THAL. VENUSTA.

Inhabits Costa Rica and the southern portion of Mexico. The only species of the genus yet discovered to the north of Panama.

THAL. VIRIDIPECTUS.

A beautiful species lately sent to Europe from the Caraccas near to the Andes.

THAL. VERTICEPS.

A species found only in my own collection. It frequents the wooded regions on the west side of Pichincha in Ecuador. Sent to me by Mr. Jameson.

THAL. GLAUCOPIS.

Hab. South Brazil.

THAL. WATERTONI.

This is the largest species of the genus and a very beautiful bird.

Hab. Demerara.

THAL. WAGLERI.

Hab. The hilly regions of Brazil, particularly Minas Geraes.

THAL. ERIPHILE.

This species also inhabits Brazil, and is generally sent in collections from Rio.

THAL. REFULGENS, n. sp.

A species very like *furcatus* in colour, but nearly as large as *Watertoni*. The under tail-coverts are steel-black; crown of the head velvety black; breast and shoulders beautiful purplish blue; tail black and considerably forked; wings purplish brown; throat rich metallic green.

Hab. ———?

January 27, 1852.

Professor Bell, F.R.S., in the Chair.

The following papers were read :—

1. NOTES ON THE EGGS AND YOUNG OF THE APTERYX, AND ON THE CASTS OF THE EGGS AND CERTAIN BONES OF *ÆPYORNIS* (ISID. GEOFFROY), RECENTLY TRANSMITTED TO THE ZOOLOGICAL SOCIETY OF LONDON. BY PROFESSOR OWEN, F.R.S., F.G.S., F.Z.S.

(Aves, Pl. XLVI.)

The Secretary placed upon the table casts of two eggs and of portions of the leg-bones of a gigantic bird of the Island of Madagascar, which had been presented by the Administration of the Garden of Plants in Paris to the Zoological Society of London, and on these Professor Owen made the following observations.

The casts were beautifully made and coloured, and were exact representations of the originals, which the Professor had examined during a visit to Paris in July last. These were received at the Garden of Plants in January last, and were described this day twelve-month (January 27th) in a communication made by M. Isidore Geoffroy-St.-Hilaire to the Academy of Sciences *. They had been obtained by the master of a merchantman at the Island of Madagascar in 1850, from the natives, who stated that one of the eggs had been found, entire, in the bed of a torrent, amongst the debris of a land-slip: a second egg, with some fragments of bone, was subsequently found in a formation which is stated to be alluvial: a third egg, which the natives had perforated at one end, and used as a vessel, was also obtained. This egg was fractured in the carriage; the other two eggs arrived entire.

They are nearly of the same size, but differ in shape, one being shorter but a little thicker, and with more equal ends than the other. The following are admeasurements of these eggs and of an Ostrich's egg:—

	<i>Æpyornis.</i>		<i>Ostrich.</i>	
	Ovoid egg.		Ellipsoid egg.	
	ft.	in. lin.	ft.	in. lin.
Greatest circumference:				
Lengthwise.	2	10 9	2	9 6
Breadthwise	2	4 3	2	5 6
Extreme length in a straight line	1	0 8	1	0 5
			0	6 4

M. Isidore Geoffroy estimates the larger of the two eggs to contain $10\frac{1}{2}$ quarts, or the contents of nearly 6 eggs of the Ostrich, or 16 of the Cassowary, or 148 of the Hen, or 50,000 of the Humming Bird. The portions of bones of which casts were exhibited consist of the lower end of the right and left metatarsal bones and the upper end of the right fibula. These are nearly equal in size to the corresponding parts of the skeleton of the *Dinornis*, as the following dimensions demonstrate:—

	<i>Æpyornis.</i>	<i>Dinornis giganteus.</i>	<i>Casuarus.</i>
	in. lin.	in. lin.	in. lin.
Extreme breadth across the trochlear condyles. . . .	5 0	5 6	2 3
Transverse diameter of shaft 6 in. above lower end† .	2 9	2 3	0 11½
Antero-posterior diameter of shaft 6 inches above lower end	1 3	1 5	0 7

In neither *Dinornis* nor *Æpyornis* is the metatarsus perforated, as in *Casuarus* and many other birds, above the interspace between the two outer condyles: that interspace is simply deeper, or curved higher in both. The outer trochlea, which is entire in both portions of the metatarsi in *Æpyornis*, is, in a marked degree, smaller than

* Comptes Rendus de l'Académie des Sciences, Jan. 27, 1851.

