

In a paper which I had the honour of communicating to the Royal Asiatic Society*, the genus *Polynemus*, among others, was pointed out by me as forming an article of food fit for curing, and easily procurable in almost any quantity: by the discovery that it produces isinglass, it has attained an additional interest; and I have no doubt the manufacture of this article will, when entrusted to judicious hands, form another valuable article of exportation from India.

L.—On *Isinglass* in *Polynemus* sele, *Buch.*, a species which is very common in the *Estuaries of the Ganges*. By J. McCLELLAND, Esq., Assistant Surgeon†.

THERE are nine species of *Polynemi*, or Paradise fishes, enumerated by authors, and although they are all pretty well described, I am not aware of any more valuable property being known regarding them than their excellence as an article of food, of which we have a familiar instance at this season in the *Pol. paradiseus*, or Mango-fish, *Tupsi Muchi* of the Bengalese.

Buchanan has five species in his work on Gangetic Fishes, but three of these are small, and probably varieties only of the *Tupsi*; two of them, however, are of great size, and so common in the estuary of the Hoogly, that I have seen numerous hackeries, or bullock carts, conveying them to the Calcutta bazar, during the cold season. They are not confined to the estuary of the Hoogly, but probably extend to all the estuaries of the Ganges, as Buchanan says they do; and we know that Dr. Russell also describes two large species in his work, long since published, on the fishes of the Madras Coast.

The very valuable production, *Isinglass*, having been recently found to be yielded by one of the fishes of the Hoogly by a writer in Parbury's Oriental Herald, it became an interesting object to determine the systematic name of the fish affording an article so valuable, and to learn as much as possible regarding its habits. Having procured a specimen of this fish from the bazar, I was surprised to find it to be a *Polynemus*, or Paradise fish, although the writer alluded to described it as resembling a Shark. My surprise was not that a person unacquainted with fishes should compare it to a Shark, or to anything else, but that a nearly allied species to the Mango-fish should contain a natatory vessel of such size and value,

* Published in the Journal of the Royal Asiatic Society of Great Britain and Ireland, No. ix., August 1838, p. 165.

† From the Journal of the Asiatic Society of Bengal, No. 87, p. 203.

while that organ is quite absent in the Mango-fish itself, though a general character of nearly all others.

I had come to the determination never to describe single or detached species of fish; but as the object of this paper is to elucidate the commercial side of a question already before the public, I shall not pretend to offer any remarks on the scientific part of the subject, which is indeed beyond my province, as my observations have hitherto been confined to the fresh water species of India.

The species affording the Isinglass is the *Polynemus sele*, Buch.; *Sele*, or *Sulea*, of the Bengalese, described, but not figured, in the Gangetic Fishes; but if Buchanan's drawings had not been placed under a bushel since 1815, probably this useful discovery would have been sooner made, and better understood by the writer in Parbury's Oriental Herald, to whom we are indebted for it.

The figure [given in the Journal of the Asiatic Society of Bengal,] from Buchanan's unpublished collection at the Botanic Garden, conveys an excellent representation, about half-size, of a specimen from which I obtained 66 grains of Isinglass: but as the writer in Parbury's Oriental Herald states that from half a pound to three quarters of a pound is obtained from each fish, we may suppose either that *P. sele* attains a much greater size than 24 pounds, the limit given to it by Buchanan, or, that the Isinglass is also afforded by a far larger species, namely *Polynemus teria*, Buch. or *Teria bhangon* of the Bengalese, *Maga jellee* of Russell, which Buchanan was informed sometimes equals three hundred and twenty pounds avoirdupois, and which I frequently have seen of an uniform size, that must have been from fifty to a hundred pounds at least, loading whole cavalcades of hackeries at once on their way to the Calcutta bazar, as I have already stated, during the cold season, when they would consequently seem to be very common.

Although the sound, or natatory vessel is the part of the fish that would afford the principal inducement to form fisheries, one of the obligations that speculators should be obliged to enter into with the Government is, to cure all parts of such fishes as might be taken for their sound. Considering the scarcity of fish in many parts of India, and the great, I may say unlimited demand for it in some parts of the country even when badly preserved, as well as the excellence of the flesh of all the *Polynemi*, the curing of these fishes might prove no less profitable to the parties themselves, than it would unquestionably be to the country. I was happy to find the attention of the Royal Asiatic Society directed to the subject of curing fishes in

India by Dr. Cantor, (vide Proceedings, 21st April, 1838) but a something was then wanting to be known in order to give a direct inducement to the undertaking*. I therefore regard the discovery of the *Ichthyocolla* of commerce in one of the larger *Polynemi* of India as a circumstance eminently calculated to direct attention to a promising and almost unlooked for source of enterprise. We first of all require to know whether more *Polynemi* than one afford it, and to be fully acquainted with the habits and the methods already employed for taking such as do. *Polynemus sele*, Buch. is the species I examined and found to contain it; but this species is supposed to be a variety only of *Polynemus lineatus*, which is very common on all the shores to the eastward; it therefore becomes a question of some importance to determine whether *P. lineatus* yields the same valuable article, and if it be really common to the eastward; if so, it seems strange that the Chinese should send for it to the Hoogly. Next, do the *Pol. Emoi* and *Pol. plebeius*, supposed by Buchanan to correspond with his *Sele*, contain the same valuable substance? and do either of Russell's species, namely, the *Maga booshee* and *Maga jellee*, (Indian Fishes, 183, 184,) yield it? These are questions easily determined along our coasts by merely opening such fish as correspond with the one figured, and ascertaining whether they contain an air vessel or not, and whether that vessel if present be large or small. Mergui, Batavia, Singapore, Tranquebar, Madras, and

