

'the mucoid postacetabular secretion serves adhesive, lubricative, protective and enzyme-directive functions.' The presence of a PAS positive secretion (in the penetration glands) which causes erosion of the cells of digestive canal during the penetrating activities of the oncosphere has been indicated in some cestodes.<sup>5</sup>

There is thus abundant evidence to suggest that the median anterior structure filled with a secretion in the miracidium of *P. tropidonotis* or for that matter in other miracidia is actually a gland and not a gut. The copious secretion stored in it may be implicated mainly in the process of histolysis of the snail tissue to facilitate penetration of the larva. It would appear that in most respects the nature of its secretion resembles that of the postacetabular glands in the cercaria of *S. mansoni*. In the sporocyst stage there is no trace of this gland, just as in the schistosomulæ the postacetabular glands disappear. In the final analysis the situation seems to correspond to a holocrine type of secretion involving the entire gland. Wajdi<sup>6</sup> in a recent study on the miracidium of *S. mansoni* suggested that it would be proper to call it a penetration gland. He also mentioned that the gland appeared deep blue in material subjected to Mallory's triple staining procedure. Manter<sup>7</sup> discussed the character of this gland with particular reference to the miracidium of *Otodistomum cestoides* (van Ben.). He has succinctly shown that this 'four-nucleate' organ shows neither a cellular wall nor a lumen and furnished evidence against its interpretation as a gut. In the light of these facts the claim of Dawes that in the miracidia he studied, this structure represents a gut cannot be sustained.

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Dept. of Zoology, K. HANUMANTHA RAO.  
Andhra University, J. S. BHARATHI.  
Waltair, March 16, 1967.

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### THE DISK OF ECHENEID FISHES

A NEW orientation in the study of Echeneid Fishes was started in 1961<sup>1</sup> and followed up in 1962,<sup>2</sup> 1964<sup>3</sup> and 1966.<sup>4+5</sup> The latest account emphasized that adhesion is only a secondary function and described the neural arch as consisting of two chambers separated by a transverse partition and that the fluid in the upper chamber can move forward and supply the requirements of the disk. It was also shown that every movement of the plates of the disk can be conveyed to the spinal cord direct.

The L.S. of the anterior portion of Echeneis (Fig. 1) reveals that the upper surface of the cranium is curved with a raised supra-occipital, a sloping fronto-parietal and a nasal with a depression on it. Just in front of the nasal there is a cartilaginous movable body the rostral cartilage considered an ethmoid, which has a curved anterior border and a straight posterior one better seen in Fig. 2. This bit of cartilage is closely invested with a covering which is attached by connective tissue to the movable premaxillæ and at the sides to the two pairs of supramaxillæ.

When the premaxillæ are lowered the front margin of the rostral cartilage will be drawn down and the hind region raised. The lowering of it is brought about mainly by the contraction of the tissues attached to the first and second pairs of supramaxillæ. By these alternate movements a valvular action is produced which can have important results.

Five possibilities suggest themselves:

