

### Speciation of Polychaetes in the Clyde Sea Area

ISOLATION is regarded as an important factor in speciation, and when the population isolated is small its divergence from the main stock is more rapid than when it is large. Most of the evidence in support of current theories of the mechanism of speciation has come from the study of terrestrial and fresh-water organisms. The difficulties involved in studying speciation in marine animals are obvious. Apart from the difficulty of collecting adequate samples, there is the additional one that there are few barriers which can serve to isolate populations, and so the phenomenon is likely to be much less marked.

A surprising number of polychaetous annelids from the Clyde Sea Area (west coast of Scotland) show morphological differences from the typical forms. These divergent animals may be awarded the following taxonomic status:

(a) Species (large or important differences).

*Lumbriconereis hibernica* McIntosh (Eunicidae)<sup>1</sup>; probably derived from *L. impatiens* Claparède.

*Spiochaetopterus* sp. (Chaetopteridae)<sup>2</sup>; differs from *S. typicus* Sars in the form of the chaetæ and in the number of thoracic segments.

*Amage scotica* Clark. (Ampharetidae)<sup>3</sup>; differs from *A. gallasii* Marion in the number of branchiæ, bodily proportions and disposition of chaetæ.

(b) Varieties (moderate differences).

*Lepidasthenia argus* Hodgson (Aphroditidae); notopodial chaetæ may be reduced in number or completely absent.

*Drilonereis filum* (Claparède) (Eunicidae); eyes present.

*Scotolepis fuliginosa* (Claparède) (Spionidae); eyes absent.

*Tharyx marioni* (St.-Joseph) (Cirratulidae); eyes present, branchiæ on fewer anterior segments than usual.

(c) Intraspecific variation (small differences).

*Harmothæ spinifera* Ehlers (Aphroditidae); first pair of elytra coloured.

*Pista cristata* (Müller) (Terebellidae); branchiæ reduced in size.

*Euchone rosea* Langerhans (Sabellidae); anal groove extending farther forward than normally.

Why variants should appear in 4-5 per cent of the polychaete species known from the Clyde cannot be answered directly; but there are three possible explanations, of which two seem less likely than the third. The Clyde Sea Area might be considered as a more or less self-contained body of water and so the fauna inhabiting it would be relatively isolated from that outside. The geography of the Firth of Clyde and what little biological evidence there is<sup>3</sup> suggest that this is an unlikely hypothesis. Secondly, the intolerance shown by polychaete larvæ at metamorphosis to unusual substrata might result in the formation of small isolated groups of those species which show variations. The substratum in the Clyde is, in places, extremely patchy and variable, although there is a deposit of mud over most of the area; but it is in this mud that the variants have been found. There remains a third possible explanation. The comparatively fragmentary knowledge of the breeding habits of polychaetes has been summarized by Thorson<sup>4</sup>. This may be an unreliable guide to the habits of Clyde worms, because little is known about geographical variation of breeding habits; however, it appears that, with the exception of

*Spiochaetopterus*, all the species which occur in the Clyde as variants have probably lost their pelagic larval phase. It is at once obvious that this would lead to the rapid establishment of small, interrelated and interbreeding populations of each species, whatever the nature of the substratum. There remains a few species which have no pelagic larvæ but in which, so far, no variants have been found. A search is being made to see if these exist and if similar variants occur outside the Clyde Sea Area.

This suggestion rests on slender evidence, and it represents only one of many methods of speciation in the group; but if it can be soundly established, it may help to explain the great divergence of polychaete families coupled with the almost worldwide distribution of many of them. Further, the subject offers interesting possibilities in the explanation of the evolution of some of the major invertebrate groups.

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<sup>1</sup> McIntosh, W. C., "The British Marine Annelids", 2, pt. 2, 383 (Ray Society, London, 1873-1923).

<sup>2</sup> Clark, R. B., *Proc. Roy. Soc. Edin.* (in the press).

<sup>3</sup> Barnes, H., *Nature*, 166, 447 (1950).

<sup>4</sup> Thorson, G., *Medd. Komm. Danm. Fisk- og Havunders.*, ser. Plankton, 4, 1 (1946).

### Recovery of Electron Microscope Grids

FILMED electron microscope grids, once exposed to the electron beam, cannot be cleaned by any of the usual solvents. The nitrocellulose is altered so as to become insoluble in amyl acetate even after prolonged boiling, and examination of the grid in the electron microscope still shows the tell-tale scraps of film in the corners of the squares.

It has been found in this Department that flaming the grids removes all trace of the film or specimen. The procedure is similar to the flaming of platinum loops in bacteriological laboratories, with the difference in the case of the copper grids that the exposure to the flame must be very short, otherwise the metal of the grid is oxidized away. This can be done in two ways: passing the grid fairly rapidly through the main body of the flame, or fairly slowly through the tip of the flame. Either method works quite



Corner of copper grid, cleaned by flaming. ( $\times 2,700$ )