

amongst them, where they were often close together, and, like those in the cavern, appear to have been ultimately filled more or less with the refuse of feasts. A clear line of demarcation was found here also between the deposits of the Moa-hunters and those of the shell-fish feeders, and, except in one instance, where a few pieces of the fresh-water mussel were met with, no shells occurred in the older series of deposits. Judging from the greater number and volume of the kitchen middens found in the small area examined, there can be no doubt that the real camping ground of the Moa-hunters was on the plain, and that they used the cavern occasionally only for shelter or for their meals, and very rarely for cooking. It seems most in accordance with the facts, also, to suppose that the shell-fish eaters lighted fires in the cavern for warmth and light, and that they probably slept there, but that, like their predecessors, they cooked their food outside.

Dr. Haast gives a tabular list of the objects collected in the Moa-hunters' middens amongst the dunes, but it is to a very large extent a repetition of the contemporary cavern list.

Dr. Haast is of opinion that the time represented by the cavern deposits was very great, and, in support of his view, directs attention to the following facts and considerations:—

1. That the mere volume of the shell-beds alone must have a great chronological value, on any hypothesis.
2. That this value is greatly enhanced by the fact of the cavern being but occasionally occupied.
3. That even the occasional visits were probably suspended during a considerable interval after the interment of the Maori.
4. That on the inner or westerly portion of the adjacent plain there is a remarkable number of shell heaps, belonging to the era of the upper series of deposits, which the natives attribute generally to the Waitaha, the first immigrants, who preceded the Ngatimaoe, who in their turn preceded the Ngatikuri, the present inhabitants.
5. That though the cannibalism found in New Zealand when first discovered by Europeans had been practised for at least several centuries, there is an almost entire absence of human bones even in the shell beds, whilst the three solitary specimens of this kind which were met with were so entire and perfect as to negative the idea that the men of even that comparatively modern period were cannibals; and that the same view is borne out by a study of the Moa beds.
6. That as far back as the traditions of the Maoris go, allusion is made in their songs to the Weka (*Ocydromus australis*); yet amongst the hundreds of bones belonging to small birds, not a vestige of the Weka was met with in any of the deposits.
7. That beyond the vast period covered by the shell beds was that interval represented only by the uniform sharp line of demarcation between the two sets of deposits, by the intermediate layer of drift sand, by the disappearance of at least eight species of Moas, and by the strongly marked change in the food of the natives.

8. That since the extinction of the Dinornis and its contemporaries there has been a period sufficiently considerable for the conversion of an area then occupied with large lagoon-like lakes into that part of the Canterbury Plain which is now near the sea, and for the formation of sand dunes of great width upon it.

9. That further back still was the period of the Moa-hunters, to whose deposits, due allowance being made for their somewhat smaller volume, all the considerations applied to the beds above them may be repeated with equal force.

There seems reason to believe that the civilisation of the Moa-hunters was in many respects not inferior to that possessed by the Maoris when first visited by Europeans.

It is obvious that if the entire absence of Moa remains in the shell-beds of the cavern and the adjacent dunes is to be regarded as conclusive on the point, there can be no reason for hesitating to accept the opinion that an enormous amount of time must have elapsed since the extinction of the gigantic birds in at least that portion of the island.

In more recent papers, Dr. Haast expresses the belief that subsequent researches, in other parts of New Zealand, tend to confirm his conclusions.

THE GERMAN EXPEDITION TO SIBERIA¹

THE travellers left Saissan on May 31, and arrived in Maiterek on June 4, in the company of his excellency the governor-general of West Siberia, General Pottaratzki, whom they met

two nights previous to their arrival. Three tarantassas drawn by artillery horses conveyed them from Saissan on to the shores of the black Irtisch. Their way led again through the steppe mostly covered with Dschi, a kind of short, thick grass, with here and there patches of white alkaline soil; but after some time their eyes were refreshed by the appearance of a few trees, their number increased until the country became wooded, and therefore they hoped soon to reach the river. In the evening they saw before them the banks of the stream, swelled by the recent rain into a majestic river, its waters of a yellowish brown colour. For 200 versts into China the stream is navigable for steamers, but up to this time it is not used as a means of communication. Beautiful trees bordered the river, and it was a pleasant change for the travellers, who had seen no trees since the Ala Tau, to find magnificent poplars, aspens, and many other trees and bushes. Though the steppe is grand yet it becomes tedious after a while. The travellers continued their journey in a lotka (a sort of boat) belonging to a rich Kirghiz, who is one of the fishers of the Saissan Nor (Saissan Lake). The lotka was propelled by two enormous oars worked in turn by eight Kirghiz or eight Cossacks. The journey down the Irtisch was rendered delightful by the beautiful vegetation near its banks, and the abundance of birds made it a perfect eldorado for the naturalist. They were tempted to stay here, but "heida" (Kirghisian for "on") was the call, which they had to obey. Gradually the strength and width of the river decline as it gets narrowed in by dense masses of reeds. In the evening they reached the settlements of some fishermen, resembling those seen in Norway—here as there frames for drying the fish, here as there the same disagreeable smell, so attractive for the black Milans, of which they shot a specimen of the Indian variety. A quantity of fish was caught, amongst them splendid specimens of a kind of Coregonus, carp, barbel, and sturgeon, the roe of which is prepared as caviare. Towards evening they landed amidst dense reeds.

