

1. That the bones were a second time found collected at the end of a spur running into the swamp.

2. That there is again an unaccountable absence of skulls and neckbones.

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ART. XXXV.—*Discovery of Fossil, Moa-feathers in Rocks of Pliocene Age.*

By H. HILL.

[Read before the Hawke's Bay Philosophical Institute, 12th Nov., 1888.]

I BEG to bring under the notice of the Society a very interesting discovery made by me a few days ago. I refer to the finding of excellent specimens of fossil feathers in rocks which I think are pliocene, and, indeed, are so classed by the Geological Survey Department.

The place where the fossils were found is situated at Ormond, about ten miles north-west from Gisborne, in the Poverty Bay district. A range of hills bounds the northern part of the Poverty Bay plain. This range extends from the coast in a north-west direction, passing behind the Ormond township, and continuing to a point five miles or so further to the north-west, where it is cut through by the Waipaoa River, which empties itself in the bay. The hills behind Ormond, where the fossils were found, must be about 350ft. above sea-level. They are composed of blue clays, coarse sandy fossiliferous limestones, and pumice mud and sands, the latter being the highest beds. All the beds appear to rest conformably on one another, and they agree in stratigraphical arrangement with the beds exposed in a high bluff on the Whataupoko, opposite the town of Gisborne. The pumice-mud deposit is one of great interest, as it is from this deposit, which must be at least 100ft. in thickness, that the fossil feathers were obtained, together with a large collection of beautifully-preserved leaf-impressions, ferns, seeds, fishes (vertebrates), crabs, and other interesting specimens.

The pumice-mud is of a creamy whiteness, clayey to the touch; is free from grit of any kind; can be used like chalk for writing; can be slit like slate into thin plates, which will bend without fracture; and, lastly, it has a slaty cleavage. In places, however, the rock passes into coarse pumice-sand, and in others it becomes indurated, and has the appearance of a siliceous sinter. Last year, in a paper on the "Distribution of Pumice along the East Coast,"\* I referred to this deposit as

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\* "Trans. N.Z. Inst.," vol. xx., p. 293.

having found in it many varieties of fossil leaves, and it was then referred to by me as corresponding to the Kidnappers conglomerate and pumice-beds, which, in my opinion, form the youngest of the pliocene deposits in this district.

Professor Hutton, in vol. iv. of the "Transactions," gives a description and an illustration of a moa-feather, and in several particulars two of the feathers found by me in the above beds agree with the description referred to. Unfortunately, the top ends of two of the best specimens are missing. The feathers are about 4in. long, and the barbs are unconnected, as in the case of struthious birds. The barbules can be seen, but there are no other traces of bifurcations, nor is there any accessory plume, as in the case of many specimens of moa-feathers now known. The feathers differ from any of the illustrations in the "Transactions" in their being broader, in the basal part of the shaft being thicker, and possibly in the absence of barbs at the basal end, these not showing at the point where the shaft is broadest.

The other feather which I have is not such a perfect specimen as the above, and it appears to be of a different kind. It is about 2½in. in length, and is bent not unlike the small side-feathers to be seen in the Prince of Wales plume.

I do not think there can be any doubt as to the feathers here described having once belonged to a moa, and if such be the case it will place the history of that bird much further back in geological time than has hitherto been recognised. No scientific question has been more sturdily discussed in our "Transactions" and elsewhere than the date of the disappearance of the moa in New Zealand, one party maintaining that the moa has been so long extinct that no reliable traditions have been handed down, whilst yet another party supports the view that the moa became extinct in comparatively recent times. The case, however, is yet undecided, and we must wait for further evidence on this interesting subject before a final judgment can be entered. But in the long discussion which has been carried on no one, as far as I am aware, has hitherto produced any evidence likely to call in question the statement put forth by the late Sir Julius von Haast to the effect that "different species of *Dinornis* or moa began to appear and flourish in the post-pliocene period of New Zealand."\* The generalisation made by Sir Julius was based upon a wide experience and knowledge of the remains of moas found throughout the country, but it would seem to have been made without due consideration as to what the future testimony of the rocks might be on the subject.

The discovery of fossil feathers in pliocene beds offers suffi-

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\* See "Trans. N.Z. Inst.," vol. iv., p. 106.

cient evidence to prove the existence of struthious birds in this country anterior to the limit fixed by the late Sir Julius von Haast, but it does not follow that yet older remains or traces of the moa may not be found. The discovery has placed the geological record of the life-history of the moa one step farther back. It has extended the period of its existence in the country, and it has opened out the fact that in the matter of climate and productions the country has changed but little. Most of the varieties of leaves found with the feathers belong to species still common in the North Island. Some, however, are new, but further treatment of the subject must be deferred until a detailed description of the fossil flora and fauna can be obtained from those more capable than myself of expressing a judgment on these matters.

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ART. XXXVI.—*The Oil Prospects of Poverty Bay and District.*

By H. HILL.

[*Read before the Hawke's Bay Philosophical Institute, 12th Nov., 1888.*]

PLATE XXIV.

DURING the present year a good deal of interest has been aroused throughout New Zealand and the neighbouring colonies by the reported "striking of oil" at one of the many springs which are to be found along the east coast of this island. It is now twenty-three years since the first reported discovery of oil in the Poverty Bay district was made known in Napier. Ten years ago I visited the site of an abandoned well in the vicinity of Poverty Bay, where it had been anticipated that oil would flow like water; but at that time few traces remained of what had once been a scene of activity and hope. Since the date of my visit a number of attempts have been made to find a payable field in several places, but without success until early in the present year, when news reached Gisborne that oil had been struck in a new sinking, and that the engine-house, derrick, and adjoining buildings had been destroyed by an explosion of gas and oil from the new well.

Being in the Poverty Bay district shortly after the reported "striking of oil," I took the opportunity to visit the site of the South Pacific Company's well, so that I might judge for myself whether the oil prospects are equal to what had been reported in the papers. The locality of the South Pacific Company's well, and of another well in course of sinking, and known as the Minerva Company's well, is about twenty-eight