

III. Notice of a Fragment of the Femur of a Gigantic Bird of New Zealand.

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THE fragment of bone here described was placed in my hands for examination by Mr. Rule, with the statement that it was found in the island of New Zealand, where the natives have a tradition that it belonged to a bird of the *Eagle* kind, but which has become extinct, and to which they give the name of "Movie." Similar bones, it is said, are found buried in the banks of the rivers of New Zealand.

The fragment is the shaft of a *femur*, with both extremities broken off. The length of the fragment is six inches, and its smallest circumference five inches and a half. The exterior surface of the bone is not quite smooth, but is sculptured with very shallow reticulate indentations: it also presents some well-marked intermuscular ridges. One of these ridges (Pl. III. Fig. 1) extends down the middle of the anterior surfaces of the shaft to about one-third from the lower end, where it bifurcates: two other ridges, or *linear asperae*, traverse longitudinally the posterior or concave side of the shaft (Pl. III. fig. 2); that next the outer or fibular side of the bone is broad and rugged, the other is a mere linear rising.

The first and most obvious idea of the nature of this bone would probably be that it belonged to the human species, or to some of the larger domestic animals introduced into New Zealand by the settlers, for food or draught. It is, however, nearly double the circumference of the *femur* of an ordinary-sized man; it also differs in the greater expansion of the two extremities than would be presented by a section of the same length from any part of the shaft of a human *femur*, and by the interspace between the two longitudinal ridges at the posterior part of the bone: there being a single *linea aspera* in the corresponding part of the shaft of the human *femur*, where likewise the orifice of the ascending canal of the medullary artery is conspicuous.

From the *femur* of the *Ox* or *Buffalo*, the bone from New Zealand differs in its cylindrical form: in the *Ox* it is three-sided, and in the corresponding part of the shaft of the *femur* the *trochanter minor* would be included, of which there is no trace in the fossil; whilst, on the other hand, both the anterior and the two posterior longitudinal ridges are absent in the *femur* of the *Ox*: the difference between the bone from New Zealand and the shaft of the *humerus* of an *Ox* is still more striking.

A portion of the shaft of the *femur* of a Horse or *Ass*, corresponding in length with that of the bone here described, would have exhibited a portion of the small *trochanter*, as well as nearly the whole of the external or third *trochanter*, and of the deep and rough depression below this *trochanter*. The orifice of the medullary artery is as conspicuous in the *femur* of the *Horse* as in that of the *Ox*, on the outer and posterior part of the middle of the shaft.

The shaft of the *femur* in the *Hog* approaches more nearly in form to that of the fossil than the bones with which it has just been compared, but no species of *Sus* is now known to exist which presents a *femur* of equal size.

The exterior *linea aspera* is formed by a sharp angle which divides the outer from the posterior surface of the bone, both of which surfaces are nearly flat in the *Hogs femur*; the corresponding ridge, besides being less sharply developed than in the fossil, is situated more on the posterior side of the bone; the anterior bifurcating ridge is wanting in the *femur* of the Hog.

If the bone from New Zealand be compared with the *femora* of the *Camel* or *Llama*, as great differences present themselves as in the human *femur*; the single *linea aspera* on the middle of the posterior surface of the bone, and the perforation of the medullary artery upon or near that ridge, forbid an approximation of these large Ruminants with the fossil.

The *femur* of the *Kangaroo* is at once distinguished by the longitudinal tuberosity developed on the middle of the posterior part of the shaft.

The *femur* of the *Dog*, independently of its inferiority in size in the largest specimens of this quadruped, differs from the fossil in the absence of the anterior ridge, and in the presence of the medullary canal near the middle of the posterior part of the shaft. In order that no reasonable ground might remain for doubting the accuracy of the conclusion to which I have arrived in regard to the above-described bone, I have compared it with the long bones of other Mammalia approaching it in size, notwithstanding the improbability of their ever having found their way to the island of New Zealand. A section of the shaft of a *femur* of the *Grisly Bear*, and of other large species of *Ursus* corresponding in length and thickness with the fossil, does not give the expansion of both extremities, and is moreover flatter antero-posteriorly: the same difference is presented by the *femur* of the *Lion* and of other large species of *Felis*. The *femora* of both the two last-cited genera of Mammalia are characterized by the aperture of the medullary artery at the middle of the posterior part of the shaft. The *femur* of the *Ouran outang* differs at much as any of the preceding Mammalia from the fossil.

The differences between the fossil and the *humeri* and other long bones of the Mammalia above cited, are equally or more marked than in the *femora*.

The texture of the bone, which affords the chief evidence of its ornithic character, presents an extremely dense exterior crust varying from one to two lines in thickness: this then rapidly degenerates into a lamello-cellular structure of from two to three lines in thickness. The lamellae rise vertically to the internal surface of the dense wall, are directed obliquely to the axis of the bone, decussate, and intercept spaces which are generally of a rhomboidal form, and from two to three lines in diameter. This coarse cancellated structure is continued through the whole longitudinal extent of the fragment, and immediately bounds the medullary cavity of the bone, which is about one inch in diameter at the middle, and slightly expands towards the extremities. There is no bone of similar size which presents a cancellous texture so closely resembling that of the present bone as does the *femur* of the *Ostrich*; but this structure is interrupted in the *Ostrich* at the middle of the shaft, where the parietes of the medullary, or rather air-cavity, are smooth and unbroken. From this difference I conclude our extinct bird to have been a heavier and more sluggish species than the *Ostrich*; its *femur*, and probably its whole leg, was shorter and thicker. In no other *femur* resembling or approaching in form and size that of which the shaft is here described, have I found superficial reticulate impressions like those above described, except in that of the *Ostrich*. The *Ostrich's femur* is subcompressed, while the present fragment is cylindrical, approaching in this respect nearer to the *femur* of the *Emeu*: but its diameter is one-third greater than that of the largest *Emeu's femur* with which I have compared it. The bones of the extremities of the great *Testudo*

*Elephantopus* are solid throughout; those of the *Crocodile* have no cancellous structure like the present bone. The cancellous texture of mammiferous bones, again, is of a much finer and more fibrous character than in the fossil.

Although I speak of the bone under this term, it must be observed that it does not present the characters of a true fossil, being by no means completely mineralized: it has probably been on or in the ground for some time, but still retains much of its animal matter. The discovery of the relic of a large Struthious bird in New Zealand is one of peculiar interest, on account of the remarkable character of the existing fauna of that island, which still includes one of the most extraordinary and anomalous genera of the Struthious order, and because of the close analogy which the event indicated by the present relic offers to the extinction of the *Dodo* of the islands of the Mauritius and Roderigue. So far as a judgement can be formed from a single fragment, it seems probable that the bird to which the above-described bone belonged, presented proportions more nearly resembling those of the *Dodo* than of any of the existing *Struthonidae*. In the partially explored state of the islands of New Zealand it would be premature to pronounce the large struthious bird thus indicated to be extinct. The present notice, it is hoped, may tend to accelerate its discovery, if it be still in being, or may stimulate to the collection of the remaining parts of the skeleton, if the species no longer exists.