An Anglo-Saxon Watermill at Tamworth

Excavations in the Bolebridge Street area of Tamworth, Staffordshire, in 1971 and 1978

by Philip Rahtz and Robert Meeson

with contributions from

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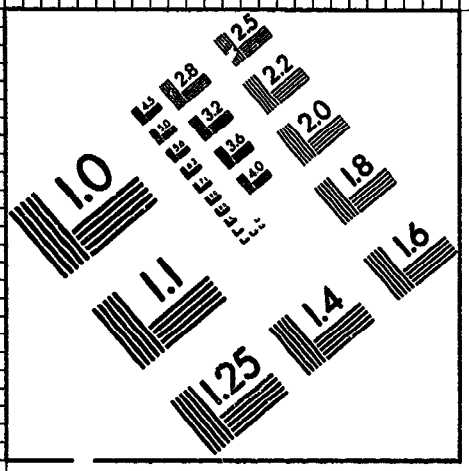
CONTEXT NO.	PHASE	LOCATION	DESCRIPTION	DIMENSIONS	INTERRELATIONSHIPS	INTERPRETATION	FINDS SUMMARY	PHASE PLAN	SECTION NO.	PLATE NO.
23g	5a	do	N-S timber, short length very irregular					5	S8	
23h	5a	do	E-W timber; lower than others; peg hole towards W end					5	S7	
24	5a	Centre of western area	Cutaway at 45° to 22 heading NE. Only seen when 444 removed; this occupying top 10cm. Below top 10cm, was further 10cm (498) of dark grey clayey soil, sloping down, to level of timber 23a to S; disturbed clay and gravel (499) below this to base of cutaway; fill displaced by 23 and cut by 22.					5	S16	



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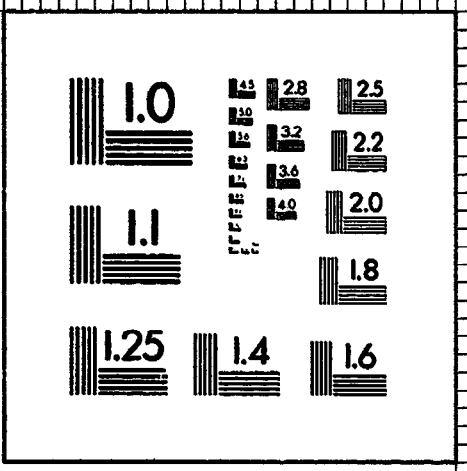

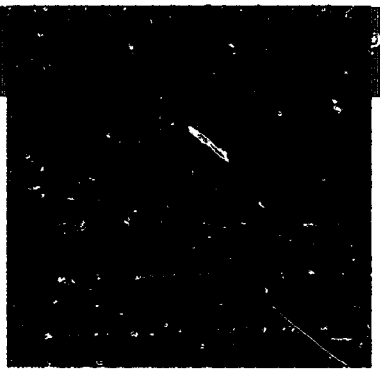

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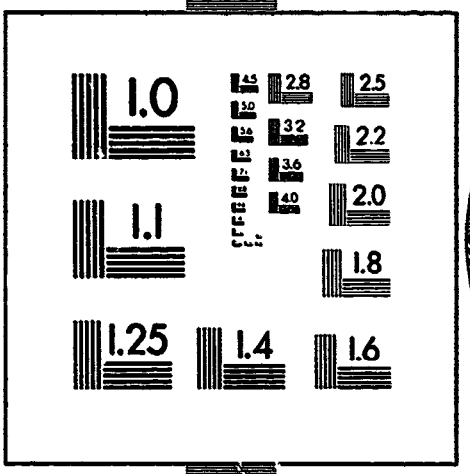

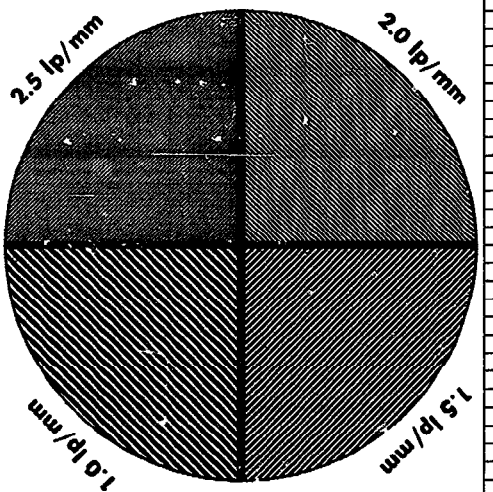

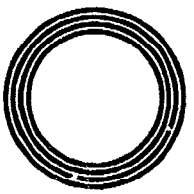

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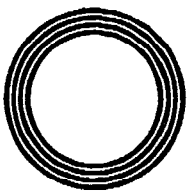

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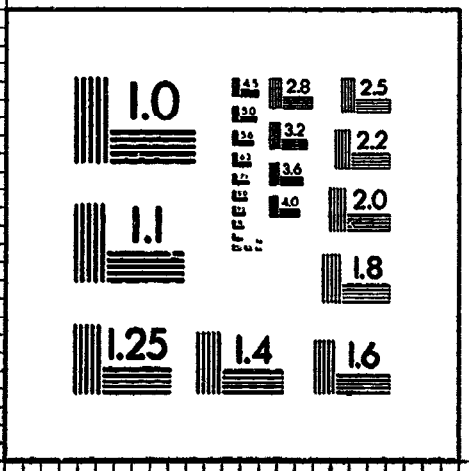

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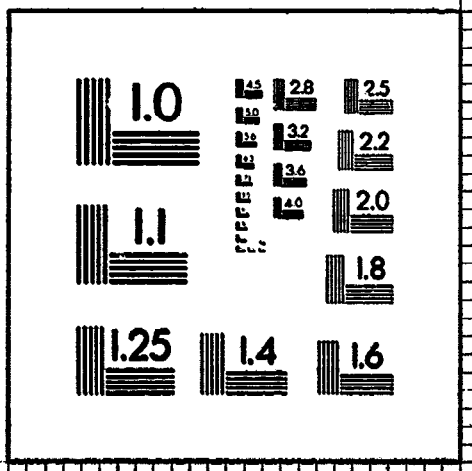

TABLE II LAYERS AND FEATURES

Introduction This table was compiled from the field record books and other notes. Additional information was gained from plans, sections, elevations and photographs. Brief notes on finds are also included. Four layers were initially defined over large areas; these have the prefix L 1, 2, 3, 4, with sub-divisions in lower case letters. The main series is however numbered; these were originally prefixed F, but this has been omitted in this table and in the text and drawings. These numbers also have lower case lettered subdivisions. Those up to 300 were given druing the excavation; those after 300 were added in 1985 for convenience of reference.

CONTEXT NO.	PHASE	LOCATION	DESCRIPTION	DIMENSIONS	INTERRELATIONSHIPS	INTERPRETATION	FINDS SUMMARY	PHASE PLAN	SECTION NO.	PLATE NO.	MONO NEGATIVE NO.	COLOUR SLIDE NO.	REMARKS
1	8	Over whole W and N part of site	Pebble surface; heavy concentration in NW corner over natural		Below L3; cf 62	Possible partly merely weathered top of natural, though may be stained green and yellow; but not all, as slopes up over 33	IR1, AB, pot C12 or very early C13		S2				
L1	10	Widespread	Unstratified material in top rubble over whole site				C01 (1807) CA1 (pin)		S1-3 S11 S18				
L1a	10	do	Thick red clayey with some red sand between L1 and L1b; general level, assoc. with brick walls in places						S1				

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25-27	9	S of centre; see S13	Pot in sketched section S13; in disturbances later than 58				Pot C13-C16		S13				Fig 76 nos 31, 36
28	10	In NW corner	Wall, robbed; stones in red clay					10	S1				
29	10	do	Hearth; large flat sandstone blocks with blackened upper surfaces. Enclosed by wall at either side and ?round the S side also; walls of mixed sandstone and limestone, packed red clay as 28			Cut into L3; 5-10cm of L3 remains under 29 at E side		10	S2				See separate plan fig 37
30	9	On edge of N section	Posthole, with stones on edge on three sides, which don't extend into section	20cm deep from 1				8-9	S2				Fill as L3 and may be L3, cf 35

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L1b	10	Widespread	Bands of charcoal with coal, and bands of brown clayey sandy soil and ?daub; cessy material at base		Below L1, above L2		Pot C13, SL AB, IR2, CO2 (jetton), slate		S1, S3, S4 S6 S11 S18				
L2	9	Extent shown on plan in NW area	Thick reddish brown sandy clay and stones over centre cutting I; some cessy material at base, where under L1b		Under L1b Over L3 and L4		Pot C13-14, IR3, AB	8-9	S11				
2	9	Centre of northern area	?Posthole, fill dark soil, two depressions in base	40cm deep below 1	Cuts 1		Green gl med pot, FC and AB	8-9					
L3	9	In NW area	Dark grey-brown sandy clayey soil	c.15cm thick to NW	Under L1, over 1		Pot C12 – C15/16, AB, and charcoal		S1 S2				Figs 75-76 nos 15, 37, 39
3	8	SW of 2	Oval cut; two depressions in base; stones in fill may be postpacking	20cm below 2	Cuts 1	?posthole	Perforated schist hone (ST1), AB, FC	8-9					

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31	9	NW corner	Iron-working feature, oval in shape. Fill as L3 but heavy charcoal in S end. Otherwise dark grey-brown sandy clayey soil, with patches of pink and red daub and iron slag			Site of small bowl furnace? - or iron smithing depression	SL; piece of shaped wood C68, IR4, ORG 1, AB. Pot C12 or very early C13	8-9					
32	5b	NE corner	Buff-brown sandy soil in NE corner of excavation; slight gravel content; heavily mottled with iron or manganese		Overlies 33, cut by 39 to E in S3, and by 382 in S4				S3 S4				Not on plan
33	5b	NE corner	As 32, but darker and more mottled with flecks of red clay and charcoal. Very clean under central part of 32, as soft fine bluish-grey thin layer 1-2cm thick		Below 32 on 34				S3 S4				32 and 33 vary. They are disturbed here by something earlier than 39 pit. They probably equate with 53.

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4	9	In NE part	Irregular depression fill dark soil		Above 1		Pot late med or early EM, FC PL, SL, AB						Not on plan
L4	9	In W area below L2	Greyish-brown clayey soil		Under L2, = 484? Over 7		RC1, SL		S11				
5	8	S of 3 by 190b	Rectangular mark of ?burnt timber		On 1			8-9					Could be earlier and associated with 190
6	9	SW of 3	Circular charcoal mark in L4; to SW of L3	c.10cm above 1	In L4			8-9					
7	5a	Western area	Large slabs of shelly limestone, set in matrix of gravel and very worn.		Possible post-socket 11 among stones	Road; see text discussion	Horseshoe (99, IR8)	5	S7 S11		A6 A10-12 B1-2	9,986-9,988 10,081 10,078-10,090	
8	8	E of centre	Pit or post-hole, fill dark soil	25cm below 1 to W	Cuts edge of 10 Below 4		FC and LE2; pot C13 - earlier C14	8-9	S14				
10	2-3	Across centre	Large negative features NE-SW with timbers			Cutting for construction of mills ?1 and 2	RC1	0-2; 3, 4	S8 S14			10,007 10,096 10,099	cf 376
10c	8	Section S13	Buff-grey clayey silt						S13				

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34	3-4	Widespread	Mixed red and yellow clay			Enveloping and waterproofing of mill 2, crept over timbers in places	Lava millstone (105) on surface	3	S3 S4 S5 S6 S9 S10 S14		C1 C2 C5	9,000- 9,995 10,008 10,051 10,051 10,092	See subdivisions; not all to be interpreted as 34, ie not all in situ
34b	3	In section S3	Probably as 34, but shown as lower in S3, with more yellow lumps among pink			Enveloping of area between mill and millpool			S3				
34c	3	do	As 34			do			S3				Cut-away 323 on north edge
34d	3	In section S3	As 34b, but under central part of area between mill and millpool		Separated from 34e by 148; 335 on surface	Enveloping of area between mill and millpool			S3 S18				
34e	3	do	do		See 34d, but joins to north	do			S3 S18				
34f	3	do	As 34h, but break line between the two										
34g	3	do	Mixed red and yellow clay		Enveloping of area between mill and millpool				S3				Partly over robbing hole 370; see text discussion

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11	5a	Among 7	?post socket, square; fill sandy soil	15cm from top of stones	Among 7			5					
12	1	Centre N part	Irregular shallow depression in natural, fill sandy soil		Cut by 10	?Natural; probably buried soil going deep, or early Saxon feature		0-2					
14	1	Centre N part	Shallow depression, fill sandy soil		Cut by 10 edge and 16	?Deepening of buried soil; cf 12		0-2					
15	1	do	Depression in surface of 1, fill sandy soil		Extension of, or cut by 12	?Natural		0-2					cf 12
16	1	do	Shallow depression, fill sandy soil		Cuts 14, cut by 10; N part not excavated	?Natural		0-2					cf 12
18	1	Centre N part	Shallow depression		Under 1	?Natural		0-2					cf 12
19	10	In section S11	Stake-hole, fill greenish and black clayey sandy soil		Cuts through L2 into L4; later than 7			10	S11				

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34h	3	do	do		do				S3				
34k	3	S4	As 34 above 341			Enveloping of millpool			S4 S15				
341	3	S4	Mixed clay in light grey; called 165 on section, now 165b/341			May not be 34; dug out of mill or millpool area?			S4 S15				
34m	3	S4	As 34, but shown in S4 as distinct wedge above 165, below 341			Enveloping of millpool			S4 S15				
34p	3	NE corner	Some mixed clay in pink-brown clayey matrix			do, but collapsed also over millpool edge			S4 S5				
34r	3	NE corner	As 34, over timber 161			Possibly enveloping in situ, but may all be collapsed material			S4 S5				
34s	4	NE corner	Mixed red and yellow clay in millpool			Destruction material in millpool			S18				

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21	8	Western area	Dense clean sand and gravel with some stone	Extends 4m to E of section S7	Overl i by 94 seals road 7; see remarks	Fill of upper part of 230; possibly bank residue	IR9-11; IR11 may join IR8. Sherds 96, 98, 100, 112; later C11-C12; probably also C13		S7 S16				Abutment 101 etc. is under S part of 21. To NW runs up thinly over 62
22	5a	Western area	Cutaway; 23 timber road set in		Cuts 24; under 7	?Erosion or cut?		5	S7 S11				
23	5a	South western area	Timbers in situ; widely spaced timber baulks with spaces between filled with wood debris, and branches up to 3cm (121 + 23 org)		Set in 22	Major timber road under stone road 7, see text		5	S7	IX	B9-12 C9-10	9,985 10,079 10,082-10,086	
23a-h	5a	as 23	Timbers in 23				CW3 and CW15	5	S7	X	C5-8 C11 D1-6	10,112 10,113	
23a	5a	do	E-W timber; peg in hole towards W end; ?sawn off at E end	9 x 7cm squared				5	S7 S16				

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35	10	Near NW corner	?Posthole, fill dark grey-brown clayey soil similar to L3, but with some flecks of pink and red burnt daub. Small sandstone and pebble packing	15cm below 1			SL; pot C17 - c 1750	10					
36	9	Near NW corner	?Posthole, fill dark grey clayey soil similar to, and possibly = L3	8cm below 1				8-9					cf 30
37	8	Near N edge	Six stones, lettered a-f		In or on 1	?Pedstones of building, or flooring		8-9					Note other unnumbered stones + 75
38	10	Going into W section S1	Posthole, fill sticky black soil as L1b with bits of red clay. Large pebble in top. Dark brown soil in base				L51	10	S1				

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39	9	N end of section S3 North end of S3	Pit, fill in top mixed charcoal-flecked sandy, clayey material; in bottom, black sticky soil		Cuts 32-34, 165 etc. Fills as on 53		PC: Ceramic tiles with nib and groove; roof slate; IR6; pot later C15 - earlier C16	8-9	S3				Fig 76 no. 40
40	9	Near W section S1	Stake-hole; small round hole in patch of red clay			Associated with clay wall 42?		8-9					
41	8	Seen in section S11	Red clayey sand		Under 484				S11				
42	9	Going into W Section S1	Buff-brown clay with straight E edge		In edge of 520. Cut by 89.	Part of building?		8-9	S1				E edge on plan. Cut obliquely in section by 89
44-45	10	In section S3	Sherds		In L1b		C13		S3				
46	8	NE Area	Sherd		In 73		C13-earlier C14		S3				Fig 75, no 16
47	10	In section S1	Clay pipe in 338				PC1		S3				
48	7	Section S3	Lead cross		In 69, close to S3		CM1		S3				
49	5b	NE corner	Buff-brown soil with sand and gravel		On 49a	Latest layer here of 5b; metalling			S3				

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49a	5b	NE corner	Brownish sandy soil and gravel; more gravel than 49		Between 49 and 50.		Sherds 49a, 192 and 223a (Stamford); 201	5	S3 S4				Fig 75 no 3. For 201, see below.
50	5b	NE corner	Dark blurish-grey sand and gravel. On surface some branch wood 5cm diam. Contains some very fine sand			Possibly only deepening of 49a	Stamford ware 51/52, 234-6; Shelly ware 233, FL1; AB		S3				
51-52	5b	do	Sherds		In 50		52 is rim, Stamford ware		S3				Fig 75 no 3
53	5b	do	Buff-brown sandy soil with a little gravel. Slight charcoal		Below 50. Fills 59; merges with 393, or runs out on top of it		FC 3-4 (incl. ?Roman brick)		S3 S4				Going down behind 68. See 32-33
53a	5b	In section S3	Continuation of 53 to S, filling cutaway 59 and down into 60		Fills 60 top edge				S3				

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54	5b	NE corner	Blue-black sticky soil				Stamford sherds 55, 237; C46; strip lead; 81, mill-stone from in base						
55	5b	do	Sherd		In 54		Stamford		S3				Fig 75 no 4
56	10	W centre	Long narrow sunken feature filled with black sandy soil; much decayed wood and some stones		Among 5B; Seals 82		ST slate, FC, ORG2; pot late C17 – c 1750	10					May account for EM material recovered from 58
57	10	S centre	Brick-lined well				Pot, end C17 to c 1750 in fill near base EOT	10	S18 S19		A9 E11 L7 L8	10,065 10,074	
58	9	SW part of cutting	Black ashy soil banking up against 86 where this slopes away to S		On 86		Med and EM pot. Much iron Sl, including large 'buns'. AB. Sherd Stamford; FC; IRS, 6, 7, 15. LRS, c1350-1450		S1 S7 S8 S13 S16c				58 falls away to S of 56. Pot joins to 86. Fig 76 23-30, 32-35, 38 EM pot intrusive

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59	5b	NE corner	Cutaway in 34		Fill 377 and 53. Cut by 60? Cuts 82	?Robbing hole for timbers of NW side of millpool		5	S3				Limits to NE not recorded
60	5b	do	Cutaway in 34		Topfill 53a. Cuts 59? Cut by 80? Cuts 82	?ditto		5	S3				do
61	8	W centre	Post in situ in post-pit surrounded by bluish grey sandy soil; base in 109; ends chopped off to make pointed end	72cm long	In base of 56. Earlier than 56. Cut off by 56. Surrounded by 21	Driven down from level above 21, surviving among 23		8-9			E9	10,086	
62	1 + 5a	W of centre	Heavy gravel with ferrous concretions		Below 42 and under L3 to N; may equate with L1 to N	Metalling on or compacted surface of natural	?Roman tile 83		S7 S11				Merges into 7 as on section S1; not reliable
63	10	In NE corner in N section	Wall; ?part of same structure as 28 wall				Brick in wall as in S2	10	S2				
64	7	NE area	Orange-brown sand and gravel				Sherds 195 (Stamford), 196 (late C12-?C13)		S3 S6 S18				

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65	7	do	Greenish sandy soil with ferrous concretions and some pebbles			Metalling?	Sherds 212, 214, 215; late C11 - earlier C12 and Stamford; 1R14		S3 S6 S18				
65a	7	do	Yellow-buff pebbly concreted soil		?top of 65	Metalling?	Sherds 205-211 (Stamford) and very late 12 or early C13	6-7	S3 S18				Not observed in 1978
66	5b	do	Dark grey sandy soil with greenish streaks		Over 54; under 49a and 66a		Sherds 224, Stamford and later C11-C12; MOR1 (219); FO5, Roman brick		S3 S6 S18				
66a	7	do	Pebbly; this was followed from S, overlying 69, and then rose up over 66b as thin gravelly layer		Above 66b; junction with 49 not clear, but should be later		220-222 Stamford ware; residual from phase 5b		S3 S6 S18				
66b	7	do	Greyish sandy		Above 69; under 66a				S6 S18				

CONTEXT NO.	PHASE	LOCATION	DESCRIPTION	DIMENSIONS	INTERRELATIONSHIPS	INTERPRETATION	FINDS SUMMARY	FIRST PLAN	SECTION NO.	PLATE NO.	MONO NEGATIVE NO.	COLOUR SLIDE NO.	REMARKS
67	5b	NE area	Bluish-grey sandy soil with some pebbles				Sherd (Stamford)		S3 S18				= 405 Fig 75, no 1
67a	5b	do	As 67, lower part more mixed clayey						S3 S18				
68	5b	do	Mixed blue-grey and brownish sandy soil with pebbles; some building stone. Compact. Large block of sand-stone		Overlies edge of 34d, on N side. Fills 80, 84, 85 etc.		AB		S3				
69	7	do	Orange-brown sandy clayey		Between 65 and 70		Lead cross 48; sherd very late C12 or early C13		S3 S6 S18				Lowest stratified sherd of phase 7
69a	7	do	As 69, but separated from it by 405 in S6				Sherd 232 (Stamford)		S6 S18				
70	?5b	do	Greyish-brown sandy silty soil		N edge cuts S or robbing hole (with 366) on S side of millpool			S3					Could be phase 7

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71	5b	do	Brown clayey soil with some red and yellow clay, probably from 34			Probably marking the base of the subsidence of which 54 is the upper fill			S3				
72	8	NE Area. In section S3	Orange-brown clayey soil		Between L1b and 73				S3				
73	3	In section S3	Grey-brown sandy soil with charcoal flecks		Below 72		Pot 46, C13 - earlier C14		S3				
74	5b	NE area	Reddish mottled compact sand, some clay and gravel			Upper fill of robbing hole (edge to S?)	265, lava millstone		S3				
75 a-c	8	Centre of N area	Stones			cf 37 stones		8-9					
76	5b	Section S3	Mixed buff and bluish-grey sandy silt; much more clayey in western metre. Large block of burnt sand-stone		In 80	Lowest fill of robbing hole 80	RC tile, AB		S3				
77	9	Section 57	Orange gravelly in S1		Below 58		Pot, C13-C14; AB		S1				

CONTEXT NO.	PHASE	LOCATION	DESCRIPTION	DIMENSIONS	INTERRELATIONSHIPS	INTERPRETATION	FINDS SUMMARY	PHASE PLAN	SECTION NO.	PLATE NO.	MONO NEGATIVE NO.	COLOUR SLIDE NO.	REMARKS
78a-c	5b	E of centre	Three timbers		In robbing hole 80	Not in situ but thrown back in 80 after larger timbers removed		5					
79	8	NE area	Mixed orange dirty clay, sand, and charcoal			Upper fill of ditch 90			S3 S6				Greyer and darker to S
80	5b	NE area	Hole; as 84 and 85; top filled with 67, 68, 76, 354. Western part goes down to a hole much deeper than east end		Cuts 60?	Robbing hole for removing timbers of millpool	Timbers 78 a-c	5	S3		A4 B3 B5-7	9,989 10,092- 10,095 10,098 10,101 10,102	Limits to NE not recorded
81	5b	do	Fr millstone		In base of 54				S3				No Q no
82	5		Dense, thick heavy gravel, greenish concretions. Around 23 come up to end around N end of 23b, but also extended under 23b and dipped and thickened, going both over and under 23, c, d, g, e. 82 dips and		In places on 341 and slopes up N, cut by 80 etc		AB by 57 wall. 159 in edge (shard c 1050-1100). IR13	5	S3 S7 S8 S9 S10 S16c S18			10,082 10,085 10,094	

CONTEXT NO.	PHASE	LOCATION	DESCRIPTION	DIMENSIONS	INTERRELATIONSHIPS	INTERPRETATION	FINDS SUMMARY	PHASE PLAN	SECTION NO.	PLATE NO.	MONO NEGATIVE NO.	COLOUR SLIDE NO.	REMARKS
82 (contd)			thickens towards W so that under E edge of 23e it is 20cm thick heavy gravel										
83	1?	In W section	?Roman tile		In 307		FC tile		S1				
84	5b	?Centrally E of centre	Shallow slot in line with but immediately W of robbing hole 80. Fill is pebbles 68; extensions of this to the N (a,b,c)		Cuts 3[illegible], 82	Timber-robbing hole		5					
84a	5b	E of centre	Slot fill similar to or = 68		do	do		5					
84b	5b	do	Hole; fill similar to 68		do	do		5					
84c	5b	do	Hole; partly sliced off. Fill as or = 68		do	do		5					
85	5b	do	Slot just S of W end of 80. Fill as or = to 68. Subsidiary features 85 a-c below		do	do		5					

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85a	5b	do	Small hole filled with brown sandy soil		do	do		5					
85b	5b	do	Small hole separated from 85c by small bridge of 34. Fill similar to 68		do	do		5-					
85c	5b	do	Large hole. Fill similar to 68		do	do		5-6					
86	8	Over N edge of ditch 90	Greenish-buff sandy silt with some charcoal		Over 92, under 53	Upper fill of 90	... tile; SL; Much med pot		S7 S8				Some pot joins to 58, including fig 76. 23 (1250-1300)
87	8	E of wall 57	Black ashy soil		Assoc. with 88, east edge	Similar to 58 but separated from it by 86 dipping away to S	Much iron slag, FL, FC tile	8-9					
88	8	On N slope of 90, W of wall 57	Concentration of slag and furnace remains or debris		Cut by 57 wall Assoc. with 87, west edge			8-9					
89	9	In section ... end	Sandstone rubble		Below 77			8-9	S1				= 304?

CONTEXT NO.	PHASE	LOCATION	DESCRIPTION	DIMENSIONS	INTERRELATIONSHIPS	INTERPRETATION	FINDS SUMMARY	PHASE PLAN	SECTION NO.	PLATE NO.	MONO NEGATIVE NO.	COLOUR SLIDE NO.	REMARKS
90	8	NNW-ENE across S part of site	Cutaway, defined by slope of 94 and other layers		Fills as on sections	Medieval town ditch	Pot C13	8-9	S3 S6 S7 S8 S16c S19		A1-3 A7-8	9,996 10,004 10,052 10,077 10,078 10,097	Various stages of definition
91	8	E of well	Posthole contemporary with 87-88. Fill similiar to 87, packing stone in centre, N side	Depth 30cm from top of 94	Surrounded by 87 and cut into 21		2 iron 'buns' 2 frs slag. 1 sherd	8-9					
92	8	W area	Grey sandy silt, leather, horn frs. and wood		Below 86 in 90; later than 94	Upper fill of ditch 90	PC tile, SL 1 and other; CM3, AB, LB9 (many). Much C13-earlier C14 pot		S7 S8 S16c				Leather numerous and dated later than pot, to c1350 - 1450
92a	8	As 92, but earlier than 438	As 92		Over 266, under 438 and 92				S7				
93	8	W area	Red sandy clay, some gravel		Over 94	?upcast of 90	AB, pot later C11 - C12		S16c				?bank residue
94	8	W area	Sand and gravel		Over 21, under 86	Upcast	Sherd C12, AB		S7 S16c				?bank residue

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95	3	NW side of mill, SW end	Upright post of mill 2 inside plank wall 126; stone packing on inside (516)			Main upright of mill, west corner		3	S24				
96	8	W area	Sherd		In 21		C11-12						Fig 75, no 9
97	8	SW area	Scoop in N edge of 230; defined by 21. Fill gravel and sandy clayey fill, dirtier than 21		Cut lower part of 21		IR12, AB; pot C11-12	8-9					Fig 75, nos 7 and 14
98	8	In Section S7	Sherds		In 21		Probably C13		S7				
99	5a	Western area	Horseshoe		In road 7		IR8	5					
100	8	In section S7	Sherd		In 21		C11-12		S7				Fig 75, no 11
101	6	SW area	Timber cropler on a shelf (101c) on edge and infill of 230 (not a primary edge). At E end, gravel (453) with pot 101a in it. Sherd			Abutment of bridge across ditch?	Sherds 101a, b, C12 and C13; FC	6-7	S7 proj		A5 A7-9 B1	9,986 10,075-10,078	See 124d, 125 Fig 75, no 10 (101a)

CONTEXT NO.	PHASE	LOCATION	DESCRIPTION	DIMENSIONS	INTERRELATIONSHIPS	INTERPRETATION	FINDS SUMMARY	PHASE PLAN	SECTION NO.	PLATE NO.	MONO NEGATIVE NO.	COLOUR SLIDE NO.	REMARKS
101 (contd)			101b was among timber remains with tile										
101c	6		Shelf in which 101 lies								A5 A7-9		Not on any section, see photos
102	8	By well 57	Laminated sands and silt layers against primary edge of 90, where cut by well 57		Fills 133	cf 358-9 and 379 in S3. See 133	Slag in top layers of orange sand. Large C13 or earlier C14 cookpot rim						Fig 75 no 17
103	8	E of well 57	Red sandy material and much gravel. Overlies original edge 90			cf 358-9 in S3							
104	4	E of well	From lava millstone		In top of 110, below 82, as in S9-10		ST2, Q120	4	S9-10(82)				
105	4	N of mill	From lava millstone		Among pebbles trodden into 34		ST3, Q128	4					
106	4	E of well	From lava millstone, near 104		In 110		ST4, Q22	4					
107	4	Near section S3	Lead object		In 335 on surface of 34d		QM2, strip	4					

CONTEXT NO.	PHASE	LOCATION	DESCRIPTION	DIMENSIONS	INTERRELATIONSHIPS	INTERPRETATION	FINDS SUMMARY	PHASE PLAN	SECTION NO.	PLATE NO.	MONO NEGATIVE NO.	COLOUR SLIDE NO.	REMARKS
108	3	NW of mill	Sloping upright timber SW of 190; jammed into natural; top inclined to NE c 15°	12 x 12cm in section		?Prop for mill-house extension		3					
109	4	Above mill and to SW	Grey bluish-brown clayey silt; slightly sandy, full of organic matter and some gravel pebbles		Under 82	Silt over destroyed mill	CW?5,12		S8 S9 S10				
110	4	E of wall 57 only in mill area	Greenish-buff mottled sandy silt		Under 82. Over 109	Final silt over destroyed mill	Lava millstone frs. 104, 106		S9 S10 S18				Probably as 109, but with less organic
111	4	Mill area	Mixed clay with much brownish mud, charcoal, and wood		Below 109	Destruction level of mill	S?5; Q10, 18, 21		S18				
112	8	In section S7	Sherd		In 21		C11-12		S7				
113	8	SE area	Pot and tile in clean sandy silt in 361 in base of 90				FC tile; sherd C13-14		S3 for 361				

CONTEXT NO.	PHASE	LOCATION	DESCRIPTION	DIMENSIONS	INTERRELATIONSHIPS	INTERPRETATION	FINDS SUMMARY	PHASE PLAN	SECTION NO.	PLATE NO.	MONO NEGATIVE NO.	COLOUR SLIDE NO.	REMARKS
114	4+5	Section S3	Robbing holes; some timber in base; base is vertically cut emplacement ghost		Surrounded by 82, which lie on 34. Cut into 34; fill 368	Emplacement for driving chute of mill, with robing hole for latter	114a sherd	3 5	S3 (low part)		B3 B5 B7 C1 C2	10,002	W end cut by mechancial trench
114a	5b	Close to Section S3	Sherd		In 368 in 114		Shelly ware		S3				Lowest stratified sherd; late C9-10?
117	9	In Tr III	'Buff clay' below 58, cf 86				Sherd of glazed painted ware C13-C14						Not on plan or section
121	5a	W area	Mauve sandy soil; forms part of fill of cutaway 22 among branches and W end of timber 23b		In 23				S7 S11 S16				
122	6	W area	Yellow brown sand and gravel filling cut 230			= 469 on S8	Sherds ?C12		S7				
124	6	In section S7	Traces of wood, very decayed		On 453	Possibly planking of 'bridge abutment'			S7				?Part of 101
125	8	W area	Wood traces		On 21				S7 S19				

CONTEXT NO.	PHASE	LOCATION	DESCRIPTION	DIMENSIONS	INTERRELATIONSHIPS	INTERPRETATION	FINDS SUMMARY	PHASE PLAN	SECTION NO.	PLATE NO.	MONO NEGATIVE NO.	COLOUR SLIDE NO.	REMARKS
126	3-4	Mill	NE-SW timber plank wall. Surrounded by blue stain		34 sags over it	Wheelhouse - NW wall (plank)		4	S8 S14 S23 S24 S25		H3 etc	9,962 etc	In collapsed state. See fig 83
128	3	Mill	Upright timber inside north corner of wheelhouse. A brown woody core surviving inside bluish sludge		Cut through timber of phase 2; 160a floor plank around it	Main north corner post of mill		3	S20 S24				See fig 83
129	3-4		Residue of plank wall turning to SE behind 128			Off timber 166?		4	S25				
130	3-4	Mill, SE side	Plank wall, as 126 NE-SW			Collapsed		4	S15				See fig 84
131	3	Mill	Main SE timber of mill jointed to 166; pegs etc at NE end			SE wheelhouse foundation timber (part)			S9 S21 S25		H9 etc	Many	SW part missing. See fig 84
133	8	SE Area	Cut-in of 90 to N; cutting away ditch fill		Fill with 102 and brown soil behind it to N			8-9					
134	5a	W edge of centre	Post	3.5 - 4cm square	In edge of 22			5					Depth not recorded

CONTEXT NO.	PHASE	LOCATION	DESCRIPTION	DIMENSIONS	INTERRELATIONSHIPS	INTERPRETATION	FINDS SUMMARY	PHASE PLAN	SECTION NO.	PLATE NO.	MONO NEGATIVE NO.	COLOUR SLIDE NO.	REMARKS
135	5a	W edge centre	Post as 135 to E of it. Jammed into natural. Tops of 134 and 135 incline to NE 10-15°	3.5 -4cm square	In edge of 22			5					
136	8	SW area	Massive post of circular section - ?tree. Visible at high level in ditch 90. Top 40cm above natural level to N. Surrounded by black sticky soil.	c 50cm diam.		Part of ?jetty complex 517; replacement for 147?	CN11	8-9		XI	F1-5	10,103 10,105	
137	8	SW area	Post to S of 136. Top inclined slightly to SW. Content as 136 and surviving to similar height, five sides Length broken off at top tapered for half its length to a point	20cm diam. squared 27,12,12,13, 17cm, 95cm		do	RC red tile	8-9		XI			

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137a	8	SW area	Smaller post to S of 137. Rectangular in section, top and broken off. Straight end at base, no point	18cm long x 15 x 8cm		Part of ?jetty complex 517; replacement for 147?		8-9	XI				
137b	8	do	Timber lying flat	37cm long x 13 x 5.5cm		do		8-9	XI				
138	8	do	Post; ?carved; tapered to point at base; jammed into natural	97cm long x 14 x 5cm	As 136	do		8-9		XI			Carving probably merely following grain, and warping
138a	8	do	Smaller post adjacent to 138; jammed in natural; not tapered; broken both ends	54cm long x 9.5 x 4.5cm rect.	As 136	do	Sherd by post; C13 - earlier C14	8-9		XI			
139	8	do	Cutaway area in which 136-138 lie; fill black soil			do	Context is below level of natural on N side. FC tile CM 4 (lump). Much pot C13 - earlier C14	8-9	See S17	XI	F1 - F5	10,103 10,105	Fig 75 nos 18, 21

CONTEXT NO.	PHASE	LOCATION	DESCRIPTION	DIMENSIONS	INTERRELATIONSHIPS	INTERPRETATION	FINDS SUMMARY	PHASE PLAN	SECTION NO.	PLATE NO.	MONO NEGATIVE NO.	COLOUR SLIDE NO.	REMARKS
139a	8	do	Content in hollow in wood and fibre structure 147			do	TR23 Mach pot C13-14 LE4, C14 or 15	8-9	S17	XI			Fig 75 nos. 19, 22 (C13 - earlier C14)
139b	8	SW area	Cutaway for 517		Timbers 136 etc. in it	Part of ?jetty complex 517		8-9		XI			
140	75a	W area	Upright timber protruding up through 82; visible when surface cleaned Pointed end. Driven in from higher level?	10 x 10cm circular 72cm long				5					Among 145; driven deeply into 109
141	3	N central	Burnt daub in section through centre fill of 10		In 34	Derived from destruction of phase 2	EC2		S14				cf 148
142	10	Cutting IV	Barrel; perforated; in fill were many large pebbles (c 20 x 10cm)		Set into 58	?Urinal as secondary use, sunk into ground	Brick, EC tile, pot later C17 bone, wood. ST (coal) PL,GL1,LE3	10		XII	E1-E3	9,997 10,104 10,105	
143	5a	West of centre	Shallow pit with skeleton of pig and skull of goat		In 82 or top of 109		AB	5					See specialist report by B Noddle 5.15
144	4	Wheelhouse floor	Wheel paddle		In 150		CW4, fig 71	4		XVII-XVIII	D9-D13	10,117	

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145	5a	West of centre	Group of sandstones; part of deepening of 82 below and to S of 23 and lie in cutaway 146		Below 23			5					
146	5a	West of centre	Cutaway in 109; fill 145 stones and heavy gravel which is deepening of 82 below level of 23 timbers		In 109				S7				Not on plan
147	8	SW area	Ovoid pit, on E side of cutaway 139b. Upper fill in centre grey sandy and stones. Main fill woody mass and moss. Hollow in this is 30cm deep filled with 139a	80cm deep or 1.10m below top of post 137		Part of ?jetty complex 517. Did this formerly hold a post? Similar to 135? If so that might be a replacement for this	Sample of woody block from upper fill. C13 - earlier C14 pot from lower fill. L85	8-9	S17	XI			Fig 75 no 20
~~148~~	3	Between mill and pool	Concentration of dark granular material in 34, including some red burnt		In 34 as lens	?Derived from destruction of phase 2			S13 S18				cf 141

CONTEXT NO.	PHASE	LOCATION	DESCRIPTION	DIMENSIONS	INTERRELATIONSHIPS	INTERPRETATION	FINDS SUMMARY	PHASE PLAN	SECTION NO.	PLATE NO.	MOND NEGATIVE NO.	COLOUR SLIDE NO.	REMARKS
149	4	By well	Irregular baulk of timber by well	10-20cm thick	In 109 lower part	Part of mill destruction		4					
150	4	In wheel-house structure. Below 111 on wheelhouse floor.	Grey brown silt and some buff sand; frs of decayed wood branches and twigs; small shells; many millstone frs (Q nos)			Destruction level of mill	Charcoal from reused burnt timber 151; millwheel paddle 144; Q1-11, 13, 15-17, 19, 20. FC2, 7. FC3, 4. OM5 (2 l mps). 226, IR16 hinge OW1-2.	4	S18	E8-12			Buff sands concentrated to hard, sandstone consistency in places; ?Roman brick recorded.
151	3-4	West area	Timber formerly in slot in timber 173, collapsed			Wall for outfall revetment		4	S7	E12 I9-10	E12 I9-10		Extends to west until cut by 139? ?Roman brick recorded
151a	3-4	West area	Planking in slot in 173 to NE of 151			ditto		4	S26				
152	4	SE of well	Burnt timber, loose; 5 pegs		Under 152a	Mill destruction	OW12 (Fig 70)	4	S9	E12			From Millhouse above?

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152a	4	SE of well	Loose plank fr lying on NE end of 152		Under 109	do		4					
153	4	SE of well	Burnt timber at right angles to 152		Under 109	do							Not on plan
154	4	N of well	NE-SW timber, separated from floor 160 by thin silt; attachment holes either end			Sole-tree of mill with steel bearing on underside; ie turned over	IR24 in CW 14	4		I XV? XVI	E5-12 E9-12	10,004 10,006 10,011 -10,013	See detailed drawings figs 68, 70
155	2	E Side	Brown sandy with some gravel, twigs, decayed wood and red clay		Under 34, cut by 156	Phase 2 leat silt	C14 sample BIRM 289 IR17, BOT		S3				Possibly ends by 157
156	3	E side	Cutaway of natural NW-SE: 34 dips down over this edge to rest cleanly on natural at its base, with some gravel		Cuts 155	Cut to put in clay waterproofing of area between mill and millpool		3	S18				Not straight

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157	2	NE of centre	Posthole. Found by removing 155. Fill as 155 going into hole + decayed wood	Depth 20cm from natural on S. 25 on N	Under 155?	Part of structure of phase 2 leat?		0-2					Top of former post possibly inclined to E
158	2-3	SE of mill	Cutaway NE-SW marking main S edge of excavation for mill		Cut by 90. 34 banks against edge	Comparable to 10? ie cutaway area for mill wheelhouse; originating in phase 2?		0-2 and 3	S3				S10 does not go deep enough to show this, where it might continue
159	5a	West of centre	Sherd, in 82 where it rises NW towards natural edge				c 1050 - 1200	5					Fig 75 no 6. Not in reliable context
160	3	Mill	Plank floor, planks lettered a-f		Under 109. Under 150	Floor of mill wheelhouse	C14 sample BIRM 290	3	S18 S20	VII et al	H5 etc	Many	See fig 84
161	3	NE corner	Timber, SW-NE; slots in surface. Packing stone to E. Plank wall 248 lying sideways on it at NE end. Jointed to 246; plank slot at SW end	32 x 33cm 3cm deep	See sections	NW side of mill pool; held plank wall at NE end + uprights	C14 sample BIRM 291	3	S3 S5 S15 S27 S30		H7 etc	10,073 etc	No groove for plank wall. Extends at least 1m into NE section S5, tapering. No more upright holes where extending into section. See figs 89, 90

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162	3	SE area	Granular black material, cf 148, but forming discrete fill in angle between 2 timbers forming E angle of mill; gravel on base			Redeposited destruction material of phase 2							
163	2	N end of S3	Post, leaning to SW	See plan	Cut by 164	?Structure in phase 2 leat		0-2					
164	2	By S3, N end	Cutaway of natural; fill 325 and 328		?Cuts 163. Covered by 165 which separates from 34b	Leat edge		0-2	S3				Secondary but within 271
165	2	NE area	Dark soil, silt, twigs, some gravel			Silt in phase 2 leat			S3 S4 S5 S15				
165a	2	NE area	Woody organic dark silt, similar to 165, but with more wood			Silt in phase 2 leat			S5 S6				See text for alternative in phase 3
165b	3	NE area	Similar to 165, but among 34 layers; = 34 1			Redeposited silt of phase 2			S5				

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166	3	Mill	Main NE timber of Wheelhouse foundation burnt material = 487, seen underneath it on natural on NE side of timber (not to SW, where 487 not burnt)			Jointed to 185 and 131; 296 and 297 on surface; groove for plank wall in surface		3	S18 S20 S21 S25		H5 H9 etc	10,008 etc	Burnt material under is frs. charcoal concreted with sand and gravel in lumps. See fig 83
167	4	SW of 166	Fallen planking			Planking of NE wall of wheelhouse		4	S18				
168	2	SE side of 270, SE side of mill	Slot, cutting natural at base of 158 cutaway. Found on removal of 34 from 258, as deeper cut in natural. Fill heavy gravel, clay and dark soil		Around SE timber 272. Below 34. At base of 158			0-2					No record of it being excavated
169	2-3	Mill	Timber under 270 timber on SE side of mill; 6 peg holes, one with peg in; 272 is E end			Timber of mill 1, re-used for Mill 2		0-2	S18		K1 K2 K3	9,976	Recorded as pegged to 178 and 191

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170	4	Mill	Burnt wood, frs millstones, frs red sandstone; and (by timber 166) concreted fibrous greenish-grey material		On floor 160; under 150		Millstones 170a	4	S18		E8 - E12	10,004 10,071 10,074	cf 470, which is probably to be equated Plate I
170a	4		Layer as 170		Under timber 172	As 170, but trapped under fallen timber	Burnt wood; Q1,10,10a; EC5;OM7 (fused strips);BOT	4 (location)	S8				Similar to 170
171	2-3	Mill	Timber NW-SE at NE end of mill (186b is W corner)		Under 186a. Ends on timbers 187 and 270	Timber of Mill 1 re-used for mill 2 or <u>in situ</u>		0-2	S18 S20 S23		K1-3	9,976	Cut by upright posts of mill 2; possibly <u>in situ</u> in cut 515
172	4	Mill	Large NE-SW plank		Directly on 170a	Plank wall of outfall revetment fallen from 175		4	S8 S26				
173	3	W of well. Mill outfall	Massive NE-SW timber with mortice hole. 151 is set into this. 151 and 173 are covered on their (slop-			Foundation timber of outfall revetment		3	S7 S16 S26		B4 H12 L7-9 L10	10,091 etc	See discussion in text

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173 (contd)			ing) NW back with heavy gravel, which is a continuation downwards of 82. On their S side the fill is 174										
174	4	W side	Clayey brown soil, some gravel and reddish clay, filling space on SW side of timbers 151 and 173, there being an edge 176a, sloping up to SW, which limits it.						S7				do
175	8	SW corner	NS timber, round section confifer, lying hard against 139 cutaway in natural sloping down from W		Over 230	Part ?jetty complex 517		8-9	S17	XI	F1-5	10,103 10,105	

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176	4	SW corner	Dark brown clayey		Edges are 176 a-c (sloping). Above 450 and 180	Mound or hump of material building up in outfall?	Unidentifiable minute sherds, sandy.	4	S7				See text discussion
176a-c	4	SW corner	Three sloping edges to 176, or possibly cuts. Sides hard and greenish		Limits to 176		Only recorded as 176b; possibly on slope (? paddle frs)	4	S7 S18 S19				do
177	3	SW corner	Large NW-SE timber in two pieces		Cut by well	Plank of floor 160		3	S8 S18	VI			
178	2-3	W of well	NW-SE timber. Grey clayey silt under, as under 191		Sealed by 180	Timber of Mill 1, re-used for Mill 2?		0-2	S8 S18	VI	K1-3	9,976	
180	4	W of well	Sand, decayed wood and gravel some orange clayey		Below 109	Destruction level of Mill 2 SW of wheelhouse	Lava millstone fr; ?brick (see 150)		S8 S18				of 150
180a	3	W of well	Orange sand, wood and gravel. As 180 but separated from it by 470 and 471			Latest silt of outfall at time of destruction			S7 S8 S18				Could be first destruction layer

CONTEXT NO.	PHASE	LOCATION	DESCRIPTION	DIMENSIONS	INTERRELATIONSHIPS	INTERPRETATION	FINDS SUMMARY	PHASE PLAN	SECTION NO.	PLATE NO.	MONO NEGATIVE NO.	COLOUR SLIDE NO.	REMARKS
181 181a	3	Mill	Orange concreted sands on mill floor		On 160, under 109	Sands accumulating and concreting in mill area		3	S19	II	E12 F7-8	10,004-10,007	See plan and text
182	6	In Section S8 W of wall	Sherd		In 469		C12?		S8				
183	4	NW of mill	Yellow sand, gravel and wood frs		To NW of 185; see plan	?Destruction level on NW side of mill on 34	Millstone frs on edge (Q14)	4					Not on any section; see 185
184	4	Mill	Lava millstone fr		On timber 185	Destruction	Q12b						Not on plan
185	3	Mill	Timber, main NW foundation of wheelhouse. 34 lay behind this to the NW extending cleanly down onto timbers 186-188 with no dirt in between. SW end has mortice, hole-filled with dark grey sandy soil and heavy gravel similar to that lying behind, (to the NW of 173, and believed to be a continuation of 82	25 x 12cm	Jointed to 166		Lava millstone fr 185 on timber 185	3	S8 S14 S20 S22 S23 S24 S25		H3 etc	Many	34 extends past and under 190a and continues to be behind 185 up to a point 5m E of the W end of 185. At this point, 34 was covered by sand and gravel. 183; remains of upright against NW side of plank and round its SW end. See fig 83

