MOAS AND MOA HUNTERS.

Gentlemen,—When I had the honour to deliver to you last year the usual anniversary address, I earnestly hoped that you would elect for the next session another of your members as your President, but although I repeatedly acquainted you with my wishes in this respect, I had to give way to your urgent request to keep for this year the honourable position assigned me, for which, no doubt, many of the members of our Institute are, in many respects, much better qualified than I am.

In my address of last year, I pointed out how very desirable it would be to have scientific and technical education introduced among us to further the sound advancement of the province, and the members of the Philosophical Institute, by petitioning the General Assembly, and by several other means, have shown their anxiety for the same object. Hitherto however, no further steps have been taken by the authorities of the province, with the exception of the opening of the Canterbury Museum in a building of its own; but I have no doubt that the desire for the progress of the colony, and the wise liberality of the Provincial Council will, in due course of time, bring about the desirable improvement and addition to our educational machinery.

In a country like ours, with its resources only partly developed, with a great variety of fine and useful raw material, with a large and daily increasing agricultural population, and with magnificent and never-failing water power in every direction, every step tending to teach its inhabitants to make better use of their dormant resources is in the right direction; and New Zealand can only become great and truly independent when its growing population will have the means to obtain all those advantages which older countries now offer to their youth. Not that I wish for a moment to assert that scientific and technical education would offer a panacea for all shortcomings we have to contend with, because it is self-evident that many causes must combine advantageously to advance a nation, but it is one amongst others of which, I can truly say, that it has produced good results in other countries; and I am not going too far in stating that the advantages gained just now by one great nation over another, to the utter astonishment of the whole civilised world have, in many respects, only been obtained by the daily improving system, of which scientific and technical teaching forms a portion, through which all classes of the German nation have become more highly educated, whilst the French nation has remained comparatively stationary.

I should like to dwell somewhat longer upon this very important subject did I not fear I should weary you with it. I shall therefore devote the space of time allotted to me to some other subjects which have for a considerable number of years occupied my attention.

When a French savant in Amiens, Boucher de Perthes, announced to the world in 1847 that he had discovered in the gravels of the Valley of the Somme, rude flint implements, together with the bones of the mammoth, woolly rhinoceros, lion, cave bear, &c., an incredulous smile, if not more, passed over the faces of scientific men, geologists as well archæologists. Both considered it a settled point, that the huge pachydermata which at one time inhabited the European continent, were so long extinct, and the human race of such recent origin, that it was impossible they could be cotemporaneous. However, further researches in almost every European country have proved beyond a doubt that the French savant was right, and that these gigantic animals, although having been extinct for such a length of time that we have no means of calculating it even approximately, were nevertheless hunted and used as food by man, and were thus connected with the present age, showing conclusively that Europe has been much longer inhabited by the human race than was formerly supposed or admitted. If we turn now to the Southern Hemisphere, and especially to New

Zealand, we have to overcome the opposite difficulty, it having been generally asserted that the extinct gigantic birds formerly inhabiting these islands, and doubtless representing the huge pachydermata and other gigantic forms of the same geological period in the Northern Hemisphere, have only recently become extinct, that there were no original inhabitants in these islands, and that the different species of Dinornis only became extinct by the exertions of a race of new comers, who, not many hundred years ago, landed as immigrants on the coast of New Zealand. With your permission, I shall devote the next portion of my address to these interesting questions, which are so full of suggestive matter.

6. The pre-historic people in Europe have been divided into four great divisions, according to the nature of the tools they employed:—1. To the Palæolithic Period belonged those oldest inhabitants who used only flint and stone implements roughly chipped, without any attempt to polish them. 2. To the Neolithic, those who had already advanced a considerable step in art, and whose stone implements of well selected forms were, more or less, finely polished. 3. The Bronze Age included those nations who used bronze implements. And lastly—4. The Iron Age, those who, after the introduction of iron, almost exclusively empl yed this ore for the manufacture of their weapons and tools. Europe has been for many centuries in the last-mentioned age, whilst New Zealand at the time of the arrival of the Europeans was only in the Neolithic period, or that of polished stone implements, but there is ample evidence that the Palæolithic period, and with it a people most probably belonging to a different race from the present native inhabitants of these islands, had passed away together with the different Dinornis species, long before the Maoris settled here. I shall endeavour to prove these propositions by laying before you the main evidence I have been able to collect, but shall give you only the general results, leaving for some other occasion all the details in proof of my hypothesis, for which drawings, sections, and maps are necessary.

7. Our first step must be to inquire what geological evidence we have of the age of the Moa, or Dinornis, because if we are able to settle that important point satisfactorily, the age of the moa-hunting population, of which I shall speak more fully in the sequel, is also fixed with the same degree of certainty. Moa bones occur first in beds which have been formed during the glacier period of New Zealand, and the era immediately following it. The principal strata in which they are embedded are either lacustrine or fluviatile beds, situated between or immediately above the large morainic accumulations which mark the former extension of our enormous glaciers in Post-pliocene times. Some localities, such as the banks of the river immediately below Lake Tekapo, an old glacier bed surrounded by enormous moraines, have been always favourite resorts for obtaining moa bones in a good state of preservation. Similar beds in the neighbourhood of Lake Wanaka have also yielded them occasionally. Following down our large river courses towards the sea, these remains sometimes occur in their banks, either water-worn amongst the shingle, or in more perfect condition where they were preserved in silt, probably deposited in back waters or similar localities. It is evident that an enormous period of time must have elapsed, first to enable these large shingle masses to be deposited, forming our large plains; and afterwards, when the rivers retreated to higher sources and dwindled to smaller watercourses, to be cut through to such an extent that their contents became exposed to a depth of several hundred feet. From the observations we were thus able to make, the conclusion has been forced upon us that these gigantic birds must have been able to sustain life over a long period, because the same species which occur in the lower lacustrine and fluviatile deposits are again found in the bogs and swamps, in the fissures of rocks and in the kitchen middens of the moa-hunting race, which latter evidently mark the end of the Dinornis age.

