Letters to the Editor.

[*The Editor does not hold himself responsible for opinions expressed by his correspondents. Neither can he undertake to return, nor to correspond with the writers of, rejected manuscripts intended for this or any other part of* NATURE. *No notice is taken of anonymous communications.*]

The Stomatic Control of Transpiration.

THE magnitude of the influence exercised by the stomata in the regulation of the water losses of plants appears to be very different under different conditions.

It has been found that when the mesophyll is rich in water the water loss is largely independent of the stomatic area ('aperture', measured by the porometer) if other conditions are constant.

When a widely open stoma changes in size, the margin of its opening scarcely alters in length. The change in area is due almost entirely to alteration of the length of the short axis.

The following experiment demonstrates that the rate of diffusion of vapour from slit-like apertures is independent of the breadth of the slit (in the case of moderately narrow slits) and is dependent in the main on the length of the slit or of its margin only.

Glass cover slips were cemented over the open ends of a number of cylindrical specimen-tubes leaving approximately rectangular openings, of which the lengths equalled the diameters of the tubes. These tubes were filled with petrol and weighed. The petrol was allowed to evaporate into the air, which may be regarded as a perfect sink for petrol vapour. After ten hours' evaporation the tubes were weighed again; the losses in weight of the various tubes and the dimensions of the slits through which the evaporation took place are recorded in the table below. The first eight experiments made are shown.

Expt.	Length in mm.	Width in mm.	Rel. wt. evptd.	Rel. margin.	Rel. area.
1	11·5	0·16	100	100	100
2	10·5	0·90	97	98	514
3	11·0	1·44	103	107	862
4	11·0	1·40	116	106	838
5	10·9	3·20	100	121	1897
6	7·1	1·18	60	71	452
7	18·3	1·20	252	167	1193
8	23·0	1·15	352	207	1437

From these results it is clear that the breadth of a narrow rectangular opening does not sensibly affect the amount of diffusion through it: in other words, the rate of diffusion through narrow openings is proportional, not to the areas, but to the lengths of the margins of the openings.

It has been pointed out elsewhere ("Transpiration and the Ascent of Sap", p. 5) that the results of Brown and Escombe may be stated in this manner. However, their observation that the amount of vapour transmitted by diffusion through a circular aperture is proportional to its radius does not account for the fact that, while the closing of widely open stomata is not accompanied by a reduction in transpiration, the final stages of the closing bring about a marked falling off in water loss.

This result is, however, inevitable when we consider that owing to the form of the stomata, during the earlier stages of the closing the margin remains the same length, while, during the final stages, the length of the slit, and consequently that of the margin, is rapidly decreased.

HENRY H. DIXON.
T. A. BENNET-CLARK.

School of Botany,
Trinity College, Dublin, Oct. 4.

Oviposition of *Hæmatopota pluvialis* Linné.

THE association of tabanid species with their eggs has been determined in only a comparatively few cases. Despite the local abundance of Tabanidæ in tropical, sub-tropical, and temperate countries, the egg-masses and egg-laying habits of many of our common species have consistently escaped the observation of investigators. Not only has the discovery of the eggs in Nature proved elusive, but also frequently the attempts to induce oviposition under controlled conditions in the laboratory have been attended with little or no success. Consequently the biology of many species that have been studied is incomplete. The reasons for this hiatus in our knowledge I have already discussed in a previous paper ("Tabanidæ of the Canadian Prairie", *Bull. Entom. Res.*, **17**; 1926). Failure to find eggs has led investigators at various times to suggest that some species may deposit their eggs indiscriminately in the soil instead of ovipositing on the leaves and stems of semi-aquatic plants or on the surfaces of stones in or near water. This hypothesis would appear to be supported by the occasional finding of tabanid larvæ in comparatively dry soil at some distance from water. In western Canada *Tabanus Reinwardtii* Wied. and *Chrysops fulvaster* O.S. are common species, the eggs of which were not found although diligently sought in localities where these species were abundant. It was surmised that the eggs might be laid separately in the soil and thus render their discovery difficult. Both of these species were, however, induced to oviposit in glass jars in the laboratory, when they produced masses similar in all respects to those that are normally laid on leaves by other members of the family.

A survey of the literature of European Tabanidæ shows that the eggs of only two species are known. In 1854 Kollar found the eggs of *Tabanus quattuornotatus* Meig. ("Beitrag zum Haushalten der sehr lästigen Viehbremsen (Tabanidæ)", *Sitzungsber. d. Akad. d. Wiss.*, Wien, 13), and they were again observed and described by Lécaillon in 1905 ("Sur la ponte des œufs et la vie larvaire des Tabanides, particulièrement du Taon à quatre tâches (*Tabanus quattuornotatus* Meig.)", *Ann. Soc. entom. France*). Two further contributions on the eggs of this species were made by the same author in 1906 (*Compt. rend. Soc. Biol.*, 60) and 1911 (*Ann. Soc. entom. France*, 80). In 1909 Surcouf and Ricardo ("Étude monographique des Tabanides d'Afrique", Paris) recorded the discovery of the eggs of *T. autumnalis* L. at Lamballe (Côtes-du-Nord) in 1907. Unfortunately, the eggs were not collected when first seen, and on the following day, when a return visit was made, the grass on which the eggs had been deposited was found to have been mown.

Up to the present there is no record of the finding of the eggs of any species of *Hæmatopota*. This is remarkable considering the relative abundance and wide distribution of the genus, of which *H. pluvialis* is our commonest species. In Scotland it is locally very abundant from June to September, and can be readily collected in rural districts where there are ponds and bogs. During July of this year specimens were collected at Thriepmuir reservoir, Balerno, near Edinburgh, and were permitted to feed either on the hand and forearm of a human host or on the ear of a rabbit. Some fed immediately the host was presented, and became engorged in ten minutes or less. Others refused to feed after repeated trials from day to day. A female that has partaken of a full blood-meal in the laboratory does not feed a second time, and it is surmised that those specimens which refuse to feed in the laboratory at the first and subsequent trials may have already fed in Nature before they were captured.