CONTEXT NO.	PHASE	LOCATION	DESCRIPTION	DIMENSIONS	INTERRELATIONSHIPS	INTERPRETATION	FINDS SUMMARY	PHASE PLAN	SECTION NO.	PLATE NO.	MONO NEGATIVE NO.	COLOUR SLIDE NO.	REMARKS
188	2-3	Mill	Timber on 187			Timber of Mill 1 re-used in Mill 2?		0-2	S8				
189	2-3	Mill	do			do		0-2	S8 S24				
190a	3	NW of Mill	Plank wall going NW from mill. Set in natural in narrow slot. Set on edge with slight slope from W-E	35cm deep x 3cm across top x 5cm across base	Set in 34 crossing cut 10	Lowest plank of wall of SW side of millhouse extension		3			E7 E11 H3 L7 L8	10,061 10,065 10,068	See also 5 in phase 8
190b	3	NW of mill	Timber, large upright set in deep hole, rect in sectionn	70cm to base		NW corner post of millhouse?		3				10,065 10,068	
190c	4	S corner of mill	Small loose timber with peg hole, not <u>in situ</u>, but in association with 242				= CW10						Not on drawings
191	2-3	Mill	Timber NE-SW cut by well; same level as 178; grey clayey silt under		Over 169 and 227	Timber of Mill 1 re-used in Mill 2?		0-2	S18			9,976	Recorded as pegged to 169
192	5b	NE area	4 joining sherds in top of pebbles		In top of 49a		Stamford ware		S3				Fig 75 no 3

CONTEXT NO.	PHASE	LOCATION	DESCRIPTION	DIMENSIONS	INTERRELATIONSHIPS	INTERPRETATION	FINDS SUMMARY	PHASE PLAN	SECTION NO.	PLATE NO.	MONO NEGATIVE NO.	COLOUR SLIDE NO.	REMARKS
185a	3	SW of Mill	Timber SW of 185, with mortice hole			Link between NW side of Wheelhouse revetment of out-fall		3	S22				
185b	3	SW of Mill	Small upright timber to NW of 185a			Wedge for 185a		3	S22				
(185d)	3	Mill W Corner	Upright timber		no data	Wedge for 185? or for millhouse?							Lost
186a	2-3	Mill	Timber at end beneath corner where 185 and 166 meet; and on 187			Timber of mill 1, re-used for mill 2		0-2	S20 S23 S25				See fig 83
186b	2-3	Mill	W corner of 171		Under 186a.	See 171		0-2	S20 S23 S25		K1-3	9,976	See fig 83
186c	2-3	Mill	Timber on 187	4-5cm thick		Timber of mill 1, re-used for mill 2		0-2	S23				
186d	3	Mill	Upright by NW edge of 185			Extra timber to support NW side of wheelhouse		3					
187	2-3	Mill	Large flat NE-SW timber. Under 185 and to NW of it. End under 171			Timber of mill 1 re-used for mill 2, or <u>in situ</u>		0-2	S8 S24 S25		G9 etc		N end not known

CONTEXT NO.	PHASE	LOCATION	DESCRIPTION	DIMENSIONS	INTERRELATIONSHIPS	INTERPRETATION	FINDS SUMMARY	PHASE PLAN	SECTION NO.	PLATE NO.	MONO NEGATIVE NO.	COLOUR SLIDE NO.	REMARKS
188	2-3	Mill	Timber on 187			Timber of Mill 1 re-used in Mill 2?		0-2	S8				
189	2-3	Mill	do			do		0-2	S8 S24				
190a	3	NW of Mill	Plank wall going NW from mill. Set in natural in narrow slot. Set on edge with slight slope from W-E	35cm deep x 3cm across top x 5cm across base	Set in 34 crossing cut 10	Lowest plank of wall of SW side of millhouse extension		3			E7 E11 H3 L7 L8	10,061 10,065 10,068	See also 5 in phase 8
190b	3	NW of mill	Timber, large upright set in deep hole, rect in sectionn	70cm to base		NW corner post of millhouse?		3				10,065 10,068	
190c	4	S corner of mill	Small loose timber with peg hole, not <u>in situ</u>, but in association with 242				= CW10						Not on drawings
191	2-3	Mill	Timber NE-SW cut by well; same level as 178; grey clayey silt under		Over 169 and 227	Timber of Mill 1 re-used in Mill 2?		0-2	S18			9,976	Recorded as pegged to 169
192	5b	NE area	4 joining sherds in top of pebbles		In top of 49a		Stamford ware		S3				Fig 75 no 3

CONTEXT NO.	PHASE	LOCATION	DESCRIPTION	DIMENSIONS	INTERRELATIONSHIPS	INTERPRETATION	FINDS SUMMARY	PHASE PLAN	SECTION NO.	PLATE NO.	MONO NEGATIVE NO.	COLOUR SLIDE NO.	REMARKS
194	7	NE Corner	2 sherds		In 198		Fine white cooking-poc rim, C13		S6				Fig 75, no 10
195	7	NE Corner	Sherd		Base of 64		Stamford ware		S6				
196	7	do	Sherd		In 64		Late C12, or even early C13		S6				
198	7	do	Mixed brown sandy soil and charcoal		Under 1b		FC. Sherds 194 of C13		S6 S18				Fig 75 no 10
199	9	NE corner	Black sticky soil, fill of pit 200				Stamford sherd. AB. LE7						Fig 75 no. 5 (displaced from phase 5b)
200	9	do	Pit; fill 199	Depth 66cm				8-9					Visible from L1b, cf 39
201	5b	do	Sherd		In 49a		c1050-1100		S3				Off-white, with dull black inclusions (see thin section, 5.17)
202	7	do	Posthole, fill orange sand and some red sand-stone	Depth 14cm	Cuts 65			6-7					

CONTEXT NO.	PHASE	LOCATION	DESCRIPTION	DIMENSIONS	INTERRELATIONSHIPS	INTERPRETATION	FINDS SUMMARY	PHASE PLAN	SECTION NO.	PLATE NO.	MONO NEGATIVE NO.	COLOUR SLIDE NO.	REMARKS
203	7	do	Posthole, ?base; fr red sandstone in fill	Depth 9cm	Cuts 49a			6-7					
205	8	SW corner	Timber sloping down from SE to NW, rammed into natural			Part of 'jetty' complex S17		8-9					
206	7	In section	Sherd		At base of 65a		Stamford ware		S3				
207-9	7	NE area	Sherds		In 65a		Stamford ware		S3				Fig 75 no 2 (207)
210	7	do	Sherd		In 65a		Stamford ware		S3				
211	7	do	Sherd		In 65a		Very late C12 or early C13		S3				
212	7	In section	Sherd		In 65		Later C11 - earlier C12		S6				
213	8	SW area	Sherd in black fill 92 of 90, S of sand and gravel 122				C13 - C14		S7				
214	7	In section	Sherd		In 65		Late C11 earlier C12		S6				
215	7	In section	Sherd 1		Base of 65		Stamford		S6				

CONTEXT NO.	PHASE	LOCATION	DESCRIPTION	DIMENSIONS	INTERRELATIONSHIPS	INTERPRETATION	FINDS SUMMARY	PHASE PLAN	SECTION NO.	PLATE NO.	MIND NEGATIVE NO.	COLOUR SLIDE NO.	REMARKS
216	7	E of mill	Orange-brown loose sandy soil with hard pebbly surface where seen to E of section		Cut by 231 to east of S3		Sherd 216a, very late C12 or even C13	6-7	S3				Fig 75 no 12
216b	7	E of mill	Metalling		On 216, cut by 231 and 90				S3				
217	6	In section S7	Sherd in 461 projected into section				Later C12 cookpot, green glazed dark grey, rough		S7				
218	7	In section S6	Rim sherd in E section in fill 411 (of 231)				Very late C12 or early C13		S6				Sandy light-bodied jug handle
219	5b	In section	Mortar in NE section		In 66		MOR 1		S3				
220/1	7	NE area in section	Sherds projected in section		In 66a		Stamford		S3				Fig 75 no 3
222	7	W of S3	Sherd and fr. of ?Roman brick		In 66a pebbly		Stamford		S3				
223a	5b	NE corner	4 large sherds very close to sherd 51 in section. On N edge of gravel at its base		In 49a		Stamford		S3				Fig 75 no 3

CONTEXT NO.	PHASE	LOCATION	DESCRIPTION	DIMENSIONS	INTERRELATIONSHIPS	INTERPRETATION	FINDS SUMMARY	PHASE PLAN	SECTION NO.	PLATE NO.	MONO NEGATIVE NO.	COLOUR SLIDE NO.	REMARKS
224	5b	NE corner	Two sherds and fr of burnt bone		Base of 66, at junction with 54		Green gl. Stamford ware and later C11-earlier C12; AB		S3				
226	4	Mill	Iron hinge, from trap door?		In 150, on floor		IR 16	4					
227	2-3	W of well	NW-SE timber, 9 peg holes		Under 178, 191 NE-SW timbers	Timber of Mill 1 re-used in Mill 2?		0-2	S8 S18			9,976	
228a,b	2	SW of mill	Two stakes rammed in natural		Below 180a	?Structure in outfall		0-2					Depth unrecorded
229	2	SW of mill	?Stake-hole in natural in SW angle between timbers 191 and 227; fill brownish sandy silt			?Structure of mill 1		0-2					No post; depth unrecorded
230	6	S side	Cutaways in natural north of 90		Fills as on sections; 413 fills 331 edge, and extension of 231 beyond.	First stage in medieval town ditch complex	Sherd 217 in context 461 (later C12)	6-7	S7 S8 S10 S13 S19		A5 A9 B1	10,075 10,077	= 133
231	7	SE corner	Large cut features		Fills 413 etc as on section	Robbing pit for timbers of SE side of millpool, and/or erosion gully as A 264 in 1978		6-7	S6				S edge of fills cut by 90; see 1978 data

CONTEXT NO.	PHASE	LOCATION	DESCRIPTION	DIMENSIONS	INTERRELATIONSHIPS	INTERPRETATION	FINDS SUMMARY	PHASE PLAN	SECTION NO.	PLATE NO.	MOND NEGATIVE NO.	COLOUR SLIDE NO.	REMARK
232	7	In section S6	Sherd		In base of 69a, N of 231 edge		Stamford		S6				Fig 75 no 3
233	5b	In section S3	Sherd		In 50 above 53		Shelly ware		S3				Late C9-10?
234	5b	In section S3	Sherd		Above timber 161, in 50		Stamford ware		S3				Fig 75 no 3
235	5b	NE area	Sherd		In 50		Stamford ware						
236	5b	NE area	Sherd		In 50		Stamford ware						
237	5b	In section S3	Sherd		In 54		Stamford, glazed		S3				
238	5b	In section S18	Greenish sandy concretion		At base of 69 and 69a	Interface, phases 5b and 7			S18				
239	4	Mill	Loose timber, with square joint. On top of 170a		Under timber 172		C49 (fig 72)						
240	5b	Millpool and area to S	Grey-brown clayey sandy silt, with some mixed red and yellow clays		Over timber 246 etc	Silt over mill/ millpool area after removal of chute in 114	Roman tegula fr FC5		S3 S18				Silt after fill of 114

CONTEXT NO.	PHASE	LOCATION	DESCRIPTION	DIMENSIONS	INTERRELATIONSHIPS	INTERPRETATION	FINDS SUMMARY	PHASE PLAN	SECTION NO.	PLATE NO.	MONO NEGATIVE NO.	COLOUR SLIDE NO.	REMARKS
279	2	NE of mill	Posthole under phase 3 main sluice timber 246. Fill dark grey sandy, some moss, bits of wood, pebbles, roots, large ?packing stones in top			Probably held sloping upright plank as others in leat area; dug out because it was in the way of 246?		0-2					Fig 29
280	2	NE of mill	Slight gully in natural. Parallel to 275 slot but fill dissimilar; brown grey sandy silt, some pebbles and wood; more like silt 165 on floor than that in erosion slots in mill		Cut by 156	Erosion gully in phase 2 leat		0-2	S3				
281	7-8	SW corner	Feature cut in top edge of 90, against edge of section. In upper part a large flat stone with twigs both above and below			West end of ditch, draining to east; intermediate in date between phases 7 and 8		6-7 8-9	S6				Cf continuation as Ditch A145 in 1978 excavation

CONTEXT NO.	PHASE	LOCATION	DESCRIPTION	DIMENSIONS	INTERRELATIONSHIPS	INTERPRETATION	FINDS SUMMARY	PHASE PLAN	SECTION NO.	PLATE NO.	MONO NEGATIVE NO.	COLOUR SLIDE NO.	REMARKS
241	3	SW edge millpool; see S18	Brownish-grey clayey silty soil, stained grey near large timbers. Brushwood in places particularly in NE corner of millpool			Primary silt of millpool	Cut object CW13; wooden bowl CW6. C14 sample BIRM 292. BOT sample 241a (5.13)		S18				
241a	3	SW edge millpool see S18	Samples of 'grass' from down against back of main timber 246 in 241 below layer 34s				BOT report by Hutton (5.13)		S18				
242	4	Mill	Small plank under 152			Probably loose		4					
243	2-3	Mill	Plank with peg and holes under 178 and 290			Mill 1 timber reused in Mill 2?		0-2			K3	9,976	Cut by well
244	3	Mill	Upright by SE end of 177			S main corner post of mill		3					Base squared off 10-15cm into natural
245	3?	NE corner of site	Post-hole with post <u>in situ</u>		Apparently within 397 as on S4			3	S4				Below modern fence post 383; coincidence?

CONTEXT NO.	PHASE	LOCATION	DESCRIPTION	DIMENSIONS	INTERRELATIONSHIPS	INTERPRETATION	FINDS SUMMARY	PHASE PLAN	SECTION NO.	PLATE NO.	MONO NEGATIVE NO.	COLOUR SLIDE NO.	REMARKS
281a	76	SW corner	Pinkish-grey sand			Fill of 281			S6				
284	3	SW corner	Slight scoop in natural at base of outfall, in side of which is posthole 285		Under 180a, fill as this but dirtier	?outfall structure		3	S7				
285	3	SW corner	Posthole in 284, sub-rectangular		Fill as 180a but dirtier	do		3					
286	3	SW corner	Stake by fallen revetment plank 151					3					
286a	8	SW corner	Cutaway in natural; original edge of major features here?		?Before 139			8-9					
286b	8	SW corner	Extension cutaway to S of 286a					8-9					
287		Cutting V	Hole dug by machine in SW corner; see S13						S13				

CONTEXT NO.	PHASE	LOCATION	DESCRIPTION	DIMENSIONS	INTERRELATIONSHIPS	INTERPRETATION	FINDS SUMMARY	PHASE PLAN	SECTION NO.	PLATE NO.	MONO NEGATIVE NO.	COLOUR SLIDE NO.	REMARKS
246	3	SW side of millpool	Main NW-SE timber of millpool complex; plank slots in centre and NW end		Jointed to 161; 300, 501, and 501 in surface	Foundation of front revetment of millpool		3	S18 S28 S29 S31	IV et al	H7 H10 J2 K4 K5	10,007 10,008 10,009 10,067 10,070 10,073 etc	See figs 89,90
247	3-4	NE corner	Upright plank in situ in hole in 161 timber of NW side of millpool			Part of millpool revetment on NW side		4					Collapsed at angle. See fig 89
248	3-4	NE corner	Plank walls, collapsed sideways but still on 161			Part of millpool NW side		4	S5				See fig 89
249	3-4	do	Fr of collapsed plank wall, ?from 248; to SE of 248 and 161; sticking out of corner of section					4	S5				See fig 89
250	2	NE corner	Upright timber; at base of phase 2 leat			?Leat structure in phase 2		0-2					Could be later see fig 89
251	3	S corner of millpool	Upright timber by SE end of 246; edge parallel with 246					3	S31				See fig 89

CONTEXT NO.	PHASE	LOCATION	DESCRIPTION	DIMENSIONS	INTERRELATIONSHIPS	INTERPRETATION	FINDS SUMMARY	PHASE PLAN	SECTION NO.	PLATE NO.	MONO NEGATIVE NO.	COLOUR SLIDE NO.	REMARKS
288	8	Cutting V	Big ?ditch in sump. S edge of ditch in sump at 53.99, dropping from this level			= 90? angle uncertain							
288a	8	Cutting V	Stump (centre); (in sump)										
289	3	E corner of mill	Upright post	40cm above mill floor	Cuts 171 of phase 2	One of main mill posts in E corner		3	S20 S21 S25				Depth unknown See fig 84
290	2	Mill	Plank, two peg-holes with pegs, close together		On 243 and 169	Mill 1 re-used in mill 2?		0-2					
291	2	Mill	Stake-hole					0-2					Only known from field plan
292	2	Mill, NW corner	Posthole					0-2					do
293	2-4	E corner of mill	Loose plank possibly off NE side of mill, timber 166					4					
294	2	NE of mill	Timbers, described on plan as 'lower' timbers)					0-2					Only known from field plan

CONTEXT NO.	PHASE	LOCATION	DESCRIPTION	DIMENSIONS	INTERRELATIONSHIPS	INTERPRETATION	FINDS SUMMARY	PHASE PLAN	SECTION NO.	PLATE NO.	MONO NEGATIVE NO.	COLOUR SLIDE NO.	REMARKS
252	4	SW edge of millpool	Cutaway by SW edge of 246. Fill grey sandy material up to side of timber. Cut in top of 34			?Erosion by edge or shrinkage of 34?			S18				
253	2	NE corner near junction of sections S5 and S6	Sloping plank rammed into natural at base of phase 2 leat			Structure in phase 2 leat?		0-2					Could be later. Top to SE
254a	2	By section S6	Sloping, plank rammed into natural as 253	5cm thick x 24cm across		Structure in phase 2 leat?		0-2					Top to NW
254b	2	By section S6	Sloping plank similar to and immediately below 254a			Structure in phase 2 leat?		0-2					Top to NW
254c	2	By section S6	?Tree root lying in and disappearing into natural just to N of 254a, b.					0-2					

CONTEXT NO.	PHASE	LOCATION	DESCRIPTION	DIMENSIONS	INTERRELATIONSHIPS	INTERPRETATION	FINDS SUMMARY	PHASE PLAN	SECTION NO.	PLATE NO.	MONO NEGATIVE NO.	COLOUR SLIDE NO.	REMARKS
295	3-4	NE side of mill	Loose plank (wedge) behind 271 and 166					4	S25	VII			
296	3	NE side of mill	Slot in surface of 166			Emplacement (lower) for by-pass chute		3	S25	VII	F8	9,980 9,981 10,004	
297	3	NE side of mill	Slot in surface of 166			Emplacement (lower) for driving chute		3	S25		F8	10,005 10,007	
298	?2	Mill	Timber		Under 185a				S22				Not on plan
300	3	SW side of millpool	Surface of 246		To SE of plank slot	Emplacement for upper end of driving chute		3	S31		H10-11	9,981 9,993 10,006 10,067	See fig 39
301	10	Section S1	Dark brown soil and charcoal		Under L1b, over 302				S1				
302	9	do	Light brown soil, red streaks of clay, charcoal		Under 301. Above L3, 42				S1				
302a	9	do	Stones on S edge of 302			?wall			S1				
303	9	do	Gravel		Under 42. Above 304				S1				
304	9	do	Sandstone rubble		Under 303, 89. Above 305				S1				

CONTEXT NO.	PHASE	LOCATION	DESCRIPTION	DIMENSIONS	INTERRELATIONSHIPS	INTERPRETATION	FINDS SUMMARY	PHASE PLAN	SECTION NO.	PLATE NO.	MONO NEGATIVE NO.	COLOUR SLIDE NO.	REMARKS
255	2	Mill	Orange stained gravel filling scoops 269a,b where not merely grey silty around random planks				Iron objects IR18-22 BO6, CW7		S16 S18				
260	2	Section S6	Black woody organic silt at base os 231; extends back to SW under 246		Between 414 & 415	Residue at leat base?	BOT report by Hutton (5.13)		S6				Fig 29
261	2	Mill centre	Mill centre	?Stake hole, in natural in base of mill; fill sand and gravel		Under 502		0-2					
262	2	do south	?Stakehole as 261					0-2					do
263	2	do do	?Double stake-hole; fill sand and gravel (?255)					0-2					
264	2	do do	?Double stake-hole 10cm S of 263					0-2					
265	5b	East side	Fr lava mill-stone		In 74		Q12F		S3				

CONTEXT NO.	PHASE	LOCATION	DESCRIPTION	DIMENSIONS	INTERRELATIONSHIPS	INTERPRETATION	FINDS SUMMARY	PHASE PLAN	SECTION NO.	PLATE NO.	MONO NEGATIVE NO.	COLOUR SLIDE NO.	REMARKS
305	9	do	Dark grey soil		Under 85, 304				S1				
306	?1-2	do	Ferrous gravel with some dark soil		Under L3 and 28 on natural	?metalling on natural			S1 S2				
307	?1-2	do	Heavy gravel		Under L3 and abutting stone 7, possibly earlier				S1				
307a	?1-2	do	Red clay		Under 307, abutting stones 7, possibly earlier				S1				
308	10	Section S3	Black ashy soil		Under L1, over 309 311				S3				
309	10	Section S3	Dark grey soil		Under 308. Above 310				S3				
310	10	do	Yellowish sandy soil		Under 309. Above 311				S3				
311	10	do	Dark brown ashy soil		Above 10. Over 312				S3				
312	10	Section S4	Grey-brown ashy soil		Under 311. Above 313				S3, S4				
313	?8	Section S4	Buff sandy soil		Under 312, over 32				S3, S4				
314	9	Section S3	Grey-brown ashy soil with some clay		Under 312, cuts 313	Fill of pit 39			S3				

CONTEXT NO.	PHASE	LOCATION	DESCRIPTION	DIMENSIONS	INTERRELATIONSHIPS	INTERPRETATION	FINDS SUMMARY	PHASE PLAN	SECTION NO.	PLATE NO.	MONO NEGATIVE NO.	COLOUR SLIDE NO.	REMARKS
266	8	SW area	Black organic ?woody silt in lower part of ditch 90; ?wood or leaves			Silt, ?waterlaid, from river?	Sherds 266a, 2 large joining; C12 or very early C13. BOT by Hutton (5.13)		S7				
267	8	SW area	Greyish-pink sandy silt in 459 in section, to S of 266 in S7		= 442 in 90? cf 361				S7				
268	9	SW area	Posthole or pit seen in section through 459/90; fill grey-black gritty clayey silty some gravel						S7				
269a	2	Mill	Scoop in natural under mill floor; fill 255			Leakage and erosion in first mill?		0-2	S16 S18		K1-3	9,976	
269b	2	Mill	As 269a			As 269a		0-2			K1-3		
270	2	Mill	Timber below burnt timber 152 and under 171		Over 169	?Se side of Mill 1		0-2			K1-2	9,976	

CONTEXT NO.	PHASE	LOCATION	DESCRIPTION	DIMENSIONS	INTERRELATIONSHIPS	INTERPRETATION	FINDS SUMMARY	PHASE PLAN	SECTION NO.	PLATE NO.	MONO NEGATIVE NO.	COLOUR SLIDE NO.	REMARKS
315	9	do	Dark grey-brown clayey soil		Under 314	do			S3				
316	9	do	Grey-black sticky soil		Under 315, and L 1b	do (main)			S3				
317	9	do	Buff sandy soil		By N edge	do			S3				Weathering of edge
318	8	do	Dark ashy soil		Under L 1b. Above 319, 320				S3				
319	8	do	Buff sandy soil		Under 318. Cut by 39 over 321 = 313?				S3				
320	8	do	Khaki-buff sandy		Below 318 and L 1b. Cut by 322				S3				
321	8	do	Grey-green sandy clayey		Below 318-20. Cut by 322				S3				
322	8	do	Dark ashy soil in shallow cutaway		Below L 1b. Above 49				S3				
323	3	Millpool/ mill area	Cut in 326 and 328, filled with 34c		See section	Cutaway of phase 2 silts to put in 34c below S corner of millpool			S3				
324	2	Section S3	Very dark brown soil and charcoal		Below 34b above 165	Silt of phase 2 leat			S3				

CONTEXT NO.	PHASE	LOCATION	DESCRIPTION	DIMENSIONS	INTERRELATIONSHIPS	INTERPRETATION	FINDS SUMMARY	PHASE PLAN	SECTION NO.	PLATE NO.	MONO NEGATIVE NO.	COLOUR SLIDE NO.	REMARKS
325	2	do	Orange-brown sandy soil		Below 165. Abutted by 325; fills 164 top	do			S3				
326	2	do	Orange-brown sandy clay		Below 346 over 327 cut by 323	do			S3				
327	2	do	Lens of grey clayey soil and charcoal		Below 326 and 328	do			S3				
328	2	do	Brown soil		Below 325-6 lowest fill of 164. Cut by 323								
329	2	do	Red clayey soil with patches of grey		?Cut by 323. Abutted by 330.	do			S3				Field drawing anomalous
330	2	do	Grey-brown soil and charcoal		Abuts 329. Below 34c	do			S3				
332	3	do	Bluish clayey soil round timber 161		See section	Stain and decay round 161			S3				
332a	3	do	Bluish clayey soil under timber 161		See section	Stain and decay around 246, or a prop under 161 end			S3				
333	3	Section S3	Blue-grey sandy soil with wood fragments		See section	Stain and decay around 246, or a prop under 161 end			S3				

CONTEXT NO.	PHASE	LOCATION	DESCRIPTION	DIMENSIONS	INTERRELATIONSHIPS	INTERPRETATION	FINDS SUMMARY	PHASE PLAN	SECTION NO.	PLATE NO.	MONO NEGATIVE NO.	COLOUR SLIDE NO.	REMARKS
334	5b	E side	Mixed red and green clay under large sandstone block in millpool base			Clay washed in			S3				
335	4	SW edge of millpool	Band of charcoal		On 34d	Destruction level directly on 34d			S3				Same level as 82 further west
336	10	Section S3	Yellowish mortar		Cut into 338	Packing of wall 37			S3				
337	10	do	Pinkish-brown soil with mortar and brick frs		Above 338				S3				
338	10	do	Dark brown clayey soil		Merges with L1, above L1a				S3				
339	10	do	Dark brown-black soil and charcoal		Under 338. Above L1a				S3				
340	10	do to S end	Brick wall some yellow mortar						S3				Same structure as 372?
341	10	Section S3	Dark brown soil and brick frs		Above 342	Upper fill of 350			S3				
342	10	do	Reddish-brown clayey with brick and mortar frs		Below 341. Above 348				S3				

CONTEXT NO.	PHASE	LOCATION	DESCRIPTION	DIMENSIONS	INTERRELATIONSHIPS	INTERPRETATION	FINDS SUMMARY	PHASE PLAN	SECTION NO.	PLATE NO.	MONO NEGATIVE NO.	COLOUR SLIDE NO.	REMARKS
343	10	Section S3	Dark brown clayey soil with brick frs		Below wall 340				S3				
344	10	do	Band of charcoal		Below 343. Above 345				S3				
345	10	do	Reddish-brown clayey soil		Below 344. Above 346				S3				
346	10	do	Ashy soil and charcoal		Below 345. Above 347				S3				
347	8	do	Grey-brown clayey sand and yellow sand patches		Below 346 (with stone between). Above 79 (as 353)				S3				
348	10	do	Black ashy soil		Below 342. Above 351				S3				
349	10	do	Yellowish mortary soil			Packing of structure 350							
350	10	do	Stone structure		Fills 341, 342, 348. Packing 349, 351	?Culvert		10	S3				cf S6
351	10	do	Large stone at base of 350, covered with mortar 352						S3				
352	10	do	Yellowish mortar		Over 351				S3				cf 349

CONTEXT NO.	PHASE	LOCATION	DESCRIPTION	DIMENSIONS	INTERRELATIONSHIPS	INTERPRETATION	FINDS SUMMARY	PHASE PLAN	SECTION NO.	PLATE NO.	MONO NEGATIVE NO.	COLOUR SLIDE NO.	REMARK
353	8	do	Grey-brown clayey sand with orange and yellow sand patches										As 347 and continuous with it but under structure 35c
354	5b	E side	Dark buff-grey sandy soil with a little gravel; part of 53a		Above 68	Upper fill of robbing hole 60, going down into 80			S3				
355	8	Section S3	Orange sandy soil and charcoal		Under 347/353. Above 356				S3				
356	8	do	Charcoal and iron slag		Under 355. Above 79				S3				
357	8	do	Grey-brown sandy soil and slag		Under 353. Above 79				S3				
358	8	do	Grey-brown laminated sandy soil		Under 79. Above 359	Fill of 90			S3				
359	8	do	Grey sandy silt		Under 358. Above 360	Fill of 90			S3				
360	8	do	Dark grey-brown sandy silt		Under 359 and 79. Above 361	Fill of 90			S3				
361	8	do	Laminated grey-brown sandy silt		Under 360	Primary fill of 90 here	Sherd C13-C14 and FC tile		S3				Finds are 113

CONTEXT NO.	PHASE	LOCATION	DESCRIPTION	DIMENSIONS	INTERRELATIONSHIPS	INTERPRETATION	FINDS SUMMARY	PHASE PLAN	SECTION NO.	PLATE NO.	MONO NEGATIVE NO.	COLOUR SLIDE NO.	REMARKS
362	2	do	Red clay and gravel		Below 34e. Lowest fill of 275	Silt of phase 2 leat			S3				
363	2	do	do		do	do			S3				
364	2	do	do. with bluish ?wood staining		Primary fill of 371	DO			S3				In small gully
365	2	do	Red clay		do								
366	?5b	E side	Greenish sandy soil		Under 70. Above 34g, 240, 357	Fill of robbing hole on S side of millpool (cf 70)			S3				Could be phase 7
367	3	Section S3	Greenish sandy hand		Under 34f but probably later displacsd				S3				
368	5b	Section S3	Bluish sandy silt		Fill of 114	Sherd 114a shelly			S3				
369	5b	Section S3	do		Fill of 370				S3				
370	5b	Section S3	Cut		Robbing hole for timber of by-driving chute?				S3				
371	2+3?	Section S3	Cut for leat to lowest levels		Final edges of phase 2 leat, or recut in phase 3			0-2 3	S3				See S3 for extent; cf 1978 edges
372	10	Section S3	Brick wall, packed with mortar 336					10	S3				cf 340 the same?

CONTEXT NO.	PHASE	LOCATION	DESCRIPTION	DIMENSIONS	INTERRELATIONSHIPS	INTERPRETATION	FINDS SUMMARY	PHASE PLAN	SECTION NO.	PLATE NO.	MONO NEGATIVE NO.	COLOUR SLIDE NO.	REMARKS
373	10	do	Dark grey-brown clayey soil and charcoal		Below 341 Above 353				S3				
374	10	do	Vertical band of gravel			?Filling fissure in edge of structure			S3				
375	10	do	Vertical band of yellowish mortar			?Trickling down fissure			S3				
376	10	W of centre	Posthole		Inside 56			10					On field drawing, no other record
378	10	Section S3	Section S3	Stone structure at S end of section				10	S3				N wall only seen cf 350
379	8	Section S3	Charcoal and slag		Junction of 360 and 361				S3				
380	10	NE side	Brick rubble in brown soil matrix						S5 S6 S18				
381	?8	Section S4	Grey-brown sandy						S4				
382	10	Section S4	Dark brown clayey soil and large stone			?Fill of posthole		10	S4				

CONTEXT NO.	PHASE	LOCATION	DESCRIPTION	DIMENSIONS	INTERRELATIONSHIPS	INTERPRETATION	FINDS SUMMARY	PHASE PLAN	SECTION NO.	PLATE NO.	MONO NEGATIVE NO.	COLOUR SLIDE NO.	REMARKS
383	10	do	Stake-hole, apparently dug from modern level; fill black soil					10	S4				cf 245, 384, 399
384	10	do	Stake-hole dug from recut level; fill black soil as 312					10	S4				cf 45, 399
385	?8	Section S4	Mottled buff-brown sandy		Above 381, otherwise as 386				S4				
386	?8	do	As 385, but over 49a						S4				
387	2	Section S4	Sand		Under 34 and 165	Primary fill or collapse of W edge of 371 leat			S4				
388	8	do	Yellow-buff sandy						S4				
389	8	do	Brown clayey soil, heavily charcoal flecks red clay patches						S5 S6				
390	7	Section S5	Brown clayey soil				204, sherd C12 or very early C13		S5				

CONTEXT NO.	PHASE	LOCATION	DESCRIPTION	DIMENSIONS	INTERRELATIONSHIPS	INTERPRETATION	FINDS SUMMARY	PHASE PLAN	SECTION NO.	PLATE NO.	MONO NEGATIVE NO.	COLOUR SLIDE NO.	REMARKS
391	7	do	Pink mortar						S5				
392	7	Sections S5-S6	Bluish sandy						S5 S6				
393	4	Sections S4-S5	Clayey gravelly and some organic			Collapsed edge of NW side of mill-pool			S5 S6				
394	4	do	Mixed reddish clay, some sand		Cut by 508	do			S5 S6				
395	4	Section S5	Reddish clay		Under 394	do			S5				
396	4	Section S6	White-buff sand with pieces of wood to SE as shown		See section	Silt layer at time of collapse of, NW side of millpool			S5 S6				
397	3	Section S4	Described as 'weathered 34' on field section		See section	Upper part of mill-enveloping			S4				
398	2	Section S5	Mixed clay		Under 165	Primary fill of 371			S5				
399	10	Section S5	Stakehole with wood in base; rest blackish soil as L 1b					10	S5				
400	3	Millpool	Compact grey-brown-pink clayey silt		See section	Silt of millpool			S5 S6 S18				

CONTEXT NO.	PHASE	LOCATION	DESCRIPTION	DIMENSIONS	INTERRELATIONSHIPS	INTERPRETATION	FINDS SUMMARY	PHASE PLAN	SECTION NO.	PLATE NO.	MONO NEGATIVE NO.	COLOUR SLIDE NO.	REMARKS
401	8	E area	N edge of 90 as seen at highest definable level		See section				S6				
402	10	Section S6	Lens of charcoal		In L 1b				S6				Thin orange-brown layer within it
404	7	E side	Reddish-brown clay						S6 S18				
405	7	do	Red clay						S6 S18				
406 (= 67)	5b	E side	Grey-green clayey sandy		Above 240				S6 S18				
407 = 67a	5b	do	Compact grey clayey						S6 S18				
408	5b	E side	Grey sandy clayey						S6 S18				
409	5b	do	Mixed red and yellow clayey ?similar to 34						S6				
410	5b	do	Brown clayey with some mixed clay ?similar to 34						S6 S18				
411	7	do	Brownish sandy		In 231, top fill		Sherd 218, ?C13						

CONTEXT NO.	PHASE	LOCATION	DESCRIPTION	DIMENSIONS	INTERRELATIONSHIPS	INTERPRETATION	FINDS SUMMARY	PHASE PLAN	SECTION NO.	PLATE NO.	MONO NEGATIVE NO.	COLOUR SLIDE NO.	REMARKS
412	7	Section S7	Orange-brown sandy with some charcoal, and pebbles in southern part		In 231				S6				
413	7	do	Brown sandy, with some red and grey clay and a few pebbles; very mixed		In 231 edges	See 231			S6				
414	?2	do	Lens of yellow-buff sand		Over 260	Residue at leat base?			S6				
415	?2	do	Clean orange sand		Under 260	do			S6				
416a	4	Section S6	Dark woody silt		See section	Silt in eroded millpool			S6 S18				
417	2	do	Mixed grey clayey and brown sandy		See section	Primary silt in eroded leat			S6 S18				
418	3	Section S6	Grey clayey soil and gravel		See section	Fill of posthole 274			S5				
419	3	Section S6	Yellow sand		See section	do			S6				
420	3	Section S6	Buff sand		See section	do			S5				
421	2	Section S6	Pink-buff-orange sand		See section	Primary silt in eroded leat			S6				

CONTEXT NO.	PHASE	LOCATION	DESCRIPTION	DIMENSIONS	INTERRELATIONSHIPS	INTERPRETATION	FINDS SUMMARY	PHASE PLAN	SECTION NO.	PLATE NO.	MIND NEGATIVE NO.	COLOUR SLIDE NO.	REMARKS
422	4	Section S6	Mixed red and yellow clay lumps similar to 34		See sections	Destruction material in millpool			S6 S18				
423	7	E side	Pipe or post hole filled with mixed yellow and orange clay		Cuts 412				S6				Later than phase 7?
424	8	Section S6	Dark grey silt with some charcoal			Fill of 90 dipping into 281			S6				
426	10	Section S7	Mixed orange clay and dark soil						S7				
427	10	Section S7	Orange-yellow clay and mixed soil			Slag and charcoal			S7				
428	10	do	Greenish-brown soil and charcoal, with some slag						S7				
429	10	do	Orange-yellow clay						S7				
430	9	Section S7	Black organically rich soil with some wood and charcoal						S7				

CONTEXT NO.	PHASE	LOCATION	DESCRIPTION	DIMENSIONS	INTERRELATIONSHIPS	INTERPRETATION	FINDS SUMMARY	PHASE PLAN	SECTION NO.	PLATE NO.	MONO NEGATIVE NO.	COLOUR SLIDE NO.	REMARKS
431	9	do	Orange-yellow clay round timbers 436						S7				
432	9	do	Greenish-yellow silt						S7				
433	9	do	Brown clay						S7				
434	9	do	Yellow sand						S7				
435	9	do	Brown sand			?Filling hole			S7				
436	9	do	Timbers, apparently round-sectioned						S7				Seen only in section
437	8	do	Yellow clay, brown clay bands						S7				
438	8	do	Fine grey soil with brown clay and rotted wood						S7				
439	6	W area	Black organic-ally rich soil			Fill of 230			S7				
440	26	do	Grey-green soil			do			S7				Or part of 90?
441	6	do	Sand and gravel as 122			do			S7				
442	8	Section S7	Grey-pink silt			On edge of 90			S7				cf 267 and 361

CONTEXT NO.	PHASE	LOCATION	DESCRIPTION	DIMENSIONS	INTERRELATIONSHIPS	INTERPRETATION	FINDS SUMMARY	PHASE PLAN	SECTION NO.	PLATE NO.	MONO NEGATIVE NO.	COLOUR SLIDE NO.	REMARKS
443	8	W area	Patch of greenish-brown sandy soil with sharp S edge as on section			?upcast from 90			S7				Missing
444	5a	W side	Very hard-packed gravel with ferrous staining			Make-up for road 7, or separate road			S7 S16				
445	4	Section S7	Bluish fine soil		See section	Decay residue round timber 151			S7				
446	4	do	Brown clayey soil with some gravel		See section	Fill of erosion of edge 460			S7				
447	4	do	Red clay		do	do			S7				
448	4	do	Bluish fine soil by 173		do	Decay residues of 173			S7				
449	4	do	Light brown silt		do	Fill of erosion of edge 460			S7				
450	2	do	Sand		Under phase 3 timber 173 and 457	Primary silt of phase 2 outfall area			S7				
451	2	do	Dark brown soil		Under 450 Over 452	Silt of phase 2 outfall area			S7				
452	2	do	Black soil and charcoal		Under 451	Silt of phase 2 outfall			S7				Burnt material

CONTEXT NO.	PHASE	LOCATION	DESCRIPTION	DIMENSIONS	INTERRELATIONSHIPS	INTERPRETATION	FINDS SUMMARY	PHASE PLAN	SECTION NO.	PLATE NO.	MOND NEGATIVE NO.	COLOUR SLIDE NO.	REMARKS
453	6	W area	Yellow sand and gravel		In 230		Sherd 101a		S7				
454	4	Section S7	Clean yellow sand		See section	Continuation of mill destruction level			S7				470
455	4	Section S7	Brown sandy soil		See section	Material on mound or lump 176			S7				
456	4	do	Dark brown sandy soil		do	do			S7				
457	2	do	Grey sand and gravel		Under 180a Over 450	Silt of phase 2 outfall area			S7				
458	2	do	Yellow-orange sand and gravel		Under 180a, over 451	do			S7				
459	6 or 8	W area	Ditch to south of 90 as seen in S7; or extension of 90		Fill 267	?earlier ditch replacing 230? replaced by 90? or = 90?			S7				See text
460	2 ?+ 3 ?+ 4	Section S7	Cut forming NW edge of outfall area		Fills as on S7	Original cut for phase 2 outfall; or recut for phase 3; or the result of later erosion		0-2 3	S7				
461	6	W area	Brown sand and gravel		Fill of 230 above 122, below 101 etc		Sherd 217 Later C12		S7				

CONTEXT NO.	PHASE	LOCATION	DESCRIPTION	DIMENSIONS	INTERRELATIONSHIPS	INTERPRETATION	FINDS SUMMARY	PHASE PLAN	SECTION NO.	PLATE NO.	MONO NEGATIVE NO.	COLOUR SLIDE NO.	REMARKS
462	9	Section S7	Black organically rich soil		Over 459 fill				S7				Equated with 266 on field drawing, and possibly part of it
464/ 465	4	Section S8	Yellow-brown sandy soil		See section	Highest material in mill abandonment levels			S8				
466	8	W of well	Reddish sand						S8				
467	6	do	Yellowish sand and gravel		?				S8				
468	6	W of well	Dark grey-brown clayey soil						S8				
469	6	do	yellow-brown sand and gravel		= 122		Sherd 182 (C12?)		S8				
470	4	Section S8	Burnt wood in sand		See section	Mill destruction level			S8 S18				= 454 cf 170
471	4	do	Ferrous-stained sand		do	do			S8 S18				
472	4	do	Sandstone block		do	do			S8				cf blocks in S3
473	4	do	Mixed brownish clay, charcoal and timber		do	do			S8				cf 111
474	4	do	Clean yellow		do	do			S8				

CONTEXT NO.	PHASE	LOCATION	DESCRIPTION	DIMENSIONS	INTERRELATIONSHIPS	INTERPRETATION	FINDS SUMMARY	PHASE PLAN	SECTION NO.	PLATE NO.	MONO NEGATIVE NO.	COLOUR SLIDE NO.	REMARKS
475	4	do	As 473 above		do	do			S8				
476	4	do	As 109		do	do							
479	2	do	Not recorded		Below 34	Silt of mill area			S8				Probably as 482-3
480	2	do	Orange sand and gravel		Below timber 191	Silt of phase 2 mill erosion			S8				
482	2	do	do		Below timber 178	do			S8				
483	2	do	Dark grey clayey soil		Under 482	do			S8				
484	9	Section S11	Dark soil		Over 41				S11				= L4?
486	5b	In Section S18	Bluish sandy patch, possibly indicating wood			?post			S18				
487	2	Mill	Dark grey sandy silt and burnt material		Under phase 3 mill floor	Silt of erosion under mill			S18				
488	10	Section S19	Mixed brown soil, clay and sandstone patches						S19				
489	8	Section S19	Grey soil with sand patches						S19				
490	8	do	Dark brown sandy soil with some pebbles						S19				

CONTEXT NO.	PHASE	LOCATION	DESCRIPTION	DIMENSIONS	INTERRELATIONSHIPS	INTERPRETATION	FINDS SUMMARY	PHASE PLAN	SECTION NO.	PLATE NO.	MONO NEGATIVE NO.	COLOUR SLIDE NO.	REMARK
491	8	SW corner	Dark brown-grey soil with charcoal and pebbles						S19				
492	8	Section S19	Grey-brown sandy						S19				
493	9	do	Brown sandy soil						S19				
494	8-9	do	Sandstone						S19				
495	8-9	do	Grey-brown soil						S19				
496	8-9	do	Grey clay						S19				
497	8-9	do	Dark brown soil						S19				
498	5a	Section S16	Dark grey clayey soil		Below 121; in cut 24				S16				
499	5a	do	Disturbed clay and gravel		In cut 24				S16a				
500	3	Millpool	Slot in surface of timber 246, SE end			Emplacement for missing timber for south side of millpool		3	S26		H10-11		cf orientation of phase 2 leat. See fig 89
501	3	Millpool	Surface of 246, NW end; 2 cylindical holes		Between two plank slots	Emplacement for upper end of by-pass chute		3			J2	9,984 10,009 10,073	Holes c 9cm deep. Plate VIII. See figs 89-90

CONTEXT NO.	PHASE	LOCATION	DESCRIPTION	DIMENSIONS	INTERRELATIONSHIPS	INTERPRETATION	FINDS SUMMARY	PHASE PLAN	SECTION NO.	PLATE NO.	MONO NEGATIVE NO.	COLOUR SLIDE NO.	REMARKS
502	2	Mill	Planking fragment		Under 506 and 169, among 487	Loose of phase 2 mill		0-2					N end not planned
503	2	do	do do, a-e		Among 487	do	0-2						
504	2	do	Posthole				0-2						No other record than field plan
505	2	do	Timber		On 187	Loose		0-2					do
506	2	do	Timber		Under 505 and 169	Loose		0-2			K3		do
507	2	do	'Burnt material', NE edge plotted; on phase 2 timbers					0-2					do
508	4+5b	Millpool	Edge of cut away in millpool			Erosion ledge		4	S6				See text for argument. Not in 1978 area
509	4	Mill	Loose plank		N of 172	Destruction of mill		4					
511	4	NW of Mill	Loose planks		SW of 190a	Part of plank walls of millhouse		4					See 190a
512	2	Mill	?Timbers or ?holes, or ?stones			?		0-2			K1-2		'shapes' on field plan not recorded
513	2	do	Group of plank fragments, or stones			Loose		0-2			K1-2		On field plan only

CONTEXT NO.	PHASE	LOCATION	DESCRIPTION	DIMENSIONS	INTERRELATIONSHIPS	INTERPRETATION	FINDS SUMMARY	PHASE PLAN	SECTION NO.	PLATE NO.	MONO NEGATIVE NO.	COLOUR SLIDE NO.	REMARKS
514	2	NE of mill	Upright timber; ?in hole			?Phase 2 leat structure?		0-2					
515	2	Mill NE	Cut NW-SE at NE edge of mill; timber 171 in NE edge		Under timber 166 - Fill is silt 487	Cut for insertion of first mill?		0-2	S18				Edge may have continued upwards, but cut away in phase 3 for insertion of clay 34, which lies only on a gravelly material
516	3	Mill	Stone-packing on SE side of upright post 95			Note use of stone in mill		3 (dotted)	S23				No other record except in S23
517	8	SW corner	Collective number given to timber features group			?Jetty		8-9		XI			
520	9	Section S1	Cut through L3 and 307a						S1				
601	0	Section S3	Orange-buff sand		See section	Glacial, a 608?			S3				
602	0	do	Orange sandy clay		do	Glacial			S3				
603	0	do	Orange sandy clay and gravel		do	Glacial as 609?			S3				

CONTEXT NO.	PHASE	LOCATION	DESCRIPTION	DIMENSIONS	INTERRELATIONSHIPS	INTERPRETATION	FINDS SUMMARY	PHASE PLAN	SECTION NO.	PLATE NO.	MONO NEGATIVE NO.	COLOUR SLIDE NO.	REMARKS
604	0	do	Red sandy clay and gravel		do	Glacial			S3				
605	0	do	Red sandy clay with green clay patches		do	Glacial			S3				
606	0	do	Red sandy clay		do	Triassic as 610			S3				
607	0	Section S3	Mottled greenish-buff sandy		See section	Buried soil or weathering horizon		0-2	S3				
608	0	do	Orange-brown soil		do	Glacial, as 601?			S3				
609	0	do	Mixed red and buff sand and gravel		do	Glacial, as 603?			S3				
610	0	do	Red sandy clay		do	Triassic as 606			S3				

MF LIST OF MONOCHROME PHOTOGRAPHS

(Numbers are those of negatives, of films lettered alphabetically, and numbered by frames within these) (this should be order of taking except that L should come after J)

A1 Ditch 90, N edge from SW, section S3 in background

A2 Ditto, from slightly more WSW

A3 Ditto, lighter

A4 Section S3 from SSW, showing robbing holes of timbers on left

A5 Ditch 230, N edge from NE, with timber complex 101 in shelf 101c on edge

A6 General view from NW, stone road 7 central

A7 Ditch 90 from W, looking along its N edge to section S3; timber complex 101 in centre foreground, in shelf 101c in 230

A8 As A6 but lighter

A9 As A5, but including well 57 in right foreground

A10 As A6, but lighter

A11 As A6

A12 Stone road 7 from NW

B1 Stone road 7 from S, with N edge of ditch 230 in foreground, with timber complex 101 on shelf

B2 Stone road 7, larger stones, from SE

B3 Robbing holes 80, 114 for timbers etc on NE side of mill; section S3 on right

B4 General view of N part of site from W looking towards (at this stage) unexcavated area of Cutting II

B5 Robbing holes 80 etc seen from above SE - line of section S3 crossing diagonally

B5-6 Ditto, lighter

B6 Timber robbing hole 80 from E, looking down

B7 General view of area between mill and millpool from SW, showing timber robbing holes and section S3

B8 Close-up of hole, identity uncertain

B9 Timber road 23 ORG, with post 61 on right, from S

B10 Timber road 23 ORG, from N

B11 Timber road 23, showing spars 23 a-h under organic brushwood etc

B12 General view of timber road 23 from W, with section S7 in background

C1 Emplacement 114 for driving chute timber, set in 34; part of section S3 in background; from SW

C2 As C1 from WSW

C3 General view of area between mill and millpool from SW at low level; unexcavated mill in foreground

C4 As C3 lighter

C5 Mill area from N, with mill timbers emerging from 34 - early stage in excavation

C6 Spars of timber road 23 from N; 62 metalling in foreground

C7 Spars of timber road 23 from SW

C8 As C7 from W

C9 23 timber road complex from NW

C10 As C9, lighter

C11 Spars of 23 closer view from SW

C12 23 timber road, lowest spar ?23f from S

D1 23 a-h timbers end on view (all)

D3 Ditto, diagonally of peghole ends

D4 Ditto; diagonally showing most of timbers

D5 Ditto; lighter

D6 As D1, but further away, in sun

D6-7 As D5, darker, no sun

D8 Timber mill paddle CW4, outer sides

D9 Ditto, lighter

D10 Ditto, even lighter (?best)

D11 Timber mill paddle CW4, inner sides, lightest (best)

D11-12 Ditto, darker

D12 Ditto, darkest

E1 Barrel-urinal 142, from above west

E2 Ditto, lighter

E3 Barrel urinal 142, from above east

E4 Blank

E5 Mill from SW, with destruction material in position; section S3 in background, and Cutting II beginning to be excavated (Ronald Lampert in Aussie hat digging)

E6 As E5, darker

E7 As E5, from NW, with timbers 190 in foreground

E8 Mill, with destruction levels intact, from N

E9 As E8, from NE (sections S8 and S7 in background)

E10 As E8, closer view, from SW

E11 SW end of mill from SE; timbers 190 in background, well 57 lower right, crossed by temporary baulk of section S8; note timbers of Mill 1

E12 Close-up view from S of wheel area of mill floor, with sands and destruction levels in position, including planks 152 and (sole-tree) 154.

