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The Tuscan Early Pleistocene rhinoceros *Dicerorhinus etruscus*

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KEY WORDS — Dicerorhinus etruscus, *Rhinocerotidae, Early Pleistocene, Italy*

ABSTRACT — The topic of this study is a detailed analysis of the remains of Dicerorhinus etruscus *from Tuscany, which represent the type specimens of the species.*

Many rhino remains from Europe have been referred to D. etruscus; *however just very few actually correspond to the forms from Tuscany on which Falconer (1868) established the species. Others, though apparently allied to the* D. etruscus *stock, with which they share what can be thought being plesiomorfic characters, possess a full complement of specialized features that make them clearly distinct from the true* D. etruscus.

The animal was a small, light weight, tandem-horned rhino that presumably utilized its horns more like branch breaking devices than like offence/defense weapons. The arrangement of its limb muscles, inferable from its skeletal structure, as well as the latter itself, suggest that D. etruscus *was probably capable of fast though not prolonged run. Its low-crowned, almost cementumless dentition and its rather spread apart fingers provide some information on the environmental preferences of this Tuscan Dicerorhine that probably lived in a humid, soft floored landscape with a rather rich forest cover.*

The investigation should be considered as a contribution to a generalized revision of the Italian Pleistocene Dicerorhinus *material planned to be performed by several researchers in the years to come. It is intended to extend this revision also to other European* Dicerorhinus *material in a near future.*

RIASSUNTO — Il presente studio rappresenta una dettagliata analisi del Dicerorhinus etruscus *della Toscana, forma tipo della specie. Un gran numero di resti di rinoceronti fossili europei sono stati attribuiti a* D. etruscus; *tuttavia pochi sono effettivamente riferibili alle forme toscane sulle quali Falconer (1868) istituì la specie. Altri residui fossili, pur appartenendo a forme probabilmente imparentate con l'autentico ceppo della specie, col quale condividono alcuni caratteri che possono essere ritenuti plesiomorfi, mostrano una serie di caratteri evoluti che li distinguono chiaramente dal vero* D. etruscus .

D. etruscus *era un rinoceronte di taglia ridotta, leggero, dotato di due corni usati forse più come strumenti per procacciarsi cibo che come organi di offesa/difesa. La disposizione dei muscoli dei suoi arti, deducibile dalla sua struttura scheletrica, e quest'ultima stessa, indicano che* D. etruscus *era probabilmente capace di una corsa rapida, ma non resistente. La dentatura brachiodonte e praticamente priva di cemento e le dita alquanto divaricate suggeriscono che l'animale vivesse in un'ambiente umido, abbastanza ricco di foreste e caratterizzato da suolo soffice.*

L'analisi rientra in un programma di revisione generale dei Dicerorhini pleistocenici italiani, programma che coinvolgerà numerosi ricercatori e che sarebbe auspicabile venisse esteso, in un prossimo futuro, anche alle forme pleistoceniche europee.

(*) Museo di Geologia e Paleontologia - Università degli Studi di Firenze.

INTRODUCTION

The Plio-Pleistocene *Rhinocerotidae* of Europe are represented by a variety of species that have been the object of more or less detailed investigation ever since the second half of the 19th century. A rather rich literature exists on these Perissodactyls. One of the most widespread rhinos in Europe is *Dicerorhinus etruscus*. The species was originally cited as *Rhinoceros etruscus* by Falconer (1868) referring to the specimes found in the Upper Valdarno. Its lectotype is a skull (IGF 756) figured by Falconer kept at the Museum of Geology and Paleontology of the University of Florence, which makes part of the Grand-ducal Collections of the museum.

Although the Upper Valdarno specimens can rightfully be considered the type forms of this species they have never been fully described and studied in detail, exception made for Falconer (1868) who however limited his study to the skulls. Furthermore, some *D. etruscus* of the kind of those from Tuscany form the ancestry of the late Early Pleistocene and early Middle Pleistocene rhinoceros stocks of Italy and posssibly of Europe. This calls for special attention to the species. The present study is proposed to make up for such a lack. A general description of the skulls and post-cranial parts that are kept in the Museum of Geology and Paleontology of Florence and in the Paleontological Museum of Montevarchi, a tentative interpretation of the adaptative significance of their characters and a comparison with the same fossil elements from other European sites are provided. Measurements are summarized on tables.

TAB. 2a

SPECIMENS		IGF 756 ♀	IGF 746 ♀	IGF 889 ♀	IGF 753 ♀	IGF 758 ♀	IGF 765 ♀	IGF 763 ♀	IGF 3098 ♀	IGF 735 ♀	IGF 747 ♀	IGF 752 ♀	IGF 12488 ♦	IGF 1417 v ♦	IGF 1413 v ♦
CHARACTERS					□		□					[]			
Toothrow-lengths	OT	225	208	225	—	—	—	—	224	—	—	—	220	—	242
	IT	200	196?	192	—	—	—	—	235	—	—	—	—	—	225
	OP	102	93	109	97	97	101	—	112	—	—	—	102	—	112
	IP	88	78?	93	84?	82	85	—	98	—	—	—	—	—	94
	OM	132	122	131	—	—	—	—	142	—	—	—	126	126	138
	IM	125	113	121	—	—	—	—	130	—	—	—	—	125?	129
P1/	OL	—	—	20	—	—	—	—	—	—	—	—	—	—	—
	IL	—	—	23	—	—	—	—	—	—	—	—	—	—	—
	AB	—	—	15	—	—	—	—	—	—	—	—	—	—	—
	PB	—	—	18	—	—	—	—	—	—	—	—	—	—	—
	ST	—	—	—	—	—	—	—	—	—	—	—	—	—	—
P2/	OL	34?	26	31	26	27	26	—	31	—	—	—	32	—	33
	IL	23	20?	23	21	18	21	—	24	—	—	—	—	—	23
	AB	26	32?	35	20	33	21	—	39	—	—	—	—	—	39
	PB	40	34	37	21	35	24	—	40	—	—	—	—	—	41
	ST	10?	13	19	21	19	22	—	17	—	—	—	16	—	18
P3/	OL	33	31	36	39?	34?	33	—	37	—	—	—	36	32	37
	IL	31	24	30	28	27	26	31	32	—	—	—	—	29	30
	AB	50	46	50	34	45	37	48	54	—	—	—	—	34	53
	PB	47	45	46	35	43	37	48	53	—	—	—	—	37	50
	ST	15	20	25	24	21	23	—	18	—	—	—	16	14	22
P4/	OL	39	34	40	37	36	37	37	39	—	—	—	33	—	40
	IL	32	33	31	31	31	29	28	36	—	—	—	—	—	34
	AB	57	48	56	42	52	43	52	59	—	—	—	—	55?	61
	PB	50	45	49	40	44	40	47	55	—	—	—	—	48?	53
	ST	16	13	32	29	21	25	26	18	—	—	—	13	—	21

TAB. 2b

SPECIMENS		IGF 756 ♀	IGF 746 ♀	IGF 889 ♀	IGF 753 ♀	IGF 758 ♀	IGF 765 ♀	IGF 763 ♀	IGF 3098 ♀	IGF 735 ♀	IGF 747 ♀	IGF 752 ♀	IGF 12488 ♦	IGF 1417 v ♦	IGF 1413 v ♦
CHARACTERS					□		□					[]			
M1/	OL	40	38	41	48	42	42	34	48?	44	42	41	36	—	42
	IL	37	30	32	31	35	34	45	37	36	34	28	—	39	36
	AB	57	52	56	44	51	46	52	58	53	58	39	—	55?	60
	PB	54	48	48	38	47	43	46	54	51	53	36	—	46?	54
	ST	13	16	24	30?	18	32	—	16	32	13	15	—	—	17
M2/	OL	44	37	46	—	—	47	—	52?	44	49	38	44	50	45
	IL	42	37	37	—	—	38	—	45	41	39	44?	—	45	41
	AB	60	53?	55	—	—	57	—	62	51	57	42	—	58	65
	PB	55	49	47	—	—	50	—	53	38	51	—	—	51	56
	ST	10	19	29	—	—	49	—	26	—	22	19	15	23	17
M3/	ML	43	50	38	—	—	—	—	55	—	—	—	43	44	57
	TL	54	41	46	—	—	—	—	45	—	—	—	—	39	41
	LL	45	42	44	—	—	—	—	46	—	—	—	—	—	45
	AB	56	49	52	—	—	—	—	56	—	—	—	—	52	56
	ST	12	20	30	—	—	—	—	30	—	—	—	14	28	28

TAB. 2c

SPECIMENS		IGF 4306 •	IGF 4307 •	IGF 12728 △	IGF 5117 △	IGF 5230 △ □	IGF 5108 △ □	n. 2, g.c. n. 8 ▲ □	n. 2, g.c. n. 9 ▲	n. 5, g.c. n. 9 ▲	n. 6, g.c. n. 9 ▲	n. 12, g.c. n. 9 ▲	n. 14, g.c. n. 9 ▲ □	n. 15, g.c. n. 9 ▲
CHARACTERS														
Toothrow-lengths	OT	—	—	—	—	—	—	228	—	—	—	—	—	—
	IT	—	—	—	—	—	—	216	—	—	—	—	—	—
	OP	—	—	—	108	—	—	102	102	—	—	—	—	—
	IP	—	—	—	95	—	—	82	88	—	—	—	—	—
	OM	—	—	144	—	—	—	134	—	—	—	—	—	—
	IM	—	—	133	—	—	—	131	—	—	—	—	—	—
P1/	OL	—	—	—	—	—	—	—	—	—	—	—	—	—
	IL	—	—	—	—	—	—	—	—	—	—	—	—	—
	AB	—	—	—	—	—	—	—	—	—	—	—	—	—
	PB	—	—	—	—	—	—	—	—	—	—	—	—	—
	ST	—	—	—	—	—	—	—	—	—	—	—	—	—
P2/	OL	—	—	—	31	22	—	32	29	—	31	—	—	—
	IL	—	—	—	28	22	—	21	24	—	25	—	—	—
	AB	—	—	—	36	25	—	34	37	—	36	—	—	—
	PB	—	—	—	42	20	—	38	42	—	42	—	—	—
	ST	—	—	—	17	15	—	—	—	—	—	—	—	—
P3/	OL	—	—	—	37	—	—	33	33	36	37	31	32	—
	IL	—	26	—	30	24	—	27	30	31	31?	—	25	—
	AB	—	—	—	53	—	—	51	51	52	50?	—	29	—
	PB	—	—	—	49	—	—	47	45	49	48?	—	37	—
	ST	—	—	—	20	—	—	—	—	19	17	18	21	—
P4/	OL	—	—	39	39	33	30	38	34	—	—	—	—	—
	IL	—	—	36	37	29	25	30	32	35	—	—	30	32
	AB	—	—	59	58	48	34	54	55	—	—	—	—	—
	PB	—	—	55	37	—	—	49	49	—	—	—	—	—
	ST	—	—	35	36	—	—	—	—	—	—	—	—	—

TAB. 2d

SPECIMENS		IGF 4306 •	IGF 4307 •	IGF 12728 △	IGF 5117 △	IGF 5230 △ □	IGF 5108 △ □	n. 2, g.c. n. 8 ▲ □	n. 2, g.c. n. 9 ▲	n. 5, g.c. n. 9 ▲	n. 6, g.c. n. 9 ▲	n. 12, g.c. n. 9 ▲	n. 14, g.c. n. 9 ▲ □	n. 15, g.c. n. 9 ▲
CHARACTERS														
M1/	OL	—	—	44	—	—	—	40	38	—	—	—	—	—
	IL	—	—	37	—	—	—	39	36	—	—	—	—	—
	AB	—	—	59	—	—	—	57	56	—	—	—	—	—
	PB	—	—	55	—	—	—	55	50?	—	—	—	—	—
	ST	—	—	29	—	—	—	—	—	—	—	—	—	—
M2/	OL	—	—	45	—	50	—	49	44	—	—	—	—	—
	IL	41	—	42	—	40	—	40?	41?	—	—	—	—	—
	AB	—	—	59	—	58	—	59	59	—	—	—	—	—
	PB	—	—	54	—	51	—	55	54?	—	—	—	—	—
	ST	—	—	38	—	44	—	—	—	—	—	—	—	—
M3/	ML	—	—	59	—	—	—	61	—	—	—	—	—	—
	TL	—	—	50	—	—	—	51	—	—	—	—	—	—
	LL	—	—	49	—	—	—	47	—	—	—	—	—	—
	AB	—	—	53	—	—	—	55	—	—	—	—	—	—
	ST	—	—	41	—	—	—	—	—	—	—	—	—	—

TAB. 2e

SPECIMENS		n. 20, g.c. n. 9 ▲	n. 20, g.c. n. 9 ▲	n. 20, g.c. n. 9 ▲	n. 22, g.c. n. 9 ▲	n. 25 g.c. n. 9 ▲	n. 7, g.c. n. 9 ▲	n. 9, g.c. n. 9 ▲	n. 10, g.c. n. 9 ▲	n. 13, g.c. n. 9 ▲	n. 16, g.c. n. 9 ▲	n. 17, g.c. n. 9 ▲	n. 18, g.c. n. 9 ▲	n. 19, g.c. n. 9 ▲	n. 21, g.c. n. 9 ▲	n. 22, g.c. n. 9 ▲
CHARACTERS										□		□				
Toothrow-lengths	OT	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	IT	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	OP	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	IP	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	OM	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	IM	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
P1/	OL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	IL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	AB	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	PB	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
	ST	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
P2/	OL	29	30?	28?	28	—	—	—	—	—	—	—	—	—	—	—
	IL	23	24	—	26	—	—	—	—	—	—	—	—	—	—	—
	AB	35	36	31?	37	—	—	—	—	—	—	—	—	—	—	—
	PB	39	37	—	38	—	—	—	—	—	—	—	—	—	—	—
	ST	23	—	—	22	—	—	—	—	—	—	—	—	—	—	—
P3/	OL	—	—	—	37	31	—	—	—	—	—	—	—	—	—	—
	IL	—	—	—	34	24	—	—	—	—	—	—	—	—	—	—
	AB	—	—	—	55	37	—	—	—	—	—	—	—	—	—	—
	PB	—	—	—	47	40	—	—	—	—	—	—	—	—	—	—
	ST	—	—	—	32	18	—	—	—	—	—	—	—	—	—	—
P4/	OL	—	—	—	44	—	—	—	—	—	—	—	—	—	—	—
	IL	—	—	—	35	—	—	—	—	—	—	—	—	—	—	—
	AB	—	—	—	55	—	—	—	—	—	—	—	—	—	—	—
	PB	—	—	—	50	—	—	—	—	—	—	—	—	—	—	—
	ST	—	—	—	27	—	—	—	—	—	—	—	—	—	—	—

TAB. 2f

SPECIMENS		n. 20, g.c. n. 9 ▲	n. 20, g.c. n. 9 ▲	n. 20, g.c. n. 9 ▲	n. 22, g.c. n. 9 ▲	n. 25 g.c. n. 9 ▲	n. 7, g.c. n. 9 ▲	n. 9, g.c. n. 9 ▲	n. 10, g.c. n. 9 ▲	n. 13, g.c. n. 9 ▲	n. 16, g.c. n. 9 ▲	n. 17, g.c. n. 9 ▲	n. 18, g.c. n. 9 ▲	n. 19, g.c. n. 9 ▲	n. 21, g.c. n. 9 ▲	n. 22, g.c. n. 9 ▲
CHARACTERS										□		□				
M1/	OL	34	—	—	—	—	—	—	—	40	37	—	—	—	—	33
	IL	31	—	—	—	—	34	—	—	36	31	—	—	—	35?	31
	AB	48	—	—	—	—	—	—	—	58	52	—	—	—	—	50
	PB	46	46	—	—	—	49?	—	—	53	46	—	—	—	48	45
	ST	—	—	—	—	—	—	—	—	25	40	—	—	—	—	28
M2/	OL	—	—	—	—	—	44?	46	51	—	39	47	44	—	—	—
	IL	—	—	—	—	—	38	—	46	—	32	—	38	—	—	—
	AB	—	—	—	—	—	59?	—	62	—	52	56	55	—	—	—
	PB	—	—	—	—	—	56?	52	56	—	49	51	51	—	—	—
	ST	—	—	—	—	—	—	38	22	—	44	22	36	—	—	—
M3/	ML	—	—	—	—	—	—	—	—	—	—	—	—	55	—	52
	TL	—	—	—	—	—	—	—	—	—	—	—	—	52	—	50
	LL	—	—	—	—	—	—	—	—	—	—	—	—	42	—	43
	AB	—	—	—	—	—	—	—	—	—	—	—	—	53	—	52
	ST	—	—	—	—	—	—	—	—	—	—	—	—	22	—	35