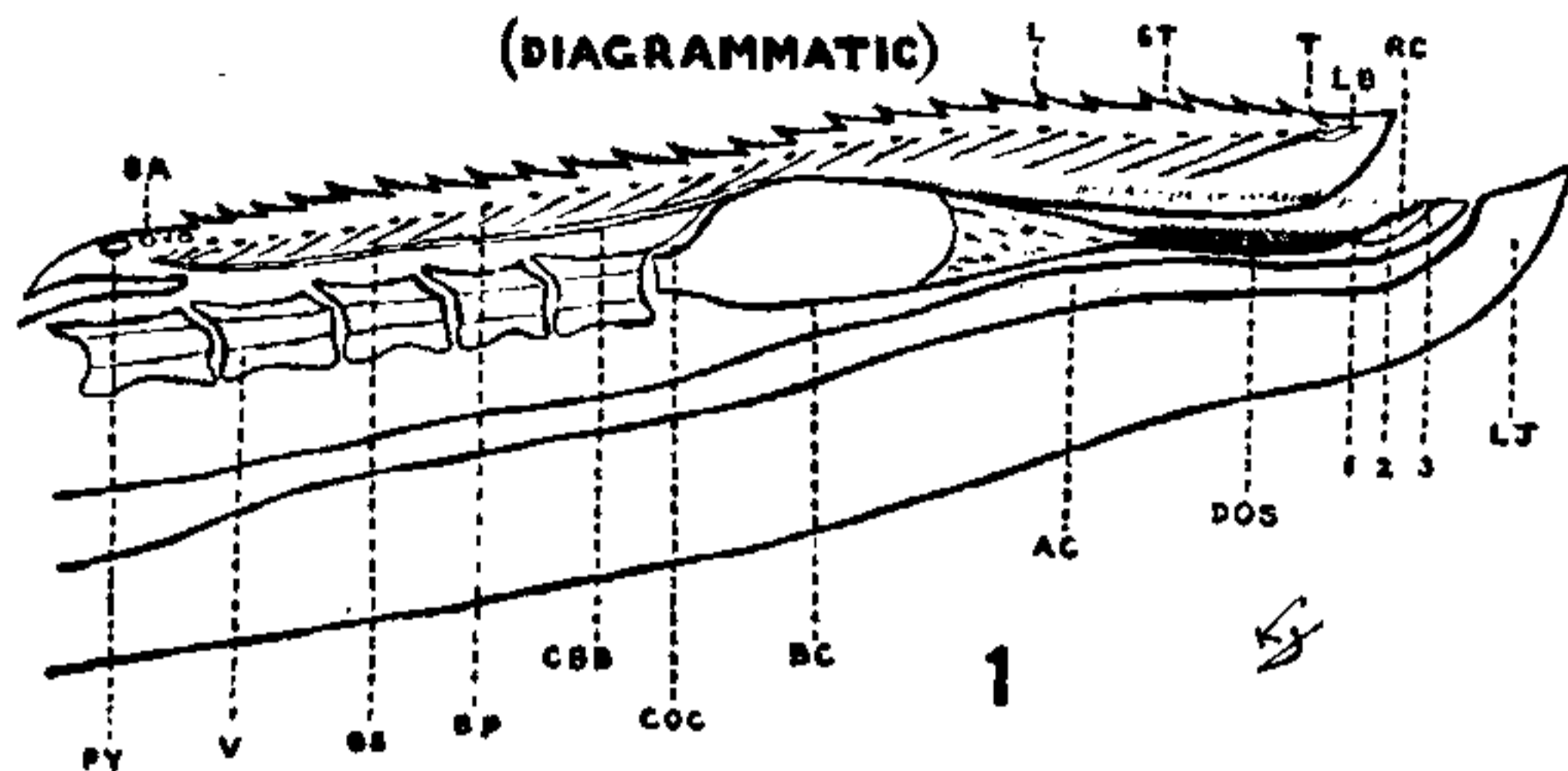
(1) It might be that the depth of the depression on the nasal is increased with the result that the fluid now occupies the fronto-parietal region as well, and if the quantity of fluid is still further raised by fluid from the supra-neural channel when the fish attaches itself to a surface, the level can rise till the supra-occipital height is reached. Figures 1 and 3 are intended to illustrate these by the various degrees of shading. (2) If the pressure thus produced increases beyond limits the rostral cartilage possibly acts as a safety valve allowing a part of the fluid to run elsewhere as for instance into the mouth. (3) It might be that the valve diverts fluid up into the disk increasing its adhesive pressure. (4) Other organs in the front end of the disk such as blood sinuses, coelomic spaces, muscles, etc., might be alternately pressed upon regulating their functions (*vide* Fig. 4). (5) Lastly a cross-section made in the front region shows that the lateral line canals are in close proximity to the rostral

cartilage that it cannot but affect their fluid contents communicating every vibration to them. One or more of these functions might be performed simultaneously.

