

REISCHEK'S 1890 PAPER ON 'THE KAKAPO (*Strigops habroptilus*) IN THE WILD AND IN CAPTIVITY'

By K. E. WESTERSKOV

ABSTRACT

During his stay in New Zealand, 1877-1889, the Austrian naturalist Andreas Reischek studied, collected and kept in captivity Kakapo (*Strigops habroptilus*). In addition to mention of Kakapo in papers in English, Reischek after his return to Austria in 1890 published a paper on the species in German, consolidating his experience and presenting new facts. A close and full translation of the paper is presented, together with notes and comments. The main sections discuss: unsociability, irregular breeding years, nesting, feeding behaviour, an alpine variety, winter ecology, parasites, plumage, trapping, offer of trapping Kakapo for Little Barrier, Kakapo in captivity.

INTRODUCTION

The Austrian naturalist and taxidermist Andreas Reischek was in New Zealand from 1877 to 1889. During this time he collected almost 1000 birds in addition to eggs, nests and skeletons, now in the *Naturhistorisches Museum Wien* (as well as an unknown number of other specimens sold or given to other museums, institutions and individuals); in the collection are 20 skins of adult Kakapo, 5 mounted specimens in a special Kakapo display case, 2 downy chicks and 2 eggs. In the *Oberosterreichische Landesmuseum Linz*, where Reischek was curator 1896-1902, there are 9 Kakapo specimens from a diorama made by him but not on display at present.

In addition to the 36 Kakapo specimens in Austrian museums, Reischek also kept live specimens for study, his first description of a pair thus held being published as early as 1878 (for translation see Westerskov 1980: 281-283).

While still in New Zealand, Reischek published 16 papers on birds in *The Transactions of the New Zealand Institute*, one of which (1884) contains a fairly detailed account of his observations of Kakapos until then. In subsequent papers there are brief mentions of Kakapo (Reischek, 1885: 98; 1887: 441) and two longer sections in *Yesterdays in Maoriland*, compiled by his son (Reischek 1930: 220-224 and 243-246).

In 1978, during a two-month stay in Vienna I found a series of ornithological papers by Reischek written and published in German in a somewhat obscure ornithological journal, *Mittheilungen des ornithologischen Vereines in Wien*; during a subsequent two-month

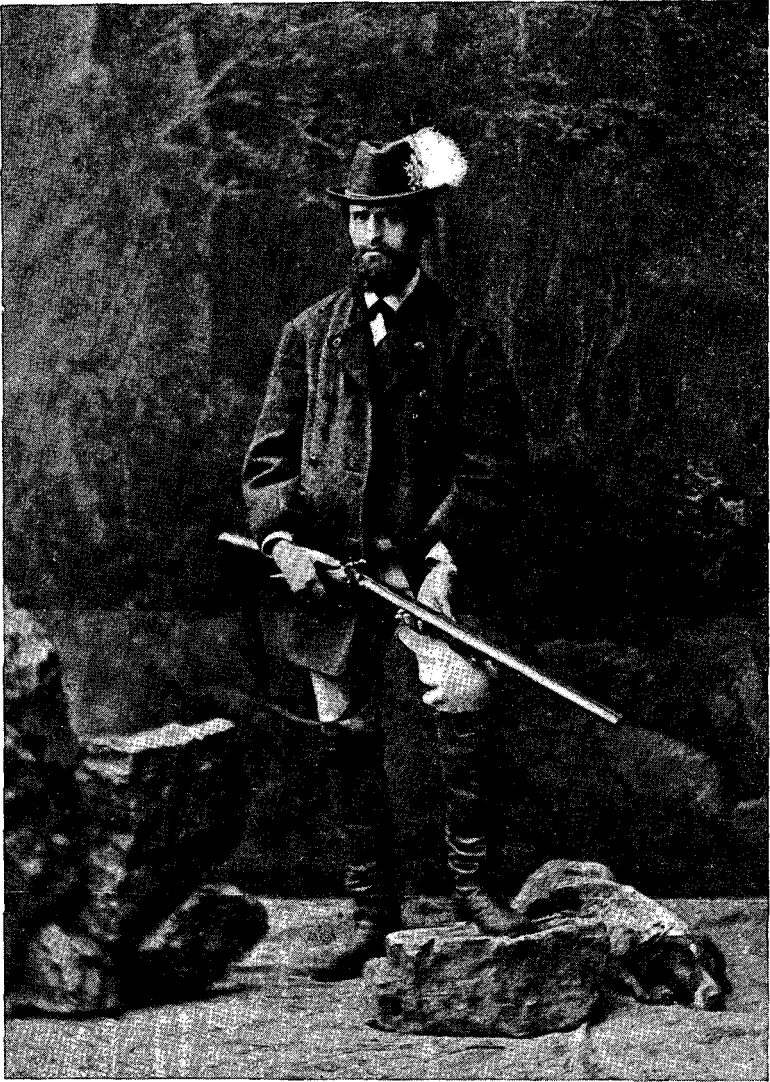


FIGURE 1 — Andreas Reischek, naturalist, taxidermist, hunter, would-be explorer, photographed in an atelier, probably in Vienna c. 1876 when he was 31 years of age. He is wearing traditional Austrian sportsman's attire of the day: loden coat with antler buttons and hat with Gamsbart (a clump of chamois back hairs). The gun is a double-barrelled, muzzle-loading, percussion hammer-gun. Photo courtesy Alexander Turnbull Library.

