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THE ANNALS

AND

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[FIFTH SERIES.]

No. 42. JUNE 1881.

XLIII.—*On Palæospinax priscus, Egerton.*
By JAMES W. DAVIS, F.G.S. &c.

[Plate XX.]

I HAVE recently had the good fortune to become possessed of an example of this rare fish, which serves to elucidate some characters not shown on the specimens described by Sir P. Egerton in the xiii. decade of the Memoirs of the Geological Survey (1872). Whilst proving the correctness of the deductions drawn by the author, this specimen also exhibits characters which enable me to correct some inferences drawn from imperfect evidence.

My specimen is 10 inches in length. The front part of the head is absent; and probably 2 inches of the caudal extremity is also broken away. The body of the fish included between these parts is extremely well represented. The fish is laid on its ventral surface, and exposes the dorsal. There are two large pectoral fins, two dorsal fins, each having attached to its anterior portion a bony fin-ray. There is also exposed one ventral fin, the opposite one being hidden beneath the body of the fish. The caudal fin is entirely absent. The vertebrae extend from their connexion with the head to the

Fig. 3.

Fig. 4.

Fig. 2.

opposite extremity of the specimen. The whole surface is covered with minute dermal ossicles or shagreen.

There are seventy-eight vertebræ present. The second dorsal spine is evidently in its natural position with regard to the vertebræ, and is fixed above the fifty-sixth from the head; behind there are twenty-two others. The position of the anterior dorsal spine and fin has been somewhat deranged during the decay of the fish: the spine has been pressed away from the fin, and is now separated by an inch and a half, or the length of ten or twelve vertebræ. Its exact position might be difficult to determine; but a comparison with the recent dog-fish (*Acanthias vulgaris*) renders its place tolerably certain. In the dog-fish, as pointed out by Sir P. Egerton, there are one hundred and eight vertebræ. Between the head and the first dorsal spine there are twenty-five vertebræ; from the first to the second are included thirty-four; and beyond the posterior dorsal spine there are forty-nine vertebræ to the extremity of the tail. The *Palæospinax* from the Lias exhibits a remarkable similarity to the recent fish. In the latter there are fifty-nine vertebræ between the head and the posterior dorsal spine, whilst in *Palæospinax* there are fifty-six; and from this close relationship it may be inferred with safety that the anterior dorsal spine was situated above the twenty-third or twenty-fourth vertebra. It may be further urged that as there are behind the posterior dorsal spine, in the recent fish, forty-nine vertebræ, there were about the same number in the fossil one: twenty-two are preserved; and a further complement of about six or eight and twenty would complete the caudal portion of the fish. Relative appearances warrant this supposition. The total length of the fish, including the portion of the snout not preserved, would be 13 inches—a considerably smaller example than those described by Sir P. Egerton.

The head is represented by the impression of some bones or cartilages not sufficiently well preserved for identification. There are two or three teeth similar in form to the figure no. 5, plate vii. of the decade referred to previously, which indicate the proximity of the jaws.

The spines were deeply implanted in the flesh of the fish, and appear to have had a groove along the back for the reception of the fin, though this is only partially evident in my specimen. The anterior spine was smooth, its upper part thickly coated with enamel; the middle portion of the spine, not actually imbedded in the flesh, was enveloped by the dermal covering of the fish, which was thickly coated with shagreen. The posterior spine exhibits the same characters, except that it was finely, but distinctly, covered with longitu-

dinal striations. The small tubercles mentioned by Sir P. Egerton as besetting the lower portion of the posterior spine do not appear to be present on my specimen; but the covering of shagreen presents a similar appearance to the one described in the decades. The spine attached to the anterior dorsal is 1·1 inch in length and ·2 inch wide at the base; it is slightly curved backwards, gradually contracts in size, and ends in a fine point. The second spine is similar in form but larger; it is 1·3 inch in length.

The pectoral fins are very large in proportion to the other parts of the fish; the anterior margin is at least 2·5 inches in length. They are thickly covered with shagreen, the tubercles clustering thickly and of large size along the anterior margin, and becoming more thinly distributed and of gradually decreasing size towards the posterior portion of the fin.

The ventral fins are also covered with tubercles in the same manner; they are 1·1 inch in length.

The dermal tubercles forming the shagreen are composed of little plates, highly enamelled, for the most part rhomboidal in form, in rare instances arranged like flat cubes in a tessellated pavement, but more generally with the corner towards the tail raised, as though the little cube were suspended diagonally at two of the corners transversely to the longitudinal axis of the body, and the anterior corner depressed, causing the one towards the caudal portion of the fish to be raised. The raised portion appears to be somewhat produced in some of the tubercles; but in no instance can I find evidence that any thing approaching a sharp tooth-like structure occurred in any of the tubercles, such as may be seen in many of the recent Placoids.

The figures (Pl. XX. figs. 2, 3, 4) show the relative size of the tubercles in different parts of the fish and also indicate a slightly different form. The minuteness of these objects may be inferred from the fact that there are between 30,000 and 40,000 to cover one square inch of the body of the fish.

The fossil *Palæospinax* presents an instance of a Lias fish which bears so close a resemblance in general character, and even to a large extent in minute detail, to the living *Acanthias*, that we are almost justified in considering the latter as a descendant of the former. The fossil form was a shorter and proportionally a thicker fish than the living one. Its pectoral fins were much larger and better developed. The vertebral column in the two fishes offers a very close parallel. In my specimen there are only twenty-two vertebræ preserved behind the posterior dorsal spine; but Sir P. Egerton mentions a specimen, in the collection of the Earl of Ennis-

killen, consisting of eighty-five vertebræ, with a spine situated above the fortieth from the anterior end, and with consequently forty-five vertebræ beyond it; this number would probably constitute nearly the whole of the caudal extremity, and is fewer by four only than in its living representative. In the specimen figured on plate vii. of the decade mentioned the spine extends above the fifteenth vertebra. In the one now being described the anterior dorsal spine is over the eighteenth or nineteenth vertebra; there can be no doubt, however, that its proper position must have been further back, because the fin to which it was attached is far behind the spine. From analogy it would be supposed that the spine occupied a position halfway between its present situation and that of the fin; and as this would place the spine above the twenty-second or twenty-third vertebra from the head, which is, as already indicated, the point inferred from the comparison with the recent fish, there remains little doubt that such was its actual position.

Locality. All the specimens hitherto described, including the one which is the subject of this paper, are from the Lias at Lyme Regis.

EXPLANATION OF PLATE XX.

Fig. 1. *Palæospinax priscus*, Egerton (nat. size).

Fig. 2. Dermal tubercles or shagreen on ventral fin ($\times 25$).

Fig. 3. Ditto on ventral portion of body behind the ventral fin ($\times 25$).

Fig. 4. Ditto on pectoral fin near the base of the anterior margin ($\times 25$).

XLIV.—*On the originally Bilateral Character of the Renal Organ of Prosobranchia, and on the Homologies of the Yell-sac of Cephalopoda.* By E. RAY LANKESTER, M.A., F.R.S., Jodrell Professor of Zoology in University College, London.

Two recent memoirs on molluscan morphology touch upon matters which have formed the subject of investigations by me, and which I have formerly discussed in the pages of this journal. I am therefore anxious to make a few remarks on the matters in question in the same place as that in which I first wrote of them.

I. Dr. J. W. Spengel, in a very interesting essay (*Zeitschr. wiss. Zool.* vol. xxxv.) entitled “*Die Geruchsorgane und das Nervensystem der Mollusken*,” refers to a note by me “*On some undescribed Points in the Anatomy of the Limpet (Pa-*