8. As before observed, boggy grounds are also frequent localities for the preservation of moa bones, of which, amongst others, the comparatively small swamps near the Glenmark home station have yielded the richest harvest, and where, as it appears from observations made during my excavations, a great portion of the birds may have perished by becoming entangled in the swamp, either by accident or what seems to me more probable, from having been driven by fire or man into it in endeavouring to cross the valley. Another portion of the bones, together with driftwood of large dimensions, which had evidently been carried by floods into the swamp, were doubtless still connected by the flesh and ligaments when deposited, as no water-worn bones were found amongst them. Thus in some spots a complete leg of one specimen is found without any bones of the same individual near it, whilst the neck of another, or the pelvis of a third, each belonging to different species, lie close to it. However, I intend to lay before you at a future

meeting a detailed account of the results obtained during the Glenmark excavations, for which hitherto more pressing work has not afforded me the necessary time. I may be permitted to state here only a few of the facts bearing upon the subject under review. The Glenmark Swamp lies in a hollow of the Post-pliocene alluvium, skirting the hillsides. Its formation dates only from the end of the Post-pliocene period, when the alluvial beds were already existing. The Glenmark brook having afterwards cut a channel through these deposits, the whole mode of formation is well exposed. Close to the swamp in question, fluviatile deposits of a thickness of 30 feet, mostly silt and shingle, are laid bare, with here and there a small layer of peaty matter interstratified, pressed together by the superincumbent mass into a much smaller compass, and containing great quantities of moa bones. Thus we have here ample evidence that the different species of Dinornis existed already when the valley was first filled with debris brought down during the glacier period from the higher regions, and that they continued to flourish till not only was the valley filled with alluvium, but also, in their turn, the hollows in the latter became levelled by marsh vegetation, and by extraneous organic substances, such as drift timber and animal remains, washed into them by floods. Immediately below the Glenmark Swamp I obtained moa bones down to the water's edge of the brook, at least 30 feet below the level of the former, so that this alone convinces us that a long period must have elapsed between the formation of the first and last deposits. Higher up the little valley, the excavations of the rivulet have been on a still larger scale. Two miles above the homestead, in a cliff about 100 feet high, water-worn moa bones occur near the water's edge, amongst the Post-pliocene shingle, and in another locality about 20 feet from the summit of the cliff, in a peaty layer, a nearly complete skeleton was obtained. The hillsides above Glenmark station are covered with silt, looking like a lacustrine formation, which, in many cases, is also studded with moa bones. I may here observe that since my first excavations in Glenmark, and after the articulation of the different Dinornis skeletons in the Canterbury Museum, I have been so fortunate as to obtain single skeletons of almost every one of these species, some of them nearly complete, the bones lying still in situ, which, in every instance, have fully confirmed the correctness of these articulations. Moa bones are found abundantly in other localities, such as fissures or caves in limestone rocks, the neighbourhood of which appears to have been a favourite resort of the Dinornis, and the hills formed of drift-sands, which, from their nature, are well adapted to the preservation of the osseous remains of these gigantic birds.

We come now to another and more difficult question in connection with their extinction. It would appear, at least at first sight, that the different species of Dinornis, and even some of the largest must have been living in comparatively recent times, owing to the fact that moa bones have been found on the ground amongst the grass on the plains or between rocks and *debris* in the mountains. I must confess I have never observed any in such positions, except when it could be easily proved that they had been washed out either by heavy freshes from older deposits in cliffs, along river beds, or by the disappearance of the luxuriant virgin vegetation, consisting of high grass or bushes, the soil having been laid bare, so that its upper portion would speedily be washed away by the rain water. I have been repeatedly informed that in the neighbouring province of Otago, some plains, when first visited by Europeans, were strewed with moa bones. This account reminded me of a passage in Darwin's "Journal of a Naturalist," pages 167 and 168, where he mentions having observed, on the plains of Patagonia, near the banks of the Santa Cruz river, masses of bones perfectly intact, of the guanaco or wild llama, which, he supposes, must have crawled before dying beneath and amongst the bushes, as it were to a common burial ground; and that distinguished naturalist adds the following pertinent remark: —"I mention these trifling circumstances, because in certain cases they might explain the occurrence of a number of uninjured bones in a cave, or buried under alluvial accumulations, and likewise the cause why certain animals are more commonly imbedded than others in sedimentary deposits."

However, on further thought, I do not consider that a similar explanation could be offered for the occurrence of the moa bones on the plains, as I am led to believe that their exposure may be more properly traced to the agency of man, whose appearance in these islands, as everywhere else, must have brought about some very important physical changes on the face of the country. The burning or destruction of the luxuriant vegetation in valleys and on hills and plains, the diminution or even drying up of swamps which formerly retained the produce of the rain or of the melting snow much longer than at a later period have, as we could quote numerous instances to show, brought about many con-

siderable alterations on the surface and drainage of the country. One of the principal results of this action is the occurrence of much larger floods than those formerly experienced, the waters running off far more rapidly than they did when the thick virgin vegetation, together with the swamps and boggy grounds acted, as it were, like a sponge, retaining the moisture for a longer period. Another argument in favour of this supposition, that the Dinornis must have become extinct much earlier than we might infer from the occurrence of bones lying amongst the grass, is the fact proved abundantly by careful enquiries, that the Maoris know nothing whatever about these huge birds, although various statements have been made to the contrary, lately repeated in England ; however, as this question stands in close relation to the age of the moa hunting race, I shall leave it until I proceed to this portion of my task.

11. The testimony that moa bones have been found lying loose amongst the grass on the shingle of the plains, together with small heaps of so-called moa stones, where probably a bird has died and decayed, is too strong to be set aside altogether, or to be explained by the assumption that the bones became exposed, as I suggested before, through the original vegetation having been burnt so extensively. We are, therefore, almost compelled to conclude that the bones have in some instances never been buried under the soil, but remained lying on the surface where the birds died. I can, however, not conceive that moa bones could have lain in such exposed positions for hundreds, if not thousands, of years without decaying entirely. Even if we assume that the birds have been extinct for only a century or so, it is inconceivable that the natives, who have reliable traditions extending back for several hundred years, and of many minor occurrences, should have no account of one of the most important events which could happen to a race of hunters, namely, the extinction of their principal means of existence. At the same time, the pursuit of these huge birds to a people without firearms or even bows and arrows, although they might have possessed boomerangs or a similar wooden weapon, must have been so full of vital importance, excitement, and danger, that the traditions of their hunting exploits would certainly have outlived the accounts of all other events happening to a people of such character.

12. The Rev J. W. Stack, with whom I repeatedly conversed upon this subject, fully agrees with me that the absence of any traditions places an almost insurmountable obstacle in the way of our supposing that the moa bones found lying on the plains or hillsides are of such recent origin as their position at first might suggest. Some moa bones, broken or otherwise injured, but excavated in good condition from the Glenmark swamp, were left by me on the banks, where in a short time they became bleached by the sun. After a few years, when again visiting that locality, these bones had entirely disappeared, and only small decayed fragments indicated in a few places where the larger specimens had previously lain. Of course I am aware that these semi-fossil bones have not the same power of resistance as fresh ones, but nevertheless this rapid destruction ought to show us that, were they fresh bones they would not resist for any number of years the agencies at work—heat and cold, rain and frost,—without becoming totally destroyed. I do not know how long the bones of cattle and horses remain on the plains exposed to the atmospherilies without becoming entirely destroyed, but I imagine they would not last for a number of years. On the other hand, if we assume that all the bones which became exposed had been subjected to the action of fire and were thus in a calcined state, which would have prepared them to offer better resistance, I do not think that this could have preserved them for such a long period as we are obliged to believe that the Dinornis has been extinct. I may here add that at present moa bones and moa stones in the Canterbury plains are found only by digging ditches and ploughing, and that, as far as I am aware, no instance has occurred lately where they have been of superficial occurrence, so that the bones which were exposed 16 to 20 years ago have all disappeared.