visit in 1980 to complete an examination of the Reischek material, I found another five notes and papers by Reischek. For the first two notes on New Zealand birds (Reischek, 1877; 1878) on Little Spotted Kiwi (*Apteryx oweni*) and Kakapo respectively, see translations in Westerskov 1980: 280-283. While some of these publications overlap in content Reischek's papers in the *Transactions of the New Zealand Institute*, others do not and contain valuable information, especially on the occurrence of rare forms, and biological observations.

One of these series, on the Kokako (*Callaeas cinerea*), has been translated and published (Westerskov 1979); this is the second such translation and more will follow.

Reischek returned to Vienna on 15 April 1889 but experienced difficulties both in gaining suitable employment and in obtaining satisfactory compensation for his large bird collection, which was not presented to the Museum in Vienna until 1891. He prepared his collections and did free-lance taxidermy, including work for the newly completed *Museum Francisco Carolinum* in his home town of Linz (now the *Oberosterreichische Landesmuseum*), where he was appointed *Kustos* in 1896. During the several years of uncertainty Reischek must have derived some satisfaction and stimulus from his writing and lecturing in Vienna and Linz on New Zealand bird life.

The local journal in which he chose to publish his series of New Zealand ornithological papers was an unfortunate choice from an international point of view. The *Mittheilungen*, printed in large (*quarto demy*) size, was local, in the German language, and was a mixture of ornithology, poultry management, cage bird and carrier pigeon keeping. It was little known in foreign countries and Reischek's papers on New Zealand ornithology appear to have remained unknown in New Zealand. None of them are listed in the *Aves* section of the *Zoological Record* for the period 1890-1893.

The following translation of Reischek's paper on the Kakapo is as close to the original German text as clarity allows, with minor alterations and interpretations as discussed in the notes and comments following the translation. For easier reading, I have added section headings: Reischek's original paper consists of only 11 paragraphs.

A copy of the original German text has been deposited in the Hocken Library, University of Otago, where it can be consulted by those interested.

THE KAKAPO (*Strigops habroptilus*) IN THE WILD AND IN CAPTIVITY

By Andreas Reischek

When the sun sets over the forests of New Zealand and when at dusk the first shadows fall and the lively multitude of birds of the day is silenced, then is the time when the Kakapos wake up in

their tree- and ground-holes where they have spent the day hidden by mighty roots.

They announce the start of their activities by hoarse screeches and soon set out to wander on their self-made tracks which are kept extremely clean; every Night Parrot, when using a track, bites off and consumes or at least tears off grasses and roots growing on the track.

These tracks are very like deer trails, and so it used to be thought they had been made by Maoris trekking from west to east. I had always doubted this explanation as for long there had been no Maoris in the west; if such a crossing had taken place a long time ago, the tracks would have been overgrown with the fast and luxuriantly growing vegetation as found throughout New Zealand. These communication lanes were, however, kept utmost clean and in good condition, and I soon found by watching the Kakapos that they were the caretakers.

Unsociability

When two Kakapos meet on these tracks, a bitter fight follows; the two opponents attack each other with beak and feet while their excitement is made known by their ardent screaming. When one of the combatants tires, he throws himself on his back and defends himself in this position against the attacks of his opponent. Such a fight ends either with the hurried escape of the defeated bird, which then is pursued by the victor for a short time, or with the death of the weaker combatant, which is killed by a bite in the throat.

The Kakapo is probably the most unsocial of all birds. Males of other species are usually antagonistic to one another, but they are never hostile to a female of their own kind. The Night Parrot, however, knows no gallantry. He knows only the right of the stronger, and the female as well as the weaker male is felled by his bite. Even during the mating period he restricts his tenderness towards his mate to *not* biting her to death or chasing her away. He does not perform a courtship display in order to win the favour of the female — in attack he gains the reward of love. The two partners separate immediately after completing mating and continue their lonely existence, every feeling of belonging together apparently extinguished: not once did I find two adult birds together in a hollow, even during the mating period.

