

The femur is 455 mm. long, and in nearly every respect like that of man; slight differences are only seen in the absence of an *Angulus medialis*, in the slight development of the *Planum popliteum* and the *Linea obliqua*, and in the concave form of the *Crista intertrochanterica*. The corresponding size of man, with a femur of 455 mm. is given as 170 cm.

The important question, of course, is asked: Is the material at the disposition of Dr. Dubois sufficient to sustain the conclusions so confidently expressed. We know that the capacity of the normal human cranium varies from 1000–1800 cubic centimeters; *Pithecanthropus*, with a capacity of over 1000, is not necessarily excluded from this series. In regard to the femur it is questionable whether the distinctive characters given by Dr. Dubois hold good, if a great number of human femora is examined; besides, the femur shows an extensive exostosis in the upper half. The evidence brought forward by Dr. Dubois certainly does not seem sufficient for the establishment of a new genus and family, forming the missing link between the *Simiidæ* and *Hominidæ*. The publication of the fauna contemporary with *Pithecanthropus* is looked for with much interest.

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The Fins of Ichthyosaurus.

As far back as 1838 Owen¹ had noticed the fact that nearly all the specimens of *Ichthyosaurus* from the English Lias showed a dislocation in the tail-vertebræ. This dislocation or bend was found at the posterior one-third of the tail, generally about the thirtieth caudal vertebra in the *Ichthyosaurus communis*; the terminal portion continued, after the bend, almost as straight as the portion of the tail preceding it. From this Owen reached the conclusion that *Ichthyosaurus* possessed a terminal tegumentary and ligamentous vertical caudal fin. By the weight of this fin, or by the force of the waves beating upon its extended surface, the break of the tail was produced. In the restorations of *Ichthyosaurus* the tail was figured unbroken, with a caudal fin extending symmetrically above and below in a vertical plane, and ending in a point at the end of the vertebral column.

¹ OWEN, R.: Note on the dislocation of the tail at a certain point observable in the skeleton of many *Ichthyosauri*. *Trans. Geol. Soc.*, 2d Ser., Vol. V., pp. 511–514, pl. 42.

In 1892 Dr. E. Fraas¹ described a specimen of *Ichthyosaurus* from Holzmaden, Württemberg (Museum, Stuttgart), in which the whole skin of the animal was preserved. The fin proved to be quite large, symmetrical, and of the same shape as that of the sharks, but the vertebræ did not extend to the dorsal but to the ventral lobe of the fin, thus demonstrating that the dislocation in the tail was the natural condition.

The same specimen showed that there existed a very large dorsal median fin, placed a little in front of the pelvic fins. The pectoral and pelvic fins were also beautifully preserved, and showed, what had been known already before, that the fleshy part of the paddles extended very much further backwards than the bony skeleton.²

Nearly at the same time a splendid specimen of a tail fin of *Ichthyosaurus* of very large size was found in the lithographic limestone of Solenhofen, and is now preserved in the Munich Museum; another tail fin from Holzmaden has gone to the Berlin Museum; and a very complete specimen, showing the whole skin, has lately been secured from Mr. W. Hauff, Holzmaden, by the Museum of Freiburg (Switzerland), for the sum of \$750. In many specimens, which are now in the different museums, the skin could probably have been preserved, if anyone had thought of the existence of it. In the future it will be possible, by very great care.

It is of very great interest that we know now the real structure of the fins of the *Ichthyosauria*. It is well known that the *Ichthyosauria* originated from land-living reptiles closely related to the *Rhynchocephalia* and *Proganosauria*;³ that the fins have been gradually developed through the adaptation to marine life is clear; it would be very interesting to find out whether the Triassic *Ichthyosauria*, in which the limbs are less specialized, show already the same structure in the tail as the forms from the Jurassic.

We see that a very similar fin structure is developed in two groups of animals belonging to two entirely different classes. In the Sel-

¹ FRAAS E.: Über einen neuen Fund von *Ichthyosaurus* in Württemberg. Neues Jahrb. f. Min. 1892, pp. 87-90.

² A very good photographic reproduction of the specimen is given by Fraas in Jahreshefte des Vereins f. vaterl. Naturkunde in Württemberg, 1894. Taf. V.

³ G. BAUR on the Morphology and Origin of the *Ichthyopterygia*. Am. Naturalist, 1887, p. 837.

Über den Ursprung der Extremitäten der *Ichthyopterygia*. Vers. Oberrhein. Geol. Verein., 1887, Stuttgart, 4 p., 4 fig.

achians the vertebral column ends in the upper, in Ichthyosaurus in the lower lobe of the caudal fin. An explanation of this fact has lately been given by Professor Franz Eilhard Schulze¹ of Berlin.

By the lateral motion of a caudal fin like that of the Selachians in form, the animal can not only be propelled forwards, but also upwards or downwards. The motion will be forwards and upwards if, as in the sharks, the upper edge of the caudal fin is the stronger one; it will be forwards and downwards if, as in the Ichthyosauria, the lower edge of the fin is the stronger, supported by the caudal vertebræ. The sharks, as it is well known, are heavier than the water; the motion upwards, therefore, produced by the motion of the lower portion of the tail, is of the highest value for the sharks. The Ichthyosaurs on the other hand were as reptiles with lungs, and with the extensive layer of fat, lighter than water. For these the motion of the upper portion of its caudal fin, producing a downward motion, is of the greatest value.

G. BAUR.

¹ SCHULZE, FRANZ EILHARD: Über die Abwärtsbiegung des Schwanztheils der Wirbelsäule bei Ichthyosauren (Sitzungsber. Berliner Akad. 1894, p. 1133).