* Should Dr. Cantor still be in London, I would recommend those who may be interested in the important question of Isinglass to consult him, as no one is so competent to afford information regarding the fish by which that article is yielded in India. He will, I am confident, on a re-examination of his notes regarding the *Polynemi*, readily distinguish those with large sounds, and be able to afford more valuable information regarding their habits, and the quantities in which they are procurable, than could be expected from any one who had not devoted his thoughts to the subject, during a survey of the place in which these fishes occur. I am not sure that the species of *Polynemus* Dr. Cantor particularly refers to in his paper as the *Salliah*, or *Saccolih*, is not the very fish that affords Isinglass; if so, it appears to be considered by Dr. Cantor as a new species, and his notes will probably afford all that it is essential to know regarding its habits. Thus, as Sir J. E. Smith somewhere observed, "the naturalist who describes a new species, however trifling it may seem, knows not what benefit that species may yet confer on mankind."

In an interesting account of Kurachee by Lieut. Carlross, read at the last anniversary Meeting of the Bombay Geographical Society, cod sounds and sharks' fins are mentioned among the exports from that place, and fishing is said to be carried on to a considerable extent along the coast of Sinde. As however the Cod, *Morrhua vulgaris*, Cuv., is quite unknown in the Indian Seas, the species from which the sounds alluded to by Lieut. Carlross are taken are no doubt *Polynemi*, the larger species of which are sometimes called by the English, Rock-Cod. It will be curious to learn if the Chinese have monopolised this trade on the coast of Sinde as well as in the Hoogly.

Bombay are points at which observations might be made. This question may be so easily ascertained, that it is hardly worth forming a conjecture about it; but if any of the species common to the coasts of the Eastern seas possessed so valuable a property, the chances are that it would have been long since discovered. It is therefore probable that the large gelatine sound will be found to be peculiar to *Pol. sele*, and perhaps *Pol. teria*,* Buch. both of which seem to resort chiefly to the Gangetic estuaries at certain seasons, particularly during the North-east monsoon, when it is easy to imagine that the shelter afforded in those estuaries at that season, might account for many peculiarities which their ichthyology appears to present, compared with that of open coasts. It is during the cold season that the two gigantic fishes above mentioned appear to be caught in most abundance, a circumstance the more favourable to any improved operations that might be resorted to with a view to convert them to useful purposes. Whether both contain the same valuable substance, I am unable to say, having as yet only examined *P. sele*.

GEN.—POLYNEMUS.

Two fins on the back, with long filaments attached to the sides in front of the pectoral fins. Opercula covered with scales; preoperculum serrated behind. Example. The common Mango-fish of Bengal.

YIELDING ISINGLASS.

P. Sele, Buch. Plate—

Sele, or *Sulea* of the Bengalese.

Five filaments, the first reaching from the front of the pectorals to midway between those fins and the anal, the other filaments progressively shorter; no streaks on the sides, lateral line deflected on the lower lobe of the caudal fin. The fin rays are as follows:—first dorsal seven, second dorsal fourteen, pectorals thirteen in each, ventrals each six, anal twelve or thirteen, caudal twenty (?) The teeth are very fine, continuous below round the edges of the jaws, but interrupted at the anterior part of the upper jaw, behind which a small detached group of palatine teeth are placed on the vomer.

The liver consists of an elongated left lobe and a short right one, under which the gall bladder is situated. The stomach is a short muscular cul-de-sac, both orifices of which being placed at the anterior extremity, from which numerous small *cæcæ* are given off, the intestine extends straight to the vent; in all these respects it corresponds nearly with *P. paradiseus*. The air vessel, which is quite absent

* *P. quadrifilis*, Cuv. *P. tetradactylus*, &c. and probably refer to the same.

in the latter, and on which the peculiar value of this species seems to depend, is a large spindle-shaped organ about half the length of the fish, thick in the middle and tapering toward the extremities, where it ends in front by two, and behind by a single tendinous cord; similar small tendinous attachments, about twenty-two in number, connect it on either side to the upper and lateral parts of the abdominal cavity. This organ, which is called the sound, is to be removed, opened, and stript of a thin vascular membrane which covers it both within and without, washed perhaps with lime water and exposed to the sun, when it will soon become dry and hard; it may require some further preparation to deprive it of its fishy smell, after which it may be drawn into shreds for the purpose of rendering it the more easily soluble. The fish which I examined weighed about two pounds and yielded about sixty-five grains of Isinglass, not quite pure, but containing about 10 per cent. of albuminous matter, owing perhaps to the individual from which it was taken being young and out of season, and not above a tenth part of the ordinary size of the species. But the solution after having been strained appeared to be equal to that of the best Isinglass, which costs in Calcutta from twelve to sixteen rupees a pound. As the subject thus seemed to be of consequence, I gave a portion of the substance in question to Dr. O'Shaughnessy for its chemical examination.

Calcutta, 3rd May, 1839.

LI.—*A Supplement to the Synopsis of the Fishes of Madeira**
in the Second Volume of the Transactions of the Zoological
Society. By the Rev. R. T. LOWE.

Fam. PERCIDÆ.

Genus CALLANTHIAS.

Gen. char.—Head scaly, except the short muzzle before the eyes; teeth as in *Anthias*, Bl.; preopercle perfectly entire; opercle with two flat adpressed spines; lateral line high up, near the back, and ending at the end of the dorsal fin, which is even or continuous; branchiostegous membrane with six rays.

CALLANTHIAS PARADISÆUS. A most elegant little fish; in general habit and colouring resembling *Anthias sacer*, Bl., but without the produced third spine of the dorsal fin. Its analogies are singularly complicated, but its affinities are truly Percidous. By Bloch it might

* Read before the Zoological Society, May 28, 1839.



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