Irregular breeding years

The Maoris maintain that the Kakapo breeds only once every five years, when the fruits of *Taphra Trycincta** are ripe. However incredible this sounds — and at first I myself doubted the truth of

* Reischek's original form, should undoubtedly read: the fruits (tawhara) of the kiekie (*Freycinetia banksii*); see notes for details.

this claim — it appears to be not without foundation: only during the year 1884 did I find eggs and young in different stages of development, but in 1885, 86 and 87 neither I nor various collectors and hunters known to me as fully reliable could find any signs of breeding Kakapo in the same region.

Nesting

The female chooses as nest site a hole in the ground that has several entrances and sections so that the bird can mislead an enemy if pursued. One of these nest burrows with two entrance holes and two sections which I measured had the following proportions: the entrance tunnel was a foot [30 cm] long and led into the larger chamber which was 24 in. [60 cm] long, 18 in. [46 cm] wide and 12 in. [30 cm] high; connected with this chamber via a one-foot [30 cm] long tunnel was a smaller hole, measuring 14 in. [36 cm] in length, 12 in. [30 cm] in breadth and 6 in. [15 cm] in height.

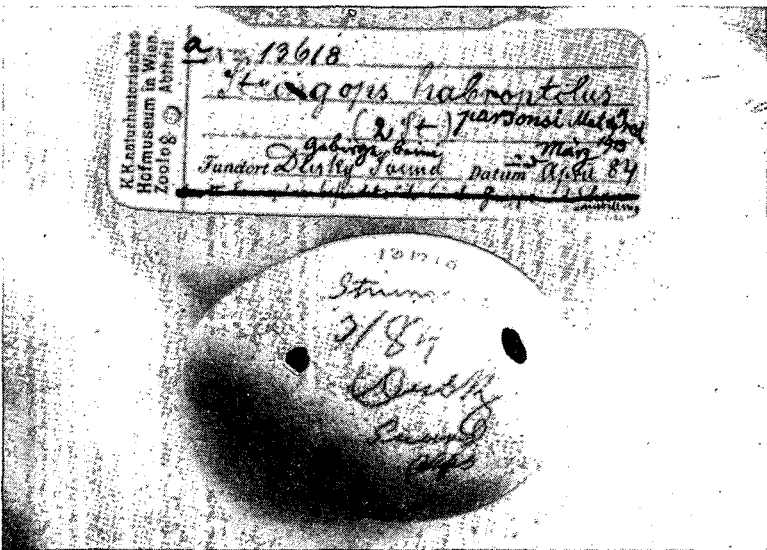


FIGURE 2 — Kakapo egg in the Reischek collection, Vienna, collected by Reischek in Dusky Sound, April 1884. The 3/84 written with pencil on the shell must be a Reischek (or later) museum error as Reischek (1884:188) did not arrive in Dusky Sound until 10 April; in the museum's egg catalogue under accession No. 13 618 is also listed one egg (not two) of 'Stringops habroptilus, Dusky Sound, April 1884.' There were two eggs in box under this entry, both well preserved; the egg shown measures 51.5 x 37.2 mm. Photo: K. E. Westerskov.



FIGURE 3 — Downy Kakapo chick (a few days old) in the Reischek collection, Vienna, collected by Reischek, probably in Dusky Sound, April 1884 (cf. Reischek, 1884, p. 195). Reischek's original label is missing and no catalogue entry is available. Photo: K. E. Westerskov.

The nest was found in a hollow in the first chamber and consisted of gnawn-off chips of wood and breast-feathers of the Kakapo. The female herself pulls these feathers to provide a soft warm layer for her offspring; an incubating female is thus easily recognised by her bare underside.

The clutch consists of two to three dirty yellowish-white eggs. I have always found only two eggs in a nest, but reliable people have assured me that three eggs are often found in a clutch. The newly hatched chicks are covered in white down, which soon gives way to the feathered plumage. The feathers show dirty white down at the tips until the young bird is a little over six months old.

When the young Kakapos leave the nest their short tail- and flight-feathers are as completely developed as in their parents. They differ from their parents only in their smaller body size and darker colours. As soon as the young have had their first outing away from the nest, they are abandoned by the mother and from then on go

through life alone. The father appears to show no interest at all in his progeny. The female at the nest makes as little noise as possible, and in the nest surroundings she moves about with the greatest wariness in order not to give the nest location away.

Food and feeding behaviour

The food of the Night Parrots consists exclusively of vegetable matter: grasses and their seeds, lichens, moss and roots, eaten in large quantities. The Kakapo eats as much as he possibly can, and in satiated specimens, the crop is still bulging full. The plants are bitten off with the beak and held with a foot, and so food is consumed in the same way as by other parrots. The birds are fattest in the New Zealand late autumn (May-June) because at this time they find everywhere a surplus of food and need not set out on long wanderings in order to find it, as they have to in winter when the vegetation is covered in snow.

At winter time the Kakapo grows thin because, even when it finds enough lichens in the shelter of the shrubs to avoid starvation, it must search for its food and for this purpose often covers vast areas. The Kakapo runs when carrying out these food-gathering wanderings; when snow covers the ground it paves its way on the same track, which sinks 1-2 inches [2.5 - 5.0 cm] into the snow cover.

