

"Common on Murree; fairly common on Thundiani."—*J. W. Y.*

63. *Spindasis hypargyros*.

Spindasis hypargyros, Butler, Proc. Zool. Soc. 1886, p. 369. n. 55, pl. xxxv. fig. 3.

Khairabad, 18th April; Futch Khan's bungalow, Kooteer, Chittar Pahar, 2000–3000 feet, 23rd April; Campbellpore, 2nd and 31st May, 2nd June, and 23rd July, 1886.

"Common generally in the neighbourhood of Campbellpore in July 1885 and April 1886; the specimens taken April 1886 were, as a rule, smaller than those of July 1885."—*J. W. Y.*

The largest specimen sent to us by Major Yerbury in 1886 and taken that year measures 39 millim. in expanse, the smallest (a very dark little female) only 25 millim.; those taken and forwarded in 1885 measured from 35–38 millim.: the really gigantic example sent in 1886 was taken in May, and there was exactly one month between its capture and that of the smallest one; therefore no supposition as to the large and small specimens being dry- or wet-season forms or seasonal forms of any kind need be suggested.

[To be continued.]

XVII.—*On the Bib (Gadus luscus) and Poor-Cod (G. minutus)*. By FRANCIS DAY, C.I.E., F.L.S., &c.

IN June 1886 Professor M'Intosh, in the Ann. & Mag. Nat. Hist., subscribed to the view that the poor- or power-cod was the young state of the bib. As I have now fresh material to investigate, and as it does not confirm this view, I must ask for a small space in order to review what have been the published opinions of British ichthyologists on this point for the last two centuries, as well as to briefly describe some fresh specimens which I cannot help thinking are opposed to this novel classification.

Willughby, in his 'Historia Piscium,' 1686, p. 169, adverted to the bib, or blinds of Cornwall, *Asellus luscus*. He likewise, at p. 171, enumerated as another species "*Asellus mollis minor seu asellus omnium minimus*," and which latter he referred to "*Anthicæ secunda species*, Rondel. Gesn. 64. An Merlangus Bellonii?" But there is no occasion to allude to all the ancient authors who have similarly held that the bib and poor-cod are distinct species, as the various references are given in Gmelin's edition of Linnæus, where the former

fish was classed as *Gadus luscus*, p. 1163, and the latter as *G. minutus*, p. 1164. The Rev. Mr. Jago, of Cornwall, observed, in his 'Catalogus quorundam piscium rariorum' of Cornwall, that he had discovered a new form of British Gadoid in the poor-cod; and in this appendix, published in Ray's 'Synopsis Piscium,' 1713, p. 163, we find "Asellus mollis minimus, *Cornub. POOR* vel *POWER* dictus, fig. 6," and Ray remarked on its being already described in Willughby. If Jago's figure is referred to, it will be seen that he correctly placed the vent in a perpendicular line beneath the last ray of the first dorsal fin, which, as I shall presently show, is a proof that he certainly diagnosed the species.

Pennant, in his 'British Zoology,' vol. iii. 1776, pp. 183 and 184, also separated the two, and figured them as distinct on plate xxx. He referred the bib to *Asellus luscus*, Raii, 'Synop. Piscium,' p. 54, or *Gadus luscus*, Linn. Syst. Nat. p. 437, and the poor-cod to Jago's figure in Ray, or *G. minutus*, Linn. Syst. Nat. p. 438. Shaw likewise considered the two forms distinct species; as did also Turton, 'British Fauna,' 1807, p. 90; Fleming, 'British Animals,' 1828, p. 191; and Jenyns in his 'British Vertebrate Animals,' 1835, pp. 442, 444. The last of the foregoing authors remarked: "first noticed as a British species by Jago, who obtained it on the Cornish coast, where it has since been observed by Mr. Couch." He then continued that he (Mr. Jenyns) had described his fish from a Weymouth example of the unusual length of 8 inches. In the bib he found the "vent directly beneath the commencement of the first dorsal," whereas in the poor-cod it was "in a line with the tenth ray of the first dorsal fin."

Yarrell ('British Fishes,' ed. 1836) gave these two forms as two species (vol. ii. pp. 157, 161), and correctly showed the position of the vent. He did not appear to have any doubt as to their distinctness, and no alteration was made in the subsequent editions of his work, which point out that by the situation of the vent and fins the two species may be readily diagnosed. Thompson, in 1837, observed, at a meeting of the Zoological Society, that among the new species of fishes he had obtained in Ireland was *Gadus minutus*, Linn., the poor-cod, and that from three localities in Down and Antrim; also that two specimens from the coast of Cork were in the collection of Mr. Ball (Proc. Zool. Soc. 1837, p. 57); and in Thompson's 'Natural History of Ireland,' iv. p. 181, the foregoing opinion was retained, and further details of the various specimens added. In White's 'Catalogue of British Fish,' 1851, pp. 88 and 89, they were kept distinct, and also in Günther's 'Catalogue of the Fishes in the British Museum,'

