

## Eating Habits of the New Guinean Frogmouth (*Podargus papuensis* Quoy & Gaimard).

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(Med et dansk resumé: Næringsoptagelsen hos Ny Guinea Frømunden (*Podargus papuensis* Quoy & Gaimard).)

In spite of its character, first and foremost as an abyssal expedition, the second Danish Galathea Expedition 1950–52 brought back from its anchoring-places in foreign countries, a good material of terrestrial animals. In the New Guinea collections there were three specimens of the Frogmouth (*Podargus papuensis* Quoy & Gaimard).

The most important recent paper on the feeding habits of the genus *Podargus* is the paper by EDITH COLEMAN (1946) dealing with the Australian *P. strigoides* (Latham). She has watched the bird flying from points of vantage straight to the ground for some prey, and she has found this to be the rather small melolonthid beetle *Heteronyx insignis* adults. The *Heteronyx* are on the ground, emerging from the soil at dusk, just when the frogmouths are active. In captivity her birds accepted readily meat, dead mice and nestlings, but living mealworms were instantly rejected although when crushed they were relished. The authoress has also seen frogmouths pursue flying moths; there was, however, never any sustained hawking, but a direct flight from tree to prey and back to tree. She has seen the birds fly some distance without alighting and immediately feed the young, and she concludes from this that flying prey is captured. She believes that »freezing« on their perch, the birds might wait for insects, small mammals etc., to creep into their beak. From the observations of others EDITH COLEMAN refers that a tree-creeper has been seen flying towards what appeared to be a bit of dead wood and was devoured by this »frozen« Frogmouth, and that the bird has been seen eating frogs and a half-grown rat.

SERVENTY & WHITTELL (1948) informs that *Podargus strigoides* does not catch the prey while flying but chooses a somehow established place from where, with its sharp hearing, it is able to observe different small animals, which it then flies down to fetch. Among the prey are mentioned mice, scorpions, centipeds, and it is clearly said that the bird does not take flying moths or flying night-insects at all. Furthermore it is mentioned that the gape is white and that these birds strikingly often are killed by cars during night time.

During his stay on the New Guinea, The Swedish scientist STEN BERGMAN (1951) for several months had the opportunity to study

a young bird of the smaller species, *P. australis*, which he kept in captivity. This bird, captured while still in the care of the parents, was easily kept alive with various kinds of animal food, such as bits of meat and grasshoppers; it swallowed these entirely but bigger pieces it tried to divide.

There is, however no observations of the feeding habits of *P. australis* under natural circumstances. The colour of the gape is described as yellowish. Concerning the proper species *P. papuensis*, which was common on places where it lived, BERGMAN only informs that very often he was able to hear its strange and strong voice, but about the feeding biology he gives no information.

One of the birds, brought home by the Galathea Expedition, was not skinned but preserved in deepfrozen condition, hence it has kept its natural appearance extremely well, The colour of the gape, as well as the inner organs, were especially well preserved. It was during the preparation for exhibition of the bird that several morphological characters seemed so strange to the senior author that he felt provoked to the examinations, described in the following.

As in all species of this genus the bill is very strong, and of an enormous size, even in comparison with other night-jars (fig. 1). The maxilla, especially the anterior part, has a very sharp edge and the tip is curved as in a hawk; the tip of the mandible is descending, following the curvature of the maxilla. The most interesting of the gape is the interior colour which is absolutely outstanding in adult birds. With the exception of the innermost depth of the throat, fleshcoloured as normally, the gape has exactly the same sulphur-yellow colour as the flower of the night-candle (*Oenothera biennis* L.), a colour which most intensively returns the scarce light of the night. According to all accounts regarding the night-candle flower, the gape of the bird must be conspicuous in a distance of several meters, even in dark nights.

When the bill opens the tongue is lying in its natural position as a pistil in a flower, a position which is of the greatest importance to the bird. This will be further mentioned below. The tongue is broad and very flat; the biggest part is membraneous and more or less transparent.