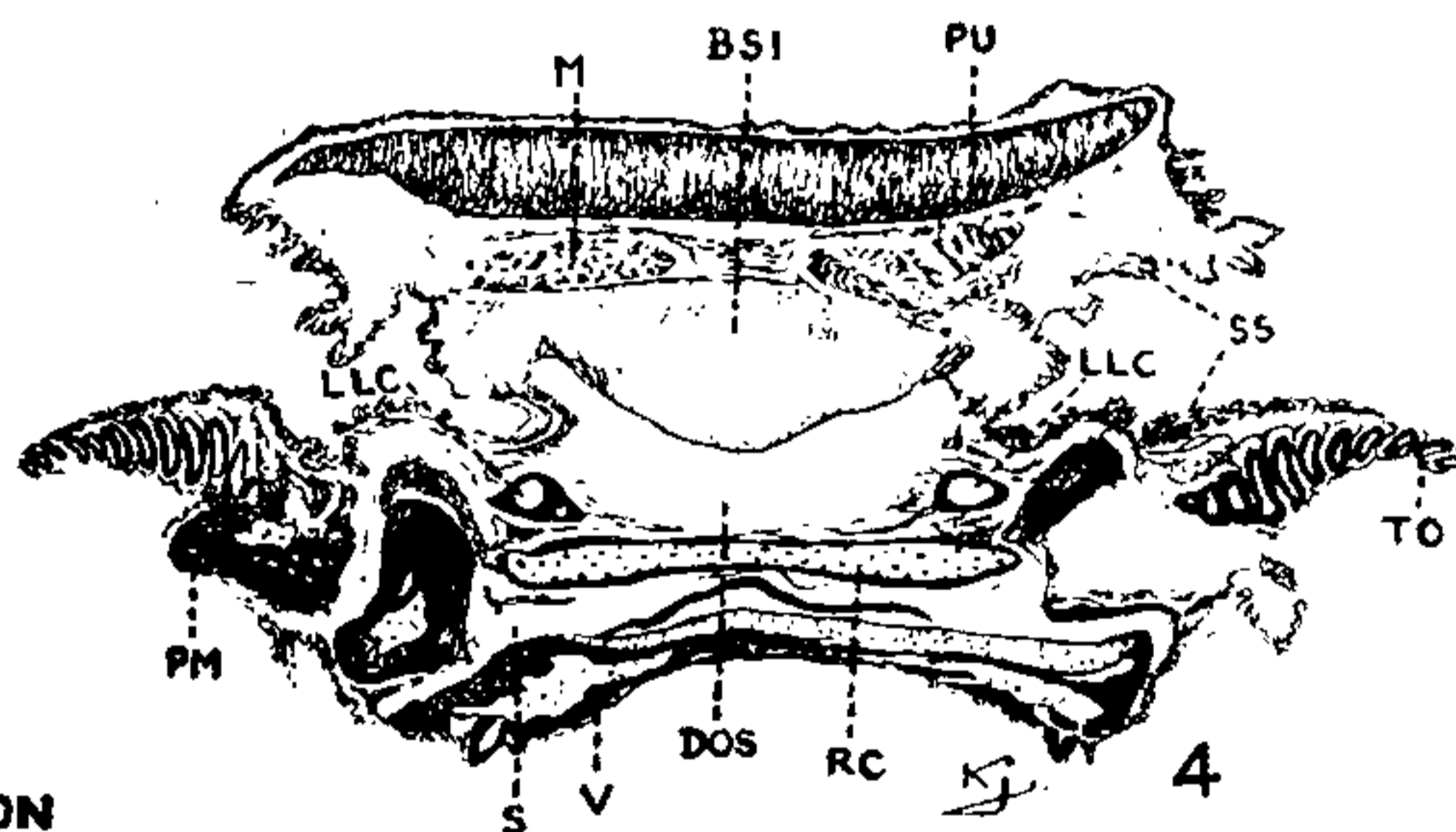
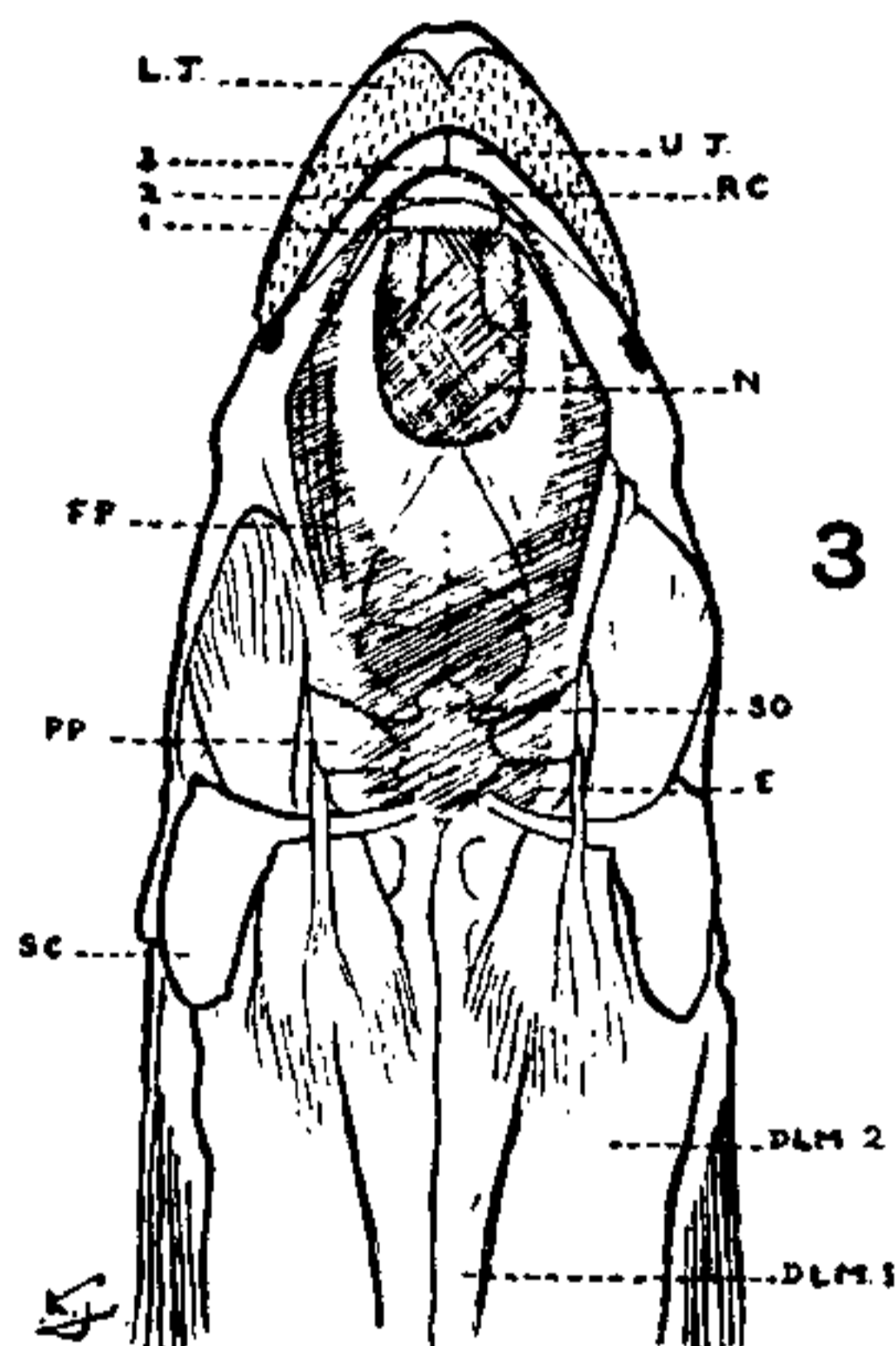
