

## BIOLOGY

## Association between Colour of the Iris of the Eye and Reaction to Dental Pain

AN association has been found to exist, in Australians of European stock, between the colour of the eyes and the reaction to pain resulting from dental cavity preparation.

At the present stage of this study, examination has been made of 403 consecutive subjects whose teeth were being prepared for filling, the cavities being cut by means of the Borden high-speed air-rotor apparatus. Their ages ranged from three years to more than fifty years.

The pain reaction of each subject was assessed, four classes being used: subjects that showed (a) no pain reaction during the preparation of the cavity, (b) a slight reaction, (c) a marked reaction and (d) those whose reaction was so great as to require the injection of a local analgesic. After having recorded the pain reaction of a subject, the colour of the iris was observed, nine categories, ranging from blue to dark brown, being recorded. The pain-reaction classes were given arbitrary values of 0-3, and the colours of the iris, values of 1-9.

The association between these factors is highly significant, but, of course, is considered to be due to their joint association with other factors. The accompanying graph (Fig. 1) of mean values displays the association between pain reaction and colour of iris.

Each point of the graph is based on more than 40 observations, with the exception of the last three, for only 11 subjects were seen with light brown eyes, 23 with brown and 28 whose irises were dark brown.

Judgement of the reaction to pain is based on 12 months use of this new apparatus (Borden high-speed air-rotor), and on more than twenty years clinical experience; nevertheless, it is acknowledged that both types of observation are open to criticism owing to their subjective nature. However, a test to establish the reproducibility of the results was satisfactory, for out of 136 subjects that were re-assessed between one and four weeks after the original examination, the same values were obtained for the colour of the eyes in 115 cases, and for the pain reaction in 114 subjects. Both for colour of iris and for pain reaction, the mean of the discrepancies between each pair of results was non-significant; the mean discrepancies were, pain reaction 0.02, iris colour 0.04.

Approximately 13 per cent of the total number of subjects required the injection of a local analgesic for cavity preparation, a similar percentage being found

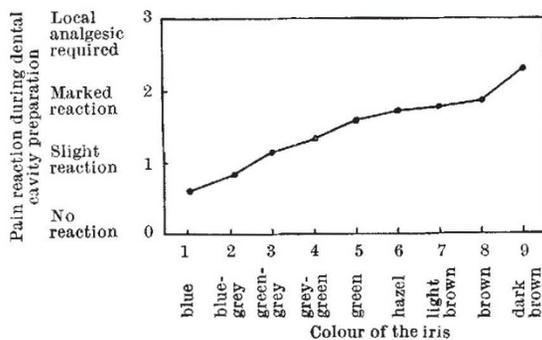


Fig. 1. Association between the colour of the iris and the reaction to pain resulting from dental cavity preparation

in the group of subjects formed by adding the results of those whose eyes were greyish-green, green or hazel. However, this aid was not required by any blue-eyed subjects, and was used for only 2 per cent of those with greyish-blue or greenish-grey eyes; but it was required by 30 per cent of the subjects with light brown or brown eyes, and by more than 53 per cent of those whose eyes were dark brown.

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Development of the Aplacophorous Mollusc *Neomenia carinata* Tullberg

PRESENT-DAY authorities agree that, within the Mollusca, the chitons (or Polyplacophora) are closely related to the solenogastres (or Aplacophora). An important item influencing this view is the description, by Pruvot<sup>1</sup>, of the development of seven overlapping, dorsal, plate-like spicules in the metamorphosing larva of the solenogastre, *Nematomenia banyulensis*. The appearance of these spicules has been considered to be a reminiscence of a chiton-like ancestor and, no doubt, has influenced many authors in coming to the conclusion that the solenogastres are degenerate chitons. Pruvot's description was based on observations on a single larva, but nonetheless the figure he gave of this developmental stage has been widely reproduced in general works.

The purpose of the present communication is to describe some observations on the development of *Neomenia carinata* Tullberg 1875; together with the work of Baba<sup>2</sup> on *Epimenia verrucosa*, they show clearly that, while the larva of *Nematomenia* may develop overlapping dorsal plates in the manner described by Pruvot, this is by no means the rule in the Aplacophora.

The embryos of *Neomenia carinata* hatch three days after oviposition (at 10° C.) as trochophores with the blastopore still open abapically, but with no stomodæum yet developed (Fig. 1A). These larvæ swim over the bottom of the culture vessel, propelled by the strong cilia of the prototroch. As the larvæ proceed, they spiral in the same direction as the metachronal waves travel around the prototroch (clockwise when viewed from the anterior). At 7-8 days metamorphosis begins; a caudal bud begins to protrude through what was formerly the blastopore (Fig. 1B). The tip of this bud bears a minute pore, the anus, and is ciliated. The rest of the bud, as it grows out, is unciliated but bears large numbers of pointed spicules (Fig. 1C). The 'trochophore' part of the larva remains ciliated, but becomes reduced in size, while the prototroch and apical tuft degenerate. The caudal bud comes to form by far the greater proportion of the larva (Fig. 1D). The last remains of the ciliated trochophore-mass are ingested through the mouth as the larva completes metamorphosis (Fig. 1E and F) and abandons pelagic life. At no time is there any trace of segmentation, nor of any dorsal shell-plates. When metamorphosis is complete the external surface of the body (except perhaps for the pedal groove) is unciliated, and the form is like that of the adult *Neomenia*.

This description is based on observations on large numbers of larvæ of *Neomenia carinata* reared through metamorphosis in the laboratory, and the