

## The Dragon-Fly.

BY ARTHUR RUCK.

*Illustrated by Photographs from Life, by the Author.*



WHO does not know the dragon-fly, that delicate dream of blue and gauze, with clear or smoky wings flitting lightly from reed to rush, or the fierce gentleman with great

goggle eyes and green body dry as a quill and straight as a grass stem, who dashes here, there, and everywhere, scattering terror and death among the winged insect world, and terrifying not a few perhaps of the lords or, at least, the ladies of creation? But not everyone knows that this dandy was born in a ditch, and few would recognise him now that he has got up in the world for the same as is figured in photograph No. 1.

Yet so it is, and astonishing is the transformation; not more surprising, perhaps, than that from caterpillar to butterfly, but certainly more startling in its method of development, as the illustrations may help to show.

Now, the first claim for admiration made for my little friend is not for beauty certainly, but for the way in which he breathes. Unlike many other water-dwellers, for instance, the great water beetle, the boatman, and many others, he is not obliged to come up to the surface for a fresh supply of oxygen; he spends all the early part of his life always under water, but he does it from choice, not necessity. He can, when occasion arises, spend days out of water, and be none the worse for it, except that he returns to the bosom of his family with a fine healthy appetite.

The dragon-fly larva, which is illustrated in this article, is

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certainly amphibious for a part, at least, of its life. Not the showman's kind, observe—"This 'ere beast is amphibilious, which means, yer know, as 'e can't live on land, and dies as soon as 'e gets in the water"—

but he can breathe in either air or water equally well. Even at a very tender age he can, if obliged, spend as much as a month out of the water, and before his final change he seems to be indifferent as to which element he breathes in; and you may see him with head out of water, or tail out of water, breathing the upper air through either end of him, and that for days at a time; or else entirely under water breathing the air dissolved in water,

as do the fish; and the reason he makes his home in the water is apparently for the one but sufficient reason that his food lives there.

He is a clever little beast, but contradictory

withal, as even his names may show; he is not a fly, for flies have but two wings and he has four, and he is certainly not a dragon; he is not a stinger, for he has no sting, and he has no connection whatever with horses; he has a long arm coming out from under his chin (Fig. 2), which the small water creatures which come near him have every reason to dread; and he shoots through the water by a method which is all his own—that is, by means of a jet of water which he expels violently from a kind of torpedo-tube astern. As a rule, he contents himself with keeping still and lying in wait, or with stalking his prey with much circumspection until his long lower



1.—THE DRAGON-FLY LARVA LIVING IN THE WATER.



2.—THE WONDERFUL LOWER JAW.

jaw, known as a mask, can reach his unsuspecting victim; but his curious water-jet enables him to travel through the water with great speed when he is moved by one of the many reasons for wishing to be elsewhere which are so well known to those whose lives consist in eating, or being eaten—if anyone not an Irishman may be allowed the expression.

Now, our friend's power of breathing in either air or water, although not unique, is very uncommon, and puts the frog, and other like animals, who have so long arrogated to themselves the title of amphibians, entirely into the shade. The frog is not much more amphibious than the gentleman who takes his tub regularly winter and summer throughout the year; indeed, not so much so, for the frog shirks both his tub and the question during the winter by burying himself in the mud and not breathing at all. Insects have much too much to do with their mouths in the great business of eating, with which the early part of their lives is entirely spent, to be able to afford to breathe through their mouths, so that they must be supplied with air in some other way, and they have accordingly pairs of spiracles, or breathing mouths, on the various segments of which their bodies consist.

Now, a dragon-fly larva has these spiracles and breathing tubes well developed. In Figs. 5, 6, 9, and 10 are seen some slender white threads, which have been broken as the creature emerges; these are the tracheæ, or air tubes, and connect with the spiracles, or breathing holes, the largest pair of which is situated on each side behind the head, and there are besides others pairs less highly developed. But in addition to this apparatus, which supplies air direct to the tracheæ, or air passages, the dragon-fly larva has another apparatus at his tail end, consisting in some species of a three-lobed flattened paddle, which serves both for swimming and for breathing, after the manner of a fish's gills, or, as in the species here illustrated, of a means of alternately drawing in and expelling the water through the tail, and extracting the air which is contained in the water.