13. From the occurrence of moa bones amongst morainic accumulations, it might appear that the moa existed in New Zealand only when the climate was different from that we at present enjoy in these beautiful islands, so much favoured by nature in this respect. In some other publications I have already treated of this subject, pointing out that at the present time in the morainic accumulations forming below the Francis Joseph glacier at the West Coast, and less than 700 feet above the sea level, the trunks and leaves of large pines and arborescent ferns are imbedded, together with the bones of Apteryx, Strigops, Nestor, and Ocydromus, from which the investigators of future days might conclude that these species had existed in a much colder climate than that of the West Coast of New Zealand at the present time. In the same way, having this interesting fact of the present day before us, we are debarred from believing that, from the former larger extent of the

New Zealand glaciers, the climate was much colder in similar positions, as far as regards aspect, altitude, and general orographical features, than it is at present. If we look, for instance, at the country at the southern base of Mount Cook, between the Tasman, Hooker, and Mueller glaciers, the outlets of which form the Tasman river, a luxuriant vegetation delights our eye, where certainly throughout the whole year the Dinornis would have found ample nourishment even close to the ice. I say so with more confidence, knowing that the locality referred to is now used as a ram paddock, always assuming that the sheep is not of a more hardy nature than those former inhabitants of the country.

14 Judging from the structural character of the different species of Dinornis, they must have inhabited the open country where such existed, and not the forest regions, where not only innumerable impediments to locomotion would have stood in their way, but where they also would probably have found little food suitable to them. In the term "open" I include plains and hill sides in the low lands covered with grass, fern, tutu (Coriaria ruscifolia), flax (Phormium tenax), and cabbage trees (Cordyline Australis), and the subalpine regions, with bushes—Spaniards (Aciphylla), wild Irishman (Discaria toumatou), and snow grasses. It has often struck me that to all appearance the greater portion of the luxuriant vegetation of New Zealand is of comparatively little service to the present fauna, whilst it would produce more harmony in the household of nature if we imagined that the seeds of the Phormium tenax (the New Zealand flax) of the Cordyline Australis (the cabbage tree), of the large species of Aciphylla (spear-grasses), the different species of Coprosma, and many other plants, had been at one time the favourite food of the Dinornis, whilst the roots of the Aciphylla, of the edible fern (Pteris esculenta), and several other plants, might have provided an additional supply of food when the seeds of the former were exhausted. Moreover, I have no doubt that the different species of Dinornis, like those of the Apteryx, were omnivorous, so that they did not despise animal food, and thus lizards, grasshoppers, and other insects might also have constituted part of their diet.

15 Another observation which I have been enabled to make convinced me that the Dinornis species remained generally in certain localities, being of stationary habits and not roaming over the country, and crossing rivers and mountains in quest of food. In collecting the crop-stones lying with the skeletons, I invariably observed that they must have been picked up in the immediate neighbourhood. Thus, to quote only a few instances. In the caves of Collingwood, all the moa stones are derived from the quartz ranges close by, in the Malvern hills from the amygdaloids of the same zone, and in Greenmark only from the chert rocks in the neighbourhood.

16 It has been the fashion to assert that the present native inhabitants of New Zealand, the Maoris, are the race who have hunted and exterminated the moa, and there are even Natives who declare that their fathers have seen the moa and eaten its flesh. If such assertions could be proved, our researches would have been much simplified. It will therefore be my duty to examine the data upon which such statements rest, and to bring in my turn what I consider overwhelming evidence to the contrary, namely that the forefathers of the Maoris not only have neither hunted nor exterminated the moa, but that they knew nothing about it.

17 The main authority quoted for the former assertion, that the Dinornis species are not long extinct, are the writings of Dr Mantell, the illustrious geologist, who in his various works, when speaking of the subject under review, gives his son's (the Hon. W. Mantell's) statements. Thus in "Petrifactions and their Teachings," London, 1851, p. 93, the following passage occurs: "The Maoris, or Natives, were acquainted with the occurrence of such bones long ere this country was visited by Europeans; and traditions were rife amongst them that a race of gigantic birds formerly existed in great numbers, and served as food to their remote ancestors. They also believed that some of the largest species had been seen alive within the memory of man, and that individuals were still existing in the unfrequented and inaccessible parts of the country. They called the bird moa, and stated that its head and tail were adorned with plumes of magnificent feathers, which were worn and much prized by their ancient chiefs as ornaments of distinction. The bones were sought for with avidity, and were used in the manufacture of lures for fishhooks and other implements."

18 Again, Dr Thompson, Surgeon, 58th Regiment, in a letter to Dr A. Smith, as quoted by Dr Mantell, when writing of the discovery of several caves containing moa bones, speaks of the same subject, page 104 of the same work:—"During the month of September, 1849, Servantes, the interpreter to the General here, was told by a native that he had discovered a cave in which were many bones of moas. I accompanied him in search of this place, and was rewarded by getting many curious specimens and several skulls with mandibles. The beak very much resembles that of the ostrich or emu. This cave is on

the west side of the North Island, in the limestone formation which extends along the coast. The country around is wild, and there are many similar caves, which, we were told, also contained bones. The popular opinion is, that the country has been set on fire by an eruption of Tongariro, and that all the moas fled to the caves for refuge, and there perished. From traditions and other circumstances it is supposed that the present Natives of New Zealand came to these Islands not more than 600 years ago. However this may be that the moa was alive when the first settlers came is evident from the name of this bird being mixed up with their songs and stories. One of the bones I obtained bore marks of having been cut or chopped, perhaps to get at the marrow."

It is evident that the statements of such observant scientific men as Messrs Mantell and Thompson deserve all attention and credence, the more so as both had such favourable opportunities to collect Native traditions, and consequently it was generally considered an undeniable fact that the Maoris had not only been cotemporaneous with the Dinornis, but had hunted them, and had also reliable traditions about them.

When I first observed the geological position of the moa bones in situ I began to doubt the accuracy of such statements, because it became clear to me that the huge birds were the representatives of the gigantic quadrupeds of the Northern Hemisphere in the Post-pliocene period. I mean to say that they have lived as far back from the present era as the mammoth, the rhinoceros, the cave lion, and cave bear, the bones of which are found in similar deposits in Europe. And as even the highest civilised nations in Europe have no traditions of the occurrence of these huge animals, it seemed to me highly improbable that a far inferior race, having advanced only to the state of those people representing the Neolithic period in Europe, could have retained traditions extending over such an immeasurably long period. The discovery of a fossil bone of Dinornis Australis in New South Wales, also in Post-pliocene beds, and resembling very much the Dinornis crassus of New Zealand, offers additional evidence of the great antiquity of these huge birds.