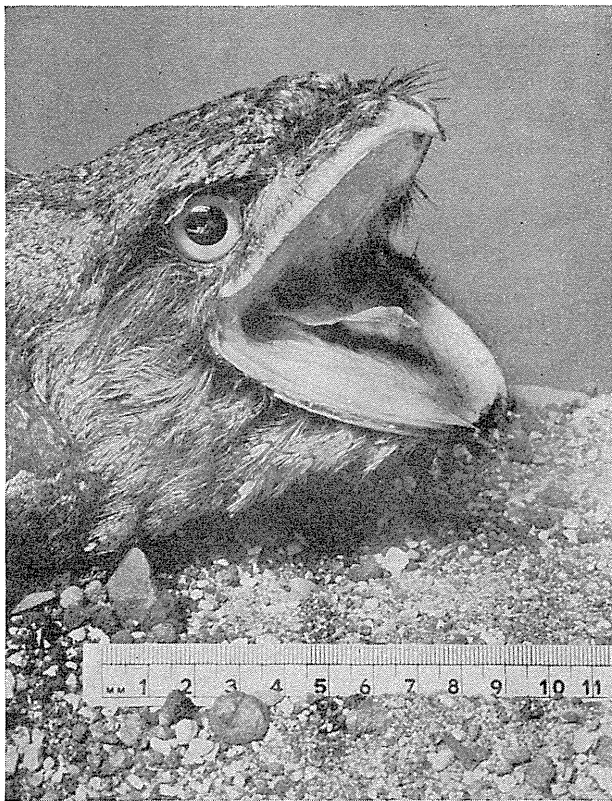


Fig. 1. Head of *Podargus papuensis*, from a mounted specimen in Zool. Museum, Copenhagen.

*Hoved af Podargus papuensis, fra et opstillet stykke i Zool. Museum, København.*

In the stomach of the examined *Podargus* two insects, both night-flying cockchafers, were found only. They were about 25 mm long and belonged to the same species of the genus *Holotrichia*, or near related to it. One of these beetles has been caught just before the death of the bird and was especially well conserved, while the other one was in a strong state of decomposition.

An interesting detail as to these beetles is that in the moment when caught both of them have been in the same position, as regards the head of the bird, and have been in the same distance from the throat. Their elytra have all been injured alike and the injury has formed oblique lines on the wings.

Both of the insects have on the same spot of the abdomen a mark due to the tip of the bill. If one places the elytra in the position which is natural to the flying beetles and, if one closes the bill with the tip against the mark on the abdomen, one gets exactly the position of the moment when the beetles were caught. Therefore it must be concluded that the beetles have been flying in the direction of the throat, but just before they

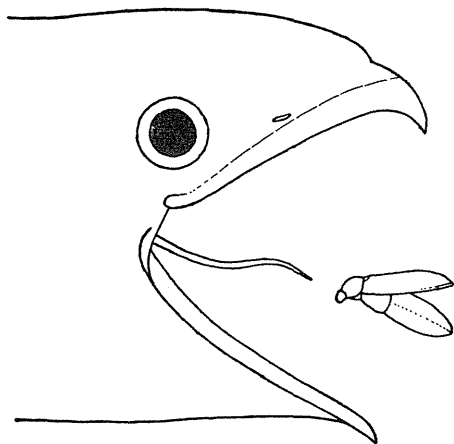


Fig. 2. Sketch of head of *Podargus papuensis* to show the position just before a beetle is caught.

*Skilse af hoved af Podargus papuensis for at vise stillingen lige inden en bille fanges.*

would have reached the tip of the tongue, the gape has been slapped together as a trap (fig. 2). Apparently the injury of the elytra is casts of the especially sharp front part of the edges of the bill.