This latter style of water breathing is the one ordinarily used during the earlier stages of the larva's existence; but later, when he is nearly or quite full fed, the nymph, as he is then called, crawls to the top of the water, sits with head and shoulders out in the air, gives up hunting, breathes through the spiracles on one or both shoulders, and seemingly "thinks of nothing at all," like any other jolly young waterman.

Now, all this shows that the nymph of the dragon-fly is a very astute individual, and well prepared for all emergencies. By the exercise of much careful selection he has so modified the defects of his original conformation, that when his natal ditch is dried up he does not perish, but travels contentedly to another, and he takes much credit to himself for having so successfully cultivated the once discredited art of teaching successive generations of grandmothers; and as for any mistakes which may be thought to have occurred in the process, he ascribes those all to Nature, which, of course, is highly creditable to his intelligence, though slightly unjust: still, it shows that he is quite up to date in his views as to where the admiration for so much foresight should rightly be bestowed.

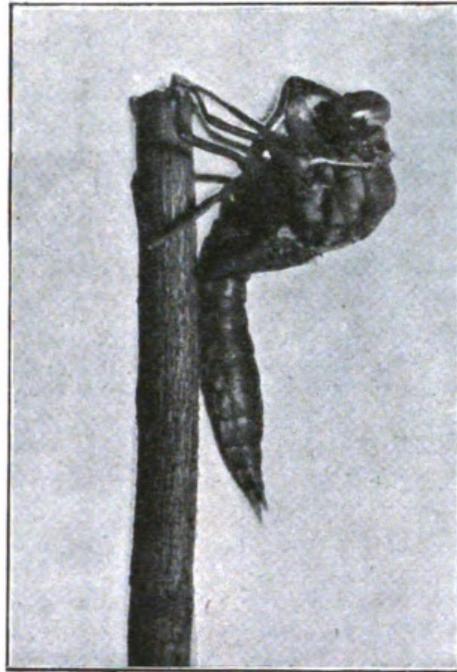
Now, after many months' continuous eating when food is plentiful, and of hopeful expectancy when it is not, after splitting many suits of clothes down the back and emerging resplendent in a new one, each more roomy than the last, he feels, as we all do when the summer comes, "to want a change": in the hot days of August he climbs up a stick, or a water plant, upon which to perform his marvellous transformation from a dull-hued, spiny dweller in a ditch to the brilliant, sun-loving dragon-fly, swiftest of insects, resplendent with gauzy wings and topaz body, who untiringly hawks by hedgerow and pond, inquisitively poisoning himself within a foot of your face, and sending the village children screaming down the road in terror of the horse-stinger, although he is absolutely harmless to all but flies.

But do not let it be thought that any stick or stem will do: his life depends upon the support not failing him at the critical time, for were it so to do he would inevitably fall into the water and there be drowned. When he has climbed up what he considers a sufficient height from the water, 2ft. perhaps, or possibly 4ft., he tries his stem with vigorous switchings of his body, and if the support is not considered safe he goes down into the water and ascends another; when he is suited he clasps the stem firmly with all six legs, pressing the claws firmly into it with all the weight and muscle he can command, and locking the two front legs fast together.

Now look: he is leaning far back; a thin green line appears in the middle of his back between the wing cases; wider and wider it grows, the whole insect strains to burst the skin which is manifestly too tight for it; now

a great back protrudes (Fig. 3) through the opening; farther and farther apart fall the skins of the eyes, and the great goggle eyes themselves are fully out, and the insect now seems to have two heads, one green and the other brown. Now the legs, limp and wet, are drawn out of their envelopes, which still firmly clasp the stem. Now all six legs are out, and two tiny shrivelled wings which give but little promise as yet of their later beauty. And the insect hangs right back, head downwards, resting a moment from its exertions. But there is much to be done yet. First

the claws must be cleansed, and these one by one are put into the great mouth and freed from the moisture which remains on them, giving the insect a ludicrous appearance of biting its nails (Fig. 4). At last

