APPENDIX 1

RAW DATA: STAKEHOLES BENEATH STAKE CIRCLE BARROWS

The barrows are dealt with in the same order as in Chapter 7, and the stake circles are listed from the centre outwards (i.e. Circle A is the innermost circle in each case). Stakeholes belonging to mortuary structures etc. are listed at the end of each barrow.

Surface diameter and depth were noted in the field; intervals between stakes were measured from the plans and are therefore less precise. All measurements are given in millimetres. Where checked, all the holes were found to be pointed, reflecting the shape of the stake.

BRENIG 42

<u>Circle A</u>

No.	Surface Diameter	Depth from OGS	Interval	Remarks
A1	90	220	500 from A94	Earth fill.
A2	90	150	500	Void
A3	80	190	600	"
A4	90	190	400	"
A5	90	240	500	"
A6	90	180	400	"
A7	90	160	500	Earth fill.
A8	80	190	450	Earth fill, inclined outwards.
A9	70	240	500	"
A10	70	200	400	"
A11	90	170	450	"
A12	80	170	400	"
A13	80	200	400	"
A14	90	260	450	"
A15	120	230	450	"
A16	80	260	400	"
A17	90	250	500	"
A18	100	310	450	Void
A19	110	320	400	Earth fill, inclined outwards.
A20	100	2[illegible]	450	Void

No.	Surface Diameter	Depth from OGS	Interval	Remarks
A21	75	190	600	Earth fill.
A22	90	460	400	Void
A23	60	250	450	Void
A24	Trial trench		650	Earth fill.
A25	Trial trench		450	"
A26	120	230	450	Void
A27	70	280	550	"
A28	80	235	450	"
A29	80	250	450	"
A30	100	250	500	"
A31	80	260	550	"
A32	100	240	400	"
A33	90	270	550	Void, inclined outwards.
A34	110	350	400	"
A35	90	280	350	"
A36	80	250	350	"
A37	100	300	400	"
A38	50	230	800	"
A39	90	340	400	Void, inclined outwards.
A40	90	360	450	" " "
A41	60	270	450	" " "
A42	60	290	550	" " "
A43	60	200	450	" " "
A44	70	190	500	Earth fill.
A45	90	260	600	"
A46	70	190	500	"
A47	70	150	450	"
A48	60	230	450	"
A49	70	200	450	"
A50	70	240	550	"
A51	70	280	450	"
A52	80	250	450	"
A53	60	210	350	"
A54	80	160	500	"
A55	90	330	400	"
A56	90	230	350	"
A57	90	190	400	"
A58	80	290	450	"
A59	60	110	550	"
A60	70	110	450	"
A61	80	130	400	"
A62	80	110	450	"
A63	60	130	500	"
A64	60	90	450	"
A65	60	80	500	"
A66	70	165	400	"
A67	60	80	500	"
A68	Trial trench		400	"
A69	Trial trench		400	"
A70	Trial trench		400	"
A71	70	170	450	"

No.	Surface Diameter	Depth from OGS	Interval	Remarks
A72	70	210	500	Earth fill.
A73	80	220	450	"
A74	60	215	500	"
A75	80	220	500	"
A76	80	240	400	"
A77	70	210	500	"
A78	90	280	450	"
A79	80	230	400	"
A80	90	280	500	"
A81	90	250	400	"
A82	80	210	500	"
A83	80	200	400	Earth fill, inclined outwards.
A84	60	110	450	"
A85	90	210	450	"
A86	80	165	350	"
A87	80	210	450	"
A88	80	200	550	"
A89	70	200	450	"
A90	70	170	450	"
A91	80	185	350	"
A92	80	190	400	"
A93	80	175	450	"
A94	90	190	450	"

<u>Circle B</u>

No.	Surface Diameter	Depth from OGS	Interval	Remarks
B1	60	190	-	Earth fill.
B2	70	220	450	"
B3	80	220	550	Void
B4	70	200	400	"
B5	80	230	500	"
B6	70	230	500	"
B7	70	220	500	"
B8	70	210	450	"
B9	70	210	500	"
B10	70	250	400	"
B11	70	200	500	"
B12	80	210	500	"
B13	70	240	450	"
B14	70	200	500	"
B15	60	190	400	"
B16	60	140	500	"
B17	60	170	450	"
B18	60	180	550	Void, inclined outwards.
B19	60	170	400	"
B20	50	170	450	"
B21	60	170	500	"

No.	Surface Diameter	Depth from OGS	Interval	Remarks
B22	80	180	400	Earth fill.
B23	60	160	400	Void
B24	70	240	450	Earth fill.
B25	70	200	500	Earth fill.
B26	60	160	500	"
B27	50	220	400	Void
B28	70	200	500	Earth fill.
B29	80	170	500	"
B30	70	160	450	"
			Long intervals ignored, incomplete fence.	
B31	70	290	-	Earth fill.
B32	80	290	400	"
B33	80	320	550	"
B34	70	320	400	"
B35	Trial trench		500	"
B36	Trial trench		450	"
B37	Trial trench		450	"
B38	80	310	400	"
B39	80	280	450	"
B40	90	280	400	"
B41	70	250	450	Void
B42	70	310	400	"
B43	60	240	450	Earth fill.
B44	60	250	350	"
B45	80	220	500	"
B46	60	240	350	"
B47	60	250	Long	"
B48	70	220	450	"
B49	60	210	500	"
B50	70	240	350	"
B51	70	210	500	"
B52	70	200	450	"
B53	70	180	450	"
B54	70	190	450	"
B55	70	230	350	"
B56	70	270	500	"
B57	100	300	550	"
B58	80	280	450	"
B59	80	340	450	"
B60	80	270	500	"
B61	70	280	450	"
B62	60	190	Long	Void
B63	50	130	-	Earth fill.
B64	60	150	550	"
B65	60	150	400	"

Stakehole arc in Southeast Quadrant

No.	Surface Diameter	Depth from OGS	Interval	Remarks
a	120x100	380	-	D-shaped, earth and charcoal fill.
b	120x100	250	950	D-shaped, earth and charcoal fill.
c	100	210	1000	Earth and charcoal fill.
d	100	340	900	" " " "
e	100	310	550	" " " "

Quadrilateral of Stakeholes in the Southeast Quadrant

No.	Surface Diameter	Depth from OGS	Interval	Remarks
f	80	210	-	Void
g	90	270	-	"
h	70	120	-	"
i	70	120	-	"

The Mortuary Structure

No.	Surface Diameter	Depth from OGS	Interval	Remarks
a	100	230	-	Void
b	80	150	-	Void with traces of charcoal.
c	80	175	-	Plugged with charcoal.
d	80	235	-	Earth fill.
e	80x60	160	-	D-shaped, plugged with charcoal.
f	90x50	160	-	D-shaped, plugged with charcoal.
g	80	200	-	Earth fill.

BRENIG 41

The fill of some stakeholes in all three circles was examined by Dr Helen Keeley, and her comments are included here. In general, the samples from Circles A and B repeatedly showed woody structures partly replaced by iron oxides, suggesting that the wood had decayed in situ. This phenomenom was not found in Circle C.

Circle A

No.	Surface Diameter	Depth from OGS	Interval	Remarks
A1	100	200	550 from A41	-
A2	90	260	550	Slight slope.
A3	100	240	500	Wood traces, unidentifiable. Sample was dark brown (10YR4/3) structureless silt loam containing 5% yellowish red (5YR4/8) iron-replaced wood and stones up to 20 mm (10%).
A4	80	200	500	Wood traces.
A5	80	90	550	Charcoal flecks.
A6	60	180	600	Slight slope, sample as A3.
A7	70	140	500	-
A8	60	140	300	-
A9	70	160	250	Sample as A3.
A10	80	150	400	Charcoal flecks.
A11	90	160	550	-
A12	90	190	500	Appeared in lower 0.06 m of turf.
A13	80	120	450	Appeared in lower 0.06 m of turf, Sample as A3.
A14	80	120	450	Appeared in lower 0.06 m of turf.
A15	90	210	450	Appeared in lower 0.06 m of turf.
A16	80	140	550	Wood traces. Sample was dark brown (7.5YR4/4) silt loam with weak blocky structure and 10% yellowish red (5YR4/8) iron-replaced wood; stones up to 40 mm (10%).
A17	70	100	350	Charcoal flecks.
A18	40	120	450	-
A19	80	200	550	Appeared in lower 0.03 m of turf. Sample was yellowish brown (10YR5/4) silt loam with high iron-replaced wood content (40%) and 15% stones up to 40 mm.

No.	Surface Diameter	Depth from OGS	Interval	Remarks
A20	60	200	600	Wood traces; appeared in lower 0.03 m of turf; wood fragments from hole identified as hazel; sample as A19.
A21	60	130	400	Slight slope; appeared in lower 0.10 m of turf; wood fragment in tip of stakehole identified as hazel.
A22	50	110	450	-
A23	60	130	350	Oval section, wood traces. Sample was yellowish brown (10YR5/6) structureless silty loam containing stones up to 10 mm (5%) and small pieces (5 mm) of woody material.
A24	50	220	400	Appeared as a void in the shale upcast from the grave-pit; sample as A23.
A25	70	150	650	Wood traces. Sample was dark greyish brown (10YR4/2) structureless silt loam containing stones up to 20 mm (20%) and partly iron-replaced woody material (30%).
A26	70	200	350	Wood traces; sample as A25.
A27	80	200	400	Slight slope.
A28	90	200	650	Wood traces.
A29	100	220	550	-
A30	80	100	600	Sample as A25.
A31	90	180	600	Wood traces. Sample was dark brown (10YR3/3) silt loam containing aggregates of dark reddish brown (5YR3/4) material (possibly replacement of wood by iron oxides or iron pan) and stones up to 25 mm (10%).
A32	80	200	650	Wood traces, analysis suggests it was probably oak. Sample as A25.
A33	110	200	450	Sample was grey (5YR6/1) silt loam without structure but with strong brown, distinct, fine mottles and stones up to 40 mm (30%).
A34	100	220	400	Sample as A33.
A35	90	230	400	Sample as A33.
A36	90	110	450	-
A37	70	220	500	Wood traces. Sample was dark brown (10YR3/3) silt loam with fragments of strong brown oxidised parent material (shale), blocky structure, few stones up to 10 mm (1%) and small wood particles with some iron replacement.
A38	60	200	400	Appeared in lower 0.10 m of turf; wood traces.

No.	Surface Diameter	Depth from OGS	Interval	Remarks
A39	100	200	350	Appeared in lower 0.06 m of turf; what were thought to be wood traces revealed on analysis no recognisable wood remains.
A40	70	280	550	Appeared in lower0.06 m of turf; wood traces; slight slope. Sample was dark yellowish brown (10YR4/4) silt loam with angular structure, containing large wood fragments, partly iron-replaced, and few stones up to 10 mm (1%).
A41	70	200	400	Slight slope.

Circle B

No.	Surface Diameter	Depth from OGS	Interval	Remarks
B1	80	130	500 from B56	Vertical. Sample was dark greyish brown (10YR4/2) structureless silty clay loam with small specks (1 mm diameter) of white (10YR8/1) material. Yellowish red (5YR4/8) iron-replaced wood was present (5%), also stones up to 30 mm (10%) and rare fine roots.
B2	70	170	400	Appeared in lower 0.04 m of turf; slight slope.
B3	90	140	550	Appeared in lower 0.07 m of turf; slight slope.
B4	70	190	500	Appeared in lower 0.03 m of turf; slight slope; wood fragment from fill 'possibly hazel'. Sample was yellowish brown (10YR5/4) silt loam, structureless and with 5% yellowish red (5YR4/8) iron-replaced wood; stones up to 30 mm (10%).
B5	70	170	550	Appeared in lower 0.04 m of turf; vertical.
B6	90	150	550	Appeared in lower 0.03 m of turf; slight slope.
B7	60	160	450	Appeared in lower 0.06 m of turf; vertical.
B8	50	170	550	Vertical. Sample was dark brown (10YR3/3) structureless silty clay loam containing 15% stones up to 30 mm and 1% yellowish red (5YR4/8) iron-replaced wood.

No.	Surface Diameter	Depth from OGS	Interval	Remarks
B9	70	150	500	Appeared as soft iron pan ring; wood traces, slight slope. Sample was yellowish brown (10YR5/8) structureless silt loam containing 10% stones up to 20 mm and 1% iron-replaced wood.
B10	70	170	550	Slight slope. Sample was very dark greyish brown (10YR3/2) silt loam with a high organic content (woody material) but no iron replacement. Structure was weak, fine, blocky with 5% stones up to 15 mm and rare, fine roots present.
B11	50	220	550	Appeared in lower 0.06 m of turf; vertical.
B12	60	100	500	Slight slope.
B13	80	120	450	Appeared as soft ring of iron pan, slight slope. Sample was yellowish brown (10YR5/4) silt loam with weak blocky structure containing 15% large fragments of iron-replaced wood (up to 40 mm) and 5% stones up to 15 mm.
B14	70	120	500	As B13, but vertical.
B15	100	130	550	Slight slope.
B16	110	190	500	Sample as B8.
B17	110	180	600	Appeared in lower 0.06 m of turf, near vertical. Sample as B8.
B18	90	130	450	Appeared in lower 0.05 m of turf; slight slope.
B19	80	130	500	Slight slope; sample as B8.
B20	80	130	500	As B19.
B21	110	130	450	As B19.
B22	120	150	500	As B19. Sample was a dark brown (10YR4/3) structureless silt loam containing 15% stones up to 40 mm and 10% very dark grey (10YR3/1) rotting organic matter. Iron replacement of wood was present but rare.
B23	140	130	500	Irregularly oval mouth, vertical.
B24	100	120	550	Near vertical.
B25	100	130	500	Oval mouth, slight slope.
B26	90	180	500	Slight slope.
B27	60	170	500	As B26, wood traces. Sample as B22.
B28	50	180	500	Slight slope.
B29	30	100	550	As B28.
B30	80	70	450	Vertical. Sample was yellowish brown (10YR5/4) structureless silty loam containing 10% stones up to 25 mm, fine roots but no wood present.
B31	80	160	450	Appeared in lower 0.02 m of turf; Slight slope.

No.	Surface Diameter	Depth from OGS	Interval	Remarks
B32	60	170	550	Appeared in lower 0.04 m of turf; ?wood traces, vertical.
B33	60	110	450	As B32, but slight slope. Sample as B30.
B34	80	150	500	As B33.
B35	80	180	600	Slight slope.
B36	80	170	450	Slight slope. Sample was dark brown (10YR3/3) structureless silt loam containing 1% yellowish red (5YR4/8) iron-replaced wood, 10% stones up to 30 mm and fine roots.
B37	80	160	600	As B36, wood traces. Sample was dark brown (7.5YR4/4) structureless silt loam containing rare (1%) yellowish red (5YR4/8) iron replacement of wood, 5% stones up to 20 mm and fine roots.
B38	80	260	450	As B37. Sample was structureless and consisted of yellowish red (5YR4/8) iron-replaced wood with patches of yellowish brown (10YR5/4) silt loam, stones up to 20 mm (10%).
B39	80	320	500	As B37.
B40	100	300	650	Oval mouth, slight slope.
B41	100	230	550	Appeared in lower 0.05 m of turf; vertical; ?wood traces. Sample was dark brown (10YR4/3) with patches of brownish yellow (10YR6/8) silty clay loam. Iron replacement of wood was noted, fine roots were present and stones up to 30 mm (10%).
B42	100	230	500	Appeared in lower 0.035 m of turf; slight slope.
B43	90	230	500	Appeared in lower 0.04 m of turf; vertical.
B44	100	280	450	Slight slope.
B45	90	210	350	Appeared in lower 0.06 m of turf; slight slope; wood traces. Sample was brown (10YR5/3) silty clay loam with weak crumb structure, friable and containing much very dark greyish brown (10YR3/2) woody material - partly iron-replaced - 5% stones up to 20 mm.
B46	90	200	500	Vertical.
B47	80	260	450	Appeared in lower 0.06 m of turf; vertical.

No.	Surface Diameter	Depth from OGS	Interval	Remarks
B48	70	270	400	Appeared in lower 0.05 m of turf; slight slope; charcoal flecks and wood traces. Sample was very dark grey (10YR3/1) friable silty clay loam with weak crumb structure, a high woody content, fine roots present, iron replacement absent and stones up to 15 mm (10%).
B49	80	250	450	As B48, no charcoal.
B50	80	250	400	Appeared in lower 0.03 m of turf; oval mouth, slight slope, wood traces. Sample as B8.
B51	60	280	500	Appeared in lower 0.04 m of turf; slight slope; what were thought to be wood traces revealed on analysis no recognisable wood remains.
B52	70	200	550	Slight slope, wood traces, probably hazel.
B53	70	190	400	As B52 and ?wood traces.
B54	100	260	550	Appeared in lower 0.04 m of turf; slight slope. Sample as B45.
B55	60	170	450	Appeared in lower 0.03 m of turf; slight slope, wood traces, charcoal flecks.
B56	50	140	600	Appeared in lower 0.04 m of turf; vertical.

<u>Circle C</u>

No.	Surface Diameter	Depth from OGS	Interval	Remarks
C1	60	110	450 from C82	Slight slope to NW. Sample was yellowish brown (10YR5/6) structureless silt loam with 10% stones up to 30 mm and no evidence of wood.
C2	60	110	450	Very slight outward slope.
C3	50	110	500	Sample was strong brown (7.5YR5/8) structureless sandy silt loam containing 10% stones up to 20 mm and very small (2 mm) pieces of very dark greyish brown (10YR3/2) woody material.
C4	80	260	150	Slight outward slope.
C5	70	190	500	Slight outward slope. Sample as C1.
C6	50	140	550	Slight outward slope.
C7	50	110	900	-
C8	70	160	550	Slight outward slope.
C9	50	160	600	Slight inward slope. Sample as C13.
C10	60	130	600	-

No.	Surface Diameter	Depth from OGS	Interval	Remarks
C11	70	170	600	-
C12	70	120	450	-
C13	60	150	450	Sample was a dark yellowish brown (10YR4/4) structureless silty loam containing rare wood fragments and stones up to 40 mm (15%).
C14	50	110	550	-
C15	60	150	550	-
C16	80	110	600	Sample as C13.
C17	70	140	500	-
C18	120x60	180	500	Oval mouth. Sample as C13.
C19	70	230	500	-
C20	70	220	650	Slightly oval.
C21	70	230	650	Sample as C13.
C22	60	180	600	-
C23	60	120	550	Sample was a dark brown (10YR4/3) structureless silt loam with 1% strong brown mottles, stones up to 10 mm (5%) but wood absent.
C24	50	70	600	-
C25	50	110	550	-
C26	50	160	650	Sample as C13.
C27	60	150	500	-
C28	60	120	550	-
C29	40	80	650	-
C30	70	90	550	Sample as C23.
C31	60	70	400	-
C32	50	70	700	Charcoal flecks.
C33	40	60	500	-
C34	60	110	550	-
(C35)	70	60	450	Somewhat uncertain (shallow hole).
C36	50	80	600	Sample as C1.
C37	60	160	600	-
C38	60	140	500	-
C39	90	180	550	Sample as C13.
C40	70	150	500	Slight inward slope with flecks of charcoal.
C41	100x60	150	500	Oval.
C42	80	180	500	-
C43	70	130	650	Charcoal flecks.
C44	50	90	450	Sample as C13.
C45	50	130	400	-
C46	50	110	650	-
C47	50	110	500	Sample as C13.
C48	70	110	500	-
C49	70	130	450	-
C50	70	140	600	Sample as C13.
C51	70	150	600	-
C52	70	160	450	-
C53	60	180	600	-
C54	70x40	240	500	Oval, charcoal flecks. Sample as C13.

No.	Surface Diameter	Depth from OGS	Interval	Remarks
C55	70	180	350	-
C56	70	280	600	-
C57	80	230	550	-
C58	50	190	450	Sample as C13.
C59	50	220	500	-
C60	70	230	450	-
C61	70x50	170	550	Slightly oval. Sample as C13.
C62	70	120	550	-
C63	70	150	550	Sample as C13.
C64	60	120	450	-
C65	140	150	500	-
C66	70	120	500	-
C67	70x50	140	500	Slightly oval with a slight outward slope; ?wood traces. Sample as C13.
C68	60	160	450	-
C69	60	200	500	-
C70	60	170	500	Very slight inward slope.
C71	60	160	500	-
C72	60	170	500	Charcoal flecks.
C73	90	180	450	Charcoal flecks. Sample was brown (10YR4/3) structureless silty clay loam containing stones up to 40 mm (10%), and charcoal with coatings of dark brown (10YR3/3) material.
C74	80	170	500	Charcoal flecks.
C75	80	290	600	Charcoal flecks.
C76	70	380	500	Charcoal flecks.
C77	130x80	320	500	Oval, charcoal flecks. Sample was very dark greyish brown (10YR3/2) structureless silt loam containing 30% stones up to 40 mm and small charcoal flecks.
(C78)	50	50	200	Pocket of soft pebbly yellowish clay in subsoil, ?stakehole.
C79	50	110	450	Charcoal flecks.
C80	50	150	450	-
C81	50	170	750	?wood traces. Sample as C13.
C82	60	230	700	Charcoal flecks.

