

DESCRIPTION of the SKIN cast by an EPHEMERON, in its
 "PSEUD-IMAGO" CONDITION. By TUFFEN WEST, F.L.S.,
 &c.

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THE following observations appearing to have some bearing on the disputed question as to the exact nature of the penultimate change in the Ephemeridæ, are brought before the notice of the Microscopical Society with the hope that they will prove to be a small contribution towards our knowledge of a subject confessedly requiring further elucidation.

In wandering near water in the country on a summer's evening, some of the members of our Society may have found themselves speedily covered by small whitish looking flies, with two or three long tails a piece, which after alighting on some portion of the dress, remain quiet for a brief period, and then fly off, leaving behind them an alter ego, in shape of a perfect cast of their integuments. These casts may sometimes be found on railings, branches of trees, &c., in the vicinity of water.

On Frensham Common are two considerable pieces of water, known in these parts by the names of the "Great" and the "Little Pond," which are favoured resorts of numerous aquatic insects, and from the latter of which on a fine summer's evening, clouds of a small species of May-fly arise, and settling on the hat and upper portions of the dress, soon cover him with their exuvæ.* So rapidly does the operation take place, that it was not till the sight had become educated by attempts on several occasions to observe the whole, that I became able to witness the entire process, whilst the (to the naked eye) complete disappearance of the pellicle covering the wings left a mystery on the mode of their reaching me which I was long unable to solve. The distance from the water at which the clouds that so thickly covered one occurred was considerable; I counted 230 paces from the water's edge to the boughs of a Scotch fir, which was fairly whitened with them, the tree being the nearest of a clump growing on a neighbouring hill.

From their extreme delicacy the bringing home uninjured of these cast-skins for microscopic examination is a very difficult matter; but an individual of a larger species having

* In Westwood's 'Introduction to the Modern Classification of Insects,' vol. ii, at p. 27, is a graphic description of the process, and in a foot-note on p. 28 a discussion of the nature of the metamorphosis.

settled and undergone its final ecdysis on the muslin curtain of one of the windows in the house in which I at present reside, tidings were quickly brought to me, and I succeeded in obtaining the specimen in beautifully perfect condition, which forms the subject of the following notes. I regret much that the fly, which was also obtained in first-rate order, and which lived with me nearly twenty-four hours, was afterwards accidentally destroyed, so that I am unable to give the species.

The entire cast measures eight lines in length, nearly five of which belong to the tails (Pl. VI, fig. 8). The three divisions of the thorax are well indicated; the integument of the legs and of the antennæ (*a, a*, fig. 9) are very perfect; the reticulate corneal covering of both the sessile and the columnar pairs of compound eyes is left, the areolation being most distinct on the latter.

Behind the slit on back of the thorax through which the creature's body was extricated, is a mass composed of the pellicle from which the wings were withdrawn (*a. p.*, fig. 8); and (if I mistake not) the investments of the puparial gills.

The most noticeable feature, however, is the presence of the two main tracheary tubes (*tr, tr*, fig. 9), which appear to arise at either side from the anterior part of the pro-thorax. Doubtless by dissection the spiracles whence they arise would be found, and the true nature of the mass at the hinder part of the thorax could be ascertained by floating in water, but I am unwilling to sacrifice so perfect a specimen for the sake of these details, which may perhaps be obtained from other examples in the coming season.

The larvæ of *Lepidoptera*, in changing their skin, cast also the lining membrane of the great tracheal trunks; it seems fair to infer, therefore, from the specimen now under consideration, that in the so-called pseud-*imago* condition of the Ephemeridæ, we have merely the pellicle forming the inner investment of the pupa, carried out by the fully-formed insect in its first flight, and shortly got rid of.

As a small contribution to the history of "minute markings," which will some day, and that probably before long, have to be considered in its extended bearings, it may be mentioned that the tegument of the May flies is thickly covered with a minute elevated punctation.