F1 Timber complex 136 etc in SW corner, from S

F2 Ditto, darker

F3 Ditto, from N, looking into corner of this limited area of excavation

F4 As F3 from slightly more west

F5 As F1 from W

F6 Blank

F7 Mill from NE, with destruction levels and fallen planks removed, but with sands left in wheel area; driving chute emplacement in foreground

F8 As F7 from N, with emplacements 296-7 for driving and by-pass chutes in foreground

F9 Timber with steel bearing (sole-tree) 154, top

F10 154, close view of bearing block IR24 and worn hole on end

F11 Close-up of bearing block IR24 in 154

F12 Ditto, lighter

G2 Mill complex as finally cleared, from NW

G3 Ditto, darker

G4 Ditto, lighter

G5 Ditto, darker

G6 Mill complex as finally cleared, from W

G7 Mill pool complex from W

G8 Ditto, darker

G9 Mill from N

G10 Northern part of mill from E

G11 Ditto, lighter

H1 Mill complex as finally cleaned, from NE (section S7 in rear)

H2 Ditto, lighter

H3 Timbers 190, 185, and 126 (NW side of mill and extension) from W

H4 Timbers 173 etc (outfall revetment) from E

H5 Mill floor planks 160, and 166 (NE end of Mill) from SE

H6 Close-up of N corner of mill, from E

H7 Close-up of NW end of timber 246, showing by-pass sluice emplacement with guide holes, and joint with 161 timber

H8 NW side of millpool at NE end, going into section S5

H9 E corner of mill from N, showing corner joint of timbers 166 and 131, and emplacement for driving chute in 166

H10 SE end of timber 246 (SW side of millpool) showing emplacement 300 for driving chute, and slot 500 for missing timber of SE wall of pool

H10-11 Ditto, lighter

H11 Boards of Mill 1 etc to E of well 57, from N

H12 Timber 173 etc (NW side of outfall revetment) from E, showing collapse of walling timber 151 under pressure from roads to NW

J1 Millstone Q1

J2 NW end of timber 246, showing close-up of by-pass sluice 501 with guide holes, from W

J3 Lava millstone fragments

J4 Local sandstone millstone fragments

J5 Millstone Q10

J6 Wooden bowl CW6, exterior

J7 Wooden bowl CW6, exterior

J8 Millstone Q10

J9 Wooden bowl CW6, interior

J10 Millstone Q4

J11 Millstone Q4

J12 Millstone Q1

K1 Mill from W, with floor-boards 160 removed, showing mill 1 timbers below

K2 Mill complex from SW after removal of 160 floor boards

K3 Mill, NW side at NE END, with 160 removed

K4 Millpool SW wall timber 246, SE end, and finally excavated floor of millpool, from NW; section S3 on left in oblique section

K5 As K4 but more from WNW, and showing more of 246 timber

K6 Clay bed for lower millstone BC3 etc

K7 Lead fragments, melted (OM)

K8 Ditto, lighter

L1 Iron hinge IR6

L2 Carved wood fragments CW1 and CW2

L3 Ditto, darker, but more complete

L4 Final view of lower (SE) part of section S7, from E

L5 Mill complex as finally cleared from SW

L6 Ditto, darker

L7 Central part of mill from S, showing outfall revetment timber 173 etc extending to left, and 190 extension into distance; well 57 in foreground

L8 Ditto, darker

L9 Section S7, and outfall revetment timber 173 and 151 from E

L10 Ditto, lighter

L11 Mill complex as finally cleaned, from SW

L12 Ditto

M1-2 Blank

M3 Leather fragments, dark

M4 Ditto, light

M5 Clay bed for lower millstone BC3 etc

M6 Blank

M7 BC3 or 5, burnt clay of lower stone seating, with grain

M8 Ditto, darker

M8-9 Ditto, lighter

M10 Lead frs, melted (OM) - dark

M11 Ditto, lighter

M12 Timber 154 end, after removal of bearing

MF LIST OF COLOUR SLIDES

(numbers are those of the indexed collection in the Department of Archaeology, University of York)

9,969 D J Fowler, isometric drawing of mill with correct labelling

9,972 D J Fowler, isometric drawing of mill with incorrect labelling

9,973 General view of digging from east

9,974 Lifting timbers by machine at end of excavation

9,975 Ditto

9,976 Timbers of phase 2, first mill from SE; end of excavation

9,977 Final photograph with most of mill timbers lifted, from NE

9,978 Mill final from NW

9,979 Mill final from W

9,980 Mill final from S

9,981 Mill final from W

9,982 Mill from NE with destruction levels in position

9,983 Mill from W with destruction levels in position

9,984 Mill and millpool, final from E

9,985 Road timbers 23 of phase 5a from N

9,986 'Jetty' features 101 of phase 7 and stone road 7 of phase 5a from SE

9,987 Stone road 7 of phase 5a from N

9,988 Stone road 7 of phase 5a from N

9,989 Robbing holes of phase 5b on eastern side of excavation, with timber fragments; from NE

9,990 NE corner of second mill with enveloping of clay (34) in position

9,991 East side of excavation at an early stage, when mill appearing; 'clay cut back to line of timbers'

10,011 Timber plank with steel bearing 154

10,012 Plank 154, right-hand end with closer view of bearing block IR24, and worn hole in end

10,013 Bearing block IR24, set in timber 154

10,014 Section through bearing block IR24, as cut and polished by Dr E Trent (Trent 1975)

10,016 Fragments of millstones of Midlands origin, grouped in stones of each millstone

10,017 Lower (grinding) side of upper millstones Q4, showing circumferential wear, and central emplacement for rynd

10,018 Lower (grinding) surface of upper millstone Q10

10,019 Upper surface of upper millstone fragments of imported lava

10,020 Lower (grinding) surfaces of upper millstone fragments of imported lava

10,021 Burnt clay fragments (BC3 and 5+) of (originally wet) bedding for lower millstone

10,022 Drawing of lower millstone bedding

10,023 Burnt clay BC3 or 5, showing grains and grain impressions

10,024 Half-melted lead mass and pieces Q27

10,025 Wooden mill paddle CW4, view of outer surfaces

10,026 Ditto, view of inside surfaces

10,029 Section (reconstruction)

10,050 Mill final from west

10,051 Grenville Astill removing clay 34

10,052 Grenville Astill cleaning out ditch 90; section S3 (right-hand side) on right

10,053 General view of mill excavation from north, at stage where destruction levels still in place; S13 and S8 in background; probably Sue Hirst and Grenville Astill in picture digging. Are people on edge Rodney Hilton and Jean Birrell?

10,054 Group on excavation. Jane Isaac second from left; Sue Hirst and Philip Rahtz on right

10,055 As 10,052, with Astill standing up

10,067 SW side of millpool (timber 246) from NW

10,068 Mill from W, timbers 190a, b in foreground

10,069 Mill complex from SW

10,070 Mill from NE, timber 246 and driving chute 300 emplacement in foreground

10,071 Mill with all destruction levels 150, 170 etc in place, from WNW

10,072 Ditto, mainly of NW side; section S7 in background

10,073 SW side of millpool (timbers 161 and 246) from SW; by-pass emplacement 501 in 246 on left

10,074 Mill from SSW, with destruction levels 150, 170 etc still in position. Well S7 in left foreground

10,075 Timber complex 101 from E (on ditch 230 edge) - apparently in shelf in 230

10,076 Ditto from SE

10,077 Ditto, from SW looking NE. Ditch 90 on right hand side

10,078 As 10,075, but lighter

10,079 Wooden (organic) road 23 from NW; section S7 on right

10,080 General view from NE; GA back to camera

10,056 General view of excavation from NW, with mill in foreground; taken at same time as 10,053 and 10,054. Daryl Fowler and Ken Sheridan on edge; PAR in distance; section S3 on left

10,057 Timbers being removed by mobile crane at end of excavation (July 1971)

10,058 Digging: Sue Sheridan and Grenville Astill

10,059 Mechanical excavation, using a Drott

10,060 General view from NE, similar to 10,053

22,232 Lead 'propellor''reverse' OM3

22,233 Lead 'propellor''obverse' OM3

22,234 Lead 'window frame''obverse' OM7a

22,235 Lead 'window frame''reverse' OM7a

10,061 View from west at early stage of excavation, before removal of bulk of 34; Section S3 in background. Section S14 in middle; timbers 190a and b in foreground under plastic sheeting. Mill not visible

10,062 Mechanical excavation

10,063 General view of digging at an early stage from SE

10,064 Mill final from NE

10,065 Mill as finally cleaned from SE; timber 190a in background; Well 57 in foreground

10,066 Ditto from north, N corner of mill in foreground

10,081 Similar to 10,080; some of stone road 7 in right foreground

10,082 Timber road 23 (organic) from W; 82 metalling on left

10,083 Timber road 23 (spars 23 a-h) from SW

10,084 Similar to 10,082

10,085 As 10,082, closer view

10,086 Timber road 23 (organic), with post 61, from ?S

10,087 Stone road 7 from N

10,088 Ditto

10,089 Ditto from SE, oblique view

10,090 As 10,089

10,091 Section S7, with timbering of outfall revetment (173 etc), from NE

10,092 General view from NW, as mill timbers (NE side) were beginning to appear by removal of 34; Section S3 in background with 80 on left

10,093 Robbing hole 80 from S

10,094 Robbing hole 80 from WSW

10,095 Robbing hole 80 SW

10,096 Edge 10 from south

10,097 Ditch 90 from NW, showing northern edge and Section S3 in background

10,098 Robbing hole 80 from SE, looking along line of Section S3

10,099 Edge 10 from S, section S14 in background on right

10,100 Section of unknown location 'north of mechanical cut' (title on slide)

10,101 As 10,098, less contrast

10,102 Ditto

10,103 Timber complex 136 etc in SW corner of excavation, from NW looking down into corner of excavation of this limited area, and possibly showing edge of 230 earlier than timber F175 (not on plan)

10,104 Barrel-urinal 142 from SW

10,105 timber complex 136 etc from S

10,106 Digging, around barrel 142; GA and SS

10,107 Stamford ware and other late Saxon or early medieval sherds

10,108 Ditto, darker

10,109 Bearing block IR24 in polished section

10,110 Lead fragments, half-melted (OM nos)

10,111 Wooden bowl CW6, outside

10,112 Spars 23 a-h of timber road 23; end view

10,113 Ditto, diagonal view

10,114 BC3 and 5+, burnt clay seating for lower millstone

10,115 Half melted lead (OM nos) closer view of 'window-frame-like' pieces

10,116 Millstone Q1, upper stone, upper surface

10,117 Mill paddle CW4, inner surfaces

10,118 Millstone Q10, upper stone, upper surface

10,119 Wooden bowl CW6, inner surfaces

10,120 Leather, numbered 1-8, = LE1-8

10,121 Millstone Q1, upper stone, lower (grinding) surface

10,122 Millstone Q4, upper stone, lower (grinding) surface

10,123 First reconstruction drawing of mill paddle CW6 (now shown to be wrong in detail)

10,124 Ewence drawings of IR25 and IR24

22,230-1 Lead cross OM1

Acknowledgments

1978 by RM

The excavation was undertaken by Tamworth Excavation Committee, chaired by A A Round. Peter Field of Tamworth Castle Museum capably assisted with the direction of the excavation and Jean Meeson was indispensable as site supervisor. The most helpful members of the team who worked on the site were George Arblaster, Susan Ball, Paul Blower, Glenn Beech, Philip Clarke, Peter May, Sue and John Saddler, Ian Sands, Colin Sayles, Paul and Barry Wale, Mike Webster, Derek Wolverton and Albert Wright.

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MF 1.4 CIRCUMSTANCES OF EXCAVATION

1971 and earlier

by PAR

Earlier work on the 1971 and earlier archaeology of Tamworth has amply demonstrated that its historical importance, long known from written sources, was well represented by surviving archaeological remains (fig 2). Excavations before (references ... Meeson 1979) were concentrated mainly on the circuit of the Anglo-Saxon defences of the 10th century, which superseded earlier works of the 8th and/or 9th centuries (1.1 above). It was Meeson (1979), however, who finally synthesised the earlier archaeological and historical work, and generated hypotheses on the wider topography of the town, based on his own excavations in the central area. This was around St Editha's Church, where he postulates the existence of a royal centre (above, 1.1). A reconstruction of Meeson's concepts was painted by Richard Bryant for the BBC TV series by Michael Wood 'In Search of ...'. This included a programme called 'In Search of Offa', in which Bryant's picture was shown.

Work in the Bolebridge Street area began with an excavation by Charles Young in 1968, never published by him (but see Young 1971). Young excavated part of the Saxon and medieval defences in the SE corner of the town, on the north side of Bolebridge Street; an important feature of his dig was the discovery for the first time in Tamworth of preserved wood and other organic residues in a waterlogged environment.

Meeson recognised the potential of the area south of Bolebridge Street (at SK 209039), all due for redevelopment as part of 'urban renewal'. It was in 1971 believed that the Saxon defences found by Young extended into this area, and subsidence of standing buildings seemed to confirm this hypothesis. Furthermore,

the estate map of George Marquis Townshend of 1810 (CRO Stafford 854/2) showed the 'Kings Ditch', the medieval town ditch found by Young, continuing its alignment down to the river. This map also shows a dotted line running down to the river on the west side of the present site; and the last occupant of the buildings in this area said there had been a right of way here to the river (info K Sheridan). This is probably of early medieval origin, as will be discussed from the archaeological evidence later in this report.

Meeson recorded nos 72-73 Bolebridge Street in 1970-71; these comprised at least three phases of timber-framed structures of the 17th-19th centuries. These had been built partly on a layer of red clay, put in to level up the subsidence noted above. This corresponds to layer L1a in the 1971 excavation. These buildings were demolished for car parking, and in the spring of 1971 Sheridan (then on the staff of the Castle Museum, Tamworth) dug a trench across the site. This revealed substantial structural timbers, ———————— again well preserved in waterlogged conditions, with burnt material and good stratification. These were interpreted as part of the timberwork of the Saxon defences; they appeared to offer a splendid opportunity for extending knowledge of the timber superstructure not only just of Tamworth, but were potentially also of relevance to the understanding of all Mercian Anglo-Saxon defences, and indeed to those of pre-Conquest England as a whole (Rahtz 1977). There was also the possibility of clarifying problems of the relationship of the defences to the north bank of the River Anker; and the precise course of that river in this area in medieval and earlier times. Resources were accordingly sought for a more extended excavation involving the local authorities and other organisations, central government (then the Department of the Environment, DOE) and the University of Birmingham; the total cost of the work, from May 31 - July 5, 1971, was £202-48.

Sheridan was unable to work full-time on the site, so Rahtz was invited to direct the work with the help of students, volunteers and four workmen, in association with Sheridan. The site was only available for a few weeks; paid labour was difficult to get (and of poor quality). The weather was poor, and conditions of waterlogging and heavy mud were very difficult. Half-way through the excavation, the heavy work caused Rahtz to slip a disc, which reduced his usefulness in direction to intermittent and merely advisory level. Susan Hirst, Grenville Astill and Daryl Fowler took over and completed the job. Under the hurried circumstances and difficult conditions, and because of the gaps in the stratigraphic record occasioned by the mechanical excavation, the records are far from perfect, and the task of bringing the data to publication has been formidable, with many ambiguities only partially resolved, and many things that could not be explained. In the last few days especially, when the timber remains were dismantled, recording was very hurried, and many of the lower timbers were not fully drawn, recorded, or photographed. The main outlines of the history of the site are, however, clear.

1978 by RM

The later excavations of 1978 (2.8 - 2.19) were directed by Meeson. In 1971 it was not possible to excavate the NE part of the millpool; there was a heavy overburden over the site; there was a shortage of time and resources; and the Old White Lion public house was too close for safety. This building was recorded and demolished in 1978 as part of further urban development in the area. An area of 600 sq m became available, which included a street frontage of 20m, and a plot length of 30m.

It was anticipated that further structures of the millpool would be found, together with at least part of the leat for both the first and second mills. The excavation lasted from March 23 to May 12, 1978; the cost, of £1,083 was met by the Department of the Environment. The labour force consisted of volunteers, mainly inexperienced, who worked on the site for a total of 18 days; this hand labour was used in conjunction with a JCB mechanical excavator. During much of the period prolonged heavy rain and considerable drainage problems added to the difficulties encountered. These circumstances were major factors in the determination of an excavation strategy.

MF 1.5 METHODS OF EXCAVATION, RECORDING AND ANALYSIS

1971 by PAR

An initial excavation of some 50 sq m was extended to about 80 sq m, with its western limit on the line of section S7, and its eastern limit on the line of section S3. The excavation was later extended to take in the NE corner (the millpool area) and another triangle to the SW beyond S7 (initially leaving a baulk here). Further extensions (Cuttings III, IV and V) were dug mechanically, with hand extensions.

fig 36

From the outset, the main priority was given to the lower levels which were, as anticipated, pre-Conquest; medieval and post-medieval levels were given relatively short shrift. Initially it was thought that the exposed timberwork and associated clayey levels were, as already mentioned, part of the Saxon defences, of timber and clay, better preserved here than elsewhere in the town. As the excavation progressed, numerous fragments of many different millstones were found; we realised that we were excavating a watermill. The rarity of such structures in the British medieval and earlier archaeological record gave the excavation a significance at least as great as if it had indeed been the defences that had been located.

Once the nature of the structure was realised, the highest priority was given to recording its precise structural detail; it is one of a handful of Anglo-Saxon sites where preserved timber offers the hope of some understanding of the techniques of carpentry available in the pre-Conquest period (Rahtz 1976, Wilson 1976). In this we were immensely helped by Daryl Fowler, whose understanding of timber joints and architecture and his skill in three-dimensional recording were much beyond our own abilities.

The later stages of the excavation were conducted under the assumption that it was a watermill we were digging, but at the time we believed it to be a vertical-wheeled undershot mill. It was only some months later (November 1971) that Sheridan suggested to Rahtz that in fact we had been excavating a horizontal-wheeled mill, for which he was able to quote many analogies in the published literature. A review of the evidence quickly made it clear that he was right. Many features that we had not understood in the context of a vertical-wheeled mill (or even at all) could be readily slotted into this revised interpretation. This was especially true of the recognition that a gap in the destruction deposits indicated the presence of the wheel-assembly; and to the crucial identification of one of the wooden objects as a paddle from the wheel.

Within the main area the stratification survived at several different levels, because of the varying depths of mechanical excavation. It was difficult therefore to follow layers in a systematic way. Attempts to do so in the early stages are indicated in the report by the definition of layers L1 to L4; it was possible to relate some features to these stratigraphically. Most layers and features were, however, numbered (by serial arabic numerals), and described as and when they were located, with observations in written form, noting such stratigraphic relationships as could be observed. Limits of some layers and features were plotted on plans at different stages at a scale of 1:20, as far as was possible. Five successive field plans are deposited in the archive in Tamworth Castle Museum. While these were drawn at successive stages of the work, they do not necessarily show layers or features that were visible together.

The crucial data, however, apart from the plan of the mill itself, were recorded on sections S1-S19 (figs 6-27) ——— it is the syntheses of these which provides the framework of phasing and vertical relationships; the principal sections are placed at the beginning of this report, some with a phased interpretation. The emphasis on such a vertical record was archaic, even in 1971; many of the unresolved problems of the site are due to the difficulties of attempting to reconstruct a three-dimensional sequence from two-dimensional records, rather than from the horizontal three-dimensional approaches familiar in British excavation in the 1980s, including single-context planning.

Apart from the sections provided by the edges of the excavation at different stages, temporary baulks were left, and sections drawn, notably around the post-medieval well (S8-S10).

Finally when the NE corner ——————) was excavated, the importance of having a section from SW to NE, on the longitudinal axis of the mill, was very clear; the triangle comprising this area was accordingly first cut back to a suitable line. Using all available data and levels this section was extended SW right across the site. Through most of its line, the stratification had by then mostly been removed, but levels were taken of surviving strata and structures, and complete profiles were available where the line intersected sections that had been drawn. The resulting reconstructed sections are shown as S18 and S19.

The final stages of excavation concentrated on the cleaning, photographing and recording of the mill structure. It was realised by this time that there had probably been an earlier mill, but time did not permit the careful examination or recording of what survived beneath the well-preserved mill. This was only possible for a few hours when, finally, the mill timbers were taken out by machine.

It was not possible in 1971 to preserve the mill either as an exposed monument, or even to guarantee the safety of the structure if it were reburied. Nor did resources allow the careful removal of the timbers. No facilities were then available for their conservation, or for their transportation in an undamaged state to a place where they could be reburied pending possible future conservation and reconstruction. All that was possible was to remove them with a machine, which inflicted a lot of damage. The principal ones were however buried in wet sand in the grounds of the Museum (Tamworth Castle), and this fortunately preserved their wood well enough for dendrochronological techniques to be applied to them a decade later, which provided the key date for the mill.

Interim reports or notes were published on the work (Rahtz and Sheridan 1971, 1972; Rahtz 1976, 1977, 1981; Rahtz and Bullough 1977). The mill also figured in

the exhibition Archaeology in Britain since 1945 at the British Museum in 1986. A model was included, and there was also a reconstruction drawing in the book of the same title which appeared concurrently with the exhibition (Cherry ed 1986). It should be noted that the model and the drawing are materially different from each other, and that neither is consistent with the interpretation as set out in this report. These discrepancies were not the fault of the BM academic staff responsible, but were due to lack of communication at the development stages of exhibition and book.

Many years were, however, to elapse before Rahtz, with the assistance of Lorna Watts (records) and Susan Wright (finds) was able to begin sustained work on this final report.

The first stage was to transcribe all written field notes into tabular form (Table II), and list all finds in material categories. Publishable copies were then made of all field drawings, with minimal interpretation or editing, other than the elimination of obvious errors, and the ensuring of internal consistency. From these versions separate and composite stratigraphic matrices were built up which formed the bases of the periodisation and ultimate interpretation. In the final stages of mill interpretation, some use has been made of ethno-archaeological analogues derived from published sources and from fieldwork in various areas of Europe by Rahtz and Watts. The discovery of the Tamworth mill was the catalyst for them of a very absorbing and fruitful field of study, including a study of the mills of this kind in Crete (Rahtz and Watts 1981).

Several factors militated against a systematic hand-dug area excavation to locate and record the rest of the millpool and leat in plan. Major changes in the urban landscape had removed any fixed points by which the precise edges of the 197 excavation could be relocated; moreover the extent of the pool and the direction of the leat were uncertain, and time and manpower were limited. Given these factors, the most practical way to assess the scale of the archaeological problem, to determine priorities, and to relocate the millpool quickly seemed to be by machine-cut sections. Two long trenches were accordingly dug by a JCB mechanical excavator in the full knowledge that some evidence might be lost (trenches A and B on plan M1, fig 39). Subsequently the technique and quality of excavation and recording selected for different parts of the site were determined by assessing the cost-effectiveness of careful excavation in relation to the quality of data it might provide, consideration of the available manpower, and the limitations of time available on the site.

Trench B, at the east end of the area, cut through more than a metre of post-medieval deposits which included metal-working hearths and furnaces between Bolebridge Street to the north and alluvial deposits to the south. A small area was opened on the west side of the trench, employing a machine to cut down to the top of the hearths. These were excavated and recorded as quickly as possible.

The medieval town ditch had been recorded in 1968 on the north side of Bolebridge Street (Young 1971, 239) and the upper edge of a ditch of similar character was exposed in trial trench A (section S51, fig 47). It was judged that if the ditch located in 1968 was the same feature as that in section S51 it would pass beneath the hearths in trench B. To test this, a mechanical excavator was employed to cut out the deposits sealed by the hearths in Area B, and an oblique part-section

of a ditch or ditches was revealed. The fills were below the modern water table; the section was photographed and drawn rapidly before it collapsed, at which point most of Area B was abandoned.

Small areas were now opened on each side of the machine-cut trench A to expose the leat, and to the south the medieval ditch was hand-dug to a depth of 3.56m from the ground surface. This operation involved the extensive use of metal shoring; as the site was prone to flooding constant pumping of water was necessary from a depth of c2.5m.

Within the area opened on the west side of trench A part of the east section (S6) of the 1971 dig was relocated. The area between trench A and section S6 was partly excavated and recorded.

During the systematic recording and removal of post-medieval deposits a hearth was exposed and recorded. The removal of the hearth and other deposits exposed the face of what is interpreted as a medieval bank. The bank sealed the silts which had been deposited over the bed of the leat. Part of the bank was initially retained adjacent to trial trench A while a small area of silts was examined, thereby exposing part of the bed of the leat. Attention was then given to the small area east of trial trench A, where the post-medieval deposits were cut away quickly. Three pits associated with metal-working in Area B were rapidly emptied and recording here was cursory. The layers of earth into which these three pits had cut were removed by spade to reveal the top of the medieval 'bank'.

Those medieval 'bank' deposits which extended out of the north section S53 into the available area were then removed quickly by trowel and spade, exposing the timbers which lay on top of the leat silts. The timbers, silts, and the bed of

the leat were then methodically examined and finally a number of sections were cut into the hard natural clay.

A separate numerical sequence was adopted in each of the two main areas A and B for all contexts and finds. The small area excavated adjacent to trial trench B was called Area B. The area west of trial trench A was designated Area A but when the excavation and recording of features associated with the leat extended east of trench A the A prefix was retained for the area (plan M1, fig 39). Numbers with the prefix 'F' refer to individual furnaces or hearths.

MF 2.2 PHASES 0-1 - prehistoric, Roman, and pre-mill

Introduction

These phases comprise all features earlier than the phase 2 (first) mill; this includes features which may be natural (0), and those possibly earlier than the first mill (1). These are shown in plan in fig 28.

Phase 0 (prehistoric and Roman)

The broad topography of the site has been discussed in 1.3. Undisturbed natural levels were reached over much of the area dug. In cuttings I and II these consisted of sands, clays and gravels, of glacial origin, of reddish or orange colour (601-605, 608-609), lying on Triassic (Keuper) red sandy clay (606, 610: well displayed in section S3).

There is no reason to believe that the natural layers encountered in the northern part of the site (north of the mill) had been truncated, so that c 60 m AOD is probably near the prehistoric ground level near Bolebridge Street.

In a limited area between the medieval town ditch of phase 7 and the mill, a possible buried soil survived as a 'peak'. This is 607 in S3, a greenish-buff mottled sandy material. If this is an (altered) former soil, it gives a minimum former surface here of c 59.00 m, or c 58.80 m at its base (to compare with the natural further north). The drop of about a metre over a distance of c 8 m suggests a general gradient of c 1 in 8 down to the river in this part of

Tamworth. This is roughly that of the observed surface of the red clay 610 in section S3, as seen in the sides of the mill/leat cut and town ditch.

A further c 8 m south, in cutting V, the red clay was encountered at c 56.00 m (see section S12). Here it is overlaid by running sand and alluvium under the lowest archaeological level at c 57.70 m (cf left of S7). These presumably represent the extent of the north edge of the River Anker in earlier times, the bank lying formerly between here and cuttings I and II, but later incorporated in the medieval town ditch. The river-bed is however over two metres higher than this now (1971), presumably due to modern water-engineering (see fig 4). The level of red clay in cutting V here, at c 56.00 m, is therefore likely to be a truncated one resulting from river downcutting, there having formerly been a sharp drop to the south just north of cutting V. What are probably river-edge layers were also encountered under the 'jetty' complex 517, in the extreme SW corner of cutting I (2.6 below).

Former 'normal' levels of the natural have been extensively cut away by human features, notably the major excavation done in Anglo-Saxon times for the mills and their leats, and by the medieval town ditch components in the post-Conquest period. All these were later filled-up by the deposition of destruction and rubbish layers to a relatively level surface on which post-medieval buildings could be erected, resulting in the modern topography of this area between Bolebridge Street and the River Anker.

Phase 1 (pre-mill)

A number of features are stratigraphically earlier than phase 3, but are not obviously related to the first mill (see below) and could pre-date it. Some are shown on the plan of phases 0-2 (fig 28). They include 12, 14, 15, 16, and 18;

none of these yielded any finds, and could all be natural depressions or tree-disturbed areas etc. In section S1, 306, 307, and 307a could also be earlier than phase 2. Apart from one flint (3.1) and some Roman tile (in 307 and later contexts), there were no pre-Saxon artefacts, or any evidence that the area had been humanly occupied before the middle-late Saxon period - a conclusion broadly true of Tamworth as a 'central place', but not of the wider area, as part of a widely-settled prehistoric and Roman rural landscape.

All other pre-phase 3 features lie in the lowered area of the second mill or its leat and should be broadly associated with the first mill, even if no function can be assigned to them in that context.

MF 2.3 PHASE 2 - the first mill (figs 28-30)

(see ⟶ glossary)

Introduction

Numerous layers and features were sealed by layers or structures which are assigned to the second mill. These phase 2 features lay in the three major cut-away areas, broadly in the western, central, and eastern parts of the site. In phase 3, the second mill, these are clearly the outfall, wheelhouse, and millpool/leat of a watermill. This is the principal reason for interpreting the phase 2 features and layers also as related to a watermill, and this assumption is the basis of all subsequent discussion It must be admitted, however, that there is no direct evidence that there ever was a mill before that of phase 3 - there are for instance no millstone fragments in these phase 2 contexts - and it is possible that an alternative hypothesis could be generated which could account for all the phase 2 archaeology (such as a fish-weir). Such reservations will be apparent in the discussion that follows. One of the principal areas of uncertainty is the extent to which the phase 2 timbers were even approximately in their original position, as structural components of a first mill. There may have been extensive dismantling of the first structure to be used as a foundation for the second mill; or even re-use of major structural timbers in the structure of that mill; some of the main timbers in the second mill had certainly been used in an earlier structure (2.4 below).

It is also assumed, without any secure basis, that the first mill was of the horizontal-wheeled type, similar to the second mill. The only feature that may well have been quite different was the way the water entered the mill. For the second mill, this was clearly by way of a mill-pool, a built structure containing a reservoir of water at a higher level than the mill itself, providing a 'head'

of water with a consequent potential velocity. For the first mill, there may never have been such a structure, the water entering the mill directly from a leat. In either mill this would nevertheless be able to supply a constant high volume of water, for reasons discussed below.

The contexts of phase 2 will be discussed as a commentary firstly on the plan (fig 28) and secondly on those sections in which phase 2 elements occur.

The source of water

The water for both mills came from a leat. This is assumed to have been fed from the River Anker further up its course; the nearest possible place is suggested in fig 2, the leat in that case being c 400 m long. Further research is needed on the nature and location of the leat point-of-entry; some associated features nearer the mill were found by Meeson in his 1978 excavation (2.11 below). A river source for the leat of a watermill obviously provides a constant and prolific flow, varying only in flood and drought conditions. This is in contrast to a mill fed by a small stream, which may dry up in summer, or whose water volume is so small that a reservoir has to be filled before the mill can operate; this can be observed in the majority of surviving mills of this type in low rainfall countries around the Mediterranean.

Major mills in England must always have been sited to use water from substantial streams or rivers, to ensure a sufficient and constant volume (cf Holt 1988). The mills at Tamworth were presumably sited at the optimum point where (a) there would be the maximum fall from a leat taken off the river, and (b) where the outfall was near enough to the lower course of the river for convenience, but still above any level which might be subject to flooding.

The plan (figs 28, 30)

While it is clear that the water came from a generally NE direction, the precise character of the final course of the water, which lies within the excavated area, is uncertain. There are a few timbers, such as 253, 254, and 279 which could be the surviving elements of some defined structure channelling the water to the right course. Some limits to the leat cut are given by the steep slope (371) on the NW side, and by the other edge of 371 on the SE side. These are more fully discussed in relation to the sections S3-S6 below. There is a gap in possible phase 2 contexts between the leat and the mill area, where phase 3 levels extend right down to the (? lowered) natural.

The plotting of all known edges and slopes suggests that the primary leat of phase 2 was orientated 10° or more southwards away from that of the mill cuts, pointing to a more south-easterly direction for the origin of the leat (cf fig 5i). This orientation appears also to be reflected in the angle of the southern side of the phase 3 millpool (see 2.4 below), but not by its other sides.

The lowest levels of the (eroded) leat of phase 2 are similar to those in the mill area; it is therefore assumed that the major excavation for the insertion of the mill (10 + 515 + 158 in fig 28) originated in phase 2; its NW edge (10) may be the same as that for the second mill, or slightly further SE, if 10 represents a recut for the second mill (see 2.4 below). The SE edge (158) is NW of the 'peak' between the 'low' mill area and the cut for the medieval town ditch to the SE; it is here defined to the SE by the ?buried soil ridge 607 (see 53). The NE edge is indicated by the slight step 515 (see S18).

Within this hollow there are many timbers in an area c 6 x 4.5 m. The location of each is indicated on the plan (fig 28) and the thickness of many are shown in

the main sections (S8, S18) and in the detailed timber drawings (figs 82-91) though not all were recorded. In general the timbers are not so substantial as those of the second mill (pl VI shows two of them); it may well be however that, as already suggested, some major timbers had been re-used, leaving only those that were of little use. Three large stones in the south corner may also be associated.

Some sequence is implied in the way the timbers overlap each other; the NW timbers 187 and 506 would be the first, followed by a series of NW-SE planks with peg-holes or pegs in them (227, 243, 169/272); then the SE timber 270, and finally the NE timber 171, the SW-NE planks (?without peg-holes) (see below) 178 and 191, and other unrelated pieces such as 186, 188-9, and 505. There are also a few small uprights (or stubs of uprights penetrating the natural) and stakes or stakeholes 261, 263-4, 292, 504, and (outlying to the SW) 228a and b. It should be noted that four holes (dashed outline in fig 28) in timbers 171 and 270 (and another SE of the SW end of 187) are those made by major posts of the second mill.

One field record (for 178) says that this and 169 were pegged together; this is not clear on any photograph, but the peg in 169 just to the SE of 191 is seen in a photograph to be protruding substantially, as if something had been pegged to it. A final point to be stressed is the diverse orientation of the 'planks' in relation to the 'main' timbers around them.

The rather haphazard framework thus defined is not obviously an entity in itself, nor, even if it were more complete, does it carry any conviction as the basal floor structure of the wheelhouse of a mill; it was however that exposed when the structural timbers of the second mill were removed. In this complex only 187, 270 and less probably 171 could be argued to be <u>in situ</u> in some sense.

It must however be admitted that a case could be made out for the majority of these timbers being the foundations and floor of a wheelhouse of a first mill (as shown in fig 30). This would be a viable conclusion especially if the planks were pegged together. In this hypothesis the evidence would suggest a double floor, of planks laid in one direction, overlaid by and pegged to planks at right angles; the larger timbers 187, 171, and 270 would then be the bases of the main walls of the wheelhouse (fig 30). The case is however weakened by the relationships of the planking mesh to the main timbers, 169/272 and 243 going under 270, and also by the obvious inconsistency of orientation already noted.

It may be concluded therefore that most if not all of the surviving timbers in the mill area were used as a foundation for the second mill structure, to some extent levelling off the uneven base of the mill hollow. It still seems probable however, that these timbers were not made for the purpose of this foundation , but were re-used or re-arranged from a dismantled structure, which was probably itself a mill. The pegged planks in particular are clearly re-used, either from a floor as suggested above, or from some superstructure, perhaps the millhouse above. A pegged plank like these was found burnt (152) in the destruction levels of the second mill; it must have come from the superstructure of the millhouse above, since this is where the fire was (2.4 below).

Around the phase 2 timbers in the easterly part of the mill area was a silt (487) (see S18) which was dark grey in colour and contained burnt material. This may have been mud accumulating in the area when the timbers were being robbed or re-arranged. This material was cut away by areas of erosion (269 a, b) whose fill was more orange and gravelly than 487 (255 in S18 and S16b). They may derive from a time when surrounding surfaces of the natural were exposed, washing

clay and gravel into these hollows; perhaps this was at the time of the initial activities associated with the construction of the second mill of phase 3. If this is true, then it confirms that the timbers of phase 2 were not in situ, as they clearly overlay 255. This argument applies not only to the plank framework but also to timbers 270 and 171, which successively overlay the planks and each other - leaving 187 as the only possible timber in situ.

An alternative explanation is that both lots of silts under and around the timbers were deposit in erosion hollows being worn away by water passing under the timbers.

In the ?latest of these silts, 255, were nails and other fittings (IR18-22), burnt clay (BC6), and worked wood (CW7). These may all be associated with the use of the first mill.

The presence of these hollows, and their associated fills, are another reason for believing that there had been a structure in the mill hollow before the second mill. Had the latter been constructed de novo, it would surely have had its basal floor set on a levelled area, not an irregular surface roughly levelled off with planks (see also below in discussion on S18, concerning 515).

The outfall of the first mill is assumed to have been broadly the same in extent and level as that of the later mill. The NW edge can have been no further NW than the extant edge of 460.

The only directly associated stratification associated with the first mill are the lowest silts in the leat (discussed below in relation to sections S3-S6); they include those under the phase 2 timbers (255, 487) filling the erosion hollows (mentioned above); those surviving on the NW edge of the leat (below, re

S3-6); and finally 482-3 in the outfall area, orange sand and gravel over more grey sandy silt like 487 (S8, S18). Further burnt material (507) was observed around the tops of the phase 2 timbers when they were exposed by the removal of the heavy plank floor of the second mill (the NE edge of 507 is shown on the plan, fig 28).

The sections

S1-2 illustrate the ground profile NW of the mill; S3-6 illustrate the stratification of the leat area (371) in phase 2; S18 shows the mill area and outfall in the NE-SW axis; and S7 the NE edge of the outfall area.

S1-2; 306, 307, and 307a are the only possible phase 1-2 layers here; all else is cut away by later features.

S3 provides a section across the postulated leat, which must have existed here if the hypotheses concerning Mill 1 are accepted. It is uncertain whether there ever was a constructed timber-revetted or lined leat here (but see the 1978 evidence, 2.11 below). If there was it may have been totally eroded or taken away. There may never have been more than just a water channel; if so it is hardly surprising that it eroded away, probably both at the sides and in the base. The limits of the leat in any dimension are uncertain within the broad constraints of the steep slope on the left and the SE edge of cut 371 on the right. At the extreme top left 34 (clay of phase 3) lies directly on the natural, with no phase 2 silt; so there may be a recut here; the edge of the phase 2 leat may have been no further north than the north edge of the late medieval pit 39.

The level of the original base is equally uncertain. It may not have been any deeper than the base of 165 on the left at c 58.70 m AOD; or the base of 328 in cutaway 164 at c 58.40 m. Further down, the present base is at 58.00 (in gully 280), and the lowest is c 57.65 m, in gully 275 (cf fig 48).

The final maximum width was between 5 and 7 metres, and the depth 1.5 m-2 m from the presumed original ground level. The profile of the base of S3 shown here is interpreted as an amalgam of sideways erosion, and downward erosion, culminating in 275, which brought the water level down to c 57.80, similar to that of the mill-base itself. By this stage there would be no head of water to give any power to a horizontal-wheeled mill and such a mill would have become inoperative.

The fills of the various steps and gullies are probably of different phases of erosion, each being mostly cut away by the next stage. They consist of brown sandy soil, gravel, twigs, wood residues and clay (eg 155, 165) or reddish clay and gravel; the latest of these deposits are 362-5 (cf latest silt in mill, 255). A nail (IR17) was found in 155 (see also botanical report, 3.13).

All of these steps and gullies are sealed by the clay (34) of the second mill.

S4-6. The lowest silt on the slope here (165 - over some eroded sand 387) extends under 161, and is continued as 165a, into S6, interleaving with 417 and 421, before being cut away in phase 4/5b (erosion ledge 508). An argument that 165a (and the layers that follow down the slope) was in fact the silt of the phase 3 millpool, is considered in relation to phase 3 below, but rejected as being less likely. Further silts which may be of phase 2 (260, 414, 415) are shown here to the south of the phase 3 posthole 274. 260 as a woody residue possibly derived from the leat corner; it actually extended under the millpool timber 246, of phase 3; the other two layers are clean sands.

S18: Here phase 2 levels survive only in the mill and outfall areas, the line of section in the leat here being of phase 3 layers (see below, 2.4) (except 417 on extreme right, cf S6). The area between leat and mill was similarly cut down to natural in phase 3. The NE (lower) edge of the original construction trench 515 is seen here in profile, and the re-used timbers with the silts around them, under the heavy floor of mill 2. 515, here 10 cm deep, is taken as the best evidence for there having been a first mill. If 515 had been, rather, a cut to make a level terrace for the second mill, timber 166 above would certainly have been set down in it, on its base. The edge of 515 presumably went up higher originally, at least up to 58.00 m, the surviving level under timber 246 (millpool south wall) of the second mill, or even higher originally before the base of the leat was eroded downwards.

The level of the base of cut 515 is c 57.95 m AOD. This is a metre or more below the original estimated level of the ground here, implying extensive excavation in phase 2, with a northerly edge on the line of 10, if not actually 10.

In the outfall area, phase 2 wood and silts form the lowest levels.

S19: By this point in the outfall the base level has dropped through 57.60 m to 57.50 m, an adequate fall for the water after its passage through the mill. All phase 2 deposits are then cut by the medieval town ditch 230.

S7: In the complex section here across the northerly part of the outfall, the earliest levels (450, 451, 452 and 458) are argued to be of phase 2, cut 284 being erosion of phase 4, since it is filled directly with mill 2 destruction levels. 62, on the extreme right, may have originated in phase 2 or earlier (see also S11).

Dating (fig 78)

There is no dating evidence for the postulated first mill except for two of the four radiocarbon dates (3.19); one of these was from leat silt 155 (brushwood) (AD 638-1011); the other was from a branch under floor 160 of the later mill (AD 624-1024). No pottery was found in any levels of Mills 1 or 2. A terminus ante quem is given for both mills by the Stamford ware and other sherds in layers above the mills; none of these is likely to be earlier than the mid 11th century. A terminus post quem of AD 824 is given by dendrochronology for Mill 2 (see below 3.18): most probably 855 ± 9. Mill 2 could however be later than this date for the timber, so this date cannot with certainty be used as a TAQ for Mill 1; this would especially be the case if the timbers of Mill 2 were re-used from mill 1; in that case Mill 1 would have a TPQ of the dendro date. Since however it is more likely that the second mill is dated by the dendro determination, a TAQ is also likely for Mill 1, dating it to the mid- 9th century or earlier. No estimate can be made of its length of use, except that suggested by the postulated massive erosion of its leat, which is unquantifiable in terms of years.

Conclusion

It seems likely that there was a mill earlier than the principal one of phase 3, and that it also was of horizontal-wheeled type, possibly longer from NE-SW than the mill which succeeded it. There is considerable doubt, however, whether any of the structural components found below the main structure of Mill 2 were in position as the residue of Mill 1. No details of the operation of the putative Mill 1 can be recovered; especially obscure is the nature of the water entry. In general however the first mill is likely to have been of a similar type to the second and to have been set at a similar level. It came to an end either by fire

The first plan, of phase 3 (fig 31) shows the mill with all deposits removed, exposing the main structural elements. The plan does not entirely reflect the original size of some timbers, of which the upper parts had decayed more than the lower. A better idea of their surviving size is given by Fowler's large scale details of the timbers themselves (figs 82 to 91); some rationalisation of their shape and original position is implied in his axonometric reconstruction of the structural remains (fig 82). Fig 31 does not exhibit a complete plan of the mill structure; collapsed plank walls, for instance, are shown only in fig 32 (phase 4). Both plans should be viewed together for completeness; see, however, figs 80 and 81, later in this report, for restored views.

Construction

In discussion of the first mill (phase 2 above), it was argued that the timbers beneath the phase 3 structure of the secondary mill could be the surviving parts of a wheelhouse in situ, but were on balance more likely to be structural elements of an earlier mill, largely or wholly dismantled and used to level off a rather uneven area for the building of the second mill. If the latter is true then the plan of the timbers of phase 2 in fig 30 above must be seen as really of phase 3 - a preparatory stage in the building of the secondary mill.

It was also argued that the cutting of a major terrace in the slope of the gravel in which the wheelhouse is set, and especially the cutting of a channel for the leat, originated in phase 2. This applies to at least the lowest parts of the cuts 460 (the outfall NW side), 10 (the mill area NW side), 515 (the mill area NE side)(not on fig 31), 158 (mill area SE side), and the major cut-away for the leat (371). It was observed however that where the mixed clay waterproofing envelope (34) was removed from the upper area cuts (notably 10), it lay in most

MF 2.4 PHASES 3-4 - the second mill

MF Phase 3 - the second mill, construction and use

Introduction

It is with some relief that the problems of the ambiguous and ill-recorded evidence of phase 2 can now be left behind. The second mill and its associated stratification and artefacts are a data set of the highest significance; although there are areas of uncertainty, the date, function and reconstruction of the mill can be attempted with a clarity unusual in Anglo-Saxon archaeology. This is all the more gratifying in that the evidence was recovered from an excavation which got off to a very bad start, was conducted in a hurry in very poor conditions, and with inexperienced workers; in contrast to a planned research excavation, with the adequate resources that the Tamworth mill should have had.

In the ensuing discussion, reference will again be made to the plans and then to the sections, for clarity of argument. To anticipate a little, the second plan, of phase 4 (fig 32) shows the mill in its destroyed state with the extent of the destruction levels, loose timbers, collapsed and distorted plank walling. Some of the distortions here probably date from a time after the destruction of the mill, arising from soil pressure, decay etc. This is true not only of the plank walls, but also of the main horizontal baulks of timber, especially those on the NW upslope side, which have been pushed out of horizontal.