BRENIG 40

Circle A

All stakeholes were circular with a fill containing flecks of charcoal etc. They inclined slightly outwards unless otherwise stated. The contents of some stakeholes were sampled by Dr Helen Keeley, and the results of her analysis are included here. The average diameter of each hole is given.

No.	Surface Diameter	Depth from OGS	Interval	Remarks
A1	50	180	550 from A29	Sample was predominantly pale brown (10YR6/3) silty clay with weak, fine blocky structure, containing isolated specks of dark red (2.5YR3/6) iron-replaced wood and pockets of dark greyish brown (10YR4/2) silty clay. (The fine pale brown - 10YR6/3 - material appeared to be the weathered product of the soft shale fragments noted in the samples).
A2	60	150	400	-
A3	50	200	700	-
A4	70	210	700	Sample was a dark brown (7.5YR4/4) silty clay loam containing specks of dark red (2.5YR6/3) iron-replaced wood and pale brown (10YR6/3) silty clay with 10% stones up to 20 mm.
A5	70	220	400	-
A6	70	230	500	-
A7	80	190	500	Sample consisted of a dark reddish brown (5YR3/2) structureless silty clay loam containing isolated specks of dark red (2.5YR6/3) and pale brown (10YR6/3) material and 5% stones up to 20 mm.
A8	100	230	500	-
A9	90	280	650	-
A10	90	270	500	Sample as A7.
A11	90	300	650	Void
A12	80	330	550	Void

No.	Surface Diameter	Depth from OGS	Interval	Remarks
A13	80	180	400	Sample was greyish brown (10YR5/2) silty clay with coatings and stainings of reddish brown (5YR4/4) and pieces of dark reddish brown (5YR3/3) iron-replaced wood. Structure was weak blocky, roots were present, and stones up to 25 mm (30%).
A14	90	190	500	Oval mouth.
A15	80	140	550	Vertical, appeared as void in 0.15 m of turf.
A16	70	240	600	Vertical. Sample as A13.
A17	120	240	500	Oval mouth, void.
A18	120	360	550	-
A19	110	170	750	Oval mouth, void, no charcoal. Sample was structureless silty clay loam, dark yellowish brown (10YR4/4) in overall colour, containing specks of pale brown (10YR6/3) silty clay and large fragments (up to 40 mm) of iron-replaced wood (dark red - 2.5YR6/3).
A20	110	210	550	Oval mouth.
A21	100	250	450	-
A22	70	180	550	Vertical, no charcoal. Sample similar to A19 but contained no fragments of iron-replaced wood.
A23	110	220	650	Oval mouth, no charcoal.
A24	60	200	550	No charcoal.
A25	80	220	700	No charcoal. Sample consisted of pale brown (10YR6/3) structureless silty clay with patches of dark greyish brown mottles (7.5YR5/6); roots were present (5%) and 10% stones up to 40 mm.
(A26)	80	?	550	Doubtful, stony patch of ground.
A27	80	160	500	Appeared at 0.40 m high in turf mound, wood fragments identified as probably oak, partly void. Sample was dark reddish brown (5YR3/4) structureless silty clay loam containing 5% strong brown mottles, 25% stones up to 50 mm and specks of pale brown (10YR6/3) silty clay.
A28	70	180	600	No charcoal, vertical.
A29	70	180	650	No charcoal, vertical.

Circle B

All stakeholes were vertical and filled. They appeared at the level of the old ground surface unless otherwise stated. Average diameter measurements given.

No.	Surface Diameter	Depth from OGS	Interval	Remarks
B1	70	150	550 from B47	Sample was a brown (10YR5/3) silty clay loam with 5% fine strong brown (7.5YR5/6) mottles and pockets of dark brown (10YR4/3) silty clay loam. It had a weak fine blocky structure; 15% stones up to 30 mm and fine roots were present.
B2	110	170	500	Oval mouth, upper half void. Sample was dark greyish brown (10YR4/2) silty clay loam with weak blocky structure, 15% stones up tp 30 mm and roots present. Evidence of iron replacement of woody tissue was given by strong brown (7.5YR5/6) fragments.
B3	50	170	450	Upper half void.
B4	90	170	500	Slopes outwards, upper half void; it appeared in lower 0.02 m of turf mound. Sample was dark red (2.5YR3/6) with iron-replaced wood. Roots were present and 5% stones up to 10 mm, also specks of pale brown (10YR6/3) clay, probably from weathering stones.
B5	80	170	650	Oval mouth, upper half void.
B6	90	150	500	-
B7	90	220	550	Oval mouth, upper half void. Sample consisted of very fine pale brown (10YR6/3) material - probably a weathering product - which was structureless and contained iron-replaced wood (7.5YR5/6); also small pockets of dark brown (10YR4/3) silty clay loam. Roots were absent but there were stones (5%) up to 20 mm.
B8	100	150	600	-
B9	60	150	600	Sample contained predominantly iron-replaced wood, structureless and strong brown in colour (7.5YR5/6). Also present was very fine pale brown (10YR6/3) material - probably a weathering product - roots and 10% stones up to 30 mm.

No.	Surface Diameter	Depth from OGS	Interval	Remarks
B10	100	160	550	Slopes outwards. Sample was mostly dark brown (10YR4/3) silty clay loam with some pale brown (10YR6/3) weathered material; structureless, roots present and 10% stones up to 20 mm, small isolated patches of strong brown (7.5YR5/6) material occurred - probably iron-replaced wood.
B11	120	160	500	-
B12	90	150	500	Oval mouth.
B13	70	180	550	-
B14	60	150	600	Slopes outwards.
B15	80	200	550	Sample as B10.
B16	60	180	500	Slopes outwards.
B17	80	210	700	-
B18	80	150	500	Sample was predominantly dark red (2.5YR3/6) indicating replacement by iron oxides, with some pale brown (10YR6/3) weathered material; 10% stones up to 15 mm, roots rare and weak; fine blocky structure.
B19	60	200	450	Oval mouth, appeared as void in lower 0.10 m of turf mound; lower part filled.
B20	80	280	550	As B19.
B21	70	220	550	As B19. Sample as B18.
B22	60	200	600	As B19.
B23	70	240	600	As B19.
B24	70	230	650	Sample as B18.
B25	70	190	500	Void, slopes outwards; traced up to 0.75 m into mound; traces of hurdling between B25 and B26.
B26	90	250	600	As B25.
B27	100	290	600	Partly void. Sample was predominantly pale brown (10YR6/3) weathered silty clay with fine blocky structure and some patches of dark red (2.5YR3/6) iron replacement.
B28	70	220	500	-
B29	80	240	700	-
B30	80	260	600	Sample as B27.
B31	90	220	700	Upper 0.15 m void, remainder loose yellow clay fill, oval. Traced to height of 0.40 m into mound.
B32	90	220	600	Slopes outwards; as B31.
B33	90	270	650	Appeared as void, lower part filled; traced to 0.40 m into mound. Sample as B18.
B34	80	230	450	Oval mouth. Sample was similar to B27 but was structureless and contained 15% stones up to 20 mm.

No.	Surface Diameter	Depth from OGS	Interval	Remarks
B35	90	220	500	-
B36	80	220	550	Stake was irregularly shaped, only lower 120 mm of hole was vertical; charcoal fragment at depth of 50 mm.
B37	70	220	600	Slopes outwards, upper 100 mm void. Sample as B18.
B38	70	200	600	Oval; appeared as shallow void.
B39	120	180	550	Irregularly shaped hole plugged on one side with yellow clay.
B40	80	150	600	-
B41	70	200	550	Irregularly shaped hole, appeared as shallow void. Sample was very dark greyish brown (10YR3/2) silty clay with small specks of dark red (2.5YR3/6) iron replacement, containing 5% stones up to 20 mm and aggregates of pale brown (10YR6/3) weathering material. Structure was weak fine blocky.
B42	60	180	550	-
B43	70	150	500	-
B44	80	150	550	-
B45	100	180	400	Oval mouth; void, lower part filled. Sample was dark brown (7.5YR4/4) structureless silty clay loam with aggregates of pale brown (10YR6/3) silty clay and 25% stones up to 30 mm.
B46	80	150	400	Oval mouth, partly void.
B47	70	160	500	Oval mouth, partly void.

Circle C

All stakeholes were circular, vertical and filled unless otherwise stated. Average diameters given.

No.	Surface Diameter	Depth from OGS	Interval	Remarks
C1	90	110	600 from C66	Sample was dark brown silty clay loam (7.5YR4/4) with weak blocky structure, containing 15% aggregates of light brownish grey (10YR6/2) silt, patches (10%) of dark red (2.5YR3/6) iron-replaced wood and 5% stones up to 25 mm.
C2	70	110	450	Slopes outwards.

No.	Surface Diameter	Depth from OGS	Interval	Remarks
C3	110	160	700	Sample was predominantly very dark greyish brown (10YR3/2) silty clay containing pieces and flecks of charcoal, strong brown fine mottles (5%), patches of light brownish grey (10YR6/2) silt and 15% stones up to 15 mm.
C4	80	100	600	Sample as C1.
C5	80	150	650	D-sectioned, slight outward slope. Sample was light brownish grey (10YR6/2) silt with weak medium blocky structure containing aggregates of very dark greyish brown (10YR3/2) silty clay (40%), localised patches and flecks of dark red (2.5YR3/6) silty clay and strong brown mottles (10%), stones up to 15 mm were noted (5%).
C6	90	140	650	Slight outward slope. Sample was dark greyish brown (10YR4/2) silty clay with medium weak blocky structure, stones up to 30 mm (20%) and coats and patches of very dark greyish brown (10YR3/2) material.
C7	70	130	700	Irregular shape, slight curve. Sample was dark brown (10YR3/3) structureless silty clay containing patches of dark brown (7.5YR4/4) material, indistinct strong brown mottles (5%) and 10% stones up to 15 mm.
C8	80	100	600	-
C9	80	100	750	Slopes outwards. Sample was dark reddish brown (5YR3/4) structureless silty clay loam containing patches of light brownish grey (10YR6/2) and small flecks of dark red (2.5YR3/6) material, stones up to 10 mm (5%).
C10	70	180	700	As C9. Sample as C9.
C11	120	170	650	As C9.
C12	60	160	650	As C9, some charcoal flecks. Sample was dark reddish brown (5YR3/2) structureless silty clay loam with 5% strong brown mottles, patches of dark red (2.5YR3/6) and 10% stones up to 15 mm.
C13	60	170	700	Slopes outwards. Sample was dark brown (10YR4/3) structureless silty clay loam with patches of light brownish grey (10YR6/2) material and stones up to 40 mm (10%).

No.	Surface Diameter	Depth from OGS	Interval	Remarks
C14	80	170	650	As C13.
C15	100	210	550	Slightly irregular. Sample was dark brown (7.5YR3/2) structureless silty clay containing flecks of dark red (2.5YR3/6) iron-replaced wood, fine roots, aggregates of light brownish grey (10YR6/2) silt and stones up to 10 mm (5%).
C16	80	160	650	Slight outward slope.
C17	70	170	800	As C16.
C18	80	140	600	Sample was a brown (7.5YR4/4) structureless silty clay with patches of dark reddish brown (5YR3/3) iron-rich silty clay (iron-replaced wood) and stones up to 30 mm (15%).
C19	60	100	750	Slight outward slope. Sample was predominantly light brown grey (10YR6/2) structureless silty clay containing flecks of dark red (2.5YR3/6) iron-replaced wood and stones up to 20 mm (20%).
C20	80	280	650	-
C21	70	180	750	Steep outward slope.
C22	100	130	900	Slight outward slope. Sample was dark brown (7.5YR3/2) structureless silty clay containing patches of light brownish grey (10YR6/2) material, less than 5% fine, distinct strong brown (7.5YR5/6) mottles and 10% stones up to 20 mm. Roots were present.
C23	70	100	800	As C22.
C24	70	140	700	Steep (c. 40°) outward slope.
C25	70	100	650	Squarish section. Sample as C15.
C26	80	180	650	Appeared as a void in lower 0.12 m of turf, slopes outwards.
C27	70	190	700	-
C28	90	240	650	Sample was brown (10YR4/3) silty clay with weak crumb structure, patches of light brownish grey (10YR6/2) silt and stones up to 10 mm (5%); faint mottles (1%) were noted, strong brown (7.5YR5/6) in colour.
C29	140x70	230	650	Noticeably oval.
C30	70	250	700	Slight outward slope, some stones in fill.

No.	Surface Diameter	Depth from OGS	Interval	Remarks
C31	70	260	550	Sample was dark brown (7.5YR4/4) silty clay loam with weak blocky structure, containing patches of dark red (2.5YR3/6) iron-replaced wood, aggregates of light brownish grey (10YR6/2) material and stones up to 25 mm (15%).
C32	70	230	600	-
C33	70	270	600	Slightly oval, slopes outwards.
C34	80	210	600	Sample as C28.
C35	80	240	600	Sample was dark red (2.5YR3/6) iron-replaced wood with black (7.5YR2.5/0) interiors.
C36	100	190	500	Slight outward slope.
C37	80	110	600	Somewhat oval, hits rock.
C38	70	230	450	Slight outward slope. Sample as C28.
C39	70	220	600	Outward slope.
C40	80	190	600	Slightly oval, irregular shape.
C41	90	270	600	Sample of upper fill was largely light brownish grey (10YR6/2) structureless silty clay containing patches of dark reddish brown (5YR3/4) iron-replaced wood, fine roots and stones up to 30 mm (15%). Sample of lower fill was light brownish grey (10YR6/2), dark red (2.5YR3/6), and dark brown (7.5YR3/2) silty clay loam with no dominant colour, weak blocky structure and stones up to 5 mm (less than 5%).
C42	80	220	600	Slightly oval.
C43	70	250	550	D-sectioned, slight outward slope.
C44	80	230	500	Sample as C28.
C45	90	190	600	Slopes outwards.
C46	90	220	650	Appeared as void in OGS and at a height of 0.25 m in turf mound. Sample as C41.
C47	80	230	450	Outward slope, void.
C48	70	250	600	Slight outward slope.
C49	70	200	550	-
C50	70	200	450	Slight outward slope. Sample as C19.
C51	70	220	650	-
C52	70	140	500	-
C53	70	170	600	Outward slope, appeared as void 0.07 m into turf mound, contained some iron-replaced wood (unidentifiable). Sample as C41 (upper fill).
C54	70	210	600	Void, somewhat irregular.
C55	80	150	500	Slight outward slope.
C56	60	150	650	Appeared as void 0.06 m into turf.

No.	Surface Diameter	Depth from OGS	Interval	Remarks
C57	70	130	650	Appeared as partial void 0.05 m into turf mound, slight outward slope, wood fragment from iron pan at mouth identified as possibly hazel. Sample as C41 (upper fill).
C58	80	180	600	Appeared as void 0.07 m into turf mound, outward slope.
C59	70	200	700	-
C60	70	220	650	Void
C61	70	200	600	Outward slope, void. Sample was very dark greyish brown (10YR3/2) silt loam with patches of light greyish brown (10YR6/2) structureless silt containing 20% stones up to 40 mm stained with black (10YR2.5/1) film.
C62	70	150	650	-
C63	70	180	650	Flecks of charcoal.
C64	70	130	650	Sample was yellowish brown (10YR5/6) silt loam with weak crumb structure, stones up to 15 mm (30%) and small patches and aggregates of very dark greyish brown (10YR3/2) ashy material.
C65	100	180	500	-
C66	80	220	650	Appeared as void, slopes outwards.

Circle E

All stakeholes were circular, vertical and filled unless otherwise stated. Average diameters given.

No.	Surface Diameter	Depth from OGS	Interval	Remarks
E1	100	300	800 from E67	-
E2	110	310	700	-
E3	90	260	800	-
E4	100	260	750	-
E5	80	260	750	Outward slope.
E6	90	200	650	As E5.
E7	100	240	650	-
E8	100	180	750	-
E9	80	150	800	Slight outward slope.
E10	90	240	750	-
E11	100	220	750	Slight outward slope.
E12	100	350	700	-
E13	100	220	750	-
E14	70	270	750	Slight outward slope.

No.	Surface Diameter	Depth from OGS	Interval	Remarks
E15	80	370	600	-
E16	80	290	650	Sample was a dark reddish brown (5YR3/3) silt loam with weak blocky structure, stones up to 15 mm (10%) and roots present.
E17	80	330	700	-
E18	70	300	950	Sample as E16.
E19	100	380	750	-
E20	90	460	700	-
E21	90	340	750	Slight outward slope.
E22	90	300	750	Sample as E49.
E23	80	290	650	-
E24	90	300	550	-
E25	80	340	700	Sample as E49.
E26	70	230	650	-
E27	90	260	800	Slight outward slope, with charcoal flecks.
E28	90	300	800	Sample was dark brown (10YR4/3) silty clay loam with weak, medium crumb structure, 5% strong brown mottles (7.5YR5/6), 20% stones up to 40 mm and roots rare.
E29	90	280	700	Flecks of charcoal.
E30	90	240	700	-
E31	90	230	650	Slight outward slope, some charcoal flecks. Sample was dark brown (10YR4/3) silty clay loam with weak fine crumb structure, 25% stones up to 50 mm and specks of dark reddish brown (5YR3/4) iron-replaced wood.
E32	90	290	650	-
E33	90	260	750	-
E34	90	390	750	Outward slope. Sample was dark brown (7.5YR4/4) silt loam with weak crumb structure containing patches of greyish brown (10YR5/2) silt, distinct medium strong brown (7.5YR5/6) mottles (10%) and stones up to 20 mm (15%).
E35	90	340	700	-
E36	90	300	600	Outward slope.
E37	90	320	650	As E36. Sample as E31.
E38	90	250	700	As E36.
E39	80	270	1100	-
E40	80	260	700	-
E41	80	250	850	Outward slope.
E42	70	320	750	Charcoal flecks.
E43	80	250	850	Outward slope.

No.	Surface Diameter	Depth from OGS	Interval	Remarks
E44	70	210	700	As E43. Sample was a dark brown (7.5YR4/4) structureless silt loam with patches of reddish brown (5YR4/4) iron-replaced wood and stones up to 25 mm (15%).
E45	80	300	1000	As E43.
E46	120x70	210	700	Noticeably oval mouth.
E47	120	180	750	-
E48	80	270	800	-
E49	100	260	700	Outward slope. Sample was brown (10YR4/3) structureless silt loam containing patches of light brownish grey (10YR6/2) material, stones up to 50 mm (20%) and distinct fine strong brown (7.5YR5/6) mottles.
E50	80	280	750	Sample was greyish brown (10YR5/2) structureless silt loam containing 5% fine distinct strong brown (7.5YR5/6) mottles and stones up to 30 mm (15%).
E51	80	320	800	-
E52	70	300	850	Sample consisted of aggregates of light brownish grey (10YR6/2) silt loam with brown coatings (10YR4/3); fine distinct strong brown (7.5YR5/6) mottles and stones up to 30 mm (15%); weak blocky structure.
E53	120x70	280	750	Oval mouth.
E54	60	230	650	-
E55	70	170	900	Sample as E50.
E56	80	180	700	-
E57	80	280	750	-
E58	70	350	700	Slopes outwards. Sample as E49.
E59	80	360	600	As E58.
E60	90	250	750	As E58.
E61	80	280	650	As E58. Sample as E50.
E62	80	250	700	As E58.
E63	70	240	650	As E58.
E64	90	280	850	Slight outward slope.
E65	70	190	950	-
E66	120	320	600	Upper half void.
E67	110	360	700	Sample as E49.

Arc D

Circular and vertical unless otherwise stated.

No.	Surface Diameter	Depth from OGS	Interval	Remarks
D1	90	230	-	Slight outward slope.