TAB. 3a

CHARACTERS	Toothrow lengths OT	IT	OP	IP	OM	IM	P/2 OL	IL	AB	PB	P/3 OL	IL	AB	PB
SPECIMENS														
○ 1 IGF 2293 v	217	215	95	92	124	121	27	26	16	20	31	29	22	25
○ 2 IGF 755	211	212	92	90	118	120	26	24	16	19	30	31	22	25
○ 3 IGF 749	—	—	—	—	126	126	—	—	—	—	32	29	21	22
○ 4 IGF 736 □	—	—	—	—	112?	121?	—	—	—	—	—	—	—	—
○ 5 IGF 737	—	—	—	—	—	—	—	—	—	—	—	—	—	—
○ 6 IGF 743	—	—	—	—	—	—	—	—	—	—	—	—	—	—
○ 7 IGF 757 □	—	—	85	84	—	—	16	17	9	10	27	27	14	16
○ 8 IGF 759 □	—	—	—	—	—	—	—	—	—	—	—	—	—	—
○ 9 IGF 741	—	—	—	—	127	129	—	—	—	—	33	34	24	25
○ 10 IGF 738	237?	239?	104	100	133?	137?	29	28	18	19	34	34	25	—
○ 11 IGF 761	—	—	—	—	120	121	—	—	—	—	—	—	—	—
○ 12 IGF 751	—	—	—	—	124	124	—	—	—	—	—	—	—	—
○ 13 IGF 762	—	—	—	—	119	120	—	—	—	—	—	—	—	—
○ 14 IGF 766	—	—	—	—	—	—	—	—	—	—	—	—	—	26
○ 15 IGF 768	225	227	99	95?	128	130	27	25?	17	19	33	33	24	25
○ 16 IGF 767	—	—	—	—	121	122	—	—	—	—	31	30	22	24
○ 17 IGF 745	—	—	—	—	131	129	—	—	—	—	35	32	24	29
○ 18 IGF 739	—	—	—	—	122	121	—	—	—	—	—	—	—	23
○ 19 IGF 748	—	—	—	—	—	—	—	—	—	—	—	—	—	—
○ 20 IGF 760	—	—	—	—	123	125	—	—	—	—	—	—	—	—
○ 21 IGF 754 □	—	—	—	—	—	—	16	15	9	10	28	26	13	17
○ 22 IGF 742 □	—	—	—	—	—	—	—	—	—	—	37	33	22	24
○ 23 P213 028 M1839	—	—	—	—	—	—	—	—	—	—	—	—	—	—
• 24 IGF 12488	213	—	93	—	122	—	28	—	—	—	29	—	—	—
• 25 IGF 1411 v	243?	245?	105?	105?	139	138	31	28	18	21	33	35?	24	25
• 26 IGF 1414 v	—	—	—	—	130	130	—	—	—	—	—	—	—	—
▲ 27 IGF 12487	225	225	102	99	123	123	28	25	18	19	35	31	24	24
▲ 28 IGF 4300	—	—	—	—	—	—	—	—	—	—	—	—	—	—
▲ 29 IGF 4299	—	—	—	—	—	—	—	—	—	—	—	—	—	—
▲ 30 IGF 4305	—	—	—	—	—	—	—	—	—	—	—	—	—	—
▲ 31 IGF 5118	—	—	95	97	—	—	27	24	17	19	32	32?	—	24
▲ 32 IGF 5116	—	—	—	—	—	—	—	—	—	—	—	—	—	—
▲ 33 IGF 5113	—	—	—	—	—	—	—	—	—	—	—	—	—	—
▲ 34 IGF 5114	—	—	—	—	—	—	—	—	—	—	—	—	—	—
▲ 35 IGF 5110	—	—	—	—	—	—	—	—	—	—	—	—	—	—

The ventral face of the skull shows about triangular-shaped occipital condyles, bordered anteriorly by narrow and deep condyloid fossae. The jugular processes appear straight and prismatic. The retroarticular processes are prismatic as well, but bend moderately inward and forward. The muscular tubercle of the basioccipital is very prominent. The foramen lacerum is typically continuous from the jugular foramen to the oval, carotid and sphenospinose notches. The two foramina lacera converge rostrally. The petrosus bones bear prominent petrosal crests; the cerebral faces are reduced and the antero-inferior apexes are sharp. No impressions of the trigeminal nerves occur in the petrosi, while antero-laterally the Eustachian tubes and the carotid sulci can be observed. A large part of the tympanic bullae is missing. A tiny foramen is present between a remnant of the tympanic bulla and the retroarticular process: it might be the petrotympanic scissure. The acoustic ducts are narrow, ar-

TAB. 3b

CHARACTERS	P/4				M/1				M/2				M/3			
	OL	IL	AB	PB	OL	IL	AB	PB	OL	IL	AB	PB	OL	IL	AB	PB
SPECIMENS																
1	35	33	25	28	38	37	26	29	40	39	28	28	43	41	28	26
2	33	33	25	28	35	35	27	28	39	38	28	29	41	43	27	28
3	35	35	23	26	40	36	26	27	39	39	28	27	41	43	26	24
4	—	—	—	—	39?	39?	—	23	38	38	22	25	37	39	25	28
5	—	—	—	—	—	—	—	—	43	41	32	29	44	44	32	29
6	39	36	28	28	39	38	30	32	—	—	—	—	—	—	—	—
7	37	36	20	21	38?	38?	22	22?	—	—	—	—	—	—	—	—
8	25	35	14	16	36	34	18	20	37	36	22	22	—	—	—	—
9	39	35	26	28	40	37	30	30	42	41	31	29	41	46	29	27
10	38	37	25	28	44	43	32	30	44	45	33	28	46?	46?	32	27?
11	—	—	—	—	39	34	26	27	38	38	29	27	40	43	28	26
12	—	—	—	—	35	36	26	25	39	42	27	26	38	41	26	26
13	35	—	—	25	35	32?	26	26	40	38	29	26	39	43	27	25
14	38	35	26	29	37	35	29	31	44	43	30	30	—	—	—	—
15	37	32	28	27	38	39	29	29	43	43	32	29	43	48	32	28
16	32	31	25	27	37	34	28	28	39	39	29	28	39	40	29	26
17	37	33	27	31	42	36	28	30	42	41	30	29	43	46	30	30
18	34	34	25	27	37	34	26	27	40	39	28	27	42	46	27	26
19	39	34	26	28	38	38	28	28	—	—	—	—	—	—	—	—
20	35	30	24	24	39	36	26	27	39	38	27	25	41	41	26	25
21	—	—	19	—	—	—	—	—	—	—	—	—	—	—	—	—
22	39?	36	23	28	—	—	—	—	—	—	—	—	—	—	—	—
23	36	36	25	25	—	—	—	—	—	—	—	—	—	—	—	—
24	34	—	—	—	36	—	—	—	41	—	—	—	43	—	—	—
25	—	—	27?	29	42	40	28	30	44	46	31	30	44	48	30	28
26	40	35	25	26	37	38	27	27	45	42	29	26	44	45	28	29
27	35	34	25	26	36	35	27	25	39	40	29	27	41	43	29	27
28	—	—	—	26	—	—	—	—	—	—	—	—	—	—	—	—
29	—	—	—	—	—	—	—	—	—	—	—	—	—	—	28	26
30	—	—	—	—	—	—	—	—	41	43	29	27	—	—	—	—
31	35	35	25	26	38	35	30	30	—	—	29	—	—	—	—	—
32	—	—	—	—	—	—	—	—	43	44	26	25	—	—	—	—
33	—	—	—	—	—	—	—	—	—	—	—	—	44	44	30	30
34	34	—	—	23	—	—	—	—	—	—	—	—	—	—	—	—
35	—	—	—	—	—	—	—	—	—	—	—	27	—	—	—	26

ched and almost placed against the medial wall of the base of the jugular process. The glenoid fossae are shallow and strecht out transversely to the sagittal plane of the skull. Also the articular tubercles are transverse to the skull, rather long and slightly arched backward. The pterygoid processes of the basisphenoid and the pterygoid bones themselves are very salient. The pterygoids join the palatine bones forming two continuous pterygo-palatine crests without any pterygoid fossae. The maxillary tuberosities are slightly protruding though robust and the stafiline scissures are shallow. The choanae have anteriorly converging lateral flanks; their front border levels the M2/-M3/ commissure. The nasal spine is rather evident. The anterior portion of the maxillaries is broken and the premaxilla are not preserved. The palatine process of the premaxilla are not preserved either. The ossified nasal septa enlarge anteriorly.

TAB. 3c

CHARACTERS	Toothrow lengths						P/2				P/3			
	OT	IT	OP	IP	OM	IM	OL	IL	AB	PB	OL	IL	AB	PB
SPECIMENS														
△ 36 IGF 5111	—	—	—	—	—	—	—	—	—	—	—	—	—	23
△ 37 IGF 5115	—	—	—	—	—	—	—	—	—	—	—	—	—	—
△ 38 IGF 5227	—	—	—	—	—	—	—	—	—	—	—	—	—	—
▲ 39 n. 1, g.c. n. 9	224	224	97	97	125	125	27	27	15	21	32	32	22	24
▲ 40 n. 3, g.c. n. 9	—	—	—	—	134	134	—	—	—	—	—	—	—	—
▲ 41 n. 8, g.c. n. 8 □	—	—	—	—	—	—	29	29	17	20	35	33	23	26
▲ 42 n. 33, g.c. n. 9	—	—	—	—	—	—	27	25	18	19	—	—	—	—
▲ 43 n. 11, g.c. n. 8 □	—	—	—	—	—	—	18	17	9	11	27	28	15	19
▲ 44 n. 22, g.c. n. 8 □	—	—	—	—	—	—	—	—	—	—	29	27	14	19
▲ 45 n. 6, g.c. n. 8	—	—	—	—	—	—	—	—	—	—	32	30	23	24
▲ 46 n. 7, g.c. n. 8	—	—	—	—	—	—	—	—	—	—	33	31	22	24
▲ 47 n. 29, g.c. n. 9	—	—	—	—	—	—	—	—	—	—	34	30	22	24
▲ 48 n. 20, g.c. n. 8 □	—	—	—	—	—	—	—	—	—	—	28	27	14	17
▲ 49 n. 12, g.c. n. 8 □	—	—	—	—	—	—	—	—	—	—	—	—	—	—
▲ 50 n. 24, g.c. n. 8	—	—	—	—	—	—	—	—	—	—	—	—	—	—
▲ 51 n. 23, g.c. n. 9	—	—	—	—	—	—	—	—	—	—	—	—	—	—
▲ 52 n. 28, g.c. n. 9	—	—	—	—	—	—	—	—	—	—	—	—	—	—
▲ 53 n. 41, g.c. n. 9	—	—	—	—	—	—	—	—	—	—	—	—	—	—
▲ 54 n. 34, g.c. n. 9	—	—	—	—	—	—	—	—	—	—	—	—	—	—
▲ 55 n. 37, g.c. n. 9 □	—	—	—	—	—	—	—	—	—	—	—	—	—	—
▲ 56 n. 4, g.c. n. 8	—	—	—	—	—	—	—	—	—	—	—	—	—	—
▲ 57 n. 9, g.c. n. 8	—	—	—	—	—	—	—	—	—	—	—	—	—	—
▲ 58 n. 10, g.c. n. 8	—	—	—	—	—	—	—	—	—	—	—	—	—	—
▲ 59 n. 23, g.c. n. 8	—	—	—	—	—	—	—	—	—	—	—	—	—	—
▲ 60 n. 35, g.c. n.9	—	—	—	—	—	—	—	—	—	—	—	—	—	—
▲ 61 n. 18, g.c. n. 8	—	—	—	—	—	—	—	—	—	—	—	—	—	—
▲ 62 n. 26, g.c. n. 9	—	—	—	—	—	—	—	—	—	—	—	—	—	—
▲ 63 n. 11, g.c. n. 9 □	—	—	—	—	—	—	—	—	—	—	—	—	—	—
▲ 64 n. 30, g.c. n. 9	—	—	—	—	—	—	—	—	—	—	—	—	—	—
▲ 65 n. 4, g.c. n. 9	—	—	—	—	—	—	—	—	—	—	—	—	—	—
▲ 66 n. 25, g.c. n. 8	—	—	—	—	—	—	—	—	—	—	—	—	—	—
▲ 67 n. 31, g.c. n. 9	—	—	—	—	—	—	—	—	—	—	—	—	—	—
▲ 68 n. 32, g.c. n. 9	—	—	—	—	—	—	—	—	—	—	—	—	—	—
▲ 69 n. 16, g.c. n. 8	—	—	—	—	—	—	—	—	—	—	—	—	—	—
▲ 70 n. 27, g.c. n. 9	—	—	—	—	—	—	—	—	—	—	—	—	—	—

Teeth (Tabs. 2a, 2b)

Teeth are brachyodont and extremely worn down. No incisors nor canines are present; the possible occurrence of upper incisive alveoli cannot be ascertained because of the lack of the premaxilla. The two first premolars are also lacking. Both maxillaries bear a full complement of three premolars (P2/-P4/) and three molars (M1/-M3/). All teeth but M3/ are subquadrate to subrectangular in occlusal view; M3/ instead is triangular-shaped.

P2/ - both P2/ show three isolated, roundish to subelliptical structures: mediofossettes, postfossettes and medisini, the latter isolated by the fusion of both crochets with anterocrochets and protocones with metacones. Cristae and styli are lacking, perhaps obliterated by wear. No labial nor lingual cingulum can either be observed. Dubitative traces of cementum are present. The thickness of the enamel is not constant.

P3/ - wear is somewhat more intense in the left than

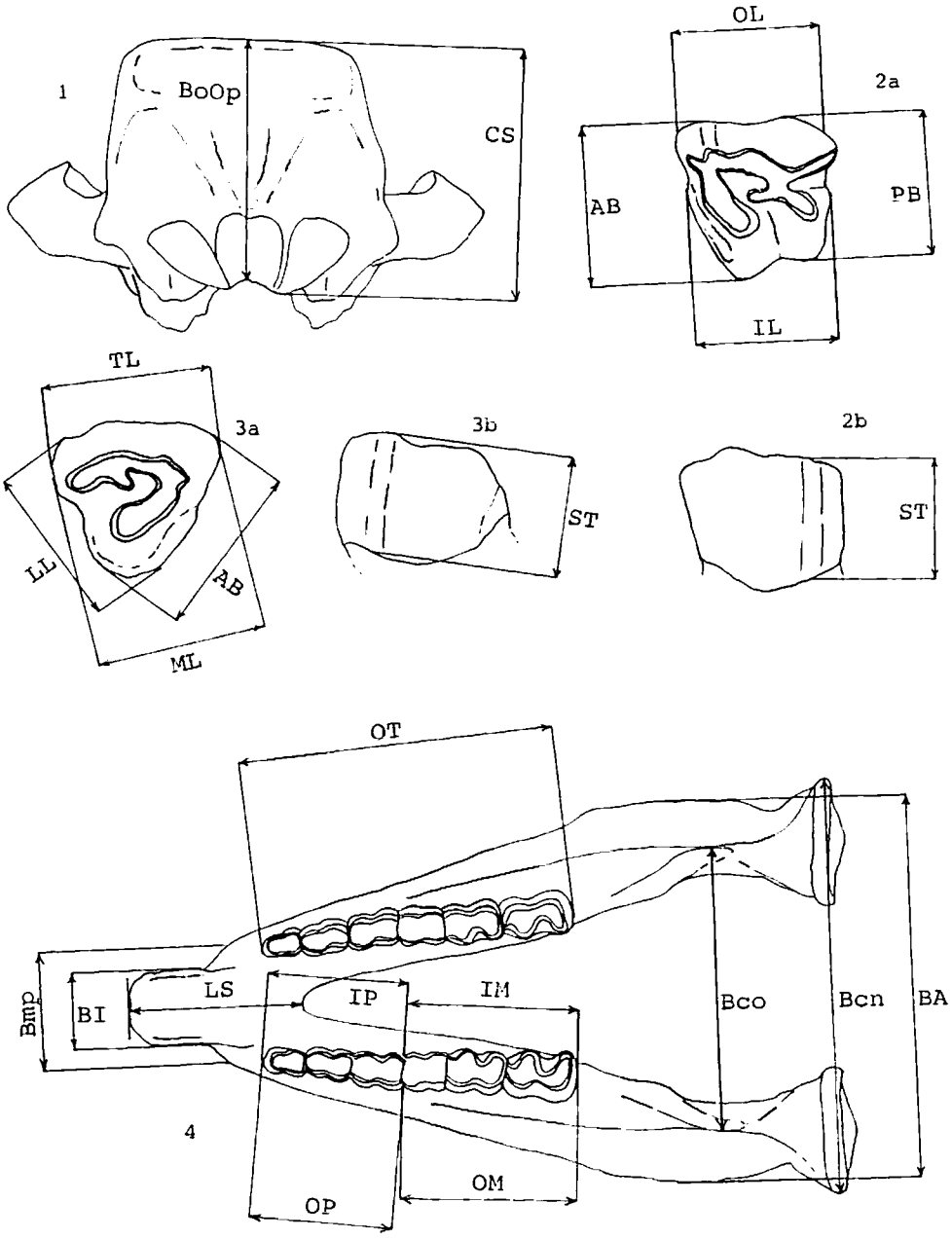

Fig. 2 - 1 - skull, occipital view; 2a - right upper molar, occlusal view; 2b - right upper molar, labial view; 3a - left third upper molar, occlusal view; 3b - left third upper molar, labial view; 4 - mandible, dorsal view.

in the right P3/: as a matter of fact the crista and the crochet, and thus also the mediofossette, are lacking in the former, while the latter still shows a widened crista and a short, thick, blunt crochet between which a squeezed, fissure-shaped, but not isolated, mediofossette can be recognized. Prefossettes and styli are removed by wear. Medisini are in shape of elongated fossettes, isolated by the fusion of protocones with metacones. Cingulum stretched only along the lingual and posterior sides of the teeth and rather thick. Cementum is lacking. The enamel thickness is unequal.

P4/ - fourth premolars are so worn that most of their original structures are obliterated; as a matter of fact prefossettes, mediofossettes, styli and cristae are lacking. The crochet is wanting as well in the left P4/, while it is hardly recognizable in the right one. Postfossettes are elonganted, squeezed. Protocones and metacones are fused together. Cingulum stretched only along the lingual and posterior sides of

the teeth and rather thick. Cementum is lacking. The enamel thickness is unequal.
M1/ - wear is even more intense than in the teeth seen so far. Only the medisini are still preserved. Protocones and metacones are closely spaced but not fused together, so that the medisini are not isolated. Cingulum stretched along the lingual and rear sides of the teeth; the former is very weak. In the left M1/ the cingulum bears a small cuspule at the lingual outlet of the medisinus. Cementum is lacking. The enamel thickness is unequal.
M2/ - these are the largest cheek teeth. Again wear was so intense that only the medisini and a tiny, roundish postfossette in the right M2/ were spared. Protocones and metacones are more spaced than in M1/. Cingulum modestly developed along the lingual sides of the teeth. It bears a small cuspule at the lingual outlets of each medisinus. The cingulum is also present at the rear end of the teeth. Cementum is lacking. The enamel thickness is not constant.
M3/ - wear is still very intense; only the medisini are still present. Metalophs are fused with ectolophs; protocones are separated from metacones. Cingulum stretched along the lingual sides of the teeth. A marked cuspule occurs at the rear end of the labial enamel wall of the ecto-metalophs. Cementum is totally lacking. The enamel thickness is unequal.

