

June 23, 1846.

Harpur Gamble, Esq., M.D., in the Chair.

Professor Owen read a Memoir (Part II.) on the *Dinornis*, descriptive of parts of the skeleton transmitted from New Zealand since the reading of Part I. (Proc. Zool. Soc., November 1843.)

The bones referable to species defined in that communication were first described. Among these were the cranial portion of the skull of *Dinornis struthoides* and a corresponding portion of the skull of *Dinornis dromioides*, which in general form more resembled that part of the skull of the Dodo than of any existing bird; but they are remarkable for the great breadth of a low occipital region, which slopes from below upwards and forwards; the almost flat parietal region is continued directly forwards into the broad sloping frontal region; the temporal fossæ are remarkably wide and deep; the orbits small; the olfactory chamber expanded posteriorly, but not to so great an extent as in the Apteryx; the plane of the foramen magnum is vertical. Many other characteristics in the cranial organization of the genus *Dinornis* were described, and the specific distinction of the two mutilated crania pointed out.

The tympanic bone of the *Dinornis giganteus* was described in detail and compared with the same bone in existing birds.

Different cervical and dorsal vertebræ, referable to the species *Din. giganteus*, *ingens*, *struthoides* and *crassus*, were described. These vertebræ were remarkably entire, and with some of the best-preserved bones of the extremities, described in a subsequent part of the Memoir, had been obtained from a turbary formation on the coast of the Middle Island, near Waikawaite.

One of the most interesting of the novel acquisitions from this locality was an almost entire sternum, referred by Prof. Owen to the *Din. giganteus*. It is a subquadrate, keel-less, shield-shaped bone, broader than long, with the posterior angles and the xiphoid process prolonged, as in the Apteryx, but without the anterior emargination. The coracoid depressions very small. This bone was minutely described and compared with the keel-less sternums of the existing Struthious birds; that of the Apteryx being demonstrated to be most like the sternum of *Dinornis*.

The following bones of the extremities, imperfectly or not at all known in 1843, were next described:—

The entire femur of *Dinornis giganteus*. Entire tibiæ and tarso-metatarsi of *Din. giganteus*, indicating a robust variety of this stupendous bird to have existed in the Middle Island.

The tarso-metatarsus of *Dinornis ingens* from the North Island, distinguished by a rough depression indicative of a fourth or back-toe, and consequently a genus (*Palapteryx*) distinct from *Dinornis*.

Femora, tibiæ and tarso-metatarsi of a *Dinornis* of the height of the *Din. ingens*, but of more robust proportions, from the Middle Island; with a feeble indication of a surface for a back-toe.

The tibiæ and tarso-metatarsi of *Dinornis (Palapteryx) dromioides* from the North Island, confirming by their long and slender proportions the conjecture hazarded in the author's former memoir (*Zool. Trans.* vol. iii. pp. 252, 264). The tarso-metatarsus also shows the rough elliptical surface for the attachment of the back-toe, indicating the *Din. dromioides* to belong to the same generic or subgeneric section as *Din. ingens* from the North Island.

*Femora, tibiæ and tarso-metatarsi*, from the Middle Island, were next exhibited and described, which establish a new species, for which Prof. Owen proposed the name of *Din. casuarinus*: a small and feeble depression, five lines by three lines, indicates that this species had a back-toe in the corresponding position with that in the *Apteryx*, but more rudimental.

A very remarkable femur and tarso-metatarsal bone, also from the Middle Island, were exhibited, belonging to an additional tri-dactyle species, to which the name of *Dinornis crassus* was given. Of this species the author remarks: "With a stature nearly equal to that of the Ostrich, the femur and tarso-metatarsus present double the thickness in proportion to their length. It must have been the strongest and most robust of birds, and the best representative of the pachydermal type in the feathered class."

The third new species is comparatively a small one, being intermediate in size between the *Dinornis didiformis* and the *Din. otidiformis*; it was founded on remains exclusively from the North Island, and was called by the author *Dinornis curtus*.

The author expressed his grateful acknowledgments to the following gentlemen, to whom he was indebted for the opportunity of examining and depicting the specimens described in the present Memoir:—Capt. Sir Everard Home, Bart., R.N.; the Hon. William Martin, Chief Justice of New Zealand; the Rev. Archdeacon Williams, Corr. Memb. Z. S.; William Swainson, Esq., F.R.S., F.L.S., the distinguished naturalist; Colonel William Wakefield; J. R. Gowen, Esq., a Director of the New Zealand Company; the Rev. William Cotton, M.A.; the Rev. Richard Taylor, M.A.; the Rev. William Colenso, M.A.; Dr. Mackellar; George Bennett, Esq., F.L.S., and Percy Earl, Esq.

The paper (which was illustrated by numerous figures) concluded by some general comparisons and remarks on the geographical distribution of the different species of *Dinornis*, and with the following Table of admeasurements of the bones of the leg:—

## TABLE OF ADMEASUREMENTS

## Dimensions of

	Din. giganteus.	Din. ingens.		Din. crassus.
	in. lin.	<i>n. robustus. f 2.</i> in. lin. in. lin.		in. lin.
Length .....	16 0	13 9	13 0	12 0
Breadth of proximal end (in the axis of the neck) .....	6 0	5 5	4 10	5 0
Breadth (transverse) of distal end .....	6 3	5 10	5 2	5 3
Circumference of middle .....	7 9	7 1	6 1	6 8

