MEMOIR
ON THE
FOOD, NESTS, AND TRADITIONS
OF THE
MOAS (DINORNIS).

The generation of the natives of New Zealand has passed away who received the traditions of ancestors to whom the living Moas were familiar; but such traditions have been fortunately collected by colonists who have mastered the Maori dialects, and from these I have selected notices of the living habits, the food, and nidification of the now extinct species of Dinornis which seemed most worthy of addition to a scientific record of that singular genus of huge wingless birds.

It is scarcely necessary to remark that no evidence of this genus has been met with in any other part of the world than the islands now called "New Zealand."

Sir George Grey, K.C.B., in a letter to the Zoological Society of London, read 24th February, 1870, communicated interesting results of his intercourse with the Maoris, while Governor of New Zealand, and since his return to that colony as a resident in the North Island.

Sir George writes:—"The natives all know the word 'Moa' as describing the extinct bird; and when I went to New Zealand twenty-five years ago, the natives invariably spoke to me of the Moa as a bird well known to their ancestors. They spoke of the Moa in exactly the same manner as they did of 'the Kakapo' (Strigops), 'the Kiwi' (Apteryx), 'the Weka' (Ocydromus), and an extinct kind of Rails (Aptornis?, Notornis?) in districts where all these birds had disappeared." Sir George, who is an accomplished scholar in the melodious Polynesian dialect of the Maoris, proceeds to state:—"Allusions to the Moa are to be found in their poems, sometimes together with allusions to birds still in existence in some parts of the islands. From these circumstances, and from former frequent conversations with old natives, I have never entertained the slightest doubt that the Moa was found by the ancestors of the present New-Zealand race when they first occupied the islands, and that, by degrees, the Moa was destroyed and disappeared, as have been several other wingless birds from different
parts of New Zealand. For instance, in page 9 of ‘Ko nga Moteata, me nga Hakirara o nga Maori’ (one vol. 8vo, New Zealand, Wellington, 1853), you will find a man speaking of the death of his sons, who says, ‘Ka ngaro, i te ngaro, a te moa’ (‘they have disappeared as completely as the Moa’)."

This testimony is confirmed and supplemented by the devoted missionary, the Rev. Richard Taylor, in a paper read before the Wellington Philosophical Society, 6th November, 1872:—“Early in 1843 I removed from the Bay of Islands to Wanganui, and my first journey was along the coast of Waimate. As we were resting on the shore near the Waingongoro stream, I noticed the fragment of a bone, which reminded me of the one I found at Waiapu. I took it up, and asked my natives what it was. They replied, ‘A Moa’s bone, what else? Look around, and you will see plenty of them.’ I jumped up, and, to my amazement, I found the sandy plain covered with a number of little mounds entirely composed of Moa-bones; it appeared to me to be a regular necropolis of the race. I was struck with wonder at the sight, but lost no time in selecting some of the most perfect of the bones. I had a box in which my supplies for the journey were carried; this I emptied, and filled with the bones instead, to the amazement of my followers, who exclaimed, ‘What is he doing? What can he possibly want with those old Moa-bones?’ One suggested, ‘hei rongoa pea’ (to make medicine, perhaps); to this the others consented, saying ‘koia pea’ (most likely).”

The specimens so collected, which reached me through the kindness of Capt. Sir Everard Home, Bart., R.N., are acknowledged in my third communication on Dinornis (June 23rd, 1846) to the Zoological Society of London (ante, p. 118). Most of the specimens yielded acceptable confirmation of the species, founded on the collection of bones previously transmitted by the Rev. William Williams, the present Bishop of Waiapu (ante, p. 75). “They told me,” proceeds Mr. Taylor, “that these huge birds were formerly very abundant before the Europeans came, but they gradually diminished and finally disappeared. Their nests were made of the refuse of fern-root, on which they fed, and they used to conceal themselves in the koromiko (Veronica) thickets, from which they were driven and killed by setting the thickets on fire: hence originated the saying, ‘Te koromiko te rakau i Tunu ai te Moa’ (the Veronica was the tree which roasted the Moa).”

Sir George Grey adduces a similar testimony from another Maori source. In one of the native poems which he has collected in the valuable volume above cited, p. 324, are the following lines:—

"Kua rongo ‘no au,
Na Hikuao te Korohiko
Ko te rakau i tunua ai te Moa."

Which Sir George renders as follows:—

"'I have heard, indeed, that from Hikuao was the Korohiko, the tree or shrub with which the Moa was cooked.' Probably the meaning is, that the boughs, leaves, and flowers of that tree were used to cover up the flesh of the Moa in the oven where it was cooked. In the same poem the Weka is immediately afterwards alluded to" ¹.

The small flightless Rail (Ocydromus) is still designated by the Maoris by the name above recorded.