During the feeding excursions the Kakapo develops high speed and endurance. One bird of which I had made drawings had a peculiar pace; it ran several steps and then made a few jumps, whereas all other Kakapos didn't make these jumps; the tracks of this bird were thus distinguishable and I observed that it covered three English miles [4.8 km] during a night.

The Kakapo is also capable of moving, skilfully climbing in tree branches, although it is comparatively rarely seen in trees. Its flying ability is little developed, and when fleeing it seeks to escape from an enemy usually by running, in which the wings are used only to help keep balance.

An alpine variety of Kakapo

A variety of *S. habroptilus* which I found only in the mountains and which I accordingly have given the name var. *alpinus* is extremely adept at climbing over rock. This variety differs from the Kakapo living in the lowlands in its considerably bigger body size as well as by its more shining plumage coloration and splendid pattern: the feathers on the back are adorned with bluish-green, iridescent mirror-like reflections; the skeleton is also more robust than in the common variety and the bird is much rarer than the latter.

I found this Kakapo, as already mentioned, only in the mountains and only in altitudes between 2500 and 5000 feet [820-1640 m]. As I first saw this bird during the summer, I thought that it would wander to the lower-lying bush in winter. But when I visited the mountain



FIGURE 4 — An example of Reischek's fine taxidermy: a Kakapo obviously feeding and holding some food material (now lost) in its left claw. From an original Kakapo diorama presented to the **Museum Francisco-Carolinum** Linz. Photo: K. E. Westerskov.

region in winter, with snow covering the ground, I found its tracks on the white cover.

Kakapo in winter

During the summer I had found Kakapos especially numerous in an area where one side of the valley consisted of a deep and steep rock wall down which one could get only by letting oneself down on a rope. I wished to visit this area to study the winter life of these Kakapos, but when I arrived at the gorge I lost heart when I saw the snow and ice masses covering the area. I hesitated a long time until I finally decided in the interest of science to set out on the dangerous journey into the depths of the mountains.

First, I roped my dog Caesar down into the abyss — the faithful companion of my lonely travels, often during long months my only company — and then I followed, recovering the rope. Here I found the tracks of the Night Parrot in fair number. To learn about its nightly activity, I dug a hole in the snow which admitted me and my dog, and then covered us both with a white sheet in order not to attract the attention of the bird.

Here I sat for hours, above me the clear star-studded sky and all around as far as the eye could see nothing but the white expanse of snow, brilliant in the moonshine. Nowhere a tree or shrub; at most a tuft of snow grass, a top of a stunted silver beech projecting above the white mass, all a picture of splendid emptiness. To this must be added a biting cold which stiffened my limbs as I did not

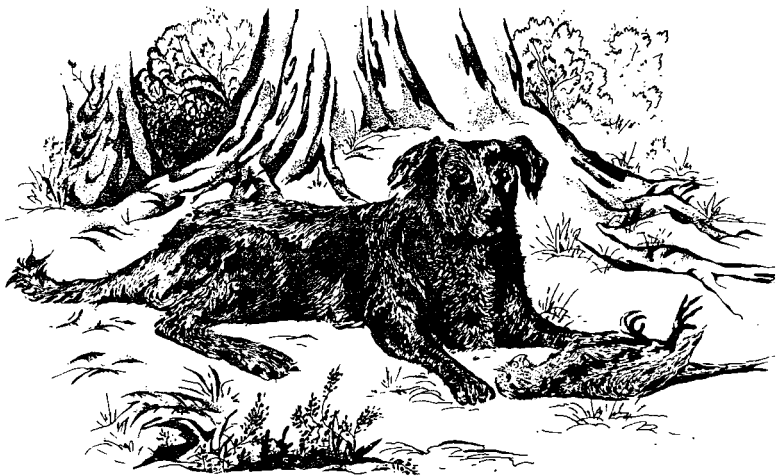


FIGURE 5 — Caesar, Reischek's efficient dog and faithful companion throughout his travels in New Zealand; here with a captured Kakapo. Redrawn by J. Clough from frontispiece to Reischek's *The Story of a Wonderful Dog*, Auckland 1889.

dare to make any movements which might betray my presence to the exceedingly fine hearing of the Night Parrots.

Sitting here I saw Kakapos hurriedly running by. They stood out sharply against the dazzling white snow wherever it was bathed in moonlight. Now they would disappear into the darkness of the shadows around a rocky outcrop; after a while they would reappear to examine thoroughly every tuft of snow grass for seeds or gnaw the soft twigs of akeake (*Dodonaea spatholata*).*

When the cold had become too much for me and I had to move to warm myself by exercising — in order to avoid exposure and freezing stiff — the parrots disappeared at my first movement; they fled fast, running to seek shelter in their holes in the ground to which they had scratched passage ways through the snow.

