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A comparative analysis of faunal remains from some roman and native sites in northern England

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Bone:--..Horn Cores.....

No.	Site No.	LEFT				No.	Site No.	RIGHT			
		1	2	3	4			1	2	3	4
1	(BC64)	5.3	3.4	>15.0	-	21	(MT66)	6.7	4.6	> 19.0	> 21.0
2	-	5.6app	4.5	>15.5	-	2	-	4.6	3.5	>15.0	-
3	(MT66)	5.7	4.2	>16.0	-	3	(MH66)	3.8	2.5	>10.0	>10.0
4	-	7.7	6.4	>23.0	-	4	(EM64)	4.1	3.2	>12.0	>13.0
5	-	5.3	-	-	>11.5	5	-	4.1	2.9	>11.5	>14.0
6	-	3.3	2.4	>10.5	>8.0						
7	-	3.9	2.6	>11.0	-						
8	-	-	-	-	-						
9	-	-	-	-	-						

Measurement 1 = greatest diameter of horn core at base
Measurement 2 = least diameter of horn core at base
Measurement 3 = Circumference of horn core at base (all approximate)
Measurement 4 = length of outer curvature (all approximate)

Bone:- Skulls

No.	Site No.	1	2	3	4	5	6				
1		7.2	5.8	4.4	16.5	17.5					
2		-	-	-	-	-					
3		-	-	-	-	-					
4		-	5.3	3.0	14.0	12.0					

Measurements taken -

1. least breadth of single frontal bone
2. greatest diameter of horn core at base
3. least diameter of horn core at base
4. circumference of horn core at base (approximate)
5. length of outer curvature (approximate)

Bone:-...MAXILLA.....

LEFT

RIGHT

No.	Site No.	Teeth	No.	Site No.	Teeth
1	-	M2	1	-	Dp2,3 M1,2,3
2		P.M.3,4 M1,2	2	-	M1,2,3
3	-	P.M.3 Dp3 M1,2,3	3		P.M.4 M.1.2
*4		P.M.4 M1,2,3	4	-	P.M.4 M1,3
5	-	M1,2	*5		P.M.4 M1,2,3
6	-	P.M.4 M1,2,3	6	-	M1,2,3
			7		P.M.2,3
			8	-	7M2

* left and right sides united

Bone:--MANDIBLE.....

LEFT

RIGHT

No.	Site No.	Teeth	No.	Site No.	Teeth
1	DS66	PM3,4 M1,2,3	1	B7M64	PM2,4 M1,2,3
2	-	PM4 M1,3	2	AE64	PM3,4M1,2,3
3	-	PM3,4M1,2	3	-	PM3,4M1,2
4	-	teeth lacking	4	-	M2,3
5	-	PM2,3,4	5	AR6?	M2,3 & sockets
6	-	PM4 M1,2,3	6	IB64	PM3,4M1,2,3
7	-	M2,3	7	?B64	PM3,4M1,2,3
8	-	M2	8	-	PM2,3,4M1,2,3
9	-	M1,2,3	9	-	PM2,4M1,2,3
10	-	PM3,4 M1,2,3	10	-	PM4 M1,2,3
11	BA64	M3	11	-	M1,2,3
12	-	PM3,4 M1*	12	-	M2,3
13	-	PM3,4 M1,2,3	13	-	M2,3
14	-	PM4 M1,2,3	14	AF64	M1,2,3
15	-	PM2,3,4M1,2,3	15	-	M3
16	-	?M2	16	-	M3
17	-	teeth lacking	17	-	PM3,4
18	GH66	teeth lacking	18	-	PM2,3,4 M1,2,3
19	-	?PM2,3	19	-	PM2,3,4
?20	-	?PM3	20	-	PM2,3
			21	-	PM3,4M1,2,3*
			22	-	M1,2,3
			23	MV66	M2,3
			24	MT66	PM4 M1,2,3
			25	-	PM3,4 ⁰

*Chillingham Type. 2nd premolar absent (No socket visible see 1911 Report page 241 of excavations at Corstopitum)

0 = Circular hole

ATLAS

AXIS

Bone:-.....

No.	Site No.	Max. length	Max. width	$\frac{W}{L}$	No.	Site No.	Max. length	Max. width
1	GY64	6.6 ⁺	8.7app	1.32	1	-	12.5 ⁺	8.9
2	-	8.2 ⁺	12.7app	1.55	2	-	10.5	7.9 ⁺
3	-	8.1 ⁺	12.4 ⁺	1.53	3	-	10.7	8.1app
4	-	7.9 ⁺	-	-	4	-	-	7.4app
5	-	8.4	13.2app	1.57	5	-	-	9.8
6	-	7.2 ⁺	-	-	6	-	-	10.1 ⁺
7	-	8.9 app.	-	-	7	-	-	7.7 ⁺
8	-	8.1 ⁺	-	-	8	M166	-	7.4 ⁺
9	FY64	-	-	-	9	-	-	8.3 ⁺
10	-	-	-	-	10	-	-	-
					11	-	-	-
					12	-	-	8.1 ⁺

⁺eroded

Bone:--SCAPULA.....

LEFT

RIGHT

No.	Site			Glenoid		No.	Site			Glenoid
	No.	Length	Neck				No.	Length	Neck	
1	-	-	4.3	-		1	GJ64	-	5.0	5.4
2	GJ64	-	4.5	5.5		2	-	-	-	-
3	GP64	-	-	-		3	-	-	-	-
4	-	-	4.4	5.1		4	-	-	4.1	-
5	FY64	-	4.4	5.0		5	-	-	-	-
6	-	-	4.2	4.9		6	-	-	-	-
7	-	-	-	-		7	-	-	4.3	-
8	-	-	4.4	4.6 ⁺		8	-	-	4.4	4.8 ⁺
9	-	-	4.7	4.8 ⁺		9	-	-	4.4	-
10	-	-	4.1	-		10	-	-	4.7	-
11	-	-	4.0	4.6 ⁺ app		11	-	-	4.9	4.9 ⁺ app
12	-	-	4.1	4.8 ⁺ app		12	-	-	5.0	5.8
13	-	-	-	-		13	-	-	4.3	4.8 ⁺
14	-	29.4*	4.5	4.9 ⁺		14	-	-	4.4	-
15	DS66	-	4.3	-		15	-	-	4.2	5.0
16	-	-	4.8	-		16	-	-	4.7	-
17	-	-	4.3	5.8 app		17	-	-	-	5.1
18	-	-	-	-		18	GH66	-	4.7	5.7
19	-	-	4.8	-		19	DS66	-	4.3	4.9
20	-	-	5.4	5.7		20	-	-	-	6.0
21	-	-	5.1	5.2 ⁺		21	-	-	4.5	5.1
22	-	-	5.6	5.7		22	-	-	-	-
23	-	-	4.8	-		23	-	-	4.4	4.7 ⁺
24	-	-	4.6	5.2 ⁺		24	DS66	-	4.6	-
25	-	-	4.5	5.0 ⁺		25	-	-	4.5	-
26	-	-	4.2	4.9 ⁺		26	-	-	4.2	-
27	FN64	-	-	-		27	-	-	-	4.7 ⁺
28	-	-	5.0	4.5 ⁺		28	-	-	-	-
29	-	-	4.0	4.7 ⁺		29	-	-	4.2	-
30	-	-	5.5	-		30	-	-	4.7	5.1
31	-	-	4.4	5.2		31	-	-	4.6	4.9
32	-	-	4.3 ⁺	-		32	-	-	3.9	4.5
33	-	-	-	-		33	-	-	4.4 ⁺	-
34	-	-	4.2	5.0 ⁺		34	-	-	4.7	4.8 ⁺
35	ME66	-	5.1 ⁺	-		35	-	-	4.5	5.0
36	NS66	-	4.5	-		36	-	-	4.8	-
37	NS66	-	4.3	4.7 app		37	-	-	4.6	5.4 ⁺ app
38	MX66	-	4.6	5.1		38	-	-	4.5	5.5
39	MH66	-	4.3	4.8		39	-	-	4.6	5.1
40	MT66	-	4.0	-		40	-	-	4.2	4.8 ⁺
						41	-	-	4.6	5.2 ⁺

Bone:-...SCAPULA.....

LEFT

RIGHT

Continued

No. Site No. Length Neck Glenoid

42	-	-	4.6	4.9 ⁺
43	NT66	26.5#	4.4	5.1
44	NN66	-	4.5	5.0 ⁺
45	NS66	-	4.5	-
46	MH66	-	4.6	-
47	MJ66	-	4.0	4.6 ⁺
48	NK66	-	4.8	-
49	MW66	-	5.0 ⁺	4.4 ⁺
50	MY66	-	4.3	-

Meek & Gray ranges

- Length = 31 - 37.5 c.m.
- Neck = 3.5 - 6.2 c.m.
- Glenoid = 4.2 - 6.5 c.m.

⁺eroded

* Exceeds range listed in 1910 Report

Bone:--.....HUMERUS.....

LEFT					RIGHT				
No.	Site No.	Length	Condyle		No.	Site No.	Length	Condyle	
1	-	-	6.6		1	HI64	-	-	
2	-	-	7.1		2	-	-	8.1*	
3	-	-	-		3	-	-	6.7	
4	-	-	6.6 ⁺						
5	NC66	-	-						

Meek & Gray range
length = 21.0 - 22.6 c.m
Condyle = 4.7 - 8.0 cm.

+ eroded

* Exceeds range listed in 1910 report

Bone:-.....RADIUS.....

LEFT					RIGHT				
No.	Site No.	Length	Prox	dist	No.	Site No.	Length	Prox	dist
1	-	-	-	5.8	1	FY64	27.4	7.7	7.3
2	GP64	-	-	-	2	AZ64	-	6.4app	-
3	-	-	7.8	-	3	-	-	6.5app	-
4	DS66	-	7.1 ⁺	-	4	-	-	-	5.7
5	-	-	-	-	5	-	-	6.8 ⁺	-
6	-	-	6.3 ⁺	-	6	-	-	-	-
7	-	-	-	-	7	7L64	-	-	-
8	-	-	6.3app	-	8	-	-	-	-
9	-	25.5	-	5.7	9	-	-	-	-
10	MI66	-	-	-					

Meek & Gray range
length = 23.4 - 32.5 cm.
distal = 4.8 - 7.7 cm.

⁺ eroded

CORSTOPITUM 1966

LEFT

Bone:-..... METACARPAL

RIGHT

No.	Site No.	Length	Prox.	Dist.	$\frac{DB}{L} \times 100$		No.	Site No.	Length	Prox.	Dist.	$\frac{DB}{L} \times 100$	
					L	1						L	1
1	FY64	-	6.0	-			1	FP64	-	5.1	-		
2	JS58	19.0	5.3	5.8	30.5		2	DQ64	-	5.2	-		
3	-	-	5.6	-			3	-	-	5.3	-		
4	-	-	4.9	-			4	-	-	5.6	-		
5	-	17.2	4.7	4.9			5	-	-*	-*	-		
6	-	-	4.8	-	28.5		6	-	-	4.7	-		
7	GP64	-	-	6.9			7	-	-	-	5.1		
8	-	17.0	-	5.1	30.0		8	-	-	-	5.0		
9	GH66	17.7	5.0	5.2	29.4		9	-	-	4.7 ^{app}	-		
10	-	-	4.8	-			10	-	17.6	4.9	5.0	28.4	
11	-	-	5.3	-									
12	-	-	5.3	-									
13	MSL	-	4.6	-									
14	-	17.2	4.8	5.0	29.1								
15	-	-	-	5.2	28.4								
16	-	-	5.2	-									
17	-	-	-	5.0									
18	-	-	-	4.6									
19	-	-	-	5.2									
20	NN60	-	5.1	-									
21	ME66	-	4.9	-									
22	NO66	-	-	5.0									
Unable to assign to either left side or to right. Labelled X													
X 1	-	-	-	-									
X 2	-	-	-	5.5 ⁺									
X 3	-	-	-	4.9									
X 4	-	-	-	-									
X 5	MH66	-	-	-									
X 6	-	-	-	-									
Meek & Gray range													
length = 15.7 - 20.3 cm.													
distal = 4.5 - 7.3 cm.													
* = too eroded to measure but sufficiently preserved to classify right or left													
+ = some erosion													
app. = estimated length													
/ = Butcher mark													

Bone:--Os Coxae.....

LEFT				RIGHT			
No.	Site No.	max.diam of acetabulum		No.	Site No.	Max diam of acetabulum	
1	7NE.XE	-		1	-	4.5 ⁺	
? 2	-	4.6		2	-	5.1 ⁺	
3	FY64	4.4 ⁺		3	-	-	
				4	-	-	
				5	-	-	
				6	-	-	
				7	-	6.0app	
				8	-	-	
				9	7NE.XI	-	
				10	OW64	6.6approx	
Meek & Gray range 4.5 - 5.3cm.							
+eroded							

Bone:--FEMUR.....

LEFT

RIGHT

No.	Site No.	Length	Condyles	No.	Site No.	Length	Condyles
1	FB64	-	-	1	-	-	8.1
2	-	-	-	2	-	*27.7	7.6
3	GP64	-	-	3	DU64	-	-
4	CJ64	-	-	4	-	-	9.0 ⁺
5	NC66	-	-	5	-	-	-

Meek & Gray range =
 length 30-0 - 37-0
 Condyles 6.3 - 9.0

* exceeds range listed in 1910 report

⁺ Eroded

Bone:--.. TIBIA

LEFT					RIGHT				
No.	Site No	Length	Prox	dist	No.	Site No.	Length	Prox	dist
1	-	-	-	5.3	1	NW.XI	29.2app	-	5.5
2	-	-	7.0 app	-	2	-	*27.7	7.9	5.1
3	NT66	-	-	-	3	-	-	-	5.3
4	NQ66	-	-	-	4	-	-	-	4.5 approx
5	-	-	-	5.1	5	-	-	-	5.6
					6	-	-	-	5.6
					**7	OW64	-	7.4 ⁺	-

Meel & Gray ranges
 length 28.5 - 36.5 cm.
 distal range = 4.5 - 6.8 cm.

* Exceeds range listed in 1910 report
 + eroded
 ** = stained with blue powder

Bone:-...ASTRAGALUS.....

LEFT			RIGHT		
No.	Site No.	Length	No.	Site No.	Length
1	-	5.8	1	FY64	5.4
2	-	6.3	2	GP64	5.9
3	AW64	5.8 ⁺	3	-	5.3
4	-	5.8	4	MJ66	- ⁺
5	IE64	5.9	5	-	- ⁺
			6	NE66	5.9 ⁺

⁺eroded

Bone:-... CALCANEUM.....

LEFT			RIGHT		
No.	Site No.	Max Width	No.	Site No.	Max. Width
1	-	5.2	1	-	5.0
2	-	5.4	2	FX64	5.5 ⁺
3	-	5.6	3	BM64	- ⁺
4	-	5.8	4	-	- ⁺
5	-	- ⁺	5	-	5.6 ⁺
6	-	5.5	6	-	5.8
			7	-	5.2
			8	MJ66	- ⁺

⁺eroded

I found it meaningless to measure length due to butchering and erosion, therefore, have recorded maximum width

CORSTOPITUM 1966

Bone:--..METATARSAL.....

