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SALAMANDRA SALAMANDRA, THE EUROPEAN SALAMANDER

Sloughing techniques of an adult and an immature compared

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A captive salamander was seen to slough only twice in nearly twenty-five years, presumably because this usually happens at night. On neither occasion was the full performance witnessed, but each time it swallowed its "skin", really the outer layer of the epidermis.

However, one of its own young, when fifteen months old and three inches long, was observed literally from head to tail. A bubble of moisture on the young salamander's nose and chin suggested that something unusual was about to occur. Indeed during the next ten minutes it became increasingly clear that the little animal was trying to split the skin all around its mouth to make an opening through which it could eventually crawl. To do this it blew out its cheeks until the entire head looked swollen, it yawned and once opened its mouth far wider than the most prodigious yawn. To go through the mouth-hole it pushed the sloughed skin back over its head by rubbing it against some moss, and appropriate bending movements enabled it to pull its front legs out as from a glove. More rubbing movements worked its old garment back to the hind legs which were pulled out in the same way as the front. With only the tail to free, the young salamander then walked round and round to the right until its head overlapped the tail, but without ever touching it. Friction with the moss freed this appendage, whereupon the little animal walked away, leaving a perfect pair of tights on the ground.

As to the adult, on one occasion the end of the operation was seen as the salamander gulped down the last two or three mouthfuls of the sloughed skin. On the other everything was observed almost from the beginning except that the entire head was already freed, that is projecting through the mouth-hole. One shoulder and the front legs were then freed as described for the young salamander. The latter, got the old skin back from its front to its hind legs by rubbing against some moss. The adult, however, freed this area by rhythmic muscular, or peristaltic, movements. Waves of expansion and contraction slowly followed one another towards the tail, the skin slipping back until it reached the hind legs which were cleared in the same way as the front.

The tail at first posed a problem as the salamander tried to take the tail skin in its mouth. At last it succeeded, but the tip inch or so would not pull free. This led to a strange tug-of-war, as the animal, turning away from the tail, got the rest of the old skin across its shoulders and pulled with might and main. At last the tip of the tail came free. Immediately the animal opened its mouth wide, whereupon the sloughed skin proceeded to go down its throat, apparently of its own accord, pulled by the peristaltic movements of the throat muscles. As the last inch or two of the skin reached the salamander, it closed its mouth and gulped them down.

Shortly after the young salamander was seen changing its skin, it was found dead and the adult in convulsions exactly one day after a small Tree Frog (*Hyla arborea*) was put in with them for lack of other space. The adult recovered after being washed in running water for several minutes. Thus any chance of watching a young salamander's sloughing technique evolving into that of an adult was destroyed by the unforeseen consequences of keeping these two species together.