It is one of the characteristics of the Alpine Kakapo that it digs its own sleeping chamber and always returns to it, whereas the Kakapo living in the lowland bush at day-break slips into the first and best hollow it finds.

The departure from this valley was laborious and dangerous and I now think back on the event with horror. As already mentioned, one side of the valley was bounded by a steep, insurmountable rock face while the terraced formation on the other side, seen from above, appeared to allow an easy climb; during the summer I had climbed this slope with ease.

As I came closer I noticed to my horror that the distance had deceived me: the terraces extended almost endlessly and furthermore were covered with ice and frozen snow in a way that imperilled every step. It was possible to cross the sloping walls separating the terraces only by chopping steps in the ice cover, using my ice-axe, a terrible job for my exhausted strength in the icy winds. If the ice cover had been only a few inches thicker a crossing would have been impossible. As I climbed up a terrace, I pulled my dog after me with the rope.

Sleep and fatigue often nearly overpowered me, but by exerting all my will and strength I resisted the temptation to take a short rest because I knew that a sleep, under these conditions, would have been my last. If my strength had given out then, if I had yielded to my need for rest, my bones would today have been bleaching under the New Zealand sun.

Finally I scaled the last rock wall; exhausted, I sank to the ground and after a while for the first time I was able to warm my stiffened limbs somewhat by rubbing them with snow. Then I tramped for an hour downwards to the bush where I lit a fire right around me, which dried out my soaked clothes. Only then was I able to search for my camp.

* Reischek's original form, which is a mistake and should probably be *Olearia colensoi*; for details see notes.

The fatigue experienced during this expedition confined me to my sick-bed in camp for a week, shaking with fever; but I consoled myself with the thought that I had obtained several beautiful specimens of the Mountain Kakapo.

Parasites

It is a strange fact that the Mountain Kakapo, which is always much fatter than the bird living in the plains, is infected with parasites quite absent from the plains bird. These parasites are tapeworms of a milky-white colour, about $\frac{1}{4}$ inch [6 mm] thick and 6 in. [15 cm] to 2 feet [60 cm] long; two or three worms are often tied together in a knot, and a single one of these parasites is often twisted into a knot.

The presence of such spongers, however, does not indicate presence of a disease because the bird is almost invariably fat and well nourished.

Abnormal plumage coloration

In September of the year 1884 I found in Dusky Sound a Mountain Kakapo that was striking by its abnormally coloured plumage. The head of this bird was pale green; back, wings and tail were yellowish green adorned with dull yellow spots; neck and breast yellow, also paler spotted; beak yellowish, feet silvery grey, and eyes dark brown.

Sunning themselves

In spite of being nocturnal the Kakapo loves the rays of the sun, and I often saw birds sunning themselves stretched out on a rock or sitting on the dwarf shrubs with obvious pleasure. Some of them let me come so close without fleeing that it was possible for me to catch them.

Kakapo becoming rare

Kakapos have already begun to become rare and will soon be as localised as the kiwis. According to Chief Wahanui of the Ngati Maniapoto tribe in Mokau, the Kakapo was formerly so widely distributed in the North (Island) that his grandfather ate Night Parrots. Today no more are to be found, as they yield to the onslaught of European civilisation as it continues to spread and are incessantly pursued by the half-wild dogs.

This dying-out of Kakapos and species of kiwis was discussed at a meeting of the Auckland Institute by Chief Judge Fenton in a lecture on the dying-out of the Maoris, their art, and the New Zealand fauna. He proposed to introduce these birds to an island where their requirements are met and where there are none of their enemies in order to save them from complete extermination.

Little Barrier Island as a bird sanctuary

The lecturer described Hauturu Island* as such a suitable place; it lies to the north, is quite large, 2000 feet in height, and covered with a vegetation which satisfies the demands of the birds.

I also knew this island well and agreed with this proposal. I offered at my own expense to provide Kakapos and kiwis for release on the island. Accordingly, I took with me from Dunedin, the capital of Otago, cages and suitable foodstuffs and proceeded on a journey to trap the Night Parrots and kiwis.

Trapping the Kakapo

When, with much trouble, I had caught several of these birds, I placed them in the cages in such a way that females and males were together as I assumed they were more likely to tolerate one another than if the sexes were kept separately. Next morning to my great horror I found, however, all the females killed by the male birds, the dead birds lying on the floors of the cages with severed throats.

From then on I kept only birds of the same sex together in one container, and while these also fought one another to begin with, none became the master of another and in the end they became accustomed to one another.

After the birds had adapted well and were eating satisfactorily, I put them aboard the government ship with the instruction that from the first port of arrival they be sent immediately to the Director of the Auckland Museum (to whom I wrote at the same time) so that he could liberate the birds right away and send me new cages so that I could deliver more Kakapos and kiwis. These birds unfortunately never reached their destination — but more about that later.