(as did Mill 2), or by the severe erosion of its leat, which lowered the entry to a level where there was such a loss of effective velocity of water that the mill must have become inoperable. The first mill was replaced by the second probably after no great interval of time. The construction of the new mill is seen as an attempt to avoid the problems which the first mill apparently encountered.

places cleanly on the natural edges, with no layer between that could be attributed to phase 2; it would seem, therefore, that even if these basic cuts originated in phase 2, they were scraped or re-cut in phase 3.

In general, it seems probable that the mill structure was erected first (from pre-fabricated timbers?), and the clay envelope packed round it. The chutes were however added after the clay, and it is probable that the clay was first put in around the lower parts of the mill, all else including fittings and superstructures being added later. The point is discussed further in relation to sections S3-S6 below.

The structural remains will be discussed individually, beginning with the millpool, extending into the area between the millpool and wheelhouse, then the wheelhouse itself, then the outfall, and finally the area to the NW. Further details will be found in Table MF II A of Layers and Features.

The millpool (plan, fig 31)

The leat which fed the millpool lies further to the NE, beyond the limits of the 1971 excavation; it was however located by Meeson in his 1978 excavation further NE (see 2.12 below). As discussed above (2.3) a leat did in phase 2 extend into the excavated area, there being no evidence of a millpool for the first mill.

The purpose of the millpool was, as summarised above, to retain water at a pre-determined elevation. It consisted of a three-sided structure probably open on the leat (NE) side; there was presumably, however, some way of controlling the water entry into the leat itself (at the point of take-off from the river) and also possibly the entry from the leat into the millpool itself.

Of this structure, two foundation timbers survived and one upright post. The NW side timber (161) was massive; in its surface were two mortice slots for timbers; collapsed parts of plank walling were found at its NE end. On the NW side of this timber was packed a mass of the clay 34, filling the steep slope left by the erosion of the phase 2 leat; this must have exerted considerable pressure and, it will be argued below, did eventually cause the collapse of the wall here.

161 was locked to the SW side timber (246) of the framework by a complex joint (fig 90). There was also a mortice cut through its SW end, and a rebate for a half-joint on the NW side of this end; the function of these two is unknown; they could relate to an earlier use of timber, perhaps in the first mill.

The SW side of the pool was formed by the massive foundation timber 246, extending below 161 in their joint, so that its base was at a slightly lower level; whereas 246 lay almost on the natural below it, 161 was somewhat suspended, so that there were silts of phase 2 below it (and below the clay envelope by its side).

In the surface of 246 there was provision for five further structural elements.

At the NW end, a slot was cut, extending into timber 161. Next to this was the emplacement for the by-pass chute (501) extending to 296 in the wheelhouse (c 2.7 m long). In the base of this were two holes c 9 cm deep (fig 90). They are likely to have been holes for wooden pegs which held in place a sluice framework above, in which a sluice-gate was set.

In the centre of 246 a further slot was cut into which was presumably fitted a substantial plank wall - the main front of the pool. The height to which this extended is a crucial matter, because it is this which determined the level at which the water was held in the pond, and so the potential velocity that it could attain in descending to the wheelhouse.

The fourth structural element was the emplacement for the driving chute (300), extending to 297 in the wheelhouse - a length of c 2.7 m+. This would have been a deep open trough, a tube, or most probably a box with an aperture at either end. This may have tapered towards the wheelhouse end, creating a venturi effect to increase the velocity; this point will be elaborated in later discussion.

The final element in 246 was an oblique emplacement at the SE end (500), presumably to take a timber which formed the foundation for the third (SE) side of the millpool. Whereas the west corner of the millpool was set at right-angles, this south corner was oblique, ie the pool was an irregular rhomboid in plan, not square or rectangular.

A further posthole (274) (see section S6 and plan fig 31) may be associated with this side of the pool; and the upright timber (251) may have been put in to buttress this corner - perhaps keyed into the missing SE side timber.

Within the pool, an edge (508) is shown in the plan (figs 31 and 32); the interpretation of this will be discussed in relation to section S6 below.

Section S3 extends from NW-SE just SW of the millpool front, and will later be discussed in relation to the area between millpool and mill. The end of timber 161 is however seen protruding here (encased in its 'stain' 332), and below it bluish staining (332a-333) which may be associated with this or with some (missing) support for the end of timber 246.

Sections S4/5 are oblique across the NW side of the millpool. The various components of 34, and 397, on the left part of S4 are the clay packing on the NW side of the millpool; in places they seal the phase 2 silts, but on the extreme left of S4, 34 is directly on a ?recut slope. In S5 timber 161 is seen

'suspended' as in S3; somewhere to the NE beyond the excavation it must have been supported in some way. The presence of organic silts beneath 161 would not prejudice the effect of the sealing clay above. To the right of 161, however, ——————————————— the phase 2 silt extended through to section S6. This is still the preferred hypothesis, but it will be seen that arguments can be marshalled that 165a was in fact a silt of the phase 3 millpool, 165 being cut away immediately to the right of 161. Whatever the truth about this lowest level, 400 above is certainly a silt of the millpool, as it is limited by 161.

In section S6 the basal layers continue as far as the major cut 231. They will be discussed further in relation to S18, which meets this section.

In section S18, a more useful profile is seen on the main axis of the millpool, through its postulated secondary phase. 246 is seen here in section with its plank slot in the top; to its right are a series of layers which link with, but are not entirely consonant with, those at the junction with S6, seen here as the right-hand end of S18. The principal problem here is deciding what layer here represents the base of the millpool, a discussion which must consider also the evidence from S5-S6 discussed above.

The preferred interpretation, and the one reflected in the phased section interpretations, is that 417, 421 and 165a are all of the phase 2 leat, their surface becoming the base of the first millpool which then silted up with 400 (396, in S5-S6, a white-buff sand with wood, being associated with collapse - phase 4 below); and that 241 was the basal silt of the millpool, 34s, 416a and 422 being silting or destruction material of phase 4 prior to final abandonment.

241 yielded fragments of a wooden bowl (CW6), which is less likely to have survived in the phase 2 leat.

<u>The area between millpool and mill</u> (plan, fig 31, sections S3, S18)

In plan, the only features here are the cut 156 and the driving chute emplacement (114). The former was either cut or recut in phase 3, as the clay packing 34 extended clearly to its base, with only a little gravel on the cut-away natural (see S18). The chute emplacement was in the surface of 34e (S3); it was defined as a nearly vertical-sided cut at the base of a timber robbing hole. The alignment fitted well to that of the emplacement in the millpool edge (300), and

to that in the wheelhouse (297); the size of 114 is also consistent with them; the chute must have been in the order of 70 cm wide in its outer dimension; the part joining the millpool to wheelhouse was c 2.70 m long, and there would have been a further extension down the side of the wheelhouse to the wheel edge, of a metre or more. The removal of the by-pass chute on the other side left no such precise cut in 34.

On S3, just to the SE of 114, 367 and 369 are bluish-stained fills of a robbing hole 370 of phase 5b; there may have been a timber here to support the SE side of the driving chute.

Section S18 provides a profile of this area showing the clay packing against the millpool (34d and e), separated by 148, a thin band of burnt material presumably redeposited from phase 2. Cuts 156 and 515 are also shown in profile here. S18 also illustrated the relative levels of millpool and wheelhouse. The level of the highest point of 246 is c 58.60 m AOD, and the base of the chute emplacement 300 is at c 58.50 m (the same as the base of the plank slot in S18). The level of the base of the emplacement 297, in the wheelhouse, is c 58.10 m (not on S18): a drop of c 40 cm in c 2.40 m, or a gradient of c 1 in 6.0 - a crucial figure in assessing velocity.

This is the level of the base of the chute trough or box as it sat on the timbers at either end. Allowing 10 cm for the thickness of the floor of the chute, this gives a drop from c 58.60 m to c 58.20 m, the same gradient, but reflecting the level of the passage of water as it entered the wheelhouse on 297. From here to the wheel is a distance of c 1.5 m, the water striking the wheel paddles at some elevation higher than c 57.90 m, the level of the wheelhouse floor. How much higher depends on how far above the wheelhouse floor the sole-tree lifted the wheel-assembly. Assuming it was at least 15 cm, and another 5 cm for the length of the male bearing on the lower side of the wheel, the paddles might have been

receiving the impact of the water at c 58.10 m, a further drop of c 10 cm from 297, giving a rather shallower gradient within the wheelhouse (these figures to be finally checked).

If water was flowing from the pool with its base at c 58.60 m, it remains to be postulated how far this was below the level of the surface of the pool itself. If a plank wall of 40 cm in height were set in the 10 cm deep plank emplacement in 246 (and it is unlikely to have been less than this), this gives a minimum height for the water at the rim of the pool of c 58.90 m AOD, a reserve head of water of c 30 cm; probably enough to give an adequate flow, and the pool surface may well have been higher than this. There would be no point in having a much higher water level unless the chute timber was exceptionally deep (as an open trough-like feature or as a closed box with a square or circular aperture in it, which would have had a thick lid - cf chapter 5 below).

Section S3 provides a more complex section across this area from NW-SE, in a rather awkward plane just to the SW of the millpool and at a slight angle to it. The clay layers on the left, components of 34, are seen here against timber 161; but they would at this point be packed against the by-pass chute also, and under this joining up with 34d and e; the surface of these is relatively flat, with some charcoal on it (335). This is the surface between mill and millpool between the two chutes; the surface was compacted and in places lightly metalled. This was continuous, and probably to be equated with 82 further west, which marks the reoccupation of the mill area in phase 5, in later Saxon times. It was certainly recorded as being around 114, here shown in section.

The base of 114 is at c 58.24 m AOD (see S3). Bearing in mind the suggested level of the water flow in 300 just NE of here (see above re S18), at c 58.60 m, this gives a thickness to the chute floor here of c 36 cm, 26 cm more than

postulated above (unless the hole was eroded in robbing and deepened). The chute timber(s) could however have had a stepped base, with a rebate set against both the SW edge of 246 and the NE edge of 166. A similar argument can be advanced for the by-pass chute, with similar levels for emplacements of mill and millpool, and a level at the base of the robbing hole (80) of 58.43 m at deepest.

To the right of 114, 34e, h and g are clay packing in situ against cut-away 158, extending round the south corner of the millpool. The post-mill metalling 82 was on the surface of h-g. 34f and 74 above this, although similar, contained a millstone fragment, and must be a dump from later timber-robbing.

The wheelhouse of the mill (plan, fig 31, sections S8, S18)

This consists of three principal foundation timbers, upright posts and a thick closely fitting plank floor. The whole structure is set in a hollow cut in the slope of the ground which, it has been argued, originated in phase 2 (2.3 above).

The NE side timber (166) has cut emplacements at each end for the chutes (296 and 297) whose function has already been discussed. Between these the centre of the timber has a groove or depression in which a plank wall was probably seated.

166 is locked to the two other main timber foundations (185 and 131); the pegged joints are complex (figs 83, 87, 88). On 185 (the NW timber) was the collapsed remains of a horizontal plank wall (fig 32) probably supported at the SW end by upright timbers set in a mortice. The other (SE) timber (131) was incomplete, but there were also residues of a horizontal plank wall on it (fig 32).

In the corners and inside the centre of the NE timber 166 were five upright posts (95, 128, 271, 289 and 244). These were cut through timbers below (of phase 2)

and all were probably set as deeply as 95 and 244, which were recorded as extending into the natural for depths of c 25 cm and 10-15 cm respectively (see section S8 for 95). The surviving upper ends of 95 and 128 (not shown in fig 31) and probably originally the others, were recorded as being notched over the main timbers inside which they were set, giving support to the basal planks of the side and end walls (for 95, see S24). There may have been a sixth post to complete the set, but this is where all is cut by a modern well. The posts must have originally extended very much higher, acting as the principal supports for the millhouse above. 95 was packed with large stones on its SE and SW sides (fig 87).

The surviving floor of the wheelhouse consisted of six very substantial planks (160 a-f) set tightly against the timber baulks, and fitted around the upright posts. A further plank (177), was partly destroyed by the well, and there is room for an eighth between this and 160a-f, which must have been pulled out when the well was dug, as the floor sands survived above where it had been (fig 32).

The wheelhouse (and millhouse above) may have originally ended here, on the NW-SE line between posts 95 and 244. There would have been no need for it to have extended further. The water that drove the wheel, or that which was by-passed down the NW side of the wheelhouse, would flow off the last plank 177 directly into the outfall, to be discussed below.

In the south corner of the wheelhouse the floor was covered with patches of sand of various textures and colours (181, 181a) around a patch of bare floor (fig 31) (pl II). This is interpreted as marking the former position of the wheel, the sands being the result of the movement of waters in a clockwise rotation through the wheel-assembly.

Section S18 shows a section through the longitudinal (NE-SW) axis of the wheelhouse. The canting of the NE timber baulk 166 and the partial displacement of the floorboards are probably due to movement after the mill was destroyed. The position of the edge of the floor sands is shown to the right of the well.

Section S8 shows a section through the south corner of the wheelhouse. It illustrates well the extent to which timber 185 has canted over, together with the residue of the plank wall (126) on its surface. This also shows the upright 95 in relation to the last plank 177, but not its notched top, which is shown in section S23.

The outfall (plan, fig 31, sections S7, S8, S18, S19)

This consists a level area cut into the slope of the ground, continuing the gradient down through the wheelhouse. The edge of the NW is well-defined, (460) of phase 2, but probably recut in phase 3. There was presumably some cut-away to the SE also, but the area in which this would have been is cut away by the later medieval town ditch, which has also partially destroyed the south corner of the wheelhouse and the SE edge of its cut. The surviving NW side of the outfall was revetted by massive timbers to prevent erosion and collapse of this edge by the water passing this way from the wheelhouse.

Of these timbers, two survive. 185a, with a post (185b) on its NW side, forms a link between the NW foundation timber of the wheelhouse (185) and the outfall revetment. 173 is another massive timber set in the cut (460). There are slots cut in both this and 185; large pieces of collapsed planks were found associated with these (fig 32).

The only other structural feature which may have been associated with the outfall is a posthole (285) set in a larger cut (284); but no function for this can be suggested. The whole outfall complex was destroyed by later medieval features close to the SW end of timber 173.

The whole of the outfall may have been boarded to prevent erosion, but there is no evidence of this.

Section S18 shows the level of the outfall in relation to that of the wheelhouse. There are silts here which may belong to the final stages of the use of mill (180a). Those above are post-mill destruction.

Section S19 extends this further SW to the point where it is destroyed.

Section S8 shows stratification similar to S18, destroyed on the left hand side by the later town ditch.

The most useful section across the outfall is S7. This shows well the cut 460 in relation to the revetment timber (173) and the outfall base beyond. 457 could be silt accumulating during the period of use of the mill, since it abuts 173; or 173 may have been inserted through it, as on the phased interpretation section.

The cut 460 may, as already said, be from phase 2, holding a revetment timber earlier than 173; it may have been recut for the insertion of 173.

It is thus assumed that 173 with its wall-planking 151 above, was in fact the timber revetment for the outfall of the second mill, the direct replacement of an earlier one. There is however a problem here in the associated stratification:

notably the cuts 176a-c (176a is shown in S7); discussion of this problem is deferred to the section below on the destruction of the mill complex in phase 4.

The area to the NW of the mill (plan, fig 31)

The only features on this side were the NW-SE timber 190a and the post and post-hole 190b, with an isolated post 108, which might be of this phase.

190a was a vertical plank 35 cm deep set in a narrow slot in the natural. Its SE eroded end ended in post-mill deposits. Its NW end was also unattached to anything, but was clearly associated with 190b, a substantial rectangular-sectioned post set 70 cm into the natural; 108 inclined to the NE, and may have been a prop.

These features are clearly associated with the mill, since 190a is directly in line with the postulated SW side of the wheelhouse, though at a higher level. It is suggested that these features are the lowest elements of the SW side of a structure, a room or outshot, which lay to the NW of the millhouse; this may have been for instance a loading or storage area between the street to the NW and the millhouse itself.

MF Phase 4 - the destruction of the mill complex and its aftermath (fig 32)

This phase comprises the destruction of the mill by fire and the collapse of at least its upper structure, the millhouse, depositing burnt debris into the wheelhouse (which being damp would not have burned). This would have been followed by salvaging of some of the material, including in this case the main wheel-hub and shaft, but leaving behind, fortunately for us, two crucial elements in any functional reconstruction; a wheel-paddle (144, CW4) and the sole-tree with its steel female bearing (154, with IR 24) (pl I). The mill area was then apparently abandoned for long enough for the hollow left by the mill-complex to silt to some depth, with many of the foundation timbers still in situ. Such silting could have happened in months rather than years.

A distinction has been made in the text between phases 3 and 4 which is valid only in terms of separating the use of the mill from its destruction. As already mentioned, however, some structural elements included here in phase 4 are really part of the mill as it was in use in phase 3, and should be retrospectively seen as part of that phase, as restored in figs 82 and 80.

A similar ambiguity applies to the stratification; it is not possible in each and every case to separate layers that are part of the use of the mill - notably silting - from those that are derived from the period of destruction and initial abandonment.

Fig 32 (plan) shows the planks and other timbers which were either loose, or only loosely attached to the foundation timbers, but were in many cases definitely associated, such as horizontal plank walls (notably 151, 172 and 126). Much of their warped and collapsed state is likely to be the result of post-depositional

processes. The only one of these loose timbers that was burnt is the peg-holed plank 152, dumped at the same time as 150 (see below).

170 was the first and principal destruction layer, lying almost directly on the floor of the wheelhouse on its NE side and extending into the east corner. Its SW limits are shown here in plan. It extended only to the edge of the sole-tree 154 in a NW direction. There was no indication that it had been disturbed by the removal of that part of the driving chute which lay within the wheelhouse. This could have been suspended in some way above the floor, so that 170 accumulated beneath it. The even distribution of 170 argues against this, however. It seems more likely that the part of the chute which lay within the wheelhouse was removed after the mill's destruction (the part of it beyond the wheelhouse to the NE was certainly not removed until much later - see phase 5 below). This suggests that the chute was in two sections.

It seems likely therefore that 170 was not the result of material from above falling onto the floor at the time of destruction, but was dumped on it afterwards. Not, however, after the wheel-assembly was removed, since this left, by its removal, a notable gap in 170 (and 150 above - see below) (pl I). It has to be remembered that the floor of the millhouse, which forms the roof of the wheelhouse (or is above it), has to be very substantial to prevent any water from below finding its way upwards into the area where corn and flour were. It looks as if the fire was entirely in the millhouse; and that only later was the millhouse and its floor removed, and the chute segment, before 170 was dumped.

170 consisted of pieces of burnt wood, fragments of millstones, an iron hinge (226, IR16), fragments of red sandstone, and (especially by timber 166, the NE foundation of the wheelhouse) concreted fibrous greenish-grey material. There was only a thin layer of grey sandy silt below 170, and some grit below that, on the floor below.

Above this material of 170 was 150, extending further to the SW, but still absent from the area of the wheel-assembly. This consisted of grey-brown silt with some buff sand; in this was decayed wood, branches, twigs and small shells, and charcoal from the burnt timber 152, which is really part of this layer. Finds in 150 include further millstone fragments from several different stone-sets; the wheel-paddle 144: fired clay FC2, 7; burnt clay BC3, 4; lead OM5; and carved wood CW1-2. The burnt clay included the remains of the clay bed on which the lower millstone was seated, on the floor of the millhouse above (3.3 below).

Section S18 shows 170 and 150 in relation to each other and to 111 above. This also contained some destruction material, including many fragments of decayed wood, stone (ST5), and millstone fragments. Its matrix was however mixed clay (from 34?) brownish mud and charcoal; it still pre-dated the removal of the wheel hub, spreading over an area similar to 150.

A further destruction layer (170a) was preserved from subsequent erosion by being beneath timber 172, a fallen plank wall further west, part of the outfall revetment. This layer contained more burnt wood, millstone fragments, burnt clay BC5 (millstone seating); lead OM7; and some botanical material.

These are the destruction layers proper. Above them was silt (109, grey-bluish-brown), extending now over the space where the wheel-assembly had been, and over the sands 181 and 181a at its edge; and banking up over the NE edge of the wheelhouse 166 on to the clay 34 beyond. Merging with this above was a further silt (110, greenish-buff mottled sandy), in which were fragments of two lava querns (104, 106). The difference between 109 and 110 may be more apparent than real, due to different organic preservation.

In the outfall area, 471, 470, and 180 are apparently layers broadly contemporary with 170/150/111. Above them was a remarkable concentration of dark brown clayey material, building up in a hump or mound (see also S19), which sloped away to the SW and to the east (the latter 176c in S19); and to the NW, as indicated by the dotted lines for 176a and b in the plan (fig 31). The explanation for this hump is unknown; it is discussed further below in relation to section S7. It is however certainly earlier than 109, as seen in S18.

In section S7, silt 180a was covered by 454 (a clean yellow sand with some burnt material), which can be equated with 470 in S18. Above this was 176, capped here with similar material (455-6). The northern edge of 176 here (176a) was very positive and sharp; 109, which lay against and over the hump 176 in S18 and S19 was here replaced by a mass of clayey material (174), accumulating above timber 173 after the mill's destruction. The road layers above (82 etc) have exerted considerable pressure here, forcing 173 out of vertical, squashing and bending its plank wall 151, and creating a space between 173 and the edge of cut 460. This was filled with 449, 447, and 446, all assigned to phase 4, as they underlie 82, as does 109.

In section S8 a similar sequence is seen, layers 471 and 470 being deposited in the outfall between 180a and 180, and destruction material (472 (a stone), 475, 474, and 473); the latter taree are equated in the field notes with 111 in the wheelhouse area. Above this 109 is shown thickly here, with patches of yellow-brown sandy soil (464 and 465) on its surface, under 82.

The origin of 176 remains a problem; its build-up may have to some extent acted as a dam, possibly causing silting 109 to the east.

In the millpool area, section S5 graphically exhibits the collapse of the wall planking of this side of the millpool, under pressure from the clay layers upslope; these have spread over the edge of the millpool. There is no clear dividing line to differentiate these collapsed clayey layers from the intact enveloping to the north in section S4. Section S6 shows this collapsed and slumped material extending as far as the edge of 508.

This cut is parallel to the SW side of the millpool (see plans, figs 31 and 32). It was defined only in relation to S6; the line of the plans is derived only from an observation on the field drawing of S6, of the angle at which cut 508 was traversing this section. An annotation in PAR's hand interprets this as 'cut for a secondary millpool'; this is, however, nowhere further discussed in the records, and was not even numbered until 1985; the 1971 interpretation now seems rather improbable, and the cut is now seen as an erosion ledge of a secondary stage of phase 4, cutting away the millpool silt 400; the edge of cut 508 appears in section S6 to extent upwards, cutting also the collapsed and slumped material to the north. The layers which fill this upper part (406-410) however interleaved with 240 in section S18, which there is good reason to assign to phase 5b (see below). There is something of a stratigraphic paradox here.

One reason for the dating of 508, as a lower cut, to phase 4 is that the two basal layers (416a and 422) interleave with 34s in S18, which lay directly on the phase 3 millpool silt 241, and should also be a basal fill layer of 508.

The destruction and silting layers discussed as phase 4 end with the deposition in phase 5, over a large area of metalling 82. This marks a major change in the use of the area, when substantial parts of the ruined mill structure, including the millpool still survived among the debris.

MF 2.5 PHASE 5 - Late Saxon — early post-Conquest

(plan, fig 33)

Introduction

The features of phase 5 span the period of the reoccupation of the mill area for quite different functions. Phase 5a comprises the features on the west side of the site, and 5b those on the eastern side. The timespan is broadly that from Late Saxon times to the early 12th century.

The date of its inception depends on the date of the mill (after c AD 855), the length of its life and the timelapse needed to account for the post-mill silts. Assuming the second mill is mid- 9th century, then some date in the later 9th or early 10th century might seem appropriate for the layers immediately over those of phase 4. Almost the only reliable dating evidence however comes from higher levels in the eastern part of the site, and this is that of pottery most of which is unlikely to be earlier than the second half of the 11th century.

In phase 5a, some broad dating is given by a horseshoe (99 = IR8), which is dated 11th-late 13th century, in the stone road 7; there is also a sherd of mid 11th-12th century date (159) recorded as being from metalling 82 (see below) in a rather unreliable context. In the eastern area there is one sherd in the lowest levels of phase 5b which is likely to be pre-Conquest, of shelly ware.

Principally because of the machine cuts in the central part of the site, there was only one stratigraphic link (gravel spread or metalling 82) between the western and eastern areas, and this in places tenuous and ambiguous; as it spans the areas of both phases 5a and 5b, it is designated as of phase 5.

The features and layers on the west side of phase 5a are not only spatially and functionally distinct from those of phase 5b to the east, but are also probably earlier in their inception (see below).

Phase 5a (plan, fig 33; sections S1, S7, S8, S16, S18)

The features of this phase consist principally of two or three successive roads of brushwood, gravel, and stone, the former set partly in areas cut or worn away in the slope (22, 24).

The earliest feature here was 24; this was a cut-away with an almost vertical northern edge, making a slight terrace in the natural gravel (section S16a). The main fill (499) banked up against this edge; this was truncated by the later cut-away 22; the fill of the latter (121) was covered by the tail of 498, sloping down to the surface of timber 23a (see below). The fills of 24 were finally capped by gravel (444) probably associated with stone road 7 (see below).

Cut 22 was filled with the brushwood and timber road (23), but was not necessarily dug to receive it. Both cuts 22 and 24 may have had some function before the roads which is now impossible to determine. In view of the subsequent fill of 22 as a road it seems possible that both 22 and 24 are the result of erosion of the lower part of the slope in a limited area when traffic began to be heavy in a linear movement zone; the destination of the traffic will be considered below in relation to the roads themselves.

Another primary feature of phase 5 in the western part of the area is metalling 82, heavy gravel with greenish concretions. As seen in S7, it lay directly over the mill destruction deposits; it could here be contemporary with the postulated (eroded) base of cutaway 22. It is recorded as ending in a northern direction

around the east end of timber 23b; but also as spreading eastwards over the destroyed mill, to be the earliest layer in the phase 5b sequence there. Among 82 was a group of worn pieces of sandstone (145); these lay in a slight cut-away (146) in which is a thickening of 82 towards the west.

As seen in S7, 82 is clearly stratigraphically below timber road 23, and could be taken as evidence that there was metalling of some consequence over the destroyed mill deposits before 23. Further towards the east however, gravel identified as 82 is recorded as merging with the timber and brushwood, 'lying both under and over timbers 23 c, d, g, and e', and 'humping' in places over 23 c-e.

To conclude, therefore, heavy gravel both preceded the timber road 23, merged with it, and sealed it; and 82 must be regarded as broadly contemporary with 23, even if it is itself of different sub-phases of metalling. 82, as a single layer of metalling, extended to the east to be a basal layer there, in the 5b deposits; this and the timber road 23 may be earlier than the later sequence in the eastern area, as 82 was there cut by the robbing hole for the driving chute (114).

82 is shown extending to the east in sections S8, S18 and (more tenuously) in S3. It clearly had a functional context as metalling (or at least trodden gravel) over an area wider than the relatively limited linear movement zone of phase 5a.

Road 23 (pl IX) consisted of a widely-spaced series of re-used fence or building posts set in a matrix of gravel, fibrous woody debris (and mauve sandy soil, eg 121 in S7), which was especially dense at the northern end ('23 org' in S7), and in places covering the timbers. The road spread over an area wider than that of the cut-away areas 22 and 24, which died away to the east and were cut to the

west. It was still however contained in a limited zone of under four metres wide. There were no ruts or areas of specific wear.

The timbers within 23 (CW3 and 15) are shown in pl X. They are mostly pointed, and range in length from 1.20 to 2.80 m (mostly c 2 m) and 5-12 cm in section, mostly squared. All except g, the shortest (and broken) timber, have drilled pegholes at one end; in some cases with the pegs in position, in one case (c) projecting 7 cm. These timbers are clearly re-used from some structure, probably a substantial fence rather than a building, with their pointed ends in the ground, and a pegged rail along the top, perhaps at a height of c 2 m.

Sealing road 23 was a further layer of dense gravel (444, well illustrated in S7, also in S16a). While this could be a separate road, it is more likely to be a bedding for the final road of stone (7). This consisted of large slabs of shelly limestone, set in and on 444, with a matrix of heavy gravel. The surface of 7 was very smooth and worn, and clearly had considerable use. It extended further to the north than the earlier timber and gravel roads, and may indeed have been a regular lane of the predecessor of Bolebridge Street. It should be noted that the stones of 7 north of the timber road could have stayed in use longer than those to the south, which were sealed by deposits of phase 7 (see S7). Those to the north were set on the ?natural gravel or 62, and were covered by the soil L3 of phase 9 (see right of S7). This appears to discount any possibility of continuity between 7 and the 'way' which appears to have been in this area in more recent centuries (1.2 above). Road 7 was traced westwards as far as section S1, where two of its stones are seen in a primary context (but not on plan), the rest cut by later features.

The destination of these roads, especially the substantial one 7, is a matter of conjecture. A horseshoe in 7 (99 = IR8) suggests something more than foot

traffic, but there are again no ruts or differential wear in 7 to suggest the use of carts (unless with sledge runners). The most likely destination is of course the River Anker, where there may have been a wharf, jetty, or landing stage (cf phase 8) or even a building, on its northern bank; or there may have been a ford or a bridge.

In this connection, there seems also to have been a way across the later medieval ditch here, to judge from the slight evidence discussed below in phase 6. Road 7 might appear in S7 to have been truncated by the cut in which this evidence is found; but as will be seen in phase 6, the possibility that road 7 actually led to this crossing cannot be entirely discounted.

Other features of phase 5a include two posts on the edge of 22 (134 and 135 in fig 33), and a squared post-socket (11) among the northerly stones of 7 (fig 33) possibly later. Another upright timber among 82, (140) may also be secondary to the stones 145, which are a component of 82 at this point. There was also an animal deposit in 82 or in the top of 109 below; a pig, together with the skull of a goat (143, AB - see specialist report in 2.15).

Phase 5b (plan, fig 33, sections S3-S6)

The features of phase 5b extend from the eastern part of the mill as far as the eastern edge of the excavation represented by sections S5-S6. They comprise the robbing holes of different sub-phases for the timber chutes between the wheelhouse and the millpool, and possibly for other timbers of the superstructure of the mill and millpool. These holes were filled and silted, and were succeeded by a series of layers including gravel spreads or metalling, and other minor features, which cannot be interpreted satisfactorily in such a limited area.

All of these events are later than the gravel spread or metalling which extended over the area of the long-abandoned mill. This (82), as we have seen, is broadly related to the earlier levels of phase 5a on the western side, though not unambiguously. The earlier layers and features of phase 5b cut 82 and should be later than the timber road 23. While some part of the 5b sequence could be contemporary with stone road 7, the upper levels of phase 5b yielded a number of sherds, but there were none in either the timber and stone roads on the western side. This negative evidence may not however be conclusive evidence of an earlier (aceramic) date for the roads: Meeson, digging areas further east of the 5b levels of contemporary date, found no sherds either.

In plan (fig 33), on the west side of S3, and mostly showing in section there, were timber-robbing holes. Of these 114 was the earlier, later than 82 as here defined, but, with its fill 368, under all later layers in this mill/millpool area. Sherd 114a, in 368, is probably late 9th- 10th century in date; this is no better a terminus post quem for 368 and all layers above it than the dendrochronological date for the second mill.

Cut 114 was the emplacement for the lower part of the driving chute, robbed out without substantially enlarging 114 at this level. On its west side 370 may be a robbing hole associated with this operation, or for some extra timber on the SE side of the chute. Some time seems to have elapsed before further timber-robbing in this area, during which silt 240 was accumulating (see below). This silt is cut by the other timber-robbing holes (59, 60, 80, 84, 85 - the last two only on plan, fig 33), which were for the removal of the by-pass chute and other adjacent parts of the wheelhouse and millpool structures. 78a-c and others (fig 33) were pieces of timber left behind in these operations. The deeper holes might have included the digging out of some upright timbers.

The remaining features in this plan (fig 33) of phase 5b are the limits of metalling 49a (see below); all the rest of this discussion of phase 5b relates to the sections S3, S5, S6, and S18.

Section S3, in the area between the wheelhouse and the millpool, shows the earliest robbing hole 114 here (with the lowest stratified sherd 114a in 368); 34f and 74 to the right and above (sealing a millstone fragment 265) may be spoil derived from this operation, as the stone lay on 82; the sloping edge to the right of 74 may be the southern edge of this phase of robbing. The silt 240 in the area above 114 is seen here cut by the later robbing holes. They appear here in a series of steps, 59 on the left, then 60, then 80 (the last two appear to merge here, but they are separate on plan, fig 33).

In the base of 80, though possibly sunk in from above, were two sandstone blocks, one burnt. They may have had some function in this area when the mill was in use. These were in silt 76; above this, to the right, 67 and 67a could be cut by 80. A series of silts fill 80, moving upwards to the left to fill against the edge of 60, and into 59; the sequence here may have been more complex than it looks. It is possible for instance that the flat base of 59 may indicate a structure here on the NW side of the millpool for which there is no other evidence.

At the south side of S3, 70 and 366 fill another possible cut, for which no obvious explanation can be adduced, though there may have been another timber here.

The upper silting and/or fills of these holes (53, 53a, 54 etc) above 240 yielded a number of early medieval sherds, mostly of Stamford ware of c AD 1050-1100; a millstone fragment (81), in the base of 54, suggested disturbance of mill

deposits. Finally these layers were capped with ?metalling 49 and 49a, with sherds of similar date.

The sequence of robbing and silting shown in S3 extended only a few centimetres eastwards of this section, to the edge of the millpool itself. 240 will however be noted again in discussing section S18 below.

In section S4, the silt (53) which filled robbing holes 59/60 is seen here continuing in the area NW of the millpool, over mill-enveloping clay 397 etc. As in S3, it is capped by metalling (49a).

In section S5, turning south-eastwards, the stratification does not follow on easily from S4, 53 and 49a merging into a series of other layers of phases 4 and 7 (390 and below).

In section S6, the phase 4 layers (393 and below) appear to be cut by 508, an erosion ledge in the millpool which has been discussed above in phase 4. The lowest layers in this (416a and 422) have been assigned to phase 4 because of their relationship to the millpool edge shown in S18. The layers above are tenuously assigned to phase 5b, up to and including 406, since they interleave with layer 240 of phase 5b in section S18. If this argument is accepted, then the upper part of the edge of 508 should be a cut of phase 5b, one of the timber-robbing holes. This phase is otherwise unrepresented in S6, all the layers above being of phase 7.

In section S18, the silt 240, which has already been noted in S3 as a basal layer of phase 5b, it is here seen extending eastwards from the line of S3 over the western timber of the millpool (246): clearly post-dating the removal of the plank wall on this timber, as it does the removal of the driving chute 114 in S3.

Above 240 are further silts (67a, 67) changing somewhat to the NE to become 407 and 406, with a ?timber stain (486) among them. The surface of 67/406 here looks like an interface (238, greenish) and this does indeed mark the junction of layers of phase 5b and phase 7 here (69 yielding a later sherd); though such an interface is, as already noted, far from clear in section S6 to the NE.

The dating of phase 5b extends from the destruction of the second mill and its robbing (in the later 9th or 10th century) to sometime later than c 1050; there may be a temporal hiatus to account for the apparently missing decades, but no clear interface is visible in the stratification. The dating extends into the second half of the 11th century, into contexts with many sherds of Stamford ware of c 1050-1100 and other sherds none of which need be later than 1100; a date terminating at the end of the 11th century or soon after in the early 12th seems likely for phase 5b.

MF 2.6 PHASES 6-9 - Medieval (plans, figs 34-36)

Introduction

Phases 6-9 comprise features and layers of the 12th-16th centuries and later. Phase 6 includes features which appear to signal the inception of the town defences and are characterised by 12th century sherds, without any of the Stamford ware characteristic of phase 5b. Phase 7 comprises some gravel dumping or metalling probably in the 13th century in the millpool/leat area, followed by further robbing of the timbers of the SE side of the millpool.

Phase 8 includes the main component of the town ditch system, ditch 90 and its fill, and other features of the 13th or 14th centuries. Phase 9 comprises a few layers and features with late medieval pottery of the 15th-16th centuries; by this time the town ditch was filled up.

This is a prelude to post medieval development of the site which led to the recent topography of the area. The separation of features of phases 8 and 9 is rather subjective in some cases, based on the unreliable evidence of pottery in fills.

Phase 6 (fig 34; sections S6, S7, S8, S19)

The only features shown in plan (fig 34) of phase 6 are the various cuts and edges which comprise the earliest phases of the medieval town ditch.

The layers and features of phase 5 were cut by this series of edges at different levels. It is argued that they were cut, rather than stopped at these points; the possibility may be considered, if only to be rejected, that the timber,

gravel and stone roads on the west side, and metallings on the east side, were contemporary with, and on the edge of, the ditch as cut in its first phase; and were there in its earliest period of existence.

It might be assumed, in any case, that all these layers on the inner (north) side of the ditch complex must be earlier than the various cuts, since there would have been a bank on this side which would have sealed them. This might indeed be true over the greater part of the circuit of the medieval defences. There are indeed some layers which could be interpreted as the residues of such a bank for the later ditch 90 of phase 8 which never survived as a feature of the landscape in this area in late medieval times, in contrast to such features in other midland towns. There is, however, always the possibility of gaps in the defensive bank, not only for major gates, but for minor access to points outside; or even of unfinished sections.

There is a possibility that there were in the area of the present excavation such gaps in the bank, though not necessarily as causeways in the ditch. There is ambiguous and tenuous evidence in the excavation (apart from the roads of phase 5a) for some crossing of the ditch area in this phase by a bridge. The destination on the southern side would have been the River Anker, which came close in fact to the medieval ditch at this point; so close in fact, that ditch and river may have merged, the river becoming a defensive 'moat' further west, nearer to the castle; or the ditch and river may have merged at periods of flood.

It is unfortunate that there is not more evidence for the location of the river bank in medieval times. It may be assumed to have been a little to the south of the area excavated in late Saxon times, because of the necessity for the mill leat to have had some elevation for its outfall. In this connection it may be noted that the present river bed beyond the area (fig 4) was in 1971 at 57.84 m

AOD, over 30 cm higher than the base of the outfall at 57.52 m AOD on the left of section S19. It seems likely on this evidence that the river level is substantially higher today than it was in late Saxon times. There is evidence in section S12 that its bed may formerly have been as low as c 56.00 m (the level of undisturbed red clay); but it can also be seen from this section that the water or mud level in medieval times, where the first ?rubbish layers were encountered, was nearly as high as 57.70 m (the surface of the grey-brown alluvium).

It is probable therefore that the water level of the river was not far, if at all, below the deepest part of the town ditch as finally cut in phase 8, at c56.50 m (see S7) and may well have been higher, especially at times of flood.

To summarise, it seems likely that the level of the river in late Saxon times was sufficiently below c 57.50 m AOD to allow a free outfall for the water issuing from the mill; that by 12th-13th centuries AD, the water level had risen, possibly due to constraints further downstream (a weir or bridge?); and that the river was not far away from the medieval town ditch in this area, or was merging with it.

The bank of the river may have come quite close to the excavated area by the 13th-14th centuries AD (see phase 8 below). In discussing phase 6, the possibilities are rather of a bridge or other crossing of a wet ditch to get to the riverside.

The earliest cuts in the medieval town ditch sequence, are generically designated 230 (fig 34); all are secondary to phase 5 contexts; in most places only the northern edge or slope of 230 was seen, the southern part being cut away in phase 8 by ditch 90.

In the eastern area (as in S3 and S6) no such primary feature was seen between phases 5 and 7, except for feature 281 (see S6 and phase 7 below).

230 is interpreted as the first stage of the medieval town ditch complex; the components seen in the excavated area were however very irregular, in plan looking more like a series of scoops in the northern slope of the later ditch 90.

In section S7, 230 can be envisaged as having originally been a major ditch c 2 m deep, of which only the base and northern edge survived. As seen here, it has a long inner slope, a cut truncating the mill deposits and apparently the roads of phase 5a as well.

There was some organically rich material near the base (434). The major fill (122) (and 461 above) is not silt, but sand and gravel, presumably dumped into it. It may have been the original upcast from 230, piled up as a bank and later pushed back; or the upcast from 459 (see below).

In the top of 122/461 (after the ditch had been mostly filled) were features tentatively interpreted as the residues of a bridge abutment (101, 101c, 124, 125) - here mainly projected into this section.

In plan (fig 34) the ?abutment residues are seen as a shelf or cut in the upper fill of 230; in 101 were several pieces of decayed wood, possibly former planking. These features were clearly secondary to 230, but earlier than the fill of 90 (see S7). They are not very convincing as elements of a bridge abutment, but the possibility must be considered for two reasons. Firstly because of the roads that led down to this point in phase 5a, implying a former

access to the river bank at this time (2.5 above); and secondly the fact that there was apparently a way here in more recent centuries (1.2), even though there does not appear to have been continuity to this, as already discussed (2.5).

In section S8, 469 (= 122?) is the primary fill of 230, here again truncating phase 5 metalling 82 and earlier contexts as in S7. The section does not unfortunately extend downwards deeply enough to show the 'abutment' features of phase 6; S10 also shows cut 230.

In section S19, an oblique cut of 230 is seen, with the main fill 122 (as on S7) thickly on is northern edge; again the 'abutment' area is missing on this.

On the eastern side of the excavated area in section S3, there is no evidence of any primary feature corresponding to 230. The same is true of section S6 (except possibly 281).

All the sherds which can be assigned to phase 6 are 12th century or earlier, except for one in the abutment feature 101b, which is 13th century, and could be intrusive from phase 8 levels above, or belong to a final abandonment phase. These sherds provide the principal broad dating for phase 6, in the 12th century, perhaps ending c 1200.

The only other feature that might be of phase 6 is ditch 459 (see section S7). This may have replaced 230 in the medieval town ditch sequence; and the possible bridge abutment (secondary to 230) may be crossing this. The silt 267 seen in S7 does however seem to be part of the fill of the phase 8 ditch 90, and 459 should probably be seen as part of this; in this case the bridge abutment would be associated with a crossing of 230 when it was mostly filled, before 459 or 90 were dug.

Phase 7 (plan, fig 34, sections S3-S6 and S18)

The later layers and features in the millpool area are differentiated from those of phase 5b because they yielded sherds that are notably later than those of phases 5b or 6, extending into the later 12th or 13th century (see fig 9 for distribution of sherds in this area). There is apparently a temporal hiatus here, though the stratified sequence looks continuous; it is clear however that the features and layers grouped as phase 7 are earlier than the main medieval town ditch 90 of phase 8.

The lowest stratified sherd that is dated later than c 1200 is in 69 (section S3) with others of similar date in layers above. There are also a number of Stamford ware and other earlier sherds in these layers, notably in 65a; these must be residual, displaced from phase 5b layers by phase 6 or 7 disturbances in this area, if the ceramic sequence is correctly dated. Such a disturbance might indeed be envisaged in S3, filled with 69, 66a, 65 and 216, if not also 70 and 366 below, though these have been assigned to phase 5b.

It should be noted that this possible disturbance is not the same as another one (231 in S6) (see link from S3 to S6 in S18), which will be discussed below; the western edge of this was recorded in plan just to the east of S3 (see fig 34).

The latest layers of metalling in the millpool area should therefore be later than c 1200, and so too may the two postholes further north (202-3 in plan fig 35) which cut metallings 49a and 65.

This TQP of c 1200 can also be applied to the secondary major cut 231 shown in plan in fig 34 and in section S6. This cut away metalling 216b (but not perhaps 64, which tails over the cut); this is interpreted as a robbing hole to remove the

timbers which formed the SE side of the millpool (see extent in plan, fig 34 and cf fig 33). The hole does seem overlarge for this purpose, but perhaps needed to be as big to get down over a metre safely. This robbing operation is clearly much later than those to the NW.

Further east, in the 1978 area, 231 appears to merge with an erosion channel draining to the east (2.14 below); it is possible that the size of 231 itself is due as much to erosion as to timber-robbing; and the two may of course be associated.

The fill proper of 231 (above the phase 2 silts 260, 414, and 415) is 413, 412 (cut by a ?later stake, 423) and 411, which contained another 13th century sherd (218). Above 411, 198 contained two more 13th century sherds (194). The 13th century sherds in the layers cut by 231 give a TPQ not only for this, but also for ditch 90. All these layers and features of phase 7 appear to be later than phase 6, which yielded no sherd which need be later than 1200; there are no stratigraphic links between phases 6 and 7.

One feature appears to be intermediate between phases 7 and 8. This is the cut 281, known only in section S6; it had a large flat stone in its top, with twigs above and below. A continuation of this feature was found in 1978 (Ditch A145), (with 13th century sherds) draining eastwards; 281 must be near the west end of this ditch (see 2.15 below, and figs 5iv and 46). In the 1978 area it was clearly secondary to the erosion features of 1978 phases 7-8; but in both areas it was cut by the medieval town ditch.

Phase 8 (plan, figs 35-36; sections S3, S6, S7, S8, S16c, S17, S19)

The principal features of this phase are the latest and main version of the medieval town ditch 90, and the later ?jetty complex 517 in the extreme SW corner of the main excavated area. There are also some features on the slope between here and Bolebridge Street; and the main filling of 90. All these are later than c AD 1200, the latest associated sherds being of 13th-earlier 14th century date.

Ditch 90 appears on plan (fig 35) as a fairly regular cut WSW-ENE, several metres wide and two or more metres deep. Variations in the edges as plotted are due to the different levels at which the edges were defined; this depended on the depth to which later contexts had truncated the edge or fills.

In section S3, the northern slope is well defined, though it extends down only as far as 57.00 m AOD, c 30 cm short of the base as seen in S7 (below); the main fill (361) is silt, not dump or backfill. The long edge seen here cuts the latest metalling (216b) of phase 7 (216b was also cut by 231/331 of phase 7 in S6).

In section S6 a similar edge (401) is seen cutting phase 7 layers filling 231/331, and also apparently the possible phase 6 feature 281 (or is this a step or ledge in 90?).

Only in section S7 was a complete profile of 90 recorded, to a maximum depth at 56.50 m AOD. The outer southern edge could either be the south side of layer 266 (a dark organic silt in contrast to 361 in S3), or the edge of 459, whose fill (267) is a silt like 361 (and 442 to the right in S7). In the latter case, 459 may be seen as part of 90 (rather than of phase 6, see above) with 266 as a

secondary fill perhaps waterlaid, associated with river flooding and scouring to the west.

The inner northern edge here cuts the phase 6 layers (the fills of 230 and the possible bridge abutment). The layers above these 21 and 94, running up over the stone road of phase 5a could be the residue of a bank on the inner side of 90; the associated sherds are mostly 12th century, but include 98 sherds which are probably 13th century and include a glazed sherd that joins to a sherd from the phase 9 layer 86.

In S16c, a sequence of layers was recorded above 82 (21/94/94/92) which except for 93, match those in S7.

In S19, a similar range is seen above the phase 6 layer 122.

In cutting V (fig 36), the south edge of what may be 90 was seen in the NE corner of the cutting, dropping from c 57.69 m AOD downwards. It does not show in the sketch section S12 of the east side of this cutting, which does not extend to the end of V.

In the lower fills of 90 (361 in 53/S6, 266 in S7) were sherds that should be 13th century or even later (in 361); and a terminus post quem of c 1200 has in any case already been noted in relation to 231/331 in S6. A date after c 1200 seems likely for the cutting of 90, even without the rather unsatisfactory evidence from the possible bank layers in S7. The ditch subsequentially silted up in the 13th century; this was succeeded by rubbish dumping on a large scale; a stage of total neglect of the town ditch as an element of defences. 92 in S7 displays this well, with many sherds of 13th or earlier 14th century pottery and much other debris, including leather dated to later than c 1350.

In the slope between these major features and Bolebridge Street, there is evidence of contemporary occupation. Section S1 has no phase 8 layers or features (see phase 9 below).

In the central southern area (over 90), an area of black ashy soil with much iron slag (88 west side, 87 east side) with a post-hole (91), is recorded here as being below 86 (see S7), and should be of this phase. Bowl-furnace residues ('bottoms') here indicate smithing or smelting activities (cf Meeson, below, 2.8).

