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*, **140**, 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.

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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.

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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

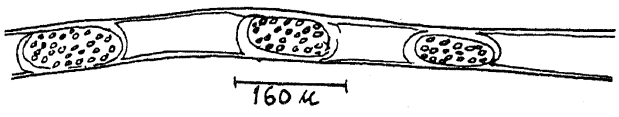

Fig. 1.

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

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* 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.