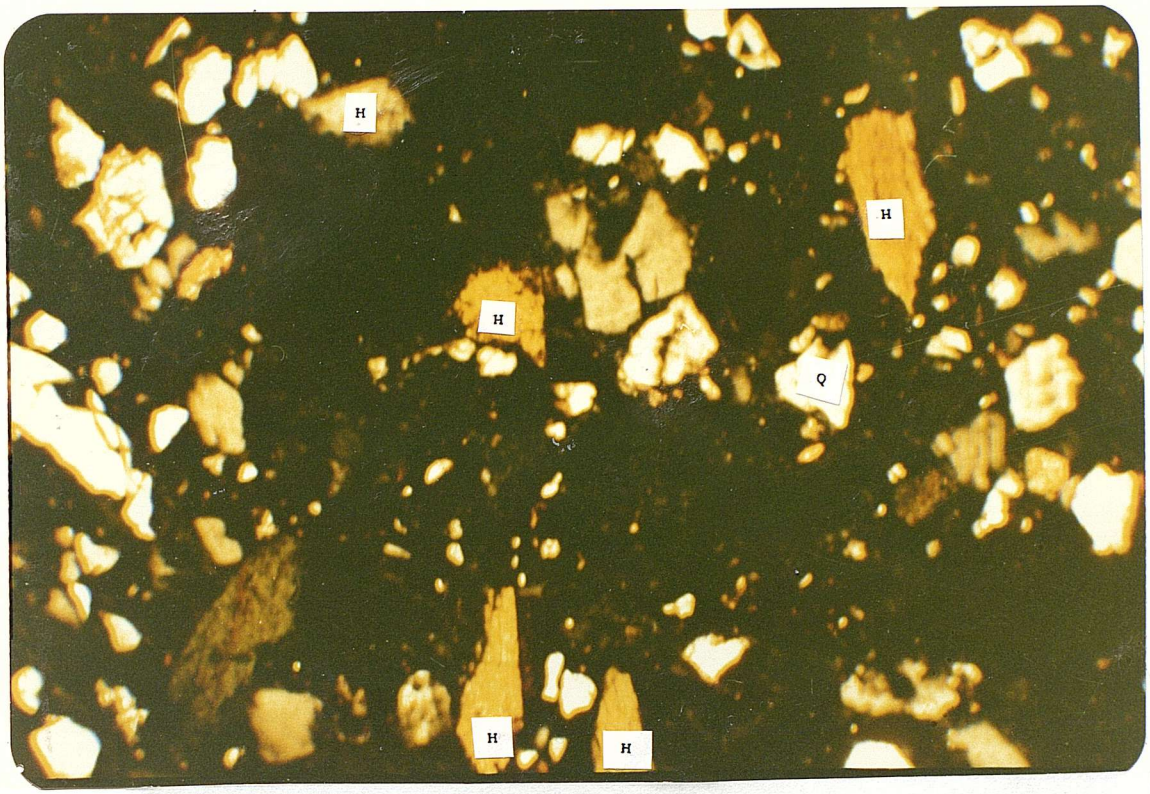
Pl.102 Shaqadud Cave: example of fabric subgroup A1 shows limestone rock fragments (R), perthite (PE) and quartz. (Crossed polars. Field width 5.15 mm).



Pl.103 Shaqadud Cave: example of mixed lithography (Fabric subgroup A2) indicates limestone rock fragments (R), hornblende (H) and quartz (Q) and zircon (Z). (Crossed polars. Field width 5.15 mm).



Pl.104.Shaqadud Cave: example of fabric group B indicates perthite feldspar (PE) and grains of quartz (Q). (Crossed polars. Field width 5.15 mm).



Pl.105 Shaqadud Cave: example of fabric group C shows hornblende (H) and quartz (Q). (Crossed polars. Field width 5.15 mm).