Being occupied in examining the contents of the large encampment of moa hunters at the mouth of the Rakaia, I applied to several of my friends in the colony, who, by their knowledge of Maori lore, had ample opportunity of forming an opinion upon the matter. I wrote to the Rev. William Colenso, who, as far back as 1838, or 33 years ago, began to devote much attention to the subject, and requested his assistance. He kindly forwarded to me a copy of the Annals and Magazine of Natural History of August, 1844, which contains an exhaustive paper, written by himself, bearing the title "An account of some enormous fossil bones of an unknown species of the Class Aves, lately discovered in New Zealand," and with which I was not previously acquainted. In this paper the author gives an excellent description of the moa bones in his possession, assigning to them their correct place in the classification of the avifauna. Mr Colenso also relates in the same publication the principal traditions of the Natives respecting the moa—that there was still one specimen in existence which lived in the Wakapunaka mountains, guarded by two Tuataras, gigantic lizards; that it was like a huge cock with the face of a man; that it lived on air and had wattles. The author, from the latter assertion, is inclined to believe that the Maoris, of Malayan origin, had still some tradition of the Cassowary, the only struthious bird having fleshy appendages. I cannot refrain from giving from that important paper the following passages bearing upon the subject, page 89 :—

"From Native traditions, we gain nothing to aid us in our inquiries after the probable age in which this animal lived; for although the New Zealander abounds in traditionary lore, both natural and supernatural, he appears to be totally ignorant of anything concerning the moa, save the fabulous stories already referred to. If such an animal ever existed within the time of the present race of New Zealanders, surely to a people possessing no quadruped, and but very scantily supplied with both animal and vegetable food, the chase and capture of such a creature would not only be a grand achievement, but one also, from its importance, not likely ever to be forgotten; seeing, too, that many things of comparatively minor importance are by them handed down from father to son in continued succession from the very night of history. Even fishes, birds, and plants (anciently sought after with avidity as articles of food, and now, if not altogether, very nearly extinct), although never having been seen by either the passing or the rising generation of aborigines, are, notwithstanding, both in habit and uses, well known to them from the descriptive accounts repeatedly recited in their hearing by the old men of the villages." And again, further on—"In fact, unless we suppose this bird to have existed at a period prior to the peopling of these islands by their present aboriginal inhabitants, how are we to account for its becoming extinct, and, like the Dodo, blotted out of the

ist of the feathered race? From the bones of about thirty birds found at Tauranga in a very short time, and with very little labour, we can but infer that it once lived in considerable numbers; and from the size of those bones we conclude the animal to have been powerful as well as numerous. What enemies then had it to contend with in these islands, where, from its colossal size, it must have been paramount lord of the creation, that it could have ceased to be? Man, the only antagonist at all able to cope with it, we have already shown as being entirely ignorant of its habits, use, and manner of capture, as well as utterly unable to assign any reason why it should have thus perished. The period of time, then, in which I venture to conceive it most probable the moa existed was certainly either antecedent or coetaneous to the peopling of these islands by the present race of New Zealanders." In his masterly essay "On the Maori Races of New Zealand," Mr Colenso briefly alludes to the same subject, affirming that he has not changed his opinion concerning the age of the Dinornis, and that he has never been able to obtain any reliable traditions concerning them.

22 The Rev. James W. Stack, who has also made careful inquiries in both islands, has come to the conclusion, after sifting the so-called traditions of the aborigines, that beyond the fact that the moa was a bird, and that its feathers resembled those of the Kiwi or Apterix, the Maoris do not possess any information about it. They, moreover, attribute its extinction to a great fire, called the fire of Tamatea, which they assert swept over the Canterbury Plains about 500 years ago, the smouldering remains of which, as they think, may still be seen in the gorge of the Rakaia. The so-called smouldering remains are, however, seams of brown coal in combustion, and this fact alone proves the legendary character of the tradition. The proverb "He moa kaihau" (a wind-eating moa) is the only trace which Mr Stack can discover in the sayings of the ancient inhabitants, relative to the existence and habits of these birds. If it is true, as I have been informed, that it is a favourite habit of the African ostrich to stand with its beak wide open towards the wind, such a coincidence in the habits of two allied terrestrial birds would be very curious, and would clearly show that although all other traces have been lost, the proverbial saying has outlived all past generations. Moreover, it would compel us to believe in its correctness. We might, however, trace it to the cassowary, as suggested by Mr Colenso in respect to the wattles.

23 Mr Alexander Mackay, Native Commissioner, who enjoys excellent opportunities of obtaining accurate information upon this and other subjects in reference to the Natives, has also made diligent researches. This gentleman informs me that there is not a single tradition amongst the Natives respecting the moa; in fact, that they know nothing about it. It seems evident to me that the present Native race, unable otherwise to account for the huge remains of the moa found sometimes washed out from the Post-pliocene alluvium, occurring in caves, &c., had recourse to miraculous legends. On comparing the moa bones with those of other living species of birds, they undoubtedly found that in their principal characteristics, they most resembled those of the kiwi or Apterix, which were sometimes mixed with them, and which fact may account for the tradition concerning the similarity of the feathers. But a still greater proof of the long extinction of the Dinornis, is the fact that all early voyagers, who had ample opportunities for observation, who assiduously collected specimens of the fauna and flora of both Islands, and noted down carefully the traditions of the Natives, never allude to the existence of the moa, nor do they speak of its osseous remains. Thus I looked in vain through the accounts of the three voyages of Captain Cook, of those of Captain Vancouver, Admiral d'Entrecasteaux, and of Captain King, but in all of these no trace of such traditions can be detected. Captain Cook, that admirable observer, who gives us such a faithful account of the animal life of New Zealand, made enquiries through his interpreter Tupia, during his first journey, concerning the Native traditions; on his second visit he obtained further intelligence from a Native chief in Queen Charlotte Sound, which is of such interest that I wish to transcribe it. Thus he says, in the "Voyage to the Pacific Ocean," vol. I., page 142: "We had another piece of intelligence of him (Taweiharooa), more correctly given, though not confirmed by our own observations, that there are snakes and lizards there of enormous size. He described the latter as being eight feet in length, and as big round as a man's body; he said they sometimes seize and devour men, that they burrow in the ground, and that they are killed by making fires at the mouths of the holes. We could not be mistaken as to the animal, for with his own hand he drew a very good representation of a lizard on a piece of paper, as also of a snake, in order to show us what he meant." I cannot stop now to enquire what animals Tawaihurua may have meant, but it shows us clearly that he was an intelligent man,

whose drawings were so well executed that the animals could be readily recognised. Queen Charlotte Sound, being in easy communication with the more southern portion of this island, and in close proximity to the Wairau plains, where moa bones have been found repeatedly, must we not assume that the Natives of those days had no traditions of the moa, or this chief would certainly have spoken of it and drawn it also, as the most wonderful animal of New Zealand? In any case, this is certainly very important negative evidence in support of my opinion.