No.	Surface Diameter	Depth from OGS	Interval	Remarks
D2	90	250	800	As D1.
D3	80	150	900	-
D4	80	300	750	Flecks of charcoal. Sample was dark brown (7.5YR4/4) silt loam with poor blocky structure, stones up to 90 mm (25%) and distinct, fine, strong brown (7.5YR5/6) mottles.
D5	70	140	900	-
D6	70	230	900	Sample was a brown (10YR4/3) structureless silt loam containing patches of very dark greyish brown (10YR3/2), strong brown (7.5YR5/6) fine distinct mottles (5%) and stones up to 20 mm (10%).
D7	80	240	850	Slight outward slope.
D8	70	310	750	As D7, some charcoal. Sample as E49.
D9	80	240	750	-
D10	130	130	750	Slight outward slope.
D11	170	290	750	-
D12	90	290	750	Outward slope. Sample was light brownish grey (10YR6/2) structureless silt with strong brown mottles (7.5YR5/6) less than 5%, and 10% stones up to 30 mm. This sample appeared to be derived from weathered shale.

Details of Mortuary Structure at centre of Brenig 40

Stakeholes a-d form the four corners of the structure; their average diameter is 110 mm, rather stouter than most of the stakes in the circles. The distances between them are: a-b = 1.13 m; b-c = 1.26 m; c-d = 1.00 m; d-a = 1.22 m.

Central Stakeholes

No.	Surface Diameter	Depth from OGS	Remarks
a	120	300	Plug of charcoal in the top; vertical; void with a little stony clay and some charcoal at the bottom; stake had been squared.
b	100	190+	Top removed by disturbance, original depth c. 310 mm; vertical; fill of loose grey/brown clay and charcoal.
c	120	190	Found beneath a plank; vertical; bottom contained loose grey/brown clay and charcoal.

No.	Surface Diameter	Depth from OGS	Remarks
d	100	230	First appeared as a void; vertical; bottom contained loose grey/brown clay and charcoal.

e and f are not part of the Mortuary Structure.

e	70	230	Vertical; grey/brown clay fill.
f	60-90	180	Ill-defined, doubtful stakehole, oval mouth, brown clay fill.

Details of Planks and Timbers

1. 1.00 m x 0.34 m x 20 mm. Resting on clay and turves.
2. 0.60 m x 0.30 m x 20 mm. Resting on clay and turves.
3. 0.25 m x 0.13 m x 15 mm. Resting on clay and turves.
4. 0.29 m x 0.07 m x 10 mm. Lying on OGS.
5. 0.21 m x 0.12 m x 15 mm. Lying on OGS.
6. 0.25 m x 0.08 m x 20 mm. Lying on OGS.

Analysis of Stakehole Fill

The contents of Stakeholes b, c and d of the Mortuary Structure were examined in laboratory conditions. The sample from b had a matrix colour grey (5YR6/1), masked by high charcoal and organic matter content which gave the sample an overall colour of 10YR3/2 (very dark greyish brown). The soil material was structureless silty loam containing 1% indistinct strong brown fine mottles and 20% stones up to 20 mm. It was not a natural soil, being a mixture of charcoal, stone and fine soil possibly washed into the stakeholes. Most of the wood was in the form of charcoal, so it was not possible to say that the post had decayed in situ. These comments also apply to samples from Stakeholes c and d which were yellowish brown (10YR5/6) silty loam (with the colour masked by charcoal), with a weak medium angular blocky structure and containing 15% stones up to 20 mm.

BRENIG 45

All the stakeholes appeared as empty holes in the old ground surface unless otherwise stated.

Stakeholes in Central Area (a)

No.	Surface Diameter	Depth from OGS	Interval	Remarks
a1	80	280	-	-
a2	100	240	-	-
a3	80	300	-	Survived 0.05 m into turf mound.
a4	80	300	-	-
a5	110x90	230	-	-

Circle A

No.	Surface Diameter	Depth from OGS	Interval	Remarks
A1	80	150	450 from A26	-
A2	80	320	550	-
A3	60	180	500	-
A4	80	200	350	Survived 0.10 m into turf mound.
A5	90	110	550	Survived 0.18 m into turf mound.
A6	80	100	450	Survived 0.19 m into turf mound.
A7	90	280	300	-
A8	90	220	450	-
A9	80	200	450	-
A10	90	200	400	-
A11	75	190	350	Flint flake embedded in side.
A12	70x85	230	450	-
A13	85x55	170	500	-
A14	80	140	400	-
A15	80	190	350	-
A16	80	160	400	-
A17	60	160	350	-
A18	70	150	250	-
A19	80	180	400	-
A20	90	220	400	-
A21	70	230	450	-
A22	90	240	500	-
A23	80	230	400	-
A24	80	240	400	-

No.	Surface Diameter	Depth from OGS	Interval	Remarks
A25	70	210	450	-
A26	80	200	400	-
A27	140	160		Lies just north of the circle.

Circle B

No.	Surface Diameter	Depth from OGS	Interval	Remarks
B1	90	430	450 from B38	-
B2	100	420	450	-
B3	100	405	450	-
B4	125	410	500	-
B5	100x80	420	400	-
B6	90	360	500	-
B7	90	320	500	-
B8	80	290	500	Survived 0.62 m into turf mound.
B9	70	230	350	Survived 0.15 m into turf mound.
B10	70	290	400	Survived 0.40 m into turf mound.
B11	90	290	400	-
B12	80x110	310	450	-
B13	90	190	350	-
B14	90	230	450	-
B15	100	320	450	-
B16	90	320	400	-
B17	80	240	500	Survived 0.16 m into turf mound.
B18	90	290	500	Survived 0.18 m into turf mound.
B19	105x90	375	450	-
B20	100	280	450	-
B21	100	340	450	-
B22	80	280	450	-
B23	90	280	450	-
B24	75x110	245	350	-
B25	80	300	350	-
B26	80	260	550	-
B27	75x85	240	500	-
B28	70	230	500	-
B29	70	240	350	-
B30	70	340	550	-
B31	80x110	300	500	Survived 0.16 m into turf mound.
B32	80	250	450	Survived 0.05 m into turf mound.
B33	95	300	450	-
B34	95	310	450	-
B35	100	340	600	-
B36	100	450	600	-
B37	120	400	500	-
B38	100	390	500	-

Circle C

No.	Surface Diameter	Depth from OGS	Interval	Remarks
C1	80	170	600 from C44	-
C2	70	150	600	-
C3	55	170	650	-
C4	60	160	550	-
C5	65	140	600	-
C6	95	180	600	-
C7	70	130	600	-
C8	60	80	650	-
C9	110x90	145	750	-
C10	90	190	650	Survived 0.60 m into turf mound.
C11	90	210	850	Survived 0.47 m into turf mound.
C12	110x150	370	850	-
C13	120	375	650	-
C14	110	250	650	-
C15	130x160	310	700	-
C16	110	310	850	Survived 0.03 m into turf mound.
C17	110	310	700	-
C18	95	320	700	-
C19	105	320	600	-
C20	130	260	500	-
C21	110x90	300	650	-
C22	110	280	700	-
C23	100	260	650	-
C24	105	290	650	-
C25	90	260	600	-
C26	110	280	700	-
C27	110	280	650	-
C28	110	270	500	-
C29	110	290	700	-
C30	100	230	650	-
C31	110	290	700	-
C32	100x120	310	350	-
C33	110	330	750	-
C34	110	290	700	-
C35	120	380	650	-
C36	100	400	500	-
C37	100	290	500	-
C38	90	270	550	-
C39	110	260	550	-
C40	80	180	550	-
C41	100	300	600	-
C42	100	290	550	-
C43	100	290	700	Survived 0.58 m into turf mound.
C44	90	160	650	Survived 0.70 m into turf mound.

Stakeholes outside Stone Wall

No.	Surface Diameter	Depth from OGS	Interval	Remarks
d1	135	310	-	d1-3 are near 'entrance' on N.W.
d2	60	100	-	-
d3	120	430	-	Carbonised wood; iron-replaced bark.
d4	90	200	-	d4-7 may be an overlap of Circle E.
d5	80	250	650	Survived 0.06 m into turf mound.
d6	80	205	600	Survived 0.07 m into turf mound.
d7	60	120	650	-
d8	70	90	-	d8-11 form a 'rectangle' on S.E.
d9	60	80	-	They are slighter than average.
d10	80x90	130	-	-
d11	55	120	-	Outward slope.

Circle E

No.	Surface Diameter	Depth from OGS	Interval	Remarks
E1	60	90	700 from E76	-
E2	60	130	450	-
E3	60	120	350	-
E4	60	100	500	-
E5	50	100	350	-
E6	75	160	500	-
E7	80	150	400	-
E8	80	150	400	-
E9	50	150	600	-
E10	80	190	500	-
E11	70	150	450	-
E12	100	300	500	Survived 0.05 m into turf mound.
E13	70	180	350	-
E14	85	130	450	-
E15	100	270	450	Survived 0.09 m into turf mound.
E16	90	270	500	-
E17	90	270	550	-
E18	80	260	500	-
E19	90	240	650	-
E20	110x80	280	400	-
E21	90	280	650	Survived 0.10 m into turf mound.
E22	110	290	650	Survived 0.09 m into turf mound.
E23	90	360	500	-
E24	90	190	500	-
E25	90	305	500	-
E26	80x90	305	500	-
E27	100	320	550	-
E28	100	190	450	-
E29	95	240	600	-

No.	Surface Diameter	Depth from OGS	Interval	Remarks
E30	70	180	600	-
E31	90	230	500	-
E32	90	230	700	-
E33	80	270	600	-
E34	95	340	600	-
E35	90	350	550	-
E36	65	130	500	-
E37	80	170	600	-
E38	90	260	500	-
E39	80	150	600	-
E40	70	140	550	Survived 0.06 m into turf mound.
E41	100	300	500	Survived 0.08 m into turf mound.
E42	80	180	550	Survived 0.06 m into turf mound.
E43	80x100	230	450	Survived 0.05 m into turf mound.
E44	70x80	140	550	Survived 0.05 m into turf mound.
E45	60	140	500	-
E46	60	90	600	-
E47	85	190	800	-
E48	80	220	650	Survived 0.02 m into turf mound.
E49	90	300	650	Survived 0.03 m into turf mound; small stones around top of hole.
E50	90x105	290	750	Survived 0.03 m into turf mound.
E51	90	290	650	Survived 0.07 m into turf mound.
E52	95x80	210	550	Survived 0.07 m into turf mound.
E53	100x80	220	750	Survived 0.07 m into turf mound.
E54	80	160	750	Survived 0.07 m into turf mound.
E55	80x50	230	650	Survived 0.07 m into turf mound.
E56	65	100	600	Survived 0.07 m into turf mound.
E57	60	110	650	Survived 0.07 m into turf mound.
E58	100	80	700	Survived 0.07 m into turf mound.
E59	80	170	750	Survived 0.07 m into turf mound.
E60	90	220	100	Survived 0.07 m into turf mound.
E61	120	230	550	-
E62	100	220	650	-
E63	100	240	650	-
E64	100	240	600	-
E65	70	250	800	-
E66	110	180	600	-
E67	100	150	400	-
E68	100x120	260	500	Outward slope.
E69	120	240	600	-
E70	110	270	550	Survived 0.05 m into turf mound; outward slope.
E71	100x80	280	600	Survived 0.04 m into turf mound; outward slope.
E72	80	260	500	Survived 0.04 m into turf mound.
E73	90x120	285	450	Inward slope.
E74	80	185	650	-
E75	90	190	450	Survived 0.10 m into turf mound.
E76	150	170	650	

CATALOGUE OF ILLUSTRATED WORKED FLINT AND CHERT IMPLEMENTS

These implements are illustrated in Figs. 3.6-8 and App. 3.1-3 . They comprise all the Mesolithic and Post-Mesolithic implements noted in the Tables and most, but not all, of the Unspecific retouched material. The unretouched material is not individually described here, but a selection is drawn and discussed in Chapter 3 (Fig. 3.5)

MICROLITHS (Fig. 3.6)

Excav. Number	Type (after Jacobi 1978)	Blank	Raw Material	Excavation Context
44:80E	1a	Blade	Black chert	OGS outside ring 5
44:94	?1a	Blade	Black chert	Make-up of inner bank ?
44:169E	? 1a	Blade	Black chert	Deep in OGS outside ring 6
44:150K	? 2a	Blade	Flint, pink	Below BA level, inside ring 5/6
45:151	1a	Blade	Flint	From turf mound
44:96E	5	Bladelet	Flint	Iron pan level = BA surface
53:C3	5	Bladelet	Chert?	Subsoil, Sq. C3
53:B4	5b	uncl.	Flint	Subsoil, Sq. B4
53:A2	? 5	uncl.	Flint	Subsoil. Sq. A2
53:74	5 middle part	uncl.	Flint	Subsoil, 1974 extension
53:C3	? 5	bladelet	Flint	Subsoil, Sq. C3
53:C2	? 5b t/7a2 t	uncl.	Flint	Subsoil, Sq. C2
53:D5	? 5b t/7a2 t	uncl.	Chert	Subsoil, Sq. D5
53:A3	? 5b t ? 7a2 t	uncl.	Flint	Subsoil. Sq. A3
53:F5	? 5 t/7a1 t	uncl.	Flint	Subsoil, Sq. F5
53:H8	? 5b	uncl.	Banded chert	Subsoil, Sq. H8
53:74	5 m	uncl.	Flint, burnt	Subsoil, 1974 extension
53:C8	5 m	uncl.	?Banded chert	Subsoil, Sq. C8 (1975)
53:C7	7a1	Bladelet	Banded chert	Subsoil, Sq. C7 (1975)
53:D1	7a1 point	Bladelet	Flint	Subsoil, Sq. D1
53:F6	7a1	Bladelet	Flint	Subsoil, Sq. F6
53:A4	7a1 p	uncl.	Flint	Subsoil, Sq. A4
53:G8	7a1 p	uncl.	Flint	Subsoil, Sq. G8
53:J5	7a1 p	uncl.	? Banded chert	Subsoil, Sq. J5
53:C4	7a1 tail	? Bladelet	Flint	Subsoil, Sq. C4
53:A1	7a1	? Blade	Flint	Subsoil, Sq. A1
53:H7	7a1 t	uncl.	Flint	Subsoil, Sq. H7
53:H8	7a2	uncl.	Flint	Subsoil. Sq. H8
53:G8	7a2	uncl.	Flint	Subsoil, Sq. G8
53:19	7a2	? Blade	Flint	Subsoil, 1974 extension
44:97C	7a2	? Blade	Flint	Just beneath iron pan = below BA level 5/6
53:A4	7a2	uncl.	Flint	Subsoil, Sq.A4
45:297	7a2	uncl.	? Chert	OGS beneath barrow
53:E6	7a2	uncl.	Flint	Subsoil, Sq. E6
53:K5	7a2	? Blade	Flint	Subsoil, Sq. K5

Excav. Number	Type (after Jacobi 1966)	Blank	Raw Material	Excavation Context
53:C1	7a2	uncl.	Banded chert	Subsoil, Sq. C1
53:B3	7a2 p	uncl.	Banded chert	Subsoil, Sq. B3
53:A1	7a2 p	uncl.	Flint	Subsoil, Sq. A1
53:H7	7a2 p	uncl.	Flint	Subsoil, Sq. H7
53:H6	7a2 p	uncl.	Banded chert	Subsoil, Sq. H6
53:C13	7a2 p	? Blade	Flint	Subsoil, Sq. C13
53:D6	7a2 t	uncl.	Flint	Subsoil, Sq. D6
44:170F	7a2 t	? Bladelet	Banded chert	Topsoil, above outer bank 1
53:G4	7a2 t	Bladelet	Flint	Subsoil, Sq. G4
44:12	9	uncl.	Flint	On surface of ring 1/3
8:20	?	uncl.	Flint	OGS beneath cairn BG 8
44:96F	Uncl.	Blade + str.plat	Flint	OGS, soil truncated in BA 5/6
53:E7	? Unfinished	uncl.	Flint	Subsoil, Sq. E7
53:A12	Uncl. (curved)	uncl.	Banded chert	Subsoil, Sq. A12
53:74	Uncl.	uncl.	Flint	Subsoil, 1974 extension
53:A2	Uncl.	?Blade + str.plat.	? Banded chert	Subsoil, Sq. A2
53:A4	Uncl. frag.	Bladelet	Banded chert	Subsoil, Sq. A4
53:C4	Uncl.	Bladelet	Flint	Subsoil, Sq. C4
53:E7	Uncl.	uncl.	Flint, burnt	Subsoil, Sq. E7
53:E4	Uncl. frag.	uncl.	Flint	Subsoil, Sq. E4
53:C3	Uncl.	? Bladelet	Flint	Subsoil, Sq. C3
53:E5	Uncl. frag.	uncl.	Banded chert	Subsoil, Sq. E5
53:E5	Uncl. frag.	uncl.	Flint	Subsoil, Sq. E5

MICRO BURINS (Fig. 3.7)

Excav. Number	Type	Blank	Striking Platform	Raw Material	Excavation Context
53:B3	Krukowski	Bladelet	Y	? Banded chert	Subsoil, Sq. B3
53:H6	Mid	uncl.	nob	Banded chert	Subsoil, Sq. H6
53:F8	Butt	Blade-like	Y	Flint	Subsoil, Sq. F8
53:E5	Butt	Blade-like	Y	Flint	Subsoil, Sq. E5
53:H6	Butt	Blade-like	Y	Chert	Subsoil, Sq. H6
53:D5	Mid	Blade-like	nob	Banded chert	Subsoil, Sq. D5
53:D3	Mid	uncl.	nob	Flint	Subsoil, Sq. D3
53:G4	Frag.	uncl.	nob	?	Subsoil, Sq. G4
53:A14	Butt (rt. notch)	Bladelet	Y	Banded chert	Subsoil, Sq. A14
44:170B	Butt (rt. notch)	Bladelet	Y	Flint	Topsoil, above outer bank 1
53:E3	Mis-hit	Blade	nob	Flint	Subsoil, Sq. E3
53:A4	?	? Blade-like	nob	Banded chert	Subsoil, Sq. A4
53:E4	Mid	uncl.	nob	Flint	Subsoil, Sq. E4
44:82H	Unsnapped	blade	Y	Black chert	OGS outside ring 5
45:1	?	Blade	nob	Flint	Topsoil
53:A1	? Distal	uncl.	nob	Flint	Subsoil, Sq. A1

MISCELLANEOUS BACKED PIECES (Fig. 3.7)

Excav. Number	Type	Blank	Striking Platform	Raw Material	Excavation Context
53:117	Backed	Blade-like	nob	Banded chert	Subsoil, 1974 extension
53:C1	Backed	Flake	Y	?	Subsoil, Sq. C1
53:J4	? Backed	uncl.	nob	?	Subsoil, Sq. J4
53:E5	Backed	uncl.	Y	?	Subsoil, Sq. E5
44:95	Backed	uncl.	Y	Flint	Make-up of Cairn on W. of ring
53:E6	Backed	? Blade-like	nob	?	Subsoil, Sq. E6
53:D2	Marginal retouch	Bladelet	Y	?	Subsoil, Sq. D2

MESOLITHIC SCRAPERS (Fig. 3.8)

Excav. Number	Type	Retouch Position, Shape, Angle & Type Descriptive comment	Blank	Striking Platform	Raw Material	Excavation Context
44:258	Scraper Double-ended	Distal end rounded; semi-invasive + semi-convergent retouch. Proximal end rounded, more abrupt, less regular retouch.	? Rejuv. flake	Truncated	Black chert	On surface of ring 1/3
44:171J	Scraper	Distal end straight, semi-invasive scaled retouch.	Trimming Flake	Plain	Black chert	Deep in OGS outside ring 6
44/45:19	Scraper	Proximal end irreg. straight, semi-invasive scaled ret.	Trimming Flake	Truncated	Black chert	On surface of mineral soil
53:H7	Scraper end	Rounded end, light retouch	Rejuv. fl.	Truncated	Black chert	Subsoil, Sq. H7
45:169	Scraper end	Convergent retouch on distal end forming rounded contour. Light marginal retouch & ? gloss on L.side.	Blade-like Flake	Narrow lipped	Pale grey Flint	Topsoil
45:194	Scraper end	Convergent retouch on distal end forming straight contour.	Flake	Plain ?	Opaque pale grey/white Flint	Disturbed area
45:126	Scraper (frag.)	Serial flaking through cortex on distal end, forming straight contour.	? Flake	nob (broken)	Opaque ochre Flint, cortex rolled.	Clay capping of barrow
53:A1	Scraper	Abrupt scaled retouch, rounded contour, ¾ circumf. retouched.	Flake	Plain wide	Burnt pebble Flint	Subsoil, Sq. A1
45:130	Scraper Extended end	Abrupt but invasive ?serial flaking on distal end & L. side forming rounded contour.	? Rejuv. flake (thick)	Plain lipped ?	Opaque honey col. Flint	Topsoil
45:311	Scraper (frag.) ? Rejuv. piece	Semi-convergent slightly invasive retouch, becoming marginal on flake round scraper edge.	uncl.	uncl.	Yellow/brown Flint	OGS under barrow
41:2	Denticulate Scraper	R.side & butt end denticulated, edge abrupt serial flaking.	Trimming Flake	nob	Opaque brown Flint, rolled cortex.	Topsoil
45:144	Scraper	Semi-convergent retouch on one end & down one side; some flaking on ventral face.	Indet. ? core	Damaged	Burnt, dark grey Flint ? cortex.	Topsoil
45:58	Scraper ?	Abrupt retouched edge on core frag. forming a rounded contour.	? Core frag.	nob	Banded chert	Unstratified

