

Notes and Memoranda.

Gadus esmarkii (*Nilss.*) in shallow water. A living specimen of this fish was taken on August 27th, 1900, in a tuck-net worked by Mr. T. Curtis on the shore of the Hamoaze, off Coombe Lake, between Saltash and the mouth of the River Lynher. Associated with it were numbers of mackerel, garfish, and young gadoids. Owing to its "bastard" characters, which struck the eye of the fisherman when handling it, the specimen was brought to the Laboratory for examination. Its capture is interesting for several reasons. It is the first specimen of Esmark's Pout recorded from the English Channel, and the only specimen hitherto obtained in littoral water, at any rate in the British area. The previous British records are enumerated in Holt's papers in *Trans. Roy. Dublin Soc.* v. 1895, p. 431, and this Journal, vol. v. 1897, p. 79. The dimensions and fin-ray formula of this specimen are given below, together with those of the less mutilated specimen from the Bristol Channel referred to by Holt in the second of his papers.

	—SPECIMEN FROM—	
	HAMOAZE. mm.	BRISTOL CHANNEL. mm.
Length, without caudal rays	168	167
„ with „	181	180
Depth, maximum	35	Shrunken
„ min. (caudal peduncle)	8	8
Length of head	39.5	37
Diameter of eye	13	12
Length of snout (preorbital)	10	9
Interorbital breadth	9	7
Fin-rays— $D_1 + D_2 + D_3$	15 + 24 + 24	15 + 28 + 27
„ $A_1 + A_2$	26 + 25	29 + ?

It will be observed that in the proportions of the eye and head ($=\frac{1}{3}$) these southern specimens agree with the Norwegian type (Smitt, *Scandinavian Fishes*, 1892, p. 502), but that the ratio of length to depth of body falls below the minimum ratio assigned to this character for Scandinavian specimens by Smitt. The figures given by this authority show that the total length varies between 5.1 and 5.9 times the depth. In the Plymouth specimen the length is only 4.8 times the depth, thus approximating to the proportions of most of the Scottish and Irish specimens described by Günther and Holt ($4\frac{1}{2}$ times). It

would therefore appear that in spite of occasional exceptions, such as those recorded by Holt, there is a general tendency in the British samples of *Gadus esmarkii* to the assumption of a stouter and less slender shape of body than in the Scandinavian type. So far as the Plymouth specimen is concerned this relation is also confirmed by the relatively greater depth of the caudal peduncle. The body length is only 21 times the depth of the peduncle, whereas in Scandinavian specimens, according to Smitt, the body is so attenuated that the length varies between 22.2 and 25 times the minimum depth of the body. Günther's figure of a Scottish specimen, on the other hand, yields a ratio of 24.5 times the caudal peduncle (*Proc. Roy. Soc. Edin.* xv. 1889, Plate III.).

The fin-ray formulæ present no distinctive features, since they happen to coincide closely in the two fishes examined with the minimum and maximum limits of variation assigned to Scandinavian specimens by Smitt. The maximum number of rays (38) attributed by Smitt to the second anal fin is clearly a misprint for 28.

It follows from the above that the only difference between the British and Norwegian samples of *Gadus esmarkii* that is revealed by the available data is a greater range of variation in the relative size of the eye and depth of the body in British than in Scandinavian specimens, a difference that may possibly be reduced upon examination of these points in a larger number of Scandinavian specimens.

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An albino Hake (*Merluccius merluccius*). During the first week of October, 1900, Mr. J. C. Ward, Director of the Milford Docks Company, sent me, at the request of the captain of one of the steam trawlers, a specimen of a fish which came up in the trawl amongst a catch of hake, and was presumed to belong to some different and unfamiliar species. It was hakelike in form and structure, but much leaner in appearance, and entirely destitute of the usual skin pigmentation, both on the external surface of the body and on the inner linings of the buccal cavity and gill covers.

As a white-mouthed hake (*Merluccius argentatus*) has been recorded from the Icelandic coast by Faber (*vide* Günther, *Catalogue of Fishes*, iv. p. 346), I examined this specimen in some detail, half expecting it to throw light on the somewhat dubious Icelandic form. In all structural respects, however, the specimen agreed with the common hake, the teeth being normal, the scales forming about 135 rows, and the fin-ray formula being D. 10 + 39; A. 38. The pigmentation of the retina and peritoneum was also normal. The specimen was clearly, therefore, a white-skinned abnormality of the common hake, and offered

no approach either to the Icelandic or New England hake, as regards an exceptionally large number of fin-rays.

The lean and emaciated condition of the specimen was, however, very striking, especially in the head region, where not only the bony ridges of the skull and cheeks projected sharply beneath the thin layer of skin, but even the lines of sculpture of the superficial bones were plainly recognisable. In a normal hake, with which I compared the specimen, these details were quite invisible, and the bony ridges were rounded off or hidden by the plumpness of the integument. In girth and weight the albino was far inferior to the normally pigmented hake of approximately equal length, as the following figures reveal:—

	Albino.	Normal (dusky) hake.
Length, to base of caudal fin	26 $\frac{1}{4}$ ins.	27 $\frac{1}{2}$ ins.
Length of head (snout to opercular spine).	6 $\frac{1}{4}$ „	6 $\frac{1}{4}$ „
Interorbital breadth	1 $\frac{5}{8}$ „	1 $\frac{3}{4}$ „
Girth round head, just in front of pelvic fins	9 „	10 $\frac{1}{8}$ „
Girth just behind the tenth anal fin-ray	9 $\frac{1}{8}$ „	10 $\frac{1}{4}$ „
Weight (guttled)	4 lb. 5 oz.	5 lb. 9 $\frac{1}{2}$ oz.

These data show that, although the length of the albino was only 4 $\frac{1}{2}$ per cent. less than that of the normal hake, the deficiency in girth amounted to 11 per cent. and the deficiency in weight to 23 per cent.

As the fish showed no signs of disease, I believe its lean condition may be attributed with some confidence to the check placed upon its catching powers by its conspicuous white colouration. Being a predacious and nocturnal fish, the hake must depend largely for its success in catching mackerel and other active prey upon its dusky inconspicuous appearance. A white hake, on the other hand, would be more easily avoided, especially at night, and would therefore catch fewer fish. Hence the emaciated condition of this albino is particularly interesting from the evidence it seems to afford of the operation of natural selection as regards the colouration of fishes.

In drawing this conclusion I have not overlooked the possibility that the deficiency in skin pigment may have involved a thinning of the skin, either as a physiological or congenital correlate, especially as in the New England hake (*M. bilinearis*), which appears to be less darkly pigmented than the European species, the ridges on the head are described as being very conspicuous (Jordan and Evermann, *Fishes of North America*, 1898, p. 2,530). The relative deficiency in the weight of this albino fish appears to be far too great to admit of this interpretation.

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