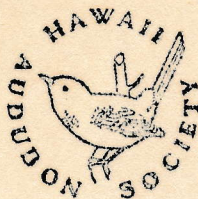


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THE NEW ZEALAND MOA By George C. Munro

An article in a local paper about a collection of moa skeletons which Dr. Robert Cushman Murphy is taking to the American Museum of Natural History at New York is interesting to a New Zealander. It takes me back over the years to my youthful days in that country when finds of moa bones were from time to time reported.

According to Dr. R. W. B. Oliver in Birds of New Zealand, 1930, the first record of moa bones was by a man named Polack who between 1834 and 1837 was given specimens of them by the Maoris. Missionaries obtained information and specimens in 1838. Professor Richard Owen about this time on the evidence of a piece of bone decided there had existed in New Zealand a struthious bird much larger than the ostrich. In 1841 and 1842 specimens were collected and Owen described from them five species of moas. Other finds were made and in one swamp in 1874 remains of 200 birds were found. Rothschild in his book, Extinct Birds, made 38 species of moas. Oliver decided on the evidence of what was then available that there were only 22.

In 1920 I examined a collection of moa bones in possession of my brother, Hugh S. Munro, at Clevedon, Auckland, New Zealand. A farmer had been digging a drain in a swamp near my birthplace and uncovered some strange looking bones. My brother heard of this, visited the place and examined the bones. He decided they were moa bones and came to an agreement with the owner of the land to allow him to make an investigation of the locality. He did this and found the remains of over 40 birds of all sizes down to little chicks. There were also in the deposit pieces of eggshells, gizzard stones and seeds of some common New Zealand trees. The bones were in piles, resting on gravel and covered with several feet of mud. The Maories had evidently killed the birds and threw the refuse into the swamp. All the specimens were saved and treated for preservation.

Scientists later examined them and decided there were 7 species of moas in the lot and some of the bones might be of an undescribed species. From the bones my brother mounted an almost complete skeleton about 6 feet high. There is a very good law in New Zealand which prohibits the exportation of natural history specimens without special permission so the specimens are still in his collection.

I once spent some time on open scrub covered country in the north of New Zealand and frequently found smooth stones which I took to be gizzard stones of the moa. Once there was a solid mass of them under the surface which weighed about 9 pounds. The bird had probably died there and left only this evidence. It was noticeable that many of the stones were strange to that part of the country, indicating that the birds were travellers. There is an interesting exhibit in the Auckland Memorial Museum which I saw in 1934. In the Moa room there was a case with a number of moa skeletons of different species and different sizes, also eggs. There was also a restoration of a large moa.

A great deal of research work has been done on moa bones in working out the history of the moa in New Zealand. In The Transactions and Proceedings of the New

Zealand Institute of 1893, Vol. XXXII, there was published "Materials for a bibliography of the Dinornithidae, the great extinct birds of New Zealand usually called moas.", by A. Hamilton. 27 pages were taken up with this list, which showed the interest taken in this study 55 years ago. A great deal has been done since. Sir Peter Buck, Director of the Bernice Pauahi Bishop Museum, loaned me a book in 1932, The Mystery of the Moa, by Lindsey Buick, which gave a very good explanation of all that was known of the moa up to the time it was written.

The reason why so many species of moas were concentrated in a small country like New Zealand was treated on many years ago by Alfred Russel Wallace in Island Life. I think this is generally accepted today. Briefly, this is from the gradual rising and falling of large land surfaces. New Zealand being connected off and on with land at some time connected with Eastern Australia which was at the time separate from the western part of the island and did not have the typical Australian fauna and flora. Struthious birds spread over these areas, the lowest parts of which gradually sank beneath the ocean leaving the birds concentrated on the highest parts which remained as islands. On these isolated islands the birds developed along certain definite trends and formed different species. The land rising again, the species were mingled. Later a gradual sinking left New Zealand above the surface with its numerous species of moas, later to be destroyed by man.