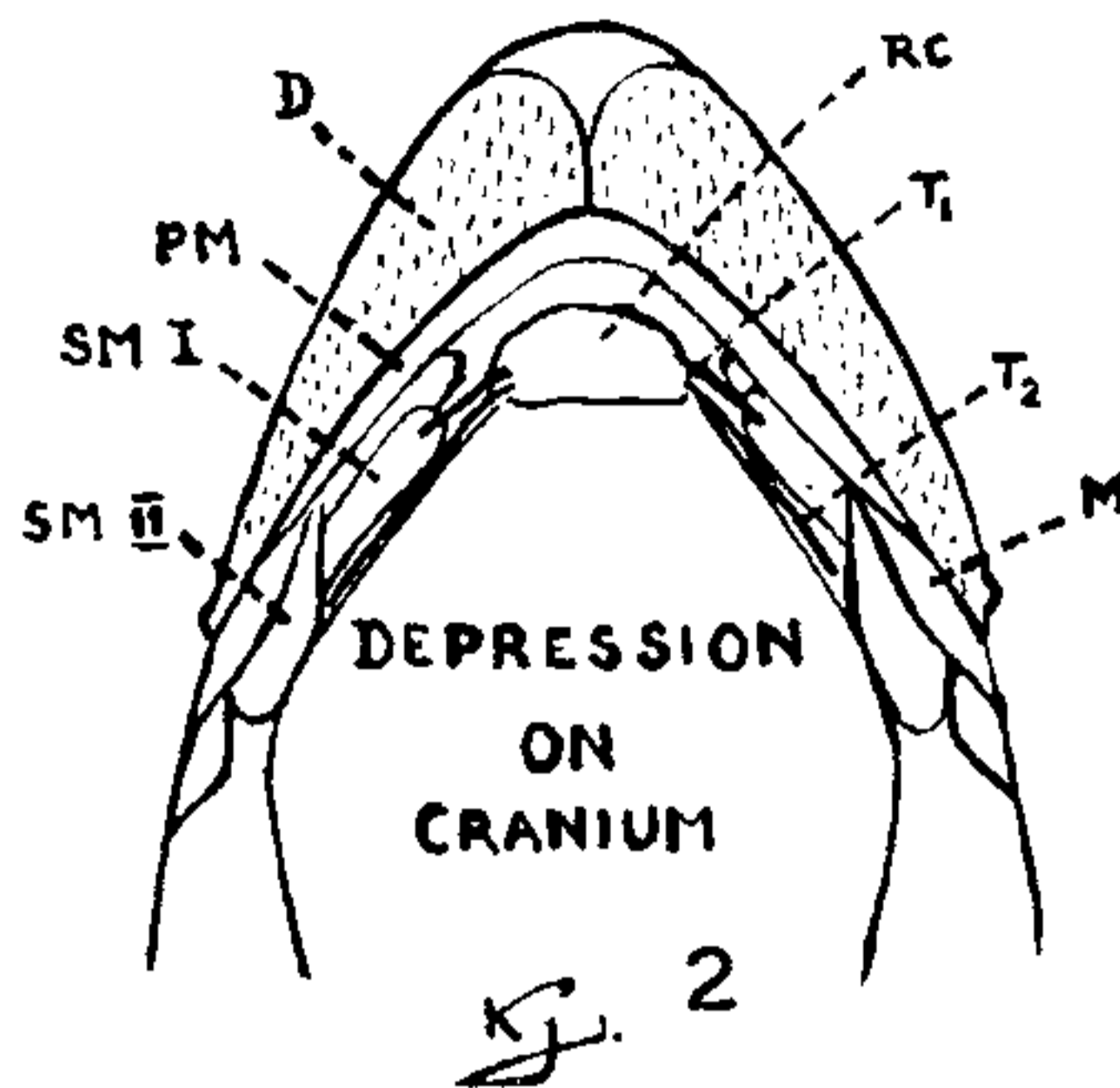
respectively at frequencies determined by a continuous process of the receptors.

