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