

physiological luminary of Greece, Aristotle, observed of these animals that they use their spines as legs for change of place,* and Reaumur, who paid particular attention to their motions, found, that whether they moved in a hori-

Fig. 18.

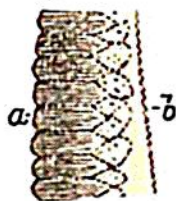


- a. Suture of a portion of the alleys at the lateral groove.
 b. Suture of a portion of the lateral groove uniting with the above.

zontal position, as they usually do, or in a reversed one, or upon their sides, they principally used their spines. As they can move in any direction, some are used as legs for progressive movement, others as points of support to prevent a retrogressive one. It is by means of their spines, also, some performing one office and some another, that they bury themselves in the moist sand on the sea-shore.†

It is not easy to conceive by what mechanism the spines are moved; the protuberances on which they move are fixed, and there appears to be no communication between the interior of the shell and the membranous sac by which they

Fig. 19.



- Suture of the intermediate groove divided at the ridgo. (See fig. 17, b.)

are attached to them. "It is very difficult," says Cuvier, "to see the fibres that move these spines at the will of the animal, for nothing is observable in their articulation but a very solid ligamentous substance, which it is very difficult to cut. I

have examined, with a lens of considerable power, the shell both within and without, and have been able to discover no pores on either side, round the base of the protuberances or elsewhere; so that it seems impossible for any muscular threads, however fine, to pass from the body of the animal to the connecting ligament by which it could move it, and so give the spine its different inclinations. Yet as the spines are employed by the sea-urchin to effect its

* Hist. Anim. B. iv. c. 5, ad fin.

† Osler in Philos. Tr. 1826.