Proceeding now to an examination of the traces left by the moa-hunting population, I believe that it was also the Hon W. Mantell who first drew the attention of scientific men to the fact that there was ample evidence to prove convincingly that man had been cotemporaneous with the Dinornis. He describes the occurrence of small circular beds of ashes with charcoal, very ancient, and such as are generally left by the Native fires that have long been burning on the surface. They contained calcined bones of men, dogs, and moas. Fragments of obsidan, flint, two fishing-line stones, and a small whalebone mere were also dug up. The Maoris informed Mr Mantell that the sand-flat of Te Rangatapu, where he obtained these relics, was one of the first spots on which their ancestors located.* A similar account is given by the Rev R Taylor, who has examined some localities in the valley of the Wanganui river abounding in old cooking places. If further investigations of these interesting localities would prove beyond a doubt that really the bones of man, moa, and dog, with flint chips and true Maori implements, occur together, and have not been mixed up accidentally, the present indigenous race having chosen the same favourable spots for their camping grounds as the moa hunters did before, the question as far as the Northern Island is concerned would soon be settled. However, I venture to assert that more careful and systematic researches than Mr Mantell, owing to the troublesome interference of the Natives, was enabled to make, would prove that the moa kitchen middens are quite distinct, and that where Maori ovens with indications of cannibalism occur, they have been formed over, near, or within those of the older race. In the course of this address it will be my duty to show why I believe that such a result would be gained, and which would confirm my observations made in this province upon the subject.

Another important question which remains still to be answered is, whether the human skeletons found amongst the sandhills, which, by the shifting of the sands, become exposed, as well as those from ancient burial-grounds, are all of Maori origin, or if, at least, some of them do not belong to a race distinct from the present aborigines. Unfortunately, I never found any human bones in or near the moa hunters encampment, to which fact I shall again call your attention in the course of this evening, otherwise they would have offered valuable material for comparison. However, one authority, and that one of the highest we could desire, has already pronounced that some of the skulls found in these sandhills are not derived from the Maori race. In the year 1868, I sent to Professor Dr C. G. Carus, the President of the Imperial German Academy of Naturalists, two skulls, which I considered belonged to the Maori race, and which were obtained from some sandhills near the Selwyn. That eminent physiologist, upon examining them, informed me that I must have made some mistake, as these skulls could not be of Maori origin, but must have belonged to some other race. Unfortunately, before my answer arrived in Dresden, the illustrious octogenarian had in the meantime passed away, but I may expect to receive shortly from some other reliable source drawings of these two skulls, together with measurements, descriptions, and a careful determination of the question as to which human family they approach nearest in their principal characteristics. As Mr Alexander Mackay, the Native Commissioner, informed me, the natives assert that in the interior of the North Island a race had existed called Maero, which they described as wild men of the woods, and somewhat like Australians. According to the Wellington Natives, a member of this race should have lived in a comparatively recent time on the island of Kapiti. It is foreign to the scope of my address to enter upon a discussion as to the manner in which these islands have been peopled. This has been done already by eminent men amongst us, as well as by distinguished savants in Great Britain, Germany, France, and America, without, however, deciding the question; on the contrary, the matter remains more uncertain than ever, and it will be long before it can be definitely settled.

My next object will be to ascertain how far back we can trace the occurrence of polished stone implements, which, in this province at least, the moa-hunters did not appear to have become possessed of. Passing over the well-known localities, such as old Maori pahs, battle-fields, burial and camping grounds, these tools have been found under the roots of huge trees, and in cutting deep drains through bogs in the Wellington province, which may

* "Petrefactions and their Teachings," page 102 and sequel.

be taken as a proof of their great age. In this province the plough has disinterred many on the plains, buried to a depth of several inches with soil or silt. But another instance of still greater antiquity has come under my notice, namely the discovery of a well-polished stone adze, together with a grinding stone, at the West Coast, about 15 feet below the undisturbed surface, over which a luxuriant pine forest was growing at the time. In a paper published in the Transactions of the Ethnological Society of London, I have described these interesting specimens of pre-historic human workmanship, which, two years ago, I had the satisfaction of laying before you, accompanying their exhibition by a verbal description. I shall therefore not repeat what I then stated, but proceed to the description of the principal locality in which I discovered a moa hunter encampment of considerable extent.

A great and almost insurmountable difficulty in the way of the foot traveller in this Island is the presence of large torrential rivers, coming down from the central chain, since they can only be crossed by him when they are very low, over long fords, and even then not without considerable danger. It is, therefore, not surprising that the aboriginal population should have searched from the earliest times for any spots where the necessity for crossing on foot could be dispensed with. They observed that all these rivers, before entering the sea, expanded into still-water lagoons, often of considerable extent, which they could easily cross with canoes, or on rafts, or even by wading, and thus the Native paths, of which in many localities the traces are still quite distinct, were always found upon the coast. The Rakaia being one of the most dangerous of these rivers, it is natural that the northern side of the river, near the sea, should always have been a frequented spot. Here, also, the lagoon extends along the coast, affording the Natives a secure resting place for their canoes or other means of conveyance, and, at the same time, a favourable fishing ground. Thus it was to be expected that we should find near the mouth of the river numerous remains of Maori occupation in the form of ovens, signs of former huts, and occasionally a Maori implement; but this locality on being more closely examined proved to be of still greater interest, having at one time been the camping ground of a moa-hunting population, and covering an area of more than fifty acres. It is to this remarkable encampment that I shall devote the next portion of this address. However, before proceeding I wish to offer a few general remarks on the topography of the spot, in order to show how well this pre-historic people had selected their habitations.

Between the mouth of the Rakaia and Banks Peninsula, and even as far as Sumner, all round the western foot of that volcanic system, a succession of lagoons, of which Lake Ellesmere is by far the largest, swamps and deep boggy creeks, exist, through which, in former years, before the original vegetation was destroyed and better drainage introduced, this portion of the country must have been kept in an almost impassable state. Looking over the country between Banks Peninsula and the mouth of the Rakaia we observe, first, Lake Ellesmere, covering a large portion of that region, and between it and the river several lagoons, surrounded by impenetrable swamps, from the outlets of which, and from several springs a little higher up the plains, a creek is formed, now called the Little Rakaia, which, after a short southerly course, empties itself into the Rakaia lagoon. Consequently, a large triangular block of country, surrounded on two sides by ground almost impassable to man or beast is formed, whilst a similar block exists on the southern side of the river, with this difference that the sea coast forms one of the sides, which was also available for hunting purposes.