Sand<sup>7</sup> confirms that the lateral line system is exceedingly sensitive to low frequency

**L.S. OF ANTERIOR PORTION OF ECHENEIS  
(DIAGRAMMATIC)**



**ROSTRAL CARTILAGE IN  
FRONT END OF SKULL**



**DORSAL VIEW OF ANTERIOR PORTION  
OF ECHENEIS WITH DISC REMOVED**

FIGS. 1-4. Fig. 1. L.S. of anterior portion of Echeneis (Diagrammatic). AC., Alimentary canal; BA, Basiarch; BC, Brain case; BP, Basal plate; BS, Basistrut; CBB, Canal below basistrut; COC, Canal over cranium; DOS, Depression on skull; L, Lamella; LB, Lamellobasal; LJ, Lower jaw; Py, Pyriboss; RC, Rostral Cartilage; ST, Subtactilodact; T, Tactilodact; V, Vertebra; 1, 2, 3, steps bounding the cavity at three levels. Fig. 2. Rostral cartilage in front end of skull. D, Dentary; M, Maxilla; PM, Pre-maxilla; RC, Rostral cartilage; SM I, Supra-maxilla I; SM II, Supramaxilla II; T<sub>1</sub>, Tendon 1; T<sub>2</sub>, Tendon 2. Note especially the shape of the rostral cartilage. Fig. 3. Dorsal view of anterior portion of Echeneis with disk removed. DLM 1, Dorsal longitudinal muscle 1; DLM 2, Dorsal longitudinal muscle 2; E, Epiotic; FP, Frontoparietal; LJ, Lower jaw; N, Nasal; PP, Postparietal; RC, Rostral cartilage; SC, Supra-cleithrum; SO, Supra occipital; UJ, Upper jaw; 1, 2, 3, steps indicating the front margin at three levels. Note also the rounded front margin and straight posterior border of the rostral cartilage. Fig. 4. Cross-section of the front end of the upper jaw of Echeneis. BSI, Blood sinus; DOS, Depression on skull; LLC, Lateral line canal; M, Muscle; PM, Premaxilla; PU, Pulvinus; RC, Rostral cartilage; S, Space; SS, Sensory surface; TO, Tooth; V, Yomer.

Parker<sup>6</sup> has shown that water vibrations of low frequency are perceived by the lateral line canals and the electrophysiological studies of Hoagland<sup>5</sup> speak of two kinds of receptors in the canals one directly responsible to tactile and pressure stimuli and compression from surrounding tissues and the other the continuously active function emitting impulses

vibrations, that responses to vibrations are modified or completely suppressed during an inhibitory perfusion of the canal and that direct mechanical stimulation of the lateral line as well as vibrations propagated from a distance are effective in exciting the receptors on account of the movements they cause in the endolymph of the canals.

The lymph circulating on the top of the skull and the endolymph of the lateral line canals possibly work in consonance and the rostral cartilage might be concerned with it. Feedback systems involving reverberating circuits are likely to be found if electrophysiological studies are undertaken.

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"Bonanza",  
Tambaram East,  
Madras-59, March 31, 1967.

B. BONNELL.

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### ON THE OCCURRENCE OF SMALL-SIZED OIL SARDINE *SARDINELLA LONGICEPS* VAL.

The occurrence on a large scale of small-sized oil sardine during the period 1960-66 is of special significance since the fishery, though known for its erratic nature and annual fluctuations, had become steadier during this period yielding an average annual catch of 135,252 tonnes forming 17.89% of the total marine fish landings in India. Not only has such occurrence of juveniles in the inshore waters served as an index of a successful oil sardine fishery, but it has also thrown useful light on certain vital aspects such as the spawning period and the size at which the new recruits and 1-year olds enter the fishery. A perusal of the literature revealed that such consistent occurrence of small-sized oil sardine has not been reported before.

In the course of investigations on the oil sardine fishery in the Mangalore zone, very young ones measuring 35 mm. onwards were observed to occur on a large scale in the months of July, August, September and October during the years 1960-66. These were caught exclusively by the non-selective gears, viz., *Koori bale* (small meshed cast net), *Kairampani* (shore-seine) and *Kolli bale* (boat-seine) operated in the inshore waters ranging in depth from 1/2

to 6 metres. The occurrence of such very small-sized oil sardine in the shallow coastal waters suggests that the spawning grounds of this commercially important species, which are yet to be located, may not be far away.