We are, of course, not able to determine whether our observations indicates any regular feeding habit of the *Podargus papuensis* as our material has been much too small for this purpose. However, we feel sure that at any rate these two cockchafers have been caught by a bird sitting passively on the ground, on a stone or on a branch, and with the bill open. Otherwise it seems very unlikely that both beetles should have been caught in the position just as described in the foregoing. Compared with a flying bird the position of the prey must be quite accidental. That the beetles, on the contrary, have been

flying is clearly to be seen by the position of the elytra in the catching moment, and by the fact that the hindwings were partly unfolded (fig. 3). The marks on elytra and abdomen could not have been formed in such a way as they are, if the bird had picked the two beetles from the ground in the manner described from Australia by EDITH COLEMAN. Then they should have been caught across the body or, if they were

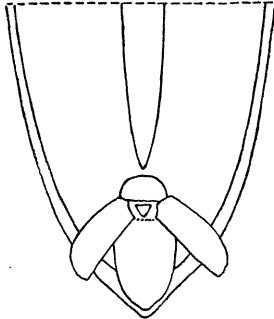


Fig. 3. Sketch of mandible and tongue of *Podargus papuensis*, viewed from above, showing the position of a beetle in the moment when the "trap" closes.

Skitse af undernæb og tunge af *Podargus papuensis*, set ovenfra, for at vise stillingen hos en bille i det øjeblik »fælden« klapper sammen.

caught on their way up from the soil, with elytra closed, hindwings folded, and prothorax damaged.

It is our conviction that first of all the colour of the gape has made it possible to the bird to catch the two cockchafers. The open gape is in a startling way, by colour as well as by form, alike a local flower with the same name as the bird: Frogmouth (*Philydrum lanuginosum*). However, it is not likely that this similarity is of importance as cockchafers do not at all pay any interest in flowers. The scents, coming from the gape, may be of some interest but possibilities for such a theory seems to be very few as cockchafers usually are not attracted by animal scents. Without knowing about the reaction abilities of the species of cockchafers in question one can, however, not reject the fact that the voice of the bird may serve as a guide to the insects choice of direction. We presume that the Frogmouth reacts on the brumbling from the flying beetle by turning the head towards the noise and, obviously,

the open gape thus acts as a light-trap to the nightflying insect. The beetle takes its course directly towards the light and, when near enough, the contrasting colour makes the central throat to a new goal. We consider it most likely that the membraneous part of the tongue now functions as a vibrator, or is in another way able to score just the distance of the prey when the gape has to be closed.

### DANSK RESUMÉ

#### Næringsoptagelsen hos Ny Guinea Frømund (*Podargus papuensis* Quoy & Gaimard).

I Galathea-Ekspeditionens materiale fra New Guinea var et eksemplar af den til natravnene hørende Frømund (*Podargus papuensis*), der var bragt hertil i dybfrossen tilstand. Det havde bevaret alle naturlige farver ganske fortræffeligt, ikke mindst i det svovlgule gab, hvis farve er meget gennemtrængende i nattens mørke.

Skønt det oplyses, at *Podargus* især lever af dyr, som den samler op fra jorden, bestod maveindholdet af det hjembragte eksemplar af to natflyvende oldenborrer. Billederne var endvidere bemærkelsesværdige ved at bære ganske ens mærker af fuglens bid, mærker, der viser, at billederne har været flyvende i fangstøjeblikket, men at fuglen har siddet stille.

Vi kan af det foreliggende materiale ikke afgøre, om vi har iagttaget en almindelig ædevane hos *Podargus*, men vi er overbeviste om, at fangsten i dette specielle tilfælde er gået for sig på følgende måde: Natravnen har opfattet billens brummen, og som reaktion vendt sit gule gab lige mod lydretningen. Gabet har virket som en lysfælde på insektet, der har styret sin kurs lige mod svælget; i en ganske bestemt afstand fra dette har fuglen lukket gabet, så insektet er fanget med næbspidsen. Sandsynligvis lukkes næbbet som reaktion på vibrationer, som insektets vingeslag frembringer i den membranøse tunge, der rager frit frem i det åbne gab.

### Literature.

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