NOTES

UNDERWATER ECOLOGICAL OBSERVATIONS IN THE GULF OF MANNAR, OFF TUTICORIN

I. Association between a fish (*GNATHANODON*) and a sea-snake

While surveying the fauna and flora of the sea bottom off Tuticorin with the help of self-contained underwater breathing apparatus (SCUBA) the authors had observed on many occasions a juvenile carangid, *Gnathanodon speciosus* (Forskål) flanking a sea-snake which also had yellow body with black annuli round its body *i.e.* the same pattern of body colouration as that of the fish. The authors are not aware of any account of a fish associated with the sea snake and therefore it is felt that observations on this instance would be of some interest.

The snake accompanied by the fish was seen moving from one place to another, peeping in here and thrusting its head there in minute holes and crevices. It looked obvious that it was in the process of searching for food, keeping a steady course in its path unless, in the meanwhile, attention was diverted by its eyes catching some natural or man-made disturbances in the vicinity (in the present case caused by our working at the sea bottom). All our operations resulted in stirring up the bottom sediment locally. In such cases the snake turned its attention to examine such spots and gulped minute materials which were in suspension, apparently exercising some selectivity. Sometimes the snake was attracted by the air bubbles coming out from the aqua-lung and moved up towards the regulator. In such cases the authors had also to steadily ascend up to avoid the snake. More often than not the snake got away after a tentative attempt but some persisted in their effort to catch up with the source where the bubbles emerged. This was warded off by a 'head down' diving descent by the authors leaving the snake above. Thereafter the snake continued to go up with the rising bubbles until it surfaced and then swam down reaching the bottom in some other place. It had never been the experience to suffer the snake harming, although encountered at such close-quarters.

The fish swam alongside the sea-snake keeping perfect rhythm with the movement of the snake. Usually four fish of almost equal size were seen, two on either side, at about the middle of its body. Occasionally 7 to 11 fish were counted. Out of the 20 observations made, the count of the fish accompanying the snake were respectively 2, 4, 4, 2, 4, 5, 4, 4, 2, 5, 7, 4, 4, 11, 2, 5, 4, 4, 4, and 2. There appeared to be no direct relationship between the total numbers and size of fish found with the length of the snake. In the particular case where the fish were caught, the largest fish measuring 50 mm. was seen swimming over the snake, riding on the snake, as it were. The fish never proceeded in advance of the snake nor did they lag behind. They kept a gap of nearly 3 to 5 cm. from the body of the snake while proceeding normally. But when they were frightened or when they apprehended some danger (as it happened when we approached them) they moved closer to the body of the snake, literally hugging the body. It was almost difficult to locate the fish at first sight in such a condition. The colour pattern of its body blended with that of the snake. The snake behaved as though it was quite oblivious of the presence of the fish by its side. Even when the snake ascended to the sea surface the fish also followed them and returned back along with the snake.

Remarks—Accompanied by the juvenile carangid, the snake in its search for food passes through many rocky hollows, pits, and crevices which are invariably inhabited by fishes like *Serranus miniatus, Gaterin schotaf, Pomacanthodes annularis, Odonus niger, Abalistes stellaris, Sufflamen capistratus, Chaetodon* spp., eels etc. The small fish, *Gnathanodon speciosus* (Forskål) escapes the attention of these big fishes. The fact that the same associates were seen together on many occasions seemed to rule out the possibility of the fish accompanying the snake by accident. It becomes evident that the juvenile fish uses the matching colour of the snake as a sort of protective colouration and is able to move about from place to place along with the snake without being harmed or eaten by enemies or larger fishes. The snake for its part exhibits harmonious existence with the fish for reasons which are not clear.

