Hancock" may be of added assistance in the finding of a mate, they are not indispensable. Seliskar (1923) regarded the glands as a character peculiar to cave dwellers, but Chopard (1938) considered them to be a morphological characteristic of most Rhaphidophorids, without any relation to the adaptive characters of cave dwellers. Chopard's opinion appears to be correct, as the glands are absent from all New Zealand members of the family so far examined.

OVIPOSITION

Very little is known about the egg-laying habits of the Gryllacridoidea; but they are believed to be similar to those observed among the majority of Gryllids and Tettigoniids, the eggs being deposited in the earth. Until this study the only information on egg-laying in the Rhaphidophoridae was by Hubbell (1936), who discovered that the majority of species of *Ceuthophilus* oviposit in the ground at a depth determined by the length of the ovipositor. He also found eggs in rotten wood, and in loose materials composing beaver and musk-rat houses. Many of the more strictly hypogenic species he considered probably oviposit in their burrows. In the limestone caves at Waitomo *Pachyrhamma waitomoensis* and *Pallidoplectron turneri* oviposit in the soft mud on the walls inside the caves.

Females of *P. turneri* were observed ovipositing on the walls of the Grotto in Waitomo Cave in January, March, April, June, July and November at times ranging from 10.30 a.m. to 10.30 p.m. This differs from what has been observed with *Ceuthophilus latibuli* where, according to Hubbell (1936), the eggs are laid at night. The female *P. turneri* begins by selecting a suitable spot. This it does by making a number of short, jerky, running movements with its maxillary palps directed straight out anteriorly to explore the surface of the ground. The antennae are not used, or are of secondary importance. When a site has been chosen, the insect raises itself upon the tips of its legs, and arches its abdomen until the ovipositor can be brought forward to a position slightly in front of vertical. The legs are well spaced apart. Then the ovipositor is thrust into the mud to a depth of about 7 mm to test its thickness and texture. If the mud is not suitable, the ovipositor is immediately withdrawn and several more probing movements are made in the same area. If still unsuitable, the maxillary palps are again directed anteriorly and the short, running movements are recommenced. Only when thick, soft mud is encountered does the ovipositor remain embedded in it for three or four minutes, or even longer. The body is lowered to a slightly arched position, and remains motionless, except for a peculiar twisting of the abdomen from side to side. At the end of this period, the ovipositor is withdrawn with a sudden, sharp movement, the insect arching its body to do so. Then, with another abrupt movement, the ovipositor is returned to its normal position. The female immediately moves away from the spot and, if oviposition is continued, it recommences probing the mud for another suitable spot. Only one egg is deposited at each insertion. A female which has been ovipositing can always be detected by the coating of mud adhering to its ovipositor. On two occasions marked wetas travelled 12.4 m and 43 m respectively from the area where last recorded to the particular spot selected for oviposition.

The walls of the Grotto tunnel contained several thousand ovipositor holes, ranging from 1.3 m to less than 30 cm above the water level. Consequently the areas were usually covered by water a number of times, depending on how many floods there were in a season, and often large areas of mud were washed away. Usually about 50 ovipositor holes occurred together over an area 2.5 cm square. Most of the holes were preliminary probes, usually only one or two eggs at the most being laid in any particular spot.

Light intensity and temperature fluctuations had very little influence on oviposition. Egg-laying was observed in temperatures ranging from 12.1° C. to 16.1° C.