

But besides this important organ—which by the air it is constantly inspiring adds force also to the internal impulse, and to the air-vessels in the wings—insects have other auxiliaries to keep them in their right course. Whoever has seen any grasshopper take flight, or leap from the ground, will find that they stretch out their hind legs, and, like certain birds, use them as a rudder. The tails also of the day-flies\* seem to be used by them as a kind of balancer in their choral dances up and down in the sun's declining beam.

But the most interesting and beautiful organ for steering animals in the air, is that formed by the tail feathers of birds, called by ornithologists, *rectrices*, or *governing* feathers, because they are used to direct their course; these are feathers planted in the rump,† usually twelve in number—but in some amounting to nearly twenty—constituting two sets of feathers of six each, and forming together a kind of fork like the caudal fin of some fishes; the inside of each feather is set with much larger plumelets than the outside, so that there is a double series of corresponding feathers, beginning one on the right side, and the other on the left; the middle feathers in each series differ sometimes from the five exterior ones, being more acute, and wearing a different aspect. In flight the tail-feathers appear to be expanded, and probably the bird, by giving an impulse to either series, can turn this way or that; or by their depression or elevation, judging from their analogy with the caudal fin of fishes, rise or fall. The rudder-tail here described is that of the male bull-finch;‡ in many birds of the Gallinaeous Order, as the common cock and peacock, these feathers form a glorious ornament, but seem to lose their use as a steering apparatus. In the black game§ the two sets of feathers of the tail turn outwards, one on each side, and

\* Ephemera.

† *Loxia pyrrhula*.

‡ *Uropygium*.

§ *Tetrao Tetrix*.