\* Perhaps not quite enough allowed

## Dimensions of

	Din. giganteus.		Din. ingens.	
	<i>t</i> 1. in. lin.	<i>t</i> E. in. lin.	<i>t</i> 2. in. lin.	<i>t</i> E 1. in. lin.
Length .....	35 0	35 0	29 0	28 9
Breadth of proximal end .....	7 6	7 0	6 2	6 6
Breadth of distal end .....	4 0	4 8	3 7	4 0
Circumference of middle .....	6 6	6 6	5 3	6 3
Fibular ridge extends down .....	13 0	13 0	12 0	12 0

## Dimensions of

	Din. giganteus.		Din. ingens.	
	<i>m</i> 1. in. lin.	<i>m</i> E. in. lin.	<i>m</i> E. <i>Colenso.</i> <i>n. robustus.</i> in. lin. in. lin.	
Length .....	18 6	18 0	14 6	13 9
Circumference at the middle of the shaft .....	5 6	6 0	5 6	4 6
Breadth (transverse) of distal end .....	5 1*	6 0	5 6	4 6
Breadth of middle of shaft .....	1 11	2 2	1 10	1 7
Thickness or antero-posterior diameter of ditto .....	1 6	1 6	1 5	1 3
Breadth (transverse) of proximal end .....	0 0	4 6	4 3†	3 6

\* The margins being broken and water-worn, I had not allowed sufficient for the entire bone.

† Perhaps not enough allowed for

Average Dimensions of Bones of *Dinornis* in

	Din. giganteus.	Din. ingens.	Ostrich.	Din. crassus.
	in. lin.	in. lin.	in. lin.	in. lin.
Length of femur .....	16 0	13 6	11 0	12 0
Circumference of ditto .....	7 3	6 10	5 3	6 8
Length of tibia .....	35 0	28 10	18 6	....
Circumference of ditto .....	6 6	6 0	4 3	....
Length of metatarsus .....	18 6	14 0	16 0	8 6
Circumference of ditto .....	5 6	5 0	3 7	4 8

## OF THE BONES OF THE LEG.

## the Femora.

Din. struthoides.		Din. casuarinus.		Din. dromioides.			Din. didiformis.			Din. curtus.	Din. otidiformis.
<i>f</i> 12. <i>f</i> Colenso.		<i>f</i> 13. <i>f</i> E.		<i>f</i> 6. <i>f</i> 16. <i>f</i> Taylor.			<i>f</i> 8. <i>f</i> 7. <i>f</i> 17.				<i>f</i> 10.
in. lin.	in. lin.	in. lin.	in. lin.	in. lin.	in. lin.	in. lin.	in. lin.	in. lin.	in. lin.	in. lin.	in. lin.
11 0*	12 0	9 6†	10 4	9 4†	9 6	9 7	8 0	8 0	8 1	0 0	0 0
4 2	4 2	3 5†	3 11	3 6	3 6	3 6	2 10	3 0	3 3	0 0	0 0
4 3	4 4	3 9	4 4	3 7	3 7	3 8	3 3	3 2	3 6	0 0	0 0
5 6	5 6	5 0	4 9	4 1	4 0	3 10‡	4 0	4 0	4 3	2 9	2 1

for mutilated extremities.

† Ib.

‡ Ib.

## the Tibiæ.

Din. crassus.	Din. struthoides.		Din. casuarinus.	Din. dromioides.	Din. didiformis.			Din. curtus.	Din. otidiformis.
	in. lin.	in. lin.	in. lin.	in. lin.	<i>t</i> 3.	<i>t</i> 8.	<i>t</i> 9.	in. lin.	<i>t</i> 11.
.....	.....	.....	19 0	21 0	in. lin.	in. lin.	in. lin.	11 3	8 9
.....	5 6	5 4	5 6	4 8	15 6	15 4	15 4	3 3	2 0
.....	.....	.....	2 11	2 8	4 5	0 0	0 0	2 0	1 3
.....	5 0	4 8	4 9	4 0	2 4	0 0	0 0	2 9	1 11
.....	10 0	10 0	8 6	9 0	4 0	0 0	0 0	4 9	3 6
					6 10	0 0	0 0		

## the Tarso-metatarsals.

Din. crassus.	Din. struthoides.		Din. casuarinus.	Din. dromioides.	Din. didiformis.		Din. curtus.	Din. otidiformis.
in. lin.	<i>m</i> 3.	<i>m</i> E.	in. lin.	in. lin.	in. lin.	in. lin.	in. lin.	
8 6	12 0	11 6	8 0	10 5	7 0	6 10	5 0	
4 8	4 3	4 2	4 2	3 9	3 3	3 3	2 10	
4 0	4 0†	4 5	3 10	3 4	.....	3 0	2 5	
1 10	1 6	1 6	1 7	1 4	1 5	1 3	1 1	
1 2	1 1	1 1	0 10	0 10	0 9	0 9	0 7	
3 3‡	.....	3 5	3 0	2 10	.....	2 3	1 11	

† With a ridge at the middle of inner condyle at proximal end.  
water-worn margins of trochleæ.comparison with those of existing *Struthionidæ*.

Din. struthoides.	Emeu.	Din. casuarinus.	Din. dromioides.	Din. didiformis.	Din. curtus.	Din. otidiformis.	Apteryx.
in. lin.	in. lin.	in. lin.	in. lin.	in. lin.	in. lin.	in. lin.	in. lin.
11 0	9 0	10 2	9 6	8 0	0 6	0 0	3 9
4 2	3 7	4 9	4 0	4 0	2 9	2 1	1 0
25 0	16 10	19 0	21 0	16 3	11 3	8 9	5 3
5 0	3 4	4 9	4 0	4 1	2 9	1 11	1 3
12 0	15 0	8 0	10 5	7 0	5 0	.....	3 3
4 3	3 0	4 2	3 9	3 6	2 10	.....	0 0