Many will be interested in the newspaper report, first referred to, of a lecture by Dr. Murphy given at the University of Hawaii while here on his way home from New Zealand. The report covered very little of the lecture, so I append an article by a Special Correspondent, in the Weekly News of February 11, 1948. The Weekly News is a very reliable New Zealand newspaper founded in 1863. The article tells of the expedition with which Dr. Murphy was connected when 25 bird skeletons were recovered. It also tells of the discovery in 1938 of the deposit and of the recovery of more than 50 more or less complete skeletons at that time. The threat of war which broke out in 1939 evidently caused the investigations to be discontinued and only now taken up again. Dr. Murphy's account of the results of this expedition will be eagerly looked forward to as probably new light will be thrown on the history of the moa by his research into the composition of the substance by which the bones were surrounded and kept in a good state of preservation. The article is very informative so I give it entire:

"Interest in one of the most important discoveries in the history of New Zealand ornithology was revived last week with the news that a scientific party from Canterbury Museum had dug up 25 complete skeletons from the rich deposits of bones at Pyramid Valley, near Waikari, North Canterbury. Three of the skeletons were of the rail, an extinct New Zealand bird, while others were complete and well preserved skeletons of moas.

"The yield of 25 skeletons in an excellent state of preservation indicates that the area is richer in bird remains than was previously thought, and suggests that the museum authorities would be well advised to exploit the field as soon as possible.

"When work began after a lapse of 7 or 8 years on the property of Messrs J. and A. Hodgen, there was a gathering of some of the best known scientists in New Zealand. Guided by Dr. R. A. Falla (Director of the Dominion Museum), Dr. R. W. B. Oliver (Temporary Director of the Christchurch Museum), experts in geology and zoology from Canterbury University College, and several other old friends of the Museum, the work went ahead steadily. In one of the pits that were dug was Dr. R. C. Murphy (a Visiting American Ornithologist). As he plunged his hands into the mass of yellow sticky soil where the precious bones lay, he commented enthusiastically that the deposits were remarkable in his experience. The only comparable deposits were in California in a lake of asphalt where animals of the Pleistocene Age had been trapped. There skeletons had been recovered in perfect preservation.

"Dr. Murphy hopes to take back to the American Museum of Natural History some of the complete skeletons that were obtained from Pyramid Valley during his visit. He will also undertake research on the nature of the peat flooring of the swamp in which, thousands of years ago, the big birds were trapped. Only a fraction of that area has so far been dug. It is a three acre basin of yellow peat which quivers like a jelly when any weight is thrown upon it. How the moas came to be stuck in it is a mystery that will not be cleared up until more is known about the composition of the swamp.

"The discovery that moa skeletons were buried in the Pyramid Valley swamp was made when a horse belonging to Messrs. J. and A. Hodgen was bogged and died in the swamp in the winter of 1938. In digging a hole to bury it they found moa bones. Some of these specimens were brought to the Canterbury Museum by Mr. D. Hope, of Salwyn Huts. The museum's staff lost no time in organizing a party to visit the site. With the aid of a gum spear six skeletons were found and three were excavated on the first visit. The skeletons were all in good order and two were of large moas.

"During the work that followed 50 more or less complete skeletons were obtained. One interesting feature of the discoveries was the preservation of the crop contents in the moist layers of earth in which the birds were buried. In addition to a large pile of crop stones there was with each bird a certain amount of vegetable matter in good preservation. This was analyzed to give some data on the food on which the moas lived. The total of one crop weighed about 10 or 12 pounds, and included stones and pebbles of various kinds, shapes and sizes. Many of the stones were not to be found in the district which gives an indication of the extent to which the moa wandered.

"Why so many moas should come to be buried in one swamp is a question that might well be asked. One theory is that huge bush fires had driven them into the swamp when it was possibly a lake and that they had then perished there. A more reasonable view is that the bone deposits are from birds that had become bogged over a long period of time or had died naturally in the course of feeding in one of their favorite grounds. This view is supported by the fact that horses even now can be easily bogged in the area. The moa - a very heavy bird, often standing about 10 feet, and unable to fly - could have entered the swamp and been unable to get out again.

"Complete moa skeletons are rarer than is often thought; in earlier discoveries of moa bones in swamps, where the largest numbers have often been found, the bones of many of the birds have been heaped together, and composite skeletons, naturally of far less scientific value, have been made from the bones of different birds. Before the Waikari discovery individual specimens have been found in caves and sandhills, but in these cases the bones were not so well preserved.

