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Dimorphism in the Portuguese Man-of-War

THE Portuguese man-of-war (*Physalia*) occurs in two forms which are mirror images of one another but otherwise identical. Under the influence of the wind, one form (left-handed) moves to the right of the downward direction, the other (right-handed) to the left.

Woodcock[1] was the first to attempt to relate these facts to wind and water movements. He observed that a large majority of specimens from the North Atlantic and Gulf of Mexico were right-handed, and sailed to the left of the downwind direction. To explain this, Woodcock formed a hypothesis which required in part that southern hemisphere forms be mirror images of northern hemisphere forms, and sail to the right of the downwind direction. An examination of museum specimens seemed to show that there was, in fact, a preponderance of right-handers from the southern hemisphere (19 out of 22). Fontaine[2] observed, however, that the forms driven ashore on the southern coast of Jamaica were always left-handers. The prevailing wind was from the east.

In the Canary Islands this year we observed that forms driven into the harbour at Arrecife, which lies on the eastern coast of Lanzarote, were always left-handers when the wind came from the east or north-east. On one occasion when the wind came from the south-west, right-handers were driven in.

It seems probable from Fontaine's and our own observations that the proportion in which the two forms are found varies in particular localities not according to the hemisphere but according to the position of adjacent land and the direction of the wind.

We tentatively put forward the view that in each brood of *Physalia* the two forms are produced in rough equality, and that this has survival value in that it obviates the stranding of the whole brood in any one set of circumstances. The early development of *Physalia* is little known so it is impossible to say whether or not the two forms are genetically different.

Crude experiments were made by one of us to ascertain the speed and angle of drift of *Physalia*. In light-to-moderate breezes the following results

were obtained with the aid of a spherical glass float, a chart and landmarks inside the mole at Arrecife. Towards the end of flood-tide on April 15 the speed of drift over the tide was 20 m./min. On April 16 at slack-water the courses taken by a number of animals moving across the wind varied from 34° to 42° to the right of the downwind direction. A boat sailing into the wind makes more forward than lateral way, but *Physalia*, though pointing up to the wind, makes much lateral and slight stern way.

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[1] Woodcock, A. H., *J. Mar. Res.*, **5**, 196 (1944).
[2] Fontaine, A., *Notes Nat. Hist. Soc. Jamaica*, **64**, 61 (1954).

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