FINE SERRATED FLAKES (Fig. 3.8)

Excav. Number	Type	Retouch Position, Shape, Angle & Type Descriptive Comment	Blank	Striking Platform	Raw Material	Excavation Context
48:115	Serrated	L.edge finely serrated for middle portion.	Trimming Flake	Plain wide	Rolled pebble Flint, burnt, ½ cortex.	Topsoil, Area 01
45:176	Serrated	Both edges serrated; L edge has line of gloss on teeth, on ventral face.	Blade frag. distal end	nob (broken)	Yellow/brown Flint	Topsoil
45:266	Serrated	L.edge serrated, edge damage on R.side.	Blade frag. distal end	nob (broken)	Pale yellow/ brown Flint Cortex on tip.	From turf mound
45:35	Serrated ?	R.edge prob. serrated but worn.	Blade frag. medial seg.	nob (broken)	Light brown Flint	From turf mound

BURINS (Fig. 3.8)

Excav. Number	Type	Retouch Position Shape, Angle & Type Descriptive Comment	Blank	Striking Platform	Raw Material	Excavation Context
53:20	Burin	Proximal end transversely truncated; one facet; opp. side has sporadic edge damage.	Blade-like Flake	Truncated	Light grey Flint	Subsoil, 1974 extension
45:183	Burin	Proximal end transversely truncated; 2 or ?3 facets.	Flake	Truncated	Opaque white/ yellow Flint, ⅓ cortex, rolled.	Topsoil
45:138	Burin Double ended	Proximal end transversely truncated by retouch; 1 facet. Distal end snapped, 1 facet.	Flake	Truncated	Light brown Flint, ½ cortex, rolled	Topsoil
45:141	Burin	Distal end transversely truncated (slightly concave) 2 or ?3 facets.	Flake	? Plain wide, edge trimmed	Opaque grey Flint, cortex 10%.	Topsoil
53:B13	Burin	Light marginal retouch on R. side, 1 facet.	Trimming flake. Hinge termination	Plain	Orange/brown Flint, cortex 5%	Subsoil, Sq. B13
53:D	Burin	? end retouched, 2 facets.	Flake ?Prep.	nob	Opaque white Flint; cortex 90%, abraded.	Unstratified
44:121B	Burin	Proximal end obliquely truncated by marginal retouch, 1 facet.	Blade-like hinge termination	Truncated	light orange/ brown Flint.	OGS beneath inner bank 5/6
45:85	Burin	Distal end obliquely trimmed by marginal retouch 1 facet.	Blade-like Flake	Linear lipped	Yellow/brown Flint	From turf mound
45:244	Burin ?	Proximal end (striking plat. remnant) transversely retouched by marginal flaking, 1 wide facet.	Flake	Retouched away	Mottled pale grey Flint	From turf mound
14:1	Burin ?	Proximal end lightly trimmed, short facet (? accidental), stepped; damage to R. side.	Flake	nob	Non-pebble, translucent Flint.	OGS beneath cairn
53:D5	Burin ?	Distal end retouched (?) invasive, serial, ? 3 facets. Sporadic irreg. edge damage.	Flake	? lipped	Brown/yellow Flint, old scar corticated.	Subsoil, Sq. D5
48:82	Burin ?	Oblique edge of distal end trimmed by marginal ret. 1 narrow facet (?accidental)	Flake ?trim'ng	Plain	Pale grey Flint, trace of cortex.	Topsoil, Area 01
44.141K	Burin + Scraper	Distal end obliquely retouched, 1 facet; edge 'strengthened'. Proximal end truncated by scraper-like retouch, rounded, marginal ret. on L. edge.	Blade-like flake	Truncated	Orange Flint ⅓ cortex (thick)	OGS beneath inner bank 5/6
44:141A	Burin ?	Distal end obliquely truncated, 1 facet; intersection of facet & flake worn smooth.	Flake	Linear	Orange/brown Flint	OGS beneath inner bank 5/6

TRUNCATED BLADES (Fig. 3.8)

Excav. Number	Type	Retouch Position, Shape, Angle & Type Descriptive Comment	Blank	Striking Platform	Raw Material	Excavation Context
48:766	Truncated Blade	Distal end obliquely truncated by abrupt retouch, scaled. Marginal retouch on L. side.	Blade ?	nob (broken)	Orange/brown Flint	Area 07, midden
48:10	Truncated Blade	Distal end obliquely truncated by abrupt marginal retouch. Inverse light marginal ret. on L. side.	Blade ?	nob (broken)	Yellow/grey Flint	Topsoil, Area 01
51:43	Truncated Blade	Distal end obliquely truncated by abrupt serial flaking; sporadic irreg. spalling on L. side.	Blade-like flake	Plain wide	Dark grey Flint, light cortication, trace fresh cortex.	OGS beneath cairn 5
45:208	Truncated Blade	Distal end obliquely truncated by semi-convergent retouch.	Blade	nob (broken)	Burnt Flint	From turf mound
8:1	Truncated Blade	Distal end obliquely truncated by abrupt serial flaking. Inverse marginal ret. on both sides leading to distal end.	Blade ?	nob (broken)	Burnt Flint	Topsoil

POST-MESOLITHIC FLINTS (Figs. App.3.1 & 2)

Grave goods, eg the burnt plano-convex-type knife from BG 44:F20, described in Chapter 11; Fig.11.9

ARROWHEADS (Fig. App.3.1)

Excav. Number	Type	Retouch Position Shape, Angle & Type Descriptive Comment	Blank	Striking Platform	Raw Material	Excavation Context
45:65	Leaf-shaped Green 4b	All-over scale flaking, bifacial.	uncl.	nob	Opaque ochre Flint	From turf mound
46:15	Leaf-shaped ? Green 3 / 4b polished	All-over serial flaking with edge ret., bifacial; scars ground on both faces. Tip damaged.	uncl.	nob	Opaque honey col. Flint	Topsoil
51:16	Leaf-shaped Green 3a	Invasive scale flaking on sides, bifacial.	?Blade-like	Flaked away	Non-pebble grey Flint	OGS beneath cairn 5
48:162	Chisel	Abrupt marginal retouch on sides, invasive serial flaking on trans. end.	? from discarded core	Flaked away	Non-pebble grey Flint	Residual, Area 01

SCRAPERS (Figs. App.3.1 & 2)

Excav. Number	Type	Retouch Position Shape, Angle & Type Descriptive Comment	Blank	Striking Platform	Raw Material	Excavation Context
44:4	Scraper Extended end	? Scaled, abrupt flaking on sides & end forming convex contour.	uncl.	Faceted	Non-pebble dark grey Flint	Above iron pan in centre of ring 2
44:219	Scraper	Parallel serial, semi-invasive retouch on distal end & R. side.	?Trimming flake	?Faceted	Non-pebble mottled dark grey Flint; 10% fresh white cortex.	OGS beneath outer bank 5/6
48:161	Scraper ?	Abrupt retouch on distal end & sides forming convex contour; flat irreg. scale flaking & much step fracturing on ventral face.	uncl.	Flaked away	Brown/grey mottled Flint	Residual, Area 01
48:733 (unillus)	Scraper ? (frag.)	Marginal retouch forming rounded contour	uncl.	nob	Non-pebble brown Flint	Topsoil Area 07
51:36	Scraper	Abrupt serial flaking on distal end & sides forming convex contour; flat invas. scale flaking on ventral face.	?Trimming flake	Flaked away	Pale grey Flint	OGS beneath cairn 5

Excav. Number	Type	Retouch Position Shape, Angle & Type Descriptive Comment	Blank	Striking Platform	Raw Material	Excavation Context
47:1	Scraper ?	?Scaled, semi-abrupt flaking on R. side, rounded, end damaged.	Flake	Plain	Non-pebble mottled grey Flint, dorsal face abraded.	OGS beneath mound
40:6	Scraper	?Scaled flaking on end & sides forming rounded contour.	?Trimming flake	Cortical	Non-pebble mottled grey Flint	From turf mound
40:14 (unills)	Scraper ?	Serial/scaled marginal ret. invasive, on end & L. side forming rounded contour.	Trimming flake	nob	? chert	OGS beneath barrow
45:29	Scraper	?Scaled shallow flaking on end & R. side forming round contour.	Flake	2 facets	Burnt Flint, trace of fresh cortex.	From turf mound
45:105	Scraper	Scale flaking (abrupt on end) round sides & end. ? same flint at 40:6	Flake	Narrow si.lipped 2 facets	Non-pebble mottled grey Flint	OGS beneath barrow
45:279	Scraper	Scale flaking on L.side, abrupt serial flaking on distal end & R. side; ?reworked; angular contour.	Flake	Plain wide	Non-pebble brown Flint	From turf mound
45:15	Scraper	Marginal semi-abrupt flaking on end & R. side (L. side damaged); angular-straight contour.	Flake	Plain	Non-pebble dark grey Flint, 25% cortex.	From turf mound
45:289	Scraper	Abrupt serial flaking on end & R. side forming rounded, irreg. contour; ?unfinished.	Trimming flake	Truncated	Dark grey Flint	Unstratified
8:17	Scraper	?Scaled semi-invasive abrupt flaking on end & L. side, chipping sporadic on R. side, rounded contour.	Flake	Plain wide	Non-pebble brown Flint	Topsoil
51:78	Scraper	Semi-invasive serial flak'g into cortex on ½ circumf. of flake, rounded contour.	Primary flake	?	Pale grey Flint; 75% rolled cortex.	Layer 7 (Beaker settlement)
51:86	Scraper	?Serial flaking, semi-invas. abrupt, one end & sides, rounded contour.	Flake	?	?Non-pebble pale grey mottled Flint 20% fresh cortex.	Layer 7 (Beaker settlement)
44:18	Scraper ?	Serial, semi-abrupt flak'g on rounded end; ? bifacial Ventral face v. undercut & re-flaked.	?Flake	nob	Non-pebble Flint burnt	Make-up of inner bank
Cairn field	End Scraper ?	Minimal marginal serial flaking on rounded end.	Blade-like	Linear	Non-pebble brown Flint	Surface of mineral soil.
7:2	Scraper	Semi-abrupt serial flaking on rounded end; marginal abrupt flaking on straight L. side.	Flake	nob	?Pebble dark Flint 75% abraded cortex.	Residual, topsoil
7:6	Scraper ?	Abrupt serial flaking, rounded contour; flat scale flaking on ventral face.	Split pebble	----	Opaque pale grey Flint	Residual, topsoil

SERRATED FLAKES (Fig. App.3.1)

Excav. Number	Type	Retouch Position, Shape, Angle & Type Descriptive Comment	Blank	Striking Platform	Raw Material	Excavation Context
41:5	Serrated	Straight; denticulated on R. side, marginal retouch on concave L. side; gloss.	Blade-like	nob	Non-pebble brown Flint	From turf mound
44:57	Saw	Straight; denticulated on L. side; gloss (inverse).	?Trimming flake	Linear	Non-pebble brown Flint	Above iron pan in centre of ring 2

Excav. Number	Type	Retouch Position, Shape, Angle & Type Descriptive Comment	Blank	Striking Platform	Raw Material	Excavation Context
48:729	Serrated	Minute serrations on butt ½ of L. side, straight-concave; R. side damaged inverse marginal retouch.	Blade/ flake Hinge termination.	nob	Non-pebble pale grey mottled Flint	Residual, Area 07
48:740	Serrated	Irreg. denticulation on convex L. side; damaged serrations on irregular R. side.	Flake Hinge termination	Faceted	Non-pebble dark grey Flint with fresh cortex.	Topsoil, Area 07
46:14	Serrated	Straight, denticulated on both sides, inverse gloss on R. side.	?Blade/ flake	Plain wide	?Non-pebble pale grey Flint	Topsoil
46:17	Serrated	Denticulated on concave R. side; sporadic retouch on irregular L. side.	?	nob	Non-pebble pale grey Flint	Topsoil
46:26	Serrated	Denticulation on straight R. side.	Blade/ flake	Lipped	Non-pebble mottled grey Flint	From disturbed area
51:18	Serrated	Serrations on straight L. side.	?Blade/ flake	nob	Non-pebble mottled grey Flint, 5% thin grey cortex.	From disturbed area
51:22 (unillus)	Serrated ?	Serrations on straight L. side.	Blade/ flake	nob	?? Chert	Surface of clay bank (layer 4)
45:71 (unills)	Serrated	Pronounced serrations on chip	Uncl.	nob (broken)	Light grey Flint	Topsoil

FABRICATORS (Figs. App.3.1 & 2)

Excav. Number	Type	Retouch Position, Shape, Angle & Type Descriptive Comment	Blank	Striking Platform	Raw Material	Excavation Context
45:275	Fabricator ? Piercer	Marginal retouch on sides converging to form point at butt end.	Flake	Flaked away	Non-pebble translucent brown Flint	From turf mound
41:35	Fabricator	Scaled semi-invasive ret. down R. side & on to end, bifacial; tip damaged but tool almost unworn.	Trimming flake	Flaked away	Non-pebble mottled grey Flint	OGS beneath barrow
44:89b	Fabricator	Proximal end inversely retouched to point (worn smooth); sporadic retouch on rest of edges.	Blade-like	nob	? Pebble Flint	Make-up of inner bank 7
44:105	Fabricator	Retouch on concave end, tip worn.	?Bladelet core	---	Non-pebble dark grey Flint	Make-up of inner bank 7
44:345	Fabricator	Retouched on all 3 faces Triangular point heavily worn, base flattened.	uncl.	---	Non-pebble brown Flint	From the filling of posthole (F.25)
48:764	Fabricator ?	Irregular marginal ret. on R. side.	Flake	nob	Non-pebble brown Flint	Topsoil, Area 07
51:85	Fabricator ?	Straight, abrupt scale flaking on sides & end, Distal end worn smooth.	Blade/ flake	nob	Non-pebble brown Flint	From stripped surface in central area. 5
53:C11	Fabricator/ Point	Marginal retouch around spur, worn smooth.	?Core fragment	---	Banded chert	Subsoil, Sq. C11

KNIVES (Figs. App.3.1 & 2)

Excav. Number	Type	Retouch Position Shape, Angle & Type Descriptive Comment	Blank	Striking Platform	Raw Material	Excavation Context
53:7	Knife ?	Abrupt marginal retouch on both sides, inverse on L. side. 20% fresh cortex.	Blade-like	nob	Non-pebble dark grey Flint	Subsoil, 1974 extension

Excav. Number	Type	Retouch Position, Shape, Angle & Type Descriptive Comment	Blank	Striking Platform	Raw Material	Excavation Context
41:31	Knife (frag)	Invasive scale flaking semi abrupt on L.side, marginal retouch on R. side, abrupt on inverse.	uncl.	nob	Non-pebble dark grey Flint	OGS beneath barrow
41:19 (unillus)	Knife ?	Semi -abrupt invasive scale flaking on straight L. side, sporadic irreg. scale flaking on R. side.	Blade-like	Shattered	Non-pebble blotchy grey Flint	From turf mound
41:8	Knife ?	Semi-abrupt flaking on L. side, spalling on R.	uncl.	Linear	Non-pebble grey Flint	From turf mound
45:290	Knife	Acute, scaled, semi-invas. flaking on L. side, irreg. marginal retouch on R.	Blade-like	Plain	Non-pebble dark grey Flint	From turf mound
14:4	Knife (frag)	Straight serial flaking on damaged distal end, semi-invas.scale flaking bifacial on L. side, irreg. serial flaking bifacial on R.	uncl.	nob	?Non-pebble blotchy grey Flint	From disturbed area
46:16	Knife (frag)	Abrupt serial flaking on straight L. side.	uncl.	nob	Burnt Flint	Topsoil
51:171	Knife / Scraper	Acute scale flaking semi-invasive on straight L.side semi-abrupt scale flaking on rounded & flattened distal end, irreg. sporadic marginal retouch on straight R. side.	Blade-like	nob	Non-pebble dark grey Flint	OGS beneath cairn near primary grave 5
51:27c	Knife (frag)	Semi -invasive serial flak'g on straight L. side.	uncl.	nob	Burnt Flint	OGS beneath Semi Circle Cairn.5
51:6 (Fig. 10.8)	Knife (frag)	Straight converging sides, L. side with abrupt serial & R. side with semi-invas. semi-acute scaled retouch.	Blade-like	nob	Burnt Flint	Disturbance above cremated bones (F.6)
44:163	Knife (frag)	Acute scale flaking semi-invasive on oblique L.side.	?Blade/ flake	nob	Burnt Flint	From Charcoal Pit (F.7)
44. 237	Knife (frag)	Acute serial flaking semi-invasive on straight R.side.	Blade/ flake	Cortical	Non-pebble blotchy grey Flint	OGS beneath outer bank 5/6
44:67	Knife ? (frag)	Abrupt/semi-abrupt serial flaking on both straight converging sides.	uncl.	Flaked away	?Non-pebble burnt Flint	Make-up of outer bank 8
7:7	Knife ? (frag)	Marginal retouch on convex R. side; abrupt ?serial ret. semi-invasive on straight L.	Blade/ flake	?	Non-pebble mottled grey Flint	Residual, topsoil
48:537 (unillus)	Knife ? (frag)	Semi-invasive scale flak'g on pointed distal end. Fresh cortex.	uncl.	nob	Non-pebble dark grey Flint	Area 05, midden

PIERCERS (Figs. App.3.2 & 3)

Excav. Number	Type	Retouch Position Shape, Angle & Type Descriptive Comment	Blank	Striking Platform	Raw Material	Excavation Context
42:4	Piercer	Retouch on distal end in concave arc off-setting point, serrated R. side.	Blade-like	nob	Orange/brown Flint	From turf mound
Bwlch Du	Piercer	Converging sides with marginal retouch, tip broken.	Flake ?	nob	Non-pebble pale grey Flint	Surface find
45:287	Piercer ?	Abrupt retouch forming concave areas at proximal end, converging to off-set point.	?Blade/ flake	Flaked away	Reddish Flint ?burnt	Unstratified
44/45:18	Piercer	Point formed by light marginal retouch at distal end.	Blade-like	Plain wide	Pebble flint with cortex.	Surface of mineral soil

VARIOUS IMPLEMENTS and MISCELLANEOUSLY RETOUCHED PIECES (Figs. App.3.1-3)

Excav. Number	Type	Retouch Position, Shape, Angle & Type Descriptive Comment	Blank	Striking Platform	Raw Material	Excavation Context
45:218	Waisted Core Tool	Bifacial retouch on rounded distal end, both sides concave and abraded.	Flake hinge termination	Flaked away	Non-pebble mottled grey Flint	From turf mound
41:26	Retouched Flake	Edge damage on R. side	Trimming flake	Crudely facetted	Non-pebble brown Flint	OGS beneath barrow
41:16	Retouched Flake	Semi-abrupt retouch forming rounded contour on side.	Flake (frag) Thermal scar	nob	Non-pebble grey Flint	From turf mound
8:2c	Misc. Retouch	Straight marginal retouch on R. side (inverse)	Flake (frag)	nob	Non-pebble Flint	Topsoil
45:54	Misc. Retouch	Abrupt marginal retouch on L.side.	Blade-like	nob	Orange flint rolled	OGS beneath barrow
44:209	Misc. Retouch	Abrupt marginal retouch on both sides	uncl.	Plain	Non-pebble grey Flint	Make-up of outer bank 8
44:64	Trimming flake	Possibly from a scraper	Rejuv. fl.	Face of core	Non-pebble grey Flint	Make-up of outer bank 8
53:B4	Misc. Retouch	Abrupt marginal retouch in uncertain position	Frag.	nob	Burnt flint	Subsoil, Sq. B4
45:240	Misc. Retouch	Abrupt ret. forming slightly convex edge on L. side. (? retouch on an anvil)	Frag.	nob	Pale Flint	From turf mound
44:191	Misc. Retouch	Abrupt marginal retouch on both sides, straight on R., irregular (inverse) on L.side.	Frag.	Linear	Banded chert	From burial pit (F.20)
53:D7	Misc. Retouch	Semi-invasive ret. on side bifacial invasive retouch on ? butt.	?	nob	Banded chert	Subsoil, Sq. D7
44:96C	Notch ?	Abrupt retouch forming concave area on R. side.	Frag.	nob	Burnt flint	Iron pan level = BA surface
53:74	Notch ?	Abrupt retouch forming concave area, L.side, butt.	Bladelet	Linear	Pale brown	Subsoil, 1974 extension
53:C2	Misc. Retouch	Abrupt inverse ret. on R. side.	Frag.	nob	Banded chert	Subsoil, Sq. C2
44:40	Misc. Retouch	Alternate marginal ret. on R. side.	Blade	nob	Banded chert	Make-up of outer bank 8
45:165	Misc. Retouch	Abrupt marginal retouch on distal end & R. side.	Blade-like	nob	Banded chert	Topsoil
44:304B	Misc. Retouch	Marginal retouch on distal end, inverse irreg. retouch (?damage) on L. side.	uncl.	nob	Non-pebble dark grey Flint	Make-up of inner bank 7
45:267	Misc. Retouch	Abrupt marginal retouch on L. side, butt half.	Blade-like	Linear	Blotchy grey Flint	From turf mound
44:52	Misc. Retouch	Irregular light damage (?retouch) on R. side	Flake	Plain wide	Non-pebble grey Flint, fresh cortex.	Above iron pan in centre of ring 2
53:F3	Misc. Retouch	Straight abrupt retouch on L. side, ?unf. microlith.	Trimming flake	nob	Brown Flint blotchy	Subsoil, Sq. F3
44:89A	Misc. Retouch Denticulate ?	Abrupt ret. (irreg. denticulation) on R.side & end.	Flake	Linear	Non-pebble brown Flint	Make-up of inner bank 7
53:D6	Misc. Retouch	Concave abrupt retouch on distal end.	Trimming flake	Plain	Pale grey Flint	Subsoil, Sq. D6
45:62	Misc. Retouch	Irreg. abrupt marginal ret. on R. side, butt half, forming concave area.	Flake	Linear	Orange Flint	From turf mound
45:142	Misc. Retouch	Straight abrupt retouch on distal end.	Trimming flake	Dihedral?	Opaque grey Flint	Topsoil
44:172	Notch	Abrupt ret. in concave area at butt end, serial flaking on R. side.	Blade-like	nob	Orange pebble Flint, 45% rolled cortex.	OGS beneath outer bank 5/6

PETROGRAPHIC ANALYSIS OF BEAKERS AND CINERARY URNS FROM BRENIG

David A. Jenkins, School of Agriculture and Forestry,

University College of North Wales, Bangor.