The size frequencies of young ones of oil sardine during the July-October period (Fig. 1)

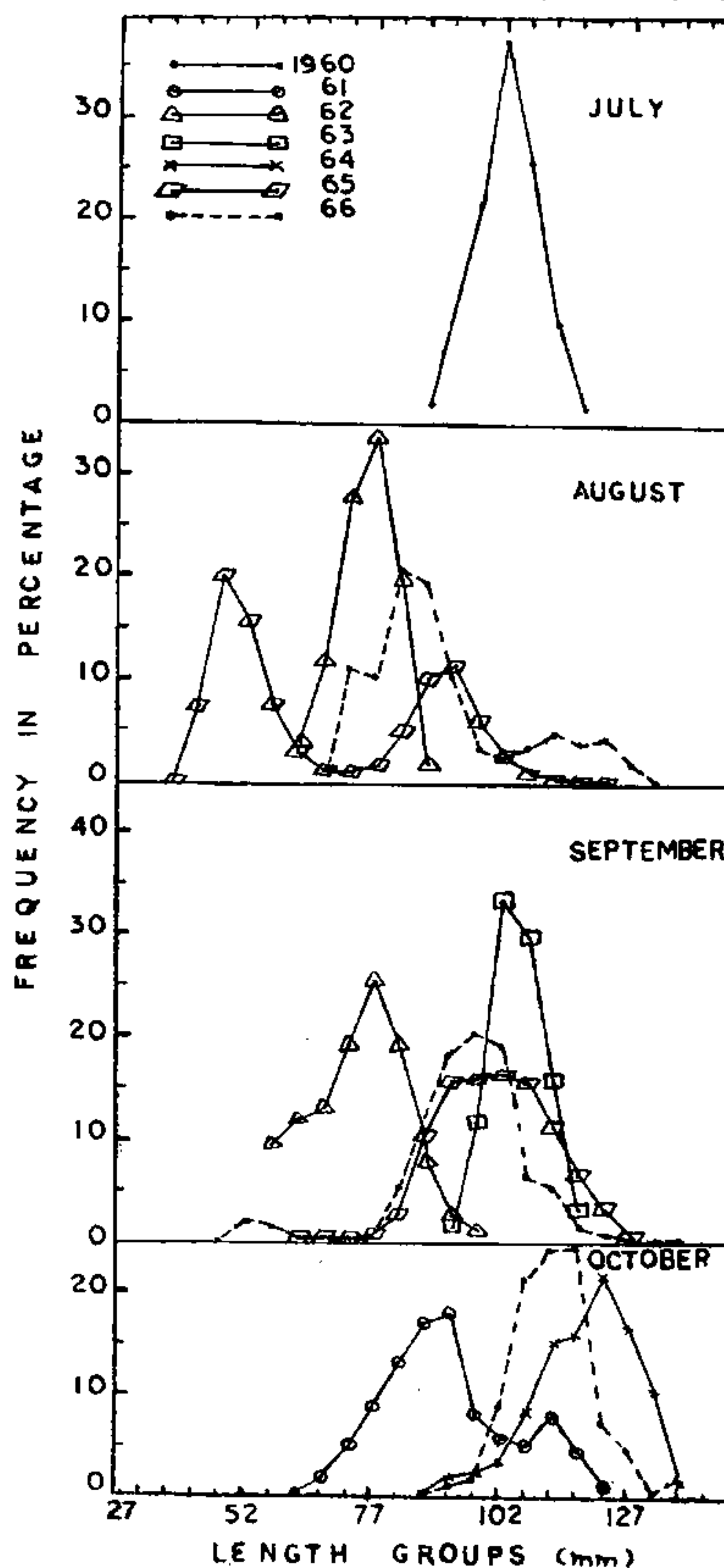


FIG. 1

clearly indicate that the juvenile population is constituted by more than one group. However, detailed analyses of the size composition of juveniles based on individual samples showed that there is no intermingling of different broods as evidenced by the unimodal nature of the size frequencies.

From Fig. 1 it is seen that in July the mode is at 102 mm. Of late, one school of thought has been inclined to believe that this group represents the 0-year class recruited during the