vol. iv. 1862, p. 335; while in this latter work it was remarked that "the ribs of this species [the bib] are proportionally longer and stronger than in the preceding [the poor- or power-cod]." Couch ('Fishes of the British Islands,' iii. 1877, pp. 70 and 72, and on plates 138 and 139) did not place these fish under one head, but observed of the poor-cod: "vent nearer the tail [than in the bib], opposite the termination of the first dorsal. The first dorsal also begins further distant from the head; the pectorals are shorter; ventrals also shorter, not reaching halfway to the vent; tail slightly incurved" (p. 73). Dr. M'Intosh, when enumerating the 'Fishes of St. Andrews,' 1875, p. 178, remarked: "*Gadus minutus*, Linn., common; *G. luscus*, Linn., not uncommon." I omit reference to the statements in my 'British and Irish Fishes,' 1882, pp. 286, 288, plates 80 and 81, for obvious reasons, simply observing that the views I then held I see no cause to alter.

The first author of any note in ichthyology who during the last two centuries has separated these forms was, I believe, Winther, in his 'Marine Ichthyology of Denmark,' 1879, p. 29, where he placed, under *Gadus minutus*, two subspecies or varieties: (a) *minutus*, (b) *luscus*. But in the Ann. & Mag. Nat. Hist. 1886, xvii. pp. 442, 443, Professor M'Intosh remarked of the poor-cod, that my "elaborate descriptions in regard to eyes, teeth, fins, scales, lateral line, and colours are not always satisfactory, since they fail to show the relationship existing between the adult and young stages apparently of the same species." Having quoted my observations on Winther's opinion, he concluded that as I stated that I had "not had an opportunity of investigating both sexes in these two species of fish," that such "indicates some uncertainty on the subject." He continued thus:—"my own experience of the species has now led me to conclude that what has been described as the poor- or power-cod (*Gadus minutus*) by several authors is only the young of the bib," concluding that "the confusion in regard to this species has partly arisen from an examination of preserved specimens."

Although my opinion had been here called in question, in my reply (*l. c.* p. 527) I could merely suggest that an account of the intermediate links between these two forms (which up to Winther's time had invariably been held to be distinct species) should be given by Dr. M'Intosh. Personally I possessed no new materials to work upon, and deemed it preferable to wait until such time as I had, for assertions are not proof. I took steps, however, to secure some fresh specimens, and applied to my old friend Mr. Dunn, of Mevagissey,

asking him to obtain for me some power-cod and bib of the same size, so as to enable me to compare one with the other. Circumstances, however, have been unfavourable, and it was not until January 5th that I received from Cornwall three specimens, no. 1 being a bib, *Gadus luscus*, 7 inches long, and nos. 2 and 3 being power- or poor-cods, each 8 inches in length, the one being a male, the other a female, while in both the generative organs were very fully developed. This last fact was interesting as demonstrating that poor-cod may be of either sex, while the size of the two forms likewise proved that one 7 inches long may be a bib and others 8 inches long may be poor-cod, rendering it somewhat problematical that the larger form could be the young or immature form of the smaller specimen. This last, I may likewise add, was, except in size, a distinct counterpart in colour and proportion of large examples of the bib in my collection.

As regards the formula of the fin-rays existing in these three fishes, it must not be overlooked that in the Anacanthini or spineless forms these are subject to considerable modification; but taking the numbers for what they are worth they are as follows:—

1. Bib, <i>Gadus luscus</i>	D. 12 20 19.	A. 31 18
2 & 3. Poor-cod, <i>G. minutus</i>	D. 12-14 23-25.	A. 24-25 21-23

Eyes.—In the bib the eye was one third the length of the head, one diameter from the end of the snout; while in the poor-cod the eye was two thirds the length of the head and two thirds of a diameter from the end of the snout, or larger than in the bib.

Vent.—In the bib this was beneath the anterior end of the first dorsal fin, or a quarter of the entire length of the fish from the front end of the lower jaw, whereas it was beneath the hind end of the same fin in the poor-cod and one third of the same distance as it was one fourth in the bib.

Fins.—In the bib the first anal commenced just behind the vent and more forward than in the poor-cod, while the two anal fins were connected together by a membrane in the bib, as if the whole had belonged to one consecutive fin; but in the poor-cod they were two distinct fins with a short interspace between. The ventral fin was one fourth longer in the bib than in the poor-cod, while their colours widely differed. Respecting the number of the gill-rakers, on which some authors have laid considerable stress in the classification of species, I found in the outer branchial arch of these two forms as follows:—Fourteen in the middle or ceratobranchial bone of the bib, and eighteen in the same place in the poor-cod.