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these indicate the position of the true tube-walls. Middle Devonian, Gerolstein.

- Fig. 5. Part of a tangential section of *R. stromatoporoides*, Roem., enlarged twenty times. The specimen is in the "*stellimicans*" state, but the walls of the tubes are visible. The peculiar rounded tubercles at the angles of junction of the corallites are well seen. Middle Devonian, Gerolstein.
- Fig. 6. Part of a vertical section of a double colony of *R. stromatoporoides*, Roem., partly in the normal condition and partly in the "*stellimicans*" state, enlarged twelve times. Middle Devonian, Gerolstein.
- Fig. 7. Part of a vertical section of another example of the same, similarly enlarged. In this specimen the stellate crystallization has not been complete, and the centres of the tube-cavities are partially unobliterated and exhibit the remains of the tabulæ. Middle Devonian, Gerolstein.
- Fig. 8. Part of the surface of *R. stromatoporoides*, enlarged forty times. Minute elevations are seen at the angles of junction of the corallites; but these may be only the result of weathering. Middle Devonian, Gerolstein.

[To be continued.]

XXXV.—Note on *Orcynus thynnus* (L.).

By FRANCIS DAY, F.L.S., F.Z.S.

It is always satisfactory to obtain reliable records of rare or little-known British fishes, especially when new facts have been ascertained as to their geographical distribution, external form or internal structure, &c.; and I was therefore pleased to see in your last month's issue a paper by Dr. M'Intosh on a male tunny (*Orcynus thynnus*), 9 feet long, trawled off Pittenweem, in Scotland. In that paper some criticisms are offered upon my work on 'British and Irish Fishes' and on my figure of the tunny, which observations I propose briefly replying to so far as they affect myself.

But I must first observe that as no figure of this new specimen is given, while the number of fin-rays is omitted, no evidence is offered, except as to the size of the fish, that it was the tunny (*Orcynus thynnus*), or the bonito (*Thynnus pelamys*), or even *T. thunnina*, which has been captured more than once off Denmark. An essential difference between the fishes forming the restricted genera *Orcynus* and *Thynnus* consists in those pertaining to the first having "small teeth on the jaws, vomer, and palatine bones," while in the second there are "small teeth on the jaws, palatine bones, but none on the vomer." Dr. M'Intosh observes of his example:—"The

mucous surface of the roof of the mouth has, in addition to the rasp-like teeth on the palatines, numerous hardened streaks from thin ossifications of the region" (*l. c.* p. 329). Consequently it would appear that *it did not possess teeth on the vomer*.

I now come to the questions raised respecting my figure, which, as I stated, was from a stuffed example in the national collection, and for stuffed fishes I think those of the tunny will bear comparison with others thus preserved but belonging to different genera; and, while giving this opinion, I may add that I have often seen bonitos and their allies when freshly taken from tropical seas. Premising that I figured the tunny as closely as I was able from the stuffed specimen without indulging in any "fanciful representations," in order to make it more closely resemble what I thought it might look like were it not stuffed, I have re-examined the British-Museum tunny, and with the following results, as any one can verify for himself should he desire to do so. Large specimens in spirit are not in that institution, for thus preserving them would be rather a useless waste of money, which remarks are still further applicable to collections belonging to private individuals.

"The first dorsal fin again is stated to have weak spines. . . . the powerful nature of the first spine is conspicuous" (*l. c.* p. 328). I have shown it nearly twice as wide at its base as the second spine, and that is what exists in the British-Museum specimens, and to it the term "*powerful*" is here quite misapplied. The bonito's is much stronger than that of the tunny; but even it cannot be termed "*powerful*," for if so how could the first dorsal spines of such fishes as some of the Siluroids be described? In fact I still think that the generic definition of "weak spines" to the tunny fishes as compared with those of other genera is literally correct.

"The premaxillary and maxillary region is too long in the figures of Cuvier and Valenciennes, as well as in Day's" (*l. c.* p. 328). In the largest British example from Weymouth (7 feet 4½ inches from the snout to the base of the tail-fin) the distance from the eye to the end of the snout is 2⅔ in the length of the head, in a second stuffed specimen 3 feet 1 inch long (computed as above) the length of the snout is just half of the entire length of the head to the postero-inferior end of the opercle, where it joins the subopercle; consequently the length of this portion of the head agrees with that shown in Cuvier and Valenciennes's work, and also with my own figure, but not with Dr. McIntosh's specimen. The eye is said to be "too large" in my figure; here, again, it

agrees with the specimen. The head "seems to be too long from the tip of the snout to the posterior margin of the operculum" (l. c. p. 328); he gives it as about $3\frac{1}{2}$ in the distance to the base of the tail-fin, but I find it to be $3\frac{1}{6}$ in the large specimen and $3\frac{1}{4}$ in the smaller fish, neither measurement agreeing with the Pittenweem example. The teeth are comparatively larger in small than in large examples, and I found them to be about 0.1 inch long in the upper jaw; consequently I do not think they are "*fancifully represented*."

The spines of the first dorsal fin "seem to have been unusually long anteriorly in the specimen figured by Day" (l. c. p. 329). In the largest fish I have referred to the length of the first dorsal spine is $6\frac{1}{2}\frac{5}{8}$ of the length of the fish (to the base of the caudal fin), and of the smaller fish $8\frac{1}{4}$; while it is not quite 8 in my figure. Even Dr. M'Intosh gives the height of the first dorsal as $10\frac{1}{2}$ inches and the length of the fish to the base of the caudal fin at 94 inches. This would be about equal to $8\frac{1}{2}$; and as I do not show it more than 8, I cannot agree to its being "unusually long anteriorly."

Not only does the anal fin in its size, as I have represented it, agree with the specimens, but also in its position, as "a line running vertically from the anterior margin of the anal fin runs behind the second dorsal" (p. 329) in Dr. M'Intosh's specimen, but it does not do so in either of the British-Museum fish.

Dr. M'Intosh, in the Ann. & Mag. Nat. Hist. 1885, xv. p. 433, inserted under the head of *Cottus bubalis* some remarks of mine on the breeding of *C. scorpius*, which I now see he returns to the species under which I originally placed them. Professor Cossar Ewart, in the 'Scotch Fishery Reports,' criticised my figure of *Serranus cabrilla*, and doubted my account of its geographical distribution, asserting that he had obtained it from the north of Scotland; fortunately he figured the specimen, which showed at a glance that it was *Sebastes norvegicus*. Possibly when Dr. M'Intosh's fish is figured it will turn out to be a different fish from the tunny; but if he had looked at the specimens in our national collection before so emphatically condemning my figure, I think he would have satisfied himself that I had only followed nature and the work of the taxidermist, carefully measuring all points and reducing them by the aid of proportional compasses to the size shown in my illustrated work.