times as long as its posterior margin is wide. The terminal cleft of the telson is triangular. Each side bears two spines, of which the outer one is the smaller. The antennular peduncle consists of three segments, the basal of these being the largest. The lateral margin of the scaphocerite is more or less straight and ends into a spine which reaches as far forward as the squamose portion.

The first pair of peraeopods is asymmetrical. The large chela (fig. 1-C) is 2.8 times as long as broad. The movable finger is slightly shorter than the immovable finger. Both the fingers have nine prominent teeth. The carpus is cup-shaped, the merus is slightly longer than the palm. The small chela (fig. 1-D) is four times as long as broad in the middle. The merus is longer than the carpus. The second pair of peraeopods (fig. 1-E) is symmetrical. The carpus is five-segmented. The dactyli of the last three pairs of peraeopods are simple.

Material and measurements. — 3 females (16-18 mm long from the tip of the rostrum to the end of the telson) were collected in the Bholaji area at 20 miles from Karachi Harbour. They were found in the intertidal zone under or among loose stones.

Distribution. — Specimens of this species were collected at Waikiki Reef and Kahala, Oahu Island, Hawaiian Islands (Edmondson, 1930: 7, fig. 3; Banner, 1953: 12, figs. 3r-g), from Phuket Island, Thailand (Banner & Banner, 1966: 39, fig. 9) and now from the Karachi coast (northern Arabian Sea).

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A NOTE ON A BEHAVIORAL SPACING MECHANISM OF THE GHOST CRAB *OCYPODE CERATOPHTHALMUS* (PALLAS) (DECAPODA, FAMILY OCYPODIDAE) [1])

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In discussing the concept of spacing, most workers emphasize territoriality or home ranging as the mechanism whereby animals maintain distance between

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themselves (see review by Brown & Orians, 1970). The emphasis has been on birds and mammals.

The ghost crab *Ocypode ceratophthalmus* (Pallas) constructs burrows along sandy beaches. Takahasi (1932) stated that the distance between burrows correlated with the size of the neighboring crabs. Hughes (1966) reported a defended area surrounding a burrow. Crane (1941) recorded one individual filling in the burrow of its neighbor in the related species *O. gaudichaudii* H. Milne Edwards & Lucas. Such evidence implies that some sort of behavioral mechanism is involved in the establishment of a spatial separation between two individuals in these species.

Reproductively active males of *O. ceratophthalmus* construct spiral burrows with a conspicuous "pyramid" of sand erected some distance from the burrow entrance. Male *O. saratan* (Forskål) also exhibit this behavior. Linsenmair (1965, 1967) stated that sand pyramids have a repulsive function, serving to space adult male burrows a minimum of 134 cm apart in *O. saratan*. He also observed a male *O. saratan* filling in the burrow of a neighbor. Thus, both pyramid-building and burrow-filling behaviors may play important roles in spatial distribution, the pyramids themselves serving as territorial "sign-posts."

My observation on 28 June 1973 from East Island, French Frigate Shoals, suggests that similar behaviors may operate in the spacing of adult male *O. ceratophthalmus*. At approximately twenty minutes before sunset, adults began emerging from the sand. One male of approximately 4.5 cm carapace width enlarged his emergence hole and began constructing a spiral burrow and pyramid. After approximately four minutes, another male of similar size emerged from the sand at a distance of 71 cm and engaged in the same activity. The first male watched the second bring six loads of sand to the surface, and then suddenly ran to the neighbor's burrow. He stopped within approximately 2 cm of the second crab, raised himself off the substratum by extending his walking legs, but did not extend his chelae. The second male ran several meters down the beach and then walked away from the area; no attempt was made to return to his burrow.

Using the walking legs of the same side of the body as the small chela, the first male pulled sand into the entrance of the burrow constructed by the second crab. This behavior was repeated four times, until the burrow entrance was completely filled. The crab probed the soft sand several times with the walking legs of both sides of the body, and then returned to his own burrow and continued excavating and constructing the pyramid. All obvious evidence of the neighbor's burrow-pyramid complex was obliterated.

The behavior of filling in a neighbor's burrow has now been reported for three species of the genus *Ocypode*. I suggest that such a mechanism may be important in the spatial requirements and distribution of ghost crabs. If a minimum space is required around a burrow, this space may be actively maintained by expelling an individual who violates the minimum distance. Furthermore, any attempted burrow within the radius of this defended area would quickly be eliminated.

Linsenmair (1967) suggests that the sand pyramids of adult male *O. saratan* serve as "petrified display signals", attracting mature females and repulsing mature males. A comparison can be made here with the territorial boundary pits of arctic ground squirrels (Carl, 1971). In contrast to the constructions of ghost crabs, these territorial signals are maintained by neighboring territorial males sharing a common boundary. In *O. ceratophthalmus*, only one male maintains the spiral burrow-pyramid complex, since it is near the center of the territory rather than being on a common border. Both systems, however, provide physical territorial sign-posts, presumably functioning in the advertisement of a minimum spatial requirement for a resident individual. Burrow-filling behavior may function in spacing when such signals are "misread," or in those species where pyramids are not constructed. Burrow-filling may serve a similar function and have a similar motivational basis as facing-away or cut-off behavior (Chance, 1962). In both cases a threatening stimulus is removed. Burrow-filling may be characteristic of the genus. Investigations of other members of the genus *Ocypode* will provide information on the occurrence of this behavior throughout the genus.

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A NOTE ON THE EPIZOITES OF PORCELAIN CRABS (DECAPODA, ANOMURA)

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During regular shore sampling of populations of *Pisidia longicornis* (L.) and *Porcellana platycheles* (Pennant) at Mumbles Point and Oxwich Bay, South Wales, it was noticed that a small number of crabs bore one or more epizoites