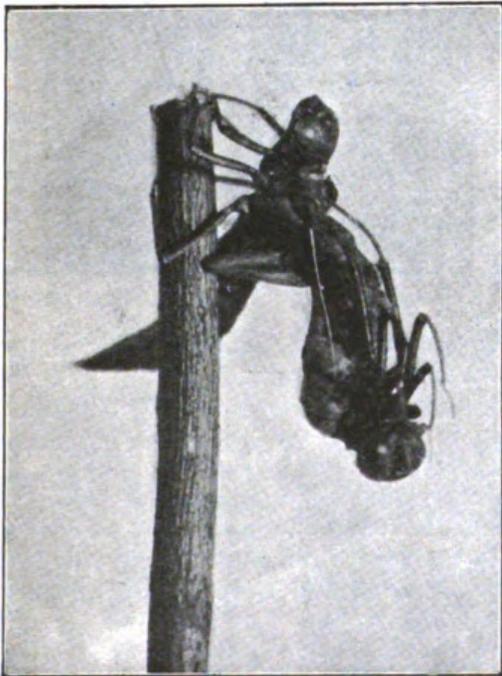


3.—THE NYMPH HAS CLIMBED A TWIG AND BEGINS TO CHANGE.

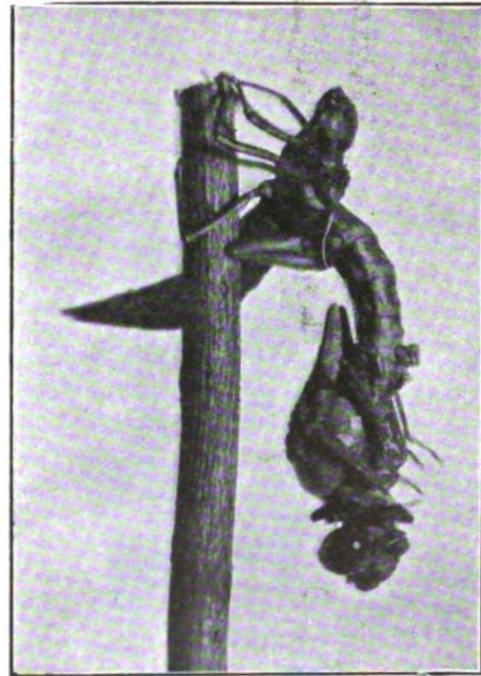
Then after about ten minutes' rest there comes a surprising feat, which would drive a professional acrobat to despair and an early retirement into private life, for but few are able to jump out of their own skins. Not so our friend, however; quickly raising head and thorax he seizes his own dry nymph skin with all his legs (Fig. 6), and in less than no time has whisked the tail end of his body out of the old skin, and hangs now right way up by his new legs (Fig. 7). And he is very modest over this performance: astonishing as it is, he prefers very much to do it at night, and without spectators,

so much so that the photographer almost despaired of getting this particular attitude, and had to call in the aid of a magnesium flash lamp about two o'clock in the morning.

The reason for this preference for coming



4.—"BITING HIS NAILS."



5.—RESTING.

all are clean and sharp for the next step, and our friend hangs down looking very much exhausted waiting for his back to get some stiffness in it (Fig. 5).

out at night is clearly that the insect may be ready for flight before it is light, when the birds, who are terrible foes for the first few hours of its new life, are in bed and asleep



6.—AN ACROBATIC FEAT.

So eager are the birds for this delicacy, and so promptly do they start off in pursuit when the insect is trying its first flight, that the writer, who assisted at the emergence of more than a hundred of this species last year, was almost tempted to think at one time that the sparrows sat outside in rows and waited until the maid opened the study window in the morning and let out the *débutantes* of the



7.—QUITE OUT.

previous night; this, however, is only conjecture, and may be a slander on the sparrows.

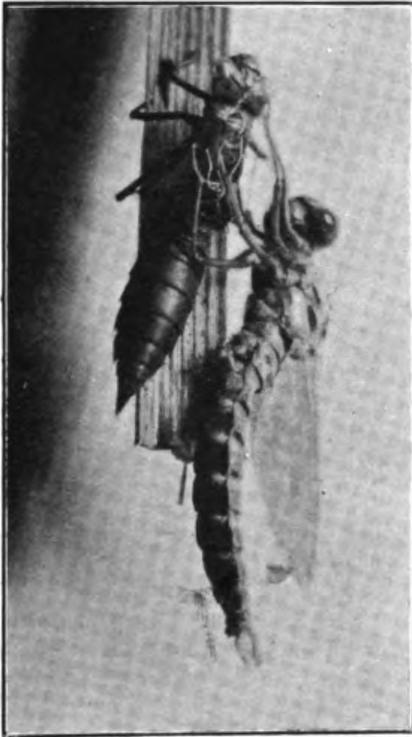
When the dragon-fly is once hanging by its legs the little crumpled wings immediately begin to expand, and can be seen to lengthen minute by minute (Figs. 8, 9, 10), the body meanwhile taking the exact curve that the wings will afterwards occupy, for the wings are infinitely tender, and must not be touched by anything until they are dry. A rough wind and a waving grass blade would make them bleed and ruin them irretrievably. When it is said that the wings bleed, it is meant that the fluid which fills