Pl.106: Continuous wavy line: Shaqadud midden Mesolithic

Pl.107: Angular wavyline: Shaqadud midden Mesolithic

Pl.108: Banded motif: Shaqadud midden Mesolithic

Pl.109: Banded motif: Shaqadud midden Mesolithic

Pl.110: Dotted St. line: Shaqadud midden Mesolithic

Pl.111: Dotted St. line: Shaqadud midden Mesolithic

Pl.112: Triangles/Vees: Shaqadud midden Mesolithic

Pl.113: Lined zigzag: Shaqadud midden Mesolithic

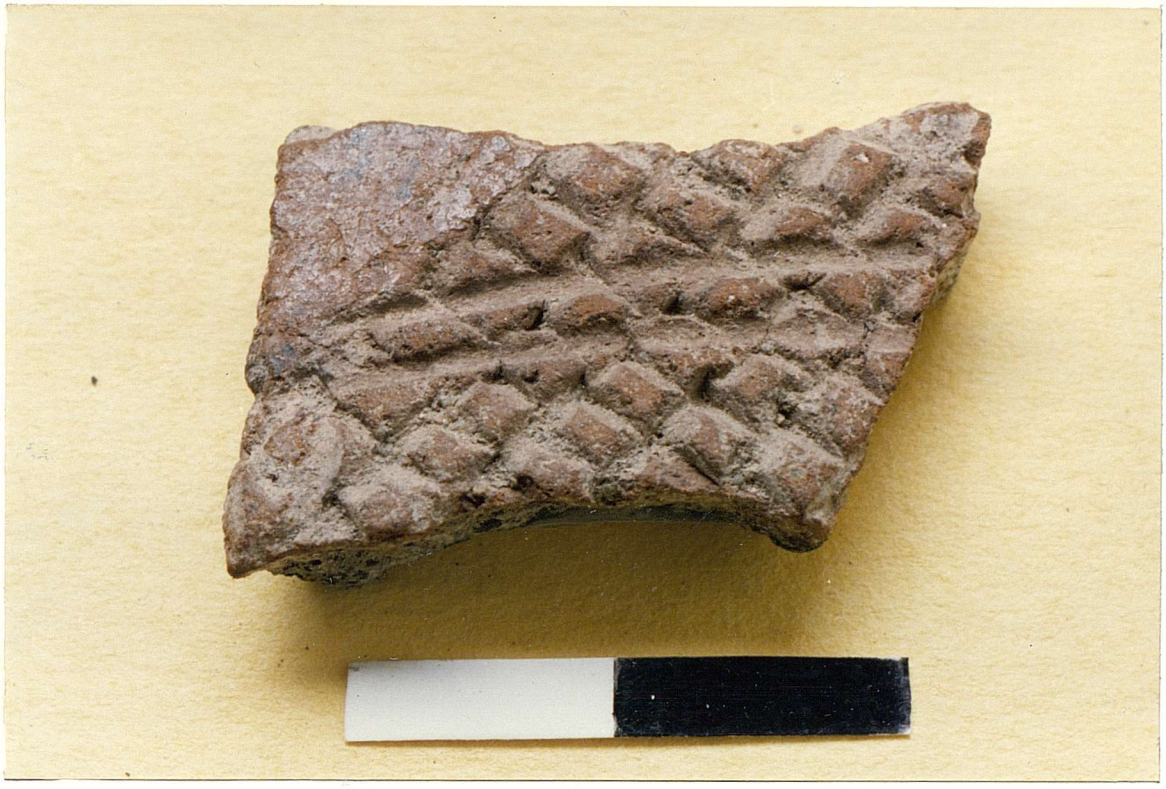
Pl.114: Zigzag St. line: Shaqadud midden Mesolithic

Pl.115: Zoned impressed: Shaqadud Cave

Pl.116: Plain black slipped: Shaqadud Cave

Pl.117: Zoned impressed: Shaqadud Cave

Pl. 118: Wiped surface: Shaqadud Cave



Pl.119: Criss-cross: Shaqadud Cave

Pl.120: Fingernail impression: Shaqadud Cave

Pl.121: Hachured grooves: Shaqadud Cave

Pl.122: Fracture-colours: Shaqadud midden Mesolithic

Pl.123: Fracture-colours: Shaqadud midden Mesolithic

Pl.124: Fracture-colours: Shaqadud Cave