"Great care was taken in the first excavations at Pyramid Valley to keep individual specimens separate. This was important because for anatomical study a correlation is required between the sizes of the skull, limbs and vertebrae.

"The discovery of the deposits at Pyramid Valley followed a series of important finds between 1867, when Sir Julius von Haast investigated Glenmark, till 1895 when a find was made in South Canterbury at Kapua. During that time several swamps were investigated; but the Pyramid Valley find was particularly valuable because of the manner in which the bones of each bird were kept together in excellent preservation.

"Mr. Roger Duff, assistant curator of the Canterbury Museum, who directed much of the work that was first done in Pyramid Valley, described in a report to the Museum the finding of the skeletons in the area that had been investigated at that stage. Most of them were discovered in a yellow peat stratum that varied from about two feet near the margins to at least four feet in the deeper parts.

"This, with a black peat overburden of one or two feet apparently represented the depth to which the moas could sink. In the deep parts, which were presumably more liquid, they sank well below the surface and sometimes came to rest upside down with the pelvis and femora downward and the rest of their limbs reaching upward. More often though the pelvis remained nearest the surface with the leg bones suspended downwards. In the shallow parts of the swamp, however, the larger birds would be trapped in a depth of four feet and would remain standing upright in the swamp until death overtook them with legs free above the tibiae and with body and neck held well clear.

"Some of the birds found were quite intact. A small specimen trapped in a spot where the swamp was about four feet deep hung suspended between the bottom margin of the top surface of black peat and the upper margin of blue clay which formed the base of the old lake. Its pelvis was uppermost and its head and neck were slumped down with the leg bones reaching downward and backward in struggling attitude."

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ERRATA: In the fourth line of the 2d paragraph of the article "Storm Toll on Moku Manu", by Dr. Frank Richardson in the Elepaio of April, 1948, p. 53, a regrettable typographical error occurs which might easily change the sense of the sentence, which reads, as printed, "...but actually thousands had not been washed from ~~their~~ nest spots and deserted." Dr. Richardson's text actually read, "...but actually thousands had now been washed from their nest spots and deserted." The editor apologizes to Dr. Richardson, and hopes readers will correct their copies.

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RAISED EYEBROWS DEPARTMENT: In the Honolulu Advertiser for March 7, 1948, is a long illustrated article titled "Millinery for Milady", which treats of Lily Dache's spring and summer 1948 collection of millinery. This collection is said to be nothing short of a plot against the frail male. What concerns us, however, is not the allure or the design, but the fact that the hats are trimmed with the feathers of the condor, the bird of paradise, a whole humming-bird. The frail male seems less a victim of the plot to us than the helpless birds who supplied these devices.

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BIRD WALK: April 24th, Saturday. Rain is always welcomed by a gardener, but when he turns into a birder; especially when the walk is scheduled for Kipapa, his heart does not leap up on the first touch of rain on his face. He looks with anxiety at the well-formed rainclouds over the Koolau. The entire week was practically dry until Friday. Friday night, when I tucked myself into bed, I wondered whether I would be fortunate enough to go into the beautiful Kipapa forest.

Ah, the soft breeze with that refreshing sprinkle on my face woke me up on April 24th, the second trial of the Saturday walks. The first Saturday bird walk was such a success that the members decided it must become a part of the Society's activities, but today I was pleasantly surprised to see Miss Cale and Mr. Porter and to learn that Miss Clark was to join us later. Of course, it was pouring at the Library, but we decided to wait until 8:30 for the late comers. Oh, no. No one came. We didn't expect anyone to be so curious. We were only being polite.