In occipital view the skull shows a typical rectangular outline, as the nuchal crests are dorsally horizontal and bend down laterally at almost right angles, moderately diverging towards the mastoids. The occipital area is depressed. Two short elongated protruding structures stretch out from the upper half of the descending rami of the nuchal crests pointing transversely towards the sagittal plane of the skull, thus delimiting two narrow areas at the upper angles of the occiput. The nuchal tubercle is wide and prominent. The occipital condyles are triangular in shape. The condyloid foramina open along the dorso-lateral margin of the condyles. The foramen magnum is subcircular; within it the inner outlets of the condylar ducts can be observed. The basilar clivus appears broad and shallow. A marked crest-like transversal relief is present on the floor of the basioccipital close to the inlet of the foramen magnum. The retroarticular processes tend to converge a little bit ventrally. The mastoids project outward to some extent. Also the zygomatic arches are strongly protruding; the zygomatic processes of the temporals are somewhat obliquely inclined upward and forward. The temporal crests are very sharp.

IGF 746 (Grand-ducal Collections) Upper Valdarno. Museum of Geology and Paleontology of Florence (Tab. 1; Pl. 2, fig. 2)

The skull is rather deformed: its postorbital portion is crushed down with respect to its preorbital portion (a transversal crack is evident between the two orbital cavities) which determines an abnormally high value for n.

In dorsal view the skull looks much like IGF 756. The nuchal crest shows the same characteristics, the temporal ridges are about equally spaced. The zygomatic arches are badly preserved; only their anterior portions and the zygomatic processes of the temporals are still visible. However on the basis of these remnants they seem to have been about like those of IGF 756. Also the rear hornbase rugosity shows strong similarities with that of the lectotype, while the front hornbase rugosity seems rather less protruding.

In lateral view the dorsal profile of the skull is abnormally flattened. Despite of its deformation, the neural portion of IGF 746 resembles that of the lectotype quite closely. Even the occipital condyles and the otic region show the same arrangement as in IGF 756. The retroarticular process is very developed and much longer than the jugular process. The orbital cavity and the thick zygomatic arch (judging by its remnants) are placed rather high. The front border of the orbital cavity levels M2/. The rear lachrymal process is pointed, prominent; the infratrochlear incisure appears rather deep. The facial crest is quite sharp with a rather developed facial tubercle at its fore end. Basing on what remains of the nasals, they must have been structured more or less as those of IGF 756. The rear border of the narial notch overlies the rear half of P3/. Only a small fragment of the ossified nasal septa is present. The front portion of the maxillary and the whole premaxilla are missing.

In ventral view the occipital condyles appear triangular-shaped. The basioccipital bone bears a fairly developed muscular tubercle. The petrotympanic units are wanting. The foramina lacera are elongated, rather wide and anteriorly convergent. The retroarticular processes bend a little bit inward and appear quite more salient than the jugular processes. The zygomatic processes of the temporals stretch outward and forward; the articular tubercles are slightly arched backward. The pterygoid apophyses of the basisphenoid are quite salient. The anterior portion of the presphenoid and the rear portions of the palatine bones are not preserved. The front borders of the choanae are broken. As elsewhere mentioned, also the premaxilla, along with its palatine apophyses, is lacking, so that we cannot tell whether the incisive alveoli were present or not.

Teeth (Tabs. 2a, 2b)

In both cheek toothrows P1/ is lacking; the left M3/ is not preserved. All other teeth are present.

Teeth are brachyodont, subquadrate to subrectangular; M3/ is triangular. Wear is very intense. The enamel thickness is not constant within each tooth.
P2/ - wear caused the fusion of protocones with metacones so that the medisini are in shape of isolated and elongated fossettes. A pair of strange isolated fossettes in each P2/ might either represent the pre- and mediofossettes or replace the sole mediofossettes. Postfossettes are isolated and elliptical. The cristae seem to be present and are fused

with the crochets. Styli lack, probably obliterated by wear. Lingual and labial cingula and cementum are lacking as well; however the labial surface of the teeth is rather rough and, according to Fortelius (1982), this "probably is related to the presence of cementum coating".

P3/ - pre- and mediofossettes are removed by wear. Also the cristae are missing, while it is not clear whether the crochets are present or not. Postfossettes are small and roundish. Proto- and metacones are fused together, thus isolating the medisini that are in shape of elongated fossettes. Styli are obliterated by wear. No cementum is observed, but the teeth show a rather rough labial surface. The cingulum is rather developed; it stretches along the lingual and posterior sides and around the antero-lingual corners of these premolars.

P4/ - fourth premolars are badly preserved. We cannot tell whether prefossettes were present or not. Mediofossettes are not isolated; postfossettes are isolated and elliptical. Crista and crochet are not present in the right P4/, while are hardly distinguishable in the left P4/. Proto- and metacones are fused together; medisini are therefore isolated and in form of elongated fossettes. Styli are obliterated by wear. Cementum is lacking but the labial surfaces of the teeth are rather rough. Cingulum rather strong and streched anly along the lingual and rear sides of the teeth.

M1/ - awfull preservation.

M2/ - these are the largest cheek teeth. Pre- and mediofossettes are lacking, as well as cristae and styli. Postfossettes are roundish. The crochet is wanting in the right M2/, while it is hardly distinguishable in the left one. Protocones and metacones are separated. Cementum is lacking but the labial surfaces of these teeth are rather rough. Cingulum stretched along the lingual and posterior sides of the teeth; it is less developed than in premolars. A cuspule is present at the outlet of each medisinus.

M3/ - these teeth are somewhat less intensely worn. Prefossette present in the right M3/, but not in the left one. Also the mediofossette is present only in the right M3/; it is not isolated. Ectolophs are somewhat W-shaped. A paracone style can be observed on the outer walls of the ectolophs. Cristae and crochets are rather marked in the right M3/ and feeble in the left one. Ectolophs and metalophs are fused together. Proto- and metacones are separated. The cingulum is present along the lingual faces of the teeth; a pointed cuspule occurs at the rear end of the labial enamel wall of the ecto-metalophs. Cementum is lacking, but the lingual surfaces of the teeth are rather rough.

In occipital view the occiput appears rectangular and depressed as in IGF 756. The outer occipital protuberance is hardly distinguishable. The nuchal tubercle is broad and quite prominent. The condyloid fossae are shallow along the dorsal margin of the condyles and get narrow and deep around the lateral and ventral margins. Within the foramen magnum the condyloid foramina can be observed. The basilar clivus is quite shallow. The occipital condyles are subtriangular. The jugular processes are not very developed. The mastoids are rather prominent and acute and the mastoid crests are strong. The temporal crests are sharp and protruding. The zygomatic processes of the temporals bend slightly upward and forward.

IGF 889 Rupinata, Upper Valdarno.
Museum of Geology and Paleontology of Florence
(Tab. 1; Pl. 2, fig. 2)

The occiput is missing.

In dorsal view the temporal ridges are widely spaced. The zygomatic processes of the temporals are quite projected outward and forward, so that the zygomatic arches appear strongly diverging. The zygomatic arches are straight and delimit narrow zygomatic fenestrae. The temporal fossae are shallow. The frontals are depressed and bear a hardly distinguishable hornbase rugosity. The nasals are very narrow and their lateral flanks converge anteriorly. Compared with that of IGF 756, the front hornbase rugosity is weak.

In lateral view the neural protion of the skull appears quite badly preserved. The uniformly concave dorsal profile looks much like that of IGF 756. The temporal and mastoid crests are robust and sharp. The otic region is damaged; however it seems to have been structured as that of IGF 576. The jugular and retroarticular processes are not preserved. The orbital cavity and the zygomatic arch are placed rather high. The latter shows a thinner horizontal portion just anterior of the glenoid cavity, then plunges abruptly downward and forward getting markedly thicker. The facial crest is rather sharp with a hardly distinguishable facial tubercle. The front border of the orbital cavity overlies M2/. The nasal diverges slightly from the maxillary and, instead, is parallel to the premaxilla. The ossification of the nasal septa is modest. The rear border of the narial notch levels P4/. The premaxilla, though partly restored, are moderately arched.

In ventral view the condyloid fossae appear rather deep. The petrosus, sphenoid and palatine bones are covered by, and partly filled in with, unremovable sediment. The glenoid cavities stretch out tranversely to the sagittal plane of the skull, as well as the articular tubercles, that are even slightly arched backward. The pterygoid processes of the basisphenoid must have been fairly salient, but now are quite abraded. The maxillary tuberosities are slightly prominent. The premaxilla is narrow. No incisive alveoli can be observed.

Teeth (Tabs. 2a, 2b)

The right cheek toothrow is formed by three premolars (P2/-P4/) and three molars (M1/-M3/), while the left cheek toothrow counts four premolars (P1/-P4/) and three molars. This is the only *D. etruscus* skull of those kept at the Museum of Florence that is provided with a first premolar. Premolars and the first two molars are subquadrate to subrectangular;

M3/ is subtriangular. Teeth are brachyodont, rather worn. The enamel thickness is unequal within each tooth.
P1/ - very badly preserved.
P2/ - pre-, post- and mediofossettes are present; the latter are isolated. Cristae and crochets are represented by a couple of enamel folds each. Protocones and metacones are still separated, but on the way of fusing. Ectolophs appear somewhat W-shaped; paracone styli are present. Cementum is lacking, yet the labial surfaces of the teeth are rough. A quite developed cingulum stretches along the lingual and posterior sides and around the anterolingual corners of these premolars.
P3/ - except for size and for the configuration of cristae and crochets (broad the former, irregulary shaped the latter), these teeth look much like the second premolars.
P4/ - also these premolars are very similar to the previous ones. The crista is represented by a single enamel fold in the left P4/ and by a couple in the right one. The crochet appears irregularly shaped, especially in the right P4/. Residual traces of cementum may be observed; the labial enamel surfaces are rather rough.
M1/ - prefossettes are hardly distinguishable, while all the other characteristic structures are well developed; mediofossettes are not isolated. The ectoloph appears W-shaped and bears a rather evident paracone style. Protocones and metacones are separated. Cingulum stretched along the lingual sides of the teeth; it is far weaker than in the premolars. Residual traces of cementum occur; the labial enamel surfaces are rather rough.
M2/ - these are the largest cheek teeth. They look much like M1/ in all but prefossettes, that here are better outlined.
M3/ - prefossettes and mediofossettes are present; the latter are not isolated. Cristae and crochets are well developed, as well as paracone styli on the ectolophs. Ectolophs are W-shaped and merge with metalophs; metacones are separated from protocones. The cingulum is very weak along the lingual sides of these molars; a cuspule occurs at the rear end of the labial enamel wall of the ecto-metalophs. Residual traces of cementum can be observed; the labial surfaces of these molars are rather rough.

Very little can be said on the occipital characters of the skull, not only for the already mentioned lack of the occiput, but also because the foramen magnum is infilled with sediment and the ventral processes are abraded. The mastoids appear prominent and rather acute. The mastoid crests must have been quite developed. The condyles are triangular-shaped. The zygomatic processes of the temporals stretch out obliquely upward and forward.

IGF 3098 C. Rapale, Upper Valdarno.
Museum of Geology and Palcontology of Florence
(Tab. 1)

The skull is mostly restored. The only original elements are: the ventral portion of the occipital area, occipital condyles included; part of the right temporal and petrosus bones; part of the zygomatic arches; the maxillaries, inclusive of all the cheek teeth; part of the frontals and part of the nasals.

In dorsal view the frontals show a peculiar, rather deep sagittal depression. The nasals are strong, with parallel lateral borders and broad horn-base rugosity characterized by a very protruding central relief. The zygomatic arches appear quite divergent and straight.

In lateral view the occipital condyles show an almost flat postero-dorsal face and a convex antero-ventral face, divided by a rather marked edge. The occiput must have been moderately inclined forward. The jugular and the retroarticular processes are fractured. The zygomatic arch is placed rather high and plunges forward and downward in about the same way as that of IGF 756. It gets rapidly thicker moving away from the glenoid area. The facial crest is sharp just anteriorly of the glenoid fossa and grows thicker forward. The facial tubercle is rather developed. The front tip of the nasals bends modestly but uniformly downward. The ossification of the nasal septa is quite advanced.

In ventral view the occipital condyles appear triangular. The condyloid foramina are small and placed between the condyles and the bases of the jugular processes. The foramen lacerum is wide. The muscular tubercle of the basioccipital is prominent. Only part of the right retroarticular process is preserved. The zygomatic processes of the temporals stretch outward and forward, the articular tubercles are a little arched backwards. The choanae are rather narrow and the nasal spine is very evident. The anterior margin of the choanae levels M2/. The maxillary tuberosity (the left one is the only preserved), though fractured, seems prominent and somewhat mammillary-shaped.

Teeth (Tabs. 2a, 2b)

No trace of the alveoli of the incisive, canines and first premolars can be observed. Both cheek toothrows are composed of three premolars (P2/-P4) and three molars (M1/-M3). The third upper molars are subtriangular; the other teeth subquadrate to subrectangular. Teeth are brachyodont and very worn down. The enamel thickness is unequal.

Slight differences can be observed between correspondent teeth of the two toothrows.
P2/ - in the left P2/ the prefossette is hardly recognizable, the mediofossette is small, roundish and isolated, the postfossette is tiny and roundish and the crista is fused with crochet. In the right P2/ all these structures were obliterated by wear. Ectolophs are W-shaped; the paracone style is present on their labial enamel walls. Protocones and metacones are fused together. An anterolingual and rear cingulum is present in both teeth. The possible presence of a lingual cingulum is questionable as the teeth are internally fractured. Residual traces of cementum can be recognized.
P3 - prefossettes, postfossettes and mediofossettes are present; the latter are very small and not

isolated. The crista is rather well developed in the right P3/, while it is hardly distinguishable in the left one. The crochet is present in both teeth. Ectolophs are somewhat W-shaped and bear a paracone style. Protocones and metacones are fused together. Cingulum stretched along the lingual and posterior sides of the teeth. Residual traces of cementum may be observed.

P4/ - all the characteristic structures are present; mediofossettes are not isolated. Protocones are fused with metacones. The lingual and anterolingual cingula are well developed. Residual traces of cementum can be observed.

M1/ - these teeth resemble the previous ones rather closely; their size, however, is larger and their protocones and metacones are separated. Crochets are very strong.

M2/ - these are the largest teeth of the toothrow. Prefossette, mediofossette and crista lack in the left M2/. In the right one, instead, the prefossette is hardly distinguishable and not isolated, the mediofossette is unusually subdivided into two parts by an additional enamel fold and the crista is barely developed, but another very strong additional enamel fold couples it. Prefossettes are elongated, ectolophs are W-shaped with a marked paracone style on their labial enamel walls. Crochets are strong. Protocones and metacones are separated. Cingulum stretched along the lingual and posterior sides and around the anterolingual corners of the teeth.

M3/ - these are the relatively less worn teeth. Prefossettes and mediofossettes are not isolated. A single, well developed crista is present in the left M3/, while a couple of feeble crista-shaped enamel folds can be observed in the right M3/. Crochets are strong. Ectolophs are W-shaped and bear a paracone style on their labial enamel walls. Ectolophs are fused with metalophs; metacones are separated from protocones. Cingulum stretched along the lingual sides of the teeth. A cuspule occurs at the rear end of the labial enamel wall of the ecto-metalophs.

In occipital view the nuchal tubercle is very prominent and overlies a quite broad, roundish foramen magnum. Within the latter at the sides of the basilar process of the basioccipital bone the two condyloid foramina can be distinguished. The two occipital condyles are triangular and seem rather spaced one from another. The condyloid fossae are wide, but shallow. The zygomatic processes of the temporals appear a little bent upward and forward.

Specimen n. 2, glass case n. 9 (gypsum cast).
Paleontological Museum of Montevarchi
(Tab. 1)

A relatively rich collection of Tuscan *D. etruscus* specimens is kept at the Museum of Montevarchi, in the Upper Valdarno valley. The fossils are not identified by inventory numbers of a general register of the Museum, but rather by series of progressive numbers within each glass case.

The fossil is only represented by the frontals, nasals, right lachrymal bone and right maxillary, the latter provided with five cheek teeth (P2/-M2/). The specimen is rather deformed.

Both hornbase rugosities are well developed, extensive; the nasal rugosity is quite prominent.

The front border of the orbital cavity levels M2/, while the rear margin of the narial notch overlies the anterior part of P4/. The fore-stump of the zygomatic arch is very thick. The facial tubercle is hardly distinguishable. The orbital cavity and the zygomatic arch are apparently placed rather high.

The ossificated nasal septa are lacking; however, on the basis of the impressions left on the ventral face of the nasals, we may estimate the ossification of the septa quite extensive.

Teeth (Tabs. 2c, 2d)

Teeth are very worn and low-crowned. They appear subquadrate to subrectangular in ventral view.

P2/ - pre-, medio-, postfossette and medisinus isolated, the latter by a fusion of protocones with metacones. The paracone style is lacking. A hardly visible anterolingual cingulum can be observed. The possible occurrence of cementum is questionable.

P3/ - except for size, the tooth is very similar to P2/. The postfossette is elongated.

P4/ - like P3/. Cingulum stretched along the lingual side of the tooth and rather strong.

