

which covers the gills; and *n*, the nasal cavities, or organs of smell. The form of the body, and disposition of the skeleton, allow of their being inserted immediately on the parts which they are intended to approximate. Hence the use of long tendinous chords is dispensed with.*

The actions of the muscles are easily understood from the nature of their insertions. In general, the direction of the fibres is, in some degree, oblique, with reference to the motion performed. Two series of muscles are provided for the movements of the tail, which consist almost exclusively of lateral flexion, the whole spine in some degree participating in this motion. These muscles occupy the upper and lower portions of the trunk; their limits being strongly marked by a line running longitudinally the whole length of the body on each side. The inclination of their fibres is somewhat different in each. The advantage in point of velocity of action which results from this obliquity has already been pointed out.

Those fins which are in pairs are capable of four motions; namely, those of flexion and extension, and also those of expanding and closing the rays; for each of which motions appropriate muscles are provided: and, indeed, each ray is furnished with a distinct muscular apparatus for its separate motion; and these smaller muscles regulate with great nicety all the movements of the fins, expanding or closing them like a fan, according as their action is to be strengthened or relaxed. This feathering of the fin, as it may be called, takes place in most fishes, and is particularly observable in the tail of the *Esox*, or pike tribe. Each ray of these fins, indeed, is furnished with a distinct muscular apparatus, for its separate motion.

Whatever analogy may exist in the structure of the fins

* Between the layers of flesh, however, there occur slender semi-transparent tendons, which give attachment to a series of short muscular fibres passing nearly at right angles between the surfaces of the adjoining plates. See Sir A. Carlisle's account of this structure in the *Philosophical Transactions* for 1806.