In the northern part of the site (plan, fig 35), the groups of large stones (37 and 75) could be parts of flooring for a structure or enclosure; or some could be padstones. They were recorded as being in or on feature 1, but could be of phase 9. Other minor features of phase 8 are shown on this plan, but they cannot with certainty be separated from those of phase 9.

On the east side, there is much less evidence of medieval activity. The comparative absence of debris in medieval levels above those of phase 5b in section S3 could be explained in terms of post-medieval truncation; but the same conclusion may be reached from the virtual absence of rubbish dumping in ditch 90 on this side (S3, S6). A deep silt (in which was 13th-14th century pot and tile) is capped by only slight rubbish (379 charcoal and slag). Further silts completely levelled off 90 here to a gradient little if at all steeper than the pre-mill profile of this area. It is clear that medieval activity was largely confined to the western part of the site, and also rubbish dumping into the town ditch (but cf Meeson below in 2.8 for activity to the east).

The complex 517 in the SW corner is rather more substantial (pl XI). The features of which it is comprised were found immediately below post-medieval levels. They cut through the timbers of the revetment of the mill 2 outfall

area; and also the 'abutment' feature of phase 6. It is not recorded (if the data were ever present) what the relationships were between this complex and the stratification displayed in sections S1 and S7. None of the associated pottery is later than the 13th-earlier 14th century; so 517 is assigned to phase 8 rather than 9; it should however be secondary to the phase 8 layers in 90.

These are two main features of 517. The first is 139, a large post-pit containing two timbers (136 and 137). 136 (= CW11) was massive, and round-sectioned, 50 cm in diameter, and probably a section of a tree; its depth was not recorded (it was not removed), but it protruded 40 cm above the natural to the north. There was a hole in its top near the centre, and another in its north side (see drawing of CW 11, fig 70). 137 was roughly pentagonal in section, with an average diameter of 20 cm; this post was 95 cm long, set deeply into the natural, with its top inclined to the SW. Both posts were surrounded by black sticky soil the same as the fill of 137. A smaller post (137a) was set into the south edge of 137. 138 and 138a were two other small posts set into the natural on the west side. 137 was a loose timber. Beneath 517 there appear to have been river edge levels, perhaps merging with 90 at this point (cf 266 and S7).

The other major feature here was an ovoid pit (147) (section S17) filled with an agglomeration of woody material and moss, to a depth of 80 cm (1.10 m below top of 137). The organic debris had sagged in the centre leaving a 30 cm deep hollow filled with grey sandy clay (139a). There were 13th-earlier 14th century sherds and leather in both parts.

On the west side of 147 was a loose timber (175), a round-sectioned conifer, lying against a cut-away edge in the natural (139a).

These two major features seem to be associated with each other, but no obvious interpretation can be offered. However, bearing in mind the discussion above concerning the possible encroachment of the river bank into the area of ditch 90, 517 might be associated with a jetty. 147 might have formerly held a big mooring post, decayed or dug-out; and replaced by 136 and other posts further north. The possibility of a jetty and mooring posts here should be seen in the context of the general discussion of the destination of roads in this area leading to the river bank at different times.

The sections show something of the complexity of the phase 8 medieval use of the site, belying the apparent simplicity of the plan.

Phase 9 (plan, fig 35; sections S1-S19)

The latest medieval layers and features appear to be separate from those of phase 8, and cannot be demonstrated to be continuous with them. Associated pottery is of the later 15th-16th centuries; the sharp distinction between this pottery and that of phase 8 may be due at least partly to the well-known problem of identifying pottery of the later 14th-earlier 15th century, or may represent a genuine hiatus.

On the western side of the site (see S1 and plan, fig 35), there is a thick layer (L3) which yielded 15th-16th century pottery as well as earlier material; this does seem to be an 'occupation layer' of general medieval date, developing on the earlier metalled surfaces below. It is truncated on its southern side by a major cut-away 520; the stratification in this includes a stakehole (4C), and the clay wall feature (see plan, fig 35). This is capped by a soil (302) which seems to end on the north side of a stone wall (302a). Further down the slope of 500 its base is covered with a dark soil (305) and above this sandstone rubble. The

latter is shown here, as drawn in the field, as 89 and 304, presumably reflecting a line of separation or a difference between them. The relationship between this rubble and the clay wall 42 is uncertain, but they should all be later than the late medieval pottery in layer L3.

Further to the east, another probable medieval 'occupation level', layer L4, is known only from section S11, where it is on the stone road 7 of phase 5a. A patch of charcoal (6) (on plan, fig 35) is recorded on the surface of this.

In the northern part of the site (fig 35) 30, 36, 3 and 2 are postholes closely associated with layer 3 (30 and L3 are shown in section S2). In and around these was much evidence of burning and debris of iron-working (ferrous slags), leather scrap, and burnt clay. 31, near the NW corner, may have been a bowl-furnace, or an iron-smithing depression.

In the NE corner of the site, 15th-16th century pottery came from pit 39, and from a depression (4) to the south of it. Another pit (200), to the east of this, had a similar fill. The major layer 58 extends over a large area of the western part of the site; it is seen in sections S1, S7, S8, S13, and S19. 58 is a layer of black ashy soil, with slag and furnace bottoms. This might appear to link it to 87/88 etc of phase 8. Indeed 58 contained a great deal of 13th and there are actually joins between sherds in 58 and ones in other contexts of phase 9. It appears from S7 that 58 was continuous stratigraphically with 86 and 92 below it, as the joining sherds also suggest; there are also recorded from 58 sherds of late 17th or more probably 18th century date (as in feature 56 among 58); but these are assumed to be intrusive from some feature unnoticed in mechanical excavation (see pot report 3.17); or from 56 itself.

Little can be said of the possible building or buildings, or the industrial activity of the scanty evidence available, and the comparative lack of attention it was possible to give these features. It is unlikely that they are all even contemporary; the sections indicate the complexity better than the plan.

2.8 OBJECTIVES OF THE EXCAVATION (plan M1)

During the 1971 excavation the SW end of the millpool was found, set at an oblique angle to the street. It was therefore unlikely that the north side of the pool would extend into the area available in 1978, particularly as the footpath alignment had been adjusted south during the interval between the two excavations. The primary objective in 1978 was nevertheless to locate and record whatever part of the millpool or leat that extended into the available area, and to recover further environmental samples from waterlogged areas to supplement those of 1971.

Before excavation started it was uncertain how much of the available area retained deposits of archaeological interest. Strategically the first concern was to assess the scale of the archaeological problem and to determine priorities, endeavouring at the same time to relocate the millpool.

Despite the modest budget and the extremely restricted timescale an excavation policy was adopted (1.5 above) which would review the overall sequence of development in this area, even if this restricted the time available to record the millpool or leat. A further problem posed by the 1971 excavation was the function and date of a large ditch crossing the southern part of the site; a complete section of this was achieved and its medieval date was confirmed.

2.9 THE CHRONOLOGICAL SEQUENCE OF PHASES

(figs 39 - 57, plans M1 - M9, sections S51 - S58)

The phasing of the 1978 excavation differs from that of the 1971 mill report (2.1 above). A summary of the main phases of the leat excavation is given below; it is collated with the phasing of the site of the mill.

1978 phases	1971 phases
Intrusions into the Keuper (Triassic) Marl	0
First phase leat	2
Second phase leat:	
a) The leat and its revetments & putative bridge;	3
b) deposition and erosion of silts in the leat;	?2 - 5
c) erosion channel A264	7
First medieval ditch and bank or causeway	7 - 8
Second medieval ditch	8
Fill of ditches; colonising of ground towards river	8 - 9
Metal-working and further colonisation	9 - 10
Standing buildings	10

2.10 INTRUSIONS INTO THE KEUPER (TRIASSIC) MARL

A number of intrusions were observed penetrating into the clay beneath the bed of the leat, as recorded on sections S51, S52 and S53. These are shown on section S51 as context numbers A108, A119-123, A127, A128 and A186, and on section S52 as A186 (figs 47-48); the clay appeared to be laminated and it contained small nodules of soft grey/green shale: there were also intrusions of small pebbles, fine clean gravel and decayed tree roots. These intrusions and the generally disturbed character of some of the clay led to speculation about a potential earlier leat or millpool with a clay fill. No convincing bases or edges could be detected however, so these layers are interpreted as part of the natural Keuper (Triassic) Marl, with root disturbance and possibly associated intrusions of water-borne gravel.

2.11 THE FIRST LEAT

(plans M1, M6 - M7; sections S51 - 53 and S56)

Introduction (plan M1)

In 1971 the function of the main structure being excavated was not at first apparent (1.4 above). By 1978, however, the interpretation of the 1971 structure as a horizontal-wheeled water mill had been widely disseminated and the identification of the contiguous wooden structure on the east side of the mill as a millpool revetment was also generally accepted. The lowest silt deposits examined in 1978 were also accordingly interpreted as those of the same millpool, or as its leat, and the earlier leat of the first mill (2.3 above). No structural division was identified to clearly demarcate a junction between the pool and its leat, but the overlap between the site of the millpool/leat junction and the area available for excavation was limited. The silts and associated timbers excavated in 1978 could have been in either or both of the leats.

The eastern limits of the 1971 excavations are represented by sections S5 and S6 (figs 11 and 12). They show the eroded base of the leat for the first mill (1971 phase 2), with its silting, followed by the millpool of 1971 phase 3; the NW timber of this is seen extending into section S5, with its collapsed plank wall. The silt of the millpool and the earlier leat continue into section S6, cut away firstly by an erosion ledge (508) and timber-robbing cuts of 1971 phases 4 and 5b, secondly by the 1971 phase 7 timber-robbing cut 231, and finally by elements of the medieval town ditch. It was hoped that a similar sequence could be discerned in the 1978 excavations east of these sections. The more northerly parts of these features were however sealed by an extension of Bolebridge Street to the south. Section S5 and the north end of S6 were therefore inaccessible in their continuations eastwards; S52 is however parallel to S6 at a distance of one

metre; the baulk between them was excavated in its upper levels, but not in the lower part except to follow through ditch A145 (plan M5). The relationship of the limits of 1971 and 1978 are shown in plan M1 (fig 39).

The first leat and its southern revetment (plans M6 - 7, sections S51 - 52)

The south edge of the first leat lay only 2m inside the available area. It was aligned west to east and at the west end of the 1978 excavation in area A it could be traced for a length of up to 2.8m. The features which are interpreted below as parts of the southern revetment of the leat are illustrated on plans M6 and M7 as A150 - 151, A117, A170 and A256. A150 is also recorded on section S52; A117 can be seen on section S51 and A256 was recorded on section S53.

A shallow groove A150 was cut into the surface of the natural clay A186; it was filled with mixed grey silt and sand. As can be seen on plans M6 and M7 (figs MF 44 and 45), 55cm east of section S52 and 1.7m east of section S6 the groove was interrupted by one of a pair of small holes, A151 and A170. The slot could be traced for 60cm east of the two holes. A151 was 17cm deep, 30cm in diameter; it had straight sides and rounded corners: A170 was slightly smaller. Both holes had a shallow V-profile but neither of them amounted to convincing post or stake-holes.

In line with A150 was A117 (plans M6 and M7 and section S51). An unknown proportion of this feature was machined away when trial trench A was cut. A shallow concavity filled with orange and soft grey sand was all that survived of A117 on the west side of section S51; it had the appearance of a solution hollow rather than a post-hole or beam-slot.

There was a marked difference between the surface character of the clay A186 north and south of A150 and A117. To the north the clay had a water-worn, potholed surface with deposits of silty sand in the hollows. To the south the surviving surface of the clay had a dirty stain upon it and although it was uneven there were no potholes. At section S52 the surviving south edge of the silts A114 and A116 were directly over slot A150 and on section S51 the edge of the same deposits extended south as far as A117, but both sections give a false impression. These silts are cut by the channel A264, the north edge of which can be seen to cut into A114 and A116 directly above A150 in section S52, and above A117 in section S51. Excavated in plan between the two sections, the silts A114 and A116 sealed the slot A150 and extended south beyond it by up to 48cm.

East of trial trench A the same rippled clay surface was recorded and again its south edge was found to be on a line projected from A150a/b. The edge of the rippled area could not be traced as far as A256 due to the presence of other (probably later) irregular cuts or hollows on the surface of the clay (plan M6, fig MF 44).

A256, a shallow sand-filled depression, lay on the line of the proposed south revetment of the first leat but its stratigraphic context is open to a variety of interpretations (plan M6 and section S53). From section S53 it is difficult to know whether A256 post-dates or ante-dates the silty deposit A257. A256 partly overlies the end of A257 in the section, from which it is arguable that the former was created subsequent to an early stage of silting. Conversely it is feasible that silts washed around and under a timber in or above A256; the subsequent removal of a timber from above A257 might have left a void which was filled by the primary sandy silt A256.

East of trial trench A the silts associated with the second leat extended over an area to the south and east of the proposed first southern revetment line. In section S53 the silt A114/116 seals A256. As can be seen from plan M7, the timbers A140 and A141 which lay on top of the silts of the second leat lay well outside the line of the origiral channel.

The features A150, A151 and A117 form a straight line which demarcates a pronounced difference in the character of the surface of the clay A186. The holes A151 and A170 were first thought to be postholes but they were not deep or substantial enough to be convincing. A170 could be the result of working a timber back and forth in an attempt to lever or dislodge a beam on the line of A150, and A151 may have a similar origin. Such an interpretation would imply that part of a putative southern revetment was deliberately robbed before the silt A114/116 was deposited across its line. This evidence seems to imply that when the second leat was excavated in phase 3 most of the evidence of the south revetment belonging to the first pool was cut away.

Uncertainty regarding the interpretation of the sand-filled depression A256 has already been noted above. It may lie on the line of a continuing southern revetment but its stratigraphic context is inconclusive.

The silt A255 was apparently the same as A125 in section S53. The extreme west edge of a negative feature A183 was noted in section S51, apparently intruding into the clay A127/186. It should not be assumed from the section drawing that the silts A124 and A125 sealed the top of A183. The latter is tentatively interpreted as a possible post-hole but it is not possible to confirm which phase of the leat it belonged to (see also below).

Where the south side of the leat passed under the north section S53 the surface of the clay A186 was at c58.19m AOD. The same surface was at c57.97m AOD on the west section S52, giving a fall from east to west of c22cm over a distance of 6m; this approximates to a gradient of 1 in 27. This observation relates to a relatively small area; nevertheless it gives some indication of the gradient of the bed of the leat as it approached the mill. The gradient of 1 in 27 cannot apply to the overall length of the projected course of the leat as this would place the start of the leat at a higher level than the river. It seems probable therefore that the bed of the leat became steeper on the immediate approach to the mill on the south side of Bolebridge Street.

2.12 THE SECOND LEAT, ITS REVETMENTS, AND A POSSIBLE BRIDGE

(plans M5 - M7, sections S53 - S56)

The leat and revetments

The features which have been interpreted as parts of the second leat are recorded on plans M5, M6 and M7. Some of the timbers associated with its putative southern revetment are recorded on sections S53 and S56.

The north side of the second leat lay outside the available area in 1978; the south edge was apparently c1.5m further south than the limits of the first leat and approximately parallel to it.

The edge of the second leat had been disturbed and probably partly cut away by the medieval ditch A145. Before that, the silts within the leat had been deeply cut into by the earlier medieval erosion channel A264 (plan M6).

A number of post-pits and the bases of extant vertical and inclined posts were recorded (plan M6 and sections S52, S53 and S56). Each of these is described individually before a general discussion and interpretation.

The position of the post-pits A169 and A144 is shown on the plan M6 (fig MF 44); A169 was redundant before A144 was cut. A169 was 47 x 40cm in plan and survived to a depth of 32cm (fig MF 106). At its base was a 38 x 7cm impression of the bottom of a post. A thin deposit of silty sand lined the north wall of the hole; the remainder of the fill was a mixture of sand and clay. There was no sign of a post-pipe.

A169 was cut by A144, a post-hole with a substantial extant post. The hole was 56 x 48cm in plan and 55c.. deep. A packing of pebbles in a sandy matrix supported a post of 41 x 7cm section. The base of the post extended downwards into the natural 11cm below the bottom of the post-hole; the post, which was vertical, survived to a length of 85cm. The top of the post coincided with the edge of the silt deposit A116 (section S56, fig 52). Significantly, the face of the timber in A144 was set in the same orientation as the post impression A169. A dendrochronological date of AD855±9 has been assigned to the post from A144 (Baillie in lit).

North of A144 and A169 three more extant timbers projected tantalisingly out of the section S53; these are also shown on plans M6 and M7 as A189, A187 and A188.

A189, with a roughly-hewn point, projected out of the clay A186 at an angle which was estimated to be c30° from vertical, inclined to the north, but only 20cm was visible. There was no evidence of a post-hole around the visible extent of this timber.

The vertical timber A187 stood in a post-hole A200 which was packed with brown clay. The hole had been cut through the natural clay; it barely extended into the excavated area. A187 was only partly exposed in the north section (S53), with visible dimensions of 17 x 12cm and a length of 62cm. The timber had a roughly-hewn lower end and the broken top coincided with the edge of silt A116.

A188 was a timber in a post-pit cut into the clay; the pit cut the post-hole A200. A188 was a vertical timber with a visible cross-section of 22 x 6cm near its base, which was cut square and not pointed.

In addition to the extant timbers which projected out of the north section, A185 was the fill of a negative feature cut into the natural clay A184 (section S53). A185 was a mixture of sand, stiff clay and small pebbles. More traces of similar clay and sand were observed in the section (S53) at a point above A185 in an area of disturbance among the overlying silt layer A116. The feature was not recognised in plan as it lay mainly outside the excavation. It is suggested that a post had been withdrawn from a hole after the silt layer A116 had been deposited, leaving a void which filled with A185.

West of post A144, near the junction between A186 and A184, was the timber A142. It was inclined to the NW at an angle of approximately 45°. The base of the timber rested in a shallow emplacement cut into the surface of the natural clay, and not in a deep post-hole. The end of the timber was not pointed or shaped but cut square. A length of 61cm survived and in cross-section it measured 65 x 23cm. The silt (A114/116 and A110) which overlay the bed of the leat had accumulated around this timber, the upper end of which had fractured close to the point where it projected into a disturbed area within the upper silt layer A109 (the silts illustrated on section S53).

The other timber inclined at 45° was A153 (plans M6 and M7). Like A144, this too has been assigned to AD855±9 by dendrochronology (Baillie in lit). 22 x 8cm in section and c1.1m long, it had a deliberately and carefully shaped pointed lower end. It had been driven almost 70cm diagonally into the clay base of the leat. Silty grey sand had washed into a depression in the surface of this inclined timber but it is absolutely certain that there was no post-pit. The post had fractured in line with the top of the silt A114: the broken top of the timber was sealed by A112 and more silt subsequently accumulated above it (see below).

Although in section S51 it appears to be sealed by the lowest silt A125, the stratigraphic context of the negative feature A183 is uncertain: tentatively interpreted as a post-hole, it has already been discussed above. Because A183 only just coincided with section S51 it is impossible to confirm from the evidence whether a putative post at this point belonged to phase 2 or phase 3. Since no other evidence of posts standing inside the first leat was found the balance of probability is that A183 belonged to the second leat.

At the west end of area A, adjacent to section S52, was a large post-pit A146 cut directly into undisturbed clay (plans M5, M6 and M7 and section S52; fig 48). The top of the postpit had been cut away on its south side by the later ditch A145. The posthole was 50-60cm wide and a little over 30cm deep but the post-socket extended 34cm below the base of the pit. The post-pipe was circular in plan at the top, and it had vertical sides; lower down the north facet of the post-pipe was raked, possibly to the shape of a cut at the end of a crudely pointed post.

To conclude: the progressive robbing and decay of timbers of this phase was associated with the processes of silting and erosion which followed the abandonment of the second mill: that process is considered in detail below. Only the construction and reconstruction of the leat revetments, presumed to have been in use during the working life of the second mill, are discussed in this section.

A case can be made for the majority of the timbers being functionally related to the second mill and its leat but it is argued below that a small number of them belonged to a bridge which carried Bolebridge Street across the leat (see below).

A150, interpreted as the base of the first leat southern revetment, was sealed by the sand A125 and that was eventually covered by A116, a silt deposit which can be traced across section S53 where it sealed A256 (fig 49). The latter also sealed the abandoned post-pit A169 and the pit fill around the succeeding post A144, but not the top of the post itself. The silt may never have extended south of the post A144, but it is possible that the evidence would have been removed anyway by the subsequent erosion channel A264 and the medieval ditch A145 (plan M6 and section S56).

The post A187 probably survived long enough to support a revetment which contained the silt A116, perhaps supplemented by the secondary vertical timber in A188 (fig MF 106). The fractured top of A187 was eventually sealed by the silt A110.

In the light of the above observations it is feasible that the erosion channel A264 may have formed along the course of a robber trench on the line of the southern revetment of the second leat. At the west side of area A the channel A264 curved north around the post-hole A146. This might be taken to imply that the south revetment did not follow a straight line from east to west between the posts A144 and A146. Alternatively the sinuous course of the channel A264 may be the result of water erosion along the course of a robber trench which was originally cut in a relatively straight line.

As it was sited south of the projected southern revetment of the second leat (plan M7), south of cut A265 (section S52), and south of cut 331 (section S6), the post in A146 probably did not form part of a revetment. In addition, the location of A146 adjacent to a bend or contraction on the south side of the leat is unlikely to be coincidental. In the absence of any firm evidence for the function of this feature it is only possible to speculate that it might have

formed part of the junction between the millpool and the leat, or it could have been associated with a sluice or fish trap, or a grill to prevent debris from floating through the millpool and onto the wheel-assembly.

A possible bridge across the leat

The timbers A142, A153 and A189 have already been described above but their possible function has not yet been discussed. Although they were stratigraphically separate from a number of planks found lying on top of the leat silts the hypothesis formed during the course of excavation was that they were all part of a bridge, the bulk of which was sited outside the available area beneath Bolebridge Street.

It is argued elsewhere that Bolebridge Street was on the course of a very early road or track (Meeson 1979, 9-13), and it is probable that the water mill was proximate to the main eastern entrance through the burh defences. It is most unlikely that a main entrance to the burh would have been across a ford and equally improbable that a miller could have tolerated constant damage to the sides of a leat caused by passing traffic. Although a putative bridge would have been outside the excavated area a number of features point to its existence, in particular the three inclined timbers already described.

As already described, there was certainly no post-pit for the carefully shaped and pointed inclined timber A153. In view of the extreme care of design and manufacture of the curving point of the post and the depth to which it was driven diagonally into the solid clay bed of the leat it is tempting to speculate that a mechanical pile-driver may have been employed. The timber was probably driven into the clay before any of the surviving silts were deposited, but as noted

earlier the fractured upper end of the post was sealed by the relatively early silt A112.

The lower end of an inclined post A189 was apparently not contained in a post-pit, though the roughly-hewn point was in marked contrast with A153.

The timber A142 survived long enough to protrude through the final layer of silt. Significantly it was not pointed, it had not been driven into the clay and it had no post-pit. It could only have remained in situ at an inclination of 45° if its upper end had been supported or fixed against a solid mass while silting proceeded around its foot. It is suggested therefore that this timber had been employed as a prop or brace to a structure sited over or across the line of the leat - the putative bridge outside the excavated area and beneath Bolebridge Street.

The timber A153 was conceivably an original lateral brace and arguably A142 was a repair, the latter surviving until a later date than the former.

In all probability the carriageway of a bridge would have been made of planks and the scant remains of five planks were indeed found lying on top of the uppermost layer of silt (plans M5 and M7). One end of the plank A139 had been truncated by the mechanically cut trial trench A; the surviving length was c1m and it was 33cm wide. Generally it was less than 1cm thick when excavated and it had decayed to little more than a stain at one end but both edges were flanged. The best-preserved flange was 7.5cm deep and 6cm wide.

Most of the plank A140 had decayed to little more than a stain but one edge had been formed into a thick flange which survived for a length of 1.37m.

A141 was a very thin plank, of which a length of 1.22m remained. From its width of 33cm it may have been similar to A139 but no flanges survived.

The plank A143 survived to a length of 1.76m and part of a flange remained along one edge. The timber A263 was similar to A140.

The inclined timbers and the planks overlying the silts are together consistent with the interpretation that silting continued around the putative bridge supports until the carriageway was collapsed or discarded. This event marked the end of phase 3 and probably coincided with the commencement of phase 4. The planks were sealed by the phase 4 earth 'bank' or causeway which is described more fully in the next part of the report. However, in this context it is significant that the bank which sealed the remains of the 'bridge' also finally cut off the leat and thereby made the 'bridge' redundant anyway.

From the archaeological evidence it is not possible to determine whether it was the decay or collapse of the bridge which occasioned the construction of the subsequent 'bank' or if the 'bank' was conceived first, closing off the residue of the leat and giving cause for the demolition of the bridge. However the balance of probability is that the bridge was deliberately dismantled and replaced by a causeway.

2.13 DEPOSITION AND EROSION OF SILTS IN THE LEAT

Introduction

Most if not all of the surviving silt deposits probably post-date the abandonment of the mill.

Largely because a succession of silts could be traced within the available area of the second leat a complex chronological sequence could be determined. This was not a series of distinct and separate periods but a continuum of interrelated occurrences. These included largely natural processes of silt deposition, water erosion and timber decay alongside human intervention including robbing activities and attempts at water control by dredging or ditching.

The silts

This part of the report continues with a sequential account of each of the main silt layers, beginning with the earliest. The major silt deposits can be traced at a tangent to the main axis of the leat on section S53 where they are recorded as deposits A109-116, A129 and A130. The same deposits also appear on sections S51, S52 and S56.

The clean sandy primary silt deposit A125/A255 could have belonged to either of the two succeeding leats. The yellow and grey interlaminated sands A124 could also be attributed to either pool/leat (section S51).

Over most of the available area the silts A114 and A116 were dug as one layer but at section S51 the deposit A114, a stiff grey clay-like silt, clearly overlay A116. The latter was a very dark grey sandy silt containing scattered very small

pebbles and driftwood fragments. A water-eroded gully (A115) had cut into the surface of A114 and then filled with silty cream-coloured sand (sections S51, S52, S53).

The silts A114 and A115 were sealed by A113/A112. To the east this was a thin deposit of yellow sand: it merged into striated white, grey and green sands, becoming deeper to the west then merging into a sticky gr y/green silt at section S52.

A yellow/white sand A111 overlay a small area of A112 on section S51. Near the junction of sections S52 and S53 a thin layer of red clay (A262) so lay on the surface of A112. The soft grey silty sand A110 which sealed A112/113 merged into a stiff grey silt A130 which contained fragments of driftwood. This was covered by A109/129. A109/129 was a layer of dark grey organic silt, merging into a grey silty sand. It was the last silt deposit in the sequence.

At the west end of the site the erosion and silting sequence was inextricably complicated: the regular succession of silt deposits described above was interrupted at the south edge of the pool by channel A264 and overlain by numerous interlaminated deposits. These were not recorded in plan but the complexity of the stratigraphy is adumbrated on section S52. The grey silt A259, the yellow sand A260 and the fine grey silt A261 may all have been redeposited material. These deposits cannot be the result of a single event. A260 was clearly deposited before the silt A130 accumulated. A257 and A258 both clearly post-date the silt A130 but it seems apparent from section S52 that they predate the silt A129/109. Whatever the explanation of this sequence of deposits may be it is clear that a deep erosion channel A264 cut away the south edge of all these redeposited and alluvial silts.

Silting and decay of the leat: suggested sequence

The relationship between the surviving timbers and subsequent silts has been described. The sequence of silt deposits, punctuated by robbing and drainage activities, has also been described. When the evidence from those two sections is considered together a general reconstruction of events can be assembled and this is given below.

The first major silt deposit A114/116 sealed the line of the former revetment A150. It also sealed the abandoned post-pit A169 and the fill around the replacement post A144. There was no evidence that the silt ever continued beyond A144 and the post A187 certainly contained this layer. Hence it is clear that at least part of the second leat revetment remained in place when the silt A114/116 was deposited.

The inclined post A153 protruded through the silt A114/116 but its fractured top was sealed by the next layer of silt A112. Hence A153 fractured, perhaps as a result of wet-rot, before the silt A112 sealed the earlier deposit A114/116. The post A187 fractured at some time after the silt A114/116 had been deposited.

The silt A112 was deposited, sealing A114/116.

A259-261 and A262 have been interpreted as upcast from the repair or robbing of revetments which occurred after the deposition of the silt A112/113.

The silt A110/130 accumulated, sealing the top of the post A187. However, a water channel remained open, or was recut on the south side of the leat, and this may have removed the south edge of A130. This channel may have been cleaned out or

'improved', creating the redeposited silts A257, A258 and possibly also A256, all overlying the edge of the silt A130.

Silting continued over a wide area of the former leat (A109/129 sealed A130 and partly overlay A257).

The inclined post A142 fractured and a number of planks fell onto, or were discarded on top of the silt A109/129 (see below).

2.14 PHASE 7 : THE EROSION CHANNEL

At section S52 the vertical north edge of the lower part of the channel A264 is not typical of the overall profile and it should be remembered from above that the apparent coincidence of that edge with A150 gives a misleading impression. At section S52 the channel was c60cm wide at its base, but the upper edge extended north to the surviving edge of the silt A129/109. The cut A265 on the south side of the channel A264 extended from the surviving top of A252. At section S52 the bottom of the channel had a fill of clean sandy silt A254. The bottom of the channel coincided with the clay bed of the postulated second leat.

At section S51 the channel A264 was deeper, a narrow gully having been gouged out of the underlying clay. The channel here contained a succession of sandy and organic silts, including the highly organic horizontally laminated deposit A100. That, and the possibly related silt A102, retained straight, vertical edges in marked contrast to the sinuous eroded profiles, possibly suggesting an artificial cut within and along the line of the channel A264. Vertical and straight edges were again noted at section S57.

At section S52 the bed of the channel A264 was at 57.95m AOD; at section S57 the probable base was at 57.78m AOD. At section S56 the channel had been almost completely cut away but the deepest surviving surface was at 58.22m AOD. Clearly in its final form the channel did not follow a regular gradient so the figures should be treated with caution; however it is possible that an attempt was made to drain water from west to east, opposite to the direction of the working leat. A more concerted attempt to achieve this direction of drainage was undertaken later with the excavation of ditch A145. The fill of A264 is dated to c1200 or later by a sherd of ?13th century pottery in layer A138 in the base of the feature (see section S57).

The erosion channel A264 took on its final form at the south edge of the former leat, partially undercutting the edge of the planks on top of the silt. This channel was itself subject to silting and may have been recut to re-establish a ditch or drain in which the water-flow may have been from west to east.

2.15 PHASES 7-8 THE MEDIEVAL BANK OR CAUSEWAY AND THE ASSOCIATED DITCH A145 (sections S51-52 and 54-55)

Introduction

A succession of layers of soil, inclined steeply southwards, are interpreted as a bank aligned approximately west-east, sealing the phase 3 silts and erosion channel. Over much of the site the southern face of the bank sloped south to coincide with the north edge of a ditch (A145); this is earlier than the major ditch A266 of phase 5 (see below).

The ditch (A145)

A 3.25m length of ditch A145 was emptied, four sections being observed in the process (sections S51, S52, S54 and S55, the locations of which are shown on plan M5).

At the eastern section S54 the ditch was 1.75m wide and 80cm deep. At the western section S52 it was 1.54m wide and 70cm deep. The bottom of the ditch was at 57.49m AOD at section S52 and 57.34m AOD at section S54. It appears from these observations that the base of the ditch sloped down from west to east, again apparently draining in the opposite direction to the former mill leat.

The ditch had been cut through undisturbed Keuper Marl, probably originally with an open-V-profile (section S51). Along part of its north side the lip of the ditch coincided both with the edge of the erosion channel A264 and with the foot of the bank which sealed the erosion channel (section S51). Where the south edge of the former leat curved northwards under Bolebridge Street both the ditch A145

and the south edge of the bank deposits continued eastwards on a straight course. Lack of time and resources prevented the total excavation of ditch A145 in this part of the site, near S56.

In area A the base of much of the ditch had apparently at some stage been cut to a steeper-sided profile with a flat base and there was evidence of recutting or cleaning out, especially at sections S51 and S54.

The fills of ditch A145 consisted of deposits of sandy primary silts, other sands ranging from fine-textured to gritty, and a succession of stiff grey silty deposits, some with a high organic content. There were sherds of 12th-13th century pot in the layers which filled the ditch (including A38 and A44); among these was a nearly complete profile of a ?13th-century cooking pot (from A44: fig 77.52).

Throughout the excavated length of ditch A145 the north face was longer and it survived to a greater height that that to the south, implying that part of the south edge may have been cut away by the later ditch A266. More significantly, at section S52 the silty grey sand A174 survived at a higher level than the surviving south lip of the ditch. Similarly, the top of the stiff grey-brown silty clay A212 was higher than the remaining south lip of the ditch on section S54. It is arguable that this undisturbed, horizontally laminated material - apparently a water-borne silt - could have been deposited at that level only if the southern bank of the ditch A145 had originally been higher. In addition to providing some confirmation of the stratigraphic relationship between the two ditches these observations imply that ditch A145 was largely filled with silt before the ditch A266 was cut.

The bank

The layers of earth which made up the bank associated with ditch A145 are recorded as A35, A97-98 and A203-4 on section S52. On section S53 the bank can be traced as layers A4 and A35 to the west; near the centre of the same section A35/B86, A231-232 and A235 probably formed part of the same bank. These layers are at least partly turfy, and did not therefore derive from the excavation of ditch A145.

At the west end of area A the southern part of the bank extended c3.5m into the area of excavation. Much of its upper part had been cut away by post-medieval intrusions including A6 and A20 (plan M5 and sections S51 and S53). Despite these intrusions a reasonable profile of the bank survived at section S51. There the face of the bank extended at an incline of c30° from the lip of the ditch A145 for a distance of c1.6m to a vertical turf face of c40cm. As can be seen from the surface of A203b and A204 in section S52 and the surface of A35 in section S51, the surviving top of the bank was flat.

East of trial trench A the bank gradually converged upon modern Bolebridge Street. It retained a similar profile to that at section S51 through most of its length but east of section S56 it tailed away. Near to the area of divergence the lower end of the bank deposits including B86 tailed out across the northern lip of the ditch (section S56, fig 52).

The lower part of most of the length of the bank comprised of sandy loose-textured layers which filled the erosion channel A264 (A98 and A99 in section S51). More compact layers such as A96, A97 and B86 overlay the silt A109 (sections S51 and S53). At section S51 the lower face of the bank comprised of a hard brown humic earth with patches of red clay and a few scattered fragments of

charcoal or burnt wood; at the top of the bank this was overlain by up to 40cm of turfy material. At some points, as at section S52, separate layers of turf residues could be distinguished.

The date of the bank should be c1200 or later, as its layers sealed the ?C13 sherd in A264 (phase 3c above). From the bank layers the only dating evidence was a later 12th century sherd in layer B86, presumably residual in this context.

Discussion of the ditch and bank

The bank and the associated ditch A145 were apparently contemporary, and when they were laid out their form seems to have been partly predetermined by the southern edge of the channel A264.

A number of characteristics of both the bank and the ditch together indicate their joint function. The bank filled and overlay the erosion channel and sealed the leat. Although its form was partly predetermined by the shape of the former leat the south face of the bank was approximately parallel to the street; the bank may in fact have been wide enough to carry the street. As well as sealing the top of the leat silts the bank deposits also covered the remains of the wooden planks interpreted as bridge residues which lay on top of the final phase of silting. A sloping face was created which drained from the street towards the parallel ditch A145. The excavation of this apparently continued the direction of drainage established in phase 3 by the erosion channel A264.

The bank was most probably an earth causeway over the soft soils of the leat below, built to carry the street, replacing the putative timber bridge and finally blocking off the line of the leat from the north. Water draining from the southern face of the causeway was channelled along the course of the ditch

A145 which apparently drained west-east. The ditch was probably recut or cleaned several times before finally silting very quickly.

Depressions in the face of the causeway such as that displayed on section S52 were probably caused by surface water erosion. The sandy deposits A172 and A173 over ditch A145 may have been washed there from the face of the bank or causeway above.

2.16 THE MEDIEVAL TOWN DITCH A266

(sections S51 - S58)

The evidence of the silts of ditch A145 discussed above in phase 4 suggested that A266 was the later of the two ditches, though their stratigraphic relationships as shown in the sections are somewhat ambiguous. The dating of the pottery does, however, support the relationship, as may that from the 1971 excavation (see above 2.9).

Ditch A266 was sectioned at trial trench A (section S51) and probably encountered but not fully sectioned in area B (section S58). Section S51 may not have been cut at right-angles to the course of the ditch. When an adjustment is made to allow for this the likely surviving width of the top of the ditch is estimated as c5.4m. Measured from the north edge on section S51, the ditch was only 1.4m deep, though the base was 3.76m below the 1978 ground surface. The narrow trench was heavily shored and prone to constant flooding during excavation so recording was extremely difficult; the drawing of the ditch section may therefore not be accurate in every detail.

The deposit of red clay near the bottom of the ditch (A77 on section S51) was probably displaced Keuper Marl and not the remains of a deliberate lining. The very soft silty sands A76 and A75 were succeeded by a highly organic silt A74. Silting continued, probably very rapidly and mainly with sand. Each of the deposits A72, A64, A62 and A61 contained a high proportion of organic material.

A partial section of a negative feature or features was recorded on the north face of a machine-cut trench in area B (section S58, the location of which is indicated on plan M1). Although one or more ditches may be indicated, or perhaps a single ditch which was recut, it was not possible to record them in plan and on

the limited and unreliable information recovered, the section is open to a wide range of possible interpretations. It is possible that the cut B90 with its base at c57.1m AOD, and the sand B56, represented a survival of the ditch A145 continuing to slope gently down to the east.

The cut B91 is likely to represent the edge of the larger ditch A266.

Because section S58 was close to the possible medieval bank of the river some of the recorded deposits, cuts and recuts may be explicable as the result of alternating water erosion and silt deposition. The cuts B92 and B93 through the silt deposit B52 therefore do not necessarily result from human intervention. While they may be the result of attempts to recut the large medieval ditch they are more likely to be the result of water erosion along the line of the ditch.

It is possible that the large ditch A266 was cut as a direct successor to A145 in a further attempt to contain drainage problems between the River Anker and the proposed causeway which carried Bolebridge Street. Alternatively, if the negative feature represented by cut B91 on section S58 was part of ditch A266 this would more probably have been a portion of the medieval town ditch. A ditch of similar scale and proportions to that on section S51 was recorded in 1969 on the north side of Bolebridge Street (Young 1971, 239). The possibility that these sections may relate to the same feature is illustrated in fig 4 which indicates an inferred town ditch turning west, perhaps to meet the River Anker obliquely. Pottery from the fills of A266 is of the 13th century, or even the earlier 14th, including fig 77, 53 and 55.

2.17 PHASES 8-9 LAND RECLAMATION

(plans M2 - M4, sections S51-52)

In area A several layers of earth were introduced to the site over the ditches A145 and A266; the layers extended north to the face of the medieval bank or causeway adjacent to Bolebridge Street. The deposition of these layers had the effect of aggrading the level of the ground, probably with the intention of reclaiming land between the street and the river. This group of deposits extended almost 10m south from the phase 4 vertical face of A35 on the medieval bank; they are represented most clearly on sections S51 and S52.

The layers and deposits recorded on section S52 which belong to this phase are A36/169, A33, A32, A234 and A4. It is conceivable that the surface of A234 and A32 together formed a ground surface for an indeterminable time. (The layers A31 to A26 were dirty deposits containing coal and it is suggested that they belong to the succeeding phase of metal-working activity during which, it is argued, the aggradation of the site continued)

The layers A37, A36, A33 and A32 on section S51 are interpreted as deposits which were introduced to raise the level of the ground. The associated deposits A34 and A47 - A50 probably result from the same process of dumping earth onto the site. On section S51 it is likely that much of the top of A32 formed the ground surface for a time. The peculiar shape of A50 on section S51 was the result of worm action.

The sandy material A47 on section S51 and the sand and pebble deposit A234 on section S52 were both sealed by A4 which was a layer of brown sandy earth containing charcoal, pebbles, sandstone fragments and a few clay intrusions. On section S51 the layer A4 overlaps the layer A47 so it cannot have been deposited

before phase 6. As can be seen on plan M4, at no point did the layer A4 overlap the end of the deposit A28. It is possible therefore that A4 formed part of the ground surface at the same time as A32/A53. The features which intruded into the surface of A4 are accordingly associated tentatively with phase 6, though stratigraphically there was no proof that they could not have been later.

A number of small irregularly disposed intrusions had been introduced into the surface of A4 (plan M4). A9 was a 12cm-deep depression, up to 34cm diameter, with a flat base; it was filled with brown sandy clay and purple sand. (Features A6, A20 and A21 on plan M4 intruded from higher levels.) A10 was also c12cm deep and filled with similar material. A number of small intrusions into A4 and the top of A47 occupied a spread of up to 80cm which extended in a line parallel to the street. Most of these intrusions were no more than 7cm in diameter; some were apparently vertical but others were inclined at various angles, pointing in different directions. They invariably contained a grey sandy fill. These intrusions are interpreted as either stake-holes, root-holes or both and it is suggested that a fence, or more probably a hedge, demarcated the break of slope between flat ground adjacent to the street and the sloping surface to the south.

Approximately 5m south of the putative hedgerow layer A32 was sealed by the deposits A52 and A51 which together formed a low wide bank, recorded only on section S51. A52 was a dark grey sticky clay; A51 was a dirty brown close-textured loam. The bank was highest on its south side where it terminated at a deep negative feature A250. The latter contained silty grey sand, clay and pieces of broken sandstone up to 18cm across. This feature could not be examined on the opposite section of trench A due to deep post-medieval disturbance.

The phase 6 deposits substantially aggraded the ground level over a large area, particularly at the west end of the site in area A. This is interpreted as the

result of a concerted attempt to provide an area of ground between Bolebridge Street and the River Anker which was elevated above normal flood level. In the light of that interpretation layers A51 and A52 may have been part of a flood barrier. The negative feature A250 was not emptied or examined in plan; nevertheless in view of its siting at the south edge of A51/A52 and the pieces of broken sandstone in its fill it is tempting to see this feature as a robber trench from which a sandstone revetment had been removed.

Pottery from phase 6 includes a ?13th century glazed jug rim from A32 (fig 77.54).

2.18 PHASES 9-10 INDUSTRIAL ACTIVITY, FLOODING, AND LAND RECLAMATION

Introduction

Only one metal-working hearth was found in area A (see below), but a long and complex sequence of furnace bottoms and hearths was noted in area B. Due to the circumstances of excavation and the restricted timescale the industrial features and associated deposits in that part of the available site were not examined as thoroughly as they deserved. Furthermore, mechanical excavation of the exploratory trench B removed much of the stratification between the furnace bottoms and apparently associated stone features B33 and B65. No attempt was made to record the exact sequence of merging spreads of ferruginous sands, charcoal and earth deposited around the hearths and furnaces. A general sequence was nevertheless elucidated for the principal strata which made up the NE corner of area B, and for the furnaces and hearths built into or upon them. In the site records most of the main industrial features were recorded as hearths but in the light of post-excavation analysis of a slag sample some of these features are now interpreted as furnace bottoms, for which reason they are assigned the prefix 'F' in the following account.

During what was probably a long period of metal-working a considerable number of furnaces could have been removed without trace before a successor was constructed. The sequence given below can only relate to the archaeological data which was recovered and probably does not elucidate the total sequence of industrial activity on the site. The earliest surviving furnace in area B was F1 and this was succeeded by a pair of contiguous furnaces F2 and F3. The furnace F3 is followed in the archaeological record by F4 and the latter was probably broadly contemporary with F5 which was built over the site of F2, again providing a contiguous pair. When the furnace F4 was replaced by F6 however, the site of

F5 was left vacant. After the furnace F6 had been largely dismantled the much less substantial metal-working hearth H7 was used, perhaps only for a short time, before being replaced by H8.

Metal-working in area A (plan M4, sections S51 and S52)

Continuing the process of aggrading the site over the line of the medieval ditches, the surface of A32 and the majority of A51 were both sealed by A30 (section S51). The layer A30 was in turn sealed by the deposits A29-A26. On section S52 this further stage in the elevation of the ground surface is represented by the group of layers which includes A31 and A26.

Only one metal-working hearth was found in area A. As can be seen on sections S51 and S52 the construction trench for the walls of the hearth A23 was cut through the layer A26. The hearth A23 and its associated flanking wall were built with small pieces of red and yellow sandstone rubble set into a shallow construction trench. The hearth was c1.46m externally on both axes and 94cm wide internally. The burnt brown sandy base was strewn with charcoal (A25) which also spread to the south over the surface of A26.

Abutting the west wall of hearth A23 was a thin brown humic deposit (A24) which was spread over A31 and A22; the latter was a rectilinear patch of stiff brown sandy soil.

The termination of metal-working in this area was followed by the introduction of yet more layers of earth and associated structural features in phase 8, as described below.

Land reclamation and metal-working in area B

As can be seen on section S58 (fig. 54), at the north end of area B over the presumed medieval town ditch, the ground was made more even when the soft brown sandy layer B46 was deposited. The top of that layer was contaminated by the black charcoal B45.

B45 was sealed by B44 - a layer of sand containing pebbles and charcoal. That in turn was overlain by a thin but compact layer of charcoal (B43). The latter was sealed by B42 - a thick depiosit of soft brown sandy earth. Though contaminated by charcoal, this layer was horizontally laminated indicating that this was probably a fluvial deposit rather than a man-made feature. The furnace F1 was constructed when B42 formed the ground surface.

The earliest furnace located within trial trench B and the contiguous small area B was F1; however, the charcoal in underlying layers B45, 44 and 43 most probably originated from metal-working activities outside the limited area of excavation which predated F1.

Furnace F1 and associated features (plan M11)

The remains of F1 were sealed below the base of F3; they were all that survived of the nearly flat sandstone base of a furnace which had been built into the surface of B42. The north-to-south width of the feature was c1.9m. The east side of the base of the furnace had been cut away in the machine-cut trial trench B; the east-to-west dimension was not less than 1.7m but it may have been up to c2.2m long. Slabs of sandstone up to 40 x 36cm in plan and up to 15cm thick were employed in the construction of the base of this furnace. Near the outer edge of

the base much of the sandstone had disintegrated into a pink/mauve congealed sand and at the centre much of the stone had degenerated into coarse white sand.

80cm from the west edge of F1 there was a scatter of purple sand and charcoal (B95) on the surface of B42. The features B59 and B60 cut through this scatter into the top of B42; they were two almost perfectly semi-spherical hollows of 20cm diameter, provisionally interpreted as seatings for crucibles.

The edge of B95 was overlain by the charcoal or black-stained area B63 which was c1.4m in diameter and almost exactly circular, with well-defined edges. On the west side of B63 there was a narrow projection of the stained surface which extended out of the excavated area. The extreme east edge of the charcoal patch was intersected by the west side of F1. Hence the sequence was B95, B63, F1.

Because F1 had been dismantled and largely removed to make way for F3 none of the fired contents of F1 remained in situ. The surviving base of F1 was immediately overlain by the remains of the base of F3.

Furnace F2 and F3 (plan M11)

At the north end of area B layer B18 was deposited over layer B42, at the same time sealing the remains of F1 and the layer B15 was subsequently deposited over much of B18. Furnaces F2 and F3 were then built into B18 and B15. The stratigraphic relationship between the substantial stone feature B65 and furnace F3 was destroyed when trench B was excavated by machine. However it is likely for the reason discussed below that the two were broadly contemporary and structurally related.

The furnace F2 had been partly removed by the subsequent construction of furnace F5. The remains of F2 comprised a sub-rectangular pit c2m wide north-to-south and c2.2m long on the east-to-west axis; a depth of c20cm survived beneath the base of F5. On its east side the concave base of the pit was covered by a crumbly mixture of red clay and sand with occasional intrusions of grey earth but it is possible that this material had been introduced as a basal layer for F5.

