

a fractured toe or finger imparts to the injured digit, — a provision which was probably rendered necessary in the case of this important organ of motion, from the circumstance that it was the only fin which the creature possessed that was not strengthened and protected anteriorly by a strong spine. In the *Cheirolepis*, — a contemporary fish, characterized, like its cogeners the *Cheiracanthus* and *Diplacanthus*, by shagreen-like scales, but in which the spines were wanting, — we find a farther development of the provision. In all the fins the richly-enamelled dermal-covering was arranged in lines over the rays, (fig. 9, *b*;) and the scale, which assumes in the fins, like the scales on the tail of the *Cheiracanthus*, though somewhat more irregularly, a rectangular shape, is so considerably elongated, that it assumes for its normal character as a scale, that of the joint of an external ray. A similar arrangement of external protection takes place in this genus over the bones of the head; the cartilaginous jaws receive their osseous dermal covering, and, with these, the hyoid bones, the opercles, and the cranium. And it is in these dermal plates, which covered an interior skull, of which, save in one genus, — the *Dipterus*, — not a vestige remains in any of the Old Red fishes thus protected, that we first trace what

Fig. 9.



- a. *Portion of caudal fin of Cheiracanthus.\**  
 b. *Portion of caudal fin of Cheirolepis Cummingia.*

(Mag. three diameters.)

\* The darker, upper patch in this figure indicates a portion in which the scales of the fins in the fossil still retain their enamel; — the lighter, a portion from which the enamel has disappeared.