Referring more especially to the encampment under consideration, we find that here the Canterbury Plains run without any break to the banks of the Little Rakaia, where they form cliffs ten to twelve feet high, whilst towards the main river two terraces occur of an altitude of eight and four feet respectively. It is chiefly on the lower terrace that proofs of Maori occupation are to be found, but ovens of the moa hunters also occur in the same locality. On the plains above the terraces, distant about sixty yards, both from the first terrace and from the bed of the Little Rakaia, Mr Cannon, the owner of the land, to whose courtesy and kind permission to collect and to make further excavations I am much indebted, in ploughing the ground uncovered a mass of former cooking places and kitchen middens, the latter consisting mostly of broken moa bones, and extending over an area of about fifty acres. When on a visit to Mr Edward Jollie, whose property is in the neighbourhood, I was accidentally informed of this interesting fact, and in his company I devoted several days, with the active co-operation of Mr F. Fuller, to a careful examination of this remarkable spot. The old ovens, generally covered by 3 to 6 inches of silt and vegetable soil, are found all over the ploughed ground, but most of them are situated near the centre of the field, where also the greatest amount of kitchen

middens occur. They are about 150 yards from the banks of the Little Rakaia, and nearly an equal distance from the first terrace sloping down towards the main river. This circumstance is more surprising, as the moa hunters had to carry stones and water for their cooking ovens a great distance, a labour they might have avoided had they selected some locality close to either of the two watercourses. When passing, however, along the perpendicular banks, 10 to 12 feet high, of the Little Rakaia, before it joins the Rakaia lagoon, we obtained in the silt, 4 to 6 inches below the surface, a large piece of flint, about 7 inches long and 3 to 4 inches broad and thick, from which pieces had evidently been chipped for knives. In other spots, in the same layer, moa bones either broken or entire occurred, but isolated, suggesting that they had more probably been thrown away by man in passing, or dropped by dogs, than that they were the remains of a regular kitchen midden. No moa bones, as before stated, were found by me anywhere on the surface. All of them had been covered by silt, or at least by a thick layer of vegetable soil; but I have been informed that the very same locality was covered with moa bones, but whether broken or entire I could not ascertain.

30. As previously observed, the principal ovens and kitchen middens are situated some distance from the banks of the rivers; about twenty acres are more or less covered with them, so that in some instances they must have offered some difficulty to the plough. Although now mostly disturbed, I could readily recognise the form and diameter of these cooking places. Some of them were of an oval shape, eight feet long and five feet broad, others more circular and about six feet in diameter. Generally covered by three to four inches of soil at the border, they are about 18 inches deep in the centre. The outer rim is generally built up by larger stones, smaller ones fill the interior, piled in four to five layers upon each other, of which, of course, many by the intensity of the heat have been split into angular fragments. Occasionally, small pieces of charcoal are still found lying between them. From five to eight of these ovens are usually in close proximity, with intervals of about 20 yards between them and the next group; the ground between having probably been the camping ground of the moa-hunters. I may here add that these pre-historic people without doubt cooked their food in the same manner as the aborigines of the present day, which has been so often described that I need not repeat it here. There are seldom any moa bones or other remnants of their meals amongst the stones of the ovens; these are generally situated a few feet from them, where the offal has been thrown in a heap, together with the chips of their rude stone implements. Large flat stones, ten to twelve inches long, and six to eight inches broad, are sometimes found near them, together with a roundish long boulder also of large dimensions, which I have little doubt have been used for breaking the bones in order to extract the marrow, or for pounding other materials. All these stones, without exception, had to be carried from the rivers or sea shore to the plains, and their great quantity testifies that for a long time this locality must have been a favourite resort of those inhabiting the country at that distant period.

31 I assume also that this spot was to them very important in a strategical point of view; the Natives after crossing the lagoon with their rafts or canoes being out of the reach of their enemies, who, without the same means of conveyance, could only cross with difficulty and loss of time. Scattered over the ground an enormous quantity of pieces of flint are strewed, proving that the manufacture of rude knives or flakes must have been carried on upon the spot for a considerable period of time. The most primitive form of stone implement, and of which a great number is found lying all over the ploughed ground, consists of fragments of hard siliceous sandstone, broken off apparently with a single blow from large boulders, and for the manufacture of which considerable skill must have been necessary. The boulder was always selected in such a form that if fractured in the right way it would yield a sharp cutting edge. These rude sandstone flakes are very different from pieces detached by heat in the ovens, where the natural joints of the rocks are always exhibited, while here the rough surface of the broken side attests clearly that the specimens have been obtained artificially. These primitive knives are mostly three to four inches long and two to three inches broad, possessing a sharp cutting and sometimes serrated edge; but there are also some of larger dimensions, being six inches long and nearly four inches broad. Some of them have evidently been much used. They were probably employed for cutting up the spoil of the chase, and severing the sinews. Similar specimens have been obtained in abundance in the Northern Island. Their frequent occurrence may be accounted for by the rapidity with which they were manufactured, and consequently they were of small value.

The really properly worked or chipped flints are so very rare that I obtained only a few of them, although of chips and flakes I could collect several hun-

dreds, of which many show that they have been used. Before entering upon a description of the former, I wish to speak of the material which has been selected for the manufacture of the greater portion of them. The principal regularly shaped implements consist of a greyish greasy looking peculiar flint rock, the original bed of which is not known to me. If it should exist in this part of the South Island, the only locality might be in the neighbourhood of Gebbie's Pass (Banks Peninsula) where so many varieties of siliceous deposits occur. Another reason for believing that the rock has been brought from a great distance, is its scarcity, which shows that unlike the sandstone knives or flakes, the ancient inhabitants took greater care of it. From specimens received from Dr Hector and Captain Frazer, it appears that it has also been extensively used in the interior of the Otago Province. There is in the Otago Museum a series of fine specimens manufactured of the same rock, collected in a short time in or near the Manuherikia Plains by the last named gentleman, so that there is no doubt that we must seek in that neighbourhood the original workshop whence they were derived. There are also, but far less frequent, smaller implements and flakes made of chert, porcellanite, and a few of chalcedony, semiopal, cornelian, and agate, probably collected for their hardness in the neighbourhood. But the most interesting objects were small pieces of obsidian, in lithological character identical with that obtained near Tauranga. It is thus evident, that a race so remote from our own times, must have had communication with the Northern Island, and as the different species of Dinornis, as far as I can judge from Professor Owen's drawings and descriptions, are identical in both Islands, it forces us to the conclusion that in the era of their existence, Cook Strait did not yet exist, but that both islands formed part of a larger island or even continent, over which the wingless terrestrial birds could roam at will. In no other way can we account for the existence of the same species of Dinornis over the whole of New Zealand. We might even assume that the human race made its appearance when this communication still existed, entirely or at least partially, because it is rather difficult to conceive that a people in such a low state of civilization could have built canoes sufficiently large and strong to cross the boisterous Strait now existing between the islands. In any case, we may safely conclude that the human races in the Southern Hemisphere are of far greater antiquity than might appear at first sight, and, instead of migrations, possible and impossible, to explain the peopling and repeopling of New Zealand, geological changes might afford a more satisfactory explanation. If we admit the former existence of land in the Pacific Ocean, either as a continent or large island, where now the boundless ocean rolls, and if we further suppose this land inhabited by autochthones, of whom we find remnants all over the islands, either still existing or extinct, and only proving their former existence by their works of art, the whole problem is solved. Such an explanation is, moreover, in better accordance with the present state of geological and ethnological science.