As illustrated on plan M11, the basal lining of F2 included blocks of sandstone, one of which was a slab 70cm across, and a piece of red tile. The sandstone was set in a heat-shattered yellow sandy matrix. Close to the SW corner of the pit the sandstone base was interrupted by a curving channel (B31); this was 30cm wide and 20cm deep; the walls were clay-lined and the base had a clay-covered sandstone lining. Within the confines of F2 the channel B31 was full of fine black charcoal. Outside the SW corner of F2 the channel B31 continued east-to-west for 1.1m to the point where it had been cut away by the construction of a brick-walled cellar. Outside F2 the fill of B31 was a clean mixture of red clay and broken tile.

Sited to the north of F2, the furnace F3 overlay the remains of F1 and was itself largely cut away by F4. A substantial portion of F3 was destroyed by the machine-cut trench B. The surviving portion was a shallow pit of similar proportions to F2, and was 2.1m wide on the north-to-south axis. Up to 1.4m of the west side of the pit survived from an estimated original width of c2m. The pit was up to 33cm deep. Like F2, the furnace F3 had been sub-rectangular in plan but it had more curving north and south sides. A conglomeration of soft yellow sand containing heat-fractured sandstone and tile remained along the south edge of F3.

A substantial mass of rubble sandstone blocks was located on the line of the mechanical trial trench B. The largest block of stone in this structure was 1.1m x 90cm x 25cm. This mass of stones extended into the available area from beneath the east section of trench B. It was c3.6m long from north to south, with two arms projecting to the west. The north arm of this structure projected towards the base of furnace F3. The south arm underlay the east edge of F2. the apparent structural relationship of these features suggests that the two furnaces F2 and F3 were contemporary with each other and with the stone feature B65. Although its surface was very uneven the latter is tentatively interpreted as the working floor on which molten metal from the furnaces was ladelled or poured into crucibles or casting pits. Pottery of a type which was produced in the 16th and early 17th centuries was found in B65.

When furnaces F2 and F3 were in operation the ground surface of B42 sloped gently south towards the river.

Furnaces F4 and F5 (plan M10)

An uneven layer of rubble sandstone blocks (B33) overlay B65, increasing the height of the surface of this feature by 15 - 30cm. Probably at the same time, the furnace F4 was built within the remnants of F3 and F5 was built over the site of F2.

The furnace F4 had been constructed largely within F3 but it was offset a little to the north. The north-to-south dimension was c2.2m overall and the surviving east-to-west dimension was 1.34m. A thin layer of red sandy material lined the base of F4 and this partly underlay the base of the furnace wall; this deposit was most probably the disintegrated remains of a sandstone base. Rubble sandstone, cobbles, tile and brick were together employed in a matrix of sand to

form the curving walls near the base of the furnace. Around the edges of the chamber, set into the angle between the base and the inside edge of F4, was a deposit of red clay which was packed with heat-fractured red sandstone blocks. This clay and stone deposit may have been an inner lining or re-lining of furnace F4.

The furnace F5 was set into the remains of F2 but was not as wide on the east-to-west axis. All that remained was the bottom of a sub-rectangular pit 1.9m wide east-to-west and 2.08m from north-to-south. Only a few small pieces of sandstone rubble survived from the lining of this furnace and these were sealed by B29, the material thrown into the base of F5 after it had been largely dismantled. B29 was a burnt or heat-discoloured sand and clay mixture containing charcoal and brick fragments along with patches of discoloured vegetable matter; fragments of fabric were recovered from this deposit (3.15). A coarse earthenware fragment of 17th-century type, and another with an internal lead glaze which might have been produced as recently as the late 18th-century were found in B29.

Furnace F6 and associated features (plan M9)

The furnace F5 was sealed by B13 - a deposit of sticky red and brown clay which was very thin to the north but 20cm thick over the remains of the furnace. It seems likely that this layer was introduced in a further attempt to elevate ground adjacent to the street, thereby once more reducing the risk of flooding.

Unlike F1-F5 the hearth/furnace F6 was roughly oval in plan and it had sloping sides which curved in towards a flat base at the centre. The width north-to-south was c2.05m. The base and sides of F6 were lined with sandstone and clay (B22). This was partly overlain on the north side by a thin deposit of mixed brown clay and broken tile (B21); this in turn was sealed by a mixed layer of sandstone,

brick and tile (B20). A layer of clay (B2), fired to various shades of pink and orange, overlay B20 and retained small pieces of rubble sandstone. Black charcoal (B3) overlay the centre of the hearth/furnace and charcoal was also found sealed between B2 and B20.

A narrow channel (B16) curved north from the north side of F6; it was 10cm wide and 8-10cm deep, with charcoal-stained sloping sides.

There was a small negative feature (B19) close to the point where the channel B16 joined F6. Up to 10cm deep and externally 35cm in diameter, B19 had small pieces of rubble sandstone packed against its sides, leaving a 25cm central space filled with a mixture of clay, charcoal and coal.

In the surface of B13, close to B19, was a depression (B27); this was circular in plan, 19cm in diameter, but only 2-3cm deep, with several small pieces of stone and tile set around the edge. B28 was a similar feature but the stones were less regularly disposed around the central depression. It was not clear whether these features were emplacements for posts or crude supports for crucibles.

As shown on plan M9, west of F6 a very shallow linear depression (B15) was filled with ash, coal, charcoal and sandstone rubble. South of F6 a narrow V-shaped groove and associated hole (B8) were cut into the surface of B13. A shallow negative feature (B10) containing loose mortar, dirty earth and rubble was intersected by a later hole (B11) which contained broken tile and brick beneath a spread of stiff sandy yellow mortar. These features were on the same alignment as the sandstone wall foundations B12 and B26.

Hearths F7 and F8 (plan M9)

A friable deposit of pink/red clay and sand filled the depression over the remains of F6. Overlying the south edge of F6, a single layer of broken bricks was all that remained of a hearth structure F7. A black-stained or burnt area 27cm wide indicated the limited scale of operations. It is possible that the bricks F7 represent the base of a small hearth, the superstructure of which was dismantled to be replaced by F8.

Overlying part of F7 was a layer of bricks (B6) and a large sandstone block in a hole (B5). Together these formed the base and two sides of F8 which succeeded F7; it was full of black ash and coal fragments.

(TAMWORTH 1978 MEESON)

INFORMATION ON FIELD SECTIONS NOT PUT ON FINISHED DRAWINGS

S51 L-R - LEFT HAND SIDE FIELD DRAWING

54? grey-brown stiff sandy, ch fl

58? ?

(below this: ? on left

sand

stiff grey silty sand

orange sand

250 fill green/black (pit or trench?)

Thick highest layer: black gritty, coal, charcoal tile

51 dirty brown soil

52 grey/black sticky smelly

53=32 dirty mixed stiff brown/mottled, small peb, s'stone 3-4cm

54=33 grey-green stiff sandy with ch and pebs

55 yellow/green sand

56 red clay

57=36 sticky brown sandy clay silt with ch

58 creamy/brown silty sand

59 yellow silty sand

60 brown silty sand

61 stiff grey silt

62 blue/grey silty

63 sand

64 stiff clay (62 and 64 merge to L into soft and water - saturated sand)

65 yellow silty sandy

66 soft and water-saturated sand

67 sand

68 ?

69 yellow sand

70 orange silty sand

71 soft and water-saturated sand

72 stiff grey silty clay; very fine particles (sample taken)

73 soft and water-saturated sand

74 soft and water-saturated sand

75 yellow/green sand

76a soft mixed silty sand

76b soft and water-saturated sand

77 ?clay

(S51 L - R continued) - RIGHT HAND SIDE FIELD DRAWING

23 fill is brown sandy soil

- to right of this cut - brown sandy soil at top = 26

- orange-brown sand = 27

- charcoal flecks

- grey/green silt with ch. fl. = 28

26 light brown sandy

27 orange-brown sand (grey sandy lens below this)

(charcoal flecks below this as

above under 23)

28 grey/green silt with ch. fl.

29 brown sand

30 dark grey/green silt, ch. fl.

30a brown sandy

32	mixed grey/green with red/orange sand and ch. fl.
33	grey/green soil, ch. fl.
34	pink/orange clay
35	turfy stiff sand
36	grey/green sand, ch. fl.
37	yellow/brown sand
38	orange sand
39	pebbly sand
40	grey/green clay
41	stiff grey silt
42	sand
43	organic
44	humic deposits in washed sand
45	washed sand
46	hard sand and pebbles
220	?washed sand
4	?(46 on field drawing)
47	orange clay
48	mixed green sand and red clay
49	green sand, few ch. flecks
50	orange sand
96	hard brown soil, red clay, charcoal
97	hard brown soil, yellow sand, charcoal
98	soft sandy brown soil
99	soft sandy light brown soil
100	black organic deposit
101	brown sandy, with clay
102	charcoal grey silty sand
103	yellow sand with red clay lenses

104 organic including grass

105 grey stiff silt

106 yellow sand and pebbles

107 grey/brown sand and pebbles

108 orange/yellow gritty sand

109 grey turfy sand - tinge of pink

110 grey turfy sand (= ?130 - see S52) (but see 130 below)

111 yellow/white sand

112 white, black and green hard, striated water-washed sand

113 grey-green sticky silt

114 stiff grey clayey silt (sample taken)

115 cream sand

116 very dark grey sandy silt, pebbles

117 orange and grey sand

118 red clay

119 stiff red clay, sand, pebbles, green intrusions

120 orange sandy clay with pebbles and grits

121 red sandy clay with pebbles and grits - friable

122 stiff red sandy clay with pebbles and grits

123 friable red clay, pebbles

124 dark grey and yellow mixed sands

125 yellow sand

126 stiff grey silt

127 friable red clay - natural

128 (=186?) hard red/brown clay with green intrustions - ?natural

- 'post-medieval stone-lined pit': clay and pebble-filled

183 ' -backed'??

(130) ?(=1210)(130 is on S52)(but 130 described as 'grey silty')

132 ?charcoal (not on field drawing, but dark on fair copy)

186 = 128 on field drawing? (128 now separate on fair copy)

S52 L - R

26	dirty dark brown/grey
31	dirty grey with coal
32	red/brown/grey mottled
33	(greenish on field drawing - no description)
36=169	
171	grey/brown sandy soil with pebbles
172	stiff brown and grey sandy mixed
173	brown sandy
174	grey sandy
175	silty sand (pale orange on field drawing)
176	grey organic
177	sand (?pale orange)
178	(pale orange on field drawing - no description - ?sand)
179	sand (?orange)
180	(pale orange on field drawing - no description - ?sand)
181	soft silty sand (pale orange?)
182	(no description, labelled 'recut') ?pale orange sand
234	yellow/brown mottled, sandy and a few pebbles
251	no description - orange-brown on field drawing
252	no description - orange-brown on field drawing
253	no description - orange-brown on field drawing
254	no description - orange-brown on field drawing
255	clean sand
4	no description - orange on field drawing
203b	no description - grey on field drawing
203c	no description - grey on field drawing
203d	no description - reddish on field drawing, but continuous with second 35 to left, which is shown as 'turf'

97 brown sandy

98 yellow/brown sandy

256 no description - dark reddish on field drawing + clay symbol

257 stiff brown sandy

258 stiff grey-brown silty

259 grey silt

260 yellow clay and sand

261 grey silt

129=109 (see S51) dark grey silty

130 grey silty

=112-113 (?) (see S51) laminated silty sands

114 stiff grey silt

116 grey silt with wood

150 (slot) no detail of fill

186 (natural) hard red clay; green lenses; gravel at base

S56

201 pebbly hard red/brown clay

232 yellow with pebbles

231 light brown fine-textured - becoming yellow to east

235 hard brown sand, turning pink to east

184 hard red/brown clayey

185 mixed brown sandy, clay and pebbles

MF TABLE III: 1971 FINDS IN CONTEXTS EXCEPT POTTERY
(numbers are serial in each category)(x = present)

CONTEXT	ST	Q	FL	FC	BC	MOR	PL	GL	SL	IR	CA	OM	CO	ORG	BOT	GR	CW	AB	WB	LE	Phase
L1											1		1								10
L1b									X	2			2					X			10
L2										3								X			9
L3																		X			9
L4					1				X												9
1										1								X			8
2				X														X			9
3	1			X														X			8
4				X			X		X									X			9
8				X																2	8
10					1																2-3
21										9-11											8
23a-h																	3, 15				5a
31									X	4				1			8	X			9
35									X												10
38																				1	10
39				X																6	9
47				1																	10
48												1									7
50			1															X			5b
53				3,4 X																	5b
54												6									5b
56	X			X										2							10
57															X						10

CONTEXT	ST	Q	FL	FC	BC	MOR	PL	GL	SL	IR	CA	OM	CO	ORG	BOT	GR	CW	AB	WB	LE	Phase
58				X					X	5, 6, 7, 15								X			9
62																					1 & 5a
65										14											7
66				6																	5b
76				X														X			5b
77																		X			9
82										13								X			5
83				X																	1
86				X																	9
87				X			X		X												8
91				X					X												8
92				X					X 1			3						X	8		8
93																		X			8
94																		X			8
97										12								X			8
99										8											5a
101			X																		6
102									X												8
104	2	12D																			4
105	3	12E																			4
106	4	22																			4
107											2										4
109																?5 12					4
111	5	10 18 21																			4
113			X																		8

CONTEXT	ST	Q	FL	FC	BC	MOR	PL	GL	SL	IR	CA	OM	CO	ORG	BOT	GR	CW	AB	WB	LE	Phase
136																	11				8
137					X							4									8
139				X								4									8
139a										23										4	8
141					2																3
142	X			X			X	1											X	3	10
143																		X			5a
144																	4				4
147																				5	8
150	X	1-11, 13, 15-17, 19, 20		2, 7,	3, 4							5					1, 2				4
152																	12				4
154										24							14				4
155										17					X						2
170a		1 10 10a			5							7			X						4
176b																	5				4
183		14																			4
190c																	10				4
198				X																	7
199																		X		7	9
219						1															5b
224																		X			5b
226										16											4
239																	9				4
240				5																	5b

CONTEXT	ST	Q	FL	FC	BC	MOR	PL	GL	SL	IR	CA	OM	CO	ORG	BOT	GR	CW	AB	WB	LE	Phase
241																	6, 13				3
241a																X					3
255					6					18-22							7				2
260															X						?2
265		12F														X					5b
266															X						8
273		12G																			4
427									X												10

MF 3.1 STONE CATALOGUE by Susan M Wright

MILLSTONES

(Maximum surface measurements of frs without intact edges are given in the order (1) at right angles to circular wear x (2) approximately parallel with wear)

Quern no	Con-text	Description
Q1,	111,	Nearly complete upper stone, comprising 20 joining frs.
Q10, Q10A	150, 170	Uneven, upper surface, slightly convex at edge, with collar/flange around central hole. Smoother, lower, grinding surface shows only limited circumferential wear and only on the outer track. The inner track is delimited by a pronounced circular groove, with a fairly sharp 'V', rather than 'U', shaped section. Inside this groove, the stone is thicker and this thicker area, ie the inner track, is 32.5 cm in diameter, measured on the lower grinding surface. 2 opposed rynd sockets to take a 2-winged rynd survive around central hole. Sockets worn, 1.5 to 2 cm deep, 6 cm wide, 6.5+ cm long. Rynd diameter is 24 cm.

Vertical and horizontal tool marks survive particularly well on the edge of one rynd socket (pl XIV); similar vertical tool marks survive on the Q23 rynd.

Very close to the central hole or eye is a very shallow, smooth, circular depression/'valley', which fades almost to nothing close to one rynd slot and which appears to be slightly eccentric to the eye. At its most pronounced (see right-hand section), this feature consists of a slope down towards the eye with a very slight lip at the end of the slope. Overall diameter of this feature c 13 cm.

The very slight, curving, linear depression originating at one corner of a rynd socket is too limited in extent and too shallow to compare it with the pronounced grooves in a similar position on the Keuper Sandstone uppers (Q3, Q4, Q13/Q17, Q23); interpreted as wear. At outer edge 5 cm thick, at highest surviving point of collar 7 cm thick.

Outer edge to interior of collar 32 cm, maximum diameter of central hole 8 cm, giving stone diameter of c 72 cm which is also suggested by curve of outer edge. 46 cm of circumference survives. Weight of extant frs c 26.5 kg. Stone blackened, ? by burning, after breakage.

Coal Measures Sandstone (DFW)

Figs 58-9

Phase 4

Q2 150 1 fr from outer edge; with 1 uneven surface, slightly convex at edge, and 1 smoother surface, with faint traces of circular wear, but no obvious curvature. At outer edge c 3.5 cm thick, 16 cm in from outer edge 4 cm thick; c 12 cm of circumference survives, diameter c 60+ cm but could be as large as 80 cm.

Coal Measures Sandstone (DFW)

Not illustrated

Phase 4

Q3 150 Part of upper stone, comprising 3 joining frs (used in museum exhibit with rest of stone restored so obscuring broken edges and part of upper surface) and 1 fr from outer edge.

Uneven, upper surface, slightly convex where thinner at outer edge.

Smoother, lower, grinding surface shows marked, circular wear on (slightly convex) outer portion of surface (the outer track). A pronounced, smooth, U-shaped section, circular groove delimits a central area with no circumferential wear (the inner track) and forms an arc between the outer corners of the surviving sockets. This inner track is thinner than the outer track. Part of each of 2 rynd sockets at approximately right angles to each other, and to central hole, survives, indicating originally 4 sockets for a 4-winged rynd, or perhaps 1 pair of opposed sockets original and other pair secondary for successive 2-winged rynds. Differential wear on vertical edges of sockets and on inner groove would correspond with clockwise motion of this upper stone (and clockwise motion of the wheel). Sockets c 2 cm max deep, 5+ cm wide, 9.6+ cm long (maximum surviving width and length).

Rynd diameter therefore c 28 cm.

At outer edge c 4.5-5 cm thick, maximum thickness 6 cm.

Outer edge to central hole 30 cm, central hole restored as diameter 9 cm, suggests stone diameter of c 69 cm; pronounced circumferential wear and projection of 'wings' of rynd suggest stone diameter of 70 cm.

30 cm of circumference survives, but outer edge probably worn or damaged (note eccentricity of surviving outer edge compared to wear pattern).

Keuper Sandstone (DFW)

Fig 60

Phase 4

Q4 150 Part of upper stone, comprising 2 joining frs.

Uneven, upper surface.

Smoother, lower, grinding surface shows marked circular wear on concave outer track. A pronounced, smooth, U-shaped section, circular groove delimits a central area with no circumferential wear, the inner track, and arcs from the outer corner of the 1 rynd socket which survives in part.

Socket c 1.5 to 2 cm deep, either c 6 or 4.5 cm wide, 8+ cm long (maximum surviving length); socket worn, especially towards outer edges. The central area (inner track) was probably originally thinner (cf Q3) than the outer, grinding surface area which appears now concave. At outer edge 3.5 cm thick, maximum thickness 7.2 cm.

42 cm of circumference survives, curve of outer edge suggests stone diameter of c 87 cm. Stone is worn close to central hole; taking

the edge to be that of the central hole (which it possibly but not certainly is), outer edge of stone to central hole is 34 cm, giving minimum stone diameter of approx 70+ cm.
But extending length of rynd socket to match that on Q3, ie to c 10 cm, would give stone diameter of c 80 cm.
Weight of extant frs c 9.5 kg.

Keuper Sandstone (DFW)
Fig 60 partial reconstruction shows 1 pair of opposed sockets, but could equally have had 4 sockets (see Q3).
Phase 4

Q5, Q8 150 5 joining frs, from outer edge of stone, with 1 uneven surface, convex where thins towards outer edge, and 1 smoother, worn surface. At outer edge 3-3.5 cm thick, at 14 cm in from outer edge 5 cm thick.
36 cm of circumference survives, curve suggests stone diameter of c 70 cm.

Coal Measures Sandstone (DFW)
Not illustrated
Phase 4

Q6 150 1 fr, from outer edge of stone, with 1 worn surface, slightly convex near edge, the other side missing its original surface but slightly convex towards outer edge. At 14 cm in from outer edge 4+ cm thick. 9 cm of circumference survives.

Coal Measures Sandstone (DFW)

Not illustrated

Phase 4

Q7 150 2 joining frs, from outer edge of stone, with 1 uneven surface, slightly convex near edge, and 1 smoother, grinding, surface showing circular wear.
The grinding surface is slightly concave and then thickens in from outer edge; probably an upper stone (compare Q4 section, fig 60). At outer edge 35 mm thick, 14 cm in from outer edge 6 cm thick. 8 cm of circumference survives.

Keuper Sandstone (DFW)

Not illustrated

Phase 4

Q9 150 2 joining frs, from outer edge, with 1 uneven surface, convex at edge, and 1 very smooth, grinding, surface which shows circular wear; stone thickens in from outer edge. Possibly a lower stone. At outer edge 3 cm thick, 15 cm in from outer edge 7 cm thick. 22 cm of circumference survives, curve suggests stone diameter of c 70+ cm, could be c 80 cm. Yellow ? iron staining on exterior, orange-red on fracture; cf Q11, Q14, Q20.

Coal Measures Sandstone (DFW)

Not illustrated

Phase 4

Q11 150 3 joining frs, from outer edge of stone, with 1 uneven surface, convex at edge, and 1 smooth, grinding surface showing circular

wear. Grinding surface is slightly concave and thickens in from outer edge; probably an upper stone (compare Q4, fig 60, and see also Q7, above).

At outer edge 3.5 cm thick, 14 cm in from edge 5.5 cm thick.

28 cm of circumference survives, curve suggests stone diameter of c 74 cm, could be c 80 cm. Stone blackened; yellow ? iron staining on fractures.

Coal Measures Sandstone (DFW)

Not illustrated

Phase 4

Q12A-G Much thinner stone(s), ? used to limit. Q12A, C, F, G: probably frs upper stone(s) used with smaller diameter lower stone(s).

Q12A 180 1 fr, no certain intact edges, with 1 uneven surface and 1 very smooth, grinding, surface showing circular wear.

12 x 10 cm fr; 3 cm thick, thinning to 2 cm thick where 'lip' begins on grinding surface towards ?outer edge; similar to Q12G; probably an upper stone.

Mayen-Niedermendig lava (DFW)

Not illustrated

Phase 4

Q12B 184 1 fr, no intact edges, with 1 uneven surface and 1 very smooth, grinding, surface showing circular wear. 6 x 24 cm fr; 4 cm thick (thickest of lava frs).

Mayen-Niedermendig lava (DFW)

Not illustrated

Phase 4

Q12C 150 1 fr, no intact edges, with 1 uneven surface and 1 very, very smooth, grinding, surface showing circular wear and beginning of 'lip'; similar to Q12G; probably an upper stone. 10 x 14 cm fr; varies 1.7 to 2.5 cm thick.

Mayen-Niedermendig lava (DFW)

Not illustrated

Phase 4

Q12D 104 (ST2) 1 fr, no intact edges, with 1 uneven surface and 1 smooth, grinding, surface showing some wear. 9 x 21 cm fr; 3 cm thick thinning to 2 cm thick.

Mayen-Niedermendig lava (DFW)

Not illustrated

Phase 4

Q12E 105 1 fr, no certain intact edges, with 1 uneven surface and 1 smooth, grinding, surface showing some traces circular wear. 7 x 11 cm fr; 3.5 cm thick.

Mayen-Niedermendig lava (DFW)

Not illustrated

Phase 4

Q12F 265 1 fr, ? from outer edge of stone or close to edge, with 1 uneven surface and 1 smooth, grinding, surface showing circular wear. 11.5-12.5 cm fr; 2.5 cm thick thickening to 3.5 cm thick where 'lip' begins on grinding surface towards outer edge; similar to Q12G; probably an upper stone. If this is outer edge, 12.5 cm of circumference survives, curve suggests stone diameter of c 65-80 cm.

Mayen-Niedermendig lava (DFW)

Not illustrated

Phase 4

Q12G 273 1 fr, ? from outer edge of stone or close to edge, with 1 uneven surface and 1 smooth, grinding, surface showing circular wear. 18 x 18 cm fr; 3 cm thick; where 'lip' begins on grinding surface towards outer edge 'lip' varies 2.7 to 4.5 cm thick.

Probably an upper, rather than a lower, stone; ?the thicker lip the result of differential wear where this - upper - stone was wider than the lower stone. Presumably the lower stone was a smaller diameter (c 10-12 cm smaller) all round. (If the upper stone overhung the lower on only one side because the two stones were not held firmly enough to prevent this degree of play, the upper would not rotate. If the lower had been larger and so 'lipped', the lip would have made it difficult for the flour to escape).

If this is outer edge, 18 cm of circumference survives and curve suggests stone diameter of c 70-80 cm. Weight c 1.5 kg.

Mayen-Niedermendig lava (DFW)

Fig 61

Phase 4

Q13, Q17 150 4 joining frs, no intact edges, from inner and middle areas of an upper stone. Uneven, upper surface. Smoother, lower, grinding surface showing slight traces circular wear on outer track. On the grinding surface a pronounced, smooth, U-shaped, curving groove delimits a central area which appears as a raised area or 'platform', although the stone itself is thinner here (in contrast to Q3, Q4, fig 60).

This groove arcs between the outer corners of the surviving rynd sockets. Differential wear on this groove at its junction with 1 socket corresponds with that on Q3 (fig 60). Part of each of certainly 1 and probably 2 rynd sockets at approximately right angles to each other survives (similar to Q3). 2 circumferential, very, very shallow, broad, hemispherical-section valleys/depressions can be distinguished on the raised inner track (see Q23, fig 61 for similar).
24 x 31 cm fr; maximum thickness 7 cm, towards centre thinning to 50 mm.
Stone blackened on grinding surface and fracture. Very similar to Q23; ? from same upper stone.

Keuper Sandstone (DFW)

Fig 61 Illustrated with Q23

Phase 4

Q14 183 2 joining frs, no intact edges, with 1 very uneven surface possibly broken and 1 smoother but still uneven surface. 20 x 18 cm fr; maximum thickness 7+ cm. Yellow-orange ? iron staining shows on fractures.

Coal Measures Sandstone (DFW)

Not illustrated

Phase 4

Q15 150 1 fr, no intact edges, with 1 incomplete broken surface and 1 smoother, grinding, surface showing slight traces of circumferential 'ridging' between broad, shallow, circular wear grooves. Grinding surface is slightly convex; possibly a lower, rather than an upper, stone.
15 x 14 cm fr, maximum thickness 6+ cm.

Keuper Sandstone (DFW)

Not illustrated

Phase 4

Q16 150 1 fr, no intact edges, with 1 uneven surface and 1 smoother, grinding, surface showing slight circumferential 'ridging' between broad, shallow, circular wear grooves (for similar see Q15). 7 x 8 cm fr, maximum thickness 3.4 cm. Grinding surface blackened. ?Modern chip.

Keuper Sandstone (DFW)

Not illustrated

Phase 4

Q18 111 1 fr, no intact edges, with 1 flat uneven surface, roughly pecked, and 1 smoother surface with a circumferential, shallow, smooth valley/depression (0.4 cm deep); inside the curve of this depression the stone appears thinner than outside.

Not an upper stone with an upstanding collar; cf Q1/Q10/Q10A upper stone (Coal Measures Sandstone as Q18) which has a raised collar on the upper surface but both collar and upper surface are only roughly dressed.

See rather the circumferential groove arcing between the outer corners of the rynd sockets on the smooth grinding surface of each of the upper stones Q3, Q4, Q13/Q17, Q23 (all Keuper Sandstone) (figs 60-1); most closely resembles Q4 section (fig 60). On this analogy therefore an upper stone. However, this fragment might be interpreted as from the centre of a lower stone if we imagine a slight cone at the centre of the lower stone on the grinding surface (as seen on, eg, modern rotary hand querns from Scotland and ?the Hebrides).

——— The circular depression on the grinding surface of the upper stone Q1/Q10/Q10A might then be interpreted as the negative of this feature on the lower stone. 9 x 11.5 cm fr, maximum thickness 73 mm.

Coal Measures Sandstone (DFW)

Fig 61

Phase 4

Q19 150 3 joining frs, from outer edge of stone, with 1 uneven surface, partly broken, slightly convex at outer edge, and 1 smoother, grinding, surface, partly broken, showing slight traces circular wear. Grinding surface is very slightly convex at outer edge where ?weathered; ? a lower, rather than an upper, stone.
20 x 15 cm fr, at outer edge 5 cm thick, maximum thickness 6 cm.
15 cm of circumference survives, curve suggests stone diameter of approx 65-75 cm.

Coal Measures Sandstone (DFW)

Not illustrated

Phase 4

Q20 150 2 joining frs, no certain intact edges, with 1 uneven surface and 1 smoother, grinding, worn surface. No wear pattern.
8 x 20 cm fr, varies 5.5 to 7.5 cm thick. Stone blackened; yellow-red ? iron staining on fractures.

Coal Measures Sandstone (DFW)

Not illustrated

Phase 4

Q21 (ST5) 111 1 fr, from outer edge of stone, with 1 uneven surface very slightly convex at outer edge, and 1 smoother, grinding, surface showing slight traces circular wear and thickening very slightly at outer edge. ? Upper, rather than a lower, stone.
At outer edge 4.8 cm thick, 13 cm in from outer edge 4.6 cm thick.
14 cm of circumference survives but partly broken, curve suggests stone diameter of c 60+ cm.

Coal Measures Sandstone (DFW)

Not illustrated

Phase 4

Q22 (ST4) 106 1 fr, no intact edges, with 1 uneven surface and 1 smoother, grinding, surface showing circular wear and a very, very shallow, circumferential depression.
8 x 13.5 cm fr, varies 4.1 to 4.7 cm thick.
Wear suggests very approx stone diameter of c 55 to 65 cm.

Coal Measures Sandstone (DFW)

Not illustrated

Phase 4

Q23 150 2 joining frs, no intact edges, from inner track of an upper stone. Uneven, upper surface. Smoother, lower, shaped surface, partly broken; shaped surface has one, smooth, U-shaped section, curving groove meeting at c 45 degrees the edge of an incomplete rynd socket (? incomplete because of subsequent use/damage). Vertical tool marks can be seen on the vertical edge of the socket; see Q1 for similar (pl XIV). In the 'triangle' between groove and socket can be distinguished 2 circumferential, very shallow, broad, hemispherical-section valleys/depressions corresponding with features on Q13/Q17 (fig 61); ? from the same upper stone as Q13/Q17.
17 x 8 cm fr, maximum thickness 0.6 cm. Blackened stone.

Keuper Sandstone (DFW)

Fig 61

Phase 4

OTHER STONE

ST1 3 Whetstone, perforated for suspension ? from eg a belt. 7 cm long x 1.8 cm wide x 0.3 to 0.6 cm thick; perforation diameter 0.5 cm.

Mica schist

Fig 67

Phase 8

Millstone petrology

by D F Williams

(HBMC Ceramic Petrology Project)

Department of Archaeology, University of Southampton

Lava

Q 12A (180)

Q 12B (184)

Q 12C (150)

Q 12D (104)

Q 12E (105)

Q 12F (265)

Q 12G (273)

The above comprise various fragments of a grey, fairly coarse vesicular lava, containing conspicuous dark phenocrysts of pyroxene. A sample of Q 12D (104) was thin sectioned and studied under the petrological microscope. This revealed that the most prominent minerals are frequent grains of green and colourless clinopyroxene, mainly augite, set in a groundmass of small lath-shaped crystals of andesine/labradorite felspar, opacite, leucite and some xenomorphic nepheline. The composition of the rock is particularly distinctive and it can be classified as a nepheline-tephrite. This type of rock is found in the lavas of the Mayen-Niedermendig area of the Eifel Hills of Germany, a region well-known in both Roman and Saxon times for supplying quernstones and millstones (Parkhouse 1977; Kars 1980; Peacock 1980). The Tamworth lava stones undoubtedly originate from this part of Germany, as previously suggested by visual inspection. Ramsbury (Williams 1980) and Northampton can be added to Parkhouse's (1977) distribution map of Mayen/Niedermendig lava quernstones in Saxon England.

The remaining fragments of millstones can be divided into two distinctive petrographic groups, one of Keuper Sandstones and the other of Coal Measures Sandstones. It should be noted that none of these fragments are of Millstone Grit mentioned in previous publications (eg Rahtz and Sheridan 1971; Wilson 1976).

Keuper Sandstone

Q3 (150) (Exhibit on display at Castle Museum, Tamworth)

Q4 (150)

Q7 (150)

Q13/Q17 (150)

Q15 (150)

Q16 (150)

Q23 (150)

Moderately hard, medium to coarse-grained reddish or greyish-buff felspathic sandstone. This type of rock can be found in the Keuper Sandstones of the Midlands area. A fairly local source to Tamworth for this material is therefore quite possible (1" series Geological Survey Sheet 154).

Coal Measures Sandstone

Q2 (150)

Q5/Q8 (150)

Q6 (150)

Q9 (150)

Q1/Q10/Q10A (150)

Q11 (150)

Q14 (183)

Q18 (111)

Q19 (150)

Q20 (150)

Q21 (106)

Q22 (111)

Fairly hard, medium-grained greyish well-cemented sandstone with visible inclusions of green chlorite and/or mudstone. This type of rock can be found in the Carboniferous Coal Measures areas of the Midlands. A fairly local source to Tamworth for this material is again quite possible (1" series Geological Survey Sheet 154).

I should like to thank Dr R W Sanderson of the Petrographic Department of the Institute of Geological Sciences for his valuable help in the identification of this material.

MF 3.2 FIRED CLAY (FC)

List		Context
FC 1	Clay pipe fragments, three of bowl and five of stem, 17th century.	47 (10)
FC 2	Brick fr, ?Roman or ?Saxon; 10.2 cm x 10+ cm in section, x 17+ cm long; coarse red gritty with lumps of red ?marl or grog and yellow and and lime and ?volcanic dark inclusions; sanded finish on extant edges with traces of wood formers.	150 (4)
FC 3	3 joining brick frs, ?Roman or ?Saxon, 11.8 cm x 7.8 cm in section x 13.5 cm + long; coarse dark gritty red with sanded surfaces and remains of dark blue-grey mortar - possibly post-Saxon?	53 (5b)
FC 4	Fr 4.5 cm max dimension; similar visually to piece from 150 above	53 (5b)
FC 5	Roman tegula fr (fig 64)	240 (5b)
FC 6	Roman brick fr	66 (5b)
FC 7	Roman brick fr	150 (4)

FC is also recorded from other contexts as follows:

Context	Phase	
2	(9)	3 frs tile
3	(8)	Fr 'Mid'.and Purple' tile
3	(8)	tile
4	(9)	tile
8	(8)	brick
39	(9)	tile
76	(5b)	tile
83	(1)	?Roman tile
86	(9)	tile
92	(8)	tile (ridge)
101	(6)	2 frs light-coloured tile with specks of yellow glaze
113	(8)	2 frs tile with fluting
139	(8)	tile fr
142	(10)	tile
198	(7)	2 frs tile

MF 3.8 ADDENDUM

Dr Arthur P Dunn P Eng, C Eng of 1287 Castlehill Crescent, Ottawa, K2C 2B2, Ontario, Canada, wrote in 1983:

'The bearing metal has a roughly conical hole in it which it is assumed represents the thrust bearing for the wheel, the size of this cone is 22 mm in diameter and about 15 mm deep. I would like to suggest that you do some calculations of the possible total load that might be resultant of the upper stone, the rynd, and the shaft and wheel's weight upon that bearing, and then considering that inevitably the bearing being under water, and not being properly lubricated, whether it could actually carry the load that is suggested.

From my own calculations of similar bearings I feel certain that the bearing described would not function; it might very well become red hot in operation and thus create the degree of hardening that Trent (1975) refers to in his paper'.

The total load is estimated to be in excess of 60 kg. The Moycraig wheel and paddle assembly, now in the Ulster Museum, weighs c 62 kg but is quite massive, compared with the reconstruction suggested in figs 93-4. The dead weight would be reduced somewhat by (a) the wheel-assembly 'semi-floating' in the water around it; and (b) by the upper stone 'floating' on the grinding grain/lower stone. We were also informed by one engineer after a public lecture that water is quite a good lubricant for iron; no other lubricant was, as far as is known, used in the Dounby mill, which has steel male and female bearings. Water would also act as a coolant.

Dr Dunn wrote again later in 1983.

'I have now had considerable discussions with persons who are involved with research into the design of bearings and metallurgy, and also considered the possible manufacturing methods that would have been available to the constructors of such a mill at about the date it was built.

It is interesting that although the person engaged in bearing research was not provided with all the information that was reported in the report of Historical Metallurgy (Trent 1975) he came to the final conclusion that under the conditions that would have applied it would have failed by seizure, which is what had actually happened, as shown by the earlier hole on the reverse side of the bearing block. Water does provide a very good means of conducting the heat that might have been caused by the energy released in the process of seizure so that seizure would have been delayed to some degree, possibly allowing the bearing to wear appreciably before failure.

The total bearing pressures according to my own calculations would have been extraordinarily high and of the order of 3 to 5 tons/sq in.

There are other forces that have to be taken into consideration and those would be largely resulting from the centrifugal forces acting upon the rotating wheel of that size, particularly those that might be due to imbalance of the rotor. Attention has been drawn by early writers to this problem so it should not be ruled out'.

Table V POTTERY FROM MILL ~ Phases 4~7 ~ Quantification

PHASE		4		5		6		7	
QUANTITY		No shs	Wt gm Min/Max	No shs	Wt gm Min/Max	No shs	Wt gm Min/Max	No shs	Wt gm Min/Max
FABRIC									
Major groups :									
Sandy ~									
(i) light bodied sandy	~ fabric 1							4	96 4/4
(iii) reduced sandy unglazed	~ fabric 3			2	25 1/2	14	144 3/6	1	4 1/1
(iv) reduced sandy glazed	~ fabric 4					7	56 /		
Stamford Ware				21	125 9/9			20	75 9/9
Minor groups :									
Oxidised sandy ~									
(i) light bodied	~ fabrics 10,14,16,18,28,38,39,47,54			1	7 1/1	2	72 1/1	1	10 1/1
(ii) pink	~ fabrics 17,23,41,43,50								
(iii) orange	~ fabrics 2,25,33,42,46,53								
Reduced sandy ~									
(i) related to reduced sandy unglazed fabric 3	~ fabrics 19,24,29,59	2	2 1/1	1	4 1/1			1	4 1/1
Shelly	~ fabrics 12,15	1	26 1/1	1	5 1/1				
TOTAL		3	28 2/2	26	166 13/14	23	212 5/8	27	189 16/16

Table VI POTTERY FROM MILL ~ Phases 8 ~ 10 and unphased ~ Quantification

PHASE	8			9			10			unphased			Total : Phases 4-10 and unphased		
QUANTITY	No shs	Wt gm	Min/Max	No shs	Wt gm	Min/Max	No shs	Wt gm	Min/Max	No shs	Wt gm	Min/Max	No shs	Wt gm	Min/Max
FABRIC															
Major groups :															
Sandy ~															
(i) light bodied sandy ~ fabric 1	229	5620	41/66	318	6,609	47/70	5	54	2/2	5	152	2/3	561	12,531	96/145
(ii) light bodied moderately sandy ~ fabric 6	62	1406	15/33	49	823	12/27	6	160	5/5	1	30	1/1	118	2,419	33/66
(iii) reduced sandy unglazed ~ fabric 3	55	1046	15/32	9	225	3/5	3	136	2/2	1	40	1/1	85	1620	26/49
(iv) reduced sandy glazed ~ fabric 4	12	198	2/3	9	266	3/4							28	520	6/8
Stamford Ware	1	10	1/1				1	12	1/1				43	222	20/20
Minor groups :															
Oxidised sandy ~															
(i) light bodied ~ fabrics 10,14,16,18,28,38,39,47,54	3	152	1/2	6	115	2/2				1	28	1/1	14	384	7/8
(ii) pink ~ fabrics 17,23,41,43,50	2	29	1/1	1	4	1/1	2	85	2/2				5	118	4/4
(iii) orange ~ fabrics 2,25,33,42,46,53	1	4	1/1	2	30	2/2	1	72	1/1				4	116	4/4
Reduced sandy ~															
(i) related to reduced sandy glazed fabric 3 ~ fabrics 19,24,29,59	3	86	1/1				1	8	1/1				8	104	5/5
(ii) various ~ fabrics 9,34,35,37,51,52	7	275	5/6										7	275	5/6
Shelly	1	35	1/1										3	66	3/3
Late medieval / early post-medieval wares :															
Midland Purple ~ fabric 110	4	400	1/1	2	140	2/2							6	540	3/3
Cistercian ~ fabrics 22,109				2	37	2/2							2	37	2/2
Miscellaneous ~ fabrics 20,32,36,40,44,48,49	3	48	2/2	4	212	1/1	1	20	1/1				8	280	4/4
Post-medieval :															
Midlands Yellow ~ fabric 100							4	130	2/2				4	130	2/2
German Stoneware ~ fabric 101							2	52	1/1				2	52	1/1
Staffordshire Slipware ~ fabric 102							2	66	2/2				2	66	2/2
Streaked / Mottled ware ~ fabric 103							1	34	1/1				1	34	1/1
Red bodied Black / Brown glazed ware ~ fabric 104				5	153	5/5	25	1888	16/25				30	2041	21/30
Midlands Black ~ fabric 107							5	61	5/5				5	61	5/5
TOTAL	383	9309	87/150	407	8,614	80/121	59	2778	42/51	8	250	5/6	936	21,616	250/368

Table VII POTTERY FROM MILL ~ Phases 4-10 Forms and Fabrics

Form / Fabric	cooking pot/jar NO SHS	cooking pot/jar WT GM	cooking pot/jar MI/MA	jug NO SHS	jug WT GM	jug MI/MA	baluster jug NO SHS	baluster jug WT GM	baluster jug MI/MA	storage vessel NO SHS	storage vessel WT GM	storage vessel MI/MA	bowl NO SHS	bowl WT GM	bowl MI/MA	tripod pitcher NO SHS	tripod pitcher WT GM	tripod pitcher MI/MA	pipkin NO SHS	pipkin WT GM	pipkin MI/MA	pot ~ general NO SHS	pot ~ general WT GM	pot ~ general MI/MA	crucible NO SHS	crucible WT GM	crucible MI/MA	counter NO SHS	counter WT GM	counter MI/MA	Stamford spouted pitcher, collared ves. NO SHS	Stamford spouted pitcher, collared ves. WT GM	Stamford spouted pitcher, collared ves. MI/MA	Bellarmine NO SHS	Bellarmine WT GM	Bellarmine MI/MA	cistern NO SHS	cistern WT GM	cistern MI/MA	hollow-ware NO SHS	hollow-ware WT GM	hollow-ware MI/MA	flat ware NO SHS	flat ware WT GM	flat ware MI/MA	cup NO SHS	cup WT GM	cup MI/MA	TOTAL NO SHS	TOTAL WT GM	TOTAL MIN/MAX
LIGHT BODIED SANDY	202	5265	50/70	246	3951	34/63	44	1300	2/2	2	16	1/1	11	710	3/3							54	1213	4/4	1	12	1/1	1	64	1/1																			561	12,531	96/145
LIGHT BODIED MOD SANDY	51	1326	9/25	63	997	20/37				1	16	1/1	2	28	2/2				1	52	1/1																											118	2419	33/66
REDUCED SANDY UN-GL.	85	1620	26/49	26																																											85	1620	26/49
REDUCED SANDY GLAZED																21	328	5/7				7	192	1/1																								28	520	6/8
STAMFORD	5	30	5/5										2	10	1/1							15	49	11/11							21	133	3/3															43	222	20/20
OXID. SANDY LT. BODIED	3	38	4/4	7	166	2/2																4	180	1/2																								14	384	7/8
OXI D. SANDY PINK				2	23	2/2																3	95	2/2																								5	118	4/4
OXI D. SANDY ORANGE	1	14	1/1	1	22	1/1							1	72	1/1							1	8	1/1																								4	116	4/4
REDUC. SANDY RELATED F. 3	4	10	3/3	3	86	1/1																1	8	1/1																								8	104	5/5
REDUC. S'DY VARIOUS	7	275	5/6																																												7	275	5/6
SHELLY	3	66	3/3																																												3	66	3/3
MIDLAND PURPLE																						2	140	2/2														4	400	1/1								6	540	3/3
CISTERCIAN																																														2	37	2/2	2	37	2/2
MISC. LATE MED/P.M.	3	40	2/2										4	212	1/1							1	28	1/1																								8	280	4/4
MIDLANDS YELLOW																																														4	130	2/2	4	130	2/2
GERMAN STONEWARE																																					2	52	1/1										2	52	1/1
STAFFORD SH. SLIPWARE																																									2	66	2/2						2	66	2/2
STREAKED MOTTLED W'E																																													1	34	1/1	1	34	1/1
RED BODIED BLACK/BR. GL.																						30	2041	21/30																								30	2041	21/30
MIDLANDS BLACK																						5	61	5/5																								5	61	5/5
TOTAL	364 / —	8684 / —	108/168	322	5245	60/106	44	1300	2/2	3	32	2/2	20	1032	8/8	21	328	5/7	1	52	1/1	123	4015	50/60	1	12	1/1	1	64	1/1	21	133	3/3	2	52	1/1	4	400	1/1	5	164	3/3	2	66	2/2	2	37	2/2	936	21,616	250/368

1978 LEAT AREA: CATALOGUE OF POST-MEDIEVAL CERAMICS

by David Baker and Bob Meeson

1978

Post-Medieval Ceramics from Area B

Context	Description	Date/century
B+	Black wares: 2 fragments.	Late 18C
	Cylindrical storage jar with internal black glaze.	17-19C
	Cream ware sherd.	Early 19C
	8 sherds from mottled ware cup.	Late 17-early 18
	Sherds from cylindrical cups or mugs. Dark brown lead/manganese glaze.	17-18C
	Lead-glazed coarse ware: 8 sherds inc. strap handle.	17-18C
	Blackware sherds inc. cylindrical cup & round-bodied cup. (Stoke?). Press-moulded white fabric. Embossed decoration picked out in dark brown slip over cream slip; lead-glazed. Press-moulded slip-ware, trailed and combed.	Late 17C-c 1730
	Slipware cup fragment.	1660-1730
	Thrown slipware dish with lead glaze.	c 1660-1730
	Light brown Cistercian ware: lead-glazed wall sherd + handle. Chafing dish?	
B4	Pink fabric with cream slip coat inside and out: lead-glazed over slip trail.	Mid 17C-c 1730

B11	Yellow-ware: rim sherd.	Late 16-mid 17C
	Brown salt-glazed stoneware: Tin-glazed Delftware: plate.	18C
	Base of butter pot? Coarse earthenware with internal lead glaze; over-fired dark fabric.	
	Pearlware: underglaze blue transfer-printed rim fragment from bowl.	Late 18-early 19C
B12	Hard orange earthenware: unglazed handle.	17-18C
B13	Cistercian-ware base: over-fired.	Late 15C - c 1640
B14	Black wares, probably all Stoke, inc. 3-handled cup. Porringer or round-bodied cup.	c 1660-1720
	Mottled ware: 3 fragments from cup or tankard.	c 1670-early 18C
	Salt-glazed stoneware, probably Stoke.	c 1700-1720
	Trailed slipware: buff fabric; brown slip coating with cream slip trailed on top; small cup?	1660-1720
	Tin-glazed earthenware, possibly a drug jar. London?	c 1660-1730
	Coarse earthenware sherd with internal brown lead glaze; over-fired.	17-18C

B20	2 coarse earthenware sherds, one with glaze, one without.	early-mid 17C
B23	Very hard fabric in style of slipware dishes from Stoke.	c 1680-1720
	2 similar sherds but not Stoke.	
	Midlands Yellow rim sherd from dish.	late 16-mid 17C
	Wall sherd: dark red fabric, dark glaze inside and out; from multi-handled cup or posset pot.	
	Wednesbury?	
	Two sherds mottled ware; probably Stoke.	Early 18C
	Pink fabric, brown lead glaze; 2 wall sherds.	Mid 17-18C
	Tile? white and blue tin-glazed.	c 1660-1730
B29	Coarse earthenware base/wall fragment; internal lead glaze.	late 18C?
	Coarse earthenware fragment.	17C?
B30	Coarse earthenware wall sherd: black glaze.	late 18C
	Everted rim of dish: dark red slip under brown lead glaze.	mid-late 18C
	Wall sherd: buff fabric, lead glaze.	17-18C
	Unglazed coarse earthenware wall sherd & part handle.	17-18C
	Earthenware rimsherd with pale yellow glaze: a late yellow-ware.	late 18-early 19
B36/37	2 small fragments hard grey earthenware similar to Midland Purple.	early 17C?