Hoping to receive new transport cages I continued my trapping and brought the caught birds together in a pit in the ground where steep walls should prevent their escape. There was no danger of escape by flight as the Kakapo only leaps down from higher objects and never flies upwards.

During the first night the Kakapos spent in this pit they managed nonetheless to escape by digging through, and it was only after much trouble that I recovered the escapers. I now secured the pit against further digging attempts of my captives, but in the end I found I had to guard them all night. There was sufficient space in this pit for the birds to get away from one another and the Kakapos tolerated one another; they also lived in harmony with the kiwis with which they shared the pit.

After I had kept the birds in this way for several weeks and all the time waited in vain for transport cages, I came to the conclusion that no cages had been sent to me. Annoyed over this, I gave the birds away or let them loose in their native habitat. Immediately after this I received a letter from the Secretary of the Acclimatisation

*Now called Little Barrier Island, covering 2817 ha, highest point 722 metres.

Society in which he acknowledged receipt of my letter but also informed me that the advised shipment had not arrived at his address.

Subsequent investigation of this matter showed that, as a result of violent storms, the ship had not reached port till after a six-week voyage, and during this time all the birds had died.

Kakapo in captivity

The newly trapped Kakapo behaves to start with in an extremely violent fashion, bites wildly everything in sight, and runs incessantly backwards and forwards in the cage. It also does not accept food till after several days have elapsed. When the first wildness has gone, it soon accepts the turnips, potatoes and vegetables which make up its food in captivity and consumes appreciable quantities; but it drinks only a little water.

After some time Kakapos caught as adults usually become so tame that they will take food out of your hand and will let themselves be touched without biting. Artificially reared birds of this species become even more trusting; an acquaintance of mine owned such a bird which at night-time ran to the bush but always returned to the house at daybreak.

Although the Kakapos, as already mentioned, eat a lot as soon as they have adapted to captivity, they do not thrive in confined spaces but grow thin and finally die. I believe that the reason for this is the inadequate exercise which the captive birds can obtain.

The cage to accommodate Kakapos must be very strong and made entirely from metal or at least be safely lined with metal as wood would very quickly be destroyed by the parrots' beaks.

Kakapos for Europe

I wanted to take with me to Europe several Night Parrots kept in a roomy cage in which there was also a darkened sleeping box. Unfortunately the birds escaped through a cage door left open by the uncalled-for curiosity of a passenger. When I returned to the ship before the departure from the country I was advised that my Kakapos had escaped and fled to the yardarms.

The captain was kind enough to let his crew help me try to recapture the birds, and now began a hunt during which I had to laugh again and again in spite of my annoyance over the probable loss of the Kakapos. However skilfully the jack-tars negotiated the rigging the Kakapos understood it even better and soon had reached the outermost tops. Harassed here too, the birds glided through the air into the sea and found their deaths in the waves. Only a few Kakapos again reached my hands and I also lost these soon through a seasickness so all the costs and trouble I had spent had been in vain.

NOTES AND COMMENTS

A few comments are necessary to explain various obscure points and verify parts of the translation.

Reischek called the Kakapo *Stryngops habroptilus* — although in his 1878 note he correctly called it *Strigops habroptilus* following most writers of his day adding an *n* but in this paper also altering the *i* to *y*: *Stryngops*. G. R. Gray (1847), curator of birds in the British Museum (Natural History) from 1831 to 1872, described this species as *Strigops habroptilus*, well named from *strix* = owl and *ops* = face, *habrops* = soft and *ptilon* = feather, meaning the soft-feathered owl-face. Buller (1868: 11) correctly called it *Strigops* but as early as 1870 T. H. Potts listed it as *Stringops (Strigops) habroptilus* and from then on *Stringops* was in common use, for instance by Buller, Finsch, Haast, Hutton, and Sharpe. Reischek followed common practice at the time by using *Stringops* in his description (1884), but the 1890 use of *Stryngops* was apparently a lapse by him.

Discussing the irregular breeding years, Reischek wrote that breeding takes place only every five years when the fruits of 'Taphra Trycincta is an erroneous rendering of *Freycinctia*. This fits in well the Maori and generic names of an important food plant. The Maori name for the fruit of kiekie is tawhara (= Reischek's Taphra) and Trycineeta is an erroneous rendering of *Freycinctia*. This fits in well with the following quotation from Reischek's *Yesterdays in Maoriland*: 222: "The Maoris maintain that the kakapo breeds only once every five years, when the berries of the tafra (*Freycinctia*) ripen." The species name is kiekie *Freycinctia banksii*; its fruit is called tawhara.

There are two obscure references to trees from when Reischek studied Kakapo in the alpine snow country.

