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APPENDIX 1
NORTH-WEST SECTOR SAMIAN
By B. DICKINSON

Unillustrated samian continuing from p.90.
79 Form 37, burnt, Central Gaulish. The ovolo is not closely identifiable, but the single festoon, sea-horse (D.33) and large beads suggest manufacture by either Casurius ii or Do(v)eccus i. c AD 160-200. ABC. Gravel spread Late. Not ill.

80 Form 37. The tongueless ovolo (Ricken-Fischer, 1963, E69) and corded border (*ibid.*, 0242) were used at Rheinzabern by Ianus ii. c AD 160-190. ABO Phase 4 or 5 gravel spread and ABJ Phase 6 gravel spread. Not ill.

81 Form 37, Central Gaulish, with scroll decoration. One of the lower concavities contains a dog (D.934) and a small ring, as used by Cinnamus ii. c AD 150-180. ABQ Gravel spread Phase 4. Not ill.

82 Form 37, in the style of Austrus of Lezoux, with single festoons containing a cup (Rogers T37) and a dog (D.935). Cf. S. & S., 1958, pl.95, 13, 20. c AD 125-140. ABY Gravel spread Phase 4. Not ill.

83 Form 37, with scroll decoration including

a leaf (Rogers H99) used at Lezoux by Hadrianic and Antonine potters. This piece is Antonine. ABY Gravel spread Phase 4. Not ill.

84 Form 37, Central Gaulish, with panels: 1) A kneeling stag (D.847), over an acanthus (Rogers K12). 2) A double medallion. Probably by Cinnamus ii; cf. S. & S., 1958, pl.159, 25. c AD 150-180. ABY Gravel spread Phase 4. Not ill.

85 Form 37. Central Gaulish, with panels: 1) A vine-scroll? (Rogers M50?). 2) An unidentified figure-type. The vine-scroll and the ovolo (Rogers B102) were both used at Lezoux by Advocisus. cAD 160-190. ACB Phase 5-6 Subsidence in pit AC. Not illustrated.

86 Form 37, Central Gaulish. Probably by Oriciro v, with rosetto junction masks and an erotic group (Oswald, 1936-7, pl.XC, B). c AD 135-170. ACD upper filling in pit AC. Phase 4. Not ill.

87 Form 37, with scroll decoration. The leaf (Rogers H13) and small ring were both used at Lezoux by the Cerialis ii-Cinnamus ii group. c AD 140-170. ACD Upper filling in pit AC. Phase 4. Not ill.

88 Form 37, Central Gaulish, with panels: A leaf (Rogers J56). 2) A medallion with cogged

outer border (Rogers E25). Both are on a stamped bowl of Casurius ii from Leicester (S. & S., 1958, pl.133, 17). c AD 160-190. AGB Gravel spread. Late. Not ill.

89 Form 37, Central Gaulish. The ovolo (Rogers B36) occurs on a signed bowl of Drusus ii, probably from Colchester (S. & S., 1958, pl.88, 1). c AD 125-145. AGK Gravel spread Phase 6. Not ill.

90 Form 37, Central Gaulish, with panels: 1) A double medallion with beaded outer border (Rogers E8). 2) Pan (D.419). 3) = 1. Both details were used by Do(v)eccus i.

A sherd in AAA Topsoil, which almost certainly belongs to the same bowl has panels: 1) The same medallion, with an athlete (D.394) and leaf (Rogers H152). 2) The Pan, with a leaf (Rogers G204). c AD 165-200. AWA Pit Phase 6. Not ill.

91 Form 37. Central Gaulish. The winding scroll contains a large leaf (Rogers B35) and a small ring, both used at Lezoux by Paternus v and Lastuca. c AD 160-195. BAA/BAB Humic layer and ADC Medieval ditch. Phaes 4-6. Not ill.

92 Form 37. Central Gaulish, with the buds (partial impression of Rogers J178) of the Cerialis ii-Cinnamus ii group and a Neptune (D.14). c AD 140-170. BWA Clay spread Phase 5. Not ill.

94 Form 37. Central Gaulish. The upper zone or top half of panel has a double medallion containing a stag (D.860). Cf S. & S., 1958, pl.126, 20, though the Little Chester bowl is not necessarily by Iullinus. Mid- to late-Antonine. CFF Gravel spread Phase 4. Not ill.

95 Form 37. Central Gaulish, in the style of Mercator i. Kiln-grit on the rim suggests that this bowl was at the bottom of a stack in the kiln. c AD 80-110. CGD Slot of granary type building. Phase 3. Not ill.

96 Form 37. Central Gaulish. Scroll decoration, with ovolo 2 of Do(v)eccus, distorted (S. & S. 1958, fig.44, 2). c AD 165-200. CPA Pit Phase 6. Not ill.

97 Form 37. Central Gaulish, with ovolo Rogers B144 and panels 1) A philosopher (D.523). 2) A chevron festoon (Rogers F40) containing a cockerel (O.2344A). By a member of the Cerialis ii Cinnamus ii group. c AD 140-170. DCA subsidence in pit DC. Phase 4. Not ill.

98 Form 37, with an ovolo used at Lezoux by the Sacer i group and Cinnamus ii. Not closely datable. DCU Upper filling of pit DC. Phase 4. Not ill.

99 Form 37, with a trident-tongued ovolo

and a fan-shaped plant. The latter was used at both La Graufesenque (Hermet, 1934, pl.14, 48) and Banassac. It was used by Mercator i and appears on a stamped bowl of the La Graufesenque potter Sabinus iv from Cannstatt (*Fundberichte aus Schwaben* XVII, (1909), Taf.III, 1). c AD 90-110. SQG Slot of granary type building. Phase 3. Not ill.

100 Form 37. Central Gaulish, with panels: 1) A trifold motif (Rogers G74?). 2) A caryatid (O.1201A?) over a chevron column (Rogers P70). 3) A warrior (O.193A variant) and cupid with basket (D.272). The bowl is by a member of the Paternus v group, perhaps Mammius, who used the column (S. & S., 1958, pl.103, 4) and the rosette. c AD 150-180. EEF Oven Phase 4. Not ill.

101 i, Central Gaulish. The ovolo (Rogers B102) and finely-beaded border were used at Lezoux by Advocisus and Priscus iii/Clemens ii. c AD 160-190. EGA Phase 5-6 Subsidence in pit DC. Not ill.

102 Five fragments of form 37, Central Gaulish. The panels include a tripod (Rogers Q16) and caryatid (not closely identified). The ring-tongued ovolo and rhomboidal beads suggest Paternus v or one of his associates. c AD 150-190. EKA Upper pit filling Phase 4. Not ill.

103 Form 37, in the style of X-2 of Les Martres-de-Veyre, with hi single-bordered ovolo (Rogers B28) and wavy-line border. c AD 100-120. EOA Coal layer Phase 4. Not ill.

104 Form 37, Central Gaulish, with a double medallion containing a lion (O.1421) over a panther (D.799). All the details were used at Lezoux by Cinnamus ii, and his characteristic ring terminals make the attribution certain. There is either a trace of a cursive signature below the decoration, or the bowl was made in a cracked mould. c AD 150-180. EOC Coal layer Phase 4. Not ill.

105 Form 37, burnt, Central Gaulish. The freestyle scene includes a stag (D.852). Probably by Cinnamus ii, but Antonine, in any case. EOD Coal layer Phase 4. Not ill.

106 Form 37 rim, burnt, Central Gaulish. The ovolo (Rogers B102) was used at Lezoux by Advocisus and Priscus iii/Clemens ii. c AD 160-190. EOD Coal layer Phase 4. Not ill.

107 Form 37. The ovolo (Rogers B145) was used at Lezoux, with a beaded border below, Carantinus and Cinnamus ii. c AD 150-180. EXC Upper filling of pit, Phase 5. Not ill.

