SECRETORY RHYTHMS IN THE HEPATOPANCREAS, 'SALIVARY GLANDS' AND POISON GLAND OF THE SCORPION, HETEROMETRUS FULVIPES
No attempts have so far been made to demonstrate any secretory rhythms in the digestive glands in invertebrates and the present investigations are of a preliminary nature. Similarly nothing is known as to whether the secretory activity of the poison gland follows any time course and an attempt is here made to throw light upon this particular point.

MATERIALS AND METHODS

The scorpions that were collected on the same day were brought to the laboratory and maintained in individual battery jars. They were given food and water freely for two days and nothing was given for one day before using them for studying the secretory rhythms in the Hepatopancreas, 'salivary gland', and poison gland. The animals were cut open at different times of the day (8.00 A.M., 12 noon, 4.00 P.M., 6.00 P.M., 8.00 P.M., 12 mid night, 4.00 A.M. and 6.00 A.M.) and the 'salivary glands' were completely removed and fixed in Bowin's fixative. The hepatopancreas was always taken from the mesosomal region corresponding to the fourth mesosomal segment, for which also Bowin's fixative was used. For fixing the poison gland extreme care was taken to see that the poison was not lost either due to stinging or due to mechanical force exerted on the sting while handling the animal. The animal was very carefully removed and the telson was so suddenly cut off at its joint with the last metasomal segment that
neither damage nor loss of poison resulted and this was fixed in Bouin's fixative. The tough cuticular exoskeleton that encloses the two lobes of the poison glands was later very carefully split open and the poison glands were removed safely without any damage. The material was discarded wherever the loss in poison or damage was noted in spite of the care taken. In another set of experiments 5 percent formalin was used as a fixative.

The materials, after having been dehydrated through an ascending series of alcohols, were embedded in wax and sections of 8 μ thickness were cut using a rotory microtome. These were spread on the slides, stained with the general Mallory's triple stains and mounted in a resinous medium (Canada balsam). The slides thus prepared were examined under the light microscope using higher magnifications. A study of the staining properties of the secretory materials was made and their diurnal variations, if any, were carefully observed. Photomicrographs were taken wherever necessary.

RESULTS AND CONCLUSIONS

No interesting observations, meriting mention, could be made regarding the secretory materials and their rhythm of secretion in the hepatopancreas and 'salivary gland'. There were no indications of any daily variations in the secretory materials in the digestive glands.
Secretory rhythm in the poison gland of the scorpion, Heterometrus fulvipes.

Pm 1: A part of the poison gland showing the secretion of the globular constituent of the poison at 8.00 A.M.

Pm 2: A part of the poison gland showing the accumulation of the globules (taking orange stain) at 12.00 Noon.

Pm 5: A part of the section of the poison gland showing the secretion of the orange staining constituent of the poison at 8.00 P.M.

Pm 6: A part of the section of the poison gland showing the accumulation of the globules, taking an orange stain, at 12 mid-night.

Pm 7 & 8: The accumulation of the granules, staining red, at 4.00 A.M. (Pm 7) and 6.00 A.M. (Pm 8). Not rich in globules.
But very interesting results were obtained in the secretory activity of the poison gland. A general examination of the secretory materials in the poison gland reveals that the poison is perhaps composed of two different constituents, one of which is granular taking a thick red stain whereas the other one is globular taking an orange stain without any granular structure. Of these two substances, the latter exhibits a clear rhythm of secretion and the former, though constantly present, appears to exhibit an inverse relationship, in quantity, with the former.

The globular secretory substance taking an orange stain appears to have a 12-hour rhythm with an indication of its secretion at 8.00 P.M. and 8.00 A.M. (PmS. 1 and 5). The accumulation of this material in the form of globules is evident in the 12 noon and 12 mid-night sections of the poison gland (PmS. 2 and 6).