

teeth in each row varied considerably. In *Pseudaneitea papillata*, for which Suter gave the denticle number per tooth as 7, radulae taken from three slugs collected at the same time and place had denticle numbers varying randomly between 3 and 11, 4 and 9, and 5 and 9. With such obvious variation as this it is surprising that denticle numbers were used as systematic criteria in the first place.

The genus *Athoracophorus* is found only on the mainland; it has a more northern distribution than the other three genera. The skin of the three constituent species of this genus is thin, and the back has to be kept moister than that of an individual of any other genus. This feature possibly enables the members of the genus to survive in areas with a relatively high average temperature, but they seem to be restricted to areas with over 40in annual rainfall. Furthermore, no member of this genus has yet been found in an open environment, in which the temperature range would be greater and the humidity lower than in forest. The thicker skin of the other three genera apparently enables them to withstand desiccation more easily, and there are numerous records of members of these genera from a grassland habitat.

There are, unfortunately, insufficient records to provide a comprehensive picture of the distribution of the species within New Zealand. There are some widespread species such as *Athoracophorus bitentaculatus*, *Pseudaneitea papillata*, and *Pseudaneitea gigantea* (West Coast, South Island), but most others appear to have a limited range, for example *Pseudaneitea dendyi*, Mid-Canterbury, *P. schauinslandi*, Marlborough Sounds, *P. powelli*, Queenstown and Te Anau, *Athoracophorus maculosus*, N.W. Nelson, and *Reflectopallium pseudophyllum*, Hawdon River. In fact, apart from a few species, the New Zealand Athoracophoridae show marked geographic speciation, and many hitherto neglected areas probably harbour new species.

The problems posed by the distribution of the subantarctic species are interesting. No subantarctic species has been found on the mainland, and only one species, *Reflectopallium martensi*, occurs on more than one island. This species has been found on both Auckland Is. and Macquarie Is. It is not known how long the slugs have been on the islands, but to speciate as much as they have they must have been there through the Pleistocene glaciation. It appears that the ice cover on the islands was not complete, and small, tussock frequenting species would probably survive so long as there was a continuity of land surface. Large slugs have been found above the bush-line at an altitude of 5,500ft in the South Island, and it does appear that thick-skinned slugs can withstand temperatures down to freezing point. The derivative problem of how the slugs reached the island in the first place cannot be solved on the basis of our present knowledge. While a land bridge hypothesis could be put forward to explain the existence of slugs on Snares, Auckland and Campbell Islands, it fails in the case of Macquarie Is., which is separated from the others by a broad expanse of deep water. Rafting of eggs among masses of drifting vegetation or on floating logs is a possibility; however, an egg immersed in seawater will survive only about three days. As the eggs are often laid in large clusters in cracks in logs, it is possible that a few eggs in the centre of the cluster would survive long enough to drift the necessary distance. But to get to Macquarie Island from Auckland Is., as *Reflectopallium martensi* has done, the raft would either have to drift against the West Wind Drift or complete a circumpolar journey, both of which are most unlikely, to say the least. It is possible that the West Wind Drift is a recent phenomenon, but this possibility is not supported by any evidence. There seems to be no satisfactory solution which can be reached on the basis of our present knowledge.

The most distinctive feature of the group as a whole is the possession of a dorsal tracheate lung of a nature found in no other mollusc. The true function