LEFT

RIGHT

No.	Site No.	Length	Prox.	Dist.	$\frac{DB}{L} \times \frac{100}{1}$	No.	Site No.	Length	Prox.	Dist.	$\frac{DB}{L} \times \frac{100}{1}$
1	-	-	-	6.4		1	-	19.3	3.8	4.5	23.3
2	-	-	-	6.6 6.6		2	-	-	4.1	-	
3	-	-	-	5.0		3	-	-	4.1	-	
4	AK64	-	-	4.8		4	-	-	3.9	-	
5	-	-	-	4.7		5	AL64	-	-	4.9	
6	-	-	-	4.5		6	-	-	-	4.9	
7	-	-	-	4.5		7	-	-	4.3	-	
8	-	-	-	4.6		8	-	-	4.5	-	
9	DS66	-	5.3	-		9	-	-	4.0	-	
10	-	19.9	4.2	4.6	23.1	10	-	-	4.2	-	
11	BG64	-	- *	-		11	-	-	4.1	-	
12	-	-	- *	-		12	-	-	-	5.0	
13	-	20.6	4.5 ⁺	5.3	25.7	13	-	-	-	4.7	
14	-	-	4.5	-		14	-	-	-	4.6	
15	-	-	4.2	-		15	DS66	-	-	4.9 ⁺	
16	-	-	4.5	-		16	-	-	- *	- *	
17	-	-	- *	-		17	-	20.6	4.2	4.8	23.3
18	-	-	-	-		18	-	-	-	4.5	
19	-	20.6	4.6	5.6	27.2	19	-	-	-	4.7app	
20	-	-	4.1	-		20	-	-	-	-	
21	-	-	4.8	-		21	-	-	-	-	
22	-	-	4.5app	-		22	-	-	-	-	
23	-	19.4	4.4	-		23	-	-	4.2	-	
24	-	-	-	5.2		24	MX66	-	4.0	-	
25	NC66	-	-	6.1		?25	-	-	4.3 ⁺	-	
Unable to assign to either right or left. Labelled X											
X1	MY66	-	-	-							
Meek range											
Length 18.1 - 24.4 cm.											
Distal 4.2 - 6.5 cm.											
** Exceeds range listed in 1979 report											
+ = some erosion											
app = estimated length											
* = too eroded to measure but sufficiently preserved to classify right or left											

Bone:- PROXIMAL PHALANGE

No.	Site No.	Length	Width	No.	Site No.	Length	Width
1	ED64	5.6	2.9	28	AD64	5.4	2.6
2	DQ64	5.9 ⁺	3.5 ⁺	29	-	5.3	2.9
3	-	6.2	3.4	30	-	5.3	2.7
4	-	5.5	2.9	31	CF64	6.1	2.7
5	-	6.0	2.8	32	FY64	5.4	2.5
6	EM64	5.6	2.7	33	-	6.0 ⁺	2.0 ⁺
7	FM64	5.5	2.9	34	-	4.9	2.6
8	AE64	5.5	2.7	35	-	5.3	2.7
9	-	5.9	2.4	36	-	5.2	2.8
10	-	5.0	2.6	37	-	6.1	3.3
11	-	5.1	2.6	38	GH66	5.7	2.5
12	HE64	5.2	2.7	39	-	5.4	3.0
13	CD64	5.2	2.5	40	-	5.8	2.8
14	AD64	5.8	2.6	41	-	5.3 ⁺	2.3 ⁺
15	FJ(1)64	5.5	2.3	42	-	6.1	2.6
16	FY64	5.7	2.1	43	-	5.2 ⁺	2.5
17	DQ64	5.8 ⁺	2.5 ⁺	44	-	5.5	2.7
18	IV64	5.4	2.3	45	-	6.0	3.1
19	AX64	5.5	3.0	46	-	5.2	2.5
20	FM64	6.0	2.8	47	-	5.5	2.6
21	AD64	6.6	3.2	48	MX66	5.8	3.1
22	CF64	6.8	3.2	49	MJ66	6.1	3.1
23	-	5.7	3.0	50	MX66	5.5 ⁺	2.6
24	-	5.6	3.1	51	NK66	5.9 ⁺	3.0
25	CD64	5.2	2.8	52	-	5.2	2.8
26	BE64	5.4 ⁺	2.5	53	ME66	5.6	2.1
27	-	5.3	2.8				

0 = Circular hole

⁺ eroded

Bone:- MIDDLE PHALANGE.....

No.	Site No.	Length	Max. Width								
1	MN64	4.3	3.1								
2	?	4.1	3.2								
3	CY64	4.6	3.4								
4	CF64	4.7	3.3								
5	-	4.4	3.2								
6	-	4.4	3.4								
7	-	4.0	2.9								
8	-	3.8	2.8								
9	-	3.9	2.7								
10	DQ64	3.8	2.9								
11	-	3.4 ⁺	2.9								
12	-	3.6	2.5								
13	-	4.0	2.5								
14	AB64	3.6	2.5								
15	B764	3.3	2.7								
16	-	3.7 ⁺	3.0 ⁺								
17	AO64	3.9	2.6								
18	DQ64	3.9	3.0								
19	AH64	3.7	2.3								
20	AU64	3.7	2.7 ⁺								
21	-	3.4	2.8								
22	-	3.8	2.8								
23	HK64	4.4	3.1								
24	⊠	3.8	2.6								
25	-	4.5	2.2								

⁺eroded

Bone:-... TERMINAL PHALANGE

No.	Site No.	Length	Max Width																		
1	GR64	7.3 ⁺	3.2																		
2	-	5.8	2.0																		
3	-	6.5	2.1																		
4	CQ64	6.1	2.2																		
5	DQ64	6.0	2.2																		
6	-	6.4	2.1																		
7	-	5.9	2.1																		
8	EG64	6.4	2.2																		
9	-	6.1	2.2																		
10	-	6.7	2.5																		
11	A164	7.0	2.6																		
12	-	6.2	2.0																		
13	CM64	5.9	2.0																		
14	-	5.3	2.1																		
15	AN64	4.7 ⁺	1.8																		
16	-	5.9 ⁺	2.3 ⁺																		
17	AX64	8.0	2.8																		
18	Ⓢ	5.3	1.9																		
19	-	6.5	2.3																		
20	-	6.0	2.4																		
21	-	5.8	2.1																		
22	-	6.9	2.4																		

⁺ eroded

Bone:-... SKULL

Lamda to Width Length

No.	Site No.	Lamda to Basion	Width Condyles	Length Condyles						
1	ME66	6.4cm	4.3 ⁺	2.0 ⁺						

* Much of occipital bone sliced away.
Bored hole in left temporal bone

⁺eroded

Bone:-.....MANDIBLE.....

LEFT

RIGHT

No.	Site No.	Teeth	Stage	No.	Site No.	Teeth	Stage
1	-	M _{2,3}	w.	1	-	M _{3,2}	x
2	-	m ₃	r	2	-	M ₃	x
3	-	P _{3,4} M ₁ all in wear	x	3	-	M _{3,2,1} m _{3,2} ↑↑ - M	r
4	-	M _{1,2,3} all worn	z	4	-	M ₁ m _{3,2} ↑ Probably	r
5	-	P _{2,3,4} M _{1,2,3}	v	5	-	M ₁ m _{3,2} ↑ Probably	r
6	-	m _{1,2,3} ↑↑↑	r	6	-	M _{3,2,1} P _{4,3}	u
7	MY66	P _{3,4} M _{1,2,3}	z	7	-	M _{2,1} P _{4,3} ↑↑ Probably	w or x
8	MW66	m ₂ ↑	?r	8	-	M _{2,1} m _{3,2} ↑↑	r or s
				9	-	M ₁ m _{3,2} ↑↑	r or s
				10	-	M ₁ P _{4,3}	x
				11	NT66	M ₁ m _{3,2,1}	r or s
				12	-	M _{3,2,1} broken m _{3,2} ↑	p
				13	-	M _{3,2,1} P _{4,3,2}	w

Stages according to Ewbank, Phillipson, Higgs(1964)

Bone:- SCAPULA

LEFT

RIGHT

Site

Site

No. No. Glenoid Neck

No. No. Glenoid Neck

No.	Site No.	Glenoid	Neck	No.	Site No.	Glenoid	Neck
1		-	2.0*	1	-	*2.4	1.7
2	-	*2.5 ⁺	1.8	2	-	-	1.5
3	-	*2.6	1.8	3	-	-	1.6
4	-	-	1.7	4	-	*2.5	1.8
5		2.3 ⁺	1.6				
6	-	*2.7 ⁺	1.8				
7		2.2 ⁺	1.7				
8		2.2 ⁺	1.6				
9		-	1.3				
10	-	*2.8	-				

* exceeds range listed in 1910 report

Meek & Gray ranges

Glenoid 1.9 - 2.3 cm.

Neck 1.1 - 1.8 cm.

⁺ eroded

Bone:-... HUMERUS

LEFT					RIGHT				
No.	Site No.	Length	Prox	distal	No.	Site No.	Length	Prox	distal
1	-	-	-	2.6	1	-	-	-	2.6 ⁺
2	-	-	-	2.4	2	-	-	-	2.6 ⁺
3	-	-	-	2.6	3	-	-	-	*3.4
4	-	-	-	2.6 ⁺	4	-	-	-	2.6
5	-	-	-	2.3					

Meek & Gray ranges
lengths - Nil
distal 2.2 - 2.8 c.m.

* exceeds range listed in 1910 report

+ eroded

Bone:-...ULNA.....

LEFT				RIGHT			
No.	Site No.	Length	Max Width	No.	Site No.	Length	Max. width
1	-	-	2.0	1	-	-	2.9
2	-	-	2.6	2	-	-	2.6
3	-	-	2.8	3	-	-	2.4 ⁺
4	-	-	2.4 ⁺	4	-	-	2.4
				5	-	-	2.8 ⁺
				6	-	-	2.1 ⁺
				7	-	-	2.4
				8	-	-	2.3

⁺eroded

Lengths not recorded due to extensive erosion

Bone:-.....RADIUS

No.	Site No.	Length	Prox	dist	No.	Site No.	Length	Prox	dist
1	-	-	3.3	-	1	-	-	2.7	-
2	-	-	3.0	-	2	-	-	-	2.6*
3	-	-	2.7	-	3	-	12.5	2.6	2.3*
4	CW62	14.1 ⁺	2.7	-	4	IE64	-	-	-
5	GR64	-	-	2.4*	5	-	12.9	2.5	2.3 ⁺ *
6	-	14.2	2.5	2.4*	6	-	-	-	2.2 ⁺ *
7	-	-	-	2.4*	7	-	-	-	-
8	-	-	3.2	-	8	-	-	2.4	-
9	-	-	2.7	-	9	-	-	2.5	-
10	-	-	3.0	-	10	-	-	2.3 ⁺	-
11	-	-	-	-	11	-	-	-	2.5*
12	-	-	2.9	-	12	-	-	-	2.4*
13	MJ66	-	2.7 ⁺	-	13	-	-	-	2.4*
14	MJ66	13.0	2.6	2.4*	14	-	-	2.5	-
15	-	-	2.7 ⁺	-	15	ME66	-	2.4	-

Meek & Gray ranges

length 12.0 - 14.5cm) 2 specimens only
 distal 1.9 - 2.0cm)

* exceeds range listed in 1910 report

⁺ eroded

Bone:--... FEMUR

LEFT

RIGHT

No.	Site No.	Length	Proximal	Distal	No.	Site No.	Length	Prox.	dist.
1	-	-	-	2.9	1	-	-	-	-
2	-	-	-	-	2	-	-	-	-
3	-	-	-	-	3	-	-	-	-
4	-	-	-	-	4	-	-	-	-
					5	-	-	-	-
					6	-	-	-	-
					77	-	-	-	3.3 ⁺

All butchered and/or eroded

Meek & Gray 2 specimens only.
 length 13.8 cm.
 Condyle 2.9 cm.

Bone:- *TIBIA*.....

LEFT

RIGHT

LEFT					RIGHT				
No.	Site No.	Length	Prox.	Distal	No.	Site No.	Length	Prox.	Distal
1	-	-	-	-	1	-	-	-	2.3*
2	-	-	-	2.1*	2	HE64	-	-	-
3	-	-	-	2.1* ⁺	3?	-	-	-	-
4	-	-	-	2.2* ⁺	4	-	18.4	3.3 ⁺	2.3*
5	764	-	-	2.4*	5	-	-	-	2.3*
6	-	-	-	2.4*					
7	-	-	-	2.2* ⁺					
8	-	-	-	-					
9	-	-	-	-					
10	-	-	3.6	-					
11	-	-	2.0 ⁺	-					
12	-	-	-	2.2*					
13	ME66	-	-	2.1*					
14	MI66	-	-	2.2*					

Meek & Gray ranges
 Length 17.3 - 19.5 (from 3 specimens only)
 Distal 1.5 - 1.8 c.m.

⁺eroded

* Distal measurements exceed range listed in 1960 Report.

Bone:-... ASTRAGALUS

LEFT				RIGHT			
No.	Site No.	Length	Width	No.	Site No.	Length	Width
1	-	2.5	1.8	1		2.7	1.9
2	-	2.4 ⁺	1.8 ⁺	2	-	3.0	1.9
3	-	2.5	1.6 ⁺	3		2.7	1.9
incinerated							
+eroded							

Bone:- CALCANEUM

LEFT

RIGHT

Site

Max

Site

Max

No.

No.

Length

width

No.

No.

Length

width

1

4.3

1.8

1

-

4.8

1.8⁺

⁺ eroded

LEFT				RIGHT			
No.	Site No.	Length	Max width	No.	Site No.	Length	Max width
1		4.3	1.8	1	-	4.8	1.8 ⁺

Bone:--...METACARPAL.....

LEFT

RIGHT

LEFT					RIGHT				
No.	Site No.	Length	Prox	dist.	No.	Site No.	Length	Prox.	dist
1	-	-	1.9	-	1	-	-	2.1	-
2	-	11.3	2.0	2.2	2	AB64	-	2.1	-
3	-	-	1.9	-	3	-	12.8	2.1	2.3
4	-	-	2.1	-	4	-	12.3	2.1 ⁺	2.3 ⁺
5	CD64	-	2.1	-	5	EM64	-	2.0	-
6	-	10.7	1.9	2.1	6	-	-	2.0 ⁺	-
7	-	12.3	2.1 ⁺	2.4 ⁺	7	-	12.2	2.0	2.5*
8	NE66	11.4	1.9	2.3 ⁺	8	-	-	2.1 ⁺	-
9	MH66	-	-	-					
10	MJ66	-	1.8	-					

Meek & Gray ranges
 length = 10.6 - 13.5 c.m.
 distal = 2.0 - 2.4 c.m.

⁺ eroded
 * exceeds range of 1910 report

METATARSAL

LEFT

Bone:--.....

RIGHT

LEFT					RIGHT				
No.	Site No.	Length	Prox.	distal	No.	Site No.	Length	Prox.	dist.
1	-	-	1.6 ⁺	-	1	-	-	1.7	-
2	-	-	1.8	-	2	-	-	1.6 ⁺ *	-
3	-	12.0	1.7	1.9	3	AE64	11.8	1.7	1.9 ⁺
4	AE64	-	2.0	-	4	-	-	1.8	-
5	-	-	1.9	-	5	-	-	-	2.1
6	-	-	1.7	-	6	8SW	12.0	1.6*	1.9
7	-	-	1.9	-	7	FF64	-	2.0	-
8	-	-	1.7	-	8	-	-	1.7	-
9	-	-	1.4app	-	9	BR64	-	1.7	-
10	-	12.2	1.8	2.1	10	-	-	1.7	-
11	-	12.6	-	2.0	11	-	-	1.7 ⁺	-
12	-	-	1.7	-	12	-	-	1.7	-
13	NE66	12.5	1.7	2.0	13	-	-	1.6*	-
					14	-	-	1.9 ⁺	-
					15	NE66	-	1.8	-
					16	MX66	-	1.7	-
					17	MJ66	12.5	1.6 ⁺ *	2.0
					18	NU66	12.5	1.7 ⁺	2.0
Unable to assign to either right or left									
1	-	-	-	2.4					
2	-	-	-	2.2					
3	-	-	-	-					
4	-	-	-	2.2					
5	MX66	-	-	-					
? 6	NE66	-	-	-					
Meek & Gray Ranges									
length 10.8 - 12.8 C.M.									
distal 1.7 - 2.1 C.M.									
+ some erosion									
app = estimated length									
S* = bone stained by a pigment									
* smaller than range listed in 1910 Report									

Bone:-..... MANDIBLE.....