108 Form 37, heavily burnt. The ovolo (Rogers B102) and a tree (Rogers N11) were

- both used at Lezoux by Advocisus. *c* AD 160-190. EXC Upper filling of pit. Phase 5. Not ill.
- 109 Form 37, Central Gaulish, with ovolo Rogers B208 (here over-run) and a slave (D.374). Both were used by Docilisi on a signed bowl from Poitiers. *c* AD 135-160. EXN Pit filling. Phase 4. Not ill.
- 110 Form 30, Central Gaulish, with astragalus borders separating panels: 1) (Lower part) Bifid motifs (Rogers K35), impressed stem-to-stem. 2) a warrior with shield (D.616). All the details were used at Lezoux by Albuclius ii and appear on a stamped form 30 from Silchester (S. & S., 1958, pl.121, 17). *c* AD 150-180. EYA Phase 3 or 4. Partially excavated feature. Not ill.
- 111 Form 37, with an ovolo used at Lezoux in the Hadrianic period (Rogers B213). FBC Phase 3. Not ill.
- 112 Form 37 (2), one in the style of the *Cerialis ii* Cinnamus ii group. Central Gaulish and Hadrianic-Antonine or Antonine. FBD Pit Phase 3. Not ill.
- 113 Form 37, Central Gaulish, with the commonest ovolo of the *Cerialis ii*-Cinnamus ii group (Rogers B144) and panels: 1) Perseus (D.146). 2) A pair of gladiators (the upper part pf D.1069A). 3) Vulcan? (D.39?). *c* AD 140-170. FBD Pit Phase 3.
- 114 Form 37, Central Gaulish. The decoration includes a polygonal leaf (Rogers J1) used at Lezoux in the Hadrianic and Antonine periods. This piece is probably Hadrianic or early-Antonine. FCE Gravel layers. Phase 3. Not ill.
- 115 Form 37, Central Gaulish. The decoration includes a stag (D.867) and a snake on rock (D.960 bis), used at Lezoux by Attianus ii and Criciro v. *c* AD 125-160. FEA Spread Phase 4. Not ill.
- 116 Form 37, South Gaulish. The ovolo was used at La Graufesenque by Memor, Mommo and a potter whose name begins in Trim... A saltire panel includes a plant (Knorr, 1919, Taf.57, 10) in the upper part. The decoration is rather blurred, as if the bowl had come from a worn mould. *c* AD 80-95. FLB Gravel layer Phase 3. Not ill.
- 117 Form 37, Central Gaulish, with panels: 1) A ram's-horn motif. 2) A figure striding to right. The fabric, with purple core, is probably from Les Martres-de-Veyre, in which case the mould is likely to have been made by one of the potters who supplied Donnaucus. *c* AD 110-125. FLB Gravel layers Phase 3. Not ill.
- 118 Form 37, Central Gaulish. Freestyle (?) decoration, including an athlete (O.679) used by Pugnus ii on a signed mould from Lezoux. *c* AD 130-150. GNB Phase 4 pit. Not ill.
- 119 Form 37, Central Gaulish, with panels: 1) A vine-scroll (Rogers M50). 2) Cupid (O.504). Both details occur on stamped bowls of Advocisus, the scroll from Caerwent (S. & S., 1958, pl.112, 12), the Cupid from Chester-le-Street *c* AD 160-190. GOB Phase 4 filling of pit GO. Not ill.
- 120 Form 37, Central Gaulish. The ovolo (Rogers B204) and bird (O.2270A variant) are both on a signed bowl of Attianus ii from Chester (S. & S., 1958, pl.87,21) *c* AD 125-145. GXB Phase 3 pit. Not ill.
- 121 Two joining fragments of form 37 rim, in the style of Drusus i (X-3) of Les Martres-de-Veyre, with his single bordered ovolo (Rogers B28) and border of dotted beads. *c* AD 100-120. HFA slot of granary type building Phase 3. Not ill.
- 122 Form 37, Central Gaulish, with ovolo Rogers B24 and a hare (O.2057A?), as used by the Large S Potter on a bowl in Peterborough Museum. *c* AD 125-140. JQF Upper filling of slot of granary type building Phase 4. Not ill.
- 123 Form 37, Central Gaulish, with hare to right (O.2057?). Hadrianic-Antonine. JQJ Lower filling of slot of granary type building Phase 3. Not ill.
- 124 Form 37, Central Gaulish, with Cinnamus ii's ovolo 1 (Rogers B223) and a sphinx (O.858 variant), which he is known to have used occasionally. *c* AD 150-180. JRA Occupation layer Phase 3. Not ill.
- 125 Form 37 rim, with a ring-tongued ovolo used at Lezoux by Paternus v and some of his associates (Rogers B105). *c* AD 150-190. JTA Pit Phase 4. Not ill.
- 126 Form 37, Central Gaulish, with ovolo (Rogers B144) and sphinx (D.496) used by the *Cerialis ii*-Cinnamus ii group. *c* AD 140-170. JTD Pit Phase 4. Not ill.
- 127 Forms 33 (with an external offset on the rim and a fine groove approximately 13mm below it) and 37 (with panel including Diana and hind D.64), Central Gaulish. Hadrianic-Antonine. JTH Pit Phase 4. Not ill.
- 128 Form 37, Central Gaulish, with panels: 1) Bird to left? 2) Caryatid (D.657). 3) Hare to right (O.2057?). 4) = 2. 5) Dog (O.2039 O). The beaded rings at the base of the borders suggest either Criciro v or Divixtus i. The bowl is perhaps more likely to be by Divixtus, since he is known to have used more of the details. *c* AD 150-180. JYG and JYN Gravel spread Phase 4. Not ill.
- 129 Form 37, burnt, Central Gaulish. One

panel contains a caryatid (D.657). Traces of a rosette-tongued ovolo suggest a member of the Sacer i group. *c* AD 125-145. JYS Gravel spread Phase 4. Not ill.

130 Form 37, in the style of Drusus i (X-3) of Les Martres-de-Veyre. The saltire panel, with multiple beaded diagonals and double acanthi (Rogers K13 & 25) is closely paralleled on a bowl from Silchester (S. & S., 1958, pl.16, 197). *c* AD 100-120. KMD Phase 2 gravel spread. Not ill.

131 Form 37, South Gaulish, with a rather blurred, trident-tongued ovolo and a panel with a hare (O.2056). *c* AD 90-110. LRK Lower filling in pit LR Phase 2. Not ill.

132 Form 37, with Igocatus (X-4) of Les Martres-de-Veyre's smaller ovolo (Rogers B37). *c* AD 100-120. LSB Gully. Phase 3 or 4. Not ill.

133 Form 37, Central Gaulish, with rosette-tongued ovolo. Probably by a member of the Sacer i group. Hadrianic-Antonine. LXA Slot of granary-type building. Phase 3. Not ill.

134 Form 37, in the style of Drusus i (X-3) of

Les Martres-de-Veyre. The panels include: 1) A saltire, with an acanthus (Rogers K25). 2) A tripod (Rogers Q15). 3A) Conjoined dolphins (O.2407A); 3B) A series of bifid motifs (Rogers G284). The basal wreath is a series of beaded circles (Rogers C294). All the details are known for him (S. & S., 1958, pl.10). The footring is heavily worn. *c* AD 100-120. LXC Slot of granary type building. Phase 3. NJA silt Phase 3. Not ill.

135 Form 37, South Gaulish, in the style of Germanus i. The ovolo is Hermet, 1934, pl.99, 37. The vine, with grapes and leaf is on a bowl in his style from La Graufesenque (*ibid.*, pl.100, 14), and the grapes alone are on a stamped form 78 from Vindonissa (Knorr, 1919, Taf.39R). The hare is perhaps Hermet, 1934, pl.26, 55. *c* AD 70-90. NYB Phase 2 gravel spread. Not ill.

136 Form 37, 2 rims, both from Les-Martres-de-Veyre and both with ovolo Rogers B28. *c* AD 100-120. PDC Phase 2, gravel spread. Not ill.

APPENDIX 2
DERBY NORTH-WEST SECTOR ANIMAL BONE
 By M. HARMAN

Phase I	Cattle			Sheep			Pig	
	L		R	L	R	L	R	
Skull	3	3	4	1				
Maxilla	2			1		1	2	
Mandible	4		5		1		3	
Tooth		1					1	
Vertebra		7			2			
Rib		11			10			
Scapula	1	1	1	1			1	
Humerus	2	1	4	2	2			
Radius + Ulna	3	1	2	3	2	1		
Metacarpal	1		2		1			
Pelvis	1		6		2			
Femur	3	2	4				1	
Tibia	3	2	3	2	2	2		
Astragalus	1							
Calcaneum			2	1				
Scapho-cuboid	1		1					
Metatarsal		1	2		1	1		
Phalanx 1	3		2					
Phalanx 2	3		1					
Phalanx 3			1					
Total		82			23		11	
(excluding T, V, R)		71%			20%		9%	
Minimum no. of animals		6 46%			3 23%		4 31%	

Also: Horse: metacarpal R.

Dog: radius R.

Table 25 Derby North-West Sector: total numbers of bones and minimum number of animals of different species identified in phase 1.

Phase 1/2	Cattle		Sheep			Pig	
	L	R	L	R	L	R	
Skull	4	2	4	1	1		
Maxilla	2		2				1
Mandible	6		6	1			2
Tooth		3			2		
Vertebra		11					
Rib		7			2		
Scapula	2	2	2	2			1
Humerus		1	2	1	2		1
Radius + Ulna	1		3	2	1		
Metacarpal	1	2	1		2		
Pelvis	3		2	2			
Femur		3		1	1	1	1
Tibia	4		5		2	1	
Astragalus	2		1				
Calcaneum	1						
Scapho-cuboid							
Metatarsal			2	1	1		
Phalanx 1	2		2	1			
Phalanx 2							
Phalanx 3	1						
Total		71			23		7
(excluding T, V, R)		70%			23%		7%
Minimum no. of animals		6			3		2
		55%			27%		18%

Also: Horse: radius L, metacarpal 1, phalanx 1:1.