"Are you still interested in birding?" "Oh, yes!", replied Miss Cale, the driver for the day. Four of us somehow to find a dry spot at Pa Lehua. We were very fortunate; the day was dry and cool there. As usual, because someone had kindly taken away the large sign I depended on so much to direct me to the trail, we drove enthusiastically along until the Waianae started fading away at our backs, then I realized what had happened. When we came to the turn we were supposed to have taken, there was an old, almost illegible sign "Puumanuwahua". As we drove along the steep road, we noticed many Chinese doves in the kiawe, and rice birds feeding on the weeds and at the same time testing the resilience of the grass blades. The protective instinct is much more powerful than the hunger instinct; consequently as we drove along we scared them from their delightful breakfast. Kentucky cardinals were darting from one abandoned pineapple field to another. Occasionally, one of the more aggressive birds would find the tallest tree and burst into song, as to say, "Share this happiness with me!" We listened for skylarks as we approached the knob where we heard the wonderful singing the last time we were here, but no "blithe spirit".

The drive through the silver oak, koa and kukui was gratifying. A wonderful day! The smell of the woods! Quiet, peace, harmony! Everything men are looking for is here, and they are here for us to be with and feel the harmonious rhythm of the universe. The woods were teeming with birds - amakihi, white-eye and apapane. Ah, here he comes - look at that tail! "E-le-pai-o! E-le-pai-o!" "Good morning; thank you". How delightful to be welcomed into an enchanted dale like this by such a friendly and hospitable elepaio. "Ho-kekyo, ho-ho!" There he goes again. Yes, bush warbler. Not, not yet, maybe today. He is very close. Shall I sit here until I have a better glimpse of him? Some other spot with branches over my head is better.

As we were watching the interesting budding of the lehua, we heard an unusual single note. Chicken? No. Pheasant? Maybe. Peacock? I don't know. We heard the same notes at different places on the trail during the day.

The silver oaks were at their best. They were beyond words. The yellow blossoms against the dark clouds with occasional blue sky for their background. I thanked God for sharing so generously.

"Chit-chat, chit-chat!" Oh, so busy. Ah ha! No wonder! Mulberries are ripe. Beautiful, the green blending so well with the leaves, but their orange beaks against the black berries betray the hill robins. They are so boisterous, yet so beautiful. The mulberries were so plentiful that we did not hesitate to satisfy our appetites. They were delicious and very refreshing.

There were many abandoned white-eyes' nests. White-eyes were flying all over and they too had their fill of mulberries and were enriching the outdoor symphony. Linnets were quite at home here. That orange bib always makes me smile and happy. It somehow suggests sunshine and hope.

With this frame of mind I decided to have lunch. Everything was so perfect; then suddenly, one drop, two drops, three---. Rain! A bird walk is never complete without rain, so I was quite satisfied to have this cooling. By the time I finished my lunch the only dry spot was the ground I was sitting on.

On our return trip we had a wonderful treat of being serenaded by the Chinese thrush. I have no words for the song except that I hope you too have had the fortunate experience of hearing the song in the quiet woods after a refreshing rain and when the shadows begin to become long. A glimpse of the brown and the white around the eyes. A gentle, well-poised bird.

Once Miss Clark and I were sure of seeing a bush warbler. This particular bird was singing and singing, as though something drastic was to happen if he stopped even for a second. We waited, but it wouldn't move; so I decided to flush the bird. I stalked it very carefully and was delighted to see the bird moving toward Miss Clark, but the light was against me. I tried to move to a more advantageous position but the bird sensed me and flew away singing, and kept on singing as we left it in the peaceful valley. No, we felt it, but did not see it.

The wonderful outdoor symphony never ends, but we always walk too fast; consequently we reached our car in no time. We headed for Honolulu with our hearts full of simple happiness.

Unoyo Kojima.

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DIVIDENDS IN BIRDS is the title of an article in the Christian Science Monitor Magazine for January 31, 1948, p. 4. In it the author, Millicent Taylor, discusses birds and bird feeders in the garden, and the dividends of beauty and pleasure, as well as the practical reward of having the birds work for you in return, by keeping the gardens clear of harmful insects and garnishing all your outdoor activities with song.

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JUNE ACTIVITIES:

BIRD WALKS: June 13th, to Kawaihoa. Meet at the Library of Hawaii at 8:30 a.m.
June 26th (Saturday) to Kawaihoa. Meet at the Library of Hawaii at 8:00 a.m.

MEETING: June 21st, at 7:30 p.m., at the auditorium of the Library of Hawaii. Mr. Larry Richards will talk on the birds of Ponape, and show skins of birds taken on that island.

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