INTRODUCTION

This report contains the results of a petrographic study of 16 sherd samples from the excavations at Brenig. These are listed together with some of their macroscopic attributes in Table 1. Seven of the samples were from cinerary urns (BG40, BG44 A & B, BG45 A & B, BG51 A and a food vessel (BG51 B), and an eighth was from an isolated sherd (BG44.185) from the same pit, F20, as BG44 A & B. The remaining eight samples were beaker sherds from Brenig 51 (BG51 73, 83, 89, 133, 135, 174 & 178). The limited amounts of sherd material available precluded heavy mineral and trace element analysis (Williams & Jenkins 1976), and the study was therefore restricted to the microscopic examination of thin sections of the resin-impregnated sherds to characterise, quantitatively where possible, their composition and nature. The aims of this study were, first, to reveal affinities and differences between the various sherds within the group and, second, to identify possible geological sources for the materials used in their manufacture. Following an account of the methodology employed, the general characteristics of the individual sherds and their components are described and summarised in tabulated form. The possible implications of these data are then discussed in relation to the grouping and provenance of the sherds.

METHODS

Wherever possible sherds were subjected to a standard procedure. If available, floating undecorated fragments of the order of 2.5 cm x 2.5 cm were selected and their macroscopic features, as seen under a stereozoom binocular microscope, noted (i.e. colour, texture & fabric in terms of clast and pore size, shape, density & distribution). The fragment was then sawn int two halves with a dental diamond saw, and one half re-ignited overnight at 500° in an electric muffle furnace with an oxidising environment to clarify its petrography. Re-ignited and unignited fragments were then placed vertically side-by-side in a glass tube, together with a label, and impregnated with a polystyrene resin system (Autoplax + 2% 28C hardener). Impregnation was carried out using a system diluted 1:1 with acetone; the tube was kept corked for several days, to encourage thorough impregnation, and then uncorked to allow the acetone to evaporate off and the resin to polymerise, a process which generally took a further 4-8 days and which was finished off overnight in a low temperature oven at 40°C. Once hardened, a slice giving a transverse section through the two sherd fragments was cut off with a diamond saw, one surface of which was ground flat with alumina (10 m) polished with diamond pastes (6 m, 3 m & 1 m) and attached to a clean microscope slide. A thin section (30 m thick) was then prepared by the usual petrographic procedures using a Logitech lapping machine to take the section down to 50 m, followed by hand grinding to 30 m and again diamond polishing.

Material was also sampled to establish the geological context of the Brenig valley and its potential as a source of clast material. Thin sections were therefore made from solid rock outcrops in the normal petrographic way, whilst the superficial geology was sampled in the form of the 2-0.63 mm fraction separated by wet sieving from the B/C horizons of soil profiles, or from stream sediments if available. The sediment sample was impregnated with resin and a thin section prepared using the same procedure as described for the sherds.

Prior to microscopic examination it is useful to prepare a magnified (x10) photographic record of the thin section. This was conveniently achieved as a negative print by projecting the slide directly into Kodak projection paper using a Leitz slide projector: a 1 cm grid was superimposed to facilitate recording of, and reference to, specific features by means of a grid reference on the print, which could also be annotated. Under the polarising microscope the composition of the sherd was studied and recorded quantitatively (vol. %) using a Swift Automatic Point Counter involving some 500-1000 point analyses. The components distinguished were 'void', 'matrix', 'grains', 'grog' and 'clast', the intention being to provide some parameter of the original 'clay' texture and to attempt to distinguish material added as 'temper' (i.e. 'clasts' and/or 'grog'), although the distinction between these components is to some extent arbitrary. For this purpose 'matrix' was recorded as the silt and clay (i.e. <63 ■ using the limit current in international soil science), larger monomineralic particles being recorded as grains (i.e. 63-200 ■, and occasionally up to 630 ■), and polymineralic fragments >630 ■ (but by petrographic extrapolation occasionally down to 200 ■) as 'clasts'. The recognition of 'grog' depended on its contrasting colour, fabric, orientation, etc., and was in some cases obvious but in others it merged imperceptibly with the matrix of the host sherd and was therefore unavoidably underestimated. Details of the various components were recorded such as colour, shape, distribution, mineralogy, petrography, etc., and specific features noted such as the presence of bioliths (phytoliths, diatoms, spicules, etc.), charcoal, spores, distinctive quartz overgrowths, and so on. The texture of the matrix was described qualitatively by comparison with thin sections of soils in established textural classes (Hodgson 1974) and the fabric recorded according to the manner and degree of the preferred orientation of its clay, as evident in aggregate birefringence, using the terminology of Brewer (1964).

RESULTS

The quantitative and qualitative data resulting from petrographic analysis are summarised in Table 2. From these it can be seen that the different attributes of the sherds examined are shared in varying proportions and combinations. It is therefore convenient to describe, for the group as a whole, features shown by the individual components - matrix, voids, grains, clasts and grog.

Matrix

This, as usual, is the dominant component varying from 50-70% by volume of the clasts studied. The texture and fabric are variable. At one extreme sherds are composed of a dense clay (C) showing strongly preferred orientation over large areas as revealed by the aggregate birefringence, and a fabric that is 'masepic' as defined by Brewer (1964). Textures grade through silty clays (ZC) to clay loams (CL), in which preferred orientation is moderately developed with 'vosepic' fabric, and ultimately to clay silts (CZ) in which only weak orientation and a 'silasepic' fabric is displayed. The cinerary urns belong to the coarser silty clay and clay loam groups (except for BG40 - clay) whilst the beaker sherds comprise the finer textured clays (except for BG51.73 - clay silt).

Voids

Voids comprise 5-12% by volume of the sherds. They tend to be discontinuous, irregular, linear and subparallel to the sherd surface and are presumably the product of manufacture: ovoid pores are also sometimes present (e.g. BG51 178). Occasionally the voids contain spores (as in BG45 A & B, BG51 89 & 174) and rarely isotropic yellow brown coatings (as in BG51 73 & 174), which are presumably of pedogenic origin reflecting the environment of burial.

Grains

Detrital 'grains' within the coarse silt - fine sand range are dominated in most samples by the ubiquitous subangular to subrounded quartz. These are accompanied by varying amounts of quartz aggregates, plagioclase, K-felspars and rare perthite - (BG51 A) and microcline (BG51 174) both of whose occurrences, it will be noted, coincide with those of coarse silicic clasts. Well-rounded quartz grains occur less frequently, and only in one sherd (BG51 A) was such a grain detected with an euhedral overgrowth. Other detrital minerals noted include muscovite and, less commonly, biotite together with hornblende, occasional pyroxene, and rare apatite and rutile. The most obvious association detectable between these components and the sherds is that between the ferromagnesian minerals and the beaker sherds, exceptions being their absence from BG51 155a & BG51 178, and the presence of an isolated grain of hornblende detected in the cinerary urn sherd BG45 A.

Similarly bioliths are absent from the cinerary urn sherds and were only detected in some of the beaker sherds, although charcoal fragments had been incorporated into, again, only the urn sherd BG45 A. The bioliths take the form of various occasional phytoliths (BG51 135, 174 & 178) and rare pinnularid diatoms (BG51 144).

Clasts

Clasts are mostly subrounded/subangular in shape and thus detrital in nature. They include a remarkable diversity of rock types, the main features of which are briefly noted below.

Vein quartz: aggregates of large anhedral unstrained quartz crystals, often traversed by trains of dust inclusions and carrying rare rouleaux of chlorite (e.g. BG45 B).

Mudstone: fine-grained rock comprised of silt-size quartz, chlorite and hydrous mica and carrying thin veins of quartz, typical of many Lower Palaeozoic argillaceous rocks (e.g. BG44 185).

Orthoquartzite: well-sorted angular fine-grained quartz sand, poorly cemented, occasionally sericitic or iron-stained (e.g. BG44 185).

Lithic sandstone: poorly-sorted medium to coarse sandstone with angular grains often displaying pressure-welded contacts and occasionally a weakly developed foliation, and sometimes iron-stained. Monomineralic grains are most commonly composed of quartz with occasional large K-felspars, perthite and muscovite; the lithic fragments are composed of rhyolitic and rare trachytic (?) material, fine quartzite, schistose quartz, slate, perthitic and micrographyric granite and rare altered mafic igneous rock material (?) (e.g. BG51 83).

Metaquartzite: well-sorted, cemented, subangular quartz, occasionally showing visible overgrowths or iron-stained, verging into an interlocking quartz mosaic.

Slate: fine-grained, strongly foliated.

Fine silicic igneous: rhyolitic material comprises a frequent clast type and shows a number of distinct varieties. Most commonly, it takes the form of a fine-grained granular quartz/felspar mosaic with occasional small felspar phenocrysts and granules of iron ore, and sometimes carrying sericite or a brown mica, and rare zircon, apatite or clinozoisite grains. Occasionally the fabric tends to a distinctive 'felted' (e.g. BG44 185) appearance or displays well-developed spherulitic structure (e.g. BG51 B), shadowy streaky structures suggestive of flow banding or even of a welded tuff (BG51 B). Some of these clasts may be heavily impregnated with ferric oxides.

Coarse silicic igneous: a coarser granular (sometimes consertal) rock type consisting of quartz (with acicular rutile inclusions) zoned sodic plagioclase, sericitised K-felspar, perthite, microcline, muscovite, chlorite and rare zircon and clinozoisite: occasional patches are microgranophyric (e.g. BG51 A).

Coarse mafic igneous: large irregular prismatic grains of hornblende (both pale green and oxidised brown) enclosing poikilitically pale green granules of clinopyroxene and zoned laths of Ca-plagioclase ('pyroxene hornblendite'?): often altered extensively to fibrous chlorite or ferric oxides (e.g. BG51 73). In addition clasts of typical dolerite occur carrying clinopyoxenes and occasional cored prisms of apatite (e.g. BG51.89).

<u>Grog</u>

The abundance of fragments of previous potsherds used as a filler (i.e. 'grog') appears to be bimodal, values being 1% or less in five samples and ranging from 7-27% in the other eleven. The higher values occur in the beaker sherds and also in the 'early' (BG45 A & B) - as compared to the 'late' - cinerary urns. Grog fragments are distinguished from the host matrix by differences in colour, texture, fabric, or simply orientation. This distinction is clearly defined in some cases whilst in others, where the grog matches closely the host sherd, recognition is difficult: in such cases (i.e. BG51 73, 89 & 133) the values quoted in Table 1 are probably underestimated, the vol. % 'matrix' being inflated at the expense of 'grog'. Conversely, it is sometimes difficult to distinguish 'grog' from mudstone clasts, especially when sectioned parallel to their bedding, and the latter may therefore have been underestimated relative to the former, for example in BG51.178. Where an earlier generation of clasts is present within grog fragments, their petrology is similar to that of clasts in the host sherd (e.g. fine silicic igneous clasts in 44 A & B). In a few cases there are suggestions of at least two successive generations of grog recognisable (e.g. BG51 174 & 178).

Features of particular interest, interpreted as grog, occur in beaker sherd BG51 83. These take the form of irregular fragments, a contrasting pale brown in colour, with a fine-grained matrix and strikingly vesicular nature (~30%). Some of the voids tend to a distinctive rhomboidal shape reminiscent of calcite cleavage fragments, and they often contain a brown, shrunken patch of amorphous material: the clay matrix contains only rare silt-sized quartz grains and displays strong aggregate birefringence resulting from a vosepic fabric. These fragments are interpreted as grog derived from some earlier calcite-tempered pot, subsequently decalcified, similar to a type observed from Neolithic contexts at Trefignath and Din Dryfol (Group 3: Jenkins 1987) and also observed in sherds from Gwernvale, and recorded for example by Peacock (1977), but of which no trace has otherwise been detected at Brenig. Furthermore, these grog fragments themselves also contain what is presumably an earlier generation still of darker, denser grog fragments.

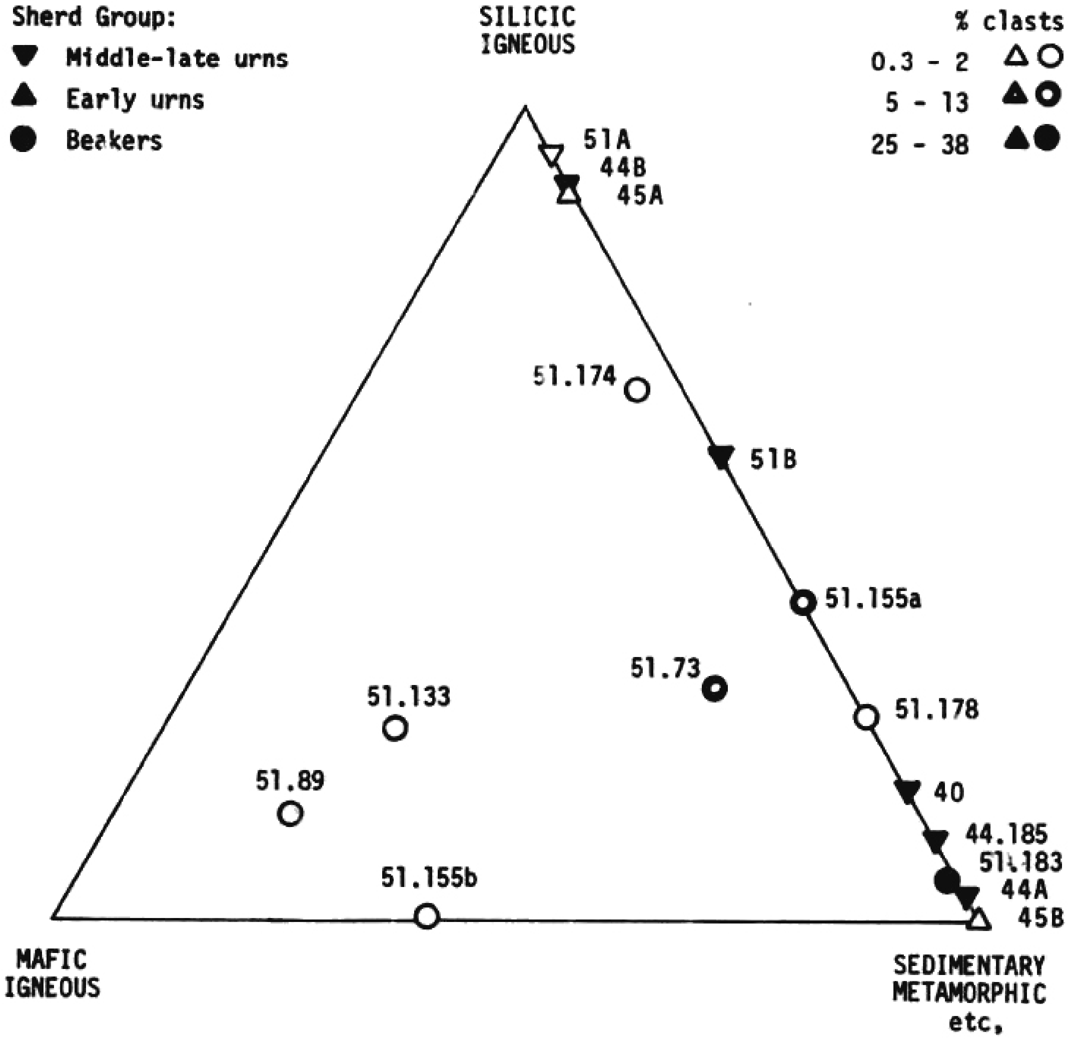


Figure 1: **Clast content and composition of sherds**

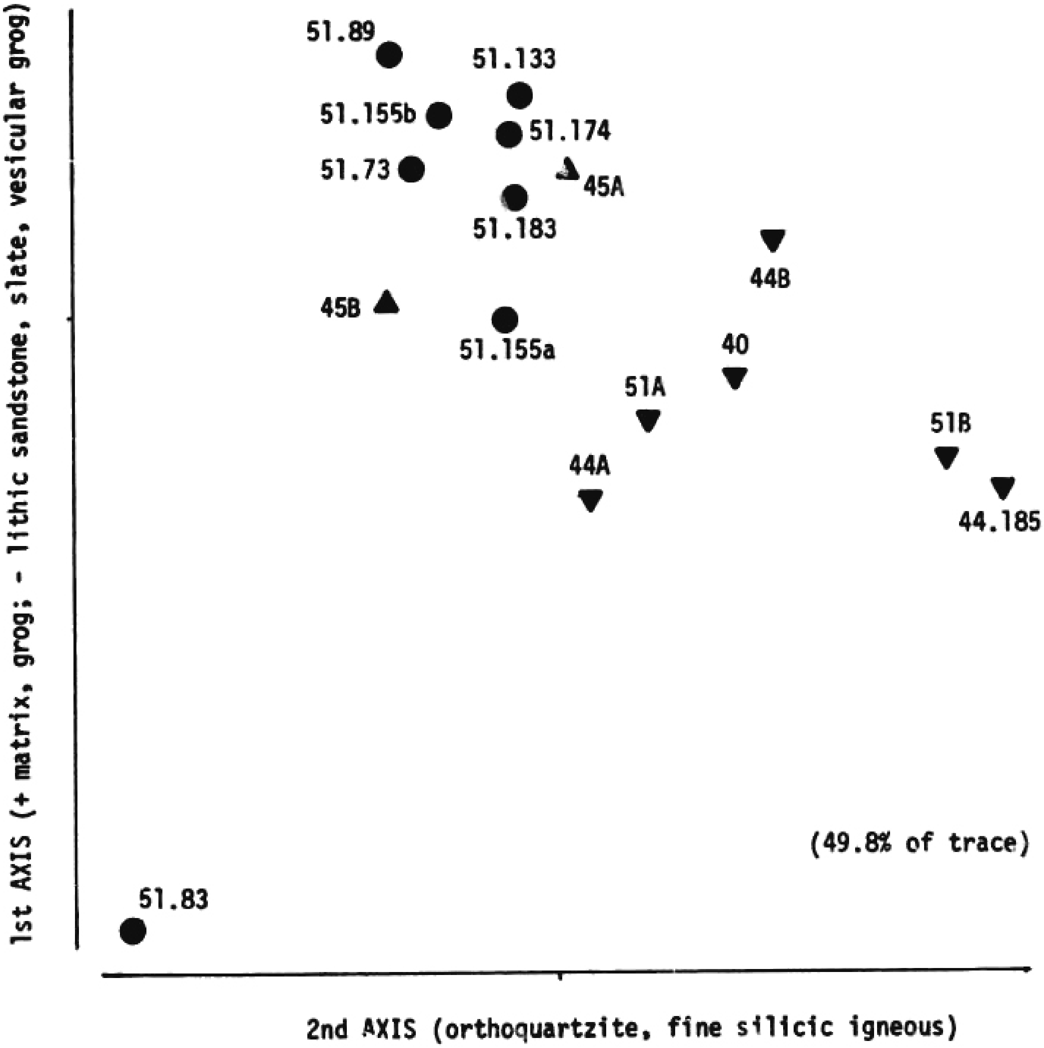


Figure 2: Principle Component Analysis of the sherds

Jenkins : TABLE 2: Petrographic Analytical Data (1)

