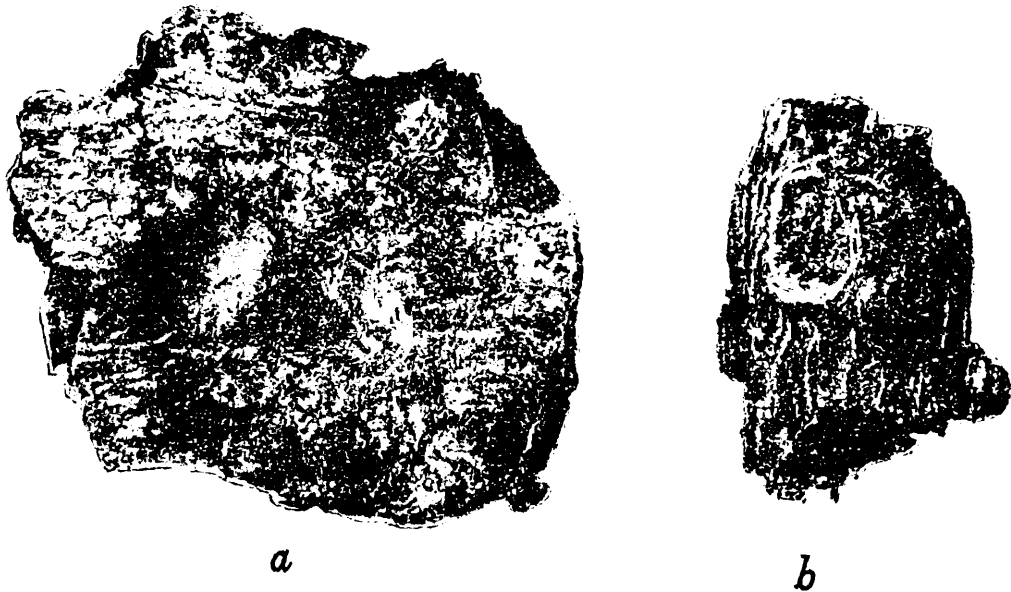


ON THE HABITS OF A SUCCINEID MOLLUSC FROM THE WESTERN GHATS.

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Towards the end of August, 1924 a short visit was paid to the part of the Western Ghats lying in the Poona and the Satara Districts of the Bombay Presidency to collect certain peculiar Littorinid shells of the genus *Cremnochonchus*. While searching for *Cremnochonchus* I availed myself of the opportunity to make an extensive collection of molluscs. In this short note I have recorded a few observations on the habits of a Succineid mollusc—*Succinea arboricola* Rao—collected at Lonavla.



TEXT-FIG. 1.—Hibernating animals of *Succinea arboricola* Rao.

(a) Three hibernating animals on bark of mango tree.

(b) Scar left on bark by forcibly detaching a hibernating animal.

Living specimens of *Succinea arboricola* were found hibernating on the bark of mango trees in the compound of the Hamilton Hotel, Lonavla. They were adhering very tenaciously to the surface and in form and colouration resembled wart-like outgrowths of the bark. In fact the resemblance was so close that the shells were first discovered by mere chance and in collecting them afterwards great difficulty was experienced. A sort of dead vegetable growth, consisting mostly of lichens, which covers the barks of trees in those parts, covered the shells also. Some individuals were also found on the under surface of leaves of mango trees; they were very sluggish and the shells in them were not covered with vegetable growth. Most of the individuals picked up from leaves were very young.

Two young individuals of this species were collected by me among wet moss at the base of a large mango tree on the way to Khandalla. Mr. R. Hodgart had obtained several active specimens of *S. arboricola* a few weeks before me in the same locality (Lonavla-Khandalla road).

When an animal is forcibly detached from the bark it leaves a scar behind and often a portion of the epiphragm forming the edge of the scar. The epiphragm consists of a thin white membrane, which covers the mouth of the shell. On removing the epiphragm the animal is found in a comatose condition. The foot, which is lightly coloured, is seen almost in the middle of the exposed animal and is on all sides surrounded by the mantle. Shortly afterwards the animal begins to show extensive movements of the foot and the mantle and a sticky substance is secreted at the same time. It was also seen that at irregular intervals the animal alternately opened and closed the pulmonary opening for the purpose of respiration. If the individuals thus disturbed found a suitable surface for attachment a new epiphragm was formed within 10 to 15 minutes. If on the other hand the animal was kept with the mouth of the shell exposed, an epiphragm was only formed in exceptional cases and that after a long time, while in most cases the molluscs dried up in 10 to 12 hours.



TEXT-FIG. 2.—Quiescent animal of *Succinea arboricola* Rao.

- (a). The hibernating pose of the animal. A portion of the foot is seen in the middle surrounded by the mantle on all sides. The remains of the old epiphragm are seen along the lips.
- (b). The same animal formed a new epiphragm after a quarter of an hour. A portion of the epiphragm is cracked.

The first epiphragm is usually formed very close to the lips, while the subsequent ones are formed deeper and deeper within the mouth of the shell and the animal ultimately is retracted entirely within the upper-half of the body-whorl only. The peristome of the shell is slightly recurved outwards. This is probably an adaptation for helping the animals to stick tightly to the substratum.

In the laboratory these animals were kept under different conditions for some time for watching the effects of different temperatures on their peculiar habit of aestivation. Some specimens were kept at a constant temperature of 104°F., some in an ice-box with ice and a few were left in the open air for about a week. The result in all cases was the same. Not a single animal became active. I am, therefore, unable to adduce any evidence to show as to what time of the year these molluscs are active. It is, however, to be surmised from the fact that some shells were found on the under surface of leaves towards the end of August that these animals probably become active after the rains.

These animals are still being kept under observation and up to the time of going to the press (August, 1925) the molluscs were found alive

hibernating on the bark. Even those that had formed an epiphragm after detachment were also alive.

The phenomenon of hibernation is not uncommon among Succineidae. *Succinea girnarica*, *Camptonyx theobaldi*, the two species of the peculiar Indian genus *Lithotis*, and certain members of the genus *Indosuccinea* are all known to aestivate during periods of draught. The peculiarity about *Succinea arboricola* lies in the fact that it was found in a comatose condition during the rainy season, when almost all of its family members are known to be very active. The rainy season at Lonavla is very long and the annual rainfall is about 400 inches. In all probability the peculiar habit of hibernation during the rains in the case of *S. arboricola* is a device for protecting the animal from being washed down by heavy rains. Other Succineidae with this habit have hitherto been found adhering only to rocks and the present example is, so far as I can find from the literature on the subject, the first record of a Succineid mollusc being found hibernating on bark of trees.

I am indebted to Mr. Srinivasa Rao for the identification of shells and for details of technical characters. Dr. Bains Prashad has gone through the paper with me and made valuable suggestions; for all this my best thanks are due to him.