M1/ - with respect to the previous teeth, in this tooth postfossette and cingula are lacking. Protocone and metacone are fused together and the isolated medisinus is reduced to a small elongated structure.

M2/ - the metaloph is damaged. Protocones and metacones are separated. A paracone style is hardly distinguishable on the labial enamel wall of the ectoloph. Crochet short, but strong. Crista and labial and lingual cingula are lacking.

IGF 12488 Olivola, Magra river valley.
Museum of Geology and Paleontology of Florence
(Tab. 1; Pl. 3, fig. 2)

The skull is still provided with its mandible, but suffered intense lateral squeezing. Disfigurament is more apparent on the right than on the left face of the specimen.

A great deal of characters are abnormally modified. Therefore the description will be confined to only few diagnostic features. On the whole the skull resembles IGF 756 rather closely.

The dorsal profile is uniformly concave. The rear hornbase rugosity is rather evident, but the frontals were probably depressed, while the nasal hornbase rugosity is prominent. The nuchal crest is not very salient and is moderately projected backward. The occiput seems depressed and apparently inclines a little forward. The nuchal tubercle must have been rather prominent. The temporal crest is sharp, the temporal line well marked, the mastoid prominent and acute. Also the mastoid crest is sharp and well developed. The otic region is structured about as in IGF 756, but the posttympanic process is in shape of a broad arch projected forward. Both the jugular

and the retroarticular processes are quite developed; the difference of length between the two structures is less stressed than in IGF 746 and IGF 756 itself. The jugular processes are prismatic. The zygomatic arch plunges downward and forward much closer to the glenoid cavity than in the skulls seen so far. Its thickness increases very slowly. Both the orbital cavity and the zygomatic arch are placed quite high. The facial crest is sharp and the facial tubercle is hardly distinguishable. The front border of the orbital cavity overlies M2/. The rear lachrymal process is well developed and rather acute. The infratrochlear notch is quite evident. The nasals are almost parallel to the maxillary and premaxilla; only their frontmost tip bends a little downward. The ossification of the nasal septa is less advanced than in IGF 756. The rear border of the narial notch overlies P4/.

The condyloid fossae, in ventral view, are rather deep and narrow. The basioccipital and basisphenoid are damaged. The muscular tubercle seems quite prominent. The rest of the ventral face of the skull is covered by sediment. The jaws are tightly locked so that only the labial characteristics of the teeth may be observed. The cheek toothrows are composed of three premolars and three molars; no incisors, canines or first premolars are present, nor are their alveoli. The teeth are low-crowned and quite worn. A very weak relief along the bases of the crowns of the upper premolars may possibly be interpreted as a cingulum; an anterior cuspule can be evidenced in both third upper molars. These latter still bear even the paracone style that elsewhere was obliterated by wear. Cementum is not present; however the labial surfaces of the upper premolars and of the lower molars are rather rough.

In lateral view the horizontal ramus of the mandible is quite slender, whilst the vertical ramus is broader and rather short. The incisive portion of the horizontal ramus is partially abraded; it is not very extended, with a uniformly convex ventral outline and an almost flat dorsal profile. In dorso-anterior view it appears spatula-shaped, with a depressed symphysis area. Three mental foramina can be counted at left of the symphysis and two at right. The rearest mental foramen on both sides is placed at the roots of P2/.

The molar portion of the horizontal ramus seems irregularly elliptical in cross section, with a convex outer wall and a flatter medial wall. In lateral view its ventral profile is flat. Again in lateral view the mandible grows abruptly thicker at the transition from the horizontal to the vertical ramus. The mandibular angle is in form of a wide open arch. No mandibular scissure can be recognized. The masseterine fossa is broad and shallow. The coronoid process is higher than the condyle and slightly arched backward. The sygmoidal incisure does not seem too deep, but is rather wide. The condyle is transversely arranged.

In medial view the pterygoid fossa is shallow and the mandibular foramen is placed levelled with the alveolar plane of the horizontal ramus. The mylohyoid line is not evident.

IGF 1417v Olivola, Magra river valley.
Museum of Geology and Paleontology of Florence
(Tab. 1; Pl. 4, fig. 1)

Like, or even more than IGF 12488, this skull suffered intense lateral squeezing and is very damaged: several structures are missing, as the zygomatic arches, the occipital condyles and most of the ventral processes; others are abraded or fractured, as the nasals, the maxillaries, the sphenoid, the nuchal area etc.

The dorsal profile of the skull is uniformly concave. The nuchal crest seems to have been modestly prominent and perhaps even scarcely projected backward. The otic region was probably structured as in IGF 756. The orbital cavity and the zygomatic arches are placed rather high. The fore border of the orbital cavity levels M2/. The anterior stump of the zygomatic arch is rather thick. The facial tubercle is hardly distinguishable. The nasals are just slightly divergent from the maxillary and their front tip is rather bent downward. The ossification of the nasal septa is rather advanced. The narial notch overlies the front half of P4/ with its rearest border. The premaxilla are very narrow and slightly arched and bear no tooth sockets. The rear hornbase rugosity is poorly developed.

In dorsal view the front hornbase rugosity is quite evident; the lateral margins of the nasals are somewhat anteriorly convergent.

Teeth (Tabs. 2a, 2b)

Toothrows are incomplete: the left one is represented by P3/ and the three molars, while the right one by P3/, P4/ and fragments of the molars. Premolars and the first two molars are subquadrate to subrectangular, the third upper molars subtriangular; they are low-crowned, rather worn down and awfully preserved. The enamel thickness is not constant.

P3/ - pre- and mediofossettes are fused together, since the cristae are lacking. Postfossettes seem elongated and isolated. Crochets are weak. Protocones and metacones are extensively fused together. The possible presence of a style and of a lingual cingulum on both P3/ is questionable, because of the bad state of preservation. Residual traces of cementum seem to be present.

P4/ - only the right P4/ is still preserved, as already mentioned, but it is so damaged that the possible presence of the prefossette, crochet and paracone style is questionable. Mediofossette and crista are lacking. Protocone and metacone are fused together. The lingual cingulum is rather developed; again the bad state of preservation does not allow to recognize the possible occurence of the cingulum on other flanks of the tooth. Cementum seems lacking.

The following data concern only the right molars.

M1/ - the tooth is very worn. Pre- and mediofossette and crista and crochet are lacking, perhaps obliterated by wear. Only an elongated postfossette can still be recognized. Protocone and metacone are separated. It is not clear whether the lingual

cingulum occurs or not. Cementum is lacking, but the labial enamel surface seems rather rough.
M2/ - the tooth is better preserved than the previous one and is the largest of the toothrow. Pre- and mediofossette and crista are wanting. The postfossette is elongated. The crochet is rather developed. Ectoloph somewhat W-shaped; it bears a paracone style on its labial enamel wall. Protocone and metacone are separated. Cementum is lacking but the labial enamel surface appears rough. The lingual cingulum seems only represented by a cuspule at the outlet of the medisinus. The cingulum also occurs at the antero lingual corner of the tooth.
M3/ - pre- and mediofossette are present; the latter is not isolated. The crista is very weak, the crochet, instead, is normally developed. Ectoloph W-shaped and fused with the metaloph; it bears a distinct paracone style on its labial enamel wall. Protocone and metacone are not fused together. The cingulum is stretched along the anterolingual corner of the tooth; it is not clear if it also occurs elsewhere. Residual traces of cementum seem present.

GF 1413v Olivola, Magra river valley.
Museum of Geology and Paleontology of Florence

The specimen consists in a deformed fragment of the fore half of a skull. Both maxillaries, with a full complement of three premolars (P2/-P4/) and three molars (M1/-M3/) each, form most of the fragment. The anterior portions of the nasals and of the premaxilla are missing, while part of the orbital cavity and a stump of the zygomatic arch are still preserved. What remains of the nasal region shows that the rear margin of the narial notch overlies the P3/-P4/ commissure. The anterior border of the orbital cavity levels the front half of M2/. The rear lachrymal process is prominent and the infratrochlear incisure is rather deep.

Teeth (Tabs. 2a, 2b)

Teeth are heavily worn, brachyodont. Premolars and first two molars appear subquadrate to subrectangular, third upper molars subtriangular. The enamel thickness is not constant.
P2/ - prefossettes appear rather well developed; mediofossettes are isolated by the fusion of the cristae with the crochets. Postfossettes are roundish. Ectolophs are somewhat W-shaped and bear an evident paracone style on their labial enamel walls. Protocones and metacones are fused together. Cingulum stretched along the lingual and posterior sides and around the anterolingual corners of the teeth. Residual traces of cementum can be observed.
P3/ - prefossettes are well developed, while mediofossettes are very small and not isolated. Postfossettes are elongated. Cristae replaced by a weak enamel undulation; crochets very reduced. Other characters like in P2/.
P4/ - very similar to P3/.
M1/ - prefossettes are hard to distinguish, while mediofossettes are totally lacking. Postfossettes are roundish and small. Ectolophs are somewhat W-shaped and bear a distinct paracone style on their labial enamel wall. The crista is wanting in the left M1/, while in the right one it is represented by a slight enamel undulation. Crochets are strong. Protocones and metacones are separated. The lingual and anterolingual cingula are well developed; the former bear a cuspule at the outlets of the medisini.
M2/ - pre- and mediofossettes are fused together. Postfossettes are subtriangular. Cristae lack, while crochets are robust. Other characters like in M1/. M2/ are the largest teeth of the toothrows.
M3/ -pre- and mediofossettes are present; the latter are not isolated. Cristae are hardly distinguishable; crochets, instead, are strong. Ectolophs merge with metalophs and bear a distinct paracone style on their labial enamel walls. Metacones are separated from protocones. The labial cingula are well developed and bear a cuspule at the outlets of the medisini. A cuspule is also present at the rear end of the labial enamel wall of the ecto-metalophs. Residual traces of cementum can still be recognized.

The two following skulls show some features that distinguish them from the other specimens seen so far.

Specimen n. 2, glass case n. 8. S. Maria al Tasso, Upper Valdarno.
Paleontological Museum of Montevarchi
(Tab. 1; Pl. 4, fig. 2)

The skull is almost complete, though badly preserved. Its right face is crushed and its right occipito-petrosal region is lacking. Also the nuchal crest is damaged.

In dorsal view the temporal ridges seem rather widely spaced. The frontal hornbase rugosity is very evident but slightly prominent, while the nasal hornbase rugosity is extremely developed and forms a very strong relief. The zygomatic arches are straight.

In lateral view the skull shows clear similarities with the other skulls hitherto described. The outer auricular duct appears strongly inclined outward and upward and quite narrow. The retroarticular process (only the left one is preserved) is very robust and bent forward. The front border of the orbital cavity overlies M2/. The narial notch is very deep; its rear border overlies P4/. The ossification of the nasal septa is very much advanced. The premaxillae appear markedly arched with ventral concavity and their front tips level the occlusal planes of the cheek toothrows.

The effects of lateral crushing are particularly visible in ventral view. Anyhow significant differences from the specimens seen till now cannot be remarked. The condyloid area suffered strong damage. The retroarticular process bends slightly forward and inward. The pterygo-palatine crests are sharp and very protruding. The premaxilla appear very narrow. There is no trace of the alveoli of the incisors, canines and first premolars.

Teeth (Tabs. 2c, 2d)

Both cheek toothrows consist of three premolars

(P2/-P4/) and three molars (M1/-M3/). Wear is very intense. Teeth are low-crowned; premolars, M1/ and M2/ are subquadrate to subrectangular, M3/ are subtriangular.
P2/ - prefossettes and mediofossettes are lacking, while postfossettes are present and isolated. Medisini are isolated by the fusion of protocones with metacones. Lingual cingula are extremely weak, while the anterolingual and posterolabial cingula are rather evident. No style can be observed on the outer walls of the ectolophs. Cementum is lacking.
P3/ - exception made for size and for the lack of postfossettes, these teeth look much like the previous ones.
P4/ - quite similar to P3/. Lingual and anterolingual cingula are strong.
M1/ - these teeth are a little bit larger than fourth premolars, but resemble them rather closely, even in the fusion of protocones with metacones. In the right M1/ we may observe a residual, tiny, isolated postfossette.
M2/ - pre- and mediofossettes are lacking, while postfossettes are present and isolated. Protocones and metacones are separated. Cingulum stretched along the anterolingual, lingual and posterior sides of the teeth. Residual traces of cementum can be observed on the labial enamel walls of the ectolophs.
M3/ - ectolophs fused with metalophs. Cristae are lacking; crochets are strong, but short. A rather developed cingulum is stretched along the anterolingual margins of the teeth. A cuspule occurs at the rear end of the labial enamel wall of the ectometalophs. Residual traces of cementum are still present on the labial wall of the teeth.

The occipital region of the skull, in rear view, is highly deformed. However the occiput appears slightly trapezoidal and not typically rectangular as in the lectotype of the species.

Two characters of this skull from S. Maria al Tasso, namely the elongated narial notch and the trapezoidal occiput, are apomorphic features that announce the set of modifications the *D. Etruscus* stock will go through towards the end of the Early Pleistocene (see further on). It is therefore plausible that this specimen may come from a stratigraphic level later in time than those that yielded most of the *D. Etruscus* material seen so far.

IFG 12728 Grezzano, Mugello.
Museum of Geology and Paleontology of Florence
(Tab. 1; Pl. 3, fig. 1)

The skull is deformed and very incomplete: all its right lateral face, most of the right parieto-temporal region, part of the occiput and of the nuchal crest, most of the basioccipital, basisphenoid and presphenoid and all the etmoid, palatine, right maxillary and premaxilla are lacking.

In dorsal view the left zygomatic process of the temporal is less protruding than in the other skulls seen so far; consequently the zygomatic arches were probably less divergent. The zygomatic arch is straight and slightly thinner than that of IGF 756. The temporal fossa is shallow, the zygomatic fenestra narrow. The frontal region is abnormally flat, with a small, rather prominent tubercle at the transition to the parietals. The rear hornbase rugosity is hardly distinguishable, while the front one is prominent. The lateral margins of the nasals are rather anteriorly convergent.

In lateral view the dorsal profile of the specimen appears rather more concave than that of IGF 756; a marked flexion can be noted at the middle of the skull, as a result of a more angled arrangement of its neural and facial portions. If we trace an ideal line from the occipital condyles to the tip of the nasals, in IGF 756 the line passes through the orbital cavity, while in IGF 12728 the orbital cavity falls well under the line. The occipital area resembles that of IGF 756 quite closely: the occiput is inclined in about the same way and also the nuchal crest is projected backward to the same extent. In the otic region the posttympanicum process is more stretched forward than in IGF 756. The outer auricular meatus is directed outward. The mastoid process appears rather acute. The retroarticular process seems relatively shorter than in other specimens. The temporal crest is sharp. Both orbital cavity and zygomatic arch seem placed very high. Compared with the lectotype, the orbital cavity of this skull appears a little shifted forward; the front border of the orbital cavity overlies the anterior half of M2/. The rear border of the narial notch levels P4/. The orbital cavity-narial notch distance is shorter than in the lectotype. Consequently in comparison with IGF 756 the post-orbital portion of IGF 12728 results lengthened with respect to its preorbital portion. The zygomatic arch is structured as that of the lectotype. The facial crest appears rather sharp, with a hardly distinguishable, blunt facial tubercle. The nasals are rather straight and their front tip bends a little bit downward. The ossification of the nasal septa does not seem very advanced.

In ventral view the condyloid fossae are very deep. The jugular process is prismatic, the retroarticular one strong and slightly bent inward and forward; both processes are somewhat latero-medially flattened. In the presphenoid region the etmoid and rotundum foramina can still be recognized.

Teeth (Tab. 2a, 2b)

The maxillary bears only the fourth premolar and the three molars. In comparison with those of the other skulls, these teeth are a little less worn. Crowns are low, the enamel thickness is unequal within each tooth. The premolar, M1/ and M2/ are subquadrate-subrectangular, M3/ is subtriangular.
P4/ - the prefossette is hardly distinguishable from the mediofossette, since the crista is barely developed; the mediofossette is obviously not isolated. Postfossette subtriangular, isolated. Crochet well developed. The ectoloph appears somewhat W-shaped and bears a rather marked paracone style. Protocone and metacone are separated. The cingulum stretches along the lingual,

anterolingual, posterolabial and posterior sides of the tooth. Cementum is completely lacking.
M1/ - pre- and mediofossette hardly distinguishable; the postfossette is elliptical, isolated. The crista is in form of a weak enamel undulation, while the crochet is strong. Protocone and metacone are separated. Ectoloph W-shaped; it bears a paracone style more developed than that of P4/. Cingulum stretched along the lingual, anterolingual, posterolabial and posterior sides of the tooth. Dubitative traces of cementum can be observed.
M2/ - this is the largest of these teeth. The prefossette is fused with the mediofossette; the postfossette is broad, elliptical. The crista is replaced by several enamel undulations at different levels on the labial enamel wall of the pre-mediofossette. The crochet is strong and so stretched forward to almost get in touch with the protoloph. Ectoloph W-shaped; a paracone style, even more developed than that of M1/, is present on its labial enamel wall. Other characters are like in M1/.
M3/ - just slightly worn. The prefossette is all one thing with the mediofossette. The crista is lacking. The crochet is strong, but wear has not affected it yet. Ectoloph W-shaped and fused with the metaloph; protocone and metacone are sepatated. A well developed, evident paracone style occurs on the labial enamel wall of the ectoloph. Cingulum stretched along the lingual, anterolingual and posterolabial sides of the tooth. A distinct capsule is present at the rear end of the labial enamel wall of the ecto-metaloph. Cementum is lacking.