SHERD NUMBER	VOIDS	MATRIX	Fabric	GROG	Vesicular Grog	GRAINS	-pyroxene	-amphibole	-biotite	CLASTS	POT TYPE
40	7	61	C	0	-	1	-	-	-	31	urn
44 (185)	6	62	CL	1	-	4	-	-	-	27	urn
44.A	10	57	CL	1	-	4	-	-	-	28	urn
44.B	6	70	ZC	9	-	2	-	-	-	13	urn
45.A	6	66	ZC	26	-	1	-	?	-	1	urn
45.B	9	57	CL	27	-	2	-	-	-	5	urn
51.A	5	53	ZC	1	-	3	-	-	-	38	urn
51.B	8	58	C	0	-	9	-	-	-	25	FV urn
51.73	15	70*	CZ	7*	-	1	+	+	-	6	Beaker
51.83	10	54	C	1	2.3	2	+	+	+	33	Beaker
51.89	8	80*	C	10*	-	0.5	-	+	-	2	Beaker
51.133	6	83*	C	10*	-	1	-	+	-	0.3	Beaker
51.155 (a)	11	69	C	10	-	4	+	-	-	7	Beaker
51.155 (b)	6	67	C	24	-	0.4	+	+	-	1	Beaker
51.174	6	70	C	22	-	1	-	+	+	1	Beaker
51.178	10	66	ZC	21	-	2	-	-	-	1	Beaker

Jenkins : TABLE 2 : Petrographic Analytical Data (2) : Details of Clasts

SHERD NUMBER	CLASTS	Vein Quartz	Lithic Sst	Orthoquartzite	Mudstone	Fine Silicic	- mosaic	- felted	- + Fe.oxides	- spherulitic	Coarse Silicic	Coarse Mafic	Metaquartzite	Slate
40	31	-	80% 24.8	4% 1.2	-	16% 5.0	+	-	-	-	-	-	-	-
44 (185)	27	-	75% 20.3	10% 2.7	5% 1.3	10% 2.7	+	+	-	-	-	-	-	-
44.A	28	3% 0.8	89% 25.0	2% 0.6	-	3% 0.8	-	+	-	-	-	-	-	3% 0.8
44.B	13	-	-	10% 1.3	-	90% 11.7	-	+	+	-	-	-	-	-
45.A	1	-	-	10% 0.1	-	90% 0.9	+	-	-	-	-	-	-	-
45.B	5	50% 2.5	50% 2.5	-	-	-	-	-	-	-	-	-	-	-
51.A	38	-	-	1% 0.4	1% 0.4	5% 1.9	+	+	+	-	90% 34.2	-	3% 1.1	-
51.B	25	-	39% 9.7	4% 1.0	-	57% 14.3	+	+	+	+	-	-	-	-
51.73	6	-	55% 3.3	-	-	28% 1.7	+	+	-	+	-	15% 0.9	2% 0.1	-
51.83	33	12% 3.9	75% 24.8	-	2% 0.7	5% 1.7	+	+	-	-	-	1% 0.3	4% 1.3	1% 0.3
51.89	2	-	-	-	-	13% 0.2	+	+	+	+	-	68% 1.4	19% 0.4	-
51.133	0.3	-	-	-	-	13% 0.01	+	-	-	-	24% 0.1	50% 0.2	13% 0.01	-
51.155 (a)	7	-	44% 3.1	-	-	39% 2.7	+	-	+	-	-	-	17% 1.2	-
51.155 (b)	1	-	-	-	-	-	-	-	-	-	-	60% 0.6	40% 0.4	-
51.174	1	-	-	10% 0.1	-	30% 0.3	+	-	-	+	35% 0.3	5% 0.1	20% 0.2	-
51.178	1	25% 0.3	-	50% 0.5	-	-	-	-	-	-	25% 0.3	-	-	-

DISCUSSION

These petrographic analytical data will be used to assess, firstly, general affinities and groupings amongst the total group of sherds. The data will then be interpreted, insofar as is possible, in terms of both the provenance of the material used in the manufacture of the sherds, on the basis of the petrography of the clasts and mineralogy of the matrix, and also of the manufacturing processes involved, as reflected in the fabric.

Groupings amongst the sherds

Visual inspection of the data in Table 2 suggests various possible divisions and affinities. Firstly, the isolated sherd BG44 185 shows a sufficient similarity to urn BG44 A in its grain, grog, and clast content and composition to suggest that it is part of the same pot and its isolation in the pit must be due to animal disturbance. By contrast, the two sherds both bearing the number BG51 155 (indicating adjacent discovery) differ sufficiently in clast content and composition to justify their being considered to derive from two different pots.

As a group there are the affinities already noted according to clast and mineral content. These group together the beaker sherds (except for BG51 178) by their mafic igneous clast content and detrital ferromagnesian grains (pyroxene, amphibole, biotite); except for BG51.83, the Beaker sherds are also linked with the Bronze Age urns from Brenig 45, by their lower clast content (1-7%; cf. 13-38%). Examining the clast content in detail, however, it is noteworthy that clast types occur in all possible combinations despite their diversity and that they therefore appear to comprise a single interlinked, if varied, group. For example, BG51.83, although dominated by silicic and sedimentary/metamorphic rock types in common with the other sherds of high clast content, also contains traces of mafic igneous material. These relationships are displayed graphically in Fig. 1.

Taking all the quantitative data into account, the relationships can be resolved by Principal Component Analysis, as illustrated in Fig. 2. Here the first two axes, which account for nearly 50% of the Trace, are plotted; they are determined mainly by matrix, grog, lithic sandstone, slate & vesicular grog %, and by orthoquartzite & fine silicic igneous % respectively. From this it can be seen that, except for BG51 83, the beaker sherds group together, and, moreover, that the urns from Brenig 45 are associated with this group rather than with the other urns. Beaker BG51 83 is separate from all other sherds, presumably because it alone carries the distinctive vesicular grog and also the slate clasts.

Provenance of component materials

Identification of rock types used as temper, or of the mineral suite within the 'clay' matrix, raises the possibility of locating their geographic source should these components prove to be geologically distinctive. Clay and temper may derive from different sources, and in the case of grog fragments further sources may again be involved. However, there is a problem in obtaining representative analyses due to the limitations imposed by the sampling. Clasts can only be identified in a thin section which is usually limited to a few square centimetres at the most, and within which only a small number of clasts may be present: in the sherds from Brenig the number of clasts seen varied from only two (BG45 B) or four (BG51 155b, BG51 178) to over 100 (BG51 83). Where small numbers are involved the significance of clast petrology can therefore only be by presence and not by absence. Also, since clast fragments are small (0.6 mm - 6 mm in the Brenig sherds) it is often difficult to identify rock types with certainty, especially when coarse-grained or altered. Matrix mineralogy is also difficult to establish adequately from a thin section and such studies require 'heavy mineral analysis' (Williams & kins 1976) and thus larger amounts of sherd than were available in the Brenig study.

Clast shape can be informative, since rounded clasts may denote a natural detrital source such as a stream, lake or shore deposit. Markedly angular and irregular clasts might suggest that solid rock material had been crushed to obtain the temper, as is possibly the case with some of the hornblende fragments. The subangular, sub-rounded clasts generally observed in the present study imply the use of a natural deposit. This conclusion is reinforced by the remarkable diversity of rock types encountered, which is more likely to have been provided by a natural deposit derived from an area of complex geology than by a mixture of crushed rock types. With regard to the clay, a few clues are provided by the mineralogy observed in thin section. There is a correspondence between matrix and clasts evident in the correlation between the occurrence of detrital ferromagnesian minerals and mafic igneous clasts, and between detrital felspars and coarse silicic igneous clasts. Other minerals such as the ubiquitous quartz are less diagnostic except in special cases: for example overgrowths in optical continuity over a red pellicle on well-rounded grains would be indicative of the Trias. No such grains were seen in the Brenig sherds thus excluding a Triassic source, although one euhedral overgrowth on a rounded grain without a pellicle was seen in the small urn BG51 A. Further information on the source of 'clay' used for the matrix is provided by the presence or absence of biogenic material such as phytoliths and diatoms. These were only seen in beaker sherds BG51 174 & 178, which suggests that the clay used for these pots was derived from a 'colonised' deposit such as a topsoil or alluvium, whereas for the other pots a 'sterile' source was used, such as a subsoil or glacial/periglacial deposit.

As to possible geographic sources for the material used to manufacture the Brenig sherds, the clast petrography is informative. The diverse rock types present are not available locally at Brenig, which is an area of relatively simple solid geology, outcrops being restricted to Lower Palaeozoic mudstones and sandstones (ribbon-banded mudstones of the Nantglyn Flags Group: Warren *et al.* 1984). Nor are such materials likely to be present in the superficial geology, since the glacial and periglacial deposits are also essentially local in origin, Snowdonian/Arenig rhyolites, granites, tuffs and dolerites being seen only rarely (Warren *et al.* 1984): this was confirmed by the two analyses of local stream sediments. The multiple combinations of the different rock types suggest that a single source was involved in an area of complex geology encompassing in close proximity sedimentary, metamorphic, and both coarse/fine, mafic/silicic igneous rocks, amongst them the distinctive varieties such as the lithic sandstone, the hornblende rock, and the spherulitic rhyolites.

Some of these rock types occur individually in Snowdonia, but the nearest potential source of such a concentrated assemblage of all these rocks is to be found in the Welsh Borderland (Earp & Hains 1971). In this region numerous small inliers of the (presumed) Precambrian occur as at the Wrekin, Long Mynd, Pontesford and Malvern. Within these areas the 'Uriconian' encompasses a suite of calc-alkali lavas and tuffs ranging from basalt through to rhyolite together with dolerite and granophyre intrusions: spherulitic rhyolites, for example, have been recorded at Wrockwardine and Earl's Hill. The underlying 'Malvernian' includes quartz-mica schists and hornblende-biotite gneisses together with diorites and hornblende granites, whilst the overlying 'Longmyndian' comprises a suite of derived sedimentary rocks. Stream sediments examined from the Malvern and Shelve areas have, amongst the 630-2000 m fraction, many rock types similar to those in the sherd clasts. However, identifying any specific source in the Borderland would require more detailed information and intensive fieldwork.

Manufacturing processes

The fabric, void, clast and grog content reflect the choice of component proportions and the manner in which the pots were produced. It is of interest that the % grog and % clast show a strong negative correlation (r = -0.82: P <0.1) which would imply that they were alternative choices of sources of temper used to make up a total of 17-39% (excluding the three sherds where grog % is probably an underestimate). The range presumably reflects the technological requirements of the manufacturing processes used for the particular clays, and is not evident from macroscopic examination of the sherds. The grog is of further interest in that it indicates a conscious reuse of pottery material, sometimes repeatedly, despite the apparent local availability of detrital material as temper. It can be imagined that such a choice could well have had ritualistic motivation. Much of this reuse involved pottery of comparable composition and origin, perhaps 'wasters' lying around the workshop. The vesicular grog in BG51 83, however, indicates that extraneous pottery was used in at least one case.

CONCLUSIONS

Detailed examination of thin sections of the sixteen sherds under the petrological microscope has provided an insight into their interrelationships and origins. The petrographic data support suggestions that certain sherds derive from the same pot (e.g. BG44 A & 185) whilst others do not (e.g. BG51 155 a & b). Overall, the data on fabric and composition reveal a general coherence amongst the beaker sherds with which the earlier urns (BG45 A & B) also show an affinity: one beaker sherd (BG51 83) is anomalous in this respect, and is also distinguished by its unusual grog content which is interpreted as deriving from a distinctive foreign calcite-tempered pot material, subsequently decalcified. By contrast, the pots with middle (BG40 & BG51 A & B) and later (BG44 A & B) dates can be distinguished by their higher clast and lower grog contents and by the lack of coarse igneous material amongst their clasts.

As to provenance, the data are also informative due to the distinctive nature of the clast petrography, despite the limitations imposed by the small sample size of sherds that could be examined. The subrounded detrital nature of their clasts and their biolith content suggests that some of the beakers were made from surface soil or other deposits, but that the remainder involved the use of subsurface or glacial deposits and only occasionally of crushed rock. Whilst a diverse range of rock types is represented in the clasts, their various combinations in individual sherds suggest derivation from within a single source area, albeit complex and variable. Brenig itself can be excluded as such a source of material used in the manufacture of the pots analysed by virtue of its incompatible solid and superficial geology.

The most likely area to provide variable mixtures of rhyolites, granites, dolerites, lithic sandstones, schist, etc., would be one of the outcrops of the Precambrian in the Welsh Borderland, such as the Shelve or Malvern. Through a detailed examination of sediments from such areas it is possible that a specific source might be identified by the matching of distinctive rock-types such as the spherulitic rhyolite 'hornblendite' and lithic sandstone. Distinctive petrographic assemblages have been described for the clasts in Iron Age pottery from the southern part of the Welsh Borderland by Peacock (1968). These include granite, quartz-diorite and mica schist material (i.e. 'Malvern Group A') as well as Palaeozoic limestones ('Group B1'), Mesozoic oolitic limestones ('Group B2') and Silurian sandstones ('Group C'). Nothing comparable to Group B has been seen within the Brenig sherds, and although in some sherds there may be affinities with Groups A and C, it would require futher work to verify this possibility. This potential association between pottery in north Wales and the Welsh Borderland is one that has already been noted from other sites such as Moel-y-Gaer and Dinorben. It hints at a tradition possibly extending from the late Neolithic to the Iron Age, and is in strong contrast to the apparent local origins of Neolithic pottery from Trefignath (Jenkins 1987) and Bronze Age pottery from Anglesey (Williams & Jenkins 1976).

REFERENCES

Brewer, R. (1964). Fabric and mineral analysis of soils, Wiley, London

Earp, J.R. & Hains, B.A. (1971). British Regional Geology: The Welsh Borderland, 3rd Edn., HMSO, London.

Hodgson, J.M. (1974) Soil Survey Field Handbook. Technical Monograph No. 5, Soil Survey, Harpenden.

Jenkins. D.A. (1987). 'Petrography of Pottery from Trefignath and Din Dryfol, Anglesey'. in C. Smith & F.M. Lynch, Trefignath & Din Dryfol: the Excavation of two Megalithic tombs in Anglesey. Camb. Arch. Monographs 4. 1987, 60-73.

Peacock, D.P.S. (1968). 'A petrological study of certain Iron Age Pottery from Western England'. Proceedings of the Prehistoric Society, 34, 414-427.

Peacock, D.P.S. (1977). 'Ceramics in Roman and Medieval Archaeology',pp.21-33 in Pottery in Early Commerce, Ed. D.P.S. Peacock, Academic Press, London

Warren, P.T., Price, D., Nutt, M.J.C. & Smith, E.G. (1984). Geology of the country around Rhyl and Denbigh. Mem. Br. Geol. Surv. HMSO, London.

Williams, J.Ll. & Jenkins, D.A. (1976). 'The use of petrographic heavy mineral and arc spectrographic techniques in assessing the provenance of sediments used in ceramics' pp.115-36 in Geoarchaeology. Eds. D.A. Davidson & M.L. Shackley, Duckworth, London.

TABLE 1: Sherd and other samples analysed

Sherd No.	Group	Unoxidised colour	max thickness (mm)	Laboratory thin section No.
44 A	urn	brown	12	1432a & b
44 B	urn	red brown	8	1429
44.185	urn fragment	grey brown	5	1430
40	urn	dark grey brown	8	1431
51 A	urn	orange brown*	7	1433a & b
51 B	food vessel	grey brown	6	1436a & b
45 A	urn	grey brown	9	1433c
45 B	urn	grey brown	9	1434
51.73	Beaker	brown	12	1438
51.83	Beaker	grey brown*	14	1437
51.89	Beaker	grey brown	8	1452a & b
51.133	Beaker	grey brown*	8	1464a & b
51.155a	Beaker	grey brown	5	1451
51.155b	Beaker	grey brown	6	1451
51.174	Beaker	brown*	8	1463a & b
51.178	Beaker	brown*	7	1471

* denotes a dark grey-black reduced interior zone

Stream gravel - NE Brenig (SH.988568) 2.0-0.63mm	1604
Stream gravel - NW Brenig (SH.968562) 2.0-0.63mm	1605

Note

The urns from Brenig 44 have a late C14 date (no. 30).
The urns from Brenig 40 and 51 have dates in the middle period of cemetery activity (nos. 10, 11, 18, 20); so do the beaker sherds (no. 19).
The urns from Brenig 45 have the earliest C14 dates (nos. 12 & 13).

NOTES ON THE BEAKER POTTERY FABRICS FROM EXCAVATIONS AT BRENIG SITE 51, CLWYD

By Dr T.C. Darvill (then of the University of Southampton)

Macroscopic inspection of the Beaker pottery assemblage recovered from below Brenig 51 revealed that the dominant fabric present was characterised by its slightly greasy feel and the presence of occasional stone and grog additives to the clay matrix. This basic fabric appeared to have been used for both thin-walled and thick-walled vessels alike. Macroscopically observable variation in firing conditions, surface colour and the frequency of non-plastic inclusions led to the suggestion that there might be some variability within the fabrics themselves, and accordingly five samples were selected for detailed analysis which seemed to cover the variability previously noted. The sherds were used for the production of thin sections so that the fabrics and the non-plastic inclusions therein could be studied in detail under a conventional petrological microscope. Table 1 sets out a list of sherds sampled and the thin-section number given to each.

Under the microscope it was clear that the basic mineral suites in each sample were essentially the same, the variation being caused primarily by different treatment during production (e.g. degree of mixing, firing atmosphere, amount of additives etc.). For this reason it is appropriate to describe only one slide here: N345 being selected as it showed the rock inclusions rather more clearly than the other samples by virtue of having a greater density of inclusions.

The groundmass is fine-grained, anisotropic, and contains within it fine muscovite mica flecks up to 0.1 m long and fine quartz grains, rounded to sub-angular in shape, and mostly less than 0.08 mm across, although exceptional grains are as large as 0.1 mm across. The groundmass is dark, due to the presence of a considerable amount of unburnt carbon, and consequently little can be said about the texture of the matrix. Set within the groundmass are two principal additives. The first comprises grog pellets which are rounded and up to 1.5 mm long. They appear in a contrasting fabric to the matrix in which they are set as they contain no visible mica, very little quartz and occasional rhyolite fragments. This grog must therefore derive from pots made from clay other than that used for making the pots under study here. The second major non-plastic inclusions are fragments of altered sandstone, probably at one time a greywache sandstone. These occur in angular fragments up to 0.35 mm across.

It is difficult to make precise statements regarding the origin of the fabric under discussion. It should not be assumed that the clay and the rock additives derive from the same place, since either could have been transported some distance before being mixed and used to make pottery. In the absence of comparative clay samples no source can be suggested for the clay itself, and because the rock fragments are too small for detailed characterisation, and the spread of comparable rock outcrops is large, only vague hints can be given regarding the source of the tempering. The site on which the sherds were found is set on the Ludlow beds of the Silurian system (Smith & George 1961, 50-51), which do contain various siltstones, mudstones and altered greywaches. The spread of the Ludlow beds is wide, however, extending from the north coast of Wales near Conwy as far south as Llangollen. No firm origin can be given within that area, but the Denbighshire Moors and Clwydian Hills are probably the most likely areas since it is here that the coarser components of the Ludlow series are to be found. It is not possible, without a certain amount of fieldwork near the site, to say whether the pottery could have been made locally or would have had to have been imported.

TABLE 1 : Sherds sampled for analysis

Sherd number	Thin-section number (1)
Brenig 51/121	N343
Brenig 51/109	N344
Brenig 51/104	N345
Brenig 51/90	N346
Brenig 51/81	N347

(1) Thin-section numbers relate to the Thin-section Library at the University of Southampton, Department of Archaeology, where the slides are now housed.