† One-third the length of the entire bone in *Dinornis giganteus*.

in *Dinornis*, as is also the inner trochlea, as far as one may judge from the posterior part which is preserved. The interspaces of the trochleæ are wider posteriorly in *Epyornis*, and the outer one is more angular at its upper end. The middle portion of the posterior surface of the lower third of the shaft of the metatars in *Epyornis* is more produced than in *Dinornis*, and a ridge is continued from it to each lateral trochlea, dividing the back part of the shaft above them into three surfaces; whereas the corresponding surface in *Dinornis* is simply flat from side to side. Above this part in *Epyornis* the posterior surface on each side of the middle prominence is concave and meets the anterior surface at a ridge, which is narrowest at the outer border of the bone. In *Dinornis* both borders of the lower third of the shaft are thick and rounded.

The *Epyornis* does not show any trace of the rough tract for attachment of a back toe, as in the *Palapteryx robustus*; in this respect it resembles the *Dinornis*.

At 6 inches from the lower end, the shaft begins to be concave along the middle of the fore part, the concavity deepening as it ascends; whereas in *Dinornis* the anterior median concavity of the shaft does not begin to appear until above the upper half of the bone. In this character the *Epyornis* resembles the Cassowary; but it differs from the Cassowary in the much narrower or sharper lateral margins of the shaft of the metatarsus. Like the Cassowary, however, the breadth of the shaft is greater in proportion to that of the trochleæ than in the *Dinornis* or *Palapteryx*.

It would be hazardous to conclude as to the length of the entire metatars from the breadth of the distal end; for this is equal in *Dinornis giganteus* and *Palapteryx robustus*, whilst the length of the metatars is 1 foot 6 in. in the one and 1 foot 4 in. in the other. I think it more probable, however, that *Epyornis* had a shorter than that it had a longer metatars than the *Dinornis giganteus*.

That its leg-bones were smaller is significantly indicated by the difference of size in the fibulæ.

	<i>Dinornis.</i>		<i>Epyornis.</i>	
	in.	lin.	in.	lin.
The longest diameter of the upper end . .	2	11	2	9
The shortest diameter of the upper end . .	1	4	1	0

This bone in *Epyornis* shows a flat, full, oval articular facet on its tibial side, of which there is no trace in *Dinornis*.

Upon the whole, therefore, Prof. Owen concluded that the *Epyornis maximus* did not surpass in height or size the *Dinornis giganteus*, and that it was more probably a somewhat smaller bird.

From the obvious differences which M. Geoffroy found on comparing these fragments with the casts of the metatarsus of the *Dinornis giganteus*, he has inferred with much probability not only its specific but generic distribution, and has proposed for it the name of *Epyornis maximus**. This distinction is illustrated not only by the metatarsal bones, but by the eggs themselves. Mr. Walter

* From *αίψις* alta, *ὄρνις* avis. The trivial epithet is hazardous, to say the least, with the results of the comparison with the above recorded.

Mantell, of Wellington, New Zealand, has recorded his observation of an egg of a *Dinornis* found in the volcanic sand, of the magnitude of which he endeavours to give an idea by stating that his hat would have been but large enough to have served as an egg-cup for it.

The fragments of the egg of *Dinornis* or *Palapteryx*—of what species, of course, cannot be determined—show, after arriving approximately at their size by the curve of the fragments, that the shell was not only absolutely thinner, but relatively much thinner than in the Ostrich, and *à fortiori* than in the *Æpyornis*. The air-pores, also, have a different form, being linear, not rounded; and the external surface is smoother.

In the smoothness and thinness of the shell, the egg of the *Dinornis* resembles that of the *Apteryx*: in the thickness of the shell and the comparative roughness of its exterior, the egg of the *Æpyornis* more resembles that of the Ostrich and Cassowary.