In occipital view what remains of the nuchal crest and of the occiput falls in the pattern typical for the species. The occiput shows a protruding structure that resembles those that delimit the two small areas at the upper angles of the occiput of IGF 756, but here it appears roundish and shifted more dorsally. The nuchal tubercle forms a modest relief. The occipital condyles are triangular, but smaller than those of IGF 756. The foramen magnum is triangular- shaped as well, and rather broad. The mastoid processes are prominent and acute.

The following characters single out this specimen from the others kept at the Museum of Florence: the unusual dorsal profile; the comparatively lengthened post-orbital portion of the skull, with a generalized fore-shifting of the orbital cavity and a shortening of the orbital cavity-narial notch distance; the very high vertical position of the orbital cavity and of the zygomatic arch; the less divergent zygomatic arches; the triangular-shaped foramen magnum. Part of these features may result from deformation, namely the strong concavity of the dorsal profile and the high position of the orbit and zygomatic arch (due to a flattening of the frontals), and can therefore be neglected. But the others do represent true differences, in my opinion. A deep, concave dorsal profile, high positioned orbital cavities and zygomatic arches and less divergent zygoma than *D. etruscus* are typical of a more recent Eurasian Dicerorhine, *D. hemitoechus*. Thus IGF 12728 might represent a late local variety of the *D. etruscus* stock, that possibly dwelt at the margins of the main populations of the species and that announced the forms that spread throughout the Old World during the Mid-Late Pleistocene.

Other upper cheek teeth kept at the Museum of Geology and Paleontology of Florence (Tab. 2a, 2b)

Twenty-four more upper cheek teeth of the Tuscan *D. etruscus* are kept at the Museum of Florence. Some are still mounted on fragmentary maxillaries, others are isolated. A few are of young individuals; in one case (IGF 752) two deciduous molars are rather worn and at their roots we can notice the still rootless capsules of the definitive teeth awaiting to erupt.

These further upper teeth are low-crowned. Premolars and first and second molars are subquadrate to subrectangular in occlusal view, while third molars are subtriangular. The lingual cingulum is generally well to very well developed. Sometimes, however, it is only represented by an isolated, small, rather pointed cuspule at the lingual outlet of the medisinus. A posterior cingulum is always present. Also an anterolingual, posterolingual and posterolabial cingulum often occurs, while a complete labial cingulum usually lacks or is represented by a row of few, variously developed cuspulae. A cuspule is always present at the rear end of the labial enamel wall of the ecto-metalophs of third upper molars. Cementum misses or is present in patches; we cannot tell whether the absence of cementum reflects a natural state or rather is due to non preservation. In several cases the enamel surface is not smooth, but somewhat rugose, irregular.

In front and rear views the upper teeth show a very marked concave occlusal surface as the lingually bent ectoloph and the lingual edges of the proto- and metacone stretch out ventrally on the occlusal plane converging one towards the others, while the central area of the tooth is depressed. Such a pattern is the result of differential wear; the enamel of the border structures is thicker and more resistant than that of the central part. The ectoloph is in form of a sharp shear blade. It is labially strengthened by a generally well developed paracone style; the mesostyle most rarely occurs. In the third upper molar the ectoloph merges into the metaloph.

In occlusal view wear morphology varies rather extensively as wear increases. The ectoloph appears somewhat W-shaped in several instances. The crochet is generally well developed, whereas the crista may not be present or may be only represented by a weak enamel undulation or, instead, by a distinct, rather sharply pointed structure. Only in some premolars the crochet and the crista merge isolating the mediofossette; in every other instance the latter is connected with the medisinus. The postfossette may be subtriangular to subelliptical and is sometimes isolated. In the premolars the lingual outlet of the medisinus is usually very little

incised, so that the proto- and metacone tend to merge with slight wear; the remnant labial half of the medisinus thus takes the shape of an obliquely elongated fossette.

The second upper molar is always the largest tooth.

Deciduous upper teeth do not apparently differ from the definitive ones in anything but size.

Other upper cheek teeth kept at the Paleontological Museum of Montevarchi (Tab. 2c, 2d)

Twenty-seven more upper cheek teeth, eighteen lower cheek teeth and six upper decidual teeth, together with fifteen mandible fragments of adult individuals, six mandible fragments of young adults and two mandible fragments bearing decidual teeth complete the fairly rich collection of skull elements kept at the Museum of Montevarchi. All these specimens come from a variety of sites scattered within the Upper Valdarno basin: S. Maria al Tasso, Stretti (Tasso), La Gruccia, Piagge di Pernina, Ville (Inferno), Piagge di Caposelvi, Croce dei Cappuccini, Le Valli (Trigesimo), Val di Peccioli (Trigesimo), Pianale (Vaccherecia), Loccano.

Upper cheek teeth are low-crowned. Premolars and first and second molars are subquadrate to subrectangular in occlusal view, third molars are subtriangular. Pre- and mediofossettes are generally roundish to elliptical and rarely isolated. Postfossettes, instead, are isolated rather often and may either be triangular or elongated; in a left upper molar (n. 22, glass case n. 9) the postfossette appears irregularly-shaped with a sort of crista on its labial enamel wall.

The crista may either be well developed, hardly distinguishable or represented by a bland enamel undulation, or may even totally lack. A very broad enamel fold replaces it in the over mentioned left molar n. 22, glass case n. 9, while a couple of cristae are present in two molars (n. 8 and n. 20, glass case n. 9) and in a premolar (n. 9, glass case n. 9).

The crochet is often very strong and rather stretched forward. More rarely it is just hardly developed; sometimes it lacks. In three molars (n. 20 and n. 22, glass case n. 9) the enamel that forms the crochet is amazingly plicated, a little bit like the enamel of the cheek teeth of *Elasmotherium*.

The anterocrochet is extremely rare; it is always very weak.

Slight wear is sufficent to cause the fusion of protocones with metacones in premolars; more intense wear is needed because the same may occur in some first upper molars.

In one molar, registered as n. 22, and in the premolar n. 8, glass case n. 9, the protocone is not connected with the ectoloph and thus the medisinus has an outlet through what should be the protoloph.

The ectoloph sometimes appears W-shaped. In moderately worn teeth a more or less developed paracone style may be observed on the labial enamel wall of the ectoloph. Four of the repeatedly mentioned molars n. 22, glass case n. 9, also bear a rather strong mesostyle on the outer wall of their ectolophs.

In third upper molars metalophs and ectolophs are constantly fused together.

The cingulum is usually rather well developed. It is mostly stretched along the lingual and anterolingual margins of these upper cheek teeth. A posterolabial cingulum is sporadic, while a posterior cingulum is always present. Sometimes cingula are totally lacking. Cuspulae are extremely rare; they happen to be found at the outlet of the medisinus and are constantly present at the rear end of the labial enamel wall of the ecto-metalophs of third upper molars (a very strong one is present in one of the molars n. 22, glass case n. 9). In one case a rather evident cuspule occurs on the anterior enamel wall of the metacone.

Cementum ordinarily lacks; when it occurs, it appears extremely thin and discontinuous. The labial enamel wall of the ectoloph is often weakly streaked.

Mandibles kept at the Museum of Geology and Paleontology of Florence (Tab. 4)

Thirty specimens of mandible of the Tuscan *D. etruscus* are kept in the Museum of Florence.

In lateral view the mandible is characterized by a slender horizontal ramus and, instead, by a rather short and thick vertical ramus. The horizontal ramus gets progressively thinner moving away from the vertical ramus. The anterior end of the horizontal ramus has a uniformly convex ventral outline; the incisive portion appears somewhat projected forward with a flat dorsal profile. Several mental foramina occur; they generally grow wider from the incisive to the molar portion of the horizontal ramus. The last and widest opens at the P/2 roots. The diastema is rather short. The ventral profile of the molar portion of the horizontal ramus is barely convex or even flat. At the transition from the horizontal to the vertical ramus the mandible thickens abruptly. The mandibular scissure is hardly distinguishable. The mandibular angle has an amply convex profile.

The vertical ramus is broad and short, as mentioned above. The coronoid process is acute, much higher than the mandibular condyle and bends a little bit backward. The sygmoidal incisure is wide and not too deep. The mandibular condyle is strong.

In posteroventral view the ventral margin of the vertical ramus appears thick, strengthened, with a very marked rugosity, characterized by a series of alternated, radially arranged grooves and elongated swellings.

In medial view the mandibular foramen is placed on a level with the alveolar border of the horizontal ramus. No mylohyoid line is visible.

In dorsal view the incisive portion of the horizontal ramus is rather depressed. It is quite narrow in its rostral end and even narrower at the transition to the molar portions of the horizontal rami; on the whole it appears somewhat spatula-shaped. The incisive corpus is commonly badly preserved, especial-

TAB. 4

SPECIMENS	IGF 2293	IGF 755	IGF 702	IGF 749	IGF 736	IGF 737	IGF 743	IGF 757	IGF 759	IGF 741	IGF 744	IGF 738	IGF 761	IGF 740	IGF 742	IGF 751	IGF 762	IGF 766	IGF 765	IGF 767	IGF 745	IGF 12498	IGF 1913	IGF 1411	IGF 1414	IGF 12487	n. 1 gc. n. 9	n. 3 gc. n. 9
	♀	♀	♀	♀	♀	♀	♀	♀	♀	♀	♀	♀	♀	♀	♀	♀	♀	♀	—	♀	♀	•	•	•	•	•	♂	♂
CHARATERS					□			□	□						□													
BI	48?	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	55	49?	—
Bmp	50	54?	—	—	—	—	—		—	—	—	—	—	45	52	—		—	—	—	—	42	—	—	—	54	66	—
BA	232	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	215	—		—	283?	239	305
Bco	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	130?	—	—	—	—	—	—
Bcn	254	—	—	—	—	—	—	—	—	—		—	—		—	—		—	—	—	—	226?	—	—	—	273?	—	304?
LS	113	—	—	—	—	—	—	—	—	—	—	—	—	110	108	—	—	—	—	—	—	—	—	—	—	—	98	—
L	487?	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	485	—	—	—	446		—
Lei	492?	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	476	—	—	—	459?	482?	—
Lcm	194	204	—	—		—	189?	—	—	—	—	—	—	—	—		—	—	—	—	—	200	—	209	206	173	170	183
Lmi	293?	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—		—	—	—	—	267	—	—	—	273	282?	—
Lcp	410	—	—	—	—	—	—	—	—	—	—	—	—		—	—	—	—	—	—	—	413	—	445		400	392	—
LD	34?	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—		—	—	—	—	39?	39?	—		35	59?	—
Hvcn	253	—	—	—	—	—	241	—	—	—	—	—	—	—	—	—	—	—	—	—	—	236	—	—	196	242	226	229
Hvs	208	—	—	—	—	—	194	—	—	—	—	—	—	—	—	—	—	—	—	—	—	228	—	—	188	214	193	199
Hvco	246	—	—	—		—	226	—	—	—	—	—	—	—	—	—	—		—	—	—	270	—	—	177	—	240	227?
H3M	83	95	89	—	70?	94	89	—	—	—	88?	96	91	—	—	89	89	97	—	77	90	85	—	104	82	93	81	85
H4P	78	78	84	79	—	—	82	60	82	86	85	80	—	—	—	83	72	81	—	71	77	80	—	74	62	77	68	85
H2P	60?	50?	—	—	—	—	—		—	—	—	—	—	—	—	—	—	—	52?	—	—	54?	47?	51	46?	60	47	—
T3M	50	50	48	—	39	50	52	—	—	51?	47?	52	41		—	49	44	52	—	48	50	49?	—	57	49	54	46	46
T2M	50	52	48	47	36	50	50	—	—	45?	46?	53	44	—	—	49	48	51	—	49	49	50?	—	44	48	57	45	46
α	106		—	—		—	107	—	—	—	—	108?	—	—	—	—	—	—	—	—	—	110	—	—	118	105	94	99

Measuring points of the mandible (Tabs. 4; Figs. 2 and 3).

BI: breadth of the incisive corpus; Bmp: breadth of the mandible at the transition to the molar portions of the horizontal rami;BA: breadth of the two horizontal rami between the two angles: gonion laterale - gonion laterale; Bco: breadth of the two horizontal rami between the coronoid processes; Bcn: breadth of the horizontal rami between the mandibular condyles; LS: length of the symphysis; L: length from the angle to the incisive corpus: gonion caudale - infradentale; Lei: length from the condyle to the infradentale; Lcm: length from the gonion caudale to the aboral border of the alveolus of M/3; Lmi: length from the aboral border of M/3 to the infradentale; Lpc: length from the gonion caudale to the oral border of the alveolus of P/2; LD: length of the diastema; Hvcn: aboral height of the vertical ramus: gonion ventrale - condyle; Hvs: middle height of the vertical ramus: gonion ventrale-sygmoidal incisure; Hvco: oral height of the vertical ramus: gonion ventrale - coronoid process; H3M: height of the horizontal ramus behind M/3; H4P: height of the horizontal ramus between P/4 and M/1; H2P: height of the horizontal ramus in front of P/2; T3M: thickness of the horizontal ramus under M/3; T2M: thickness of the horizontal ramus under M/2; α: angle between horizontal and vertical ramus.

ly in its fore margin, that is often abraded. Sometimes a pair of residual incisor alveoli can be observed at the lateral margins of the incisive portions in form of small, shallow cavities. The symphysis levels the P/2-P/3 commissure or P/3 itself with its rear margin. The molar portion of the horizontal ramus shows a rather constant thicknes all along its extension. The coronoid process and the sygmoidal incisure are thin. The mandibular condyle is about transversely elongated and directed upward and outward. The masseterine and pterygoid fossae are shallow. The outlet of the mandibular foramen is rather wide and displaced forward.

In anteroventral view the symphysis often shows a blunt sagittal carina.

In cross section the horizontal ramus is characterized by a convex outer wall and by a somewhat flatter inner wall.

Mandibles kept at the Paleontological Museum of Montevarchi

Specimen n. 1, glass case n. 9 Il Tasso, Upper Valdarno.
Paleontological Museum of Montevarchi
(Tab. 4)

The fossil shows clear affinities with the ones kept at the Museum of Florence.

Four mental foramina can be counted on each side of the incisive corpus in anteroventral view; the rearest one opens at the roots of P/2. No ventral carina can be observed on the outer face of the mandibular symphysis.

The right coronoid process is not preserved. Also the fore-edge of the incisive corpus is lacking.

The horizontal ramus is characterized by a flat medial wall and by a slightly convex lateral wall.

The mandibular condyles are inclined inward.

Teeth (Tabs. 3c, 3d)

Both cheek toothrows are composed of three premolars (P/2-P/4) and three molars (M/1-M/3). Teeth are brachyodont. Cingula and cementum are lacking; however the labial enamel walls of the premolars are rugose. A cuspule occurs on the rear face of the talonid of both M/3.

Specimen n. 3, glass case n. 9 Inferno (Ville), Upper Valdarno
(Tab. 4)

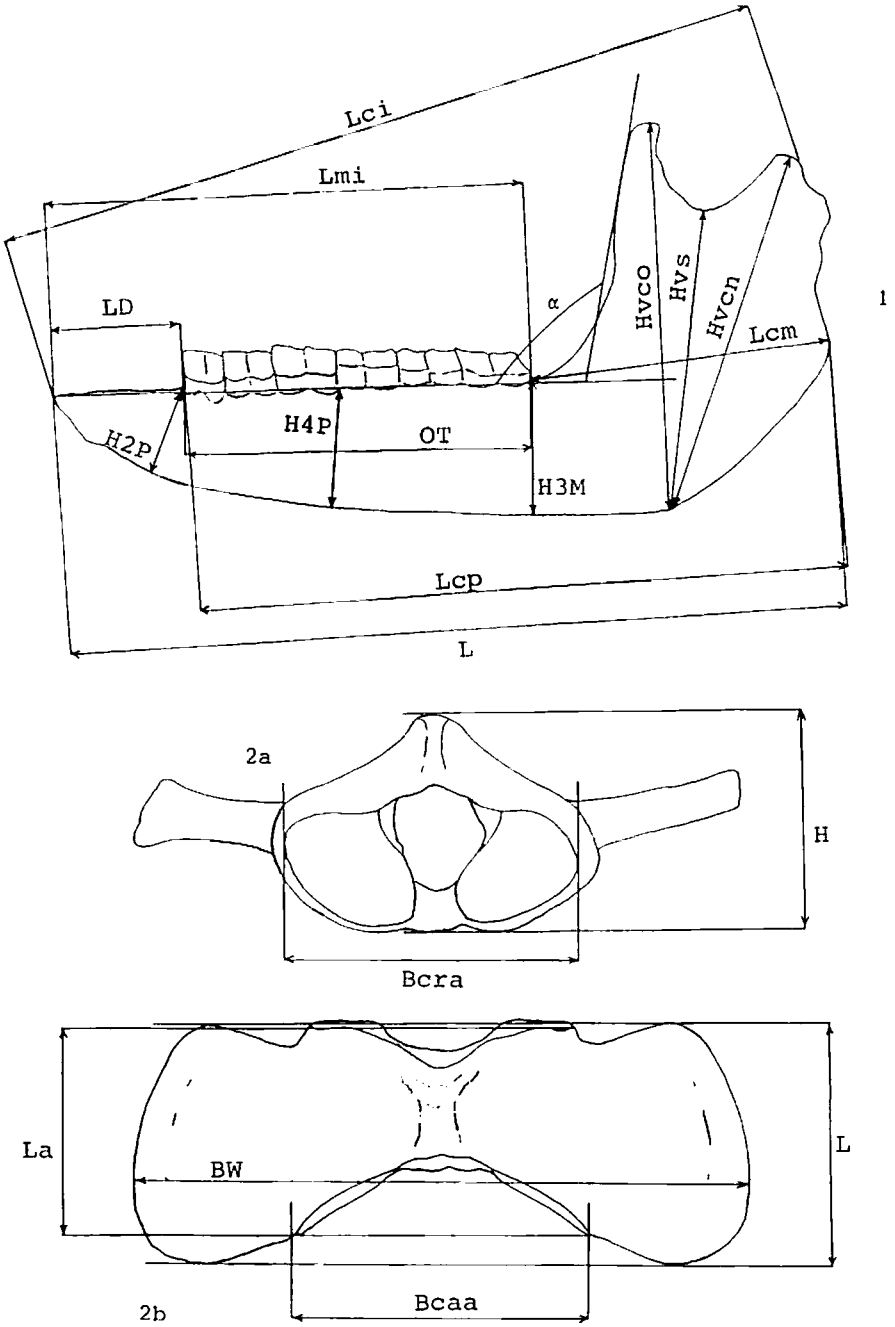

Fig. 3 - 1 - mandible, lateral view; 2a - atlas, cranial view; 2b - atlas, dorsal view.