(1) "a top of a stunted *Silberfichte* projecting above the white mass." This German name refers to the silver fir, the commonest species of fir to a European being *Abies alba*, but it is used generally in both languages for species of the genus *Abies*; none of these were found then or are found now in Fiordland alpine valleys, and Reischek was using a familiar and common tree name for the small stunted trees he saw sticking up through the snow. In his 1884 paper (p. 197) Reischek says: "I found three birds in different places, sitting upon low silver-pine scrub." I have translated it as silver beech, but it could have been totara, which has sharp-pointed, narrow, *Abies*-like leaves.

(2) Kakapos were examining tussock for seeds and were gnawing the soft twigs of "Ake-Ake (*Dodonaea spatholata*)." Here Reischek has made a mistake as akeake *Dodonaea viscosa* (= *spatholata*) is a lowland-coastal shrub, not found in the alpine scrub zone and occurring only north of a line running approximately from Greymouth to Banks Peninsula (Poole & Adams 1963). In his *Yesterdays in Maoriland*, Reischek (1930: 244) has an almost identical description but corrects the species' name: "... and pecking at the soft branches of the ake-ake

(*Dodonaea viscosa*).” After a visit to certain southern islands of New Zealand, Reischek (1888) mentions “the akeake (*Olearia* sp.)” Williams (1957) records that akeake is used in reference to: “*Dodonaea viscosa*, *Olearia traversii* and other species, trees” and Salmon (1963) uses akeake for both *Dodonaea* and *Olearia avicenniaefolia*.

The Maori name *akeake* is used for *Dodonaea viscosa* (= *D. spatholata*) and for some of the shrubs of the genus *Olearia*. Reischek obviously knew an alpine *Olearia* as akeake but in the 1890 paper used the Maori name and *Dodonaea spatholata* in error. D. V. Merton has suggested that the most likely food plant Reischek referred to was *Olearia colensoi* (known to be a common and favoured food of the Kakapo occurring both in Fiordland and on southern islands), and in the translation this name has been substituted for the obviously incorrect *D. spatholata*.

Reischek's reference to Chief Judge F. D. Fenton's proposal to make Little Barrier Island a bird sanctuary for Kakapos, kiwis and other threatened native birds has the following background. At the meeting of the Auckland Institute held on 18 October 1886, four papers were read. One of these was Reischek's (1886a) paper on the Pied Tit, Robin and Bellbird. According to the *New Zealand Herald*, 19 October 1886 (p. 3) reporting the meeting: “Professor Thomas read a paper on ‘Ornithological Notes’ by Mr Reischek. He added that it appeared that the birds of New Zealand seemed to have less power of resisting their various enemies than those which had had to go through keener competition in their struggle for life. Judge Fenton suggested that the members of the society should make an effort to get the Little Barrier Island (Hauturu), where the birds alluded to were abundant, into their own possession. Mr Reischek and Dr Murray Moore also spoke.”

At the following meeting of the Auckland Institute, held on 14 November 1886, Reischek (1886b) made the following proposal: “If the members of this Institute are in favour of obtaining Hauturu Island for preserving and protecting the Native birds, from my knowledge, and after many years studying the habits of New Zealand birds, I could not recommend a more favourable place . . . and if my aid in the project is of any use, I will be most happy to procure (gratis) live specimens of both sexes of *Apteryx* (kiwi) and *Stringops* (kakapo), if the Committee will provide me with cages and arrange for the transport, before or when I am again on the West Coast, about December next.” It is about the fate of this proposal that we have read in his Kakapo paper translated above.

The claims of Little Barrier Island as an ideal bird sanctuary were set before the Government in 1891 by Judge Fenton. In 1892 Hugh Boscawan camped on the island and reported to Parliament on its suitability. The island was bought by the Crown under the provision of the Little Barrier Island Purchase Act 1894 as a preserve for flora and fauna (Hamilton 1961).

Some of the comments made on this manuscript by D. V. Merton, Wildlife Service, who has probably had more experience with Kakapos in the field than anyone else, will be of interest; Merton found many of Reischek's observations "of very real significance to current research on Kakapo." Different points will be discussed in the order in which they occur in Reischek's text.

Merton has found that most of the Kakapos located in recent years have been roosting in low trees, on the ground in dense cover, under tussock bushes, or in shallow natural cavities; rarely in holes as described by Reischek. He further found that Kakapos maintain tracks only during the booming periods: such long well-defined tracks along ridges, as rescribed by Reischek, are now known to be the contiguous "track and bowl systems" of neighbouring males on an arena. They are thus not for migration or commuting, but for courtship purposes only; they belong to several birds and are maintained almost exclusively during the irregular booming seasons. 'Tracks' used at other times of the year are not deliberately maintained by the birds; this is supported by H. A. Best (pers. comm.) from recent observations on Stewart Island.