Hare: femur: L.

Table 26 Derby North-West Sector: total numbers of bones and minimum number of animals of different species identified in phase 1-2.

Phase 2	Cattle			Sheep			Pig	
	L		R	L		R	L	R
Skull	13	7	15	1	1	1	2	1
Maxilla	6	6			2			
Mandible	13	3	12	3		5	2	2
Tooth		9			2			4
Vertebra		30			2			1
Rib		64			31			
Scapula	13	5	12			1	1	1
Humerus	7	2	11	4		3	1	4
Radius + Ulna	6		6	8		10	3	3
Metacarpal	1	6	9	4	1	2		
Pelvis	5		6	2		3	2	1
Femur	2	3	2		3	3		1
Tibia	5	2	5	6		19		1 3
Astragalus	1						1	
Calcaneum	1		3	1		1	2	
Scapho-cuboid	1		1					
Metatarsal	4	4	5	2		5	2	
Phalanx 1	9		4	1			1	
Phalanx 2	1							
Phalanx 3	3		1					
Total (excluding T, V, R)		221			92			33
		64%			27%			9%
Minimum no. of animals		15			21			5
		37%			51%			12%

Also: Goat: skull L + R frontals.

Horse: scapula L, humerus L, metacarpal L.

Dog: tooth 1, tibia R.

Red Deer: antler part tine.

Table 27 Derby North-West Sector: total numbers of bones and minimum number of animals of different species identified in phase 2.

Phase 2-3	Cattle		Sheep			Pig			
	L	R	L	R	L	R			
Skull	5	4	7	2	2	1	2		
Maxilla	2		2	2	2				
Mandible	2	1	8	5	5	1	2		
Tooth		7			2		1		
Vertebra		13			7		23		
Rib		76		68					
Scapula	3	2	6	1	4	1	1	2	
Humerus	1	3	1	2	5			1	
Radius + Ulna	5	2	6	10	1	4	2	2	
Metacarpal	4	4	3	3	2	3	1	1	
Pelvis	3		6	1	4			1	
Femur		5		3	3	1	1		
Tibia	5	4	1	9		12	1	2	1
Astragalus	1								
Calcaneum	2	1		1					
Scapho-cuboid									
Metatarsal	1	3	2	6	3	1		1	
Phalanx 1	3		4					2	
Phalanx 2	3		1						
Phalanx 3	1		2						
Total (excluding T, V, R)		119			96			26	
		49%			40%			11%	
Minimum no. of animals		8			12			3	
		35%			52%			13%	

Also: Horse: radius R, phalanx 1:1.

Dog: scapula L.

Table 28 Derby North-West Sector: total numbers of bones and minimum number of animals of different species identified in phase 2-3.

Phase 3	Cattle			Sheep			Pig		
	L		R	L		R	L		R
Skull	22	18	32	1	2	1	1	1	5
Maxilla	5		7	1		2	1		4
Mandible	20	2	29	13		21	6		5
Tooth		14			7			2	
Vertebra		60			7			2	
Rib		262			102			1	
Scapula	14	4	21	5	4	5	3	2	2
Humerus	16	7	12	9		8	4	1	2
Radius + Ulna	12	6	17	17		17	5	1	2
Metacarpal	10	11	7	4	2	6	2		2
Pelvis	20	1	23	8		6	2		4
Femur	3	15	5	3	13	2	1		4
Tibia	12	7	19	21	5	24	2		5
Astragalus	2		3						
Calcaneum	4		2			1	1		1
Scapho-cuboid	5								
Metatarsal	6	13	6	12	3	8			1
Phalanx 1	20		12						
Phalanx 2	6		5						
Phalanx 3	4		2						
Total (excluding T, V, R)		462			224			70	
		61%			30%			9%	
Minimum no. of animals		33			24			7	
		52%			37%			11%	

Also: Horse: tooth: 3, scapula: R, radius/ulna 4 L, femur 1, phalanx 1:1.

Dog: tooth 2, mandible L, femur part DNE, femur, same animal — rib: parts 11, humerus L, radius, ulna, femur R.

Hare: tibia R.

Roe Deer: antler.

Sheep/roe deer: humerus L.

Table 29 Derby North West Sector: total numbers of bones and minimum number of animals of different species identified in phase 3.

Phase 3-4	Cattle		Sheep			Pig			
	L	R	L	R	L	R			
Skull	8	6	6	2	2	1	2	2	
Maxilla	3		1	2				2	
Mandible	3		7	4		9	2	2	
Tooth		6			7				
Vertebra		21			11			2	
Rib		68			40			1	
Scapula	6	5	5	3		2		2	1
Humerus	7		5	7	1	5	1		3
Radius + Ulna	6	4	12	8		7	1		2
Metacarpal	3	5	1	6	2				
Pelvis	6		4	2		6	2		
Femur	2	11	1	2	7	2	3	1	3
Tibia	2	2	6	12	1	14	2		3
Astragalus	1		1	1					
Calcaneum	4		5			2			1
Scapho-cuboid	2								
Metatarsal	2	5	4	6	5	5			2
Phalanx 1	7		5			2			1
Phalanx 2	3								
Phalanx 3	2		1						
Total (excluding T, V, R)		169			128			38	
		55%			42%			13%	
Minimum no. of animals		13 38%			16 47%			5 15%	

Also: Horse: mandible: part, tooth: 1, radius: R, ulna: R.

Dog: skull: R, vertebra: 1, rib: 1, radius: R.

Table 30: Derby North-West Sector: total numbers of bones and minimum number of animals of different species identified in phase 3-4.

Phase 4	Cattle			Sheep			Pig		
	L	R	L	R	L	R	L	R	
Skull	41	17	43	6	7	9	3	3	3
Maxilla	14		11	3		7	5		2
Mandible	37	7	22	27		27	14		15
Tooth		37			31				12
Vertebra		93			34				6
Rib		389			245				
Scapula	33	11	19	12	6	18	4	5	5
Humerus	30	18	27	29		30	5	1	11
Radius + Ulna	28	4	16	37	2	38	3	1	4
Metacarpal	14	18	17	18	15	19	5	1	7
Pelvis	38	2	45	16		21	4		5
Femur	12	30	9	9	26	12	4	1	4
Tibia	25	6	32	53	6	53	6		8
Astragalus	9		10				1		1
Calcaneum	8		12	4		3	1		6
Scapho-cuboid	4		1						
Metatarsal	14	21	14	21	9	2	1	2	5
Phalanx 1	17		24	2			1		1
Phalanx 2	5		7						
Phalanx 3	7		4						
Total		783			566				147
(excluding T, V, R)		52%			38%				10%
Minimum no. of animals		40			54				15
		37%			49%				14%

Also: Horse: skull: part, maxilla: R, mandible: part, tooth: 5, scapula: humerus: L, radius: R, metacarpal: 2L, femur: L, tibia: L, metatarsal: L, R, splint bone: 1.

Dog: one skeleton pp . tooth: 1, vertebra: 1, scapula: R, humerus: L, R, radius: 1, ulna: 2L, R, pelvis: L, femur: L, tibia: 2L, metatarsal: 1, metapodial: 1.

Red Deer: antler piece, scapula: frag, femur: 2 parts, tibia: R, scapho-cuboid: R.

Roe Deer: radius: L.

Hare: tibia: L.

Table 31 Derby North-West Sector: total numbers of bones and minimum number of animals of different species identified in phase 4.

Phase 4-5	Cattle		Sheep			Pig	
	L	R	L	R	L	R	
Skull	2	1	2	1			
Maxilla	1		1			1	
Mandible	4	1	5	4		1	2
Tooth		4			1		1
Vertebra		4			4		1
Rib		26			11		
Scapula	3		3			4	
Humerus	1	1	2	1		1	1
Radius + Ulna	4	1	4	3		4	1
Metacarpal		5	3	1	1	2	
Pelvis	3		2			2	1
Femur		3			1	1	
Tibia	4		2	1	1	3	2
Astragalus	1		2				
Calcaneum			2				
Scapho-cuboid							
Metatarsal	2		1	2	1	2	
Phalanx 1	1		3				
Phalanx 2							
Phalanx 3							
Total (excluding T, V, R)		70			37		9
		60%			32%		8%
Minimum no. of animals		5			5		3
		38%			38%		24%

Also: Horse: tooth 3.

Dog: mandible: R.

Table 32 Derby North-West Sector: total numbers of bones and minimum number of animals of different species identified in phase 4-5.