The mandible is highly damaged. The incisive corpus is almost entirely abraded.

Both coronoid processes are broken; the left one is completely lacking.

The specimen appears rather massive, but on the whole it shows strong similarities with other *D. etruscus* mandibles already seen.

The two flanks of the horizontal rami are flat or barely concave.

Teeth (Tabs. 3c, 3d)

As for what concerns the cheek toothrows, the right horizontal ramus still bears only M/3 and the outer half of M/2, while the left one shows the three molars and P/4, the latter broken in its trigonid. Teeth are not intensely worn. The cingulum occurs only along the antero-labial margin of M/2; a very weak cuspule can be observed on the rear face of the talonid of M/3. Cementum is lacking.

Other mandible fragments kept at the Museum of Montevarchi are portions of horizontal rami. Most are charecterized by flat inner walls and convex outer walls.

Lower cheek teeth kept at the Museum of Geology and Paleontology of Florence (Tabs. 3a, 3b)

One hundred and twenty-one lower teeth of the Tuscan *D. etruscus* are kept at the Museum of Florence.

Lower teeth are characterized by typical rhinocerotidae crescent-shaped lophids. The cingulum is ordinarily present and rather well developed along the anterolingual and anterolabial flanks of the trigonid; it also commonly occurs at the posterolabial face of the talonid, while otherwhere it might be only represented by rare very small cuspulae. A more or less developed cuspule is often present on the rear face of the talonid. Cementum very seldom occurs and always forms a discontinuous, very thin cover; however the labial enamel surface of the teeth is often rather wrinkled, whereas the lingual surface usually is quite smooth.

Deciduous teeth are easily recognized by their size and by their unusual enamel configurations and consequently by their odd wear morphology.

Other lower cheek teeth kept at the Paleontological Museum of Montevarchi (Tabs. 3c, 3d)

Also the other lower cheek teeth kept at the Museum of Montevarchi are brachyodont. Trigonids appear somewhat horse-shoe-shaped with the two arms of the horse-shoe pointed lingualward; talonids are L-shaped.

A strong cingulum is often present along the anterior margin of the teeth, while along their posterior face a weak cingulum is seldom observed. Cingula are more commonly present in molars rather than in premolars. Several times cingula are completely lacking. Cuspulae, instead, are rather frequent. A more or less developed cuspule is constantly present on the rear enamel wall of the talonids of third lower molars. They are also rather common on the labial enamel walls of premolars, where they may align to form a continuous row that replaces the cingulum. Molars n. 32 and 34, glass case n. 9, bear a strong cuspule on the labial wall of their talonids and n. 34, in particular, shows other two cuspulae on its lingual side. Lingual cuspulae, however, are extremely rare.

Cementum lacks; nevertheless few lower teeth have rugose labial enamel walls (e.g. two molars registered as n. 29, glass case n. 9).

Postcranial bones.

Atlases (Tab. 5; Pl. 4, fig. 3)

Six atlases are kept at the Museum of Geology and Paleontology of Florence.

In dorsal view the atlas shows a rather wide open V-shaped cranial incisure in the dorsal arch. The dorsal tubercle is robust and very protruding. The cranial tubercle is evident and somewhat kidney-shaped; a deep vascular scissure separates it from the cranial border of the articular cavity for the occipital condyle. The vascular scissure that connects the dorsal outlets of the intervertebralis and alaris foramina may be present (and in this case quite deep) or not. The ala is broad, rather flat and elongated backward and outward. No foramen trasversarium occurs.

In cranial view the dorsal arch of the vertebra

TAB. 6

CHARACTERS	L	Bcra	Bcaa	Bc
SPECIMENS				
o IGF 2206 v	117	134	69?	100
o IGF 725	112	129	47	78?

Measuring points of the axis (Tab. 6; Fig. 4)

L: length; Bcra: breadth of the cranial articular surface; Bcaa: breadth of the caudal articular surface; Bc: breadth of the corpus

TAB. 5

CHARACTERS	L	La	BW	Bcra	H	Bcaa
SPECIMENS						
o IGF 2285 v	114	110?	211?	143	118	152
o IGF 2207 v	111	108?	178?	127	95	—
o IGF 727	114	114?	210?	143	94	135
o IGF 726	—	107?	177	121	103	130
• IGF 182 v	113?	—	170?	122?	—	—
• IGF 183 v	107	—	175?	131?	89?	—

Measuring points of the atlas (Tab. 5; Fig. 3)

L: length; La: length from the cranial to the caudal articular surface; BW: breadth over the wings; Bcra: breadth of the cranial articular surface; Bcaa: breadth of the caudal articular surface; H: height.

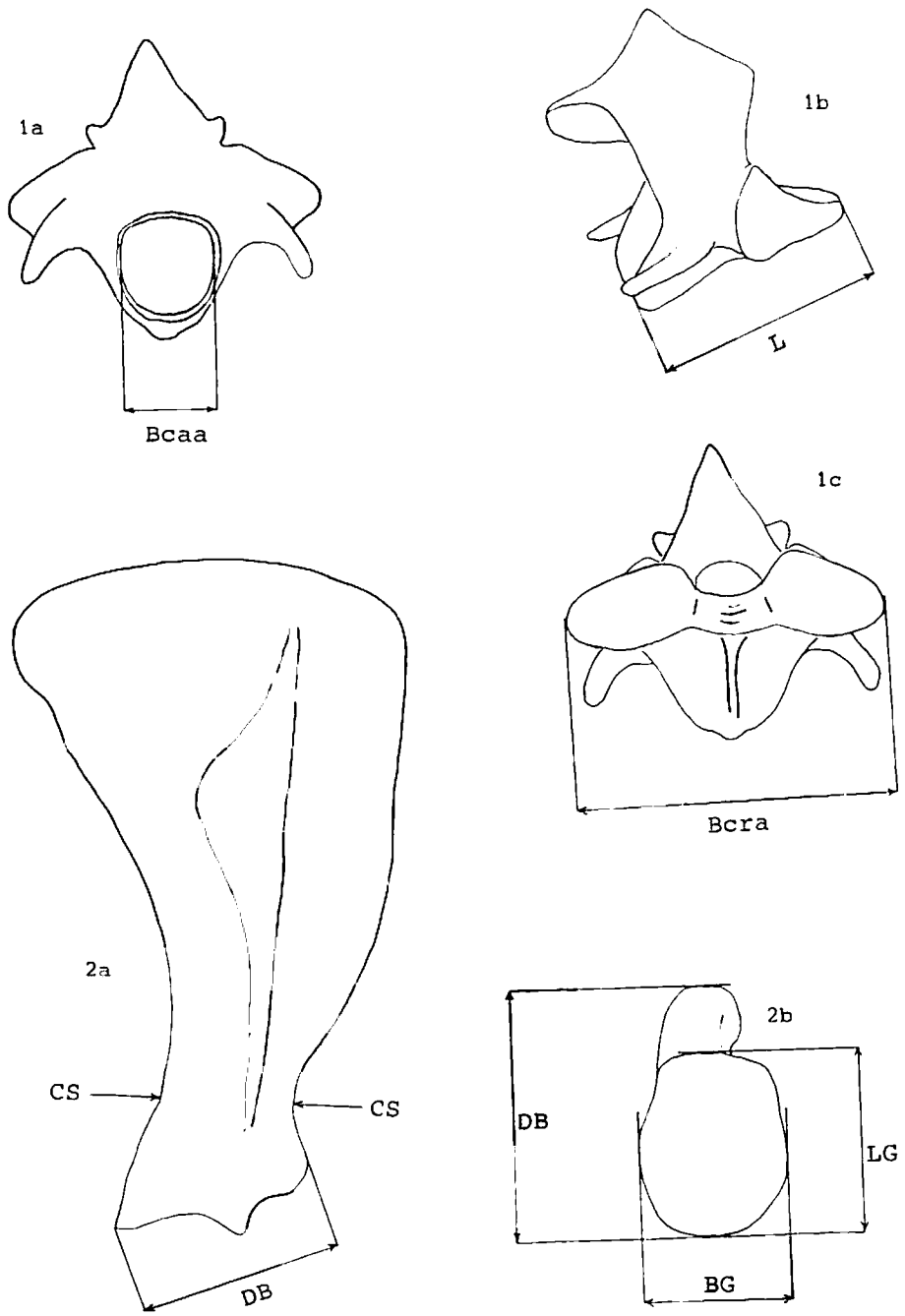

Fig. 4 - 1a - axis, caudal view; 1b - axis, lateral view; 1c - axis, cranial view; 2a - scapula, lateral view; 2b - scapula, distal view.

is sturdy and flat, horizontal. The articular cavity for the occipital condyle is somewhat ear-shaped and very deep. The interarticular incisure appears in form of a wide, angular groove. The ventral tubercle may be either salient and sharp or broad and not very prominent.

Caudally the articular surfaces for the axis are flat, obliquely elongated outward and backward and ventrally separated by a wide, U-shaped fovea dentis. The transverse crest of the ventral vertebral arch is quite fore-shifted.

In ventral view the ala is rather concave and the ventral outlet of the alar foramen can be observed.

Axes (Tab. 6)

Two axes are kept at the Museum of Florence.

The spinal process and the dorsal arch miss in both specimens.

In dorsal view the dens axis appears cylindrical and flanked by two slightly convex cranial articular surfaces stretched backward and outward. A groove runs from the border of the cranial articular surface to the intervertebral foramen. The floor of the vertebral foramen is in form of a wide shallow groove with a weak central longitudinal relief in its anterior portion that divides it into two symmetrical halves. The transverse processes are badly preserved in all the specimens. The rear cotyloid cavity is very deep, hemispherical.

In lateral view the dens axis is markedly inclined upward. The cranial articular surface is about elliptical; anteriorly it is connected with the articular surface that extends all along the ventral face of the dens axis. Of the foramen transversarium nothing remains but a deep groove that extends parallel to the main length of the bone.

Ventrally the ventral crest is straight and very salient and the posterior tubercle of the crest is rather well developed.

Scapulae (Tab. 7; Pl. 4, fig. 4)

Two scapulae are kept at the Museum of Florence.

The scapulae are badly preserved. They appear very light and slender.

In lateral view the supraspinous and infraspinous fossae are long and narrow. The latter is a little bit deeper than the former.

TAB. 7

CHARACTERS	DB	CS	LG	BG
SPECIMENS				
○ IGF 2208 v	—	—	72	58
○ IGF 718	98	91	76	59

Measuring points of the scapula (Tab. 7; Fig. 4)

DB: distal breath; CS: breadth of the Collum scapulae; LG: length of the glenoid cavity; BG: breadth of the glenoid cavity

The spine is well developed; the neck is slim. No subglenoid tubercle occurs, while the supraglenoid tubercle is rounded and very protruding. The glenoid fossa is broad and shallow. The ideal line connecting the distal border of the supraglenoid tubercle with the ventralmost point of the glenoid cavity is strongly oblique to the sagittal axis of the bone.

In medial view the suprascapular fossa is almost flat.

Ventrally, the glenoid cavity is elliptical, rather small and very shallow, the coracoid process extremely reduced.

Four limbs (IGF 716) of an adult *D. etruscus* individual, together with the pelvis and a fragment of the sacrum make part of the ancient collections of the Museum of Florence. They were found at Poggio al Pero, Figline, Upper Valdarno, and were first reported by Nesti (1811) and succesively by Cuvier (1822). The left fibula shows clear evidence of resealing in its diaphysis. The accident probably occured when the animal was still in growth. As a matter of fact, although the tibia was not injured, its proportions appear modified in comparison to the right tibia: it is shorter, its diaphysis is thicker and its distal epiphysis is abnormally enlarged.

The bony elements of these four limbs are described below.

Humerus (Tab. 8)

In front view the lesser and the greater tubercle summits are very salient; the former is somewhat higher than the latter. They flank an ample and deep intertuberal groove. The lesser tubercle convexity forms a rather sharp prominence along the medial margin of the bone. The deltoid tuberosity is strongly protruding; it seems rather proximally displaced along the shaft. The teres major tubercle, on the medial face of the diaphysis, is placed at about the same level of the deltoid tuberosity. The lateral epicondyloid crest is sharp and the lateral epicondyle prominent; the former is short and bears a distinct, somewhat cranially displaced tubercle. The crest ends ventrally in correspondence with a laterally projected, usually well developed shelf-like structure. Such bony formation connects the outermost point of the lateral condyle with the lateral margin of the coronoid fossa. A rather deep and low coronoid fossa encloses a radial fossette that is barely outlined, if present at all. The coronoid fossa is not pierced. Within the coronoid fossa a bland vertical relief divides it into a medial and a lateral half.

Laterally the tricipital line is straight and protruding; it bears a very marked teres minor tuberosity. The deltoid tuberosity seems somewhat twisted backward. The lateral epicondyle appears globular.

In medial view the distal epiphysis shows a fairly smooth surface. A rather marked relief divides the area where the superficial flexor of the phalanges inserts from that where the deep flexor inserts. On the contrary the areas for the ulnar and radial flexors of the carpus are not evident.

In rear view the articular head is broad, hemispherical and is mounted on a very thick neck. The teres major tuberosity is modestly developed and, alike the deltoid tuberosity, seems somewhat proximally shifted. As a matter of fact it is about symmetrical to the deltoid tuberosity along the medial border of the bone. A rather strong lateral epicondyle and, instead, a weak medial epicondyle border, ventrally, a deep, long and narrow olecranon fossa. The medial epicondyle slightly protrudes over the olecranon fossa.

In dorsal view the articular head is somewhat rectangular-shaped.

In this view the greater tubercle convexity appears strong and rather protruding, while the lesser tubercle convexity is far less developed. The summit and the convexity of the greater tubercle are

TAB. 8

CHARACTERS	L	LL	PL	BP	DP1	DP2	Btd	BS	BD	BT
SPECIMENS										
○ IGF 716	—	392	360	138	158	128	115	56	128	87
○ IGF 488 v ⊏	357	360	323	151	—	113	100	45	121	79
○ IGF 2209 v	—	—	—	—	—	—	—	—	130	86
○ IGF 2210 v	—	381?	358?	—	—	—	119	55	116	77
○ IGF 14840	384	374	336	133	160	117	123	59	122	78
○ IGF 712	—	379	353	136	158	117	111	58	126	86
○ IGF 730	—	407	389?	—	169?	141?	116?	55	153?	86?
○ IGF 717	—	—	—	—	—	—	—	53	125	79
○ IGF 732	—	—	—	—	—	—	—	—	128	89
• IGF 160 v	387	384	355	143	—	110	—	59	134	89
• IGF 170 v	—	—	—	—	—	107	107	59	—	—
• IGF 172 v	—	—	—	—	—	—	—	60	114	81
• IGF 171 v	—	—	—	—	—	—	—	58	130	85
• IGF 1981	—	—	—	—	—	—	123	—	—	—
• IGF 1415 v	—	—	—	—	—	—	—	—	109	78
• IGF 4328	—	—	—	—	—	—	—	50	—	—
• IGF 4324	—	—	—	—	—	—	—	—	99?	81
• IGF 4325	—	—	—	—	—	—	—	58	—	—
• IGF 4322	—	—	—	—	—	—	—	60	122	88
• IGF 4329	—	—	—	—	—	—	—	52	—	—
• IGF 4323	—	—	—	—	—	—	—	—	123	—
• IGF 4327	—	—	—	—	—	—	—	56	—	—
• IGF 1869	—	—	—	—	—	—	131	60	—	—
▲ n. 4, g.c. n. 10	—	—	—	—	—	—	—	55	111	—
▲ n. 2, g.c. n. 10	—	—	—	—	—	—	—	52	116	—
▲ n. 1, g.c. n. 10	—	—	—	—	—	—	—	—	—	79

Measuring points of the humerus (Tab. 8; Fig. 5)

L: greatest length; LL: lateral length; PL: physiologic length; BP: breadth of the proximal epiphysis; DP1: depth of the proximal epiphysis from the greater tubercle summit to the caput; DP2: depth of the proximal epiphysis from the lesser tubercle summit to the caput; Btd: breadth across the deltoid tuberosity; BS: breadth of the shaft.

separated by a shallow but narrow groove, while an even shallower but far wider depression lies between the summit and the convexity of the lesser tubercle. The intertuberal groove is wide and deep. Several vascular foramina occur.

The distal extremity of the bone, in ventral view, is characterized by a very strong lateral epicondyle, whilst the medial epicondyle is far weaker, rounded and slightly stretched out over the olecranon fossa. The grooves dividing the two epicondyles from the trochlear lips are well marked, but shallow and narrow.

Radius and ulna (Tabs. 9a, 9b)

Radius

The radius is rather more developed than the ulna.

In front view the coronoid process is prominent, forming a marked edge along the anterior margin of the proximal articular surface.

The radial tuberosity has a bump-like appearance; it is in form of an evident roundish rugose relief. Also the smaller lateral tuberosity is represented by an easily recognizable prominent rugosity. Distally a rather wide and shallow groove for the radial extensor of the carpus can be observed, while the other lateral grooves and the tendon groove are hardly distinguishable. The stiloid process of the radius is very protruding.