It appears to me that the flakes, which have generally a sharp cutting edge, have also been used by the moa hunters for the purpose of cutting, perhaps, also, as small scraping knives to prepare their meals, or what is still more probable, to assist them in eating their food, because doubtless they would have required some instrument to cut through the sinews and ligaments, or to otherwise divide the meat after being cooked in the large ovens, which from their size would have easily contained a whole bird. The principal specimen of flint implements which I obtained from the locality in question, is of the so-called spear-headed pattern, closely resembling those found in the Post-pliocene beds of France, and in many other spots of the same geological age in Europe. It is four-and-a-half inches long and two inches at its broadest parts. There is, however, one great difference between this antipodean tool and those of Europe, namely, that the former is flat on one side, all blows having been struck on the other. That their form and peculiar manner of manufacture are not accidental is proved by similar specimens collected by Captain Frazer and now in the Otago Museum, to which I alluded already. There are at least half a dozen amongst them which have exactly the same form, being at the same time only chipped on one side.

Two other specimens found at the Rakaia are flint implements, manufactured in the form of a chopper, about six inches long and three inches broad and three-fourths of an inch at its thickest part. They are also flat on one side with a ridge near the centre on the other, whence they have been worked towards the edges, which are both sharp. At one corner a piece has been removed so as to form a kind of handle, or for fixing it to a piece of wood. A similar specimen is also in the Otago Museum. As far as I am aware no implement resembling this curious tool has been described from Europe. There are some flint implements of the so called oval-shaped hatchet type, presenting the same peculiar

characteristics, and again some smaller flint knives resembling those found near Abbeville, in France. I may here observe that I also found two smaller spear head implements, which in every respect resemble those of the mammoth and rhinoceros beds in Europe; intermediate forms are also present.

As I stated previously, this locality shows traces of having been afterwards inhabited, from the fact that true Maori ovens, for ordinary cooking as well as for the preparation of the cabbage tree, are not unfrequent; moreover, the Maori track leading to the south passed over the same ground. It is, therefore, not surprising that a few greenstone adzes, and some other well polished Maori implements, should have been turned up by the plough.

Another more interesting discovery was made by Mr Cannon; a câche, containing twenty-two pieces of roughly chipped Palla, a green siliceous rock, occurring only on the northern side of the Gawlor Downs, between the forks of the Hinds. They had evidently been brought a distance of over 50 miles to be shaped into the proper form by polishing them. They had already been prepared to take finally the more recent forms adopted by the Maoris, which at once distinguishes them from the moa hunter implements. This is the more evident, since, in many localities, polished Maori adzes have been obtained, manufactured from this peculiar green siliceous rock. When I first found it on the Gawlor Downs, about seven years ago, I was struck by the large amount of chips lying about, which led me to believe that somebody struck by the flinty appearance and fine colour of this rock, which besides this spot, occurs only in Transylvania, had amused himself by making specimens. I am now satisfied that the Maoris visited the spot in question to obtain this rock for their stone implements, carrying it away such long distances. Mr John Davies Enys found some of the Palla adzes in the Upper Waimakariri country.

I searched for a long time, anxious to obtain any other relic which might shew that the pre-historic race had used any durable ornament made of stone or bone, such as ear or nose ornaments, amulets to wear round the neck, bracelets or needles and pins made of bone. At last we discovered two pieces of the ulna of the Wandering albatross (Diomedea exulans), which, at their proximal end and below the condyle, had evidently been bored through by the hand of man. Both, however, were broken in the middle of the shaft, the lower portion of both being missing, and they had therefore probably been thrown away. Of course it is impossible to say for what purpose these neat holes had been bored; but, belonging to such a majestic bird, is it not possible that they might have been worn as charms or amulets, or used in connection with some religious rite?

Amongst all the stone implements, there was not a single one from which we might draw an inference how the moa hunters killed their prey, but as the birds lived doubtless in droves, they were probably driven by men or dogs towards the apex of the triangle either to be killed with heavy wooden implements or stone spearheads fixed to staves, to be snared, or to be caught in flax nets. Another method of killing them, if we assume that the moa hunters were allied to the Australians, may have been by the use of the boomerang or a similar wooden weapon, to be hurled at their prey.

Proceeding to an examination of the kitchen middens or refuse heaps, we observe that by far the greater portion consists of moa bones, belonging to several species, identical in every respect with those the skeletons of which we excavated in the Glenmark Swamp. In the first volume of the "Transactions of the New Zealand Institute," page 89 and sequel, I have given a list of the Dinornis bones found in Glenmark, arranged according to the species they belonged to, and showing the number of each. From that list, it will appear that of all these species, Dinornis casuarinus is the most numerous, being represented by bones belonging to at least 45 specimens, while Dinornis didiformis follows with 37, Dinornis crassus in the third line, and then Dinornis elephantopus. The other species, Dinornis gracilis, struthioides, robustus, giganteus, and maximus, are of much more rare occurrence, and Palapterix ingens is only represented by one single specimen. I ventured to draw the conclusion, that the smaller and more numerous species had been living in droves, whilst the larger ones were of solitary habits and of much rarer occurrence. During the examination of the kitchen middens, and while in the act of collecting their contents, I was at once struck by the curious fact that the more or less frequent presence of the bones coincided closely with similar observations made concerning the skeletons embedded in the Glenmark swamp, and which showed that the frequency of the different species in that locality was not accidental. It also became evident to me that all the species, except perhaps the largest ones, had been cotemporaneous, affording ample food to the aborigines of the country. Of the remains of Dinornis casuarinus, the leg-bones are the most plentiful. A few only of the tarsus-metatarsus were intact, by far the greater

portion broken on both extremities, the tibia was always broken on both ends, the shaft of the bone smashed to small fragments, with the exception of a few pieces which were left uninjured. This additional trouble had doubtless been taken in order to extract the medullary contents for food; also the epiphyses both of the proximal and distal ends were generally partially destroyed, having been scooped out to get at the marrow. The femur appeared generally broken in the centre, but a few were also fractured on both ends. Of Dinornis didiformis, which with D. crassus was next in number of individuals, only one tarsus-metatarsus was intact; the tibiæ were either broken in the centre or more frequently on both extremities. Of the femora, a few were collected, broken in the middle, but generally they had been left entire, so as to suggest that the medullary contents, which must have been very small, were not thought worth the trouble of extracting. Dinornis crassus seems also to have occurred in large numbers on the plains, judging from the great quantity of bones belonging to it. The metatarsus is only rarely broken, the tibia always at both epiphyses, and the femur in the centre. Of Dinornis elephantopus, bones belonging to a few specimens were collected, of which the tibia is invariably broken, whilst the femur, and, in a few cases, the tarsus-metatarsus, have been fractured in the centre. Of Palapterix ingens, I obtained remains belonging to at least three specimens. They are, however, a little smaller in size than that figured by Professor Owen. All the three principal leg bones, without exception, are broken at both extremities, and the intermediate portion fractured to small fragments. The epiphyses also show clearly how they have been scooped out to obtain the marrow.

