

155 (1902)

Symmetry of heliotropic orientation in slugs.

By W. J. CROZIER and W. H. COLE.

[From the Zoölogical Laboratories, Rutgers College, New Brunswick, N. J., and Lake Forest College, Lake Forest, Ill.]

The creeping of the slug *Limax maximus* shows no apparent neuromuscular asymmetry. But in heliotropic orientation there is chiefly involved the parietal musculature, where differential activity might conceivably be associated with the fundamental torsion of the body of the gasteropod. The point has been studied in relation to the occurrence of "trial movements" at the beginning of the act of orientation, and has a special significance also for the analysis of "circus movements."

Experiment shows that a previously quiescent, dark-adapted *Limax*, illuminated from in front, turns with equal frequency to the right or to the left. *Limax* is negatively heliotropic, for all intensities used in these experiments. A similar equal frequency of turns to right and to left is found under non-stimulating (red) light. It would be incorrect to speak of these movements as "trial movements," for in a series of 142 observations it was found that in 122 the direction of orientation coincided with that of the first indication of turning; only in 20 did the side definitively contracted differ from that first contracted (8 right; 12 left).

The relative tensions developed by the two sides of the body, when right or left is the particular side toward which orientation is made, may be decided by comparing the rates of orientation in the two cases. Making allowance for the fact that the rate of orientation varies inversely with the size of individual, by comparing only "right" and "left" records for the same individuals, it is found that there is no sensible muscular asymmetry to be considered in the measurement of circus movements. Asymmetry of this type reported for some shelled gasteropods may be due to the mechanical effect of the shell's weight.