B66	Earthenware fragment.	16-17C?
B69	Fragment of black ware.	c 1660-1730
B71	Coarse earthenware dish: black lead glaze.	mid 17-18C
B81	Wide everted rim: internal glaze patch.	Late 15-early 17
	Gritty grey earthenware sherd.	?
	Coarse earthenware fragment.	17-18C?

Post-Medieval Ceramics from Area A

A+	7 coarse earthenware sherds; 1 with flat everted rim and internal lead glaze.	17-18C
	Lead-glazed earthenware: 13 sherds. 12 sherds black ware (1 may be Cistercian ware; 1 chamber pot rim; 1 dish rim; 1 with applied strip decoration).	c 1660-1720
	Press moulded slipware with trailed slip decoration; possibly N Warwicks.	early 18C
	Press-moulded slipwares with trailed and combed slip decoration, 1 with pie-crust rim.	18C?
	4 sherds hollow-ware vessels in creamy white fabric: trailed brown slip decoration; internal & external glaze directly onto the body. N Warwicks?	early 18C

	Mocha ware fragment: N Staffs type.	early-mid 19C
	2 sherds yellow ware.	16-early 17C
	Mottled wares, 1 from chamber pot.	late 17-early 18C
	2 slip-coated sherds: 1 a body handle, the other a base. Cream fabric, brown slip coat, lead glazed.	c 1710-1730
	3 sherds stoneware.	19C
A2	Cistercian ware: dark brown lead-glazed rim sherd of cup; fragment, glazed black inside, exterior cream slip or applied clay with lead glaze.	late 15C - c 1540
A15	Mocha ware rim sherd.	early 19C
A17	Coarse earthenware wall sherd with internal lead glaze.	Prob. 17C
A18	30 sherds from internal lead-glazed earthenware pancheon(s).	late 17-18C
	Transfer printed earthenware sherd.	mid 19C
	1 sherd Cistercian-ware	late 15-early 17C
A20	Midland Purple ware; lead glaze on shoulder & neck.	16-early 17C
A24	Midland Purple wall sherd.	late 15-16C

A26	Midland Purple sherd with everted rim & wavy line decoration.	15th-16C
	Midland Purple wall sherd fragment with external lead glaze.	
	Press-moulded cream slipware fragment with trailed & combed decoration and pie-crust rim.	1670-1730
	Coarse earthenware wall sherd with internal lead glaze.	prob. 17C

Leather shoes and fragments

LE1 Phase 9 F 38 Photo No A8552/2

Crescent shaped strip, c 7 x 8cm, 8mm wide. Edge/flesh stitch along length, stitch length c 7mm. Probably remains of rand or welt. Calf/cattle.

LE 2 Phase 8 F 8 Photo No A8552/7

Leather fragment with no identifiable features.

LE 3 Phase 10 F 142 (illustrated in fig 74) Photo No A8552/3/4

Child's shoe, left foot. Welted construction, almost complete except for instep and vamp throat.

a) Fragment of vamp, shape uncertain.

b) Lower portion of vamp, extending from butted seam with quarter on one side to similar seam on other side, edge/flesh stitch in both cases c 3-4mm stitch length. Lasting margin is pleated at the front, the pleats corresponding with the inner edge of the welt and the toe end of the insole, these three parts being sewn together (hand lasting) with stitches c 8mm in length. Calf.

c) and d) The quarters, originally joined at back with butted seam edge/flesh stitch length c 3-4mm, and joined to vamp with butted seam, edge/flesh stitch length c 3-4mm. The outside quarter shows the beginning of a latchet (ankle strap). Calf.

e) The insole has four or five holes where it was tacked to a wooden last. It may have been channelled to take the welt seam, but this is not certain as the sewing operation would tend to raise the edge. Calf/cattle.

f) The welt, now in two parts, but probably originally one continuous strip joining at the heel end rather than at the irregular edges at the inside waist which suggest a break. Calf/cattle.

g) The sole, complete, showing stitching channel set in 7-8mm from edge (except under heel piece) with stitch length 6-7mm corresponding with holes on welt to which it was stitched. Calf/cattle.

h) The heel piece was inserted between sole and insole to give lift; it does not show wear as it would do had it been in contact with the ground. Calf/cattle.

The welted construction, latchet ties, back seam and wedge heel suggest a date of C17 or later.

LE 4 Phase ?8 F139A (illustrated in fig 74) Photo No A8552/1

Left foot turnshoe sole 190 x 75mm. Edge/flesh seam with stitch length c 7mm. Worn at back of seat and inside front of forepart. Very thick leather, c 7mm, cattle. Narrow strip of leather associated with sole with corresponding edge/flesh stitch and triangular section is probably remains of a rand. Calf/cattle.

Date of 1350 to 1450 suggested by shape of forepart.

LE 5 Phase ?8 F 147 Photo No A8552/8

Clump sole 8.5 x 6.4cm for repair of seat area. Nail holes for attaching repair to original sole at edge nearest waist. Worn away at outside back edge. Cattle.

LE 6 Phase 10 F39 Photo No A8552/9

Leather fragments, turnshoe sole and parts of upper.

a) Fragment of right foot turnshoe sole, possibly a repair clump, serrated edge sometimes indicates this, but this edge may be due to deterioration along the stitching channel. The stitch length is c 6mm which is usual for an original seam, repairs usually have a larger stitch. Date of 1350-1450 suggested by shape of forepart.

b) Fragments of upper, position uncertain, with cut edges, and some stitch holes, c 5mm stitch length. One piece has scalloped edge possibly suggesting use as a heel stiffener, although lower edge is cut so there is no evidence of a lasting margin. Calf.

LE 7 Phase 10 F 199 Photo No A8552/6

Fragments of turnshoe sole, much of forepart and outside joint missing, as is seat (torn edge, not cut). Edge/flesh seam with stitch length 6-7mm along one edge, other edges torn.

LE 8 Phase 8 F 92 (illustrated in fig 74) Photo No A8552/5

Right foot turnshoe sole, complete, 260 x 90mm. Edge/flesh seam, stitch length c 7mm. The sole was repaired by attaching a clump sole to the forepart, and another repair at the seat. The repair sections were attached by tunnel

stitching round the edges, stitch length 9-10mm. The wear of the original sole shows at the forepart and the outside back of the seat. Date of 1350-1450 suggested by shape.

LE 8 (Mill Pool Area B: Machine Trench Unstratified)

Two fragments seat of turnshoe sole, c 75 x 65mm. Edge/flesh seam around edge, stitch length c 6mm. worn, torn edge at waist. Holes on grain side possibly from nailing repair to this area.

MF 3.18 DENDROCHRONOLOGY (DEN)

The earliest attempts at dendrochronological dating of the Tamworth timbers were done by the Research Laboratory for Archaeology and the History of Art at Oxford, under the direction of Dr J M Fletcher. The timbers had been buried in sand, and uncovered for this purpose by K Sheridan in July 1973. Samples were taken from two of the planks and two of the baulks from the timber. Measurements were made on the sample from the plank 160c and gave a curve with 143 annual rings, starting fairly near the pith (letter from JMF to KS 31.7.73, copied to PAR); nothing is known of the results of this work.

In 1978, W G Simpson of the Department of Classical and Archaeological Studies of the University of Nottingham wrote to PAR (20.6.78) asking permission to sample the Tamworth timbers with a view to establishing a floating dendrochronology for the then newly-established Tree-Ring Research Group at Nottingham through SRC grants. PAR gave permission, and in a letter of 29.6.1978 Bob Meeson wrote a letter to WGS (copied to PAR) indicating that if Miss Tarjan at the Castle Museum agreed, core samples could be taken; nothing more was heard of this work.

The third attempt was initiated by Dr M G L Baillie of the Department of Archaeology at Queens University of Belfast. In a letter of 21.1.80 he asked permission to sample to assist in their current programme. A further letter of 18.6.80 to PAR said that samples had been taken on 4.6.80 and that they had given a 420 year chronology which cross-dated with Belfast and various English sections of the chronology (cf Fletcher 1981 and Hillam 1981). The outcome was that the felling date for the mill timbers was in the range AD 855 ± 9, a date indistinguishable from that obtained in the same year by Baillie (1980) from timbers from Bob Meeson's adjacent site. The result was subsequently published (Baillie 1980) and is shown in fig 78 compared with the C14 dates.

A further letter from MGLB to PAR of 18.7.80 enlarged on the above. The ± 9 is based on the number of years to be added to the date of the outermost visible ring to take account of the amount cut off to get rid of sapwood and square off a timber, to arrive at the felling date. Experimental results suggest that the number of years to be added is between 23 and 41, expressed as 32 ± 9; this, Baillie believes, is a fairly good guide for any Irish or British oak. Three timbers from Tamworth have outer rings dated to 820, 824 and 825 (with no sapwood present).

While one must accept the Belfast estimate of 32 ± 9 to be added to the date of the outer ring in the absence of sapwood (giving the range 846-864), it must be stressed, in the interests of historical accuracy, that the true terminus post quem for each timber is the last ring, of 820, 824 and 825; though Dr Baillie does not care for this way of quoting the date, since the true felling date is demonstrably considerably later. The 32 ± 9 is however only an estimate based on Belfast's experience, and is not a universal one accepted by all dendrochronological laboratories. The 'historical' date for the felling of the Tamworth timbers, and very probably for the building of the first or the second mill on the site itself, is best expressed as 'mid- 9 th century AD'.

MP 3.19 RADIOCARBON DETERMINATIONS (RD)

(additional to main text) (figs 78 a,b)

The first radiocarbon determination from the area was done on an oak plank from Charles Young's 1968 excavation in Bolebridge Street (his ref TAM 68 BS I.E.47). This was done by Birmingham as follows (the late Professor F W Shotton):

Birm 109 1541± 80 B P = ad 409 (Libby ½ life)

In 1971 samples were submitted to Prof Shotton, and dated as follows:
(for calibration see main text)

Birm 289 Context 155; sample of twigs from primary leat (phase 2)
1200± 100 B P = ad 730 (Libby ½ life)

Birm 290 Under context 160; branch under plank floor 160 (phase 2)
1162± 100 B P = ad 788 (Libby ½ life)

Birm 291 Context 161, sample from NW edge at NE end of NW baulk of millpool (outer edge of massive timber) (phase 3)
1240± 110 B P = ad 755 (Libby ½ life)

Birm 292 Context 241, branch from millpool (phase 3)
1195±90 B P = ad 755 (Libby ½ life)

- samples taken from context 241 (twigs from millpool) (phase 3), and context 166 (main NE ground sill timber of wheelhouse; sample from outside NE edge) were submitted, but not done, by Birmingham.

In a subsequent letter, Professor Shotton asked if grain could be substituted for one of the submitted samples. He pointed out the difficulty of making

determinations from a squared beam, as it was not known how many outer rings had been trimmed off. 'The beam put in for counting (Birm 291 Context 161) has 38 growth rings, which corresponded to a circle of about 1.7 m diameter. We could draw the inference that the plank or beam was cut from a very large, old oak, perhaps 500 years old, or more, but in this case from near the outside'. He could not find bark.

Two years later (in 1973) a sample was submitted to Professor Shotton from the (fig 103)
Moycraig mill wheel-hub, now in the Ulster Museum, Belfast (from which a sample was supplied to PAR by Dr W McCutcheon, one of the then staff). The result was:

Birm 491 (Moycraig mill wheel-hub)

100 ± 100 BP = ad 950 (Libby ½ life)

A further four radiocarbon samples were taken in 1974 by the late Dr J M Fletcher of the Oxford Laboratory (see under Dendrochronology), from planks 160a and 160c. They were submitted to the Cambridge Laboratory on 9.11.1974, and JMF sent PAR a copy of the submission sheet, but nothing has been heard since.

For 1978 see main text and following frames

Julian Richards kindly calibrated the Birmingham dates for the mill, and also the Harwell dates from the 1978 excavation. A summary is provided in the main text and figs 78 a and b. The details are as follows:

1 sigma

C-14 calibration
using agreed curve (combining Pearson & Stuiver: Radiocarbon 28, p. 821 & 851)

extends from: 76 bp to 3976 bp
(1874 ad to 2026 bc)

BIRM 289
1220 bp (730 ad) +/- 100,
with 66% probable range
For the early end, there is one value:
AD 674
For the later end, there is one value:
AD 895
Thus the range is AD 674 to AD 895

BIRM 290
1162 bp (788 ad) +/- 100,
with 66% probable range
For the early end, there are 3 values:
AD 767
AD 733
AD 726
For the later end, there is one value:
AD 981
Thus the range is AD 726 to AD 981

BIRM 291
1240 bp (710 ad) +/- 100,
with 66% probable range
For the early end, there is one value:
AD 667
For the later end, there is one value:
AD 890
Thus the range is AD 667 to AD 890

BIRM 292
1195 bp (755 ad) +/- 110,
with 66% probable range
For the early end, there is one value:
AD 680
For the later end, there is one value:
AD 968
Thus the range is AD 680 to AD 968

A radiocarbon determination, as it comes from the dating lab, is not a precise, true date. It is an estimate of a true date. When a radiocarbon determination is quoted, two figures are given: a central point of the estimate, and an error term. In the example 2450 bp +/- 75 the central point is 2450 bp and the error term is 75. What this means is that there is a certain probability that the true value of the date lies within a range on either side of the central point; and the size or width of the range is given by the error term.

Each such range is a 'probable range'. For example, there is roughly a 68% probability that the true value of the date lies within the range from one times the error term above the central point to one times the error term below the central point. In the example above, the probability is about 68% that the true value lies in the range 2450 +/- 75, that is, between 2525 bp and 2375 bp. This is sometimes termed the '68% probable range' of the date. Similarly, there is roughly a 95% probability that the true value of the date lies within the range from twice the error term above the central point to twice the error term below the central point. In the example above, the probability is about 95% that the true value lies in the range 2450 +/- 150, that is, between 2600 bp and 2300 bp. This is sometimes termed the '95% probable range'. It is important to grasp that there is no single range which is 'the correct one': each range has a certain probability, and you choose which range to calculate by first choosing which probability you need.

Some of the same ideas may be applied to the concept of a 'probable limit'. Whereas a range gives you a value at each end of the range, a limit gives you just one value. Just as a range has a certain probability attached to it (and if you change the probability, you get a different value for each end of the range), so a limit has a certain probability attached, and you get a different value for the limit if you choose a different probability

When one has several radiocarbon estimates to deal with, each estimate will be an estimate of a true value of one date. When one combines several estimates together, there are four main kinds of 'probable limit' which one may calculate: earliest limit, early limit, late limit and latest limit. Each of these limits may have a different value, if you choose a different probability.

An earliest limit is the limit than which no true value is earlier; that is, all true values are later than this limit. This is a kind of terminus post quem. A probable earliest limit is a date for which there is a certain probability that all the C14 samples are later than this date. For example, if you calculate a 95% probable earliest limit, there is a 95% probability that all the C14 samples date from after this limit. That is, there is only a low probability (5%) that any of the C14 samples is really earlier than this limit.

An early limit is the limit than which not all true values are earlier; that is, one or more of the true values is later than this limit. This is a different kind of terminus post quem. A probable early limit is a date for which there is a certain probability that at least one C14 sample is later than this date. If you calculate a 99% probable early limit, there is a 99%

probability that one or more of the C14 samples really dates from after this limit. That is, there is only a low probability (1%) that all the C14 samples really date from before this limit.

A late limit is the limit than which not all true values are later; that is, one or more true values are earlier than this limit. This is a kind of terminus ante quem. A probable late limit is a date for which there is a certain probability that at least one C14 sample is earlier than this date. If you calculate a 95% probable late limit, there is a 95% probability that one or more of the C14 samples really dates from before this limit. That is, there is only a low probability (5%) that all the C14 samples really date later than this limit.

A latest limit is the limit than which all true values are earlier; that is, none of the true values are later than this limit. This is a different kind of terminus ante quem. A probable latest limit is a date for which there is a certain probability that all the C14 samples are earlier than this date. If you calculate, for example, a 99% latest limit, there is a 99% probability that all the C14 samples really date from before this limit. That is, there is only a small probability (1%) that any of the C14 samples really dates from later than this limit.

1 sigma

HAR 2858
1180 bp (770 ad) +/- 70,
with 66% probable range
For the early end, there is one value:
AD 773
For the later end, there are 3 values:
AD 948
AD 907
AD 899
Thus the range is AD 773 to AD 948

HAR 2860
1130 bp (820 ad) +/- 90,
with 66% probable range
For the early end, there is one value:
AD 786
For the later end, there is one value:
AD 996
Thus the range is AD 786 to AD 996

HAR 2861
1440 bp (510 ad) +/- 70,
with 66% probable range
For the early end, there is one value:
AD 555
For the later end, there is one value:
AD 656
Thus the range is AD 555 to AD 656

2 sigma

C-14 calibration
using agreed curve (combining Pearson & Stuiver: Radiocarbon 28, p. 821 & 851)

extends from: 76 bp to 3976 bp
(1874 ad to 2026 bc)

BIRM 289
1220 bp (730 ad) +/- 100,
with 95% probable range
For the early end, there is one value:
AD 638
For the later end, there is one value:
AD 1011
Thus the range is AD 638 to AD 1011

2 sigma

BIRM 290
1162 bp (788 ad) +/- 100,
with 95% probable range
For the early end, there is one value:
AD 660
For the later end, there is one value:
AD 1028
Thus the range is AD 660 to AD 1028

BIRM 291
1240 bp (710 ad) +/- 100,
with 95% probable range
For the early end, there is one value:
AD 623
For the later end, there is one value:
AD 996
Thus the range is AD 623 to AD 996

BIRM 292
1195 bp (755 ad) +/- 110,
with 95% probable range
For the early end, there is one value:
AD 641
For the later end, there is one value:
AD 1024
Thus the range is AD 641 to AD 1024

HAR 2858
1180 bp (770 ad) +/- 70,
with 95% probable range
For the early end, there is one value:
AD 672
For the later end, there is one value:
AD 997
Thus the range is AD 672 to AD 997

HAR 2860
1130 bp (820 ad) +/- 90,
with 95% probable range
For the early end, there is one value:
AD 677
For the later end, there is one value:
AD 1033
Thus the range is AD 677 to AD 1033

HAR 2861
1440 bp (510 ad) +/- 70,
with 95% probable range
For the early end, there is one value:
AD 441
For the later end, there is one value:
AD 680
Thus the range is AD 441 to AD 680

limits

C-14 calibration
using agreed curve (combining Pearson & Stuiver: Radiocarbon 28, p. 821 & 851)

Tamworth
95% probable earliest limit for:
1220 bp (730 ad) +/- 100
1162 bp (788 ad) +/- 100
1240 bp (710 ad) +/- 100
1195 bp (755 ad) +/- 110
1180 bp (770 ad) +/- 70
1130 bp (820 ad) +/- 90
1440 bp (510 ad) +/- 70
No unique result. 3 alternatives are:
AD 531
AD 473
AD 467

75% probable earliest limit for:
1220 bp (730 ad) +/- 100
1162 bp (788 ad) +/- 100
1240 bp (710 ad) +/- 100
1195 bp (755 ad) +/- 110
1180 bp (770 ad) +/- 70
1130 bp (820 ad) +/- 90
1440 bp (510 ad) +/- 70
No unique result. 3 alternatives are:
AD 591
AD 582
AD 567

95% probable early limit for:
1220 bp (730 ad) +/- 100
1162 bp (788 ad) +/- 100
1240 bp (710 ad) +/- 100
1195 bp (755 ad) +/- 110
1180 bp (770 ad) +/- 70
1130 bp (820 ad) +/- 90
1440 bp (510 ad) +/- 70
The limit is AD 887

limits

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75% probable early limit for:
        1220 bp (730 ad) +/- 100
        1162 bp (788 ad) +/- 100
        1240 bp (710 ad) +/- 100
        1195 bp (755 ad) +/- 110
        1180 bp (770 ad) +/- 70
        1130 bp (820 ad) +/- 90
        1440 bp (510 ad) +/- 70
The limit is      AD 958


95% probable late limit for:
        1220 bp (730 ad) +/- 100
        1162 bp (788 ad) +/- 100
        1240 bp (710 ad) +/- 100
        1195 bp (755 ad) +/- 110
        1180 bp (770 ad) +/- 70
        1130 bp (820 ad) +/- 90
        1440 bp (510 ad) +/- 70
The limit is      AD 666


75% probable late limit for:
        1220 bp (730 ad) +/- 100
        1162 bp (788 ad) +/- 100
        1240 bp (710 ad) +/- 100
        1195 bp (755 ad) +/- 110
        1180 bp (770 ad) +/- 70
        1130 bp (820 ad) +/- 90
        1440 bp (510 ad) +/- 70
    limit is      AD 647


95% probable latest limit for:
        1220 bp (730 ad) +/- 100
        1162 bp (788 ad) +/- 100
        1240 bp (710 ad) +/- 100
        1195 bp (755 ad) +/- 110
        1180 bp (770 ad) +/- 70
        1130 bp (820 ad) +/- 90
        1440 bp (510 ad) +/- 70
The limit is      AD 1037


75% probable latest limit for:
        1220 bp (730 ad) +/- 100
        1162 bp (788 ad) +/- 100
        1240 bp (710 ad) +/- 100
        1195 bp (755 ad) +/- 110
        1180 bp (770 ad) +/- 70
        1130 bp (820 ad) +/- 90
        1440 bp (510 ad) +/- 70
The limit is      AD 1013
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MF 4 THE MILL: CONSTRUCTION AND RECONSTRUCTION

Introduction. The problems related to the construction of the mill, and its theoretical reconstruction, were studied on the site by Daryl Fowler in 1971. It was not realised at the time that the mill was of the horizontal-wheeled type, and Fowler was concerned principally with the structural carpentry involved in the building of the extant timber foundations as seen in the ground.

By the time the first interim note appeared (Rahtz and Sheridan 1971) Fowler had essayed an axonometric reconstruction; although by the time this appeared it was clear that the mill was horizontal-wheeled, the details of wheel position etc had not been worked out; this first reconstruction has the location of the driving chute shown as the outfall, and the by-pass as the driving sluice. This misunderstanding was perpetuated in a more detailed drawing by Fowler published in 1972 (Rahtz and Sheridan 1972); this did, however, include reconstructions of the locking joints of the main mill timbers.

By 1974 more work had been done by PAR on the working of the mill, and this formed the basis of a diagrammatic plan and reconstructed section published in 1976 (Rahtz 1976, figs 2.18-19). In this there was also a short note by Fowler of the carpentry techniques involved (Rahtz 1976, 93).

In 1978 Bob Meeson was commissioned by the Tamworth Borough Council to write a feasibility study for a proposed full scale working reconstruction of the second mill as part of a proposed heritage park. The principle of the scheme was accepted by them, and in 1979 FWB Charles was commissioned to write a further detailed feasibility study with detailed drawings of the second mill which would enable it to be built, at an estimated cost of c £20,000. Charles is not only one of the most experienced architects in the sphere of restoring ancient buildings, with a profound knowledge of practical carpentry design and engineering in this and earlier centuries, but is very familiar with the academic and theoretical background of vernacular architectural studies, and also of millwrighting. The reconstructions he produced on paper and in model form must therefore be viewed with considerable respect. They were done after full consultation with PAR and others, and incorporate all the evidence that was then available to him, before the compilation of this monograph.

It was hoped that the reconstruction would not only be a splendid attraction in Tamworth for archaeologists and the public alike, but would provide a test-bed for experimental archaeology for the building of the mill structure, and for the hydro-dynamic and other problems involved in its running and maintenance. Unfortunately, a political change (1980) replaced the Conservative-controlled council by a Labour one, who disapproved of spending the money for a series of reasons.

Charles' drawings, however, remain; they provide the most detailed reconstruction of the mill at present available. They are reproduced here as figs 95 to 100, unchanged except for some minor modifications arising from more recent consideration of the evidence; they are justified in the discussion below.

The full text of Charles' study (dated 17.12.79), which includes many details of how the mill layout was to be achieved in terms of the proposed site, skilled labour, the expertise of modern millwrights, and materials, is in the archive. Extracts relevant to the reconstructed mill are now quoted, as being of general interest in furthering the discussion of problems.

'The Mill and pond' (figs 95-100)

'According to the evidence both the mill and pond were of horizontal timber baulk construction. The incidence of this form of building in Saxon times is not yet fully known. Remains of solid vertical planking are probably more common. One reason may be that horizontal baulks, unlike anything in the nature of post-construction or palisades, may leave no trace in the ground once the structure has been demolished. But there is no doubt about them here, and the only question is whether this form of construction was the same throughout the

mill structure. The possibility that they may have been the foundations of a timber-framed superstructure, as suggested by Meeson, must be discounted for several reasons. First, there is no evidence, despite assumption of some archaeologists, of Saxon timber-framed buildings - that is, buildings of the so-called "timber-frame tradition", with which we are familiar through standing structure (the "black-and-white") of later medieval down to Jacobean times. While that could be accounted for by the fact that timber-framing, like baulk construction, would leave little, if any, remains, it is much more likely that this highly advanced method was not introduced until after the Conquest. Otherwise the great Saxon halls of which there is abundant post-hole evidence would surely have been built of it. Secondly, such different systems as baulk and timber-frame construction could hardly be combined within a single small building. And thirdly, since timber plank walls were common enough for buildings in later times and are closely related to log construction (which must be prehistoric), there is hardly reason to assume the use of anything else at this mill. It may be extremely extravagant of timber, but that too is characteristic of much Saxon building.

In all other respects, it is entirely suitable for the reconstruction, for every piece may be cut in the workshop with its correct joints, leaving for the site work only the physical exertion (which will be considerable) of placing one member on top of another. This even applies to the roof. The obvious choice of thatch has been discarded, not only because, again, there is no evidence but also because baulks are as suitable for roofs as for walls. Some advantages of the solid roof compared with rafters and thatch are that it is stronger, bird-proof and sheds no debris. Its fire-risk is also far less. All of these may have been as important in a Saxon mill as they are today. The baulks could be laid either horizontally or vertically. The latter has been preferred, as it saves a little in labour, and though such a roof could be completely watertight, oak shingles

have also been shown as probably being more acceptable as a traditional covering, but availability and cost would have to be taken into account in any final decision.

The construction of the milling floor would be of cross-beams with short boards laid in rebates between them. The beams prevent spread or inwards movement of the walls at ground level where the pressures would be reversed. At wall-head level the heavy wall-plates resist any spread of the roof.

As for the secondary items, doors would be battened planks with bar hinges. Demountable shutters could be secured on the inside of the windows by turnbuckles.

The timber will be the same throughout but it would not be oak in the reconstruction. The cost of English oak would be prohibitive, about three times that of imported greenheart.

From the point of view of appearance, the greenheart baulks would come closer to the enormous widths of the original oak as found in the excavation than would any other timber available today. Variation of width is unfortunately not possible. The replica would inevitably therefore have a more machine-like appearance than the original mill probably had. But so far as this dispels the popular misconception that everything ancient in timber-building was crooked and whimsical it will be beneficial. If slightly random lengths of wall components should occur, as perhaps in the original structure, these would not be "corrected".

The final structure would present an appearance at any rate as sturdy as the original must have been and its proportions would be much the same as those of the numerous extant horizontal mill buildings of stone or timber in Shetland, Spain and as reconstructed at the Frielandsmuset in Copenhagen'.

'The machinery and equipment' (figs 98-99)

'Horizontal mill wheels have been used since at least the seventh century AD (Ch 6 below), and there has been very little evolution, as the design is so simple. Indeed, it is evident that mills still in use today in practically all the less industrially developed counties are hardly different from this one of Saxon England. Thus, what may appear to the layman difficult and even incomprehensible is perfectly straightforward to a millwright.

The experimentation which I anticipated would be necessary would probably all have been done on the job after the mill and pond had been constructed. The question of authenticity of the machinery hardly arises since the margin of choice or error within the confines of existing mill precedents and the archaeological evidence is extremely narrow. Of course, certain differences would be inevitable, as, for example, had the original chute or flue, as seems most likely, been hollowed out of solid timber, today it would have to be made of separate planks - as shown on the diagram. But such differences to not violate the principle or alter the functioning of the mill.

The basic machinery consists of the wheel, nave and shaft, set with a bearing upon a steel socket let into the sole-tree, all of which can be reproduced, if not exactly, at any rate within very close proximity to the original. The most important components of all, the paddles, can indeed be exactly copied, as a practically complete original paddle almost miraculously survived. A prototype

of this has already been made in softwood. The purpose of this was to get an idea of the time needed in cutting it and so of its cost. Its hydrodynamic elegance is astonishing by any standards.

Again the equipment, including the hearst on which the stones are raised above the mill floor, the hopper, either slung from the roof or supported by a horse, the vat or surround to the stones, the stones themselves and all the moving parts are so standard that the sole criteria by which to judge them is their appropriateness for the mill structure, their proper functioning and the degree to which they conform with the evidence'.

(end of quote from Charles)

Charles' reconstructions were of course not meant to be a precise reconstruction based on the archaeological evidence. They are rather a realisation in practical terms of the Tamworth mill evidence, which embodies the broad framework of the evidence, but may differ from it in detail. A good example, as Charles points out, is the driving chute, which in these diagrams is made of separate pieces of wood, but would very likely have originally been of one or two pieces. This is not to say that Charles has ignored the archaeological evidence, he has not; he has stuck very closely to it, indeed as far as possible, bearing in mind that the reconstruction he has drawn had to be <u>built</u>. Many 'archaeological' reconstructions would not stand up to this acid test! There are of course bound to be elements in any reconstruction which are a matter of debate, in discussing whether or not they do represent a correct interpretation of the archaeological evidence. Hopefully, by presenting Charles' practical hypothesis in this report, a forum for debate may be opened. We are fortunate indeed to have a reconstruction of an archaeologically defined structure in such detail, rather than the rather woolly sketches usually seen in archaeological reports. To recapitulate what was said earlier, Charles' version of the mill carries a

veracity that can be expected from someone who is an architect, an architectural historian, a conserver of ancient timber structures, and a molinologist. We may paraphase one of the most famous captions in archaeological literature (Taylor 1974, fig 9, p 170). 'Charles' reconstruction does not serve unambiguously to define the mill as it was in Anglo-Saxon times. But such a reconstruction does violence neither to the archaeological evidence nor to the technological or architectural probabilities as they are known from the period or from mills surviving today. The reconstruction could be regarded as the flesh and skin of the mill indicated only in skeleton by the archaeologists'.

It will perhaps be useful to comment on the Charles drawings reproduced here before passing on to the reconstructions of a more limited kind essayed by P A R. The reconstruction drawings reproduced (others exist of timber details) have been numbered I-VI, in figs 95 to 100.

I. The plan incorporates the missing sixth upright post on the SW side; it should be noted that the wall line across the wheelhouse on the SW side of the three uprights does not exist at wheelhouse level (where the wheelhouse is open to allow water to move out freely) but only at millhouse floor level and above, as shown in Ib.

The SW floor plank found in the excavation is shown here surrounding the west corner upright, rather than being on three sides as found; a further plank or baulk is shown to the SW of the posts in the plank, but not in the axonometric reconstruction. A doorway is shown on the NW side.

II. The gable and elevation (c) is that at the NE end, and shows a square window, which may have been leaded, with horn panes (3.10 above). The horizontal plank walls are shown as extending right down to, and incorporating, the bypass

and driving chutes. This end of the wheelhouse could of course have been open below the level of the millhouse floor/wheelhouse ceiling.

The NW side elevation shows the height of the wheelhouse at 1.45 m, and the doorway opening out onto the level ground to the NW. In none of his drawings does Charles include any annexe to the NW, and does not offer any interpretation of the plank and post extending tc the NW at millhouse level.

III. A hearst is shown here, raising the stone set 50 cm above the floor. Many mills do have this feature, and a box or vat around the stones (the latter not shown here, but assumed by Charles). There are however some mills where the stones are set at floor level, the flour dropping into a recessed bin. (Fig 63) The raised arrangement is more convenient for the miller, and is followed in our own reconstructions; as also is the consequent length of the shaft; its diameter will be discussed below. The bearing is shown here rather diagrammatically; the steel female bearing is set <u>in</u> the sole-tree in the original, protruding only slightly if at all; whereas here it looks as if it sits on <u>top</u>. The sole-tree is also set <u>on</u> the floor, rather than suspended above it, as the archaeological evidence suggests. The diameter of the millstone is correct, but the eye should be only 9 cm, rather than the 18 or so shown here. The rynd diameter is also rather too large here; it was about 26-29 cm.

IV. As already mentioned, the chute may have been of one or two pieces, the main part being a hollowed-out log (cf Knocknagranshy, figs 101-102). The precise location of the orifice end must of course remain uncertain in the absence of direct experimentation. In the section, Charles has shown the chute supported at its lower end on a baulk on the floor. The archaeological evidence offers no support for this; the chute must have been supported certainly, but on timbers affixed to the SE side of the wheelhouse; or above, in the wheelhouse

ceiling. Here the sole-tree is shown correctly, off the floor. A fall of 49 cm is shown, from the level of water at the upper end at its exit from the millpool, to the base of the paddle. This is considered in our own discussions on relative levels (2.4) and is near this figure.

V. Charles' reconstruction of the shaft and wheel-assembly looks appropriately elegant; the paddle is the only part of this to survive. The number of paddles shown is 12; this allows for suitable wedging in the hub, but may be too few. If there were 18 or 19 like Moycraig (Green 1963, fig 86), or 23, like Mashanaglass (Fahy 1956) (both in fig 103), the paddles would look very crowded, but these do exist, and we may have shown too few. Again, experimentation would be the only way to find out the optimum spacing. A sophisticated wheel of 1588 (Ramelli, fig 104, from Green 1963, fig 86) only has 14; should there be an odd number?

The length of the shaft is a consequence of the height given by Charles to the wheelhouse and his inclusion of a hearst to raise the stones, as already said. The diameter of the shaft is shown here as c 10 cm, rather than the 15 shown in the section in reconstruction III, which, with its squared hub, is clearly only meant to be diagrammatic. 15 would in any case be too large, as the hole in the clay seating for the lower millstone is of this diameter; the shaft may however have been only a little less than this, so that water could not easily be forced upwards around it, so we would favour 12 rather than the 10 shown here, which would of course increase the weight. Charles may be right that it was nearer 10, with a 2 cm thick bush around it where it passed through the hole above.

VI. The reconstruction of the millpool shows two sluices that are identical except that the by-pass one carries bars, presumably to stop debris such as branches from passing into the wheelhouse. These are put in to use the archaeological evidence of two holes in the sill-beam here; such a grill would

however be more necessary for the driving sluice, to stop branches fouling the wheel; the holes may perhaps have been rather to carry pegs for the lower members of a sluice gate.

Charles shows the pool with substantial timber walls, pegged to central uprights, on three sides; this is not quite what the archaeological evidence suggests. The mill side is shown with short vertical planks in the central plank slot, set into a massive timber baulk which carries the sluice gates; all this is quite possible.

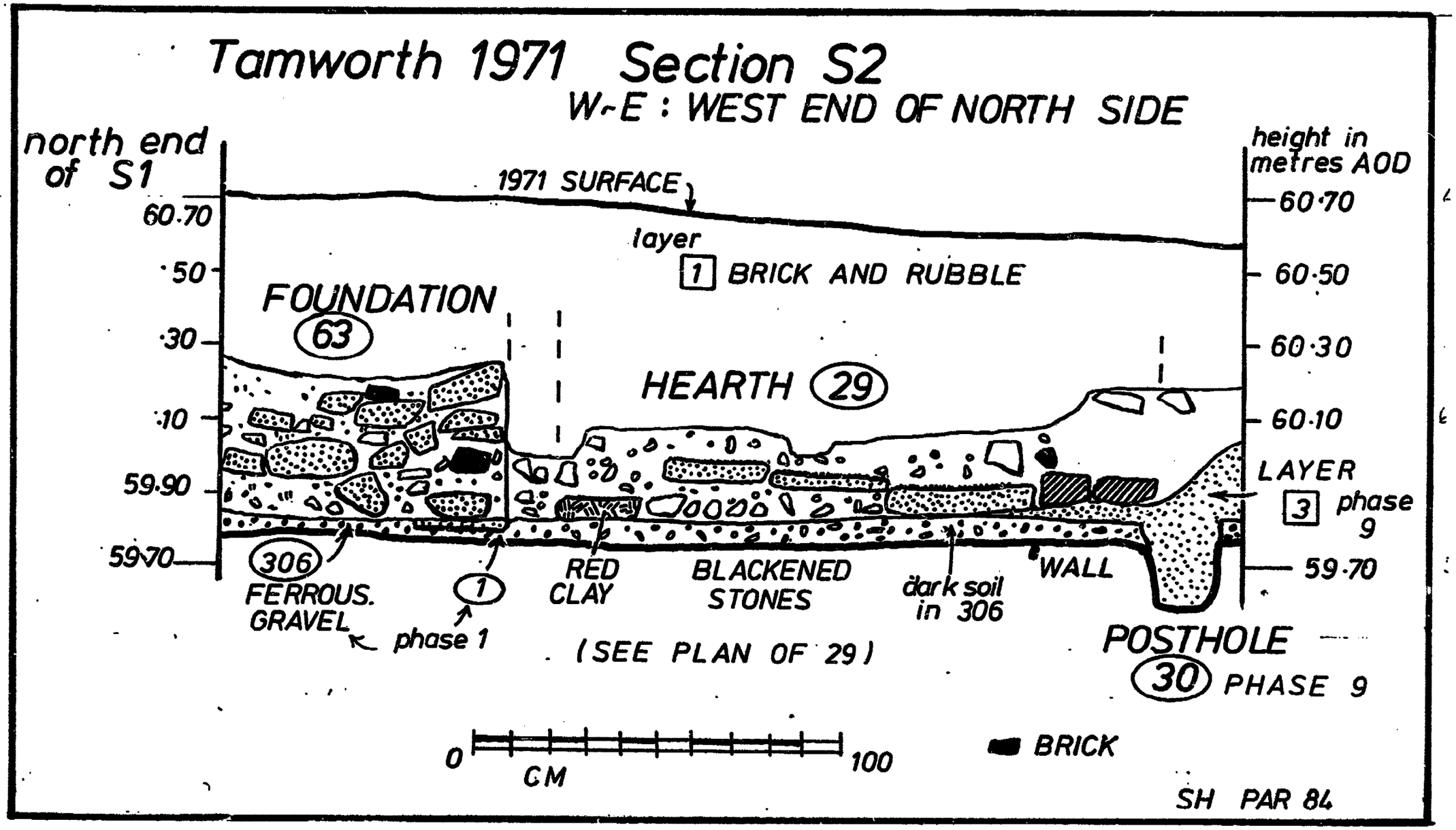

Tamworth 1971 Section S2
W-E : WEST END OF NORTH SIDE
north end of S1
height in metres AOD
1971 SURFACE
60·70
·50
·30
·10
59·90
59·70
60·70
60·50
60·30
60·10
59·70
layer
1 BRICK AND RUBBLE
FOUNDATION
63
HEARTH 29
LAYER
3 phase 9
306
FERROUS. GRAVEL
1
phase 1
RED CLAY
BLACKENED STONES
dark soil in 306
WALL
POSTHOLE
30 PHASE 9
(SEE PLAN OF 29)
0
CM
100
BRICK
SH PAR 84

FIG MF 7

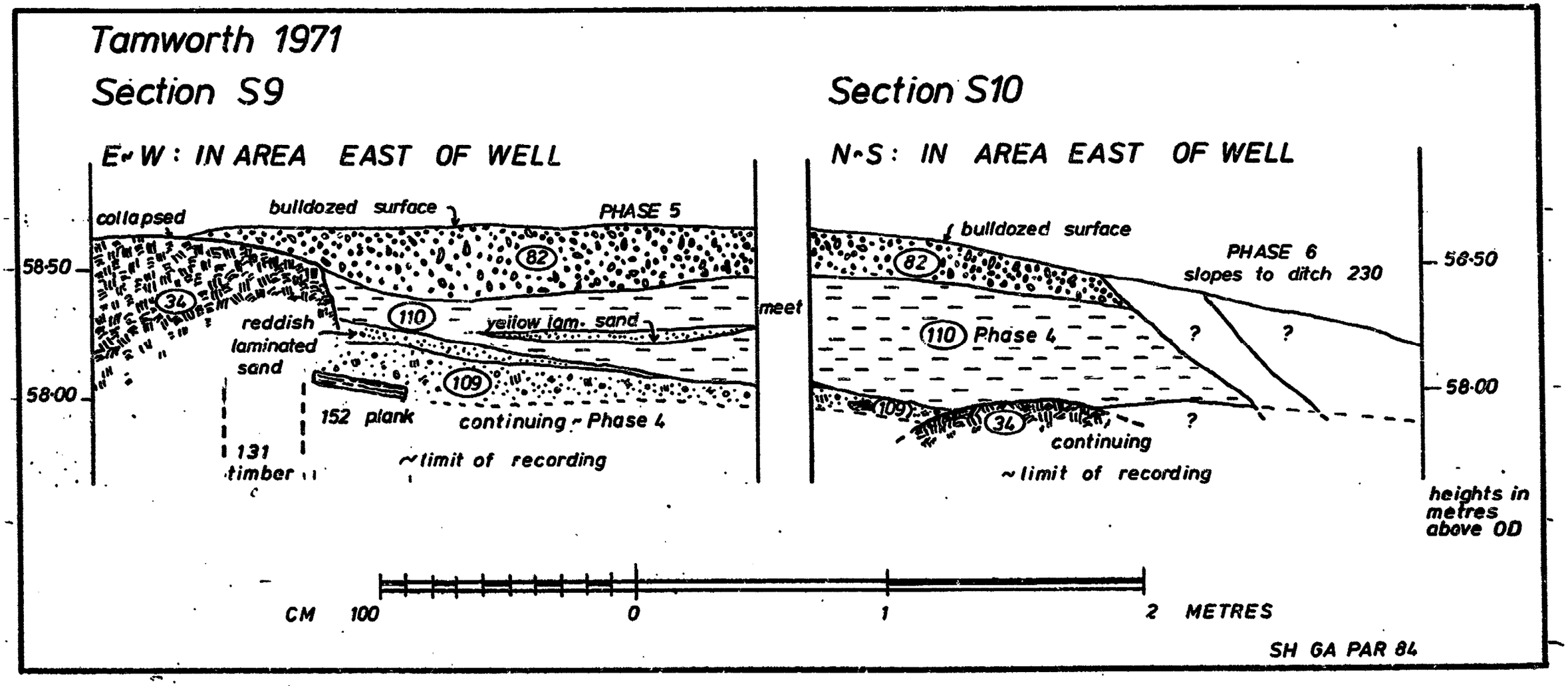
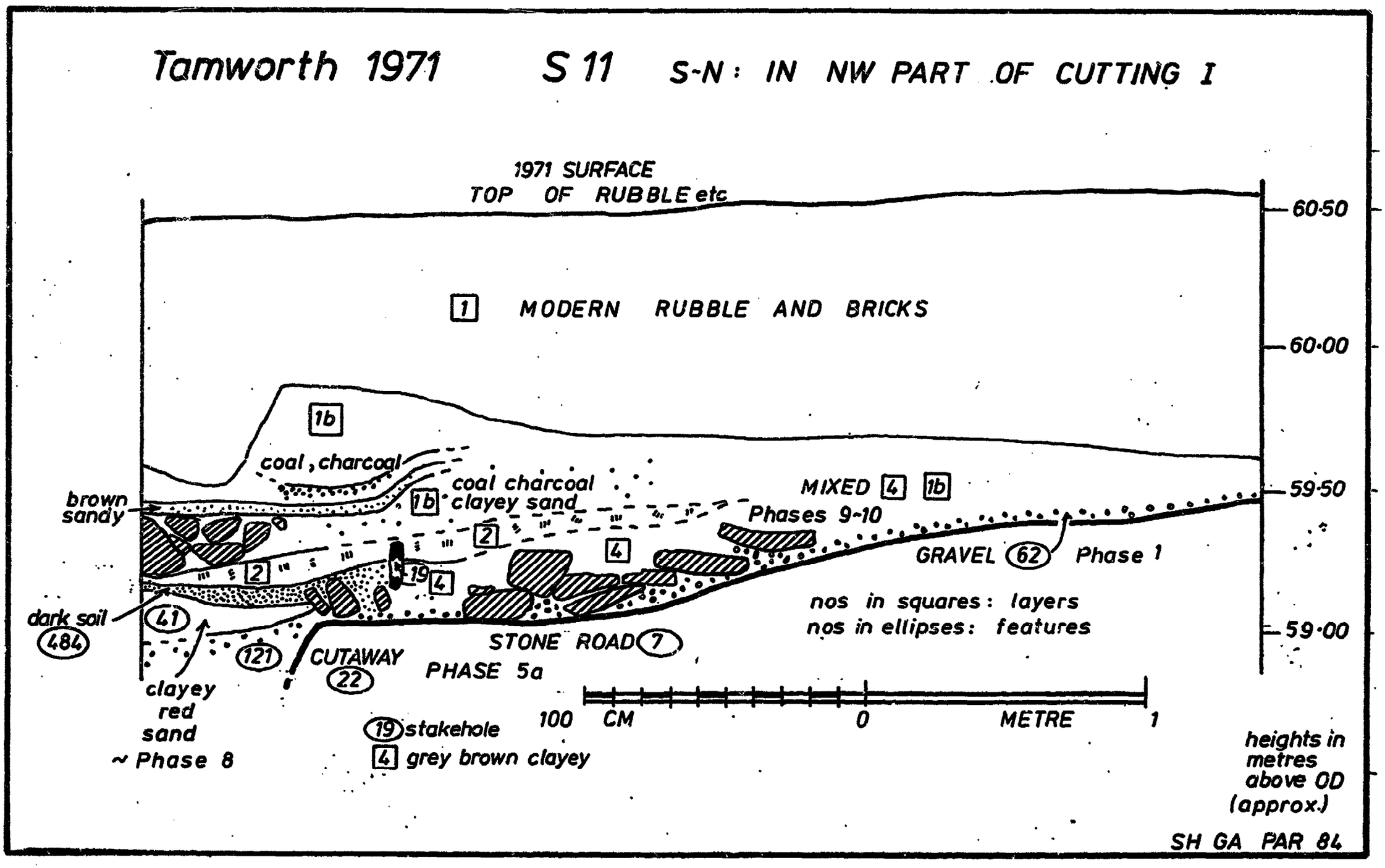

Tamworth 1971
Section S9
E-W: IN AREA EAST OF WELL
collapsed
bulldozed surface
PHASE 5
58·50
82
34
110
reddish laminated sand
yellow lam. sand
meet
58·00
109
152 plank
continuing ~ Phase 4
131 timber
~limit of recording
Section S10
N-S: IN AREA EAST OF WELL
bulldozed surface
82
PHASE 6
slopes to ditch 230
58·50
110 Phase 4
?
?
58·00
109
34
?
continuing
~limit of recording
heights in metres above OD
CM 100
0
1
2 METRES
SH GA PAR 84

FIG MF 17

Tamworth 1971 S 11 S-N: IN NW PART OF CUTTING I



PRECISE LOCATION UNCERTAIN, BUT PARALLEL WITH S1 AND S7, WITH WHICH COMPARE

FIG MF 18

HEIGHTS IN METRES ABOVE OD

N

S

Tamworth 1971

S 12

SURFACE 1971

RUBBLE

CHARCOAL, BURNT BRICK

RUBBLE

59·00

BLACK CLAYEY SOIL, BRICK, RUBBLE

GRAVEL, STONES, SANDY SOIL

GREY SANDY CLAY, GRAVEL, SANDY CLAY, STONES

58·00

FINE BLACK CLAYEY SOIL

GREY CLAY AND STONES

CHARCOAL, BURNT BONE, CLAY

'NATURAL'

