

LETTERS TO THE EDITOR

[The Editor does not hold himself responsible for opinions expressed by his correspondents. No notice is taken of anonymous communications.]

Permanent Variation of Colour in Fish

A QUESTION of some interest is raised by a letter published by Mr. Saville Kent, in *NATURE*, vol. viii. p. 25. It is stated that a Plaice, now in the Brighton Aquarium, has "the posterior half of its under surface, usually white, coloured and spotted as brilliantly as the upper one; the line of demarcation between these two colours again, though sinuous, is most abrupt," and the writer proceeds to say that, on the Darwinian theory, this may be considered as a remarkable instance of reversion—"the *Pleuronectidæ* being derived from ancestors originally possessing bilateral symmetry, and an equal degree of coloration on each side."

First, as to the fact:—Examples of such colouring among the *Pleuronectidæ* are not very uncommon, and they occur most frequently in the Flounder (*Pleuronectes flesus*) and Plaice (*P. platessa*). Sometimes it is the upper surface which is thus affected—more or less of it being purely white. In a specimen now before me the colouring of the upper surface occurs upon the under one in numerous blotches of various sizes, and this mode of distribution is not uncommon. In every instance that I have heard of, the line or lines of demarcation, when they exist, are such as your correspondent describes, but, in extreme cases, no such line is present—the whole of one surface having uniformly assumed the colouring of the other. Such abnormal colouring may occur either upon the upper or lower surfaces; the fish in the former case being entirely white, and in the latter entirely brown.

The rationale offered by your correspondent, although engaging, is not unopen to criticism. For nothing can be more evident to Darwinists than that the colouring of the *Pleuronectidæ* has been acquired because of its protective adaptation to their peculiar form and habits. But it is difficult to see how such colouring could have conferred protection upon their free-swimming ancestors, so that, unless we make the highly anti-Darwinian supposition that the common progenitor was coloured in anticipation of the habits to be contracted by its offspring, there is only one hypothesis open to us, viz., that the unmodified progenitor adopted, through natural selection, the habit of lying on its side because of its original sandy colour. As this view, however, will be rejected by all who know how much easier colour is to modify than habit or structure, we are compelled to adopt the supposition, as being the most probable, that the coloration of the *Pleuronectidæ* is the result and not the cause of their form, and has, therefore, been acquired during the process of their flattening.

Although, however, we cannot, without gratuitous supposition, imagine that the unmodified ancestor of the group in question was coloured exactly like his progeny, there is still one other hypothesis by which atavism might be called in to explain such instances as that adduced by your correspondent. Whatever may have been the original cause of the flattening taking place, it is not likely that the initial variations (whether these were sudden and considerable, or gradual and slight), presented nearly so great a modification as that which we now observe. During these initial stages the partially modified individuals may have lain indifferently on either side, and so have acquired protective colouring on both. As the flattening, however, proceeded (from whatever cause), and the bones of the skull, etc., became more and more contorted, the new exigencies of the case might have caused the left side to be more and more used as a ventral surface, until its colouring, being of no further use, was allowed gradually to disappear. Upon this view the deviations from the normal colouring which now occur would be reversions, not to the bilaterally-symmetrical ancestors of the flat-fishes, but to their partially modified offspring. And, if this view were tenable, it might throw some light upon the otherwise inexplicable fact that some species of *Pleuronectidæ* are normally reversed—i.e. the left side instead of the right, constituting the upper surface—while in both kind of species individuals often occur which are reversed with reference to their specific type.

As however, this explanation is rather far-fetched, and, moreover, fails to account for the appearance of the partly white and the wholly white specimens above mentioned, it is best, I think, altogether to abandon the reversion theory.

Another, and, to my mind, a more probable one is open to us.

Accepting the occurrence of abnormally reversed fish as an unexplained fact, we might, *a priori*, expect that a cross between a normal and a reversed individual of the same species might present the appearance described in your correspondent's letter—the abrupt, though sinuous line of demarcation between the two colours, which always attends the occurrence of this variation, being precisely analogous to that which obtains in higher animals when piebald. Moreover, the abnormal coloration being of most frequent occurrence in the Flounder and Plaice—fish which are also the most frequently reversed—and the occasional appearance of the entirely white and entirely brown varieties, are just the facts we should anticipate were this explanation the correct one. Of course it may be objected that abnormal colouring is not of nearly so frequent occurrence as abnormal reversal, but when we remember how utterly ignorant we are regarding the causes which determine reversal in the *Pleuronectidæ*, and the blending or non-blending of colours in all animals when crossed, we should not lay too much stress upon this objection.

The truth or falsehood of this explanation would admit of easy experimental test on the part of the Brighton Aquarium authorities. Should they, however, undertake such, they must not rest satisfied with mere simple crosses, however numerous, but also try various complex and reciprocal ones. The piebald fish they possess should also be crossed with several normal and reversed Plaice. Should all their experiments prove unsuccessful, they would still be interesting as tending to throw us back upon the only remaining explanation, viz. that all these instances of abnormal coloration are independent sports, and so affording us by far the most striking of the many examples in the animal kingdom of the tendency towards bilateral symmetry which abnormal colouring frequently presents.

Dunskaithe, Ross-shire, May 15

GEORGE J. ROMANES

Venomous Caterpillars

THE concluding words of Mr. H. S. Wilson's letter in your last number only reiterate the truth of a fact. Nearly all British entomologists who have collected *Lepidoptera* must have had painful experience of the irritation caused by the hairs of some one or other of our Bombyces that have very hairy larvæ. *Por-thesia chryso-rhœa* is the greatest delinquent in this respect; and some years since I suffered intense agony after collecting the pupæ of this species. The hairs of the caterpillar are woven into the cocoon and the web surrounding it, and I recommend anyone in search of a counter-irritant to rub his face and neck with his hands after collecting these pupæ. The result, although painful, will be edifying and admonitory. The hairs have no effect upon the harder skin of the palm of the hand and fingers; and I believe (with most entomologists) that their action is purely mechanical, i.e. they pierce the tender skin in multitudes. A precisely similar, though less severe, effect is caused by the hairs of some Boraginaceous plants, e.g. *Echium vulgare*. On the Continent the extreme irritation caused by the hairs of *Cnethocampa procionea* is well known; and the introduction of a brood of these larvæ into a drawing-room would probably be followed by effects similar to those caused by the king's "great flea" in Faust.

At present I consider that the existence of caterpillars actually venomous (i.e. with a poison-gland at the base of each hair) requires confirmation. There are some pachydermatous individuals upon whom the hairs of Bombyces have little or no effect. I am unhappily not one of those, but my mental hide repels the insidious attacks of romancers in Natural History.

Lewisham, May 16

ROBERT MCLACHLAN

BETWEEN the years 1857 and 1862 when stationed at Bel-lozi, the capital of British Honduras, I made the acquaintance of a so-called venomous caterpillar, which was held in very great dread by the natives, who averred that "its bite always produced fever."

Knowing their superstitious habits, and that, as far as my knowledge of natural history went, there did not exist a caterpillar capable of producing a wound of any kind by biting, I resolved to test the truth of the assertion. Accordingly, and to the intense horror of the bystanders, I took one in my hand from a tree that was literally covered with them. It was about 1½ in. long, by ⅓ in. thick, of a blue-grey tint, and in addition to the fine long hairs which clothed it, was armed with clusters of short spines. These clusters were formed into rows