PETROLOGICAL REPORT FOR BRENIG 48. FIND No. 717

Dr Elaine Morris, then of the University of Southampton.

My reference no. - NG.

A single, small rim sherd was recovered from the surface of the subsoil from within the round wooden structure beneath BG48:07 (Fig. xxx). The fabric is slightly sandy, slightly vesicular, and smoothed on the surface. This soft fabric is reduced to a dark brown to grey/black colour. ie vertical-shaped rim has an internal double groove and a single one on the outside.

Macroscopically, this vesicular fabric is recognisable by its surface which is moderately to sparsely pitted with irregular voids, generally up to 3.5 mm across. Unfortunately, a fresh break to the sherd's section revealed no identifiable inclusions other than a small amount of fine quartz in a loosely structured matrix. There was no reaction from the fabric to an application of dilute hydrochloric acid.

Microscopically, this is an anisotropic clay matrix which has rare fragments of mica, and is generally well-mixed throughout. The background inclusions in the matrix consist of a 5-10% concentration of sub-angular quartz from 0.1 mm or less in size, and less than 1% concentration of angular quartz 0.1 mm or larger. There is also a 5-10% concentration of dark red/black, frequently opaque, argillaceous matter which may be natural clay pellets, which vary from 0.05 mm - 1.0 mm in size.

In addition to the above inclusions, there are amorphous-shaped lumps of quartz cemented within a clayey matrix which is lighter in colour than the general sherd matrix. These lumps are mudstones, argillaceous sedimentary rocks consisting of quartz grains floating in a solid matrix of mud. The quartz in the mudstone is less than 0.15 mm across and is of a high concentration - more than 25%. These mudstones are loosely structured and frequently they have been partially or completely weathered out, leaving irregularly-shaped voids. The largest mudstone fragment visible (only one thin section was prepared) measured 5.2 mm long, but the average length is 2.0 mm. These mudstones, or their voids, comprise 10-15% of this example. They are probably a natural inclusion in the clay, and not a temper additive.

Extremely similar material has been identified macroscopically, and confirmed petrologically, from Iron Age contexts at the following sites:

Breidden (all vesicular pottery is mudstone fabric)

Ffridd Faldwyn (")

The Berth (")

Midsummer Hill Camp (")

Worcester-Nudix Court (") unpublished; Worcester City Museum

Blackstone, Worcs (one-third of the total pottery by weight is mudstone fabric) forthcoming report.

Twyn-Llechfaen (SO 082291) - small collection.

Gaer (SO 175376) - small collection

Droitwich-Friar St. 1975 - small collection

Dinedor - small collection

Credenhill	) The mudstone fabric
	) pottery from these
Kenchester (Iron Age occupation) forthcoming	) sites is less than
	) 1% of the total
Croft Ambrey	) Iron Age pottery
	) by weight from that
Danes Camp. Conderton	) site

This distribution and rare presence of Malvernian inclusions in a small number of examples (to be published in detail elsewhere - thesis, Southampton University) suggests that a source for this fabric may lie in west Worcestershire. This is supported by the presence of mudstones in this area (Earp & Hains 1971, 72-77; 88). The pottery distribution strongly follows the River Severn valley, and is in contrast to the distribution of Malvernian B_1 fabric wares (Peacock 1968, 421-22; Fig. 2):- where there is a large proportion of B_1 fabric material, i.e. at Beckford, Croft Ambrey and Sutton Walls, there is very little or no mudstone fabric pottery; while at Midsummer Hill Camp, Blackstone, The Berth and Breidden there is no B_1 fabric pottery, only mudstone fabric pottery. The majority of these sites have yielded Malvernian A fabric material.

The rim and vessel forms, rare decoration of stamped and linear-tooling, and occasional additional rocks and minerals all suggest that this mudstone fabric may belong to the Malvern Hills complex of Iron Age pottery production in this region. However, the source for this fabric may prove to be up to 8-15 km from the Hills themselves. Nevertheless, the mudstone material could be considered a candidate for inclusion in the general terminology of 'Iron Age Malvernian pottery'.

SECOND PETROLOGICAL REPORT FOR BRENIG 48 FINDS Nos. 730 and 739

My Reference Nos., - NH and NI, respectively.

Two small sherds were submitted for examination in response to the first report on BG48 - Find No. 717. These three sherds constitute the entire collection of hand-made, prehistoric pottery found on the surface of the subsoil at the centre of the post-ring building on this site.

Find no. 739(NI) is a small fragment of a probable body sherd. It is black in colour and seems to be sooted (?pre- or post-depositional sooting). This sherd is slightly vesicular and very light in weight. Microscopically, by thin-sectioning and petrological analysis, the fabric of this sherd proved to be identical to the mudstone fabric of BG48 - Find No. 717 described in detail in the first report.

Find No. 730(NH) is another small probable rim sherd which is black in colour. This sherd is not vesicular and appears to be much denser than either BG48 - Find No.717 or 739. Microscopically, the fabric of this sherd is extremely similar (?identical) to the Iron Age Malvernian Group C Fabric identified by Peacock (1968, 423-24; Fig. 3:18-23). This sandstone fabric is most likely derived from the Cowleigh Park beds located immediately to the west of the Malverns in Hereford and Worcester. In detail, the fabric consists of an optically anisotropic red/brown clay matrix containing frequent, crushed coarse sandstone fragments. These fragments are angular in shape, and contain round grains of quartz in a granular cement. One piece of sandstone contained a fragment of plagioclase felspar (albite twinning), and another piece had a lava fragment. The fabric also has a background of sub-angular quartz grains measuring about 0.05 mm across and rare clay pellets. Three pieces of rhyolite were also present. They measured from 1.0 mm - 3.0 mm across. It is interesting to note the similarity in ceramic fabric assemblages between the Iron Age occupations at the Breiddin hillfort and Brenig 48. Petrological analysis of the Breiddin collection by Dr David Williams (Musson *pers.comm.*) has demonstrated the presence of both mudstone fabrics and probable Malvernian Group C pottery on that site. Thus, the identification at Brenig 48 of two types of Iron Age pottery probably produced in the Malvernian area of Hereford and Worcester places this seemingly isolated site within the broader social-ceramic network of the West Midlands-Welsh Borderland.

References

Earp, J.R. and Hains, B.A., 1971:
The Welsh Borderland, British Regional Geology, 3rd ed. HMSO, London.

Peacock, D.P.S., 1968:
'A Petrological Study of Certain Iron Age Pottery from Western England', Proc. Prehist. Soc., 34, 1968, 414-27.

APPENDIX 5

HUMAN CREMATIONS FROM THE BRENIG VALLEY

Carole A. Keepax and T.P. O'Connor, Ancient Monuments Laboratory, London.

Twenty-two samples of cremated bones from ten sites in the Brenig Valley were submitted for study. A further seven samples were examined in the field. With one exception the sites were thought to be Bronze Age in date.

Some of the samples contained bone only, but many were submitted with the surrounding deposit. These samples were generally passed through a 1 mm sieve and the bone separated by hand. The bone was then divided into anatomical groups (e.g. long bones, skull), and each part weighed separately (see Table 1). The samples examined in the field were not weighed. Wherever possible, comments are made on the age, sex and number of individuals present in each sample.

Brenig 42

BG42:15 "On old ground surface in SE quad. - possible pyre site (F3)".

A few tiny fragments of unidentifiable burnt bone are present.

Brenig 40

BG40:4 "From disturbed area at centre of barrow, associated with sherds of a Collared Urn".

This sample contains calcined bone fragments representing most parts of the body (see Table 1). Some of the tooth fragments suggest that the individual may have been fairly elderly.

Brenig 41

BG41:27 A sample thought to be wood: "from the base of the grave pit".

The structures observed resemble highly decayed bone.

BG41:32 A sample thought to be wood: "from the edge of the grave pit".

Heavily iron-stained deposit with iron-replaced material, possibly bone.

<u>Brenig 45</u> : Burial 1

BG45:196 "From central grave pit (disturbed by Victorian robber-pit)".

There is a small amount of human calcined bone (mainly long bone shaft fragments).

BG45:66. "Bottom of Turf Stack Mound", assumed to be spill from central grave. Examined in the field.

There are only a few fragments, mainly long bone shafts.

BG45:20 "From Victorian robber-pit".

A few fragments of calcined long bone shaft are present, probably human.

<u>Brenig 45</u> : Burial 2

BG45:32 (F9) Examined in the field.

These are the fairly well-calcined remains of an adult, probably in the age range 25-45 years. The sex is indeterminate though there are indications that the individual may have been a female. Most parts of the body are represented; there is no evidence suggesting that more than one individual is present.

<u>Brenig 45</u> : Burial 3

BG45:8 (F4) Examined in the field.

These are the fairly well-calcined remains of a mature adult. There are some indications that the individual may have been male. Most parts of the body are represented, and there is no evidence to suggest that more than one individual is present. The hand, long bones, and vertebrae display slight bony lipping, probably due to degenerative joint disease (osteoarthritis).

<u>Brenig 45</u> : Burial 4

BG45 : Cremation found in 1971. "Content of cremation pit from the top of the turf stack mound".

This deposit was previously examined at Liverpool University; our comments agree with theirs, i.e. that there is a small quantity of unidentifiable human bone.

Brenig 45 : Burial 5

BG45:185 (F21) "Cremation in top of turf stack mound".

A very small amount of calcined human bone (probably from an adult) is present. This consists mainly of tooth roots and fragments of phalanges.

BG45:184 (F21) "Contents of a cremation pit in top of turf stack mound (see sample 185)".

This large soil sample yielded less than 1 g of bone, not identifiable as human.

Brenig 45 : Burial 6

BG45:F3 (Urn 1) "Contents of Urn". Examined in the field.

This urn contained the well-calcined remains of a fairly young adult, probably male. Most parts of the body are represented. There is no evidence to suggest that more than one individual is present.

BG45:6 (F3) "Bone from outside Urn 1". Examined in the field.

A very small amount of well-calcined bone (mainly fragments of skull vault and long bone shafts) is present. There is no good evidence to indicate the age and sex of this obviously incomplete individual, but the general thickness of the bones suggests that this was not a child.

Brenig 45 : Burial 7

BG45:Urn 2. "Contents of small urn in palisade trench". Examined in the field.

Very few well-calcined, poorly-preserved bones are present. Much of the bone was reduced to very small, unidentifiable fragments. A few fragments of long bone shaft and skull, some deciduous tooth crowns with unformed roots, and left and right petrous bones were identified. The state of the dental development and general size of the bones indicate that the child was new-born or not older than six months at the time of death.

The major parts of the skeleton are represented and therefore there is no reason to suppose that an incomplete body was cremated. The bones are poorly preserved because of their originally frail nature. Any discussion of 'ear bone rituals' is therefore not justified in this case.

BG45:39 "From just outside the 'wall' beneath the 'cairn'". Examined in the field.

A very small amount of unidentifiable bone is present.

Brenig 8

BG8:8 "Isolated scatter of bone in central grave pit in dark loam".

A few fragments of unidentifiable bone (probably unburnt) are present. These cannot be definitely identified as human.

BG8:11 "Main mass of cremated bone in dark loam fill in central grave".

A few fragments of poorly-preserved burnt bone are present. Most of these seem to be from long bones. Some fragments are thinner than usual, suggesting that the individual may have been immature.

Brenig 46

BG46:1&2 (F9) "Cremation in small stone cist near edge of cairn".

A minimum of one adult individual is present; most parts of the body are represented (see Table 1).

Brenig 14

BG14:8 "Entire contents of a cremation pit beneath the central area of cairn".

Most parts of the body of a single individual are represented (see Table 1). This was probably an adult. There is no evidence suggesting the presence of more than one person.

Brenig 6

BG6:09A "From disturbed turf and stone mound of cairn, associated with grey soil".

A few fragments of calcined bone are present. These cannot be identified as definitely human.

Brenig 51

BG51:F7 "Contents of Urn B". Primary burial.

The remains were partly embedded in a ferruginous 'iron pan' material. They represent a minimum of two individuals, as shown by duplication of the pisiform bones. The bones of the two individuals could not be distinguished, but it appears that both were adults; their sex is uncertain. All long bones were well represented, although it is impossible to assess whether this applies to both individuals or not. The presence of numerous small extremity bones also suggests cremation of the entire body, as mentioned above (see Table 1).

Two vertebral centra display distinct osteophytoses around their margins. An apparently lipped proximal articulation of a metatarsal is also present. These changes are caused by degenerative joint disease (osteoarthritis), and indicate that at least one of the individuals was probably middle-aged or older.

BG51:F6 "Contents of small pit in central area".

The remains are probably those of a juvenile (in the order of 11 years old). This age estimate was based mainly on the teeth, which included a deciduous canine. The sex could not be determined. All parts of the body are represented, suggesting that the body had not been allowed to decay before removal to the cremation fire (see Table 1). No pathological abnormalities were noted.

Brenig 44

BG44:294(F43) "Contents of a pit in the centre of the Ring Cairn".

These are the well-calcined remains of an adult, probably not very advanced in age. Most parts of the body are well represented (see Table 1). There is nothing to suggest that more than one individual is present.

BG44:Spoil heap "Scraps of bone from central cremation (F43)".

A small amount of well-calcined bone from an adult individual, including long bone shaft fragments, tooth roots and bones from the hand, was identified.

BG44:F20 "Contents of Pot A".

The remains of an adult are present. There is no evidence suggesting the presence of more than one individual. Most parts of the body are represented (see Table 1).

BG44:F20 "Contents of Pot B".

The well-cal ined remains of at least <u>two</u> individuals are represented .as indicated by the identification of two right petrous bones). The presence of partially-developed tooth crowns and unfused epiphyses suggests that one individual was a child, probably about 5 years old. Teeth and bone fragments indicate that the other individual was an adult, but probably not very advanced in age. Weights are indicated on Table 1.

BG44:147 "From Pit B in the cairn built against the ring on the west. This pit belonged to the latest phase of activity ".

There are a few small and eroded fragments of bone, not necessarily human.

<u>Brenig 48</u>

BG48 01:97 "From the midden in front of the house in Area 01".

A few fragments of calcined, unidentifiable bone are present, together with a few fragments of herbivore teeth and the unburnt lower third molar of a cow.

(Animal bones identified by Mr. R. Jones).

<u>TABLE 1</u> Weights of anatomical groups in Brenig cremations (g)

Sample No.	Long bones	Skull & teeth	Vertebrae	Pelvis	Pectoral	Extremities	Ribs	Misc.	Total
BG 14	116	33	18	0	0	2	1	0	170
BG 40	450	160	20	31	0	30	9	0	700
BG44 Pot A	288	138	3	0	0	3	0	147	579
BG44 Pot B	422	304	25	11(?)	12	33	79	792	1678 (2 indivs.)
BG44:F43	609	227	57	5(?)	3	34	45	714	1694
BG 46	300	75	14	0	0	18	7	0	414
BG51:F6	165	108	10	24	8	46	5	0	366
BG51:F7	482	109	18	21	13	74	11	0	728 (2 indivs.)

Appendix 7

GLACIAL AND LACUSTRINE SEDIMENTS OF THE BRENIG VALLEY: ANALYTICAL RESULTS.

Edward Derbyshire, Professor of Physical Geography, University of Leicester.

Note These analyses were carried out for the Dee and Clwyd Water Board in connection with the engineering of the dam.

The bedrock surfaces of the Brenig-Fechan valley and large areas of moorland to the east are mantled by thicknesses of up to 42 m of till, sands and gravels left behind by the Pleistocene glaciers and their meltwaters, and often interbedded with lacustrine deposits. The tills are well-graded to clast-dominated in type. The tills are characterised by both subvertical and subhorizontal fissures, a strongly consistent pebble and granule orientation and a loose to compact microfabric. They are regarded as a mixture of subglacial lodgement and meltout tills (i.e. deposited beneath the glacer by plastering on to the surface and by slow melting out of debris-rich basal ice, respectively). The clasts are predominantly of Denbigh Grit lithology and generally subangular to subrounded with occasionally striated facets. They are clearly of southerly to south-westerly provenance, as is the grey (R7 5/2 Munsell) silty-clay matrix. The clay-size fractions are made up of quartz, muscovite and chlorite derived as rock flour by the glacial grinding of the local bedrock, clay minerals attributable to atmospheric weathering being absent. Reaction varies from neutral to mildy acidic. Pedogenic modification (alteration by soil forming processes) is limited to the upper 4 m, where acidic to strongly acidic reaction is common. However, even here, mineralogical alteration is only superficial. The yellow colour of the till fines (2.5 Y 6/4) is due to finely divided iron hydroxides, which coat clast surfaces and till fissures, together with manganese oxides which locally act as a cement.

Tills

The Brenig tills are well graded to matrix dominated lodgement and meltout tills, the matrix being of cohesive type (McGown & Derbyshire, 1977). Typical grading envelopes of material finer than 60 mm (Fig. 1) show a gravelly, sandy clay silt, 45-59% being in the clay and silt range and an average of 20% in the sand grades. This reflects the origin of the till from abrasion of greywacke bedrock. The log-probability plot (Fig. 2) brings out the sharp break at the lower end of the coarse silt grade, separating the matrix from the clast population (McGown 1973) in the manner typical of comminution tills.

The tills are clearly of southerly to south-westerly provenance as indicated by the dominance of clasts of gritstone and siltstone (Denbigh Grits). This provenance is confirmed by long-axis orientation study of clasts from selected samples of till from the eastern (large) drumlin (Fig. 3) at the dam site.

The fabric of the tills may be expressed in terms of selected structural components, namely the joints, the disposition of the a-b planes of included clasts (i.e. the largest plane within the clast form), and the organisation of the matrix (microfabric).

Four major joint suites appear indicated. These are made up of two high angle joint sets, one dipping at 72° towards 012° true and the second dipping at 92° towards 285°. The deduced mean direction of ice movement (Fig. 4) almost precisely bisects these two joint set directions, suggesting a major principal stress from between south and west. This might be explained by shear stresses (Kupsch 1955) from a glacier overriding previously deposited till.

The macro-fissility so common in overconsolidated tills (Elson 1961) is expressed in this till by two low-angle fissure suites. The first, dipping at 10° towards 035°, bisects the angle between the drumlin axis and the median pebble orientation. The second, dipping at an average of 13° towards 300°, closely approximates the azimuth of the adjacent side-slope of the drumlin and the a-b planes of the contained pebble- and granule-size clasts.

The disposition of the a-b plane (or the maximum projection areas) of till clasts is a sensitive indicator of the pressure field within the till during its deposition. It is broadly complementary to the pebble long-axis orientation. The dip and azimuth of the a-b planes of till particles (the till fabric) are plotted on a Schmidt net (lower hemisphere). It can be seen (Figs. 3-6) that the fabric, the drumlin form and the dominant fissure population (expressed as macro-fissility) are closely related. The disposition of the clasts is original, but the sympathetic fissure population has probably been accentuated by pressure release.

Stereograms of the disposition of the a-b planes and a-axes of the same clasts are presented for comparison (Figs 5 and 6). The a-axis maximum is much weaker than that for elongate pebble-size clasts (Fig. 3). In the case of Figs 5 and 6, all clasts were measured rather than just those with clearly developed long axes, and the dominance of platy or wedge-shaped clasts over rods results in a reduced maximum in the a-axis plot. Nevertheless, the modal orientation (245°) is very similar to that of the pebble-size clasts (225°).

A small sample of grey till from a borehole was air-dried, fractured and vacuum-coated with gold palladium and viewed at a variety of magnifications in a scanning electron microscope.

The matrix was found to consist of silt and clay sized quartz fragments, together with clay minerals (see below). The handling properties of the till matrix are those typical of silts, but the grading curves indicate that the predominant grain size is a silty clay. This apparent anomaly is explained by the aggregation of the clays into silt-size units ('domains'). The fabric also includes clusters of clay (in domains with stepped face-to-face structure) and occasional single clay grains which act as delicate bridges between silt-size clusters. Clay also acts as a coating on the larger grains. Figure 7 shows the features described. The sample has much in common with microfabrics of modern, dilated lodgement tills although it does contain some compact, aligned aggregations similar to the matrix of some lightly over-consolidated Pleistocene lodgement tills.

Some sub-horizontal aggregates of clay and silt particles occur within this loose fabric, suggesting that this till sample is normally to only lightly over-consolidated, and probably of subglacial lodgement origin.

Silty Clays

The grading envelope (Fig. 1) shows a predominance of clay (45-55%) with fine to medium silts (40%) and some sand. Occasional pebbles ('dropstones') occur.