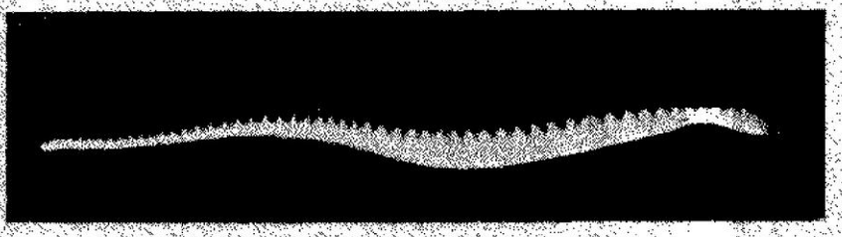

FIG. 1. Sea-snake with which *Gnathanodon speciosus* is associated

FIG. 2. *Gnathanodon speciosus*

Animal association seems to be common among marine animals. Dales (1957) has given an exhaustive account of interrelations of organisms with particular reference to commensalism. Among the Indian biologists, to mention a few, Panikkar and Prasad (1952) observed *Caranx kalla* C. & V. with *Rhopilema hispidum* Mass ; Jones (1960) recorded the association of *Selaroides leptolepis* (C. & V.) forming a vanguard with *Acromitus flagellatus* (Stiasny) and Noble (1963) has noted *Caranx malabaricus* (C. & V.) being associated with *Porpita pacifica* Lesson. Apart from the inference that the fish in the above cases might derive some benefit by way of protection from enemies, the exact significance of the association was not possible to be ascertained. In the case of *S. leptolepis*, Jones (1960) stated that even this

much of conjecture about the partnership was not easy to be conjured with, in view of the fact that the fish were always swimming in advance of the medusa. However, it is of interest to note that in the above mentioned cases it is the juveniles of carangid fishes which are involved as one of the partners.

Out of the two common forms of sea snakes observed in the sea bottom at Tuticorin, the association of the carangid was seen only with the one possessing an yellowish body with brownish black annuli alternating all over the body (Photograph 1). This snake had been seen frequenting the rocky area and was more active and graceful in its movements than the other one. Efforts to catch the snake together with the fish were unsuccessful. However, 3 numbers of the fish alone were netted and these were later identified as *Gnathanodon speciosus* (Photograph 2). It is hoped that positive identification of the snake will be possible at a later date.

ACKNOWLEDGEMENTS

Grateful thanks are due to Dr. S. Jones, Director, Central Marine Fisheries Research Institute for his valuable suggestions and criticism. The authors special thanks are also due to Dr. F. B. Salvadori, F.A.O. Underwater expert for his help in photographing the snake underwater and also for his interest shown. To Mr. Kanagaraj David, Inspector of Fisheries, we are grateful for his help underwater while dealing with the snake.

Central Marine Fisheries Research Unit,
Tuticorin.

S. MAHADEVAN,
K. NAGAPPAN NAIR

REFERENCES

DALES, P. R. 1957. Memoir 67, 1 : 391-412 *Geol. Soc. America.*

JONES, S. 1960. *J. Mar. biol. Ass. India,* 2(1) : 51-52.

NOBLE, A. 1963. *Ibid.,* 5(1) : 142-143.

PANIKKAR, N. K. AND PRASAD, R. R. 1952. *J. Bombay nat. Hist. Soc.,* 51(1) : 295-296.

UNDERWATER ECOLOGICAL OBSERVATIONS IN THE GULF OF MANNAR, OFF TUTICORIN

II. THE OCCURRENCE OF THE SYNAPTID *CHONDROCLOEA* ALONG WITH THE MASSIVE SPONGE, *PETROSIA*

In this paper an interesting instance of association between a sponge and a synaptid, which was observed during the course of our underwater dives with SCUBA is recorded. The rocky patches of the sea bottom off Tuticorin exhibited certain characteristic fauna depending on the depth and locality. For instance, the shoreward rocky floor in the 10-13 metre range was characterized by, amongst other things, the small and medium sized sponges firmly attached to the substratum and was conspicuous by the absence of the massive sponge of the genus *Petrosia.* The offshore rocky area between 10 and 22 metres showed, in addition to other sponges, the prolific growth of *Petrosia* spp., especially in between Lat. 8°43′ N-8°50′N and