



K. H. Barnard del.

The Isopod *Phraetoicus capensis*, Barnard.

n.s. natural size.

TROUT FOOD AND ITS IMITATION

By A. CECIL HARRISON

PART 4 — "FRESHWATER SHRIMPS" AND GALAXIAS AT STEENBRAS

(Previous parts in this series: Part 1, No. 58, Spring 1963, Introduction and Mayflies. Part 2, No. 59, Summer 1963/64, Dragonflies. Part 3, No. 61, Spring 1964, Cape Alderflies and Snipeflies.)

IN PISCATOR No. 72, page 46, the occurrence of these two forms in the stomachs of trout caught in the Steenbras Reservoir was mentioned. Fuller particulars may be of interest. In the case of the "freshwater shrimps"; although the Amphipod *Gammarus* (*Paramelita*) *nigroculus* is found occasionally in trout caught in upland streams, the masses of the Isopod *Phraetoicus capensis* in the reservoir trout, to the exclusion of all other food, is much more remarkable. The fact that some trout had specialised in the collection of this food item suggests that they had struck a patch on the bottom in a favourable area. The following notes on the habits of *Phraetoicus* seem to bear this out.

The Isopod *Phraetoicus capensis*, Barnard, illustrated above, was first described by Dr. Keppel H. Barnard of the South African Museum in *Nature* in 1913, and in the *Annals of the South African Museum*, Vol. x, 1914. He dealt further with the genus and with the anatomy, embryology, and biology of *P. capensis* in the *Transactions of the Royal Society of S.A.*, Vol. xiv, 1927.

Dr. Barnard's field and laboratory studies in this research, as with all his work, were most exacting and complete. He was in contact with Dr. C. Chilton of Christchurch, New Zealand, who sent him specimens of the Australasian species, *Phraetoicus australis*, from Mount Kosciusko, New South Wales, and *P. kirki* v. *dunedinensis* from New Zealand, with which *P. capensis* proved to have close affinity.

P. capensis was first reported from Table Mountain in 1913, and thereafter Dr. Barnard collected it in the Hottentots Holland mountains, in the Steenbras valley and the Kogelberg, as well as in the Sonderend mountains, in the Langeberge near Swellendam, the Tradouw Pass and at Riversdale—notably areas with dark, peat-stained and acid waters.

The *Phraetoicus* are closely allied to *Asellus aquaticus* of Europe. They do not swim on their backs or propel themselves along on their sides, but always (on a flat surface) walk erect and move along with a slow, steady push. If dropped into the water, they sink passively to the bottom, making no attempt to swim. They curl up and remain quiet for a while and then bury themselves in the mud or crawl into vegetation.

In the Steenbras valley (before the coming of the reservoir) Dr. Barnard found quite small runnels, often only a few inches wide, thickly populated with *P. capensis* during the wet season, evidently finding their way there from other more permanent runnels, or tiding over the dry season by aestivating in holes (as described below). They also thrive in marshy spots where the water must be stagnant all the year round.

He found them confined to those portions of the stream where the current is not too strong to prevent the growth of moss and the accumulation of humid mud, not in typical mountain streams where the water tumbles over boulders and scours out its bed. Obviously, with the inundation of large areas of the former natural habitats, there must be muddy bottoms amongst the reed beds of the shallows of Steenbras Reservoir where trout, if so inclined, can glean a stomachful of these succulent crustaceans.

Dr. Barnard found that the eggs of *P. capensis* are carried in a brood pouch by the females, numbering from 7 to 15 eggs from which 5 to 12 embryos reach maturity, so they are by no means prolific. The young start their independent existence at mid-summer when they are about 3 mm. in length. Their rate of growth increases until about May, and then slows down in the winter season. It increases again after July, and continues through the summer until the following May, when they are fully grown.

From the beginning of May onwards, pairing takes place and mated pairs are everywhere to be found at this season, in fact single mature specimens are so rare that very close equality in numbers of each sex may be inferred. Pairing continues up to November, when the females are found with ova in the brood pouch. Whether the same male may carry the same female for upwards to six months could not be proved, as it was not possible to keep pairs alive under observation beyond one month; but during that period the male did not leave hold of the female.

The food of *Phraetoicus* consists of vegetable mud from the bottom of streams and pools, and at the bases of moss and water weeds in which they live. They may also fill the alimentary canal with fragments of Sphagnum moss, bitten off from green, growing shoots. They cannot be attracted to bait as can the black-eyed *Gammarus*, but Dr. Barnard once left a mountaineer's porridge saucepan in a stream to soak overnight and collected an enormous number of *Phraetoicus* in it next morning!

When these crustaceans wander from their protective haunts among the beds of water weeds, they are liable to be devoured immediately by frogs and fish. This has certainly occurred with trout; but Dr. Barnard was writing about the Steenbras stream in its original mountain condition, where the sole indigenous fish, the "mountain minnow" *Galaxias zebratus*, was in his opinion not large enough (60-70 mm.) to be able to swallow an adult *Phraetoicus capensis*.

Dr. Barnard determined by laboratory experiments that *Phraetoicus* is able to exist without water for several weeks or months, and survive droughty periods by aestivation in little pits in the peaty mud of the Hottentots-Holland-Steenbras area. The peat was saturated with water, but there was no free water in the holes occupied by the animals where they were breathing only damp air. They were active at once when dug out.

In his summary, Dr. Barnard notes that *Phraetoicus capensis* is confined to old and mature valleys in the less highly tilted mountains and is not found at the present day outside the limits of the effective deposition of moisture from the clouds formed by the south-east Trade Winds.



**Pits formed by
Phraetoicus
in the mud at
the bottom of a
dried-up pool in
the Hottentots
Holland
Mountains.**

(Photo: K. H. Barnard)