The rhythmically bedded silts, in doublets typically 1 mm - 3 mm in thickness, are the product of seasonal variation in the sedimentation rate of fines in a proglacial lake contained in the Brenig valley by ice from the Snowdon-Arenig ice-shed which sealed the valley at the southern (outflow) end. The rhythmites are best developed in the saddle and at depth (c. 30 m) north of the eastern (large) drumlin crest. With proximity to the surface and to the onset (up-glacier) slope of the eastern drumlin, the silts become less and less clearly graded and thinner and less regular in occurrence. Silts do not appear to be significant in the upper 30 m of the onset face of the drumlin, and below this level, while occasionally laminated, they are nowhere rhythmically bedded. In surface exposure, the silts may be finely laminated (average thickness 1.0 mm.) and remarkably uniform. The handling properties of the lacustrine deposits suggest a higher silt content than that found in the grading curves. This probably arises from deflocculation in the laboratory of the silt-size aggregates of clay particles making up these deposits.

In order to assess this possibility, small samples of grey and yellow silts were taken from two boreholes. These were air-dried and vacuum-coated with gold palladium prior to inspection in a scanning electron microscope.

The major structural units were found to be aggregations of silts: these aggregates reach 25 microns in diameter. The majority of the constituent grains are of silt-size, confirming the impression gained from the hand specimens, within which voids are evenly distributed. It is also evident, however, that many of these silt-size components are made up of clusters of clay-size particles. In fact, as Fig. 8 indicates, the clay-size particles are clustered together into silt-size domains with a predominance of face-to-face contact. Single-grain fabric is absent. A degree of flocculation is suggested, therefore. In addition, the fabric includes some delicate clay-silt bridges and buttresses typical of many modern, normally consolidated lacustrine silty clays.

The silty clays slake readily in distilled water and in the unconfined state and, when peptized, consist predominantly of clay-size grains. Elemental analysis using the electron microscope showed the major peak to be aluminium with notable peaks for chlorine and silicon. The iron peak was diminutive.

Where they overlie bedrock, both the tills and the lacustrine silts are yellow to varying degrees due principally to limonitic staining. The yellow colour in the tills is often irregular, patchy and often concentrated about small joints and matrix-clast interfaces. Sometimes, however, it affects the whole till or rhythmite mass. The discoloured material is more cohesive, slightly less permeable and may have a higher moisture content.

X-ray Diffraction Analysis

In order to assess the degree to which weathering was responsible for the yellow colour, X-ray diffraction analysis was undertaken.

In the laboratory, a suspension of each sample was deposited on three glass slides and air-dried. One slide was scanned untreated, a second was heated to at least 550°C for two hours and scanned, and a third was suspended in ethylene glycol vapour for one hour at 80°C and then scanned. Length of scans was from 3-30°2 using CuK radiation and a Ni filter. The statistical error is 3%.

The X-ray diffractograms from both grey and yellow rhythmites and tills are shown below (Figs 9 & 10).

The principal minerals present are, aside from quartz (001 peak at 26.6 degrees 2), muscovite (peaks readily recognizable at about 10A (8.80 degrees 2) and 5A (17.8 degrees 2), and a chlorite with peaks at 14.25A (6.3 degrees 2), 72A (12.2 degrees 2), 4.75A (18.7 degrees 2) and 3.57A (25.2 degrees 2). Some traces from the till fines show feldspar peaks at 3.18A (28.0 degrees 2 : plagioclase) and 3.25A (27.4 degrees 2 : orthoclase).

The muscovite is well crystallised, as shown by the sharp peaks, and probably of the 1M polytype, there being no evidence of the 1Md polytype with its disordered structure, yielding broad peaks (illites). The disappearance on heating of reflections of higher order than 14A identifies the chlorite component and its weak 001 and 003 reflections suggest it is the Fe-rich variety. There is no evidence of interstratified, mixed-layer minerals of either the montmorillonite-halloysite-kaolinite family or the montmorillonite-chlorite-muscovite-illite suites. The minor peak at about 7.9A (11 degrees 2) in the yellow silt is an unidentified non-clay mineral.

The striking similarity between the diffractograms for all samples is evident: they closely follow X-ray diffractogram traces for powders of the local bedrock types. The well-crystallised nature of the muscovite and the absence of illite and the interstratified mixed-layer clay minerals is consistent with the suggestion on process given below.

The yellow-staining of both tills and rhythmites is due to the presence of finely divided Fe. Closed tube and other tests suggest limonite/goethite. In the joints and clast-matrix interfaces in the near surface samples from the core trench, faces were found to have a lining of material whose properties suggest the presence of haematite. This has not been encountered at depth and must be ascribed to pedogenic processes which would be interesting in view of this mineral's pedogenic occurrence in British soils being associated with palaeosols.

The pH of the samples varies from neutral (7.1 for till at a depth of 40 m) to slightly acid (6.4-6.0 for grey tills of core trench at 5 m depth and 6.6 for grey and yellow clays in boreholes) and distinctly acid (4.8-5.0 for yellow till in the core trench at a depth of 4 m and at 27.3 m in a borehole).

While the result from the core trench is that to be expected, the low pH of the yellow till from the borehole is from material adjacent to bedrock and 3 m below grey silts with a pH of 6.6. It is the diffractogram (Fig. 10 upper) of this acidic sample which shows the highest Fe background.

Taken together, these results favour the view that alteration at depth has been restricted to slow movement of ground water from the subjacent shales, which themselves are rich in limonite staining along the frequent joints and bedding planes. The limonite and associated low pH values probably originate from the oxidation of a pyritic facies of the Denbigh Grits. The diffuse limonite staining is not due to normal (subaerial) weathering but to local perched watertables and slow permeation of water associated with spring sources.

The average depth of surficial weathering (4 m) is comparable with that for clay tills of the last ice advance in Scotland (3 m - 4 m). This superficial nature of the weathering of the glacial sediments, the local stratigraphy at Brenig and the very limited frost churning (geliturbation) of the upper surface of the glacial deposits does not accord with prolonged exposure through an interglacial period, followed by a period of glacial cold, and then the warm, moist postglacial, and is sufficient to suggest some reappraisal of Embleton's (1970) opinion that the Denbigh Moors were not overriden by ice during the last glaciation of north-east Wales. Although it is clear that adjacent areas of north Wales have suffered more than one ice inundation, clear-cut evidence for multiple glaciation in the Denbigh Moors is lacking. This and their gently moulded morphology led Embleton to suggest that they were not inundated by ice during the last (Devensian) glaciation. However, the evidence and detailed results reported here would seem to be at variance with this conclusion.

Bibliography

Derbyshire, E. and McGown, A., 1976:
''Total' fabric of some till landforms', Earth Surface Processes, 1, 1976, 17-26.

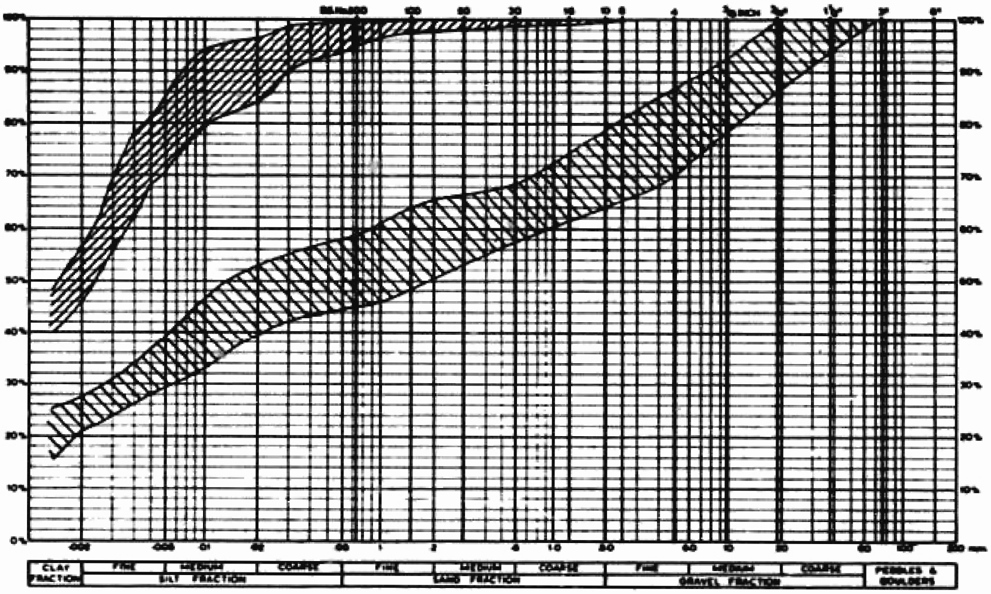
Elson, J.A., 1961:
'The Geology of Tills', Proc. 14th Con. Soil Mech. Conf. Nat. Res. Counc. Canada, Assoc. Com. Soil and Snow Mech., Tech. Mem., 69, 1961, 5-36.

Embleton, C., 1970:
'North-eastern Wales' in C.A.Lewis (ed) The Glaciations of Wales, Longmans, London, 59-82.

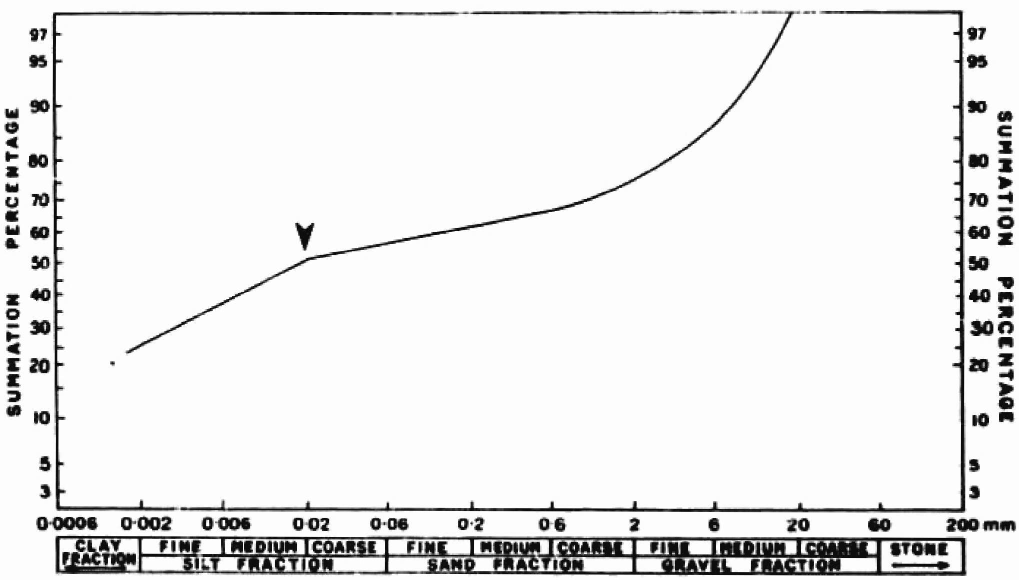
Kupsch, W., 1955:
'Drumlins with jointed boulders near Dollard, Saskatchewan', Bull. Geol. Soc. Amer., 66, 1955, 327-38.

McGown, A., 1973:
'The nature of the matrix in glacial ablation tills', Proc. Intnl. Symp. Soil Structure, Gothenburg, Sweden, 1973, 87-96.

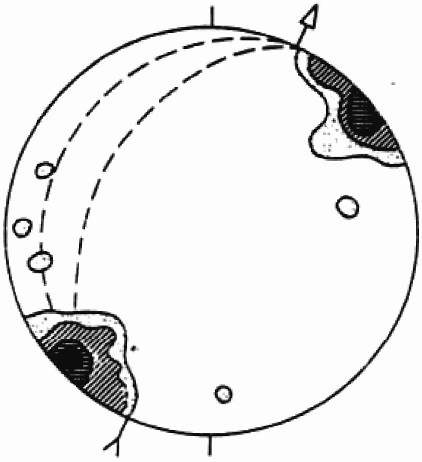
McGown, A. and Derbyshire, E., 1977:
'Genetic influences on the properties of tills', Quart. J. Engng. Geology 10,1977, 389-410.



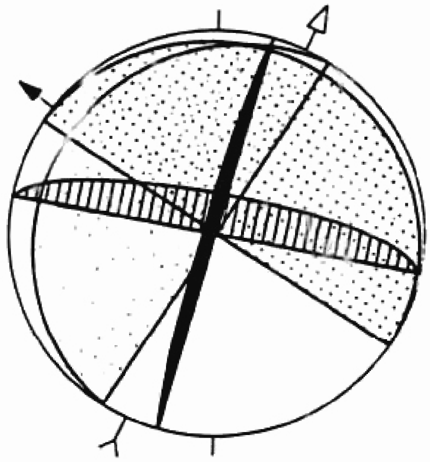
App. 7.1 Grading envelopes from Brenig tills (lower) and glacilacus-trine silty clays (upper).



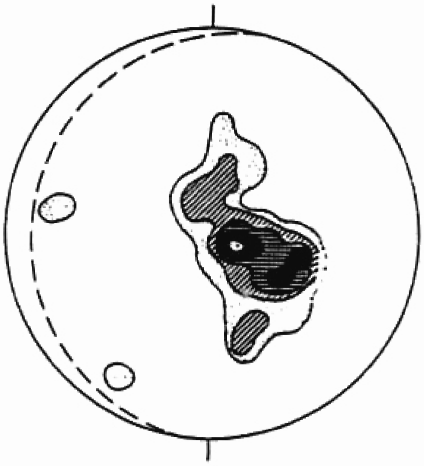
App. 7.2 Log. – probability curve expressing mean size distribution of till made up of two components (matrix and clasts) typical of comminution products.



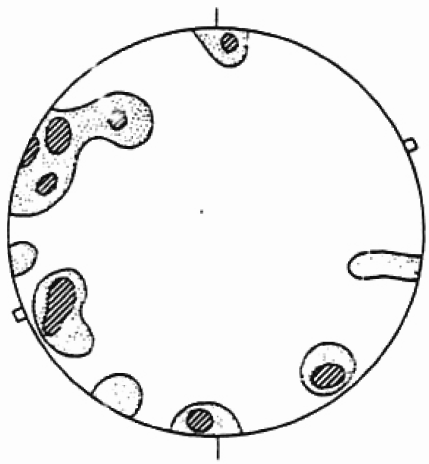
App. 7.3 Plot of the long axis orientation of elongate pebbles at a site near the crest of the eastern drumlin at the Brenig dam site. The dominant sub-horizontal fissure population falls within the two cyclographic traces. Class intervals shown below.



App. 7.4 Fabric diagram (Schmidt net) showing disposition of conjugate sub-vertical joint sets (solid black and hatched). Also shown (light stipple) are the low angle fissure set (13 dip toward 300 azimuth) interpreted as a desposition feature, and the low angle fissures dipping at 10 along an azimuth of 035 (medium stipple) interpreted as the product of stress relief.



App. 7.5 Fabric diagram (Schmidt net) for till in the Brenig drumlin expressed as normals to the maximum projection plan of contained pebbles and granules. Class intervals as below. The dominant joint set at this point is shown by the cyclographic trace and the pole to it by the dot which falls within the mode of the pebble fabric.

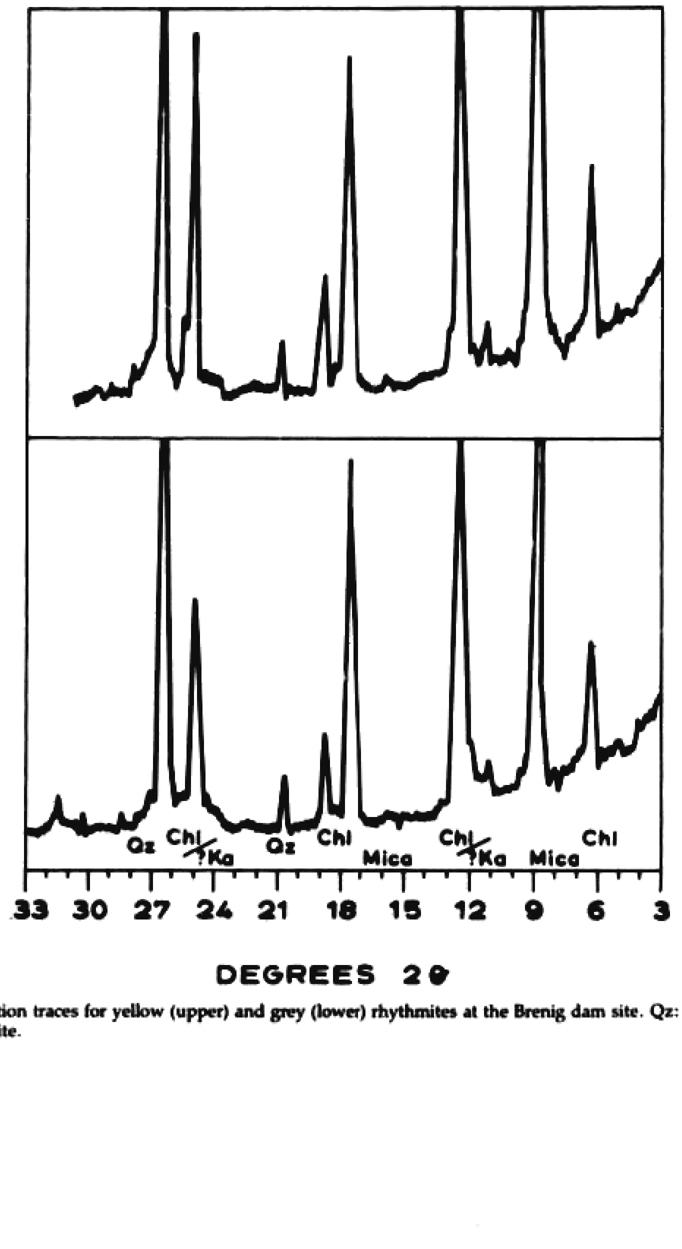


App. 7.6 Fabric diagram showing the orientation of the long axes of the same pebbles and granules used to construct Fig.3. Class intervals as below. The box symbols indicate the median orientation. Compare with Fig. 1 and see text.

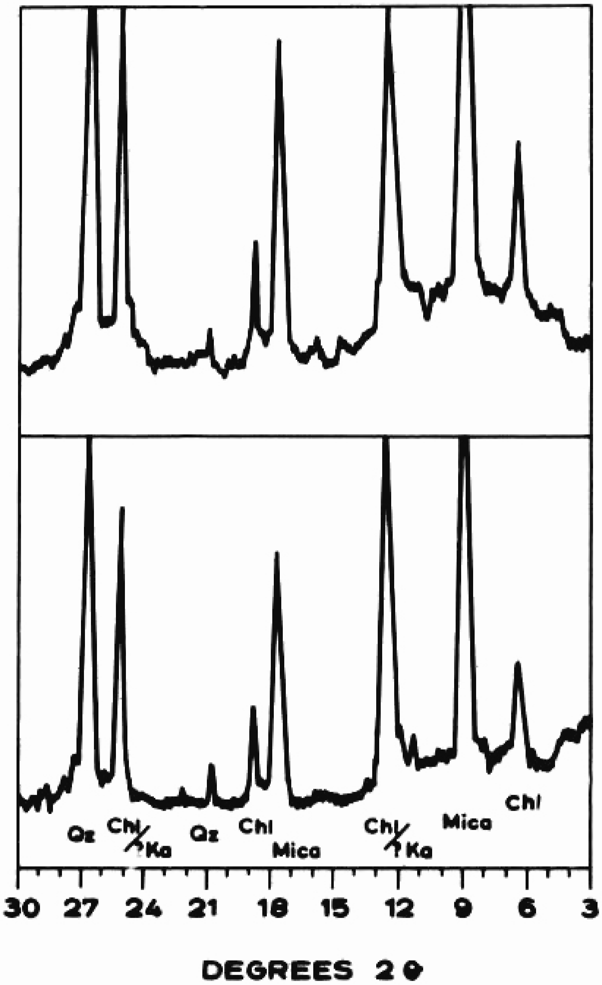
PER CENT PER 1 PER CENT

App. 7.7 Scanning electron photo micrograph showing a vertical section in the matrix of the Brenig till. The scale bar represents 10 µm. See text.

App. 7.8 Scanning electron photo micrograph of vertical face of glacilacustrine silty clays. The scale bar represents 10 µm. See text.



App. 7.9 X-ray diffraction traces for yellow (upper) and grey (lower) rhythmites at the Brenig dam site. Qz: quartz; Chl: chlorite ?Ka: ?Kaolinite.



App.7.10 X-ray diffraction traces for yellow (upper and grey (lower) tills at the Brenig dam site. Abbreviations as in Fig.9.