ON THE BIONOMICS OF THE SACRED CHANK, *XANCUS PYRUM* (LINN).[1]

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The Sacred Chank, *Xancus pyrum* (Linn.) is a large whelk of the family Turbinellidae. Its home is in the Gulf of Manaar and the Palk Strait. It also occurs sparsely in the littoral waters of the Bay of Bengal as far north as the Nellore District (Madras). It is fished also occasionally off the coast of Travancore (South India) and off Kathiawar (Bombay).

Its commercial value is due primarily to its being fancied as an ornament by the women of Bengal and of neighbouring provinces. The shell is carved out into bangles, beads and rings. The sinistral shells occasionally fished, being much coveted by Hindu temples and homes as an emblem of Vishnu, fetch sometimes fabulous prices.

The Chank fishery has been a royal monopoly from time immemorial. It yields considerable revenue to the Governments concerned. In the Madras Province, this shell-fish fishery gives employment to thousands of divers. On an average, the Madras Government derives annually a revenue of over a lakh of rupees. Hence the importance of the study of the bionomics of this Chank.

The greater portion of the body of the chank, which consists of the liver and the gonad, is enclosed in the uppermost whorls of the shell. For the successful conduct of research on the maturity of the gonads, these glands had to be extracted intact and uninjured. There were two obstacles for this: (1) the hard shell, which when broken by a hammer, caused such damage to the gonads in particular as to render them useless for study, and (2) the irresponsiveness of the animal to narcotics. These difficulties baffled previous research on the maturity of the gonads. They were overcome by a simple device developed and perfected in the Krusadai Biological Station. The chank is kept in position by a bench-vice; then a longitudinal and a few circular cuts, coinciding with the circular grooves of the shell are made over the shell by a small hack-saw; and a few gentle taps by a hammer are given to the shell which breaks open into 3 or 4 pieces, exposing the animal unhurt. This extraction does not take more than five to ten minutes.

Altogether 353 specimens were dissected in the laboratory during the three years 1940–43. Their diameter ranged from 20 to 113 mm. and their length from 42 to 220 mm. The collection included a specimen whose diameter was 113 mm. and the length 220 mm., the largest on record. In measuring the length of the shell, that of the protoconch was omitted, for only 25 to 27 per cent of the adult shells retain it. The shell of the female chanks are slightly larger in diameter by 2 to 4 mm. and more globose.

The Gonads.—The sexes are separate. The penis is a blade-like structure about 50 mm. long and 10 mm. broad. A retractile short tubular process, 10 mm. long is found on its summit. The gonads are found over the liver-mass as yellowish or orange-coloured layers in the immature stages but turn red when they are ripe.

From the latter part of January onwards the penis which is generally kept folded back in the mantle cavity is found thrust out with its retractile tube also pushed out. Numerous spermatogonia are found in the testes early in the breeding season but later in January spermatozoa can be seen which have a spindle-shaped body and a thin long tail. By the end of February, spent males are seen. The internal fertilisation is effected

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by the penis and the retractile tube; the latter can be supposed to be the chief means of the transference of spermatozoa into the oviduct of the female. That fertilisation takes place within the oviduct was confirmed by the observation made in five instances, in the first and second weeks of February 1942, when spermatozoa were found along with ova in the albuminous fluid of the oviduct of a female.

Formation of the Egg Capsule.—The ovary shows numerous round oogonia during November and December, and shows numerous ova from the end of December onwards. By the end of January, the ovary over the liver-mass disappears and the reproductive activity centres round the oviduct, for the ripe ova have descended here. The walls of the oviduct become thick being evidently glandular, for its cavity gets filled with an albuminous fluid in which the ova are scattered. The oviduct is also distended having a diameter of nearly 22 mm. Later, the inner layer of the oviduct is thrown into folds, highly suggestive of the chambers of the egg-capsule. To the oviduct, therefore, one must assign the function of producing the egg-capsule. It is likely that this structure is formed just before its deposition, for otherwise, the absence of specimens with the egg capsule *in situ* in the oviduct in the collections examined till now cannot be explained. It is also likely that, soon after fertilisation, the mother chanks retire to deeper water beyond the reach of the collector who gets them within the tidal zone and there secrete the egg-capsule in whose chambers the fertilised ova along with a share of the albuminous fluid get distributed, extrude it unobserved by enemies [1] and plant it, thus securing protection for the young chanks.

The egg capsules are generally found from February to April but rarely in May. Spent female chanks with collapsed oviduct and empty ovaries are seen in March, April and May; this argues that they return to the tidal belt soon after depositing the egg-capsules.

The breeding season commences from November and lasts till April. The male chanks attain maturity when they are 57 to 60 mm. in diameter. In the female chanks, ova are seen in specimens with a diameter of 58 to 60 mm., but the distension of the glandular oviduct and its contents are found only in chanks with a diameter of 60 mm. and above.

A chank egg-capsule was kept under observation in a Table Tank from 12-2-1942 to 25-3-1942, the seawater in the tank being changed once a day. A chamber examined on 20-2-1942 showed only gelatinous matter with egg-clusters. A chamber examined on 10-3-1943 had shelled larvae. Assuming that the egg-capsule was deposited on 12-2-1942, the period of incubation seems to be nearly six weeks. After the shelled larvae appear, for want of circulating seawater in the aquaria, difficulties of respiration must have set in, for the shelled larvae were found dead on 25-3-1942.

Summary.

(1) A safe method of opening the shell of the Sacred Chank and setting the soft-body unhurt and intact was developed and perfected at the Krusadai Biological Station.

(2) It is highly probable that the egg-capsule is produced by the secretions from the glandular walls of the oviduct which also secretes the albuminous fluid. The ripe ova migrate into this and after fertilisation here get distributed into the chambers of the egg-capsule which is produced by the oviduct which therefore functions more as an uterus than as a duct.

(3) The breeding season generally commences in November of one year and closes in April of the following year.

(4) The period of incubation of the egg-capsule has been roughly estimated as nearly six weeks.

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[1] Seven opercula and parts of head and foot of chanks were found in the stomach of a large specimen of the Leopard Shark, *Stegostoma tigrinum* Day, dissected in the laboratory.