the reduction divisions, producing a linear or T-shaped tetrad of four megaspores of which the lowest functions. Its nucleus divides to give rise to the eight nuclei of the embryo sac which is of the usual organisation. The antipodal cells are ephemeral.

Paired ovules, borne on a single funiculus, were met with occasionally. The two nucelli had each an inner integument of their own, but a common outer integument. This is shown clearly in the figure which is drawn from a section passing transversely through the nucelli. Both the gametophytes were developing simultaneously and there is, thus, a possibilty of the occurrence of "false polyembryony".

Endosperm and embryo: The endosperm formation is of the Helobiales type. The lower cell enlarges considerably and remains undivided so that it can be seen even up to the formation of the cotyledon. The embryo is of the usual monocotyledonous type with a large basal cell. The full paper will soon be published elsewhere.

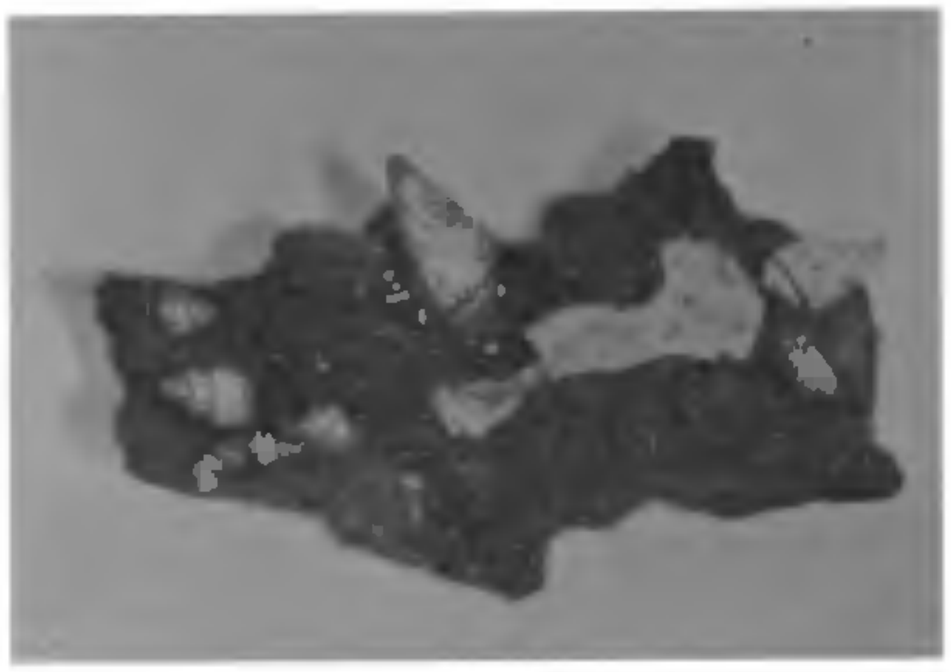
P. MAHESHWARI.

Botany Department,
Agra College, Agra,
June 12, 1933.

An Aestivating Gastropod from Mysore.

THOUGH it is a well-known fact that several gastropods protect themselves readily from the seasonal droughts, very little of it was known in the Indian forms until 1925 when Hora[1] reported on the æstivating habit of *Succinea arboricola* (Rao) from the Western Ghats. Later Hora and H. S. Rao[2,3] have extended our knowledge of this phenomenon to several other Indian gastropods.

When in last April, I had been out collecting fishes from Bethmangala tank, six miles from Kolar Gold Fields, I observed a few small gastropods æstivating in the crevices of the trunk and branches of Pongamia. They were tenaciously sticking to the bark of the trees. Most of them were young ones. I collected a few of them with the bark and sent some to Dr. Hora of Calcutta, for identification. The mollusc has been identified as *Rachisellus punctatus* (Anton) and so far as I can find from the literature available on the subject, its æstivating and tree climbing habits have not been recorded. A few of them were revived to activity in the laboratory by bringing them in contact with a small quantity of water. The epiphragm is thin and membranous and covers the shell completely. It



A piece of wood showing a number of æstivating *Rachisellus punctatus*. (*Natural size.*)

becomes soft in contact with water. The animal moves actively on moist surface, but on recurrence of dry condition it withdraws itself into the shell and secretes another epiphragm within about fifteen minutes. When they are detached from the bark they generally fail to secrete the epiphragm and finally desiccate in a few hours. But in very few cases, however, a thin epiphragm is secreted inside the shell, which protects the animal from drought.

B. S. BHIMACHAR.

Department of Zoology,
Central College,
Bangalore.

Aerial Respiration in *Pseudapocryptes lanceolatus* (Bl. & Schn.)