Site LEFT		Site RIGHT			
No.	No.	No.	No.		
1	-	M _{2,3}	1	-	M _{3,4}
2	-	I _{1,2} C P.M. _{3,4} M _{1,2,3} plus I ₁ C ₁ (right)	2	-	M _{3,4}
3	-	M ₃	3	-	M ₁ plus R & L rami
4	-	M _{2,3}	4	-	TM ₂
5	-	M ₃ broken	5	-	P.M. _{3,4} M _{1,2,5}
6	-	M ₃	6	-	M ₃
7	-	M _{1,2}	7	-	C ₁ P.M. _{3,4}
			8	-	P.M. _{3,4} M ₁
			9	-	C ₁ P.M. _{3,4} M _{1,2}
			10	-	M ₂
			11	-	P.M. _{2,3}
			12	-	P.M. ₃ M ₁ broken
			13	-	P.M. _{3,4}
			14	-	M _{1,2,3}
			15	-	I ₃ P.M. _{1,3,4} M _{1,2,3}
			16	-	M _{2,3}
			17	-	M _{1,2}

Bone:--...SCAPULA.....

LEFT

RIGHT

Site

Site

No. No. Glenoid Neck

No. No. Glenoid Neck

No.	Site No.	Glenoid	Neck	No.	Site No.	Glenoid	Neck
1	-	-	2.0	1		2.7 ⁺	2.0
2	-	-	1.9	2		-	-
3		-	-	3	-	-	2.2
				4	-	-	2.0
				5	-	-	- ⁺
				6		-	-

Meek & Gray ranges.

length 14 - 17.1 cm.

Neck 1.7 - 2.3 cm.

Glenoid 2.4 - 2.9 cm.

⁺eroded

Bone:- HUMERUS

LEFT					RIGHT				
No.	Site No.	Length	Prox.	Dist.	No.	Site No.	Length	Prox.	Dist.
1	152	-	-	3.3 ⁺ *	1	-	-	- ⁺	- ⁺
2	-	-	-	3.5 ⁺ *					
3	-	-	-	3.5 ⁺ *					

⁺eroded

* exceeds range listed in 1910 report

Meek & Gray ranges
length - NIL
distal 2.4 - 2.8 cm.

Bone:--..ULNA.....

No.	Site No.	LEFT	Max. width	RIGHT							
1			1.7								
2	-		2.1								

Meek & Gray the ranges
 one right ulna
 Olecranon = 2.3cm

Lengths not recorded because of erosion or fracture

RADIUS

Bone:--.....

No.	LEFT				No.	RIGHT				
	Site	Length	Prox	dist		Site	Length	Prox	dist	
1	-	-	-	-	71 *	-	-	-	- distal shaft only	
					72 *	-	-	-	- distal articulation only	
No measurements possible										
* These two fragments fit together										

METATARSALS and or METACARPALS
Bone:-

No.	Site No.	Length (Prox	distal)	not needed							
1	-	7.3									
2		6.5									
3		-									
4		-									
5	-	-									
6	-	-									
7	-	-									
8	-	-									
9		-									
10	-	-									
11		-									
12		6.5									
13	-	-									
14	-	-									
15	-	-									
16	-	-									
17		-									
18	-	-									

Meek & Gray publish no details

Bone:- FEMUR

LEFT

Site RIGHT

No. No. Length Prox. distal

1	3	-	-	4.1
2	-	-	-	4.3

(condyles only)

Meek & Gray - 12 specimens - No measurements

Bone:-...TIBIA.....

LEFT

RIGHT

LEFT					RIGHT				
No.	Site No.	Length	Prox.	dist	No.	Site No.	Length	Prox	dist.
1		-	-	-	1	-	-	-	eroded
2	-	-	-	eroded	2		-	-	eroded
3		-	-	-	73	-	-	4.5	-
					74		-	-	-

Meek & Gray ranges.

length - 1 specimen at 18.0cm.

distal 5 specimens at 2.1 cm

Bone:-.....CALCANEUM.....

LEFT				RIGHT				
No.	Site No.	Length	Max. width	No.	Site No.	Length	Max. width	
1	-	7.7 ⁺	3.2	?	1	-	6.8	2.7 ⁺
2		7.0 ⁺	2.3 ⁺	?	2	-	6.0 ⁺	2.3 ⁺
3		6.5 ⁺	2.6		3	-	5.5 ⁺	3.0

⁺eroded.

Bone:-.....MAXILLA.....

LEFT

RIGHT

1	-	P.M. 2,3,4	M 1,2,3	1	P.M. 2,3,4	M 1,2,3
?2	-	P.M. 2		2	I 2,3	C 1
3		C ₁		3	?P.M. 2	

Bone: MANDIBLE

LEFT

RIGHT

1	-	I ₅ C ₁	P.M. 2&3			1		I ₆	C (broken)	P.M. 2,3,4
2	-	I _{1&2}				2	-	P.M. 1,2,3		M 123
3	-	I ₅ C ₁	P.M. 2			3	-	I _{2,3}		

Bone:-..... SCAPULA

LEFT

RIGHT

Site

No.	No.	Length	Neck	Glenoid								
1	-	-	5.6	6.1*								
2	-	33.2 ⁺	6.5	5.9								

⁺ eroded

* exceeds range listed in 1910 Report

Meek & Gray ranges

No lengths given

Neck 5.4 - 6.7cm.

Glenoid 4.9 - 6.0cm.

Bone:-... RADIUS

No.	LEFT				No.	RIGHT					
	Site No.	Length	Prox.	dist.		Site No.	Length	Prox	dist.		
1	-	31.9	7.5	6.0	U.A.	1	-	34.7*	7.4	6.4	U.A. 0
2	-	32.4	7.1	5.8	U.A.	2	BP63	33.4	7.2 ⁺	6.4	
3	-	-	-	6.0 ⁺							
<p>Meek & Gray ranges</p> <p>Length 29.2 - 33.9 C.M.</p> <p>distal 5.2 - 6.4 C.M.</p> <p>* Exceeds range listed in 1910 report</p> <p>+ eroded</p> <p>U.A. = Ulna Attached</p> <p>0 Circular hole</p>											

LEFT

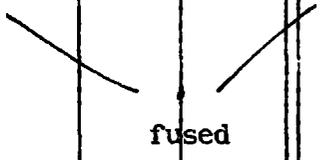
Bone:-...Metacarpal.....

RIGHT

No.	Site No.	Length	Prox.	distal		No.	Site No.	Length	Prox.	dist.	
1	-	24.0*	5.6	5.4*		1	-	23.2	5.8*	4.9	
2	-	23.2	5.8	4.9	*	2	-	22.3	5.0	5.3*	
3	-	22.2	5.4	5.0							
<p>Meek & Gray ranges Length = 21.7 - 25.5 c.m. distal = 4.3 - 5.2 c.m.</p> <p>* arthritic distal end and part of shaft</p> <p>* Exceeds range listed in 1910 report.</p>											

LEFT Bone:--..... OS COXAE

LEFT			RIGHT		
No.	Site No.	Maximum diameter of acetabulum	No.	Site No.	Maximum diameter of acetabulum
1	-	5.6	1	-	5.6
2	-	5.8	2	-	5.8



0 = Circular hole

Bone:- TIBIA

LEFT					RIGHT				
No.	Site	Length	Prox.	Dist.	No.	Site	Length	Prox.	Dist.
1	-	32.8	8.9	*7.2	1	-	37.3	10.5	8.2* o
2	-	30.8	8.2	*6.1	2	CN63	*38.3	10.5	8.1* o
					3	-	35.2	10.0	7.6* o
					4	-	33.0 ⁺	8.7	6.7*
					5	-	-	-	6.6*

Meek & Gray range
 length 29.3 - 37.9 c.m.
 distal 4.3- 5.5 c.m.

* Exceeds range listed in 1910 report

⁺ eroded

o Circular hole

Bone:-..... METATARSAL

LEFT					RIGHT				
No.	Site	Length	Prox	Dist	No.	Site	Length	Prox	Dist.
1	-	27.9	4.7	*4.7	1	-	26.9	5.2	*5.2
2	-	23.8	4.2	4.2	2	OE64	23.7	4.2	4.2 ⁺
? 3	-	-	-	-					N.C.

Meek & Gray range
length 22.6 - 29.0 C.M.
distal 3.5 - 4.5 C.M.

* Exceeds range listed in 1910 report

⁺ eroded

N.C. = not classified as being either right or left

Bone:- METACARPAL

No.	Site No.	Length	Prox.	dist.								
1	-	27.2	4.2 app	4.2								

prox = width of proximal articular surfaces
 dist = width of distal articular surfaces
 app = estimated distance

Bone:--.....MANDIBLE.....

LEFT						RIGHT					
No.	Site No.					No.	Site No.				
1	-	P.M. 1, 2, 3	M. 1, 2			1	-	P.M. 2, 3	M. 1, 2		
2	-	ramus - no teeth				2	-	ramus - no teeth			
						3	-	P.M. 1, 2	M. 1		

Bone:- HUMERUS

LEFT
Site

RIGHT

No.	No.	Length	Prox	Distal	No.	Site	No.	Length	Prox	Distal
1	JL64	14.9	2.5	2.8*	1	BN62		16.7*	2.8	3.2*
2	-	18.4*	3.0	3.3* ⁺	2	-		12.8	2.4	2.5*
3	-	-	-	-	3	-		-	-	2.3*

Meek & Gray ranges
length 8.5 - 15.0 cm.
distal 1.3 - 2.0 cm.

Board used not calipers

* Exceeds range listed in 1910 Report

⁺ eroded

Bone:-.....RADIUS.....

LEFT					RIGHT					
No.	Site No.	Length	Prox. dist.		No.	Site No.	Length	Prox. dist.		
1		-	1.5	-		1	-	-	1.5	-
2		-	2.0	-						

Bone:-Radius.....

No.	LEFT	Length	Prox.	dist	No.	RIGHT	Length	Prox.	dist.
	Site					Site			
					1	- eroded	-	-	- no measurement taken
	LEFT				<u>FEMUR</u> 21				RIGHT - - 1.8

Bone:-...FEMUR.....

No.	LEFT			RIGHT		
	Site No.	Length		No.	Site No.	Length
1	NE66	-		1	-	-
2	MF66	-		2	8SW	-
3	-	-				

Bone:-.....HUMERUS.....

LEFT

RIGHT

No.	Site No.	Length				No.	Site No.	Length			
1	-	-				1	-	-			

2 eroded vertebrae												
--------------------	--	--	--	--	--	--	--	--	--	--	--	--

4.

APPENDIX 'A'

TOTALS OF ALL BONES RECOVERED AT CORSTOPTUM DURING 1966. DISTAL AND PROXIMAL FRAGMENTS ARE INCLUDED

BONE	SPECIES						
	OX	HORSE	SHEEP	PIG	DOG	FOX	RED DEER
Skull	4	2	1	-	-	-	Tines with 7
Maxilla	14	6	4	14	-	-	Skull
Mandible	45	6	21	24	5	-	Fragments
Atlas	10	-	2	1	1	-	-
Axis	12	-	-	-	-	-	-
Scapula	90	2	14	9	1	-	-
Humerus	8	-	9	4	6	-	-
Ulna	4	-	12	2	-	-	-
Radius	19	5	30	2	3	1	-
Metacarpal	38	5	18	18	-	-	1
Os Coxae	13	4	15	-	-	-	-
Femur	10	-	11	2	-	1	-
Tibia	12	7	19	7	-	-	-
Fibula	-	-	-	?2	-	-	-
Astragalus	11	3	6	1	-	-	-
Calcaneum	14	3	2	6	-	-	-
Metatarsal	51	5	37	-	-	-	-
Prox. Phalange	53	6	-	-	-	-	-
Middle Phalange	25	1	7	9	-	-	-
Terminal Phalange	22	5	-	-	-	-	-
Horn Cores	14	-	-	-	-	-	-
	469	60	208	101	16	2	8

APPENDIX 'D'

TABLE SHOWING THE TOTALS OF ENTIRE BONES OR FRAGMENTS DISPLAYING DISTAL ARTICULATORY SURFACE, RECOVERED FROM CATCOOTE

SPECIES

BONE	OX		HORSE		SHEEP		PIG		RED DEER	
	1966	Total	1966	Total	1966	Total	1966	Total	1966	Total
	L.	R.	L.	R.	L.	R.	L.	R.	L.	R.
SKULL	-	2	-	3	-	3	-	-	-	-
MAXILLA	2	4	-	15	9	6	7	4	-	11
MANDIBLE	13	22	-	40	21	19	8	9	-	17
ATLAS	-	1	-	2	-	2	-	-	-	-
AXIS	-	6	-	6	-	6	-	-	-	-
SCAPULA	9	19	1	25	16	9	3	1	-	4
HUMERUS	7	20	1	16	5	11	1	1	-	2
ULNA	2	4	-	15	11	4	-	-	-	-
RADIUS	2	4	1	3	1	2	-	-	-	-
METACARPAL	4	10	-	7	2	3	-	-	-	-
OS. COXAE	4	6	-	12	7	5	-	-	-	-
FEMUR	1	3	-	2	1	1	1	1	-	2
TIBIA	8	12	1	12	7	5	1	1	-	1
FIBULA	-	-	-	-	-	-	-	-	-	-
ASTRAGALUS	10	18	2	12	6	6	-	-	-	-
CALCANEUM	8	16	1	17	11	6	-	-	-	-
METATARSAL	2	5	1	10	3	4	3	3	-	8
PROX. PHAL.	36	36	-	-	-	-	-	-	-	-
MIDDLE PHAL.	22	22	-	-	-	-	-	-	-	-
TERM. PHAL.	8	8	-	-	-	-	-	-	-	-
HORN CORES	4	13	-	6	2	4	-	-	-	-
MIN. NO. ANIMALS	13	8	3	8	2	4	2	4	-	-
	231	281	28	201	201	39.6%	46	9.1%	1	0.2%
	45.6%		5.5%	39.6%			9.1%			
										Total = 507

8.

APPENDIX 'E'

DESCRIPTION OF DENTITION OF SPECIMENS OF CHILLINGHAM CATTLE

FOUND IN THE BRITISH MUSEUM (NATURAL HISTORY)

<u>Reference No.</u>	<u>Left Mandible</u>	<u>Right Mandible</u>
1953 L/4	22-3 P.3 (emerging) P2 d.m. ^{↑↑↑} 3,2,1	Same as left
	4 P.3 (emerging) P2,1 d.m.3,2 (socket for p.m.1)	Same as left
	*- 5 P3,2,1 P.M.4,3,2	Same as left
	*- 6 P.3,2,1 P.M.4,3 (broken tooth in socket ? P.M.2)	Same as left
	- 7 P.3.2.1 P.M.4.3 (socket for P.M.2)	Same as left but socket is tiny may be d.m.1 (deciduous)
	- 8 P.3,2,1 P.M.4,3, no socket present.	Same as left
	- 9 Mandibles absent from this specimen.	
	-10 - Teeth lacking	
	No socket for P.M.2	Socket apparently for P.M.2 present.
*1890. 3.12.1. male	M.3,2,1 P.M.4,3,2.	Same as left
1890 3.10.2. female.	Jaw severely deformed.	
	Dentition apparently	Same as left
	M.2 (damaged) M.1, P.M.3,2.	

* Specimen apparently bears permanent premolar P.M.2

9.

APPENDIX 'F'

STATISTICAL TESTS APPLIED TO CATTLE METAPODIALS RECOVERED

FROM CORSTOPITUM

(a) Chi Square Tests on Metatarsal Distal Widths

Meek and Gray results show 61 left and 66 right for which a distal measurement was given.

1966 results show 13 left and 10 right for which distal measurement is available.

