

spines, both brilliantly enamelled, is preserved entire; whereas the interior framework of the head exists as mere point-speckled impressions; and the inference appears unavoidable, that parts which so invariably differ in their state of keeping *now*, must have essentially differed in their substance originally.

Now, in the *Cheiracanthus* we detect the first faint indications of a peculiar arrangement of the dermal skeleton, in relation to certain parts of the skeleton within, which — greatly more developed in some of its contemporaries — led to important results in the general structure of these Ganoids, and furnishes the true key to the character of the early ganoid head. In such of the existing Placoids as I have had an opportunity of examining, the only portions of the dermal skeleton of bone which conform in their arrangement to portions of the interior skeleton of cartilage, are the teeth, which are always laid on a base of skin right over the jaws: there is also an approximation to arrangement of a corresponding kind, though a distant one, in those hook-armed tubercles of certain species of rays which run along the vertebral column; but in the shagreen by which the creatures are covered I have been able to detect no such arrangement. Whether it occurs on the fins, the body, or the head, or in the scale form, or in that of the prickle, it manifests the same careless irregularity. And on the head and body of the *Cheiracanthus*, and on all its fins save one, the shagreen-like scales, though laid down more symmetrically in lines than true shagreen, manifested an equal absence of arrangement in relation to the framework within. On that one fin, however, — the caudal, — the scales, passing from their ordinary rhomboidal to a more rectangular form, ranged themselves in right lines over the internal rays, (fig. 9, *a*,) and imparted to these *such strength as a splint of wood or whalebone fastened over*