GREY BROWN ALLUVIUM

57·00

RUNNING SAND

56·00

RED CLAY

0 1 2

METRES

SH GA PAR 84

SKETCH SECTION OF EAST SIDE OF CUTTING V (sewer trench) = 287

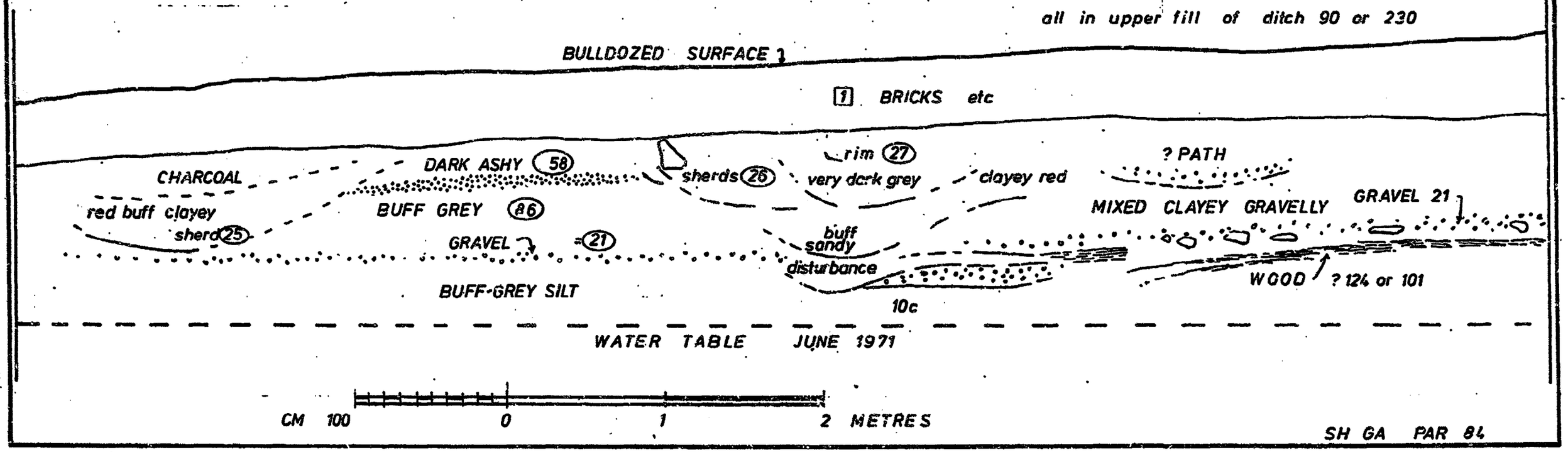
REDUCE TO 11.5 CM

FIG MF 19

OK JAN 86

II-1C

Tamworth 1971 Section S 13 E-W : SKETCH SECTION OF SOUTH SIDE OF CUTTING I



REDUCE TO 19·7 cm = 2/5 = 1/50

CCR JAN 55

OK FIG MF 20

Tamworth 1971

Section S 14

NE ~ SW : FROM 8 PIT or POSTHOLE
TO NW CORNER OF MILL

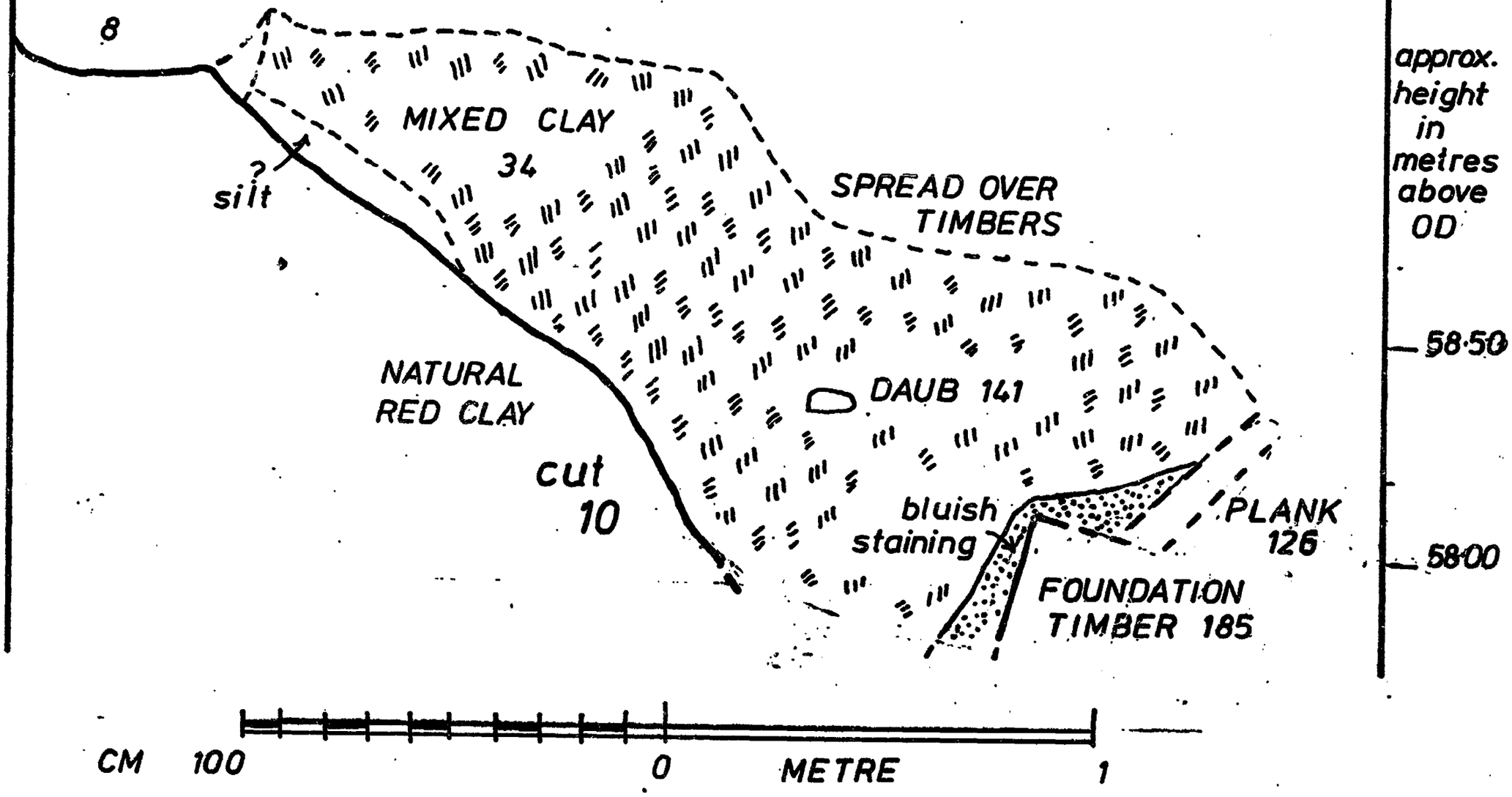


FIG MF 21

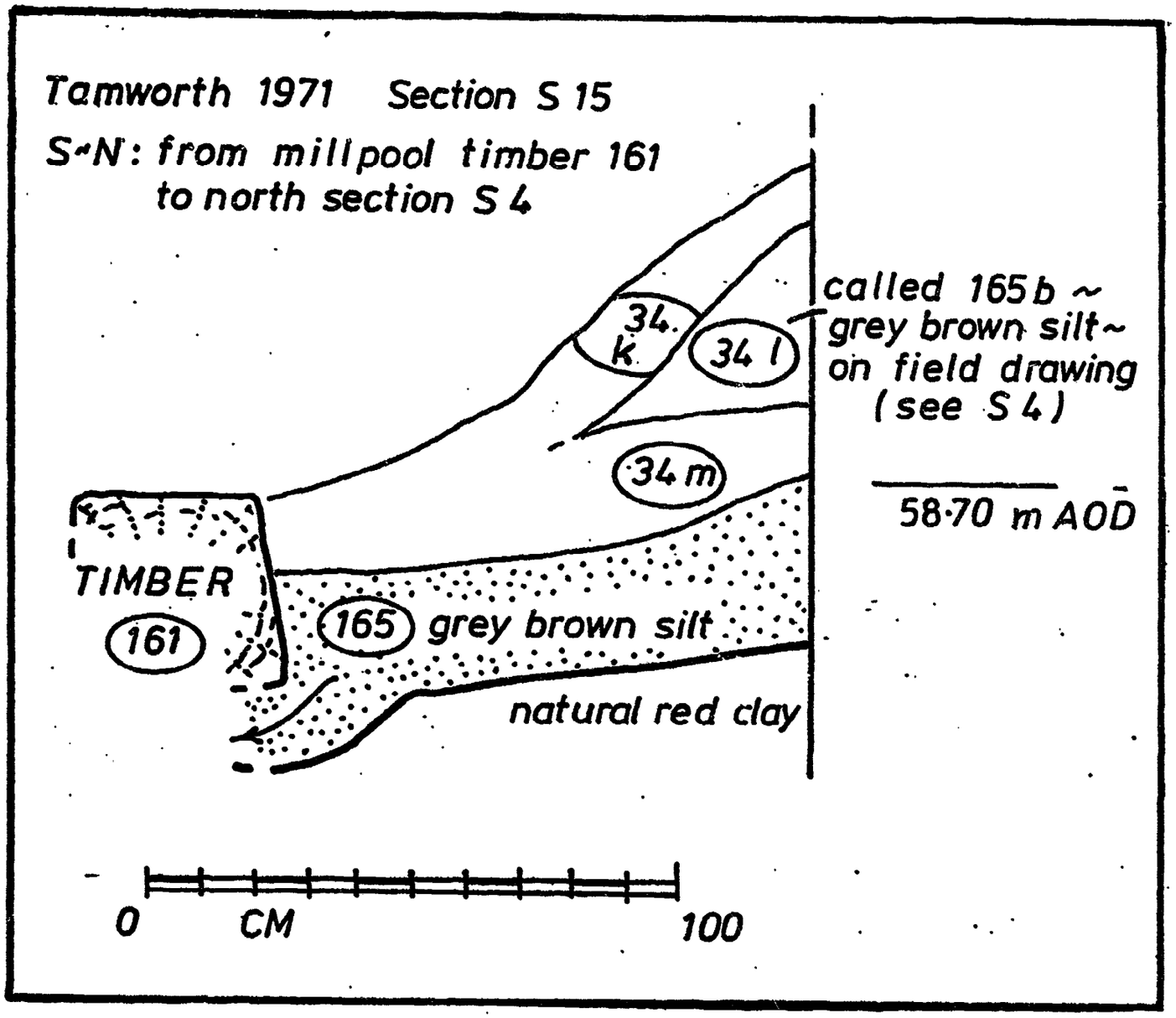
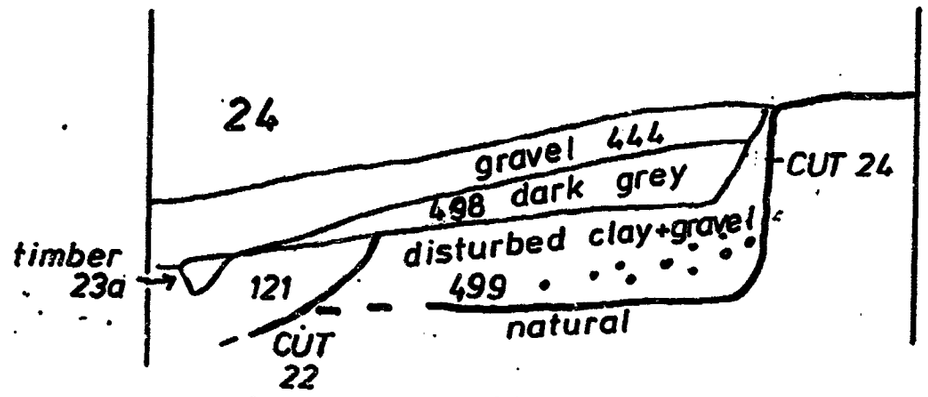

Tamworth 1971 Section S 15
S-N: from millpool timber 161
to north section S 4
34 k
34 l
34 m
called 165b ~
grey brown silt~
on field drawing
(see S 4)
58·70 m AOD
TIMBER
161
165 grey brown silt
natural red clay
0
CM
100

FIG MF 22

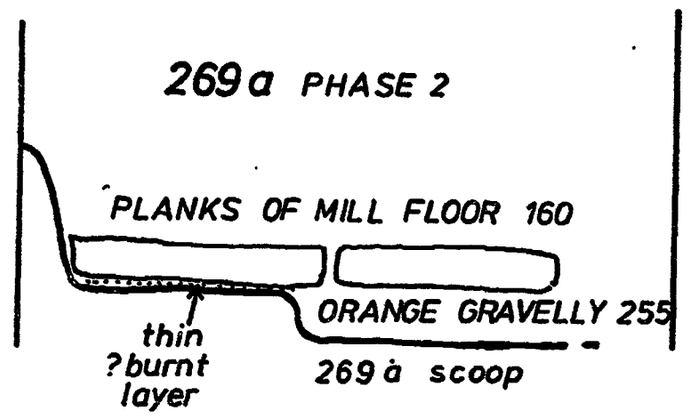
Tamworth 1971 Sections S 16 FIELD SKETCHES IN NOTEBOOKS

(a)



ALL PHASE 5a

(b)



(c)

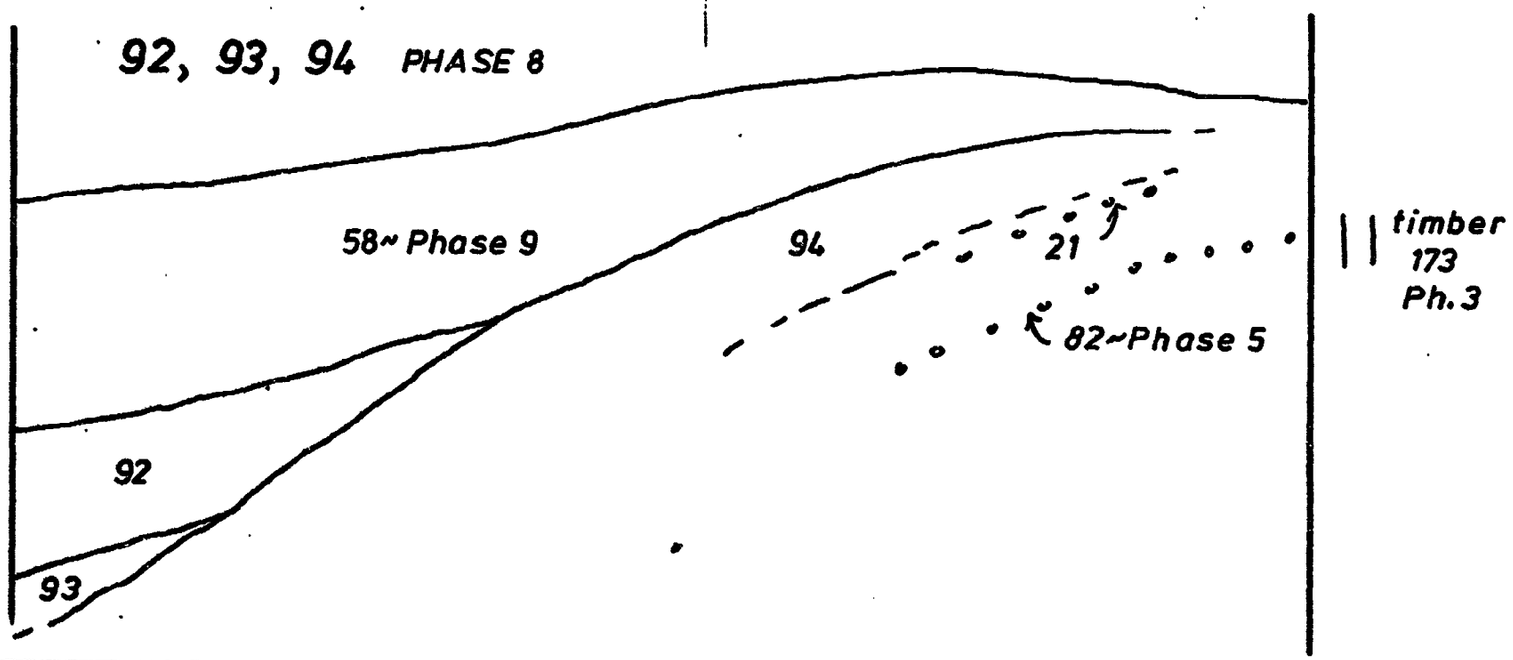
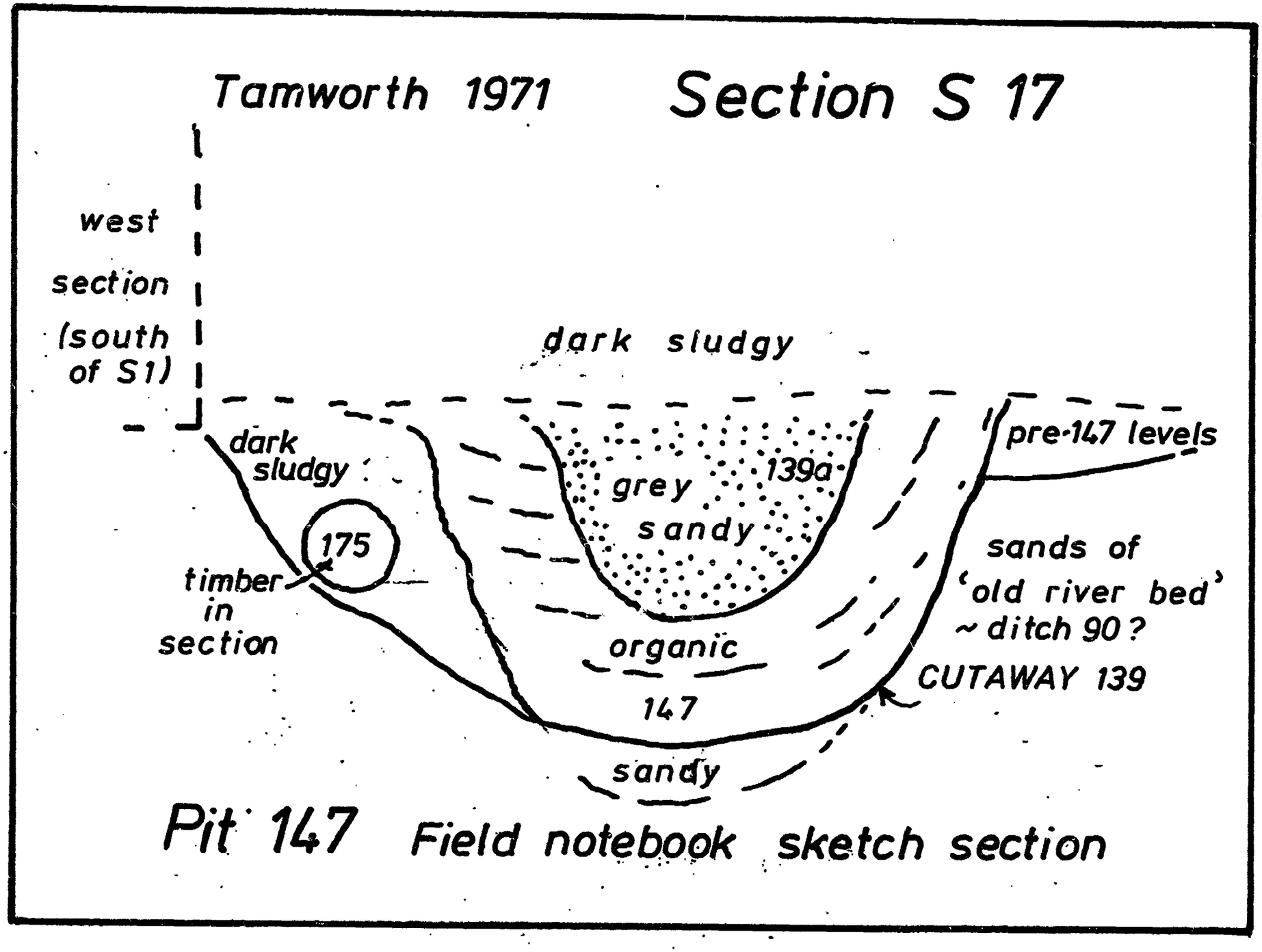


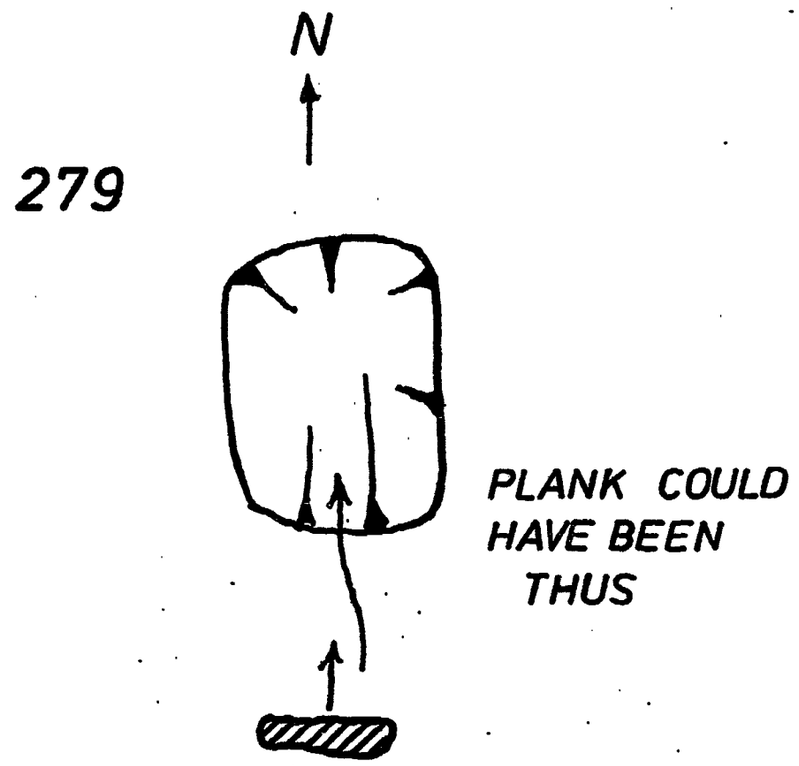
FIG MF 23



Pit 147 Field notebook sketch section

FIG MF 24

Tamworth 1971 *Notebook field sketch plans*



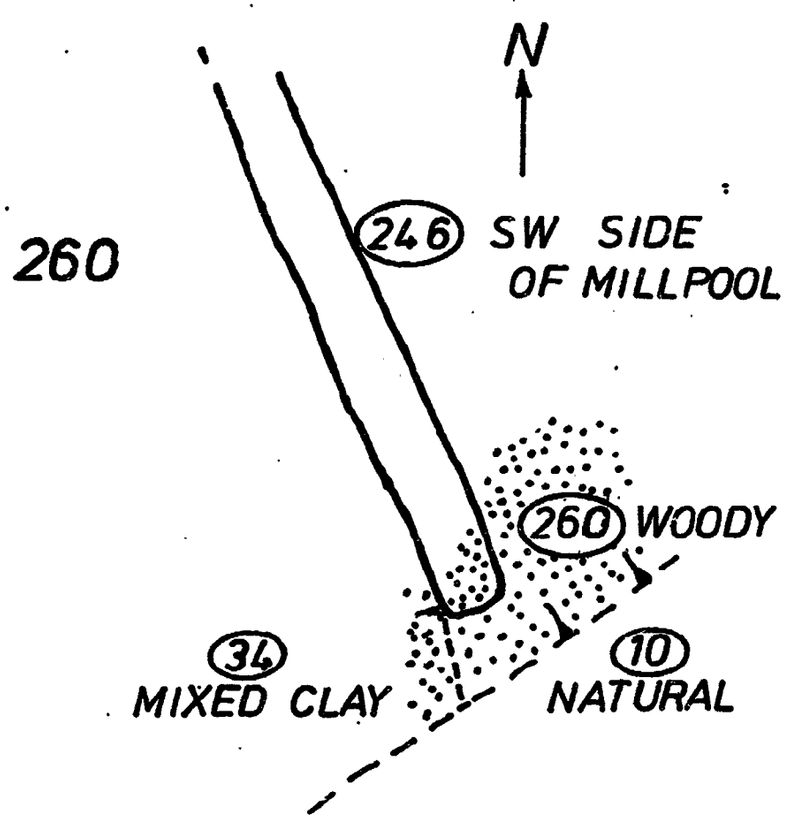
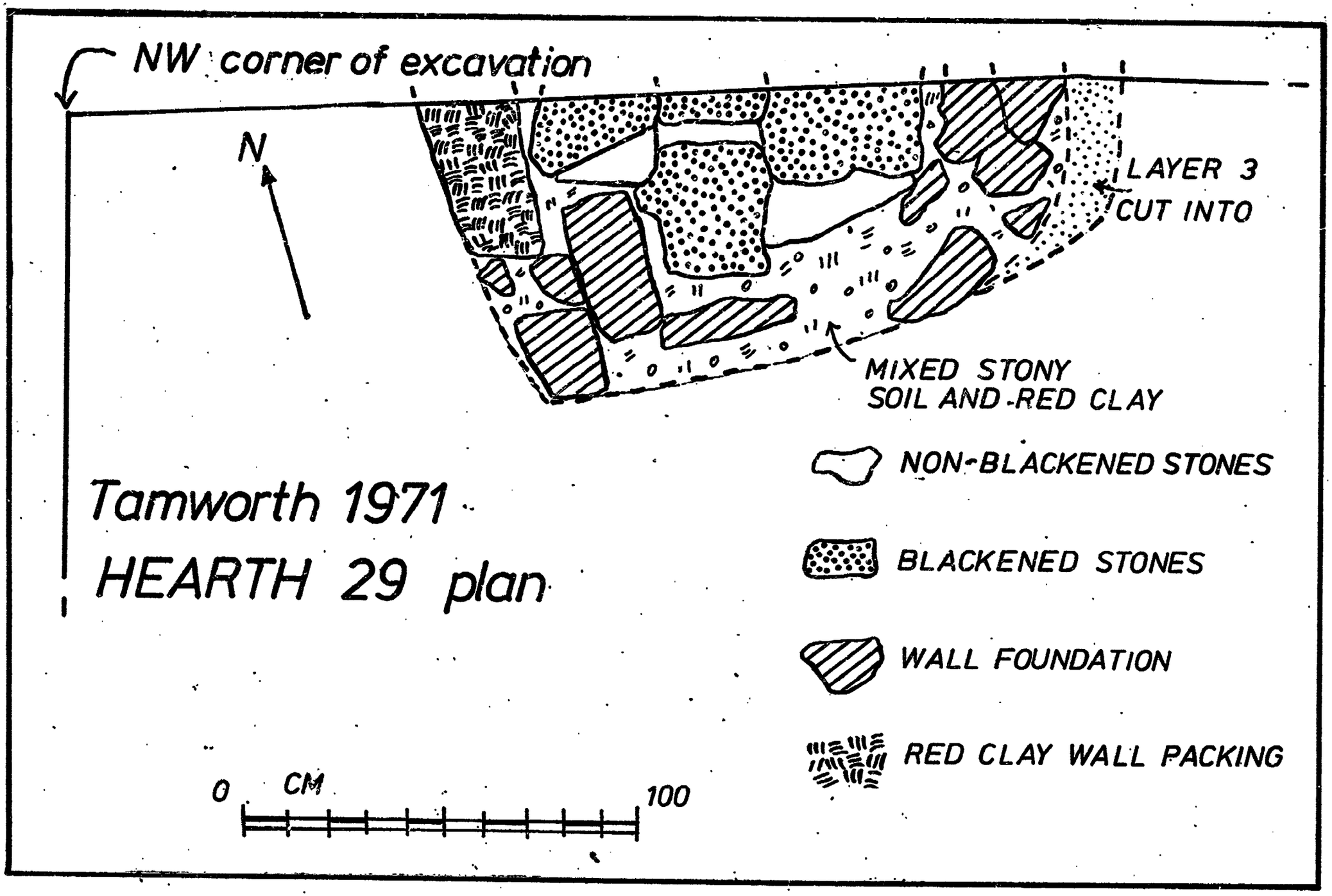


FIG. MF 29



Tamworth 1971

HEARTH 29 plan

FIG MF 37

E3-4

Tamworth 1978

AREA A PLAN M5

grey soil packing round sandstone

NOTIONAL EDGE OF EXCAVATION

post med.

55

6 post-med.

20 post-med.

183

LINE REPRENTS TOP OF SLOPING FACE OF MEDIEVAL 'BANK' (PHASES 7-8)

battered edge

263

139

142 stake

143

140

141

144b

144a

orange sand with many pebbles

turfy sand

fall 32 cm

35

BAULK LEFT IN SITU

? Bridge planks

trial section cut down to natural

149

these lines not recorded on site: estimated from section on W. and plan on E.

MODERN BRICK-LINED PIT

SLOPING FACE OF BANK : TOP OF 96 ON SECTION S 51

SECTION S 56

SECTION S 57

EROSION CHANNEL A 264

265

large post hole 146

offset in section

CELLAR

line of SECTION S 54

DITCH 145 PHASES 7-8

baulk removed to follow ditch through to section S6

1978 SECTION S 52

1971 SECTION S 6 END

SECTION S 55

this area dug to level of 26 only

TRIAL TRENCH AREA A

DITCH 266 PHASE 9

SECTION S 51

N

NUMBERS 'A' PREFIX

YS YELLOW SANDSTONE

C C C - EROSION CHANNEL A 264 (PHASE 7) BELOW PHASE 4 BANK AND CUT INTO PHASE 2/3 LEAT

100 cm 0

0 1 2 3 4 5

metres

RM 1987

Tamworth 1978
AREA A
PLAN M6

NUMBERS 'A' PREFIX

W end of section S 53
S 53 top of section
bottom of section
brick wall in section
S. edge of second leat
189 projecting pointed stake
see section 185
green-stained on end
timbers in section
153 pointed post Dendro AD 855±9
line of section at base
183
119
red clay: rippled pot-holed sand-strewn surface ~ bed of second phase leat
tighter more orange clayey with pebbles
117
hard red clay
152
sand
256
irregular bed
184
186
187
169
void
at 45°
142
144b
Dendro AD 855±9
THIS BAULK CUT OUT
POST-HOLE FOR SLOPING STAKE 22×10mm IN SECTION
170
150b
150a
151
mixed dirty stiff red ~ brown clay
beam slot and post-hole ~ black organic fill
edge of erosion channel 264 (cuts 114 and 116) Phase 7
line of NIS SECTION S51
SECTION S56
SECTION S57
DITCH A 145
erosion channel 264 cut through leat silts
MIXED CLAY AND SAND
MODERN BRICK-LINED PIT
CELLAR
offset in section
146 post-hole in side of leat
DITCH A 145 PHASES 7-8
SECTION S 52
line of SECTION S54
SECTION S51
1971 SECTION S 6 END
TRIAL TRENCH AREA A

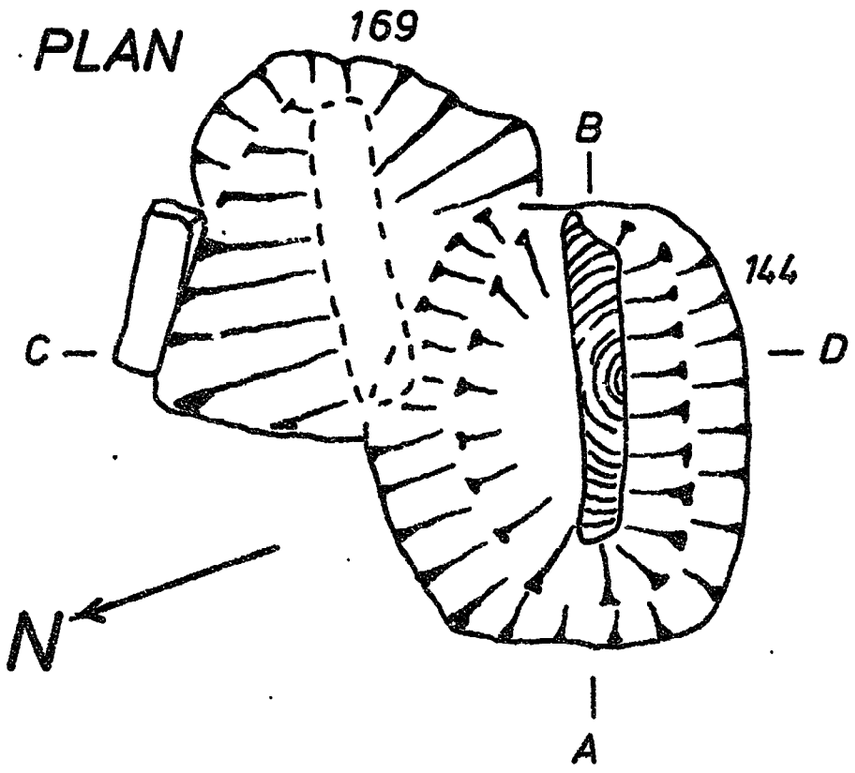
N

100 cm 0
0 1 2 3 4 5
metres

RM 1987

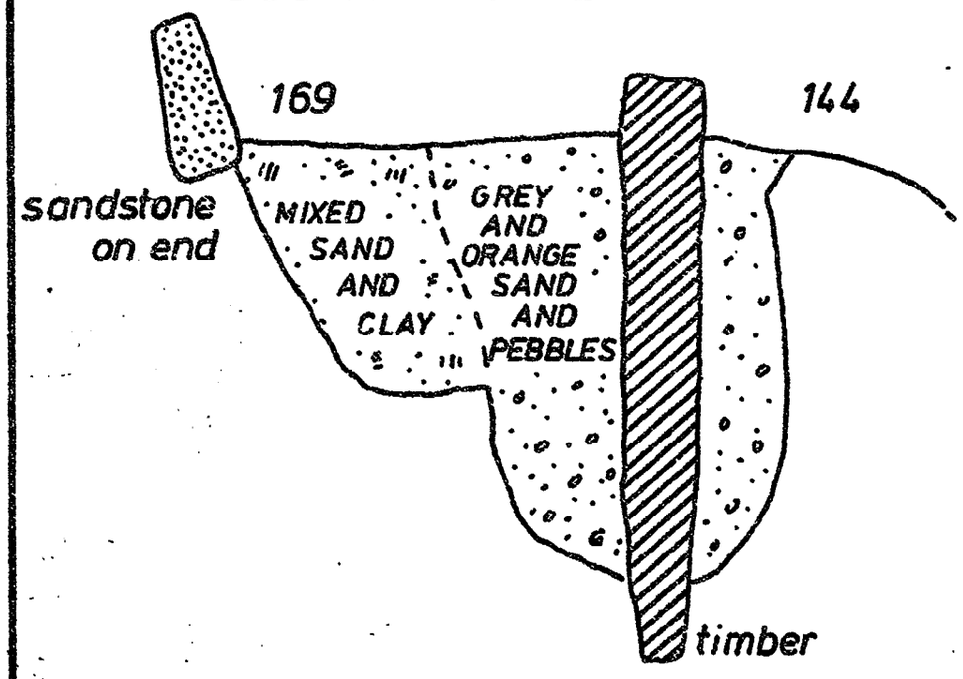
Tamworth 1978

PLAN and SECTIONS of 144 and 169

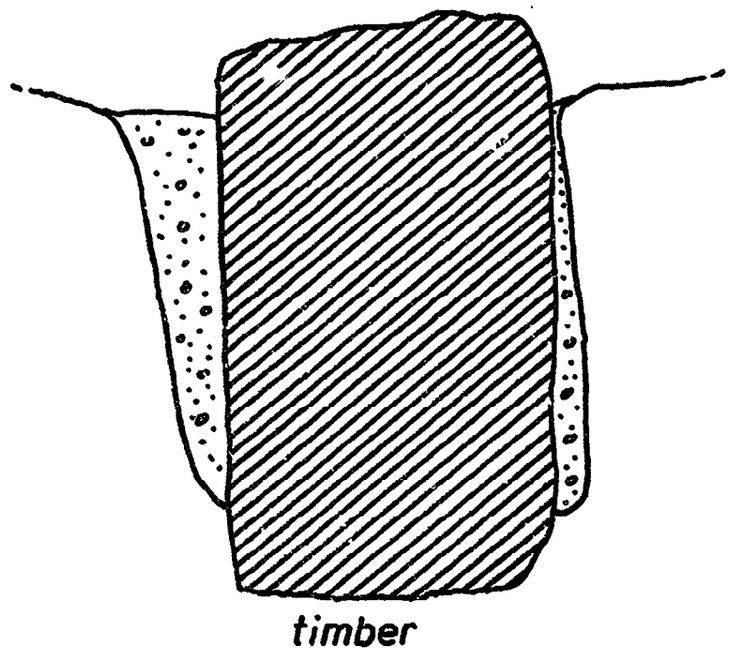


58·52 m AOD

Section C ~ D

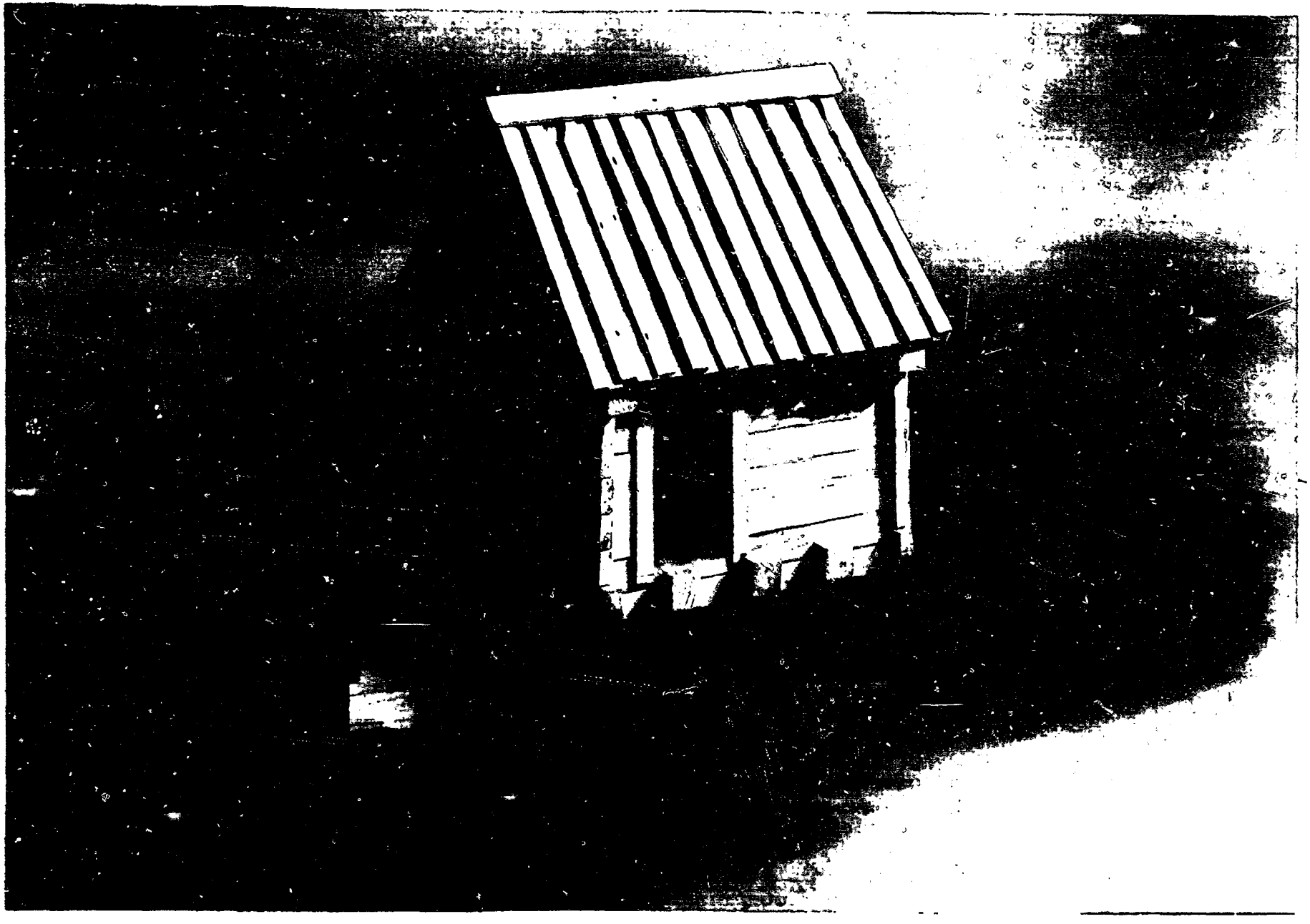


Section A ~ B



RED $\frac{1}{2}$ = 12·4

MF FIG 106

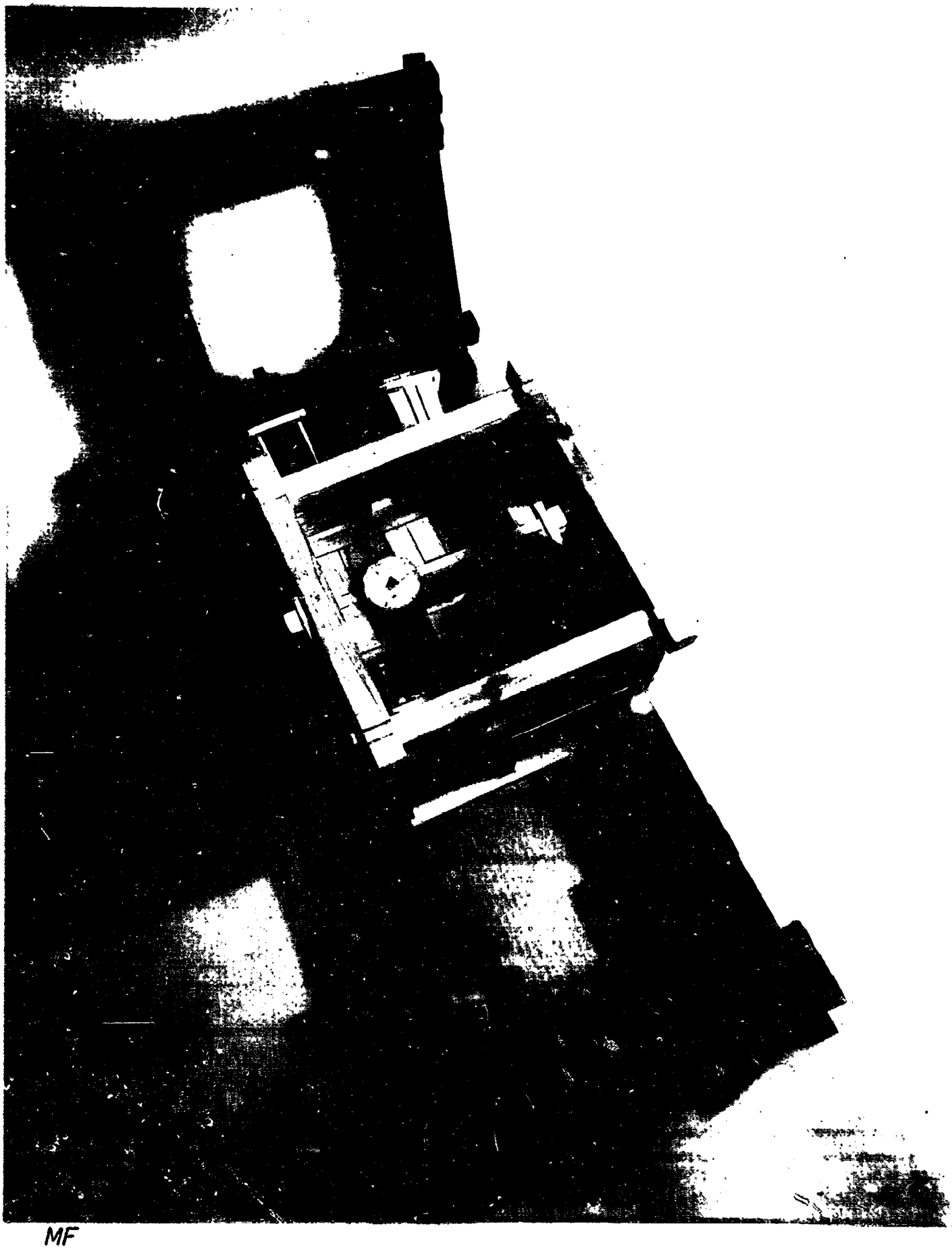


MF PL XXV

C 290280

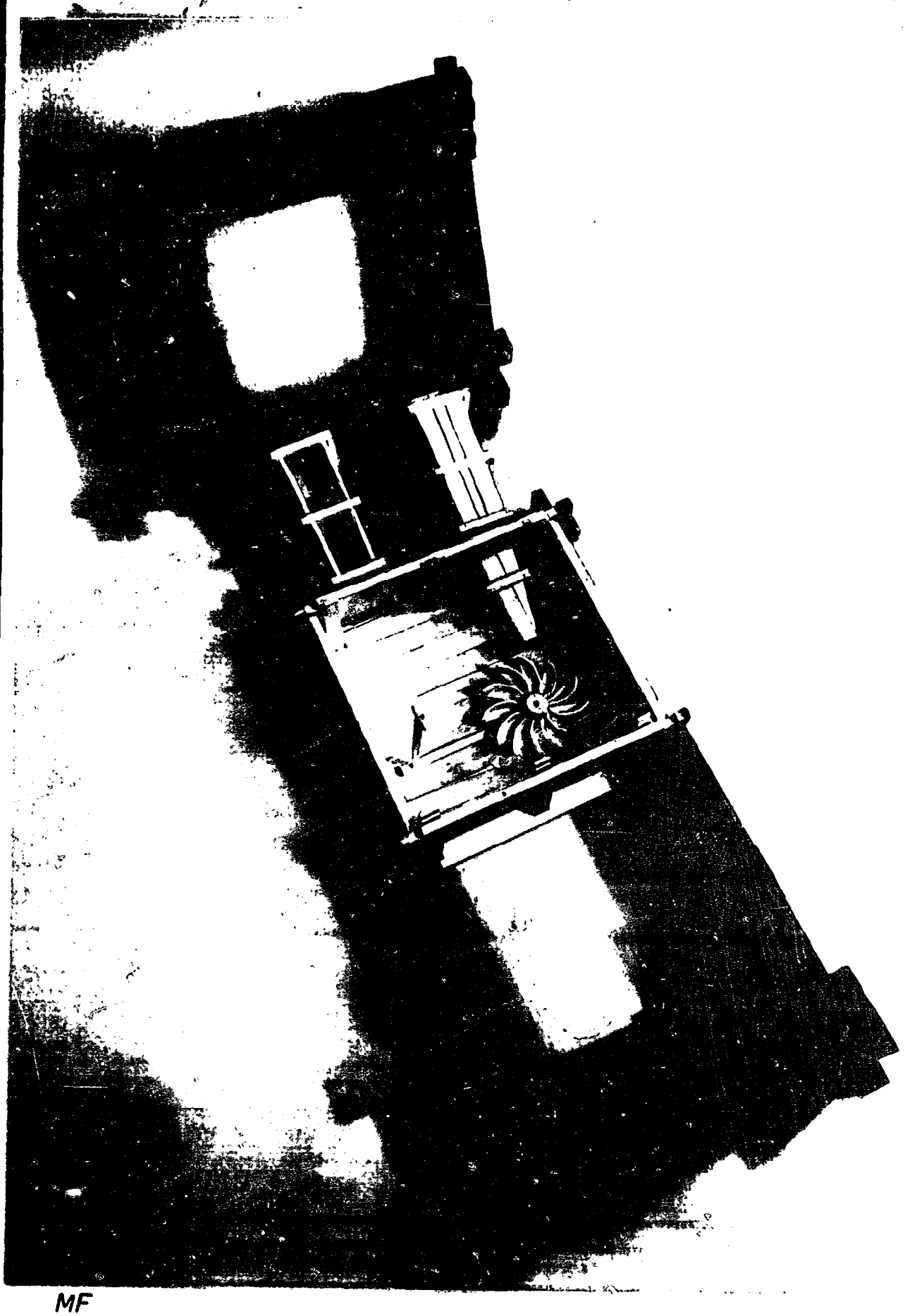
MF
PL XXVI

A 290280



MF
PL XXVII

F 290280



MF
PL XXVIII

E 290280

MF
PL XXIX

G 290280