Confirmation of the traditional allusions to the food of the Moas is supplied by observations on the excrement found, together with bones, nests, and feathers of a Dinornis in a cavern explored by Taylor White, Esq. This cave is situated on a hill on the south side of Lake Wakatipu, Otago, South Island.

"Floor of fine powdered rock or sand, 9 inches deep, encrusted with crystals of sulphate of soda to 2 inches deep. Thirty feet from the entrance in the crust were scattered several double-shafted feathers, of a greyish-brown colour, 3 inches long. Height of cave here 3 feet 6 inches, width 6 feet ².

"Further in was a small collection of short sticks, fern broom, which might be the remains of a nest. Here the feathers were scarcer, and a metatarsus was found in good preservation, which measured 8 inches in length, 6¾ inches in girth at the proximal end, 3½ inches at thinnest part, and 8¾ inches in girth at distal end ³. Also portions of egg-shell, of a green colour, which appeared to be parts of a large egg.

"In both these places feathers of different birds were found, the greater number belonging to the Paroquet (Platycercus). These appeared to be generally nearer to the surface than those first mentioned.

"Close to the end of the cave were found a fibula, measuring 11½ inches in length, and 4⅝ girth at the proximal end, several vertebrae, and an upper mandible. All these belonged to the same bird.

"There were also bones of other kinds of birds, some of which were very delicate, together with a considerable number of pieces of egg-shell; these were white. Excrement of a large bird was also found, which extended to a greater depth than the feathers. Some of this consisted of undigested fragments of what looked like the stalk of the fern."

Additional evidences were obtained from another cave, in a range of hills south of the Gorge road, about a mile from Queenstown, Otago, difficult of access, the hill being almost perpendicular below the entry of the cave. This entry is 14 feet high by 5 feet wide.

"Floor of drift mica-sand, 2 feet deep, below which are blocks of schist; then comes a steep descent for about 60 feet, of the average height of 6 feet to 8 feet, and an average width of 6 feet. A thin white incrustation appeared here and there on the

¹ Proceedings of the Zoological Society, 1870, p. 117.
³ These dimensions indicate the Dinornis casuarinus.
roof, but no drip. On the floor of this cave was found a quantity of double-shafted feathers of a brown colour, with a light colour down the tube ('shaft'), most plentiful 1 foot below the surface (indicating the amount of drift-sand blown in since the deposition); they appeared to be chiefly in a layer of hard-trodden excrement. Perfect droppings were also found in the sand, and a few specimens of a similar outward appearance contained undigested vegetable fragments, some of which seemed to be branches and stalks of ferns, broken into short pieces of \( \frac{3}{4} \) of an inch in length. To the left of the mouth of the cave, a little higher up the hill, was a crevice of an angular form, about 5' wide and 15' deep, made by a forward slip of a portion of the hill. In this were found bones of a \( D. \) robustus, and of some smaller species, and a portion of a large egg." Mr. White conjectures, "The birds must have fallen or slipped in while examining its capabilities as a nesting-place."

Resuming the traditional evidence, I shall again quote from the interesting notes by the Rev. Mr. Taylor:—

"The last visit which I paid to Waingongoro was in 1866, in company with Sir George Grey. On our arrival there he asked me to show him the place where I discovered the great deposit of Moa-bones in 1843. I took him at once to the place, and to my astonishment I found the hillocks almost as thickly covered with bones as when I first saw them; the wind had uncovered the lower stratum since my former visit. A great number of these old ovens were opened; all of us worked in good earnest, and no one more heartily than the Governor. A large cloth was spread on the ground, and the various articles found were piled upon it. These were of a very miscellaneous character, consisting not only of bones of the Moa and fragments of its eggs, but of almost every other bird indigenous to these islands, including those of the Kakapo and Kiwi, with chert flakes, fragments of highly polished axes, and other articles. These ovens seem to have been made in a double line, and to have been used for many years, as each layer of ashes was separated by a thin stratum of sand from the one immediately below, and the number of them was very great. The natives informed me that when the Moa-hunt was to take place, notice was given to the neighbouring places, inviting them all to the battue. The party then spread out to inclose as large a space as possible and drive the birds from their haunts, then gradually contracting the line as they approached some lake or swamp, they at last rushed forward with loud yells, and drove the frightened birds into the water, where they could be easily approached in canoes, and despatched without their being able to make any resistance.

"These Moa-hunts were doubtless very destructive, as, from the number of men employed and the long lines of ovens, the slaughter must have been very great; and, in addition to this, from the large quantity of egg-shells, a clear proof is given that they were eagerly sought for and feasted upon. Thus the poor birds had little chance of continuing their race."
Mr. Taylor addsuce a plaintive Maori saying, in which the traditional knowledge of
the extirpation of the Dinornithidae is applied, as in the chant above quoted from
Sir George Grey—"'Kuāngaro a Moa te iwi nei' (the Maori, like the Moa, has passed
away)," remarking that "the Moa has passed away, and its hunters as well; and the
proverb is being fulfilled in the progressive diminution of their descendants."

