one was larger than the left. Ctenii were at the formative stage, the deposition being laid. Seven of them (*C*) were conspicuous. They were devoid of basal components. The ctenii region occurred in such a position as not to come exclusively under the ambit of any particular focus, since it lay in the middle line passing between two foci. Eight radii had appeared and they extended centripetally towards the foci.

The foci, on being surrounded by their own circuli, could be taken to represent two scales at the incipient developmental stage. It might be imagined that at an early period of development, owing to some developmental irregularity probably caused by arrested growth, the inferior layers of these two incipient scales were fused to form a common lower layer. The hyalodentine of each of them, which was already calcified, retained its identity as the focus in spite of fusion of their lower layers. Thus the presence of two foci was explained. Thereafter by this union the rest of the features which were laid down by the activity of the inferior layer were common to both foci. Thus it appeared that two incipient scales merged so as to give the appearance of a single scale. The nature of ctenii being common to both the foci could be explained, because the ctenii were formed as delayed deposition, as previously shown by Ganguly and Mookerjee.

SIVATOSH MOOKERJEE

Zoological Laboratory,
University of Calcutta.
Oct. 7.

[1] Ganguly, D. N., and Mookerjee, S., *Proc. Nat. Inst. India* (in the press).

Resistance to Inanition in Grass Seedlings

SOME years ago I found that grass seedlings which were in competition with other grasses older than themselves were able to remain alive for several months, although growth, in the sense of increase in size, could not take place[1]. In these experiments the competition of the older plants operated by the removal of mineral nutrients from the soil surrounding the young seedlings, and by the exclusion from the latter of light. The tolerance of the latter was so pronounced that an inquiry was started into the general ability of grass seedlings to survive inimical conditions.

The results can be summarized as follows:

(i) Increase in size of seedlings may be completely inhibited by a lack of mineral nutrients, but with this factor alone operating and with full light, the seedlings survive indefinitely.

(ii) Seedlings from which light is completely excluded remain alive for periods determined by the temperature prevailing; for example, at 22° C. survival does not exceed 20 days, whereas at 9° C. survival may extend to 18 weeks. At the end of this time, on the admission of light, chlorophyll is formed and normal development can proceed. Resistance to inanition is independent of the food reserves in the caryopses, and of the presence of chlorophyll. This behaviour is shown by seedlings grown *in vitro*, and in soil; and seedlings from seeds sown in the autumn may not appear above the soil until the following spring. Low mineral nutrition, and the admission of light at low intensities, or for intermittent short periods, increases the longevity of the seedlings.

(iii) The well-known ability of seeds to develop after desiccation during the initial stages of germination is shared in a lesser degree by grass seedlings which have developed two or three leaves. After six days air-drying at 14° C., survival is approximately 20 per cent, and the survival period can be considerably extended by intermittent moistening of the seedlings.

(iv) All the commoner species of British grasses show this ability to resist inanition and desiccation; but no dicotyledonous species so far tried has possessed it.

H. G. CHIPPINDALE

"Woodthorne", Wergs Road,
Tettenhall, Staffs.

[1] Chippindale, *Ann. Appl. Biol.*, **19**, 221 (1932).

Mauthner's Cells in the Larvæ of Anuran Amphibia

IN a previous communication[1], confirming the occurrence of Mauthner's cells in the larvæ of *Rana*, each axon process was described as dividing into two similar fibres, each of which decussated separately. Subsequent work, while confirming the existence of this condition in other batches of material, has shown that it is not invariable. In many instances the axon process remains undivided, at least in the region of the medulla oblongata.

Although variability of this type is apparently unique, my records show clearly that it is not associated with any marked differences in the maintenance of equilibrium, the locomotory habits and general behaviour of living larvæ.

A. G. WILLIS

Department of Zoology,
University, Manchester.
Sept. 22.

[1] Willis, A. G., *Nature*, **159**, 410 (1947).

Demonstration of the Heart Beat

I SHOULD be interested to know whether any physiologist who is also a smoker has noticed the following phenomenon, and whether it has been previously reported. Choose a quiet room, fill the mouth with tobacco smoke, and blow gently out through a very small aperture between pursed lips. Careful observation of the fine jet of smoke will show that it has a definite periodicity—that of the heart beat. With a delicately controlled jet it is even possible to make the heart blow a smoke ring at each beat.

It is evident that the heart is giving a pulse of pressure to the air in the mouth, just as does the hand when tapping the stretched diaphragm of the well-known box used for the demonstration of smoke rings. The pressure pulse may be communicated directly through the heart wall, or perhaps it is given by way of the arteries in the throat and mouth. It is possible that observation of air-pressure in the mouth by means of a quick-acting micromanometer might give useful information about the condition of the arteries responsible.

C. A. BEEVERS

Dewar Crystallographic Laboratory,
Chemistry Department,
King's Buildings,
Edinburgh 9.
Sept. 25.