the fate of all the crabs except for *Halicarcinus planatus*. If some members of *Nectocarcinus* had been able to withstand colder conditions these may well have survived around the Auckland Islands while the rest died out, a situation in which theoretically two species could have evolved. On the mainland of New Zealand, *Nectocarcinus antarcticus* (which in spite of its specific name extends further to the north at present) could either have lived on in its present form, or have evolved into its present form from an ancestor common to both species. Around the Auckland Islands the surviving members of the genus could well have evolved to form the present *bennetti*. The general morphological differences between *bennetti* and *antarcticus* (though constant) are relatively slight except for the form of the first pleopods. This quite marked change in these important organs is just the kind of change which would prevent interbreeding of *antarcticus* and *bennetti* when their ranges overlapped with the onset of warmer conditions.

On this explanation it seems a relatively simple case of the development of two allopatric species while a barrier existed, involving changes of sufficient magnitude in a crucial organ to maintain genetic isolation when the ranges became sympatric later. If the last Pleistocene Glaciation was a major stimulus involved in this specific differentiation the time scale involved (approximately 20,000 years) is a very short one as far as marine biologists are concerned. At the same time, faced with a similar time scale and undoubtedly much more sever conditions on land, some New Zealand biologists have been prepared to accept the possibility of specific differentiation taking place within the same period for terrestrial organisms. In the case of *Nectocarcinus,* however, there is no necessity to invoke the last Pleistocene Glaciation as the causal agency. Cold periods earlier in the Pleistocene could equally well have been responsible.

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Literature Cited

Alcock, A., 1899. Materials for a Carcinological Fauna of India. No. 4, The Brachyura Cyclometopa. Part II. A Revision of the Cyclometopa with an Account of the Families Portunidae, Cancridae and Corystidae. *J. Asiat. Soc. Bengal* 68: 1–104.

Balss, H., 1924. Decapoden von Juan Fernandez. *In*: Skottsberg, C., *The Natural History of Juan Fernandez and Easter Island.* 3. Almqvist and Wiksell, Uppsala. Pp. 329–340, 3 figs. (It appears, from a copy held in the Australian Museum, that this paper was distributed as a separate in 1923.)

Bennett, E. W., 1964. The Marine Fauna of New Zealand: Crustacea, Brachyura. *Bull. N.Z. Dep. scient. ind. Res.* 153: 1–120, 141 figs.

Chilton, C., 1909. The Crustacea of the Subantarctic Islands of New Zealand. *In*: Chilton, C., *The Subantarctic Islands of New Zealand.* II. Philosophical Institute of Canterbury, Christchurch. Pp. 601–71, 19 figs.