Reischek comments about intraspecific hostility of Kakapos to the point of killing one another and even males killing females. Merton wonders if Reischek had *seen* this in the wild; he suggests that Reischek's observation of captive birds may have been extrapolated as the basis of the dramatic statement of Kakapo antagonism and of males killing females in the wild. Merton has found that in the wild they live singly and are intolerant of one another, and that in general each bird has a large home-range (at least 1 km²), except during the courtship period. If Reischek's observation is correct, such fighting behaviour would occur only during the courtship season; in mid-summer when little if any snow was about. Without night vision equipment — as used now — the recorded observations would seem impossible in the wild, and Merton suggests that Reischek probably inferred such encounters after hearing pre-booming social interactions, during which (Merton says) "you would swear the birds were killing one another."

Merton agrees with Reischek's observation that the "Kakapo is the most unsocial of all birds" and says it is fully supported by recent observations; they are intolerant of one another, male and female of their own species; he doubts, however, that males would, under normal circumstances, ever kill one another or females in the wild: "Such behaviour is counter-productive and suicidal to the species."

Reischek apparently never saw the Kakapo's elaborate courtship display as he had no night vision equipment. Although he did study Kakapos by moonlight, he is not likely to have seen them closely enough to see the display. Kakapos do have an elaborate and spectacular courtship display during the night, booming and displaying from established bowls or courts on arenas (Merton 1977).

Observations at two nests on Stewart Island in the 1980-81 summer have confirmed that the female alone tends the nest.

Reischek's comment (based on what he had learned from the Maoris and supported by his own observations) that Kakapos breed only every 5 years when the fruits of kiekie are ripe was considered by Merton to be of considerable interest and is supported in principle by recent findings: "We have found that booming (= breeding) occurs at intervals of 1-4 years, usually every 2 years, always in summer (in the South Island and on Stewart Island). It is almost certainly regulated by food availability and/or quality." Further, "in some years *all* birds in a region boom, in others *none* boom, and yet in others *some do* and others in neighbouring valleys *do not*. We have yet to confirm that no nesting is attempted by females in non-booming years, but I am sure Reischek and his contemporaries are correct in this assumption."

Of the two Kakapo nests found in the 1980-81 summer, one was under a tussock clump and the other in a shallow natural cavity. Merton has not seen Kakapo burrows as described by Reischek and suggests that they may in fact have been petrel burrows taken over by Kakapos because, even in an earth-floored enclosure, Kakapos seem unable to tunnel under a side wall to freedom.

Reischek's observation that young birds show dirty white down at the feather tips until 6 months old, Merton finds of interest and perhaps of practical application in identifying birds of the year and thus proof of recent breeding.

Reischek's conclusions on the food of the Kakapo are by Merton considered correct after examination of many hundreds of droppings. Merton has found that Kakapos have a most unusual if not unique method of feeding, all grinding of food items being done in the bill. Except for some seeds, only very fine material is taken in; the gizzard is small and degenerate and its function of grinding food seems largely to have been taken over by the bill.

Regarding flying ability Merton agrees with Reischek; Merton finds the Kakapo's powers of 'flight' "approximate those of a fat Black Orpington hen"; its 'flight' is a wing-assisted leaping or parachuting of steep descent for short (4-5 m) distances only. Merton has often seen Kakapos climbing in trees up to c. 15 m, and about 40% of birds captured have been in trees, at heights of 1-6 m.

Merton comments that: "In mountainous country (Fiordland), adult males in breeding condition often migrate to higher levels to tend arenas. Females presumably inhabit lower areas. This would account for larger (male) birds, weighing 2.0-3.5 kg, in fine plumage at higher levels, and females weighing 0.75-1.5 kg elsewhere. Most sexually active male Kakapo we have found in Fiordland in recent years have been at 2500-3500 ft [760-1065 m] above sea level. They lived nearby or at slightly lower elevations at other times." He concludes that Reischek's suggested bigger alpine race may in fact have been mature males encountered at higher levels, and that the smaller birds found at lower levels are likely to have been females and young birds.

Reischek's long description of his visit to the Kakapo country in winter is a somewhat romantic account of an undoubtedly harrowing experience, in both length and emotion somewhat out of step with the remainder of the largely descriptive article. Merton has pointed out that the scene described is an unlikely landscape for Kakapo, and the proximity of the birds to one another is suggestive of activity on an arena. Such activity, however, is not known to occur in winter months. It is not possible to pinpoint the locality, but Merton suggests it is "most likely in Fiordland on account of Kakapo abundance at that time, the steep terrain and the extent of snow and ice. I suspect it may have been the Milford catchment, access to which at that time was by rope via the Homer Saddle."

In alpine areas Kakapos often boom from high vantage points. Merton comments that sexually active males may weigh 2.5-3.5 kg, while in non-booming seasons these same birds may weigh only 1.8-2.2 kg.

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 K. E. WESTERSKOV, *Department of Zoology, University of Otago, Dunedin.*