Early on June 2 an excursion to the neighbouring lake was made. On the banks were a good many persons fishing, and numbers of birds—amongst them the East Indian kind of the bald eagle (*Haliaeetus leucorhynchus*), sitting in pairs on the trunks of dead trees—were animating the shores of the river and the reeds. About half-past seven—sunset—they landed; Kirghiz with camels and horses were awaiting them, and they proceeded on their journey over the most desolate steppe imaginable towards the north. This steppe was very stony and sparsely covered with vegetation; only at the outskirts the crippled brushwood of the Saik-Saul, of a myrtle-like appearance, was to be found; further on nothing but bare gravel; eye-witnesses told the travellers that the appearance of this steppe was quite analogous to that of the desert of Gobi. For seven hours' march there was no water, although in spring this steppe is quite impracticable as the water then flowing down the mountains forms ponds and swamps in the loamy parts. Often they passed the dry beds of such ponds, looking like mosaic by reason of the frequent and regular cracks in the dry mud. Here the spermophilus was met with for the first time, and later on three kulans, the wild solipede of these parts of Asia (more horse than ass), accompanied by a young one. Never were the mirages seen more beautiful than on this steppe, though occurring every day, here were splendid blue lakes with trees on the shores so distinctly that they could fancy them to be real. Several other times Saiga antelopes were seen and kulans, once seven at a time, but none were obtained. At last they came to a depression and found a bad but welcome spring; they rested here for a few hours. On proceeding they had soon to pass through a hilly country covered with slate. This part was interesting for the geologist: granite followed immediately upon slate, then slate and granite, after this quartz, white and grey, and with this a coarse-grained sandstone. On June 4 they reached the outlayers of the Altai; here they saw a numerous fauna and many settlements of the Kirghiz with their cattle. The outlayers consist of granite, crystallised slate and a hornblend porphyry, they are fantastically shaped but quite bare, yet not without some picturesque beauty. The zigzag road led up hill. At last they saw in the distance a lovely valley with green trees, and with the joyous cry of "Maiterek" the Kirghisian guide galloped downward, followed as fast as possible by the others, to a yurt camp, situated in a wood of aspen trees near a murmuring rivulet. This was the place where the governor-general was expected, and at last, accompanied by many Kirghiz, his excellency the governor arrived with a large escort, including ladies. A friendly welcome was exchanged, and

¹ Abstract of the third and fourth letters dated from Maiterek, June 5, and a valley in the Tau Teke Mountains, in the Chinese Altai, June 11, respectively. Continued from p. 515.

after having rested a little while the whole procession moved onward, as fifteen more versts lay still between them and Maiterek.

The travellers proceeded on their journey towards the Altai in the company of the governor-general, his wife, and daughter, on June 6. The weather was most unfavourable from their departure up to their arrival in the Altaian Staniza on June 11, and now they had to undergo all the hardships from which travellers have more or less to suffer. The roads they had to traverse led nearly always along the steep narrow banks of rapid mountain streams, or along the verge of a threatening abyss, or they crossed over vast accumulations of snow filling up the ravines.

On the summit of the pass, about 6,000 feet high, covered with grass as yet undeveloped, was a splendid view of the distant Saik Saur mountains behind Saissan; a pale yellow line extended from there up to the horizon like the ocean, it was the steppe. Beautiful meadows covered with yellow and purple pansies were discernible in the valleys between the plateaus, wooden Kirghisian tombs, somewhat resembling log huts, gave to the whole the appearance of an Alpine landscape. It was strange to see the mole (*spalax*) burrowing at this height, where trees—even the hardy larch tree—had disappeared. One night's rest was spent in a yurt camp near the lake Marka Kul. They approached it along the steep shores of the river Kuldshir, the sole outlet of the lake, and one of the tributaries of the black Irtisch. The view here was delightful, the lake of an azure colour, surrounded on all sides by mountains rising 1,500 feet above its surface, covered with snow, and partly wooded. The banks of the lake are very steep and indented here and there with deep bays. With their nets they secured many fine fishes, which, apart from their scientific interest, were welcomed as a pleasant change to their every day fare of mutton. There is an abundance of fish in the Marka Kul, but it is caught only by the Chinese Kirghiz and the Russian Altaian peasant, and that in a very primitive way. Generally they divert one or other of the small tributaries from its course, and the fish remaining in the dry bed are caught.