No bones of other species came into my possession, such as those of Dinornis gracilis, struthioides, and the more gigantic forms, which, considering that they are very rare in comparison with the species enumerated above, is not surprising, and does not prove that they did not exist. Further excavations in the same locality will doubtless afford us more information on the subject. Of Cnemiornis, a bird with well developed wings and of the size of the bustard, and of which I also collected some portions of the skeleton in Glenmark, a few bones were also found at the Rakaia. Small pieces of moa bone, mostly derived from the leg-bones, are very numerous, and lie generally upon the refuse heaps. Occasionally they are burnt, so that it appears that the moa-hunters generally threw the refuse of their meals upon the middens, and only accidentally into the fire, unless we assume that they used the bones occasionally as fuel. Phalanges of all the species already mentioned are present, and in the same proportions; they are generally intact. Of the pelvic-bone only one large piece of Dinornis didiformis was obtained, but otherwise its fragments were of frequent occurrence. They were probably broken up to get more easily at the meat. The same observation also applies to the sternum, of which only small pieces were found. Ribs and intercostals, generally broken, are not rare. A great many vertebræ, and occurring in the same proportion as the leg-bones, mostly in a good state of preservation, were collected. It is remarkable that only in a few bones cuts or other marks could be observed; the reason may be that the larger bones, as already pointed out, were probably broken with stone mallets. However, some of the smaller bones show clearly the marks of the rude stone knives.

The fact that the vertebrae and other smaller bones, such as costals and intercostals, were quite uninjured, and that I never found any sign of gnawing on any of them, either large or small, would imply that the dog was not domesticated by the moa hunters, but lived in a feral state, and was hunted by them like the moa. Several of the skulls of D. casuarinus and one of D. didiformis were obtained, some of them in a very fragmentary condition, and each having been scooped out from below to obtain the brains. Of minor bones were collected the upper and lower mandibles, tympanic bones, and tracheal rings of most of the species named, which, with the rest are now exhibited in the Canterbury Museum; also a good selection of moa-stones could be made, consisting either of pebbles of quartz, agate, &c., such as we obtain in the Malvern Hills, or of siliceous sandstone, and of chert. It was in vain that we searched for egg-shells; if once existing, they must have decayed. Of the bones of smaller birds we were able to distinguish those of the New Zealand rail (Rallus pectoralis), the black backed gull (Larus dominicanus), the swamp hen (Porphyrio melanotus), the mollymawk (Diomedea melanophrys), and the godwit (Limosa uropygialis). Apterix bones were missing, but this may easily be explained by the distance of timber covered country from the encampment; but a more striking feature is the total absence of bones of the weka (Ocydromus Australis), which is at present found all over the island. Could this bird have been confined during the Dinornis era to the forest region, kept there by the attacks made by the large birds upon it?

Another interesting fact is the frequent occurrence of tympanic bones of whales; there is, however, not a single specimen amongst them belonging to the Caprerea antipodarum, nor of any of the other large right whales visiting the coast of New Zealand; all the specimens belong to smaller species, such as Berardius Arnuxii, &c. These bones are mostly in a fragmentary state, having been broken in such a way that the interior cavity or lower surface remains intact. It is difficult to understand why these bones, of which we picked up more than a dozen, should have been collected and brought up to the encampment; they could not have been used for ornaments, as they are always broken too unevenly for such purpose; or can they have been used for drinking-cups or ladles? Some of the pieces were charred. There were also a few pieces of larger bones, belonging to the skeletons of cetaceans of the smaller dimensions. Seals must have formed also a favourite article of food, as many bones, belonging to at least two species, are found frequently in the kitchen middens.

The dog is also represented in these refuse heaps. We obtained parts of a few lower jaws, belonging to several individuals, some vertebræ, part of the pelvis, sternum, and of the skull. It was of the size of a shepherd's dog, the canine tooth longer and more slender in comparison with the other teeth than is generally the case with the present varieties of the same size. These remains are, however, rare, which might suggest that the dog was only exceptionally eaten, either when its owner was short of provisions, or perhaps when some of these animals were killed by the moas during the chase. I have, however, already given some reasons why we are almost compelled to believe that the dog was not domesticated by the moa hunter. Some few shells were also found between the bones, consisting of freshwater mussels (Unio), and of a large Mytilus.

Bearing in mind whatthe Hon. W. Mantell states in respect to the occurrence of the bones of men, together with those of the Dinornis, dog and seal in the kitchen middens of the Northern Island. I concluded that the moa hunters must have been cannibals; however, the most careful search, continued for a number of days, has never brought to light the smallest portion of a human bone at the Rakaia. And, although this evidence is merely of a negative character, it is strong enough to induce the belief that the moa hunters were not addicted to anthropophagy, as Mr Mantell's observations might suggest. Had the inhabitants of the Rakaia encampment been cannibals, there is no doubt, in my mind, that amongst the thousand fragments of bones passing through my hands, at least some of the human skeleton should have appeared to bear witness. Mr F. Fuller, who lately discovered a small moa hunter encampment in Tumbledown Bay, near Little River, found close to it, amongst some sandhills, the traces of a cannibal feast, but there was nothing to connect the one with the other.

Some other localities, in which the ancient population has left evidence of its presence, are the flat, near Moabone Point, on the road to Sumner, another, near Mr Joseph Palmer's former residence among the Sandhills, near the Avon, and on the opposite side below Mr Wright's property. Here, moa bones, broken in the usual manner, associated with those of the seal and tympanic bones of whales, are exposed by the sands having been shifted by the wind. Similar flakes, manufactured of flint and sandstone, occur also there, together with great quantities of pipi shells (Venus intermedia) and of Amphibola avellana. The contents of the ovens consist of common river shingle, but also of rough pieces of volcanic rocks, derived from Banks Peninsula, and which must have been brought all the way, unless we admit that during the time of the moa hunters, the sandhills in question were still close to the sea shore, or at least fringing an arm of the sea, running round Banks Peninsula. Another locality, where Mr John D. Enys has collected flint implements of the same type as those described previously, is situated on the western flanks of Mount Torlesse, about 3000 feet above the sea level.

From all these observations, I am led to the conclusion that the moa hunters have left their traces in many localities in both islands, of which only a very few are at present known to us. I have no doubt that further search will bring to our knowledge many more large camping places, and will offer us more ample material to draw conclusions as to the character, life, and manners of that pre-historic people whose implements, so far as we know, are of the same character throughout both Islands.

Fragmentary as my researches have been, so are necessarily my notes on this important subject, but I trust that they will be at least the means of procuring more attention to the matter amongst my fellow-colonists, many of whom, I have no doubt, can assist me materially in more fully investigating it, either by collecting specimens, describing their own experience, or pointing out to me where similar encampments may be examined. I need scarcely observe that I am far from considering the

inductions drawn from the observations I have been able to make as final, or that I claim for the different hypotheses I venture to propose more than a simply suggestive character.

Every day, especially if other observers will give us the result of their labours, new vistas will be opened before us, and our ideas become enlarged and modified. I should feel quite satisfied with the result of my labours, even should some of the views expressed to-day prove erroneous, if by this means I shall have been instrumental in extending our acquaintance with the ancient inhabitants of this country, and thus promoting the advancement of knowledge and truth.

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