Mr. John White¹, Interpreter in Government transactions with the Maoris, learnt
from them that, according to the traditions of their fathers, the Moas subsisted on the
young shoots of the fern (rarauhe), and on grasses growing on the margins of the
swamps, on young sprouts of the Karokia shrub, also on a water-plant called Puke-
kakeka; for this the Moa visited the lakes and pools near its native forests. "When
the Moa was hunted, the tracks made by it to visit the water were sought, and men
waited on these tracks to capture the bird. It is also said to live on fern-roots; the
good kind, called 'roi,' of which there are three sorts, are found near the edges of the
swamps, one on deep black soil, and one on the edge of the forests, which is called
'ronga.' This was dug up by the beak of the Moa, and was the food most eaten
by them."

The tracks observed by Dr. Hector on the mountains near Jackson’s Bay are such
as would be made by huge birds pushing through scrub. Along the sides of such
tracks the hunters would lurk to attack the birds in the manner described by
Mr. White.

"The Moa did not go in large flocks, but usually a male and female and their young;
hence the proverb, 'He whawhai tautau a Moa' (a fight between two and two, like
the Moa), indicative of the sexual combats which the Moa-hunters had seen between
the males of Dinornis.

"The nest was made by the bird collecting a heap of toi-toi or other grass, and in
the centre on the top lay the eggs.

"The last Moa-hunt remembered in the North Island was at or near Whatakene,
in the Bay of Plenty. The feathers of the birds killed there were, till a late period, in
the possession of a chief called Apanni, an uncle of the half-caste James Nulloon, who
was murdered by the Hauhaus at that place.

"At or a little before that hunt a Moa was killed on the plains near the foot of
the Ruahine mountains, N.E. of Waipukurau, at Napier.

"The Maoris admitted that their ancestors were afraid of the Moa, as a kick from
the foot of one would break the bones of the most powerful Brave; hence the people
made strong spears of 'maire' or 'manuka' wood, six or eight feet long, and the sharp
end of which was cut so that it might break and leave about six or eight inches of the spear
in the bird. With these the men would hide behind the scrub on the side of the track,
and when the birds were escaping from the fear of the noise of those who had driven
them from the lakes, those spears were thrown at them, thus sticking in the bird; the

¹ Trans. of the New-Zealand Institute (1875), vol. viii. p. 78.
scrub on the sides of the track would catch the spears and break the jagged end off, leaving it in the bird. As it had to pass many men, the broken spear-points thus put into the bird had caused it to yield in power when it had gained the open fern country, where it was attacked in its feeble condition by the most daring of the tribe.” To this rendering of the native tradition, Mr. W. T. L. Trowers, F.L.S., of Wellington, New Zealand, appends the following note:—“I may mention that a hill on the east coast, called ‘Karanga na Hape,’ is said to derive its name from the circumstance that Hape, a chief of the Arawa, pursued a wounded Moa up the hill side, and attacked it with a ‘taiaha,’ when the bird kicked him and broke his thigh, and he rolled down the hill”¹. The ‘taiaha’ is the axe or adze of green jade-stone. The obsidian flint afforded the trenchant knives for cutting up the bird. Of this mineral the Maoris noted four kinds:—the black, called ‘tuhua’; the light-coloured, called ‘waiapu’; the green, called ‘panetao’; and the red, called ‘kahurangi.’ “The first only was used in cutting up the Moa.”

From this act probably was derived the ancestral knowledge communicated to Mr. White, viz. that “the Moa swallowed stones, which the Maori says was only of a certain sort; and hence when they see a Turkey hone, or oil-stone, they call it ‘Moa.’ The stone used for polishing the Ponnamu is called ‘Hoanga Moa’ (the stones which the Moa swallows); also comes the saying, when a heap of stones are seen on a plain where no other stones are seen, ‘He tutal Moa’ (there is the Moa excrement).”

This saying is strongly confirmatory of the basis of actual observation on which the details on the native natural history of the Moas, collected by Mr. White, have rested.

That stone-heaps should be pointed out by Maoris as the excrement of a bird, would have excited in most unscientific settlers a scornful incredulity. But Moa-hunters may have seen such actually discharged, and would certainly, in opening the gizzard of a bird eviscerated prior to cooking, find such smoothly worn rounded pebbles as are described p. 337, and figured Plate XCII. fig. 9.

“Again, as the Maori after his arrival here was the cause of the extinction of the Moa, hence, when a tribe has been cut off by war, and not an individual has been saved, the tribe is said to be ‘Ngaro i te ngaro a te Moa’ (lost as the extinction of the Moa).”

¹ Tom. cit. p. 80.