In spite of the dangers of the roads, the governor's wife had availed herself of every possible opportunity to photograph the most beautiful parts of the wild mountain scenery about them: this excellent horsewoman rode without fear or giddiness, never dismounting even at the most dangerous places.

The travellers resumed their journey on June 9, but the bad weather still followed them; they passed through large virgin forests, along the borders of abysses nearly 1,000 feet deep; at last they camped on a green meadow facing the Tau Teke Mountains (Steinbock Mountains), so called on account of the numbers of Steinbock found there. Early on June 11 a Steinbock hunt was attempted, thirty Kirghiz on horseback acting as drivers, but they did not get anything. On going on, in about an hour they reached the top of the pass, the Burchat; here they saw two cairns with poles before them, the Chinese frontier poles, and now they left the Celestial Empire and rode on into Siberian territory, slowly descending from the height of about 8,000 ft., where trees cease to grow; the descent soon became steeper and steeper, and at last so rapid that even Cossacks and Kirghiz were obliged to dismount. When they reached the plain they were surprised to see the vegetation, trees, bushes, and flowers, so much richer than at the Ala Tau. Also in this camp the governor was welcomed by a deputation of Kirghiz, and after a short rest they rode on to the Altaian Staniza, a military post.

NOTES

On the 25th ult. there was unveiled at Copenhagen a bronze statue to H. C. Oersted, the discoverer of electro-magnetism, who died twenty-five years ago. The monument, erected on a terrace of the old fortification, consists of a hexagonal pedestal surmounted by a statue of Oersted, and on which are three female figures representing the Past, the Present, and the Future. Oersted has in his hand the wire of an electric battery which he holds over a magnetic needle. The ceremony of unveiling was attended by the King of Denmark, the King of Greece, the Crown Prince, most of the ministers and diplomatic officials, professors and students of the University, and many other official, learned, and scientific men. The address was spoken by Prof. Holten of the Polytechnic, who sketched

the private and scientific life of Oersted, and referred specially to the great discovery, first published in a small Latin pamphlet on July 21, 1821.

It is fitting that we should record here the death of a modest but devoted student of science, Dr. Thomas Strehill Wright, of Edinburgh, at the age of 58. Dr. Wright was a practising physician in Edinburgh, but found time to make many researches, and probably a few discoveries, in various departments of science, both in biology and physics. From a memoir in the *Scotsman*, we learn that after settling in Edinburgh in 1853, he undertook a series of observations on British zoophytes, more especially those inhabiting the Firth of Forth, and not only discovered many important facts in their structure, but added to the British fauna several new and interesting forms. His memoirs on these animals, eighteen in number, were published in the *Annals of Natural History*, the *Edinburgh Philosophical Journal*, and the *Proceedings of the Royal Physical Society* of Edinburgh, and speedily attracted the attention of scientific workers in the same field both at home and abroad. He entered into a correspondence with Agassiz, Van Beneden, Claparède, Kölliker, and Allman, who in their writings repeatedly refer to the value of his observations and discoveries. But he did not confine himself to natural history studies. He was constantly at work with physical apparatus, and invented various singular forms of telephones, &c. Some of the most curious of his experiments on what he called Electric Cohesion Figures are described by himself in *Chambers's Encyclopædia*. But it is much to be feared that a great many of his most ingenious inventions and discoveries are entirely lost, as his modesty prevented him from bringing them before the Royal Society of Edinburgh, though he was frequently urged to do so. One of these was a mode of studying the scintillation of stars by observing them through a telescope of low power supported on a vibrating stand. In 1865 Dr. Wright was made a member of the Zoologico-Botanical Society of Vienna. His ingenuity and readiness showed themselves in the mode in which he constructed out of simple materials a piece of apparatus, or devised a new method of observation, or executed the beautiful drawings with which his natural history papers are illustrated.

THE Queen has acted justly and generously in granting to the widow of the late George Smith a pension of 150*l*. It is stated that Mr. Hormuzd Rassam will succeed the late Mr. Smith in his work of exploration in the East. A firman for two years has been conceded to Mr. Rassam.

THE Cavendish College, Cambridge, will be opened to-day by the Chancellor of the University, the Duke of Devonshire. The building when complete will be capable of accommodating 300 students. The objects of the college are—1. To enable students somewhat younger than the usual age to go through the University course. 2. To give a special training in the art of teaching to those students who desire to become schoolmasters. 3. To attract poor students by reason of the economy in cost of living. The College charges will be 84*l*. per annum, which will include tuition, University dues, board and lodging—in fact, everything but books and clothes. The residence will be nearly forty weeks during the year.

THE death of M. Lick, the well-known founder of the Californian University and Observatory is reported by an American paper as having taken place on October 1. Some difficulties are anticipated in the adjustment of the donation which amounts to 5,000,000 of dollars.

FOR the intended Liebig memorial the sum of 140,000 marks has been already obtained. Both Munich and the little town of Giessen, where Liebig began his important researches, will have memorials.