In lateral view the radius as a whole appears rather fore-arched. The coronoid process is less salient than another apophysis that is present along the rear margin of the proximal articular surface. Such an apophysis is connected with the coronoid process by means of a saddle-shaped relief that represents the radial portion of the trochlear notch

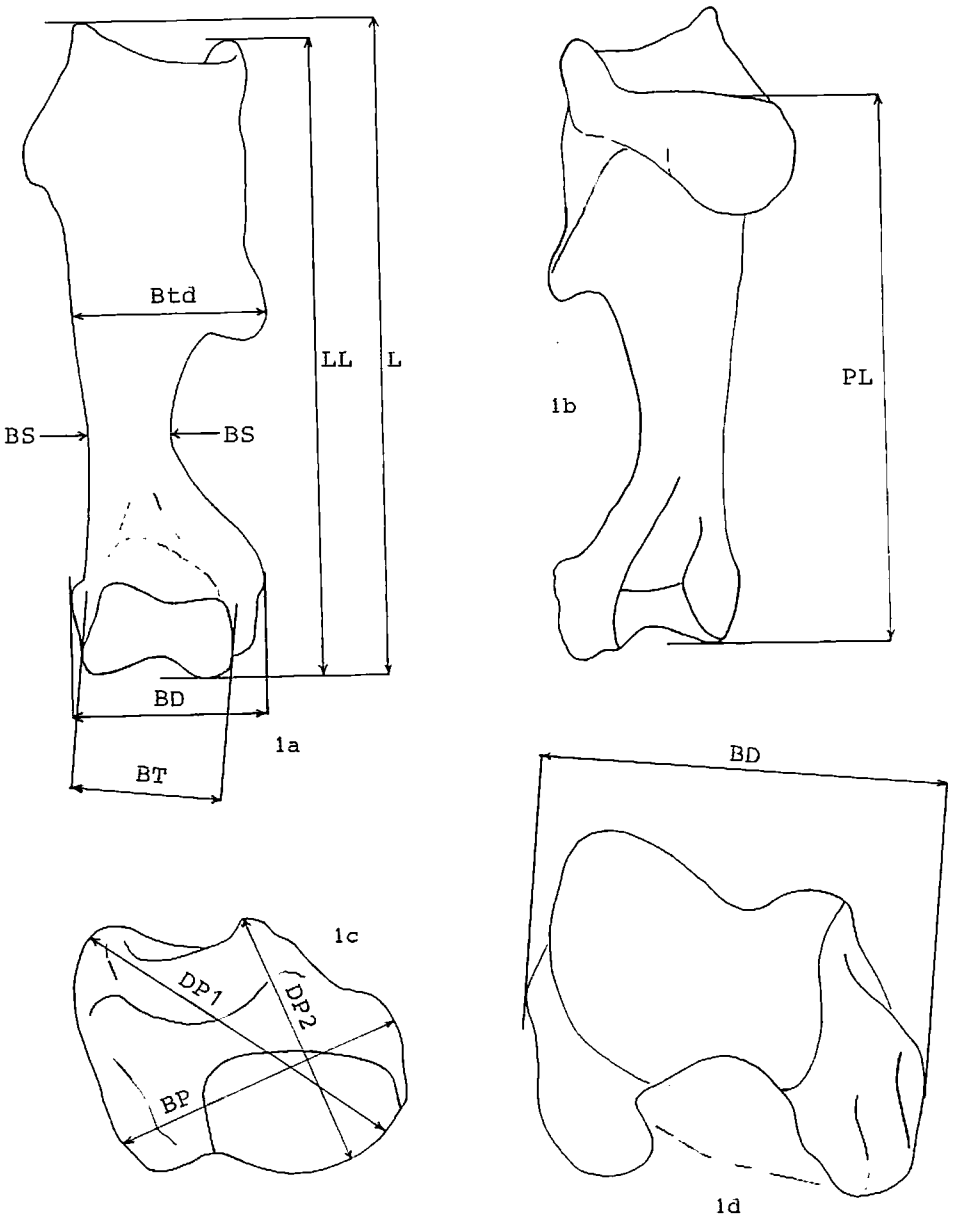

Fig. 5 - 1a - humerus, anterior view; 1b - humerus, posterior view; 1c - humerus, proximal view; 1d - humerus, distal view.

(Incisura trochlearis). The rear apophysis fits into an articular cavity of the ulna. A moderately wide interosseus space occurs between the upper third of the shafts of the radius and ulna.

The rear face of the radius is proximally flat or even slightly convex and gets concave distally. The transverse crest and the groove that borders the distal articular surface are weak.

In medial view the distal half of the medial edge of the radius is extremely sharp.

Of the two surfaces that compose the proximal articulation, in dorsal view, the medial one is broad and subcircular, whilst the lateral one is smaller and subrectangular. These two surfaces are separated by the already mentioned saddle-shaped relief between the two marginal apophyses of the proximal articulation.

The distal articular surface, in ventral view, is composed of a broad and circular medial surface and of an elliptical, transversely elongated lateral surface. The two surfaces are separated by a bland relief. Both surfaces consist of an anterior, rather concave portion and of a posterior convex portion. The latter extends backwards over the margin with

TAB. 9a

SPECIMENS	IGF 716 ♂	IGF 488 v ♀	IGF 2212 v ♀	IGF 2211 v ♀	IGF 721 ♀	IGF 2213 v ♀	IGF 2214 v ♀	IGF 2236 v ♂	N 196 ♀	N 198 10715 ♂	IGF 166 v •	IGF 4667 •	IGF 4309 •	IGF 4321 •	IGF 1907 •	IGF 1901 •
CHARACTERS		□														
Lr	359	345	—	373	—	—	—	—	386	—	384	—	—	—	—	—
PL	337	318	—	328	—	—	—	—	338	332	352	—	—	—	—	—
BPr	84	82	88	85	—	—	85	—	89	87	82	—	—	84	—	—
BPar	84	82	—	—	—	—	85	—	89	86	81	—	—	—	—	—
DPr	—	52	56	59	—	—	55	—	—	—	—	—	—	51	—	—
BDr	89	79	—	86	—	84	—	—	88	90	69?	—	—	—	88	—
BDar	65	64	—	65	—	60	—	—	70	70?	53	—	—	—	74?	—
DDr	55	57	—	53	—	54	—	—	59	58	60	—	—	—	51	—
BSr	44	39	44	48	—	—	46	—	48	49	43	—	—	43	—	48
Lu	—	—	—	455	458	—	—	—	—	—	468	—	—	—	—	—
Lo	—	—	—	—	—	—	—	—	—	140	126	—	—	—	—	—
Do	—	70	—	79	77	—	—	—	—	76	79	—	73?	—	—	—
DPa	95?	90	—	102	101	—	—	—	—	102	101	—	85?	—	—	—
BPau	73	—	—	—	77	—	—	70?	76	74	71	—	69	—	—	—
BDu	59	65	—	55	63	52	—	—	—	—	—	—	—	—	—	—
BDau	—	—	—	—	—	37	—	—	36	—	39	—	—	—	—	—
BSu	25	31	—	36	33	—	—	—	34	32	31	40	—	—	—	—
Lru	—	—	—	—	—	—	—	—	—	—	478	—	—	—	—	—
BDru	—	—	—	—	—	110	—	—	118	—	111	—	—	—	—	—
BDaru	—	—	—	—	—	97	—	—	100	—	92	—	—	—	—	—

Measuring points of the radius/ulna (Tab. 9; Fig. 6)

Lr: length of the radius; PLr: physiologic length of the radius; PBr: breadth of the proximal epiphysis of the radius; BPar: breadth of the proximal articular surface of the radius; DPr: depth of the proximal epiphysis of the radius: BDr: breadth of the distal epiphysis of the radius; BDar: breadth of the distal articular surface of the radius; DDR: depth of the distal epiphysis of the radius; BSr: breadth of the diaphysis of the radius; Lu: length of the ulna; Lo: length of the olecranon; Do: depth of the olecranon; Dpa: depth across the anconaeus process (beak); BPau: breadth of the proximal articular surface of the ulna; BDu: breadth of the distal epiphysis of the ulna; BDau: breadth of the distal articular surface of the ulna; BSu: breadth of the diaphysis of the ulna; Lru: greatest length of both radius and ulna in articulation; BDru: greatest breadth of the distal epiphyses of both radius and ulna in articulation; BDaru: greatest breadth of the distal articular surfaces of both radius and ulna in articulation.

the rear face of the bone. The grooves for the extensor of the carpus and for the dorsal extensor of the phalanges are quite developed. The digital fossa is shallow and laterally displaced.

Ulna

The olecranon summit, in front view, is somehow triangular in shape; it bears a very strong dorsal crest. The anconeal process is very protruding. The stiloid process of the ulna is very robust.

Laterally the olecranon summit appears prominent. The trochlear notch is circular and deep and the anconeal process, in this view, appears rather well developed and quite projected forward.

The lateral face of the shaft is flat. Several lines streak this face.

In cross section the shaft is triangular with very sharp edges.

In ventral view the distal articular surface is anterolaterally-posteromedially convex and concave in anteromedial-posterolateral direction. At the rear border of the articulation a small articular surface for the semilunar occurs.

Carpus (Tabs.10-14)

Scaphoid (Tab. 10)

Only the right scaphoid is present.

The scaphoid is probably the biggest carpal bone. It appears rather elongated antero-posteriorly and gently arcuated with lateral concavity.

The anterior margin of the bone is quite concave and bears a rather prominent apophysis at its ventral end. The posterior margin is amply convex, protruding, even somewhat acute.

In dorsal view the articular surface for the radius is subtriangular in shape. It is characterized by a prominent, transversely elongated condyle at its fore end, by an even more salient and pointed

TAB. 9b

SPECIMENS	IGF 1903 •	IGF 1900 •	IGF 1899 •	IGF 1904 •	IGF 4318 •	IGF 1865 •	IGF 4337 •	IGF 4338 •	IGF 1864 •	IGF 4313 •	IGF 4302 •	IGF 4320 •	IGF 1978 •	IGF 4304 •	IGF 2216 •	IGF 1866 •
CHARACTERS								□								
Lr	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
PL	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
BPr	81?	—	—	79?	75?	—	—	—	77	83	—	80	—	—	—	—
BPar	—	—	—	—	—	—	—	—	—	—	—	72	—	—	—	—
DPr	58	—	—	54?	42?	—	—	—	46	49	—	60	—	—	—	—
BDr	—	—	—	—	—	—	85	87	—	—	—	—	—	—	—	—
BDar	—	—	—	—	—	—	—	68?	—	—	—	—	—	—	—	—
DDr	—	—	—	—	—	—	51	50	—	—	—	—	—	—	—	—
BSr	43?	55	53?	—	44?	—	41	—	39	—	—	—	—	—	—	—
Lu	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Lo	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Do	—	—	—	—	—	—	—	—	—	—	61?	—	—	—	—	63
DPa	—	—	—	—	—	—	—	—	—	—	90?	—	—	—	—	—
BPau	—	—	—	—	—	65	—	—	—	—	74	—	—	63	70?	—
BDu	—	—	—	—	—	—	—	—	—	—	—	—	57	—	—	—
BDau	—	—	—	—	—	—	—	—	—	—	—	—	39?	—	—	—
BSu	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	35
Lru	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
BDru	—	—	—	—	—	—	—	102?	—	—	—	—	—	—	—	—
BDaru	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—

TAB. 9c

SPECIMENS	IGF 2215 v •	IGF 4312 •	IGF 1806 •	IGF 163 v •	IGF 164 v •	IGF 173 v •	IGF 165 v •	IGF 175 v •	IGF 169 v •	IGF 177 v •	IGF 4319 •	IGF 4315 •	IGF 1939 •	IGF 2217 v •	IGF 4314 •	IGF 2236 v •	n. 5, g.c. n. 10 ▲
CHARACTERS																	
Lr	—	—	—	—	367	354	371	378	—	—	—	—	—	—	—	—	—
PL	—	—	—	—	343	335	345	351	—	—	—	—	—	—	—	—	—
BPr	—	79	85	81	86	84	87	80	87	73?	87	83	—	—	—	—	89
BPar	—	—	85?	—	85	85	87	80	87	65?	86	—	—	—	—	—	—
DPr	—	57	54	—	61	51	56	50?	60	—	56	49	—	—	—	—	—
BDr	—	—	—	—	88	90	82	84	—	—	—	—	—	—	71?	—	—
BDar	—	—	—	—	—	69?	71?	66?	—	—	—	—	—	—	—	—	—
DDr	—	—	—	—	54	46	38	47	—	—	—	—	—	—	56	—	—
BSr	—	—	49	—	43	45	47	49	50	—	41	—	—	—	—	—	49
Lu	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
Lo	—	—	—	—	—	—	—	121	98?	124	—	—	—	—	—	—	—
Do	—	—	—	—	—	—	—	69	69	81	—	—	—	—	—	—	—
DPa	85	—	—	—	—	—	—	92	102	106	—	—	—	—	—	—	—
BPau	59	—	—	63?	—	—	—	—	76	67	—	—	68	69?	—	70?	76
BDu	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
BDau	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
BSu	—	—	—	35	34	—	—	—	31	29?	—	—	—	—	—	—	—
Lru	—	—	—	—	—	—	—	486	—	—	—	—	—	—	—	—	—
BDru	—	—	—	—	96?	—	—	—	—	—	—	—	—	—	—	—	—
BDaru	—	—	—	—	88	—	—	—	—	—	—	—	—	—	—	—	—

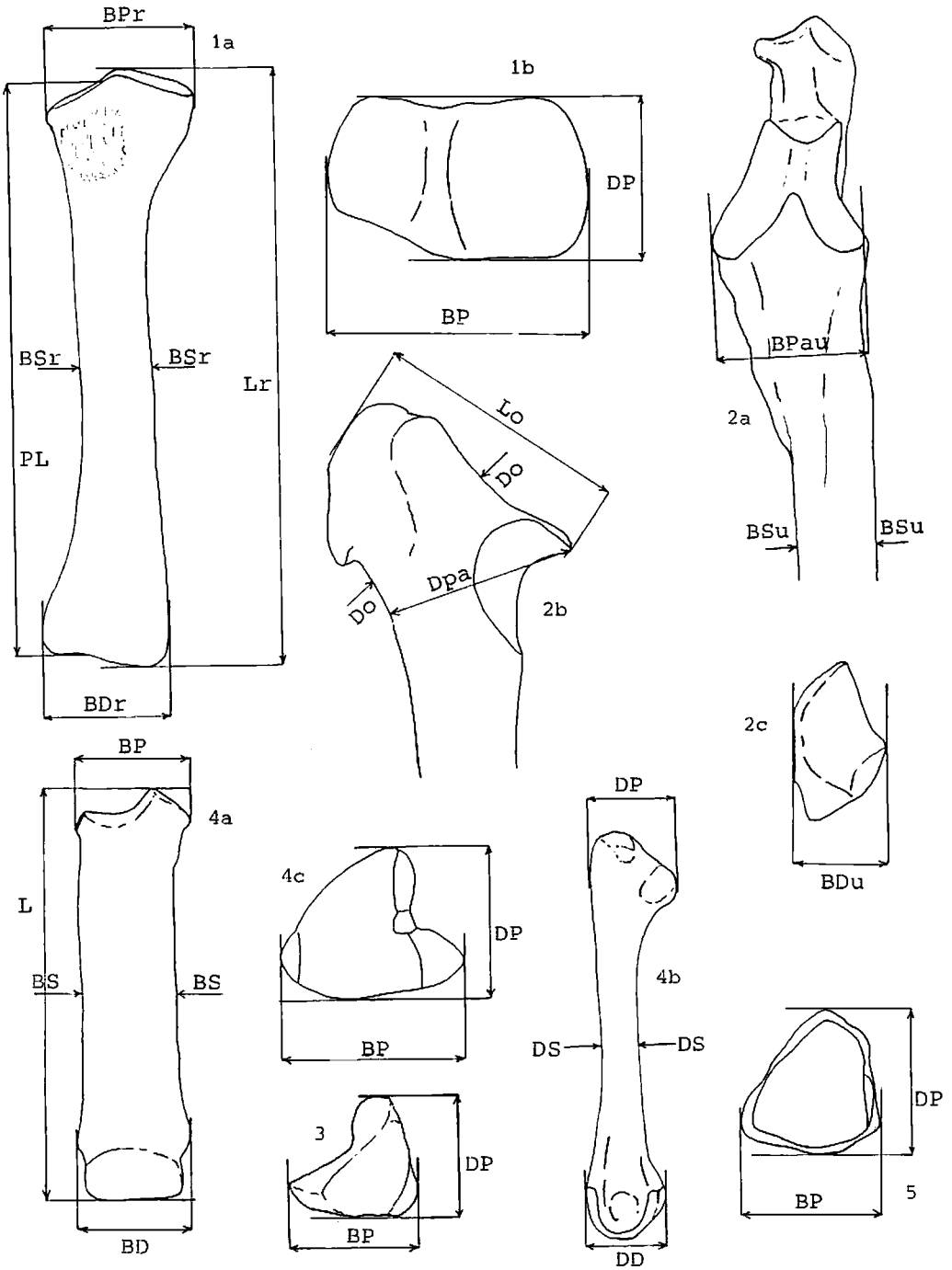

Fig. 6 - 1a - radius, anterior view; 1b - radius, proximal view; 2a - ulna, anterior view; 2b - ulna, medial view; 3 - right second metacarpal, proximal view; 4a - left third metacarpal, anterior view; 4b - left third metacarpal, lateral view; 4c - left third metacarpal, proximal view; 5 - right fourth metacarpal, proximal view.

apophysis at its rear end and by a broad, depressed, transversely concave and longitudinally slightly convex area in between.