WITH reference to Dr. B. K. Das's account of a 'hitherto unknown' mode of ærial respiration in *Pseudapocryptes lanceolatus* (*Cur. Sci.*, **1**, 389, 1933), the following passage from Day [*Journ. Linn. Soc.* (Zool.) XIII, p. 202, 1877] is of special significance:

"In 1871, at Calcutta, I procured some living specimens of eels (*Ophichthys boro*). The gills of this fish are contained in large cavities, one on either side of the head, those on one side being divided from those of the other by an impervious septum. On watching its movements, it was seen to distend this receptacle with air taken in at the mouth, or, if in water, to live equally well by passing this fluid through the gill-cavity. On holding its small gill-opening firmly closed, it took in air by its mouth in distinct gasps: if its mouth were (*sic*) closed, it struggled until it was released, as, of course, without its use it could

---

[1] Hora, S. L. *Rec. Ind. Mus.*, **27**, 1925.
[2] Hora, S. L. and Rao, H. S. *Rec. Ind. Mus.*, **99**, 1927.
[3] Hora, S. L. *Rec. Ind. Mus.*, **30**, 1928.

not respire. On exposing the gills by cutting away the gill-membranes, and then placing it in water, it could be seen to slowly move its branchiæ, even when in such a situation that it could not obtain atmospheric air direct. It appeared to be able to employ for respiration air dissolved in water or air inspired directly from the atmosphere."

Attention may here be directed to a recent paper by Elfriede Schöttle entitled "Morphologie und Physiologie der Atmung bei wasser-, schlamm-und landlebenden Gobiiformes" (*Zeitschrift Wissen. Zoologie*, **143**, 1, 1932). A detailed account of the bionomics of almost all the well-known estuarine Gobioid fishes of India is contained in this article. *Pseudapocryptes lanceolatus* is also dealt with.

SUNDER LAL HORA.
Zoological Survey of India,
Indian Museum, Calcutta,
June 24, 1933.

Light Source in Hyperfine Structure Work.

IN experimental investigations on hyperfine structure it often becomes necessary to use a source which has the effect of showing the weak satellites relatively enhanced. For instance, in the case of Zn which has the following isotopes 64, 66, 68, 67 and 70, the order being that of decreasing relative abundance, the satellites corresponding to isotope 67 whose abundance is of the order of 5% (certainly not more than 10%) would be relatively faint. With the object of enhancing these satellites the source described in *Current Science*, Vol. I, p. 264, was devised. Essentially it consists in passing a stream of Zn vapour through a cooled-cathode mercury arc of length 30 cm. with a tungsten anode, observation being made axially. With such a source selective absorption has the effect of enhancing the weak satellites. Hence the intensities of the satellites corresponding to isotope 67 in the hyperfine structure patterns of the Zn I lines $4\,^3P_{0,1,2,}$–$5\,^3S_1$, cannot be even in approximate agreement with the relative abundance of this isotope. The enhancement of weak satellites is of great utility when the objective is only the measurement of wavelength separations. It is hardly necessary to say that the second stage of self-reversal when a line becomes double should not be reached. In the case of the apparatus under consideration it is easy not to reach this stage by so regulating the stream of Zn vapour that the main component in each case never shows a doubling. It may be mentioned that in such an apparatus a satellite corresponding to an isotope whose relative abundance is small may approach or even outstrip in intensity a satellite of an isotope present in much larger relative abundance.*

When the reasoning centres round the relative intensities of the hyperfine structure components, self-absorption must be avoided. Especially is this so when, as in the case of Cs, resonance lines are under examination. One way of minimising self-reversal was described by Venkatesachar and Sibaiya in *Current Science*, Vol. I, p. 303. The method consisted in introducing a small quantity of caesium chloride into a vertical mercury arc with a tungsten anode. When the metal Cs was introduced into the arc, the two components of the resonance line were nearly equal in intensity, whereas when Cs was replaced by CsCl the components grew sharper and the intensity difference became distinctly marked. If nuclear spin is calculated from intensity considerations self-reversal has the effect of increasing the calculated spin. Minimising self-reversal by the above method, the nuclear spin of caesium has been found to be 5/2.

B. VENKATESACHAR.
Physics Laboratory,
Central College,
Bangalore.
July, 1933.

Aplanospore-formation in *Vaucheria uncinata* Kutz.

DURING our investigations of the Punjab Fresh-water Algæ, we came across a sheet of *Vaucheria uncinata* Kutz., in a pond called Mastiwal near Bodal in the Hoshiarpur District. Usually this species is found

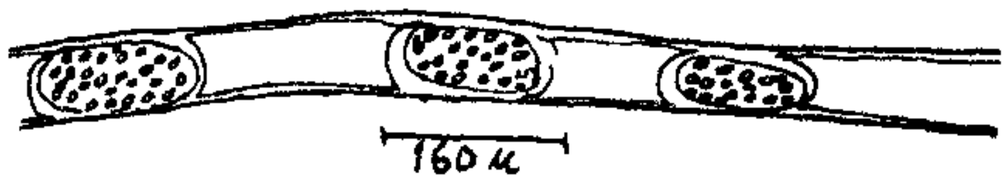


Fig. 1.

free floating in ponds and slowly flowing fresh-water streams but in this particular case a sheet of the alga was found partly

---

* Lau and Reichenheim. *Naturwiss*, **20**, 49, 1932.
Wood. *Phil. Mag.*, **8**, 205, 1929.
Metcalfe and Venkatesachar, *Proc. Roy. Soc.*, **A**, **105**, 520, 1924.
Venkatesachar, *Zs. f. Physik*, **75**, 676, 1932.