8.—WINGS EXPANDING.

them exudes and forms a brilliant green blotch like an emerald, beautiful it is true, but when once injured, or when unable to expand equally, the wings never develop properly, and flight becomes impossible.

Here is, indeed, a puzzle. How does our friend know that the body must assume this particular curve? Each one as it comes out does the same and never makes a mistake. Who teaches him to come out at night when the birds are asleep? Who impels him, when first out, to soar up far out of sight, where he is safe from his enemies, until he is strong on the wing and can laugh at them? The birds no doubt take singing lessons from their fathers: there is a half-educated young wood-pigeon in the



9.—WINGS GETTING LONGER.



10.—WINGS FULL SIZE.

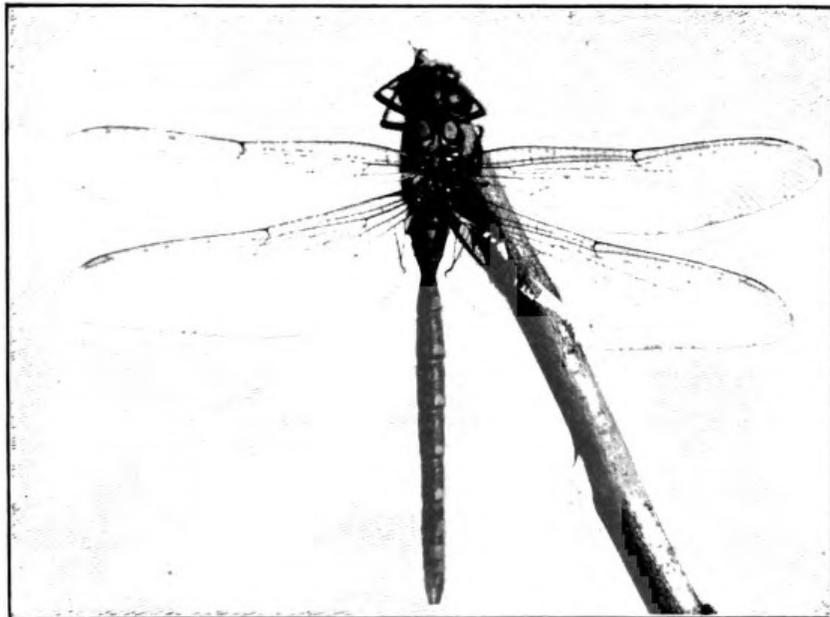
writer's garden who made a shocking exhibition of himself last spring, and could not get hold of his "Tak' two-o-o co-os Taffytak" for months. This year, it is to be hoped, he will do better. The birds certainly take lessons in nest-building.

The magpie is the only large bird that has a roof over her nest, and why? She was the first to find out how to build a nest, and called the others around her to teach them how to do it; but they were such exasperatingly cocksure learners, and knew so much before they were told, that she got sick of the whole thing in the middle, and left them to manage the roof as best they could.

The migratory birds presumably teach their young ones the science of meteorology and the use of the globe—who knows? But who teaches the dragon-fly? For taught he undoubtedly is, account for it how we may. No one can watch this transformation scene and doubt that intelligence is at work; but whose intelligence?

His father and mother died the winter before he was born, and he certainly never saw any other of his kind go through his performance; so we will call it inherited instinct, and imagine that we know all about it.

After about four hours from first emerging from the water the dragon-fly is perfect, the wings dry, stiff, and expanded, and the body straight and nearly dry, and ready for his first joy in the sunlight (Fig. 11).



11.—READY FOR FLIGHT.