Such colour—a dull greyish yellow, as the *originals* of the eggs of the *Æpyornis* now at Paris show—may well have been derived from the recent alluvial soil in which it is stated that they were discovered: the darker stain on one part of the circumference of the larger egg seems to have been due to some accidental circumstance. Most probably they were originally white, like the eggs of the Ostrich, and like the fragments of the eggs of the *Dinornis*: whether an original green tint, like that of the egg of the Emu and Cassowary, would be wholly discharged by long continuance in the soil, may be a question.

It is most probable that the entire eggs of the *Æpyornis* were excluded in the usual fertile state, but had suffered such want or interruption of the heat requisite for their incubation as to have become addled.

How hazardous it is to judge of the size of a bird by that of its egg would appear, Prof. Owen observed, by the remarks which he should next proceed to offer on the eggs of the *Apteryx*. Of these the Professor exhibited one entire specimen, and a nearly fully incubated chick from a second egg, both of which had been most liberally transmitted to him by the Rev. Wm. Cotton, M.A., from the North Island of New Zealand.

Had it not been for the demonstration afforded by the chick itself, it might well have been doubted whether so small a bird could have excluded so large an egg. The following are the dimensions of the egg (Aves, Pl. XLVI.) :—

	Egg of <i>Apteryx</i> .		
	ft.	in.	lin.
Greatest longitudinal circumference	1	0	9
Greatest transverse circumference	0	10	0
Length	0	4	10
Breadth	0	3	2

The egg presents the usual long oval form, the colour a dull dirty greyish white; but this is partly due to grease stains from the decomposition of an incompletely hatched chick, with its yolk, within.

Viewed under a moderately magnifying power the surface presents a very fine fibrous, or spicular character; the raised lines, like spiculæ,

crossing in opposite directions, with air-pores scattered here and there and barely perceptible to the naked eye. The shell is not more than $\frac{1}{8}$ th of a line in thickness. Supposing, as is most probable, from the size of the bones of the *Æpyornis*, that it did not exceed the *Dinornis giganteus* in size, the egg of the *Æpyornis* is smaller in proportion to the bird itself than the egg of the *Apteryx* is in proportion to that bird.

The embryo *Apteryx*, which had been removed from its shell, had nearly reached the term of its incubation, the yolk-bag being reduced to a hernia-like appendage of an inch in length and half an inch in breadth, protruding about two lines in advance of the cloma, and covered by a continuation of the ordinary integument of the abdomen: the free end of the hernia was open, and exposed the ruptured ends of the allantoic vessels.

The whole body was clothed by down-fascicles, presenting the appearance of moderately thick cylindrical hairs, $1\frac{1}{2}$ inch in length, with a smooth, unbroken exterior, gradually tapering to a fine point. This smooth surface is due to an extremely delicate capsule, which when torn open exposes the down-tuft, consisting of a central stem with slender smooth barbs from 3 to 5 lines in length, diverging loosely from each side of the stem.

	in.	lin.
Length of the body from the base of the beak to the tail	4	0
Length of the beak	1	7
Length of the leg from the knee-joint	4	3
Length of the freely projecting part of the fore-limb from the elbow-joint	0	6

From these dimensions it will be seen that, with the characteristic large size of the unhatched young, in the genus *Apteryx*, the chief peculiarities of the remarkable external form of the bird had been acquired. The feet were very completely formed with well-developed claws, the small back claw presenting its characteristic proportions, and the integument of the naked part of the foot its well-marked dentations. The little wing-rudiments had their terminal hook. The tail presented the form of a short bifid prominence. The beak being comparatively soft, had become distorted and bent in the bottle of spirits in which the specimen was transmitted to the Professor, but it showed its characteristic shape, the terminal nostrils, and the slight terminal expansion, which forms the end of the crutch in the mature bird. The eyelids, with their cilia, and the orifice of the ear opening obliquely upwards, were rather larger in proportion than in the adult, according to the usual law of the precocious development of those organs of sense; and the same remark applies to the entire cranium. The neck is relatively shorter and thicker.

The young bird must be excluded unusually well developed, with a complete clothing very like that of the parent, and capable of using its limbs and beak for its own safety and support.