1. Left and right metatarsals in Meek & Gray Report were numbered from 1-61 and 1-66 respectively.
2. 13 left and 10 right were picked out at random. (This was repeated for a second test).
3. The distal width of 23 thus selected was noted.
4. They were arranged in 2 intervals.
5. Meek & Gray data now treated as "expected" "E" distribution.
1966 material treated as "observed" "O"
6. Frequencies were -

	<u>44-45</u>	<u>46-47</u>	<u>48-49</u>	<u>50-51</u>	<u>52-53</u>	<u>54-55</u>	<u>56-57</u>
1st sample	4	6	2	8	0	1	0
2nd sample	6	3	4	4	1	2	1
1966 specimens	4	6	5	2	2	0	1

	<u>58-59</u>	<u>60-61</u>	<u>62-63</u>	<u>64-65</u>	<u>66-67</u>
1st sample	1	0	0	1	0
2nd sample	0	2	0	0	0
1966 specimens	0	1	0	1	1

$$\chi^2 = \sum \left[\frac{(O-E)^2}{E} \right]$$

$$\begin{aligned} \text{1st Test. } \chi^2_{(11)} &= \frac{(4-4)^2}{4} + \frac{(6-6)^2}{6} + \frac{(5-2)^2}{2} + \frac{(2-8)^2}{8} + \frac{(2-0)^2}{0} \\ &\quad + \frac{(0-1)^2}{1} + \frac{(1-0)^2}{0} + \frac{(0-1)^2}{1} + \frac{(1-0)^2}{0} + \frac{(0-0)^2}{0} + \frac{(1-1)^2}{1} + \frac{(1-0)^2}{0} \end{aligned}$$

∴ $\chi^2_{(11)} = 19.0$
Probability > 0.05

2nd test.

$$\begin{aligned} \chi^2_{(11)} &= \frac{(4-6)^2}{6} + \frac{(6-3)^2}{3} + \frac{(5-4)^2}{4} + \frac{(2-4)^2}{4} + \frac{(2-1)^2}{1} + \frac{(0-2)^2}{2} + \frac{(1-1)^2}{1} \\ &\quad + \frac{(0-0)^2}{0} + \frac{(1-2)^2}{2} + \frac{(0-0)^2}{0} + \frac{(1-0)^2}{0} + \frac{(1-0)^2}{0} \\ &= \frac{4}{6} + \frac{9}{3} + \frac{1}{4} + \frac{4}{4} + \frac{1}{1} + \frac{4}{2} + \frac{0}{0} + 0 + \frac{1}{2} + 0 + 1 + 1 \end{aligned}$$

$$\chi^2_{(11)} = 10.41$$

Probability between 0.50 and 0.30. *Approaching 0.50.*

The tests were repeated arranging the bones in 4 m.m. intervals.

Frequencies -

	45-47	48-51	52-55	56-59	60-63	64-67
1st sample	10	10	1	1	0	1
2nd sample	9	8	3	1	2	0
1966 specimens	10	7	2	1	1	2

1st test

$$\begin{aligned} \chi^2_{(5)} &= \frac{(10-10)^2}{10} + \frac{(7-10)^2}{10} + \frac{(2-1)^2}{1} + \frac{(1-1)^2}{1} + \frac{(1-0)^2}{0} + \frac{(2-1)^2}{1} \\ &= 0 + \frac{9}{10} + 1 + 0 + 1 + 1 \end{aligned}$$

$$\chi^2_{(5)} = 3.9 \text{ Probability } > 0.50$$

2nd test

$$\begin{aligned} \chi^2_{(5)} &= \frac{(10-9)^2}{9} + \frac{(7-8)^2}{8} + \frac{(2-3)^2}{3} + \frac{(1-1)^2}{1} + \frac{(1-2)^2}{2} + \frac{(2-0)^2}{0} \\ &= \frac{1}{9} + \frac{1}{8} + \frac{1}{3} + 0 + \frac{1}{2} + 4 \\ &= 0.11 + 0.125 + 0.33 + 0.5 + 4 \end{aligned}$$

$$\chi^2_{(5)} = 6.065 \text{ Probability } 0.30^0$$

Chi Square Tests on Metacarpal distal widths

A similar sampling technique was adopted for the metacarpals as for the metatarsals. Eleven left and five right were selected at random (repeated for 2nd test). *selected not random! Taken*

Frequencies were grouped in 2 m.m. intervals.

	45-46	47-48	49-50	51-52	53-54	55-56	57-58	59-60
1st sample	0	0	4	3	3	0	1	3
2nd sample	0	1	4	4	4	0	0	0
1966 material	1	0	7	5	0	1	1	0

	61-62	63-64	65-66	67-68	69-70	71-72	73-74
1st sample	0	1	0	0	0	1	0
2nd sample	0	1	1	0	0	0	1
1966 material	0	0	0	0	1	0	0

1st Test

$$\chi^2_{(14)} = \frac{(1-0)^2}{0} + \frac{(0-0)^2}{0} + \frac{(7-4)^2}{4} + \frac{(5-3)^2}{3} + \frac{(0-3)^2}{3} + \frac{(1-0)^2}{0} + \frac{(1-1)^2}{1} + \frac{(0-3)^2}{3} + \frac{(0-0)^2}{0} + \frac{(0-1)^2}{1} + \frac{(0-0)^2}{0} + \frac{(0-0)^2}{0} + \frac{(1-0)^2}{0} + \frac{(0-1)^2}{1} + \frac{(1-0)^2}{0}$$

$$= 1 + 0 + \frac{9}{4} + \frac{4}{3} + \frac{9}{3} + 1 + 0 + \frac{9}{3} + 0 + 1 + 0 + 0 + 1 + 1 + 1$$

$\chi^2_{(14)} = 15.58$. Probability between 0.30 and 0.50.

2nd Test

$$\chi^2_{(14)} = \frac{(1-0)^2}{0} + \frac{(0-1)^2}{1} + \frac{(7-4)^2}{4} + \frac{(5-4)^2}{4} + \frac{(0-4)^2}{4} + \frac{(1-0)^2}{0} + \frac{(1-0)^2}{0} + \frac{(0-0)^2}{0} + \frac{(0-0)^2}{0} + \frac{(0-1)^2}{1} + \frac{(0-1)^2}{1} + \frac{(0-0)^2}{0} + \frac{(1-0)^2}{0} + \frac{(0-0)^2}{0} + \frac{(0-1)^2}{1}$$

$$= 1 + 1 + \frac{9}{4} + \frac{1}{4} + \frac{16}{4} + 1 + 1 + 0 + 0 + 1 + 1 + 0 + 1 + 0 + 1$$

$\chi^2_{(14)} = 14.50$. Probability between 0.50 and 0.30.

The tests were repeated arranging the bones in 4 m.m. intervals.

Frequencies -

	45-48	49-52	53-56	57-60	61-64	65-68	69-72	73-76
1st sample	0	7	3	4	1	0	1	0
2nd sample	1	8	4	0	1	1	0	1
1966 material	1	12	1	1	0	0	1	0

1st Test

$$\chi^2_{(6)} = \frac{(1-0)^2}{0} + \frac{(12-7)^2}{7} + \frac{(1-3)^2}{3} + \frac{(1-4)^2}{4} + \frac{(0-1)^2}{1} + \frac{(0-0)^2}{0} + \frac{(1-1)^2}{1}$$

$$= 1 + \frac{25}{7} + \frac{4}{3} + \frac{9}{4} + 1 + 0 + 0$$

$$\chi^2_{(6)} = 10.15. \text{ Probability between 0.2 and 0.1.}$$

2nd Test. N.B. extra degree of freedom necessary.

$$\chi^2_{(7)} = \frac{(1-1)^2}{1} + \frac{(12-8)^2}{8} + \frac{(1-4)^2}{4} + \frac{(1-0)^2}{0} + \frac{(0-1)^2}{1} + \frac{(0-1)^2}{1} + \frac{(1-0)^2}{0} + \frac{(0-1)^2}{1}$$

$$= 1 + \frac{16}{8} + \frac{9}{4} + 1 + 1 + 1 + 1 + 1$$

$$\chi^2_{(7)} = 8.25. \text{ Probability between 0.2 and 0.1.}$$

"Students 't' Test" for establishing the significance between Means
for small samples

Metacarpals

1910 $\sum \frac{x}{N} = 5.44$ $\sigma = 0.6$ $N_1 = 116$

1966 $\sum \frac{x}{N} = 5.21$ $\sigma = 0.539$ $N_2 = 16$

Standard error of difference between the means = σ_D

$$\sigma_D = \sqrt{\sigma_{M_1}^2 + \sigma_{M_2}^2}$$

where $\sigma_{M_1} = \frac{\sigma_1}{\sqrt{(N_1 - 1)}}$

and $\sigma_{M_2} = \frac{\sigma_2}{\sqrt{(N_2 - 1)}}$

$\sigma_{M_1} = \frac{0.6}{\sqrt{115}}$

and $\sigma_{M_2} = \frac{0.539}{\sqrt{15}}$

$\sigma_{M_1} = 0.056$

and $\sigma_{M_2} = 0.139$

$\therefore \sigma_D = \sqrt{0.056^2 + 0.139^2}$
 $= \sqrt{0.0225}$
 $= 0.15$

Critical Ration C.R. = $\frac{(M_1 - M_2)}{\sigma_D}$ where M = Mean

$= \frac{5.44 - 5.21}{0.15}$

$= 1.533$

Degrees of freedom d.f. = $(N_1 - 1) + (N_2 - 1)$

$= 130$

Distribution of 't' at probabilities of 0.05 and 0.01
for d.f. = 120 are 1.98 and 2.617
d.f. ∞ are 1.96 and 2.576

Difference between the means of the two samples is not significant

Cornu's Value $\frac{s.d}{e}$ where $e = \frac{\sum |x - \bar{x}|}{n}$

for metatarsals = 1.35
for metacarpals = 1.18

Value for normal distribution = 1.25 (Brooks and Caruthers 1953)

10.

APPENDIX 'G'

STATISTICAL DATA REFERRING TO LONG BONES OF CATTLE AND SHEEP

(a) EXCAVATED AT CORSTOPITUM

Cattle

	$\sum x^2$	$\sum x$	N	$\frac{\sum x^2}{N}$	$\frac{\sum x}{N}$	s.d	=	s.d
1910 report	3249.16	639.2	127	25.58	5.03	$\sqrt{0.28}$	=	0.529
1966	587.08	115.4	23	25.53	5.02	$\sqrt{0.33}$	=	0.575
Combined	3836.24	754.6	150	25.57	5.03	$\sqrt{0.27}$	=	0.52

Metacarpals (distal width)

1910 report	3473.29	631.5	116	29.95	5.44	$\sqrt{0.36}$	=	0.6
1966	438.82	83.4	16	27.43	5.21	$\sqrt{0.29}$	=	0.539
Combined	3913.11	714.9	132	29.64	5.42	$\sqrt{0.26}$	=	0.51

Tibia (distal width)

1910 report	2254.72	417.2	78	28.91	5.35	$\sqrt{0.29}$	=	0.539
1966	221.42	42.0	8	27.68	5.25	$\sqrt{0.12}$	=	0.346
Combined	2476.14	459.2	86	28.79	5.34	$\sqrt{0.27}$	=	0.52

Radius (distal width)

1910 report	2211.40	371.2	63	35.10	5.89	$\sqrt{0.41}$	=	0.64
1966	151.91	24.5	4	37.98	6.13	$\sqrt{0.4}$	=	0.633
Combined	2363.31	375.7	67	35.27	5.91	$\sqrt{0.34}$	=	0.583

Scapula

(a) minimum width of neck

1910 report	5395.78	1105.6	229	23.56	4.83	$\sqrt{0.23}$	=	0.48
1966	1539.10	338.8	75	20.52	4.52	$\sqrt{0.09}$	=	0.3
Combined	6934.88	1444.4	304	22.81	4.75	$\sqrt{0.25}$	=	0.5

(b) maximum diameter of glenoid

1910 report	3597.56	702.0	138	26.07	5.09	$\sqrt{0.20}$	=	0.447
1966	1300.86	256.9	51	25.51	5.04	$\sqrt{0.14}$	=	0.374
Combined	4898.41	958.9	189	25.92	5.07	$\sqrt{0.18}$	=	0.424

(b)

Sheep

<u>Metatarsals</u>	$\sum x^2$	$\sum x$	N	$\frac{\sum x^2}{N}$	$\frac{\sum x}{N}$	s.d	s.d
Meek & Gray	38.52	19.6	10	3.85	1.96	$\sqrt{0.01}$	= 0.1
G.W.I.Hodgson	51.09	24.7	12	4.26	2.06	$\sqrt{0.02}$	= 0.14
Combined	89.61	44.3	22	4.07	2.01	$\sqrt{0.03}$	= 0.17

Metacarpals

Meek & Gray	66.65	30.5	14	4.76	2.18	$\sqrt{0.01}$	= 0.1
G.W.I.H.	37.13	16.1	7	5.30	2.30	$\sqrt{0.01}$	= 0.1
Combined	103.78	46.6	21	4.94	2.22	$\sqrt{0.01}$	= 0.1

Tibia

Meek & Gray	39.20	23.4	14	2.80	1.67	$\sqrt{0.01}$	= 0.1
G.W.I.H.	59.98	26.8	12	5.00	2.23	$\sqrt{0.03}$	= 0.17
Combined	99.18	50.2	26	3.81	1.93	$\sqrt{0.09}$	= 0.3

Figure 1 CORSTOPITUM

(10.13.1961)

CATTLE METACARPAL DISTAL WIDTHS

116 SPECIMENS FROM 1911 REPORT
16 SPECIMENS FROM 1966 REPORT
132 SPECIMENS PLOTTED.

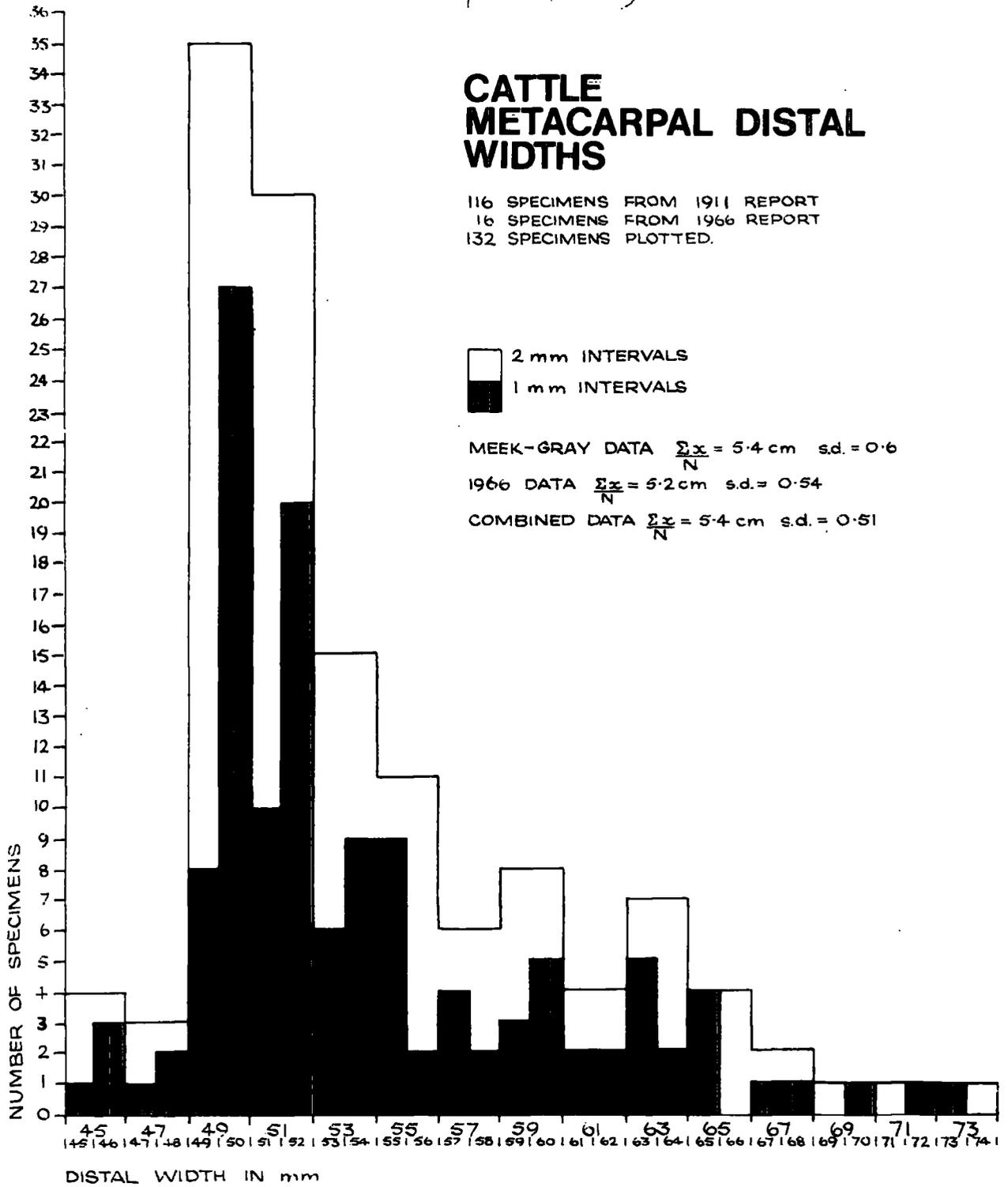


Figure 2
CORSTOPITUM
(D. S. G. ...)