Phase 5	Cattle			Sheep			Pig		
	L	R	L	R	L	R			
Skull	15	9	18	4	4	1	2		
Maxilla	2		2	5		3	5		
Mandible	15	1	20	14	14	1	6		
Tooth		26			10		3		
Vertebra		43			12		2		
Rib		133			116				
Scapula	11	6	6	6	3	5	1	2	
Humerus	10	4	9	13	2	10	1	1	
Radius + Ulna	4	4	14	23	1	23	1	3	
Metacarpal	3	10	4	7	13	5	4	4	
Pelvis	11		12	10		14	2	1	
Femur	2	16	6	3	14	6	1	2	1
Tibia	15	1	7	18	4	27	3	3	
Astragalus	2		3						
Calcaneum	6		3	1		1			
Scapho-cuboid	2		1						
Metatarsal	3	10	11	10	3	10	1	1	
Phalanx 1	1		8	2		3			
Phalanx 2	2		2						
Phalanx 3	4		5						
Total (excluding T, V, R)		300			278		50		
		48%			44%		8%		
Minimum no. of animals		20			27		7		
		37%			50%		13%		

Also: Horse: maxilla: L, tooth: 3, vertebra: 1, metacarpal: L, femur: 1, splint bone: 1.

Dog: mandible: 2R, scapula: R, metatarsal: 3.

Cat: mandible L + R, humerus L + R, pelvis: R, femur: L + R, tibia: L + R.

Roe Deer: metatarsal: L.

EHA Sheep: skull L + R, mandible L + R, vertebra: 6, rib: 22, scapula: L + R, humerus: L + R, radius: L + R, ulna: R, metacarpal: L, pelvis: L + R, femur: R, tibia: L, metatarsal: L + R, phalanx 1: L.

Table 33 Derby North-West Sector: total numbers of bones and minimum number of animals of different species identified in phase 5.

Phase 5-6	Cattle			Sheep			Pig	
	L		R	L	R	L	R	
Skull	4	1	3		1		1	1
Maxilla						1		
Mandible	1	1	1	1		1	1	
Tooth		8			1		1	
Vertebra		5			1			
Rib		28			7			
Scapula	4	1	2	1	1	1		
Humerus	10		3			1		
Radius + Ulna	6	1	4	3		3	1	
Metacarpal	5		1	1	1			
Pelvis	9		4	2		1		
Femur	1	2			2		1	
Tibia	1		2	2		1		
Astragalus	1		1					
Calcaneum	1		1	1				
Scapho-cuboid								
Metatarsal	3	3		1		1		
Phalanx 1			2					
Phalanx 2								
Phalanx 3			1					
Total (excluding T, V, R)		79			28		5	
		71%			25%		4%	
Minimum no. of animals		10			4		1	
		66%			27%		7%	

Also: Horse: astragalus: L.

Red Deer: radius: R.

Table 34 Derby North-West Sector: total numbers of bones and minimum number of animals of different species identified in phase 5-6.

Phase 6	Cattle			Sheep			Pig		
	L	R	L	R	L	R	L	R	
Skull	19	8	22	1	1	3	6	2	4
Maxilla	12		9	3		5	4		1
Mandible	11	3	14	12		20	10	2	7
Tooth		63			20			9	
Vertebra		71			12			5	
Rib		245			116			2	
Scapula	15	6	22	17	2	6		3	2
Humerus	16	2	16	18	1	19	2		5
Radius + Ulna	22	1	11	18	1	17	3	1	1
Metacarpal	5	10	10	11	12	9	2		1
Pelvis	18	2	23	7		17	2		3
Femur	1	17	7	4	24	3	3	2	
Tibia	22	4	17	22	5	21	3		4
Astragalus	7		6	1					1
Calcaneum	6		6			2			2
Scapho-cuboid	5		2						
Metatarsal	8	21	6	8	13	9		2	2
Phalanx 1	18	1	16	1		1			
Phalanx 2	4		8				1		
Phalanx 3	4		4						
Total (excluding T, V, R)		467			314			81	
		54%			37%			9%	
Minimum no. of animals		22			26			11	
		37%			44%			19%	

Also: Horse: skull, L molar, maxilla frag L + R, tooth: 5, tibia: L, R, astragals: R, calcaneum: R, phalanx 1:1,

Dog: skull: part, R side, maxilla: L, mandible: R, humerus: L, tibia: R, metacarpal: 1, metatarsal: 1.

Red Deer: 2 antler frags, mandible: L, tooth: 1, metatarsal: shaft.

Hare: femur: L.

Table 35 Derby North-West Sector: total numbers of bones and minimum number of animals of different species identified in phase 6.

Phase 6 or later	Cattle			Sheep			Pig	
	L		R	L	R	L		R
Skull	5	3	5			1		1
Maxilla	1				1	1		
Mandible	4	3	10	4	3	1	1	
Tooth		29			15		5	
Vertebra		20					6	
Rib		50			20			
Scapula	6	6	4	4	2	2	1	1
Humerus	7	1	6	6		5	1	1
Radius + Ulna	6		8	12		9		
Metacarpal	1	1	2	2	6	4	1	
Pelvis	7		3	5		3		1
Femur	2	5	1	1	12			1
Tibia	9	1	6	12	2	16	2	1
Astragalus	1		2	1				
Calcaneum	3		4			1		
Metatarsal	4	5	5	4	4	2		
Phalanx 1	4		5					
Phalanx 2	1		2					
Phalanx 3	2		2					
Total (excluding T, V, R)		157			123		18	
		53%			41%		6%	
Minimum no. of animals		11			16		4	
		35%			52%		13%	

Also: Horse: skull: L, tooth: 4, radius: L, calcaneum: 2L, R, metatarsal: R, splint bone: 1,
 Dog: mandible: L, metacarpal: 3, tibia: R,
 Red Deer: antler: 2 frags, radius: R,
 Roe Deer: metatarsal 1

Table 36 Derby North-West Sector: total numbers of bones and minimum number of animals of different species identified in various phases.

APPENDIX 3 PATHOLOGICAL BONES: NORTH-WEST SECTOR

By J. R. BAKER

ABO Sheep right mandible. A small nodule of porous new bone has formed on the lateral aspect Dm 3. The cause of this is unknown.

AGC Horse right metatarsal. There is an elliptical area of new bone with a central depression just proximal to the distal epiphyseal plate. This represents a local periostitis probably following a skin wound.

ALA Sheep right metacarpal with abnormally curved distolateral end, in the absence of the rest of the bone I cannot hypothesize about the cause.

BAA Sheep left metatarsus. There is a fairly smooth uniform mid-shaft swelling with an additional thin irregular area of new bone on the lateral aspect. This might be a particularly well healed fracture.

BAF Cattle left pelvis. The acetabular fossa is almost completely closed, there is proliferation of new bone on the ileal and ischiatic margins of the acetabulum. There is also an area of eburnation. These changes represent an osteoarthritis probably due to overrotation of the head of the femur due to the use of the animal for draught purposes.

BPM Part of a dog skeleton. A posterior thoracic vertebra has one rib fused to it by smooth new bone. This could have resulted from either a fracture of the head of the rib very close to the vertebral body, or a crush injury to the chest producing tearing of the ligaments of the rib articulation. The right astragalus and calcaneum are fused, the cause of this is not known.

CNA Sheep left metatarsal. There is proliferation adjacent to the proximal articular surface which has largely been lost post mortem making it impossible to diagnose.

DCE Fragment of sheep mandible with a perforation associated with a tooth root. This change is due to a tooth root abscess, a rather rare condition in sheep.

EHA Sheep left radius. There is proliferation of new bone on the lateral aspect of the elbow. This will be of traumatic origin and probably is a case of "penning elbow".

EOC Horse left metacarpal. The splints are fused to the main bone and the lateral one shows a small swelling towards its distal end, probably a healing fracture following a blow. A small spur of new bone is present on the

posterior aspect of the distal medial articular facet. The cause of this is not known.

EOC Horse left metatarsus. There is minimal new bone adjacent to the proximal articular surface on the antero-medial aspect. This is an early case of spavin.

EOD Rib, probably sheep. There is a smooth swelling on the lateral surface, probably the result of a blow which had raised the periosteum.

EXC Part cat skeleton. The right femur shows a midshaft fracture that has united in a very misaligned position so that there is a bend of approximately 50° in the shaft.

EXD Cattle right first phalanx. Severe erosion and distortion of the distal articular surface and with extensive periarticular new bone. This is an inflammatory lesion, possibly secondary to foul-in-the-foot.

EXF Possibly sheep metatarsal. This is smoothly swollen and curved, probably indicating a well healed fracture.

EXN Cattle rib with swollen zone as the result of callus formation around a fracture. There is eburnation of the broken end of the rib indicating the possibility of a false joint formation.

EXP Cattle right mandible. There is bone resorption and proliferation following periodontal disease and secondary osteitis centred around M1.

FBC Sheep skull right side. The one horn core present is misshaped due largely to an irregular groove running three-quarters of the way around the circumference. This probably indicates a period of malnutrition.

DLC 79 FDF Fowl, left tarsometatarsus. There is an irregular fusiform swelling at the lower end of the diaphysis with some new bone in the medullary cavity. This probably represents a healed fracture.

FEA Cattle metatarsus. There is periarticular new bone with expansion of the articular surface and eburnation. This is a case of osteoarthritis.

DLC 80 FLB Fowl, left tibiotarsus. This bone has a massive fusiform swelling on the shaft and the bone appears dense. This is a case of osteopetrosis, an unusual and sporadic disease of chickens. The only other recent report was a bone from York.

DLC 79 FPH Fowl, right tibiotarsus. This shows a markedly bowed shaft, probably the result of a dietary deficiency when the bird was very young.

DLC 80 HYF Fowl, right tarsometatarsus. An exostosis is present on the posteromedial

aspect of the shaft running parallel with the flexor tendons. This is a normal senile change. DLC 80 JQB Fowl, left tibiotarsus. This also has osteopetrosis.

JTH Sheep left radius with small spur of new bone on lateral aspect of proximal articulation. This is of traumatic origin and possibly a case of "penning elbow".

DLC 80 JYK Fowl, left humerus. There is new periosteal bone around the distal end of the diaphysis, probably a response to a periostitis. A shallow, almost rectangular depression is

present on the proximal half of the bone. It measures 9mm x 2mm, the cause is unknown. KHA Sheep right mandible. There is extensive alveolar resorption and some osteitis associated with severe periodontal disease in the region of PM4, M1, M2, M3.

KYB Cattle right metatarsal. There is almost complete loss of the proximal articular surface and its replacement by pitted bone and also periarticular new bone formation on the anterior and lateral aspects. This is probably the result of a bacterial (possibly septic) arthritis.

APPENDIX 4

THE CREMATIONS: DERBY RACECOURSE CEMETERY

By M. HARMAN

Human bones

Cremation deposits were found in association with structures 1, 3 and 4. Many more were found in the area of the inhumation cemetery: several in pots or with groups of potsherds, others in pits. Some of these had been disturbed and are probably represented by an unknown proportion of the original deposit. Fragments of cremated bone also occurred in some grave fillings, probably scattered from disturbed cremation burials. The total number of cremation burials is thus unknown.

All the calcined bone fragments were looked at, and recognisable fragments listed. Groups containing 25g of bones or more were weighed, and the length of the largest fragment was recorded. Most of the bones were white or pale greyish, indicating firing at a high temperature, but there were some deposits which contained black or brown fragments, indicating a less efficient cremation. In most cases it was possible to place a cremation in an age category within a range, partly as suggested by Wells (1960, 30-31): Child: (less than 12 years); Adolescent: (12-17 years); Young Adult: (17-25 years); Ageing Adult: (over 35 years), and Adult: (over 17 years); frequently it was only possible to ascertain that the bones were not those of a child, and to place them in an Adolescent/Adult category.

In the catalogue below, the following information is given for each deposit: weight, length of largest fragment, comment on firing if not efficient, brief notes on identifiable fragments, conclusion as to age of individual where possible.

Several cremation deposits included calcined animal bone fragments; these are mentioned in the catalogue of human bone, and noted more fully in a section following the catalogue.

Deposits regarded as cremations, whole or disturbed, are listed first, then the groups of bone found in graves or other features.

Cremation deposits

S 1 360g 46.0mm. Skull fragments, part axis, humerus head, long bone shaft fragments, 4 phalanges.

Adult + animal bones. (Pig and sheep). Bird bones.

S 1 21 500 g 73.0mm. Skull fragments, 1 thoracic, 3 lumbar vertebrae, L acetabulum, R ilium, femur head, R femur distal end, tibia proximal end, astragalus, calcaneus, metapodial. Adult + animal bones (Pig?).

S 1 22 750g 62.0mm. Skull fragments, 3 thoracic vertebrae, ilium, ulna proximal end, several phalanges.

Adult + animal bone (Pig). Bird bones.

It is possible that the three deposits of burnt bone in this structure are all from the same person. Together they are similar in weight to the single deposits in Structures 3 and 4; none of the bones are duplicated and there are no obvious differences in size, but no pairing fragments from the different groups were noted,

and though it is a possibility, these deposits may be the remains of three separate people. However, the pig remains from the structure and from Pot 22 are probably from the same animal.

S3 1k 130g 82.5mm. Skull fragments, part mandible (XXX21 12X4X), 4 cervical, 2 thoracic, 1 lumbar vertebrae, scapula, ulna proximal and distal ends, radius distal end, acetabulum, femoral condyles, metatarsal, phalanx. The cervical vertebrae show evidence of some osteoarthritis.

Ageing Adult + animal (Pig).

S4 1k 350g 71.4mm. Skull fragments, parts atlas, axis, 1 cervical vertebra, scapula, humerus distal end, ulna shaft. The cervical vertebra shows some evidence of osteoarthritis.

Ageing Adult + animal (Pig). Bird bones.

104 260g 55.0mm. Skull vault fragments, femur shaft.

Young Adult.

105 125g 32mm. Skull vault fragments.

Adult.

114 Under 25g 29.0mm. Skull vault fragment.

Young Adult/Adult.

116 Under 25g 24.0mm. 2 skull fragments.

Young Adult/Adult.

122 60g 41.0mm. Skull vault fragments, tooth root.

Young Adult/Adult.

123 75g 45.0mm. Skull fragments.

Ageing Adult.

129 Inside clay bowl.

350g 33.0mm. Skull vault fragments.

Adolescent/Adult + animal (Pig).

Outside clay bowl.

50g 27.0mm. Skull vault fragments.

Adult + animal (Pig).

These deposits may or may not be part of the same individual.

132 Under 25g 21.0mm. Skull vault fragment.

? + animal (Pig).

135 25g 32.0mm. Skull vault fragments, part ulna?

Adolescent/Adult.

136 100g 34.0mm. Skull vault fragments, 3 tooth roots, part mandible.

Young Adult/Adult.

138 90g 40.0mm. Skull vault fragments, 2 tooth roots, part mandible.

Young Adult/Adult.

140 225g 48.0mm. Many pieces only charred, of black or brown colour.

Adult.

141 335g 51.0mm. Skull fragments, vertebral arch, ulna, part pelvis, femur shaft. Child:

skull fragments, incisor and molar crowns.

Adult + Child + animal (Pig). Bird bones.

143 150g 50.0mm. Skull vault fragments, fibula, phalanx.

Adult.

146 Under 25g 44.0mm. Skull vault fragments. Adolescent/Adult.

147 Under 25g 27.0mm. Skull vault fragment. Child?

149 Under 25g 19.0mm. Long bone shaft fragments.

Adolescent/Adult.

151 Under 25g 43.0mm. Skull vault fragments.

Adolescent/Adult.

152=153? Under 25g 23.0mm. Skull vault fragments, cervical vertebra.

Adult.

153=152 25g 35.0mm. Skull vault fragments, molar crown, lumbar vertebra.

Adolescent.

It seems unlikely that 152 and 153 are part of the same individual.

154 Under 25g 23.0mm. Long bone shaft fragments.

?

155 340g 50.0mm. Some black pieces. Skull vault fragments, femur, tibia, phalanx.

Ageing Adult.

156=157? Under 25g 28.0mm. Long bone shaft fragments.

Adolescent/Adult.

157=156? Under 25g 25.0mm. Long bone shaft fragments.

Adolescent/Adult.

158 50g 33.0mm. Skull vault fragments.

Adolescent/Adult.

161 40g 34.0mm. Skull vault fragments.

Adolescent/Adult.

162 115g 49.0mm. Skull vault fragments, phalanx.

Adolescent/Adult.

163 120g 43.0mm. Skull vault fragments, femur head.

Adult.

168 200g 45.0mm. Skull vault fragments, femur shaft.

Ageing Adult + animal (Sheep? Pig?). Bird bones.

169 1k 360g 108.0mm. Skull vault fragments, axis, 3 cervical, 8 thoracic, several lumbar vertebrae, recognisable fragments of all long bone shafts and articular facets, several metapodials, carpals, tarsals, phalanx. Some of the vertebral fragments show evidence of osteoarthritis.

The shape of the occipital fragment suggests

- that this may have been a male individual.
Ageing Adult + Bird bones.
- 173 Under 25g 31.0mm. Skull vault fragment.
? + animal (Sheep? Pig?).
- 184 225g 45.0mm. Skull vault fragments, 2 phalanges.
Adolescent/Adult + animal (Pig). Bird bones.
- 192 60g 40.0mm. Skull vault fragment.
Adolescent/Adult + animal (Cattle? Pig?).
- 208 25g 27.00mm. Skull fragment, tooth root.
Adolescent/Adult.
- 214 425g 51.0mm. Skull vault fragments, 3 tooth fragments, part ulna, 3 phalanges.
Adult. 224, 225 925g 62.0mm. Skull vault fragments, part pelvis, astragalus, phalanges.
Adult + animal (Pig).
- 227 50g 31.0mm. Long bone shaft fragments.
Adolescent/Adult.
- 231 Under 25g 45.0mm. Skull vault fragments.
Adolescent/Adult.
- 240 50g 42.0mm. Skull vault fragments.
Adolescent/Adult.
- 241 Under 25g 15.0mm. Skull vault fragment.
? Child.
- 243 Under 25g 19.0mm. Three fragments.
?Child/Adolescent.
- 247 Under 25g 29.0mm. Long bone shaft fragments.
Adolescent/Adult.
- 253 125g 56.0mm. Skull vault fragments, part humerus/femur head.
- 253 Adult + animal (Pig).
- 254 Under 25g 30.0mm. Long bone shaft fragments.
Adolescent/Adult.
- 255 75g 49.0mm. Skull vault fragments.
Adult + animal (Pig).
- 258 Under 25g 23.0mm. Tooth crown, long bone shaft fragments.
Adolescent/Adult.
- 260 Under 25g 42.0mm. Skull vault fragment.
Adolescent/Adult.
- 261 230g 62.0mm. Skull vault fragments, part scapula, part femur.
Adult.
- 265 225g. A quantity of charred and calcined fragments, including skull vault fragments, two tooth roots, long bone shaft fragments, including femora and radius, barely burnt. This is an unusual cremation, not very well done.
- Groups of bone which may be cremation deposits.
- 102 Under 25g. 4 fragments.
?
- 107 100g 50.0mm. Skull vault fragments, 1 cervical vertebra.
Adult + animal (Sheep, Sheep? Pig?).
- 111 Under 25g. 3 fragments.
Adolescent/Adult.
- 117 470g 66.0mm. Some black pieces, skull vault fragments, humerus proximal end, ulna distal end, parts femur, tibia. Shape of occipital and size suggest this may be male.
Adult.
- 118 Under 25g 35.0mm. Skull vault fragment.
Adolescent/Adult.
- 119 25g 48.0mm. Skull vault fragment.
Young Adult/Adult.
- 120 30g 30.00mm. Some black pieces. Phalanx.
Young Adult/Adult + animal (Bird).
- 125 Under 25g 25.0mm. Skull vault fragments.
?
- 130 Under 25g 26.0mm. Skull vault fragments.
?
- 134 385g 109.0mm. Some fragments barely burnt: black and brown. Skull vault fragments, mandibular condyle, axis, 4 cervical vertebrae, femur and tibia shaft fragments.
Adult. 137.
- 137 Under 25g. 5 fragments.
?
- 139 Under 25g 36.0mm. Skull vault fragment.
Adult.
- 144 Under 25g 36.0mm. Skull vault fragment.
Adolescent/Adult.
- 145 Under 25g 36.0mm. Long bone shaft fragment.
Adolescent/Adult.
- 150 25g 38.0mm. Skull vault fragments, molar root.
Adult.
- 160 75g 40.0mm. Skull vault fragments.
Adolescent/Adult.
- 164 30g 56.0mm. Skull vault fragments.
Adult.
- 165 30g 40.0mm. 1 skull fragment brown and black: other skull vault fragments.
Adult.
- 166 150g 68.0mm. Skull vault fragments, occipital condyle, part ilium, phalanx.
Adolescent/Adult + animal (Sheep).
- 167 25g 37.0mm. Skull vault fragments.
Ageing Adult.
- 172 235g 41.0mm. Skull vault fragments, tooth root.
Adolescent/Adult + Child?
- 175 100g 53.0mm. Skull vault fragments.
Adolescent/Adult.
- 179 175g 44.0mm. Some black fragments.
Skull vault fragments.

Adolescent/Adult + animal (Pig).

180 50g 101.0mm. One black and brown piece. Skull vault fragment.

Adult.

181 Under 25g 40.0mm. Long bone shaft fragment.

Adult + animal (Pig).

196 Under 25g 49.0mm. Long bone shaft fragments.

Adolescent/Adult + animal (Sheep).

197 Under 25g 33.0mm. Skull vault fragments. Adolescent/Adult.

Nine groups, had calcined bird bone fragments with them. Structure 1, and 4, 120, 141, 168, 169, 184 and 221.

200 Under 25g 26.0mm. Long bone shaft fragments.

Adolescent/Adult.

201 175g 42.0mm. Skull vault fragments, humerus head, 2 phalanges.

Adult.

219 Under 25g 54.0mm. Skull vault fragment. Adolescent/Adult.

220 Under 25g 30.0mm. Skull vault fragment. Adolescent/Adult.

221 175g 58.0mm. Skull fragments, tooth root, part scapula, phalanx.

Adolescent/Adult + animal (Pig). Bird bones.

245 Under 25g 49.0mm. Skull vault fragments, part femur shaft.

Adolescent/Adult.

246 Under 25g 29.0mm. Skull vault fragments. Adolescent/Adult.

248 Under 25g 30.0mm. Skull vault fragments, part mandible.

Adult.

250 Under 25g 21.0mm. Two fragments. Child/Adult.

251 Under 25g 27.0mm. Skull vault fragments.

Adolescent/Adult.

252 55g 38.0mm. Skull vault fragments, part vertebra.

Adult.

262 Under 25g 36.0mm. Skull vault fragments. Child/Adult.

264 35g 51.0mm. Long bone shaft fragments. Adolescent/Adult.

267 Under 25g. Long bone shaft fragments. Adolescent/Adult.

269 Under 25g. Skull vault fragments. Adolescent/Adult.

276 70g 33.0mm. Skull fragments, part femur. Adolescent/Adult.

277 Under 25g 17.0mm. Skull vault fragment, tooth root.

Adolescent/Adult.

280 90g 58.0mm. Skull vault fragments, part ilium, femur, metatarsal.

Adult.

There is no evidence for the presence of the remains of more than one person in any deposit except for 141, and possibly 172, though this may be scatter from more than one cremation. The number of children represented is small. The deposits from the structures and the jug burial (169) are much more complete than any of the others, and if any of the cremations in pits are undisturbed, the original deposit must have been a token one, a sample from the ashes of the deceased.

Several cremations were accompanied by the calcined bones of pigs; those in the structures may well have had complete animals burnt to go with them, while the others have only a few bones. The occasional sheep bone was also found, but no other species was definitely identified.

Animal bones

The following groups of animal bones were recognised among the cremated bone fragments:

S1, AZ Pig: parts skull, mandible, tooth crown, 3 vertebrae, scapula, humerus, radius, ulna, femur, tibia, astragalus and phalanx 1.

Sheep: radius fragment, very small lamb.

S1, 21 Pig?: humerus fragment.

S1, 22 Pig: part skull, maxilla, 3 vertebrae, humerus, femur.

These three deposits give the impression of being part of the same piglet of less than a year old, distributed between the pots 21 and 22 and the main structure.

S3 Pig: large animal: parts femur, tibia.

Small animal: parts scapula, humeri, radii, pelvis, femora, tibia, astragalus.

Parts of two animals, one of less than a year old, one larger one of less than three years old.

S4 Pig: parts skull, mandible, 3 vertebrae, humeri, pelvis, femur, tibia, phalanx 2.

Probably one animal, of less than a year in age.

107 Sheep/Pig vertebral body, young animal.

- 129 Pig: parts alveolus and third molar.
 132 Pig: tibia distal end.
 141 Pig: part ulna? and calcaneum.
 166 Sheep: tibia shaft fragment.
 168 Sheep/Pig: part calcaneum.
 171 Pig: some recognisable skull fragments, many other fragments, all recognisable pieces are pig.
 173 Sheep/Pig: part femur.
 179 Pig: part molar tooth.
 181 Pig: part scapula.
 184 Pig: calcaneum, nearly full grown.
 192 Pig: parts skull, tooth crowns, ulna, acetabulum, femur.
 Immature animal.
 Cattle?: part phalanx, immature.
 196 Sheep: femur shaft fragment.
 221 Pig: part skull.
 224 Pig: part vertebra, tibia, calcaneum, astragalus, from an adult animal of over three years.
 253 Pig: part metapodial.
 255 Pig: part pelvis, tibia.

It is clear from the above list that most of the animal bones accompanying cremations were from pigs, and generally these were from immature animals. The deposit in 171 contained no recognisable human bones.

Derby Racecourse Dental Formulae

					Upper									Jaw				
Right	8	7	6	5	4	3	2	1	1	2	3	4	5	6	7	8	Left	
side	8	7	6	5	4	3	2	1	1	2	3	4	5	6	7	8	side	
					Lower									Jaw				

Key:

X Loss ante mortem

/ Loss post mortem

c Caries

A Abscess

E Pulp exposure

U Unerupted

O Erupting

N Not developed

- Jaw missing

103	/	7	6	5	4	3	2	1	1	2	3	4	5	6	7	8
	N	7	6	5	4	3	2	1	/	2	3	4	5	6	7	N
104	8	-	6	5	/	3	-	/	/	2	3	4	5	6	X	X
	8	7	6	5	4	3	2	1	1	2	3	4	5	X	7	8
	c		c													
	A															
105A	-	7	6	5	4	3	-	1	1	2	3	4	5	6	7	-
	-	7	6	5	/	/	/	/	1	2	3	4	5	6	7	8
																U
			A											A		
	c	c	A										c	c		
111	8	7	6	5	4	3	2	1	1	2	3	4	5	6	7	8
	8	7	6	5	4	3	/	/	1	2	3	4	5	6	7	8

261		8	7	6	5	4	3	2	1	1	2	3	4	5	6	7	8
		8	7	6	5	4	3	2	/	1	2	3	4	5	6	7	8
269		8	7	X	5	4	3	N	1	1	/	3	4	X	X	7	N?
		8	7	6	5	4	3	2	1	1	2	3	4	5	6	7	8
		U												O			
271		8	7	6	5	4	3	-	-	1	2	3	4	5	6	7	8N?
		-	7	6	5	4	3	2	1	1	2	3	4	5	6	7	-
				A													
				c													
276		8	7	6	5	4	3	2	1	1	2	3	4	5	6	7	8
		8	7	6	5	4	3	2	1	1	2	3	4	5	6	7	8
		c															
														c			
280		8	7	6	5	4	3	2	1	1	2	3	4	5	/	7	8
		8	7	6	5	4	3	2	1	1	2	3	4	/	6	7	8
																	c
281/2					no								maxilla				
		8	7	6	5	4	3	2	1	1	2	3	4	X	6	7	8
															c		
															A		
284	loose	6	e	d	3	-	-			-	b	3	d	e			6
	tooth	6	e	d	c	-	a			-	-	c	d	e			6
	crowns.				3							3					

Table 37 Derby Racecourse Cemetery: dental formulae.

PATHOLOGICAL BONES

By J. L. PRICE

103 Left humerus. Probably a well healed fracture of the medial epicondyle.

107 Right tibia, proximal end. A curious congenital anomaly of doubtful significance. A tongue of the epiphysis projects downwards and forwards to form the bulk of the tibial tuberosity. No other abnormality is seen.

117 Left humerus. Broad base osteochondroma arising from upper third of humerus. The pedicle is composed of cortical bone merging with normal humeral cortex. The margin of the lesion appears to be well demarcated. No stigmata of malignancy are seen.

105 and 125 Tibiae. Undulating periosteal reaction with dense subperiosteal new bone formation. This is a long standing reaction, probably healed, of the type associated with "tropical" ulcers.

125 The first metacarpal joint shows an irregularity of the articular surface, with sub-

chondral cysts and fringe osteophytes which point to degenerative osteoarthritis.

139 A healed fracture of the first metacarpal, of more than five years duration.

148 Right femur. A small benign exostosis (osteochondroma) of the upper posteromedial aspect of the shaft.

155 Right femur. There are fringe osteophytes present and cystic changes in the femoral head indicating osteoarthritis.

216 Cervical vertebrae. A minor congenital anomaly with incomplete fusion of the vertebral body and bifid spinuous process.

172 Ribs and tibiae and fibulae. A non specific periosteal change on the ribs. There is barely visible lamellae periosteal reaction on the tibiae and fibulae. The changes are non specific. As the ribs are involved this must be due to a chronic systematic disorder; probably hypertrophic osteoarthropathy from extrathoracic disease i.e. ulcerative colitis dysentery i.e. mucoviscidosis.

APPENDIX 5

DERBY RACECOURSE 1974: SLAG DISTRIBUTION REPORT

By J. G. McDONNELL

The Derby Racecourse site produced a large quantity of slag, over seventy-eight kilos. The material was examined at Derby City Museum. The site had not been visited during excavation although plans and slides of the hearths and comments on them by Professor Tylecote were available.

The slag was categorised into two broad groups, firstly the fayalitic ironworking slag (69.3 kilos) and, secondly, the non-fayalitic slags comprising fragments of hearth, (or furnace) lining, often with adhering slag, fuel ash slag and cinder, which are highly siliceous residues not necessarily associated with ironworking. The total quantity of this material was 8.9 kilos.

It is important to determine whether the fayalitic slag derived from the smelting or the smithing process. There is, as yet, no scientific test that can be applied to distinguish the two slag types, nor is it possible to individually analyse 69 kilos of slag comprising several thousand pieces. Therefore, the appearance of the slag with respect to slags already studied from other sites, the nature of the site, in particular the features, especially the hearths, associated with the slag have to be considered in determining the slag type. It is also possible that both the smelting and smithing processes were practised on the same site, and hence have a mixed assemblage of slags.

Most of the metalworking activity on the site dates from the mid second century to the early fourth century. The evidence of iron smelting in Britain from this period would suggest a reliance on major centres of production, e.g. Rockingham Forest (Northamptonshire) and the Forest of Dean (Gloucestershire), functioning on an industrial scale. Local needs could also be met by local small scale production. (J G McDonnell, 1983, p.14-23, A R Aino, 1977, p.73-82). The predominant iron smelting technology used in the Roman period appears to have been the shaft furnace producing iron blooms and the characteristic tap slag as residue. Evidence of iron smithing is to be expected on virtually all Roman sites, both rural and urban, there being no identifiable single characteristic of the smithing slag except the presence of hearth bottoms, (plano-convex) accumulations of slag, with a depression in the upper surface, formed in the smithing hearth). Although the hearth bottoms can be confused with slag cakes, plano-convex accumulations of smelting slag were formed by tapping the slag into a pit in front of the furnace.

The visual examination of the fayalitic slag from the site indicated that it was predominantly smithing slag, there being less than one kilo of probable smelting slag, including a small fragment of probable tap slag weighing 70 grammes. This represents one per cent of the total assemblage and can be regarded as intrusive. A single lump of bog ore was also recovered from Area VIII.

The smithing slag varied in appearance from extremely cindery slag, and distinct hearth bottoms to dense slag lumps and those with a 'flowed' appearance. These more smelting slag-like samples did not occur in groups, only individually amongst smithing slags, and therefore were probably smithing slags exposed to higher temperatures than normal.

Analysis of the distribution of the slag with respect to context and features show that 23% [16.87K] of the total was recovered from the disturbed layers (1) and (2). This included nearly all the smelting slag (630 grammes, (83%)), 25% of the smithing slag, but only 6% of the hearth lining/fuel ash slag etc. A single piece of galena? (lead sulphide) [weight = 30 grammes] was also recovered from these levels. Eight hearths had slag associated with them, and the data is given in Table I.

Area No.	Feature No.	Slag Types (wt in grammes)	
		Smithing Slag	Hearth Lining, etc
III	F70	500	-
III	F95	370	180
V	F16	50	-
V	F5	20	-
VI	F40	540 (2 hearth bottoms)	-
VI	F46	700	5270
VI	F20	70	-
VIII	(2A)	22.8 kgrammes	-
VIII	F5	310	-

(Note: VIII(2A) is a deposit associated with hearth F5)

Table 38 Derby Racecourse 1974: the hearths and associated slag.

The presence of smithing slag in hearth fillings is evidence for the hearth's use as a smithing hearth, though it may have also been used for other purposes, (eg. domestic, or non-ferrous working). The large quantity of slag recovered from VIII(2A), the context associated with F5 is evidence for large scale activity, ie. a permanent smithy.

The disturbed layers and the hearths contain 62% of the smithing slag, the remainder (26.15 kilos) was found in contemporary pits, ditches etc. Individual contexts rarely produced more than one kilo of slag; the features producing slag from each site are given in Appendix I.

Conclusions

The majority of silicate slag from the Derby Racecourse site derives from the smithing process. There is evidence of smelting, but only in the form of small isolated slag lumps, and this can be regarded as intrusive. 39% of the slag is associated with hearths, the majority occurring in association with hearth VIII F5. This quantity of slag (23 kilos) indicates a level of smithing activity that can be interpreted as a full time smithy.

Six examples of the silicate slag are being analysed and a report on their mineralogical constitution will be prepared.

Area I Context	Smithing Slag	Hearth Lining etc	Other
(7)	50	-	-
(8)	30	-	-
(11)	260	-	-
(11A)	30	-	-
(12)	40	-	-
F1A	-	100	-
F5A	1320	100	-
F5D	500	40	150
			(conglomerate)
F8	30	-	-
F13	110	-	-
F17A	90	-	-
F18	15	-	-
F30	380	540	-
F51	110	-	-
F53	-	30	-
F59	-	20	-
F60	60	-	-

Context	Smithing Slag	Hearth Lining etc	Other
Area II			
(3)	30	-	-
(7)	240	-	-
F1	250	150	-
F1A	1415	310	-
F24A	50	-	-
F24B	30	180	-
F25	-	40	-
F39	50	-	-
F54	140	-	-
Area III			
F1A	90	60	-
F7B	210	180	-
F14	540	70	-
F31	40	-	-
F36	70	-	-
F37	120	-	-
F39	20	-	-
F40	-	40	-
F52	3	-	-
F60	50	90	-
F68	50	50	-
F69	-	30	-
F69B	60	-	-
F70	500	-	-
F71B	—	-	runner? 60
F73A	200	-	-
F80	60	-	-
F91	-	-	tap? 70
F95	370	180	-
Area IV			
F39	500	-	-
F53	100	-	-
F135	-	20	—
Area V			
(4)	300	-	-
F1	1010	-	-
F5	20	-	-
F7	100	-	-
F14	240	-	-
F16	50	-	-
F17	10	-	-
F55	50	-	-
F58A	1050	-	-
F58B	280	-	-
F74	120	-	-
F78	1810	-	-
F95	430	-	-
Area VI			
F20	70	-	-
F27	3570	-	-
F31	50	-	-
F34	130	-	-

Context	Smithing Slag	Hearth Lining etc	Other
F39	150	-	-
F40	540	-	-
F46	700	5270	-
F51	90	-	-
F54	110	30	-
F59	200	-	-
F71	100	-	-
F103	200	-	-
F106	1900	-	-
F121	-	40	-
F124C	20	-	-
F125	2050	-	-
Area VIII			
(5)	110	150	-
(6)	400	-	-
(2A)	22.3 kilos	400	-
(2B)	1200	320	-
F3	130	-	-
F4	2750	-	200 (bog ore)
F5	200	-	-

Table 39 Derby Racecourse 1974: a list of contexts producing slag, excluding disturbed layers (1) and (2). Weights in grammes.

APPENDIX 6

A REPORT ON SOME METAL ARTIFACTS FROM THE EXCAVATIONS FROM DERBY RACECOURSE CEMETERY

By P.A. BLACKWELL and L. BIEK

Some 780 metallic items from the above excavations were visually examined under an optical stereomicroscope at a magnification of 12.5x. A full report with photographic plates is held in archive. The majority of the items appeared to consist of the corrosion products of iron together with earthy material and were unidentifiable, but 15 iron nails were in good condition. They were measured and some of them were sectioned for micro-examination and hardness testing. Five of the items appeared to be very small fragments of a copper based alloy, showing a characteristic dark green patina, and no further examination was carried out. Finally, one of the bronze straps from the sheath of an iron knife blade (p.269 no.6) from grave 218, was sectioned for micro-examination and chemical analysis.

Iron nails

The nails appeared to be free of the usual brown-coloured rust surface coating and showed the dark grey surface typical of the iron scale formed when hot forging has been used. Eight of the nails (F121, F172, F179, F181, F195, F214, F221) appeared to be of the same pattern, with an average shank length of 49mm and a tapering square section reducing from an average of 4mm measured just under the head, dimensions similar to those of the Group E Roman nails found at Inchtuthill as classified by Angus *et al* (1962, 958).

Micro-examination of nails from F121, F161 and F162 showed the characteristic inhomogeneous iron structure, with low carbon content, of early nails. The nail from

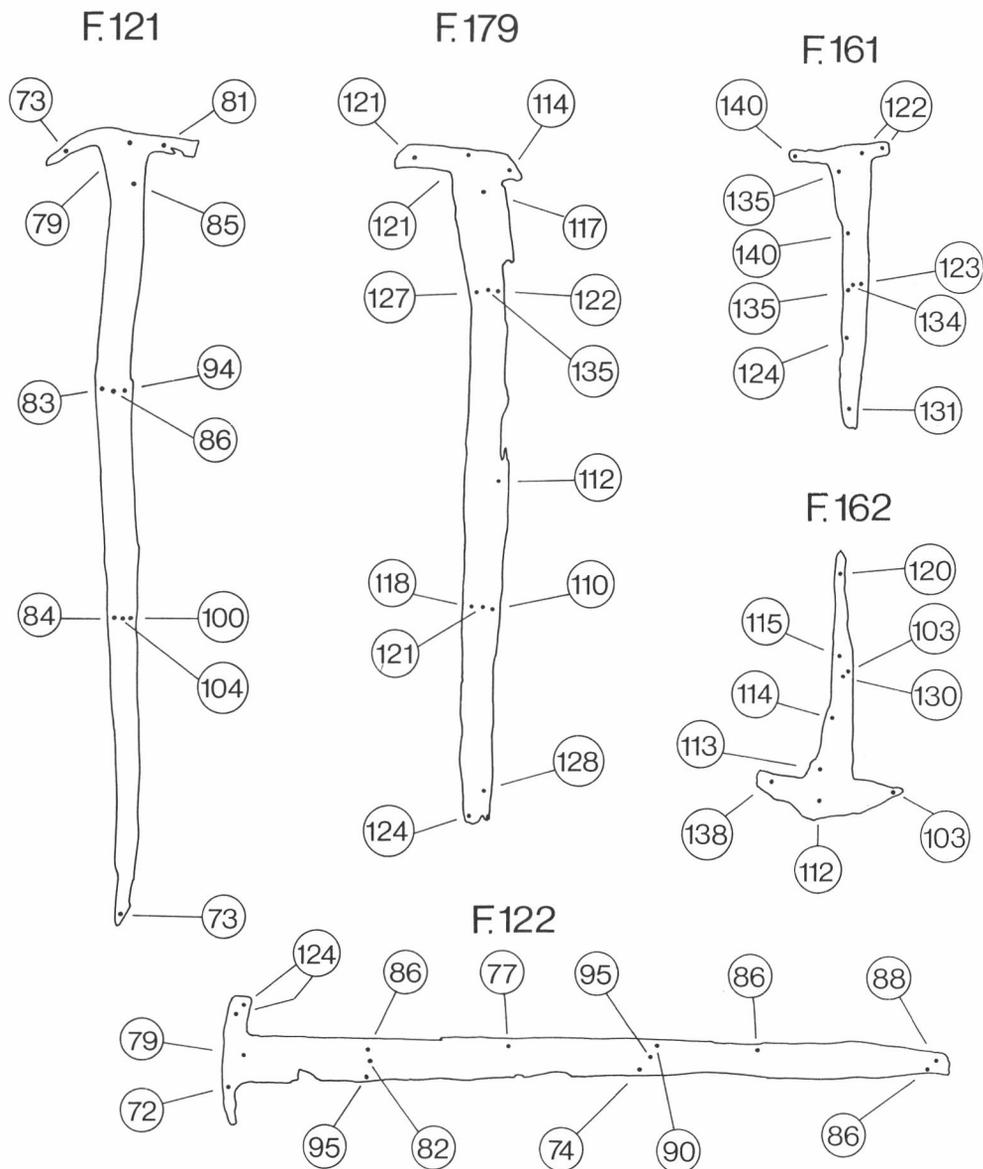


Fig. 131 Derby Racecourse Cemetery: hardness of nails.

F179 showed a lower carbon content. This variation in composition is typical of the products of a bloomery furnace.

Hardness tests using the Vickers indentation method were carried out on all these nails and the results are shown in Fig.131. Again the range of hardness found is typical of bloomery iron.

The absence of corrosion may be due to both the anaerobic conditions, which may have been present in the region of individual nails, and the naturally produced layer of scale (Angus *et al.*, 1962, 960). However, it can also occur where the metal comes into

contact with the aerobic part of a zone that is at a high temperature incidentally, as in a conflagration. Although it is difficult in certain cases to distinguish between such a 'fire scale' and the 'forge scale' mentioned above, the archaeological evidence can sometimes aid interpretation. Comparison with similar material from other sites (e.g. Biek, 1963) suggests it is more likely that this group of nails passed through a fire at some time after manufacture. Both fire scale and forge scale would confer the same kind of protection against corrosion provided there was adequate and continuous adhesion to the metal, but on the whole this is more probable in fire scale.

Grave good from F218

Examination of the bronze by P.A. Blackwell was restricted to one strip. This was carefully removed by using a scalpel, and was unfolded in order to cut out a sample for micro-examination. It was found to be soft and ductile, showing some evidence of corrosion. The sample was mounted in cold-setting resin, and prepared for examination, etching in dilute ferric chloride solution. The microstructure showed equi-axed grains of a single phase with twin bands. Small islands of a grey-coloured second phase were present, and there were many particles of non-metallic inclusions (slag). The presence of twin bands within the grains indicates that during its manufacture the strip had been subjected to cold working followed by annealing. This operation would be normal for the production of strip.

The high impurity content of the alloy tends to indicate some antiquity, but does not provide precise dating. Alloys produced over the last one hundred years or so would have a very small impurity content. The presence of the light-coloured second phase in the alloy (possibly the β phase) shows that it could have a tin content much higher than would be expected for an artifact produced by working as opposed to casting.

Through the courtesy of Rolls-Royce Limited, Derby, a chemical analysis was obtained using an instrument similar to an electron-microscope. This showed the tin content of the grains to be 15%, which is about twice that which would be expected in strip material. The particles of the second phase had a tin content of 27% which would tend to confirm that they were the hard and brittle tin-copper compound known as the ϵ phase. In the impurities the elements, zinc, copper, sulphur and oxygen were found; also tin, copper, iron and oxygen. These would normally be expected to be present.