In ventral view three surfaces, for the magnum, trapezoid and trapezium, are aligned and separated one from another by sharp and very protruding saliencies. The anterior surface, for the magnum, appears triangular-shaped, while the one for the

trapezoid is quadrate. They are both very concave latero-medially and rather convex antero-posteriorly. The last small facet is for the trapezium.

In lateral view the bone shows a dorsal and three ventral articular facets. The former, relative to the semilunar, is flat and about in shape of an overturned back-pointed asymmetrical V. Antero-dorsally it is connected with the just mentioned dorsal surface for the radius, of which it seems to be a smooth extension, while moving to the back the two surfaces appear separated by a distinct edge.

Moving backwards along the ventral margin of the lateral face of the bone we observe an elliptical, flat facet, again for the semilunar, connected with

Tab. 10

CHARACTERS	L	l	H	L art. sup.	l art. sup.	L art. inf.	l art. inf.
SPECIMENS							
○ IGF 716	79	52	62	34	48	55	27
○ IGF 488 v □	—	—	59	32	43	—	28?
○ IGF 2223 v	75	50	55	35	44?	49	27
○ IGF 2222 v	73	50	53	31	47	54	28
• IGF 1969	72	43	53	35	43	47?	26
• IGF 1968	73	51	65	34	50	53	28
• IGF 1966	72	44	54	33	36	49	25
• IGF 1967	73	51	54	33	47	53	28
▲ n. 13, g.c. n. 10	—	38?	51?	—	34?	53?	28

Tab. 11

CHARACTERS	L	l	H	H anat.
SPECIMENS				
○ IGF 716	70	51	49	50
○ IGF 488 v □	61	43	47	49
○ IGF 2225 v	61	45	45	47
• IGF 1965	61	47	45	48
• IGF 1964	60	47	43	46
▲ n. 13, g.c. n. 10	59	—	46	48

Tab. 12

CHARACTERS	DAP	DT	H
SPECIMENS			
○ IGF 716	34	44	48
○ IGF 2228 v	35	48	49
• IGF 1962	36	44	47
• IGF 1961	34	46	48
• IGF 1963	31	49	50

Tab. 13

CHARACTERS	L	l	H	H art.
SPECIMENS				
○ IGF 716	82	49	58	58
○ IGF 488 v □	—	45	—	—
○ IGF 2224 v	79	38	55	52
○ IGF 2226 v	—	45	—	58
○ IGF 2218 v	80	46	55	54
• IGF 4345	83	44	60	57

Tab. 14

CHARACTERS	l. abs.	L anat.	l	H
SPECIMENS				
○ IGF 716	87	71	65	51
○ IGF 488 v □	—	—	62	48
○ IGF 2219 v	85	59	58	48
○ IGF 2227 v	77	64	58	45
○ IGF 2221 v	81	53	61	44
• IGF 1953	82	61	61	45
• IGF 1954	83	65?	62	45

Measuring points of the carpus (Tabs. 10 to 14 and 50). Tab. 10 - scaphoid; Tab. 11 - semilunar; Tab. 12 - pyramidal; Tab. 13 - magnum; Tab. 14 - uncinate; Tab. 50 - trapezoid)

Guérin (1980) measurement schemes were followed in the present work in measuring carpal bones; characters were indicated with the same abbreviations used by Guérin to make comparisons easier.

Abbreviation have the following meaning: L: greatest length; l: greatest breadth; H: height; L artic. sup./L artic. inf.: length of the upper/lower articular surface; l artic. sup./l artic.: breadth of the upper/lower articular surface; L abs.: absolute length; L anat.: anatomical length; H artic. sup.: (in the magnum) height of the articulation taken at right angle to the distal articular surface; H anat.: anatomical height; DT: transversal diameter; DAP: antero-posterior diameter; For further information, see Guérin (1980).

the ventral articular surface for the magnum, a small lateral extension of the ventral surface for the trapezoid and, separated by a marked edge, a small, narrow, slightly concave ventro-laterally inclined extension of the ventral surface for the trapezium.

Semilunar (Tab. 11)

Also the semilunar is stretched antero-posteriorly.

In front view it appears rather triangular-shaped, transversely elongated in its dorsal portion and squeezed in the middle.

A latero-medially lengthened, very convex articular surface for the radius and the ulna characterizes the dorsal face of the bone. It is bounded at the extremities by two transversely disposed articular surfaces. The one at its medial end is for the scaphoid; it stretches backward bounding most of the upper inner face of the bone. The one at the lateral end, for the pyramidal, is small, elongated, flat, subtriangular in shape. Moving backward the dorsal articular surface gets abruptly narrow and concave; it stretches complessively over most of the front half of the dorsal face of the bone.

In medial view two articular surfaces for the scaphoid, a dorsal and a ventral one, can be observed. As already mentioned above, the dorsal surface extends along most of the upper margin of the bone. On the contrary the lower one is rather small, subelliptical in shape and barely concave. It is located along the front margin of a ventral antero-posteriorly elongated surface for the magnum. The latter surface, in ventral view, is separated from a somewhat advanced, deeply concave ventro-lateral facet for the uncinate by a very protruding crest in shape of an overturned Y.

On the lateral face of the bone another elongated articular facet is present along the rear dorsal margin of the just mentioned ventro-lateral surface for the uncinate. It stretches antero-posteriorly bending laterally outward at its rear end. It represents the articular surface for the pisiform.

Pyramidal (Tab. 12)

The pyramidal is rather compact, prismatic. In front view the pyramidal appears slightly higher than large. The posterior margin of the bone is characterized by a rather protruding and acute tuberosity.

The dorsal face of the bone is characterized by an antero-posteriorly concave and latero-medially convex, somewhat trapezoidal-shape articular surface for the ulna. Such a surface is connected with an articular facet extensively stretched on the lateral face and limitedly even on the rear face of the bone, that forms two dorso-ventrally elongated, slightly concave articular surfaces for the pisiform separated one from another by a rather marked edge.

Along the upper front margin of the medial face of the bone a very reduced, flat, crescent-shaped facet for the semilunar occurs. It is separated from the dorsal articular surface by an evident edge.

In ventral view a broad, concave surface for the uncinate can be observed. Such a surface is connected, though distinguished by a marked edge, with an elongated facet for the semilunar that borders the lower margin of the medial face of the bone as well as the lower medial margin of the posterior face.

The pisiform, trapezium and trapezoid of these limbs are lacking.

Magnum (Tab. 13)

The bone is very elongated antero-posteriorly and transversely flattened. In front view it has a somewhat rhombic aspect.

Dorsally a very protruding condyle can be noted, with a smooth sagittal articular surface for the semilunar. Laterally and medially to this condyle two other facets occur, both transversely enlarged in their frontmost portion. They are separated by a very protruding sagittal apophysis, anterior of the dorsal condyle. The lateral surface is relative to the uncinate; it stretches out along the antero-lateral margin of the dorsal condyle and bends anteriorly outwards. A barely distinguishable line separates it from the sagittal surface for the semilunar. A symmetrical correspondent of the lateral surface is the medial articular facet for the scaphoid. It is triangular, latero-medially stretched, transversely concave and longitudinally slightly convex in its front portion and more vertically arranged and more concave in its rear portion. This latter portion bounds the upper medial front half margin of the dorsal condyle.

In medial view the bone appears clearly arcuated with a thick fore portion, a thumb-like rear projection and a dorsal,semicircular, very protruding condyle. The just mentioned dorso-medial surface for the scaphoid makes transition, ventrally, to two other articular facets. The first is subtriangular in shape, concave and antero-posteriorly stretched; it is relative to the trapezoid and is separated from the dorso-medial surface for the scaphoid by a distinct edge. More ventrally, separated by a bland relief, we meet a convex, crescent-shaped facet for the second metacarpal.

In ventral view we find a very broad ear-shaped surface for the third metacarpal. It is antero-posteriorly concave in its rear half, while in its front half it appears latero-medially convex. Two sharp edges separate it laterally from the dorso-lateral surface for the semilunar and medially from that for the second metacarpal.

Uncinate (Tab. 14)

Only the right uncinate is present.

The uncinate is a big, antero-posteriorly flattened bone with a very strong, protruding, thumb-shaped rear process. It is characterized by two transversely sloping dorsal articular surfaces, separated by a very salient, sharp apophysis, that give a roof-like aspect to its upper margin in front view. Of these two surfaces the lateral one, in dor-

TAB. 15

CHARACTERS	L	BP	DP	BPa	BD	DD	BDa	DDa	BS	DS
SPECIMENS										
○ IGF 716	166	44	32	39	39	37	31	37	31	19
○ IGF 488 v □	—	—	—	—	41	—	33	37	—	—
○ IGF 2230 v	—	46	40	—	—	—	—	—	—	—
○ IGF 1355 v	173	43	39	39	40	37	33	37	33	37
• IGF 1935	—	41	37	37?	—	—	—	—	36?	15?

TAB. 16

CHARACTERS	L	BP	DP	BD	DD	BS	DS
SPECIMENS							
○ IGF 716	200	53	—	58	42	48	20
○ IGF 488 v □	189	49	—	59	39	44	17
○ IGF 1355 v	200	53	45	54	41	45	19
○ IGF 2231 v	—	53	39	—	—	47?	18?
• IGF 1928	—	52	43	—	—	—	20?
• IGF 1925	197?	—	—	—	—	—	—
• IGF 1926	—	58	42	—	—	—	17?
• IGF 1926	194	51	45	54	39	49	20
• IGF 1929	—	—	—	58?	—	48	—

TAB. 17

CHARACTERS	L	BP	DP	BD	DD	BDa	BS	DS
SPECIMENS								
○ IGF 716	165	37	37	42	39	33	32	17
○ IGF 488 v □	161	38	37	42	37	33	30	16
○ IGF 2232 v	169	43	38	46	39	35?	39	20
• IGF 1945	176	40	41	42	36	36	36	19
• IGF 1944	157	37?	40	40	36	32	35	17
• IGF 1946	—	—	—	37	35	34	34	19
• IGF 1949	—	—	—	—	—	—	39?	—
• IGF 1948	—	36?	29?	—	—	—	37?	12?
• IGF 1936	149?	38?	32	33	34	32?	32	21
• IGF 1947	—	39	31?	—	—	—	36?	17?

Measuring points of the metacarpals (Tabs. 15 to 17; Fig. 6): Tab. 15 - second metacarpal; Tab. 16 - third metacarpal; Tab. 17 - fourth metacarpal

L: length; BP: breadth of the proximal epiphysis; DP: depth of the proximal epiphysis; BPa: breadth of the proximal articular surface; BD: breadth of the distal epiphysis; DD: depth of the distal epiphysis; BDa: breadth of the distal articular surface; DDa: depth of the distal articular surface; BS: breadth of the shaft; DS: depth of the shaft.

sal view, is broader, quadrangular and very convex antero-posteriorly; it is relative to the pyramidal. The medial surface, for the semilunar, is subtriangular, mostly flat or barely convex except for its medial vertex that is raised.

Ventrally the bone shows a very developed, continuous articular surface that stretches out transversely all along its ventral face with exclusion of the rear process. Moving medially from its lateral end the surface appears, at first, wide and very convex in its lateral half, which takes part in forming the articulation with the fourth metacarpal; then it

bends backward, assuming an arched aspect and becoming narrow and rather flat in the portions relative to the third metacarpal and the magnum.

Second metacarpal (Tab. 15)

Only the right second metacarpal is present.

The bone appears somehow transversely flattened at its proximal end and little more bulky at its distal end. The dorsal articular facet for the trapezoid is subtriangular in shape, latero-medially concave and rather convex antero-posteriorly. It is separated from a lateral articular surface for the magnum and the third metacarpal by a very prominent, sharp edge. The lateral surface is in shape of on overturned horse-shoe with expanded front and rear portions connected by a narrow horizontal surface.

Most of this lateral surface takes part in forming the articulation with the magnum; only a small ventral portion of its anterior expansion, distinguished from the rest of the articular surface by a bland antero-posterior relief, forms the articulation with the third metacarpal.

A modestly prominent dorso-medial tuberosity is present at the proximal end of the anterior face of the bone.

The shaft seems quite elliptical in its cranial half and turns rather more rounded distally; in like manner, its antero-lateral border appears a little more angular proximally than distally.

In rear view the shaft is characterized by two parallel grooves that grow increasingly deeper towards the distal end of the bone, ending at the dorsal margin of the distal articulation.

In the right second metacarpal in place of the rear grooves, a wide deep depression occurs just over the distal articulation.

The distal articular surface has an asymmetrical aspect. Its front labium is smooth and swollen, while a relief appears on its ventral face and extends backward separating a large and bulging medial condyle from a weaker lateral one.

The lateral ligament fossette is far deeper than the medial one.

Third metacarpal (Tab. 16)

The distal half of the left third metacarpal is lacking.

This very important metapodial is long and straight. It appears rectangular-shaped in front/rear view and quite antero-posteriorly flattened in its shaft in latero-medial view.

In front view the surface of the bone is smooth and levelled off, all but at its proximal end where a broad prominent dorso-medial tuberosity occurs. The widest of the articular facets present at the dorsal end of the third metacarpal is that relative to the magnum. It appears subtriangular in shape, very concave transversely and antero-posteriorly convex. A very strong saliency separates it from a small latero-dorsally inclined subtriangular-shaped front surface for the articulation with the uncinate. This latter surface, in lateral view, is separated ventrally from a little flat crescent-shaped facet for the articulation with the fourth metacarpal by a blunt relief.

Another rear surface for the articulation with the fourth metacarpal is also present in lateral view. It is elliptical, dorso-ventrally stretched and much wider and longer than the front one; a sharp relief separates it from the dorsal surface for the magnum. Along the medial side of this articular surface for the magnum a small, antero-posteriorly lengthened facet for the second metacarpal is present.

The distal articulation is far more symmetrical than those of the other metacarpals. It does not appear so swollen, in front view, as that of the second metacarpal, but rather flat and wide. An intercondyloid relief stretches from the ventral face of the distal articulation backwards, getting increasingly more developed.

Two deep broad symmetrical grooves that carve the distal end of the rear face of the shaft, right over the margin of the distal articular surface, fade out abruptly upward. A bland relief seems connecting the ventral border of the rear articular surface for the fourth metacarpal with the distal portion of the lateral margin of the bone in posterior view.

Both ligament fossettes are quite deep.

Fourth metacarpal (Tab. 17; Pl. 9, fig. 3)

Only the right fourth metacarpal is present.

The shaft appears rather arched forward and somewhat transversely flattened in its upper half, which makes the bone easily recognizable among the metacarpals. A broad subtriangular surface for the articulation with the uncinate is present at its dorsal end; it is transversely concave and antero-posteriorly convex.

In medial view at the dorsal end of the bone we can observe two articular facets, a front and a rear

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Measuring points of the phalanges (Tabs. 18 to 26 and 41 to 49; Fig. 10): Tab. 18 - first phalanx, first finger, hand; Tab. 19 - second phalanx, first finger, hand; Tab. 20 - third phalanx, first finger, hand; Tab. 21 - first phalanx, second finger, hand; Tab. 22 - second phalanx, second finger, hand; Tab. 23 - third phalanx, second finger, hand; Tab. 24 - first phalanx, third finger, hand; Tab. 25 - second phalanx, third finger, hand; Tab. 26 - third phalanx, third finger, hand; Tab. 41 - first phalanx, first finger, foot; Tab. 42 - second phalanx, first finger, foot; Tab. 43 - third phalanx, first finger, foot; Tab. 44 - first phalanx, second finger, foot; Tab. 45 - second phalanx, second finger, foot; Tab. 46 - third phalanx, second finger, foot; Tab. 47 - first phalanx, third finger, foot; Tab. 48 - second phalanx, third finger, foot; Tab. 49 - third phalanx, third finger, foot.

First and second phalanges: L: length; BP: breadth of the proximal end; DP: depth of the proximal end; BPa: breadth of the proximal articular surface; BD: breadth of the distal end; BDa: breadth of the distal articular surface;

BS: breadth of the shaft; Third phalanges: L: length; B: breadth; Ba: breadth of the dorsal articular surface; Da: depth of the dorsal articular surface; Ls: length of the solea; H: height

TAB. 18

CHARACTERS	L	BP	DP	BPa	BD	BDa	BS
SPECIMENS							
♂ IGF 716	44	41	37	31	38	33	37

TAB. 19

CHARACTERS	L	BP	DP	BPa	BD	BDa	BS
SPECIMENS							
♂ IGF 716	35	39	28	35	30	26	37

TAB. 20

CHARACTERS	L	B	Ba	Da	Ls	H
SPECIMENS						
♂ IGF 716	37	62	38	20	34	24

TAB. 21

CHARACTERS	L	BP	DP	BPa	BD	BDa	BS
SPECIMENS							
♂ IGF 716	48	51	35	40	45	43	45
♂ IGF 488 v □	40	45	34	41	40	40	41

TAB. 22

CHARACTERS	L	BP	DP	BPa	BD	BDa	BS
SPECIMENS							
♂ IGF 716	36	50	26	43	43	39	50
♂ IGF 488 v □	30	48	25	42	42	40	48

TAB. 23

CHARACTERS	L	B	Ba	Da	Ls	H
SPECIMENS						
♂ IGF 716	31	—	38	20	33	23

TAB. 24

CHARACTERS	L	BP	DP	BPa	BD	BDa	BS
SPECIMENS							
♂ IGF 716	39	41	36	30	32	32	38
♂ IGF 2240 v	40	44	40	31	36	31	37

TAB. 25

CHARACTERS	L	BP	DP	BPa	BD	BDa	BS
SPECIMENS							
♂ IGF 716	33	38	28	32	27	—	—
♂ IGF 488 v □	33	35	25	32	30	26?	32

TAB. 26

CHARACTERS	L	B	Ba	Da	Ls	H
SPECIMENS						
♂ IGF 716	36	63	39	22	23	31