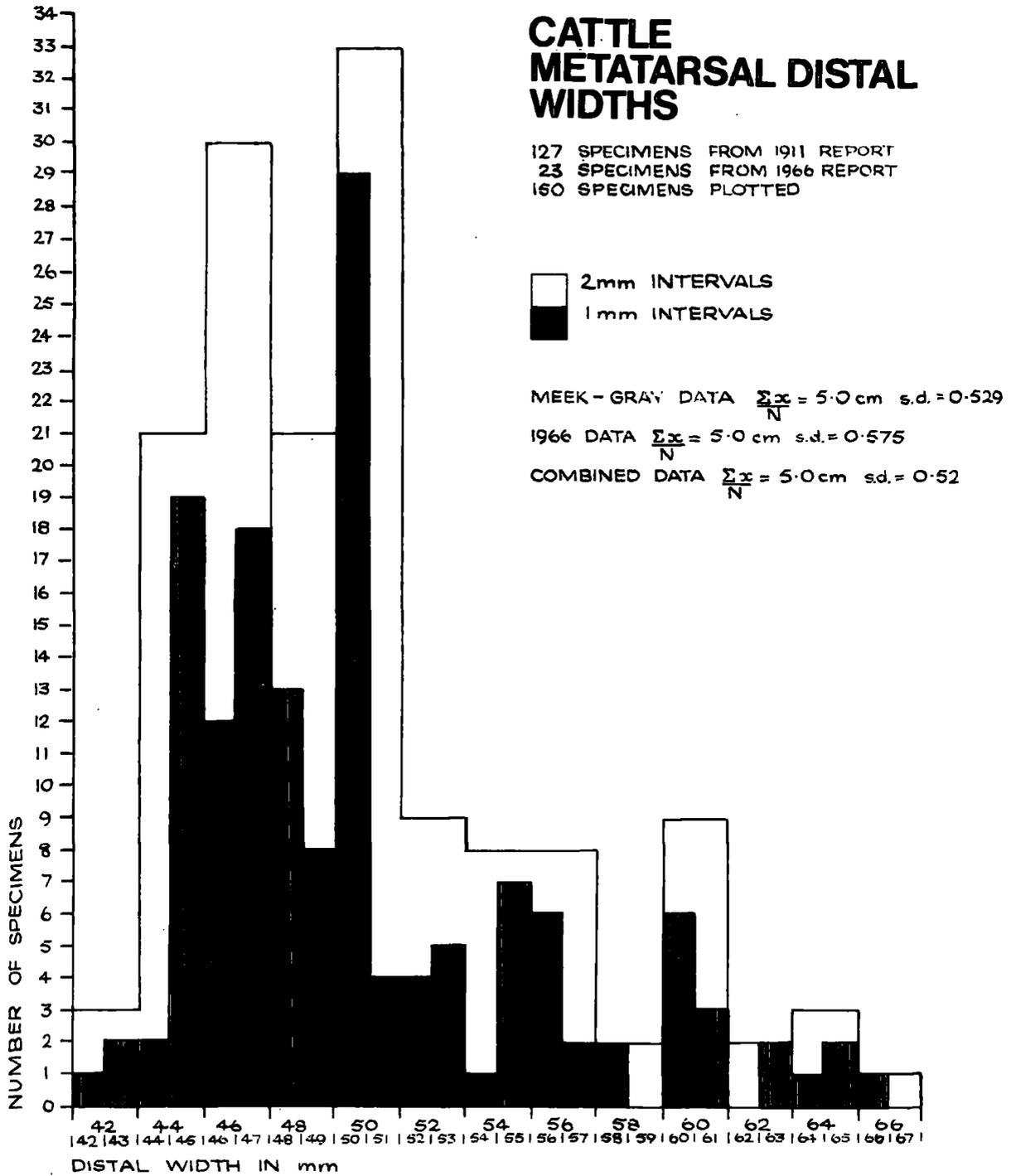
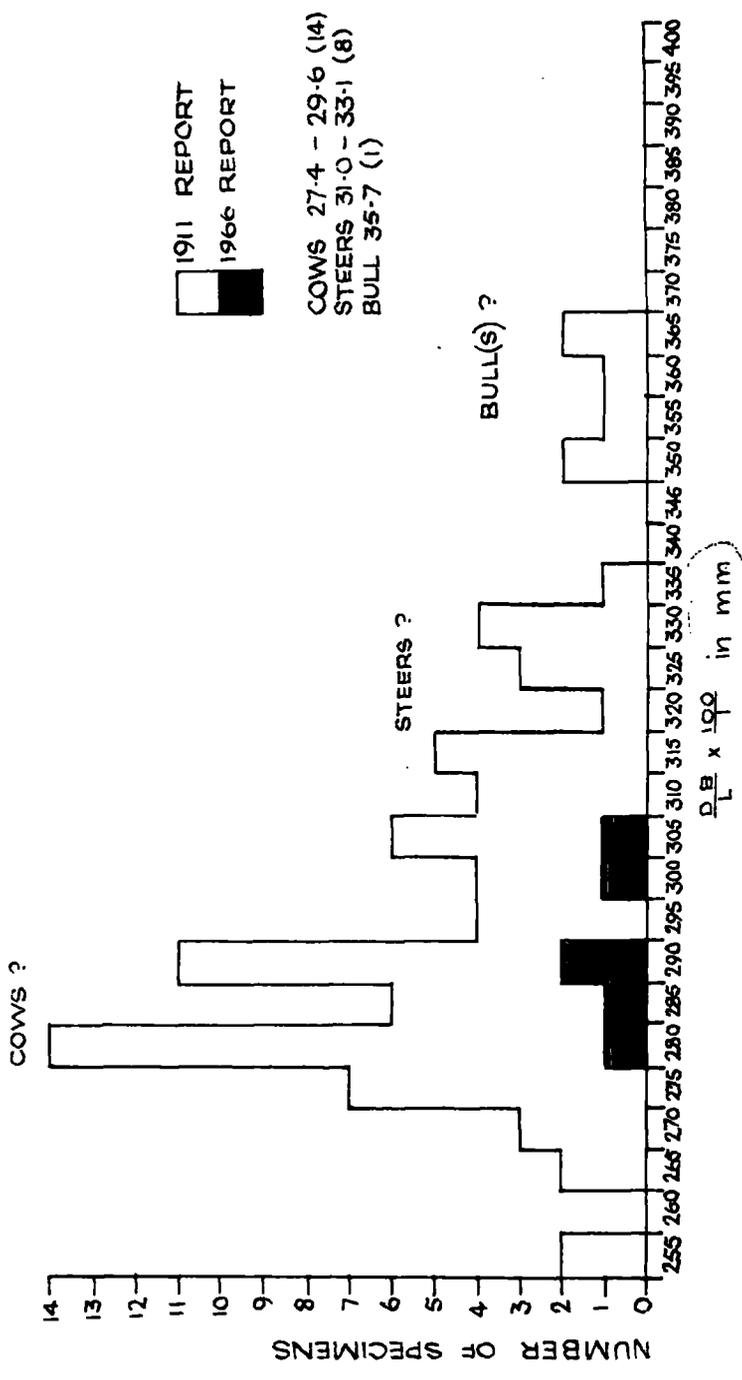


Figure 3
CORSTOPITUM
2.13, 16.1

CATTLE METAPODIAL INDICES
METACARPAL $\frac{DB}{L} \times \frac{100}{1}$
 INDEX ACCORDING TO HOWARD M.M. (1962)



This is an index (of 1/2), not a measurement. Some other units used

Figure 4
CORSTOPITUM

(p. 16, Vol. 1)

CATTLE METAPODIAL INDICES

$$\text{METATARSAL } \frac{DB}{L} \times \frac{100}{1}$$

INDEX ACCORDING TO HOWARD M M (1962)

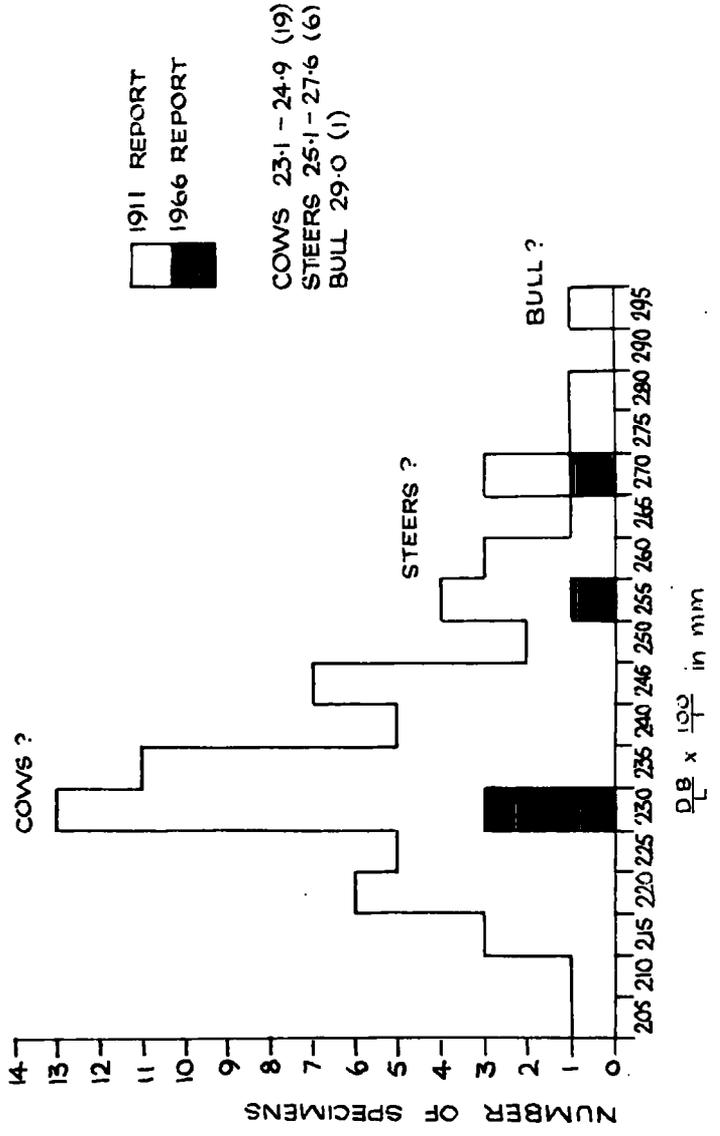


Figure 5
CATTLE METACARPAL LENGTH RANGES
 ADAPTED FROM
 JEWELL (1962) EXTENDED
 AND REVISED

R V C - Material in
 Royal Veterinary College,
 breed and sex not
 known

Chillingham and Chartley
 material from British
 Museum

Figures for Alderney and
 Kerry are from Pitt
 Rivers (1888)

Number at side - number
 of specimens
 Number inside - mean value

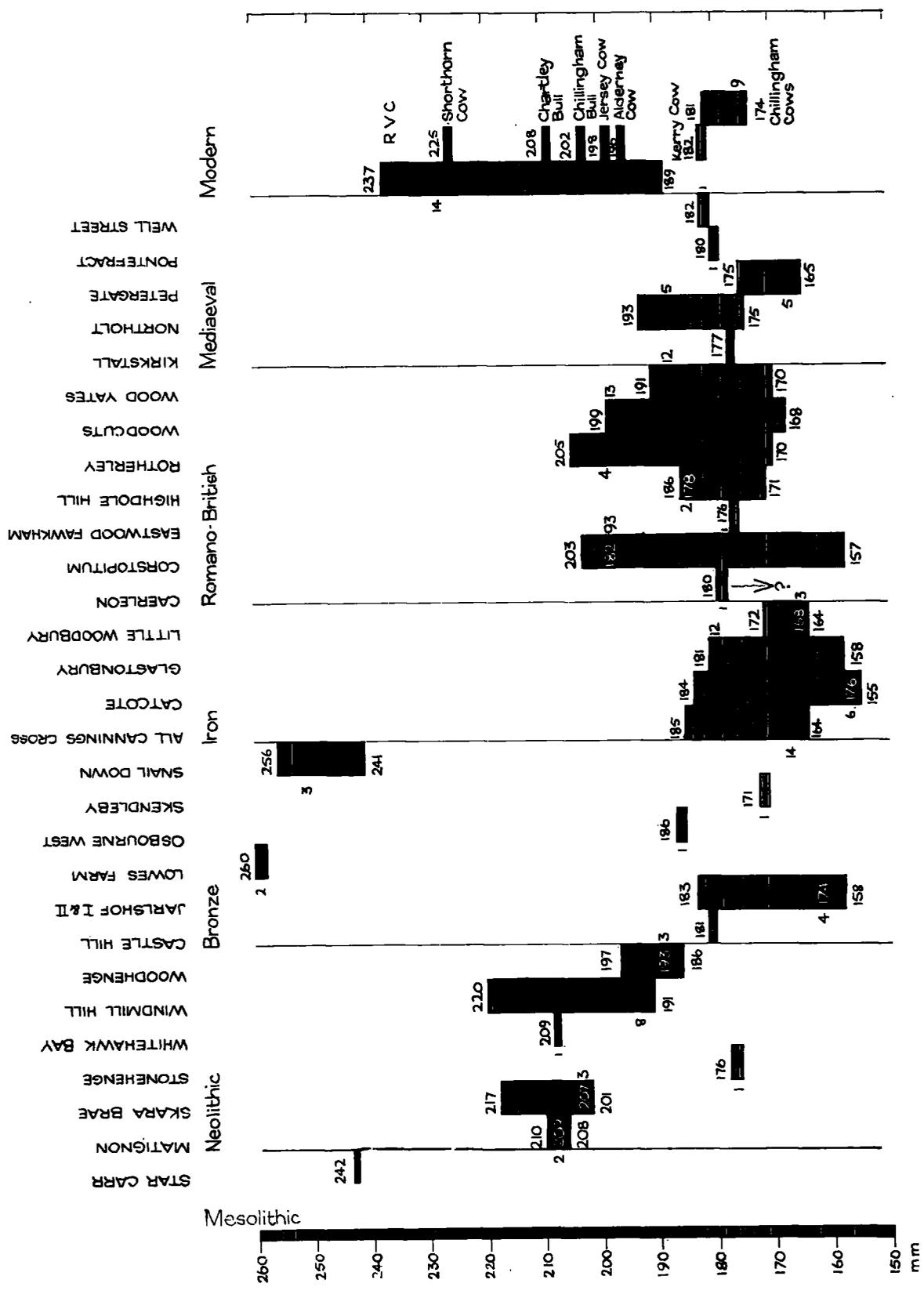


Figure 6
CATTLE
DISTAL WIDTH
RANGES OF
METACARPALS
 DETAILS AS IN FIG 5

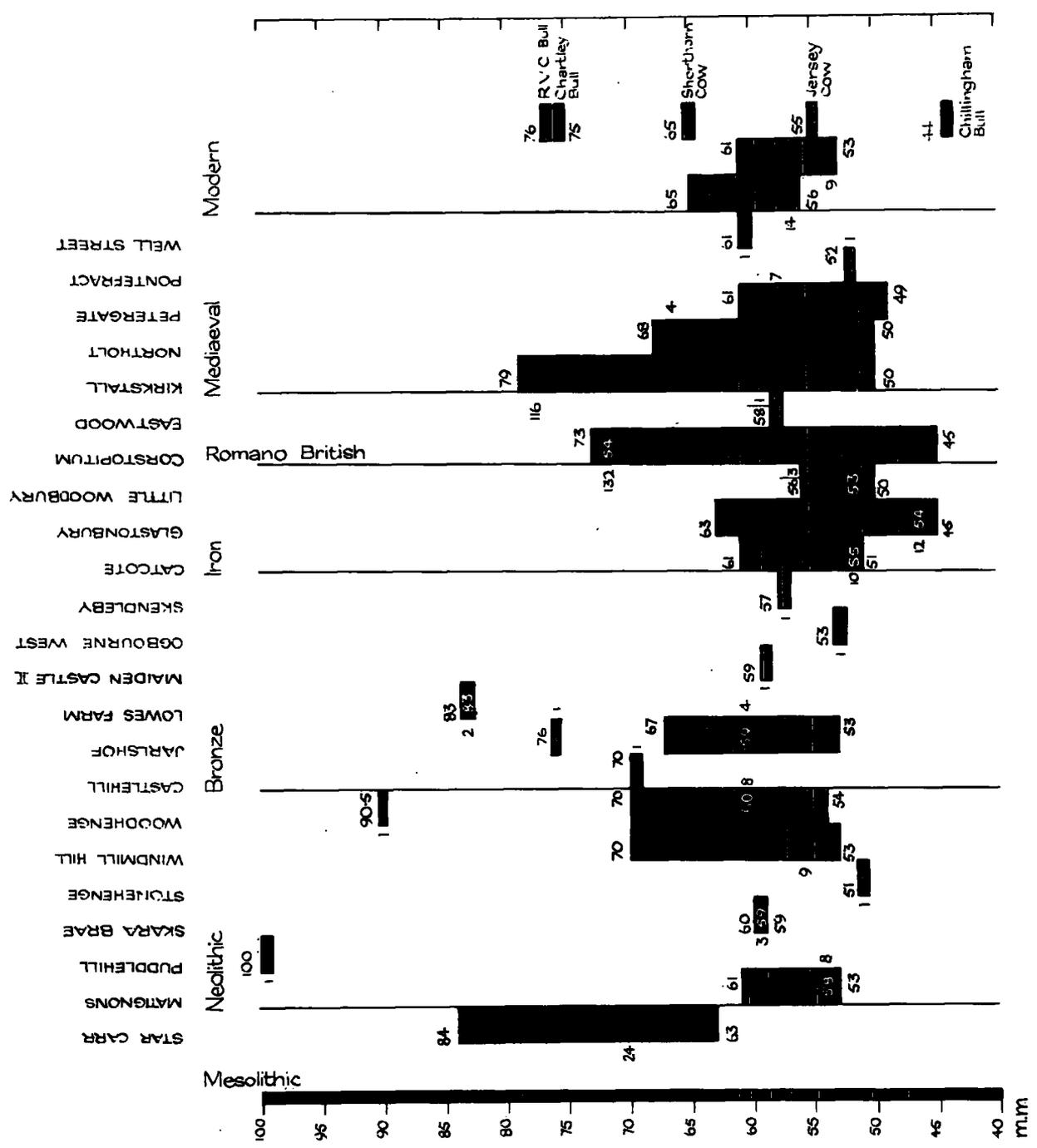


Figure 7
CATTLE
HUMERUS
WIDTH OF DISTAL
ARTICULATION
 DETAILS AS IN FIG 5

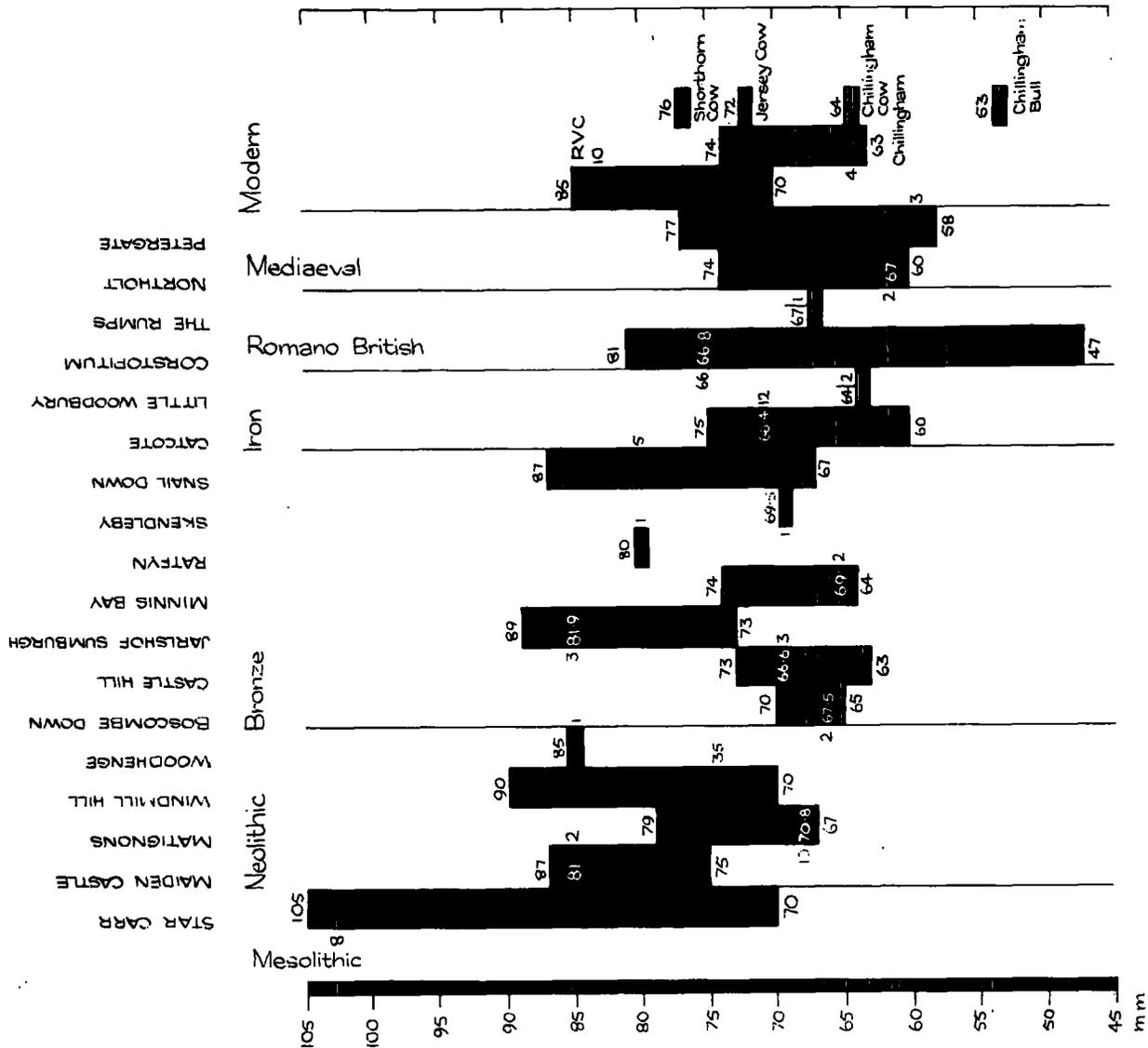


Figure 8
CATTLE
ASTRAGALUS
LENGTH RANGES
 DETAILS AS IN FIG 5

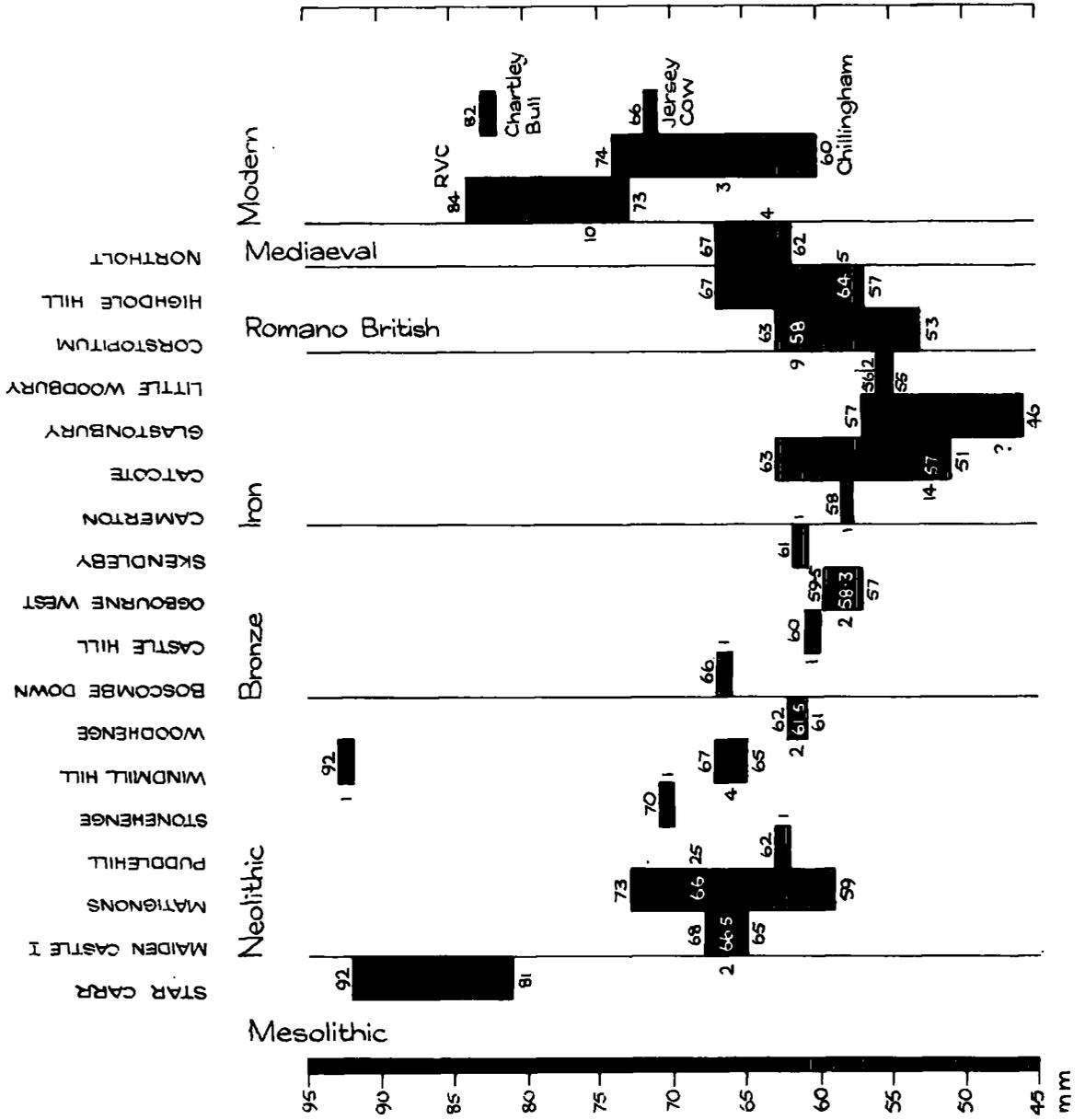


Figure 9

**CATTLE
METACARPAL DISTAL WIDTHS
FREQUENCY DIAGRAM**

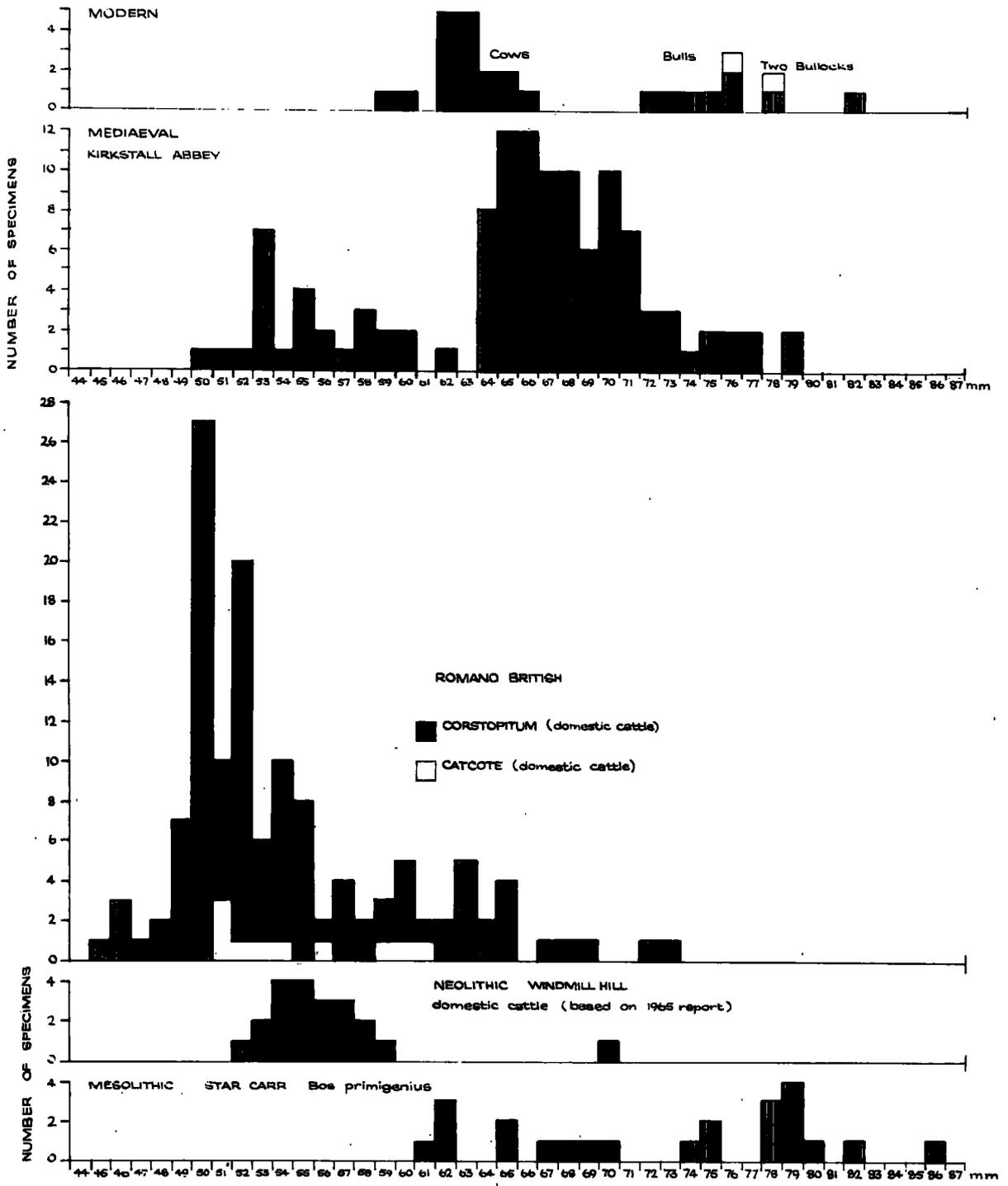


Figure 10a

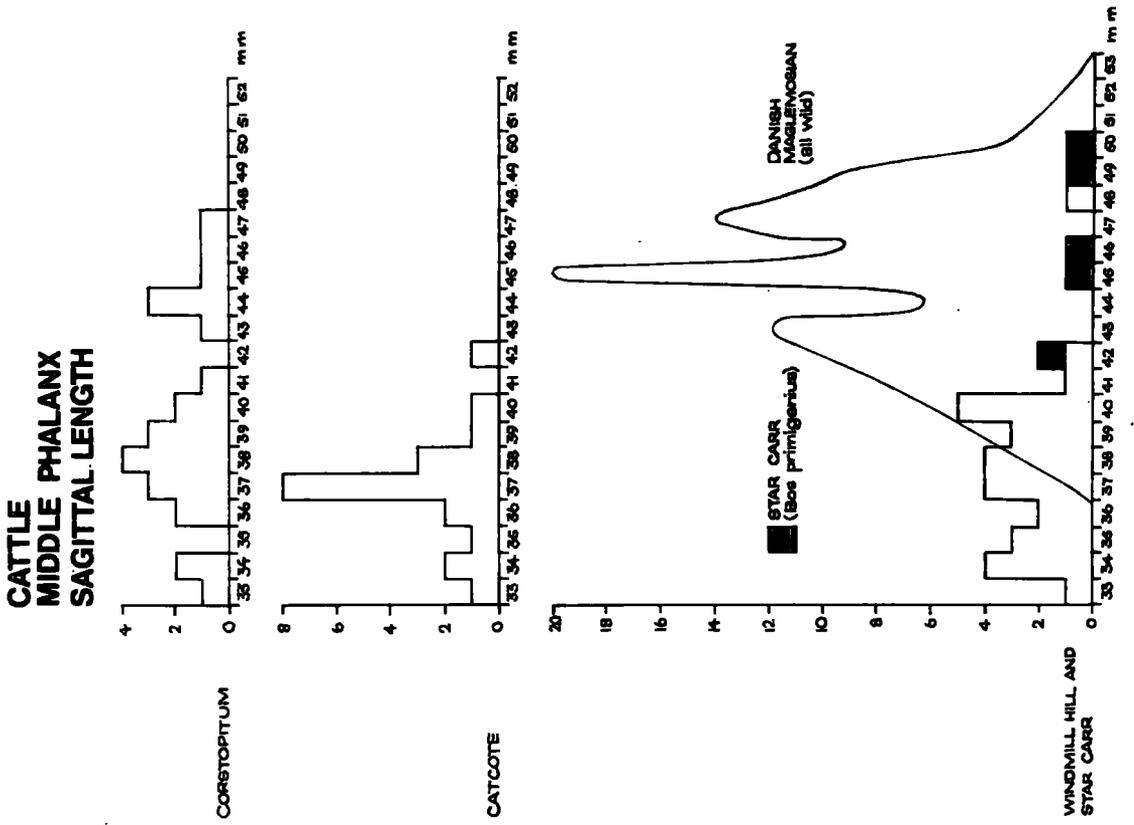
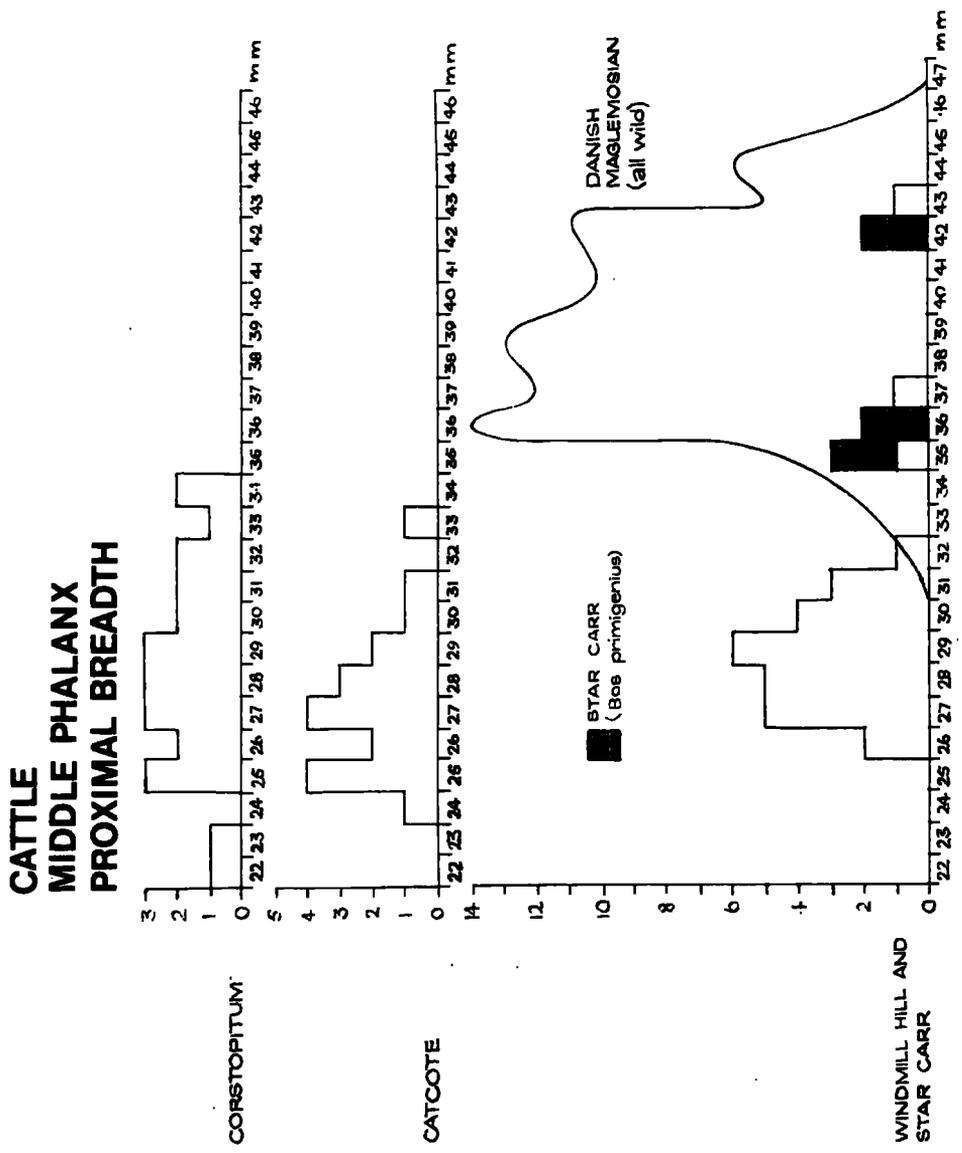
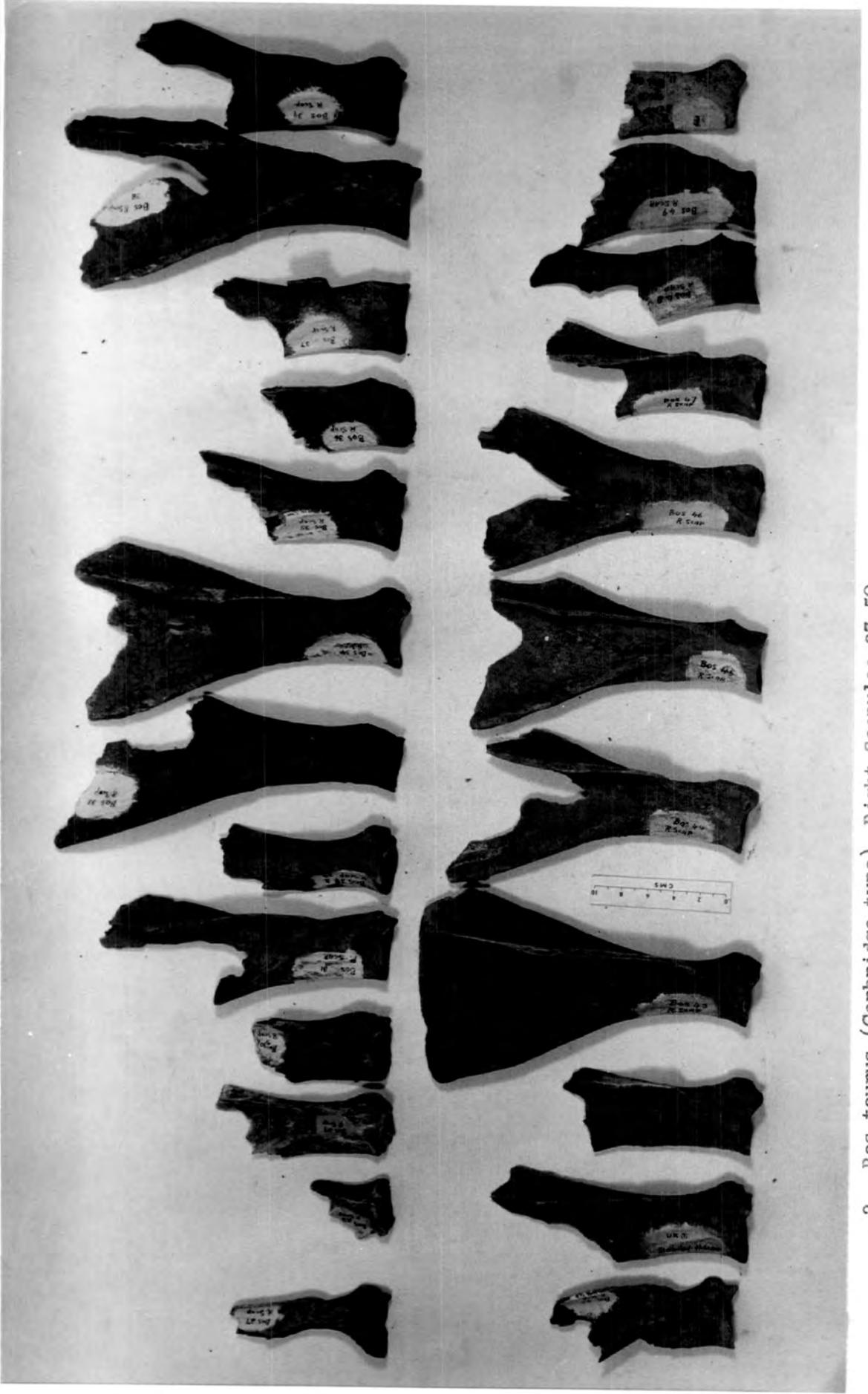


Figure 10b

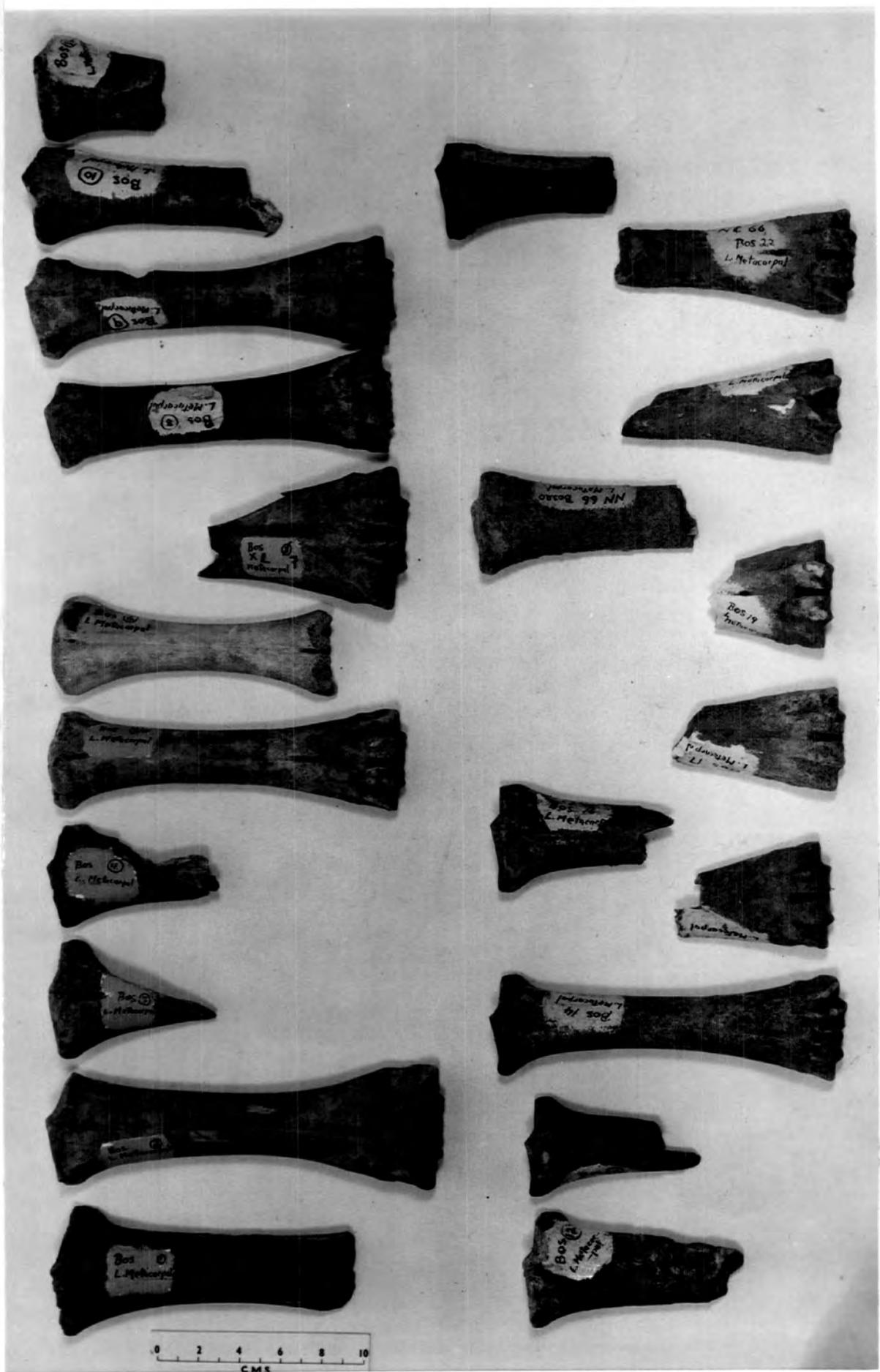




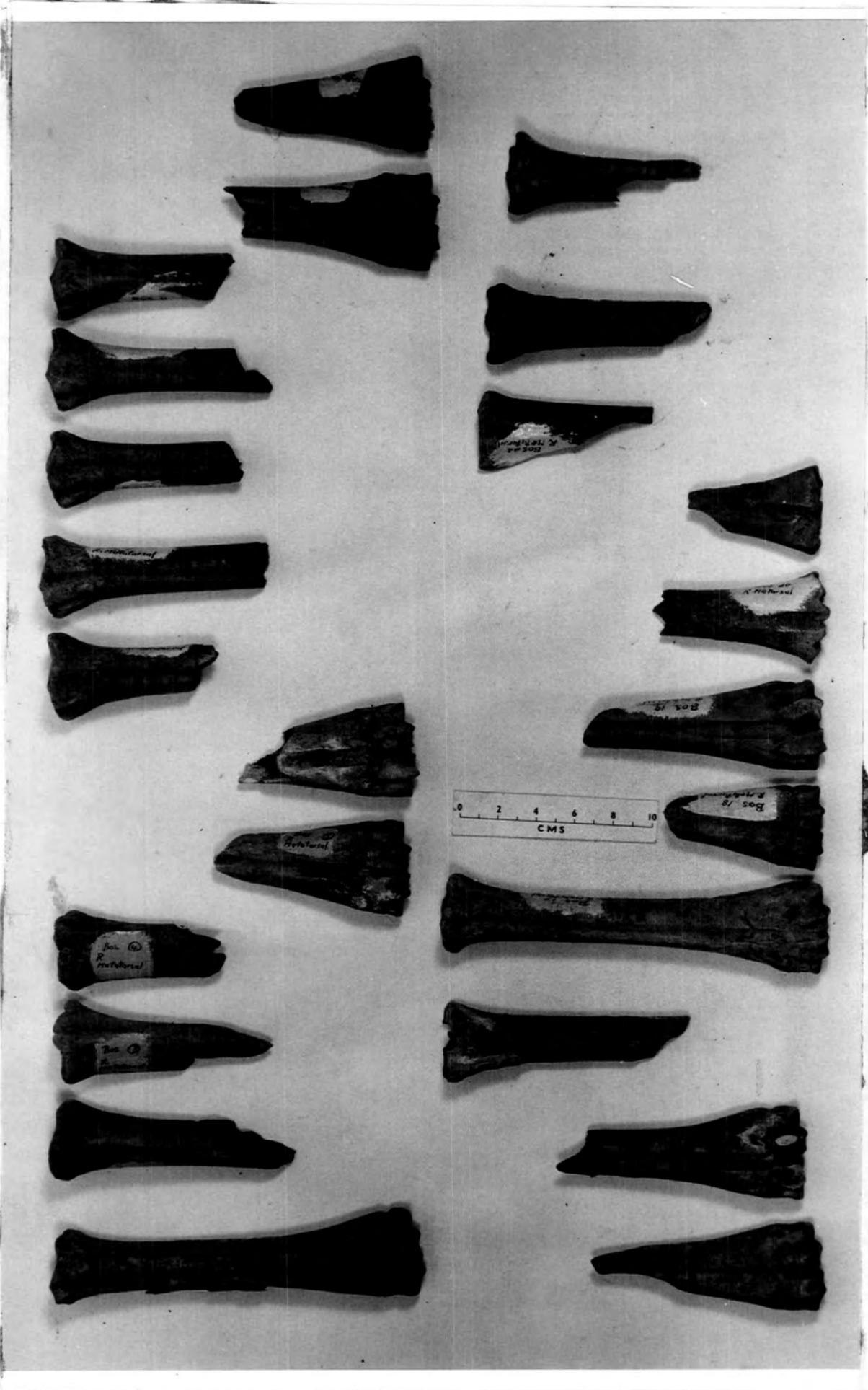
1. Bos taurus (Corbridge type) Right Scapulae 1-26.



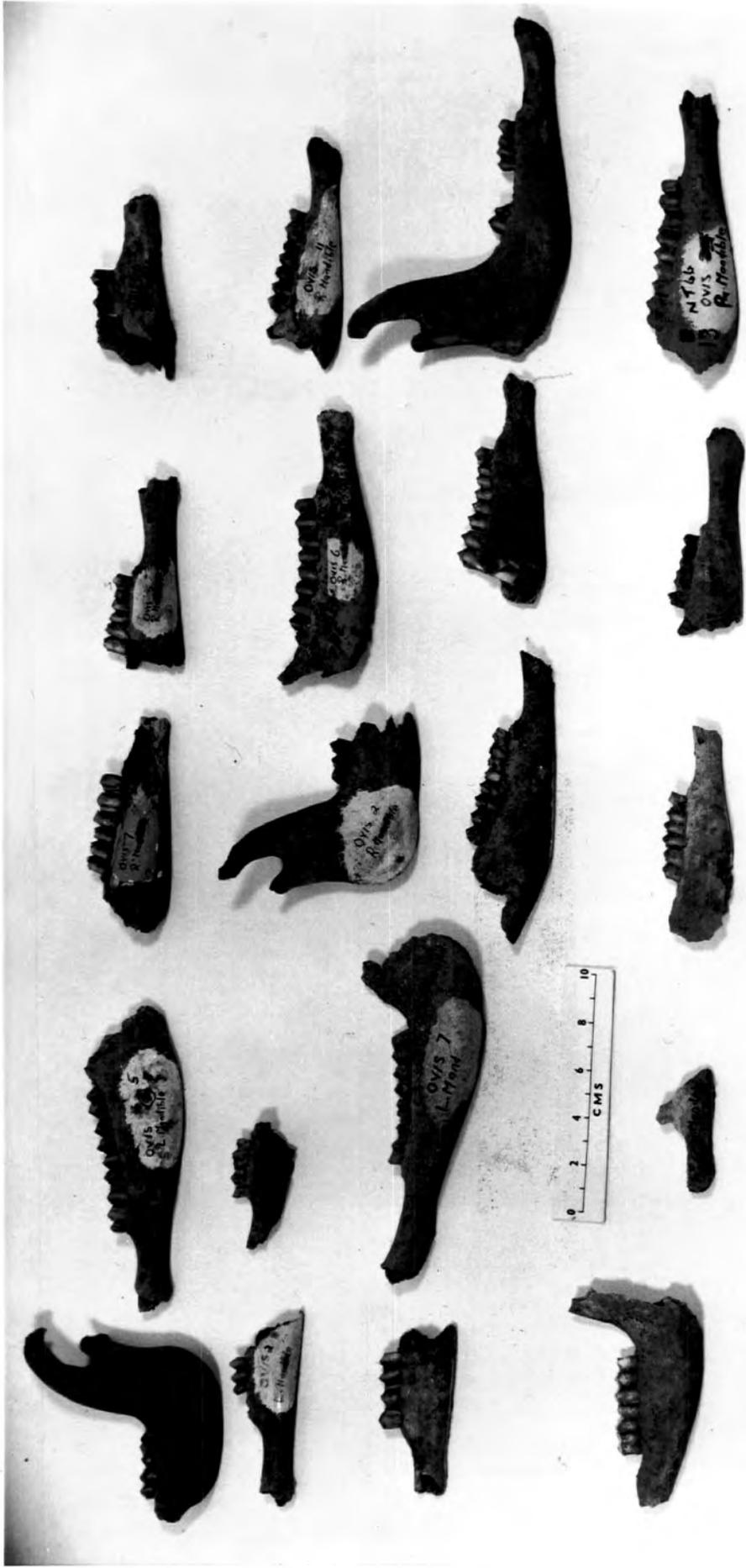
2. Bos taurus (Corbridge type) Right Scapulae 27-50.



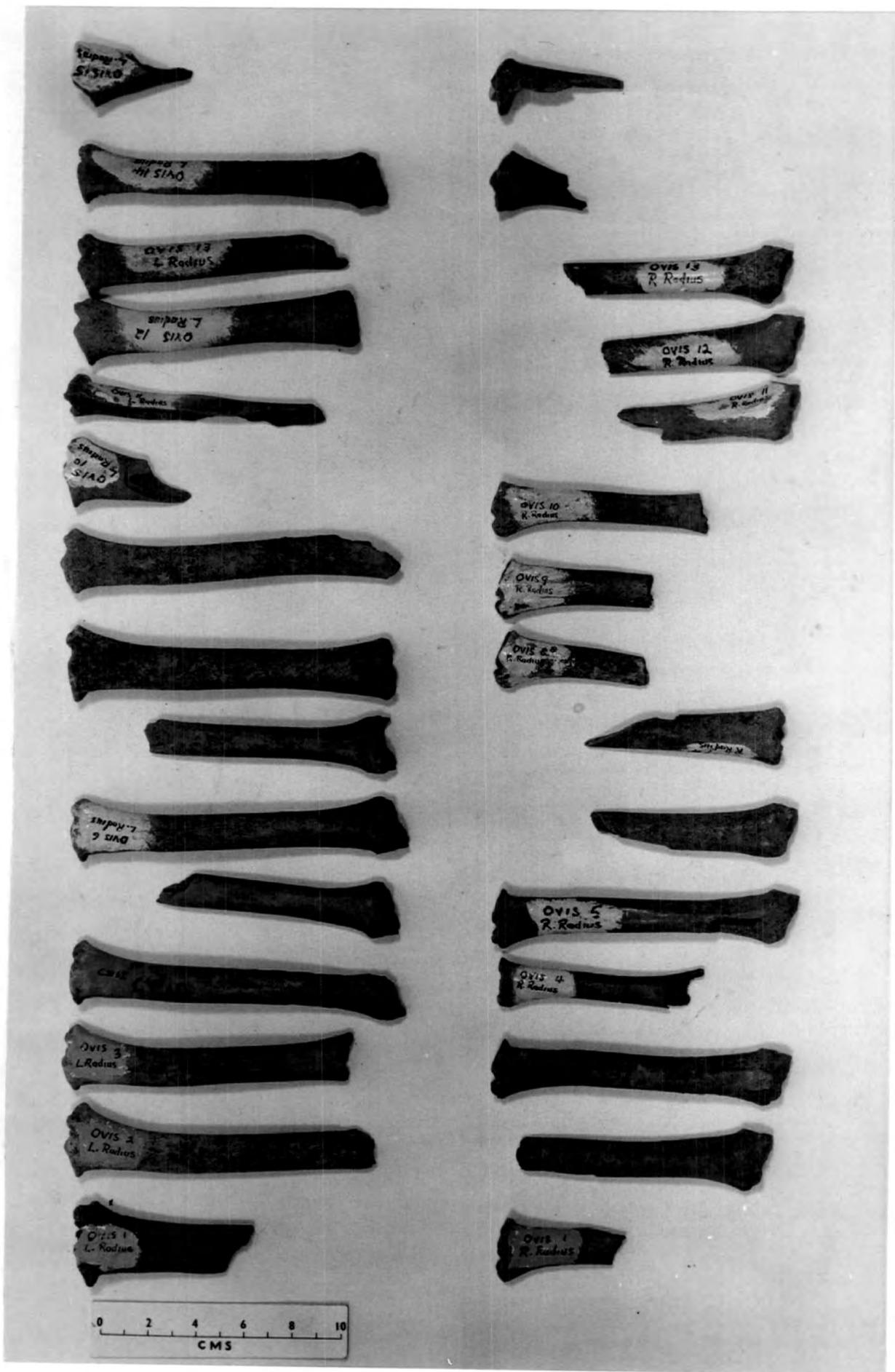
3. Bos taurus (Corbridge type) Metacarpals.



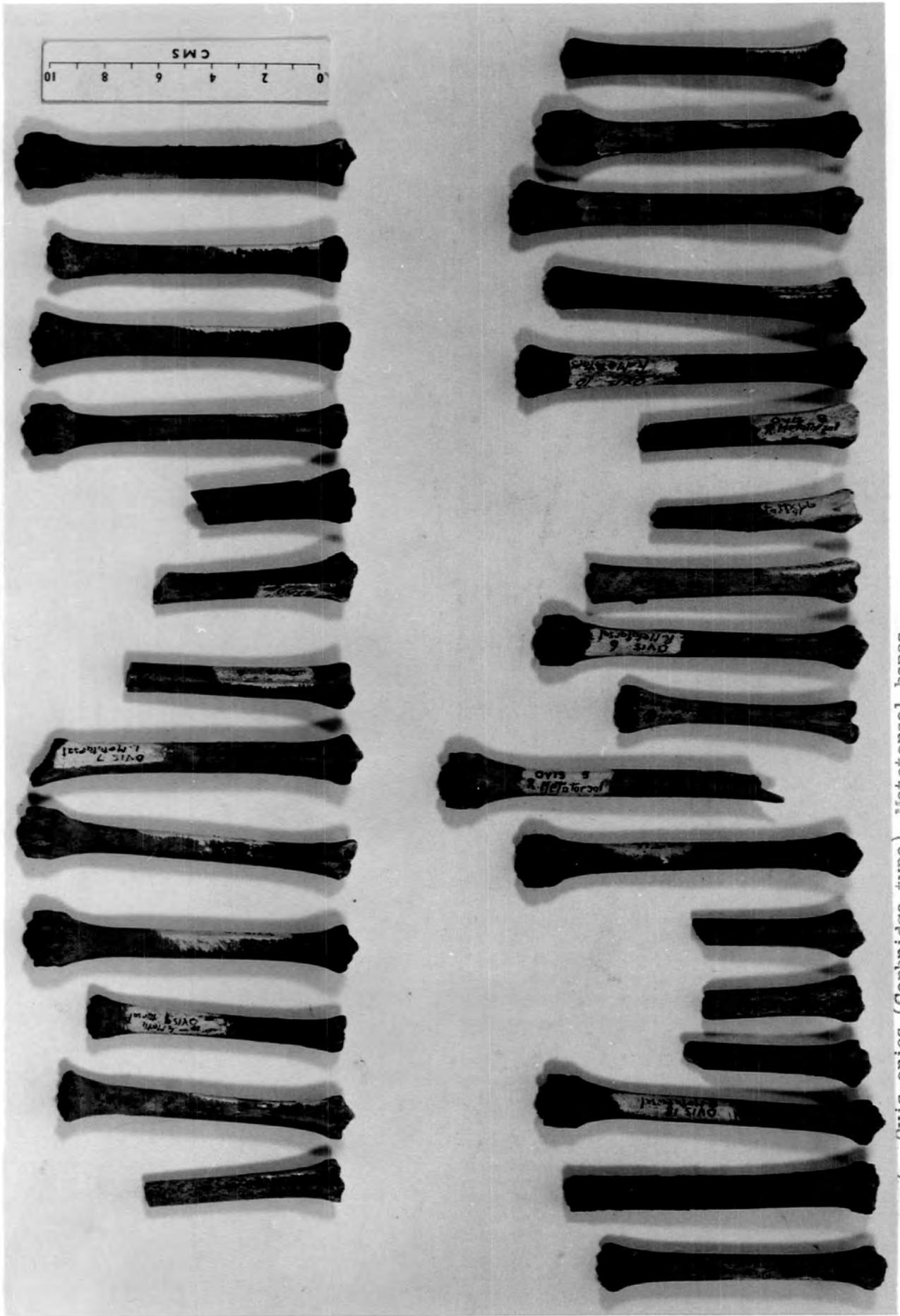
4. Bos taurus (Corbridge type) Metatarsals



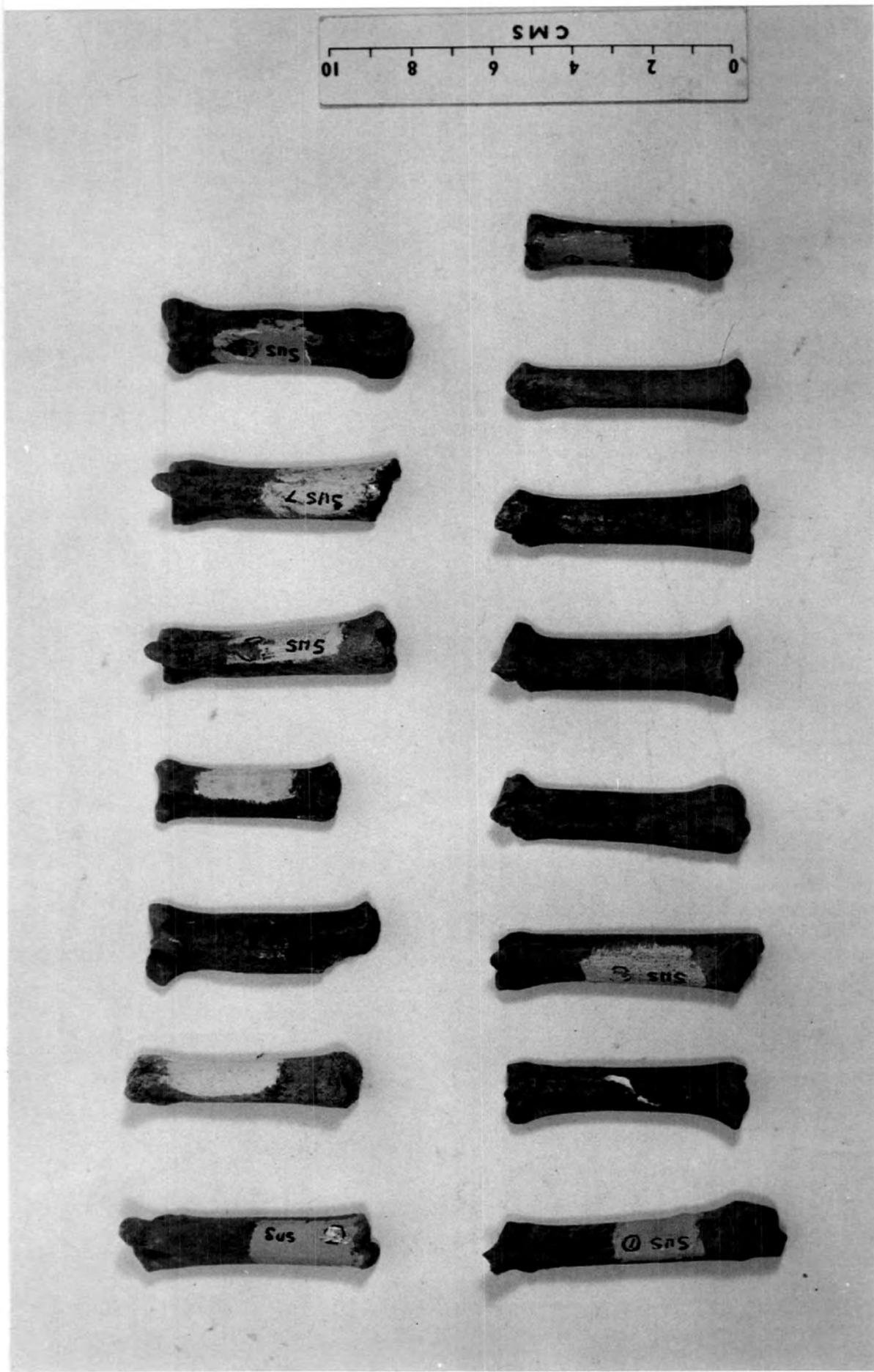
5. Ovis aries (Corbridge type) Mandibles.



6. Ovis aries (Corbridge type) Radius bones.



7. Ovis aries (Corbridge type) Metatarsal bones.



8. Sus scrofa (Corbridge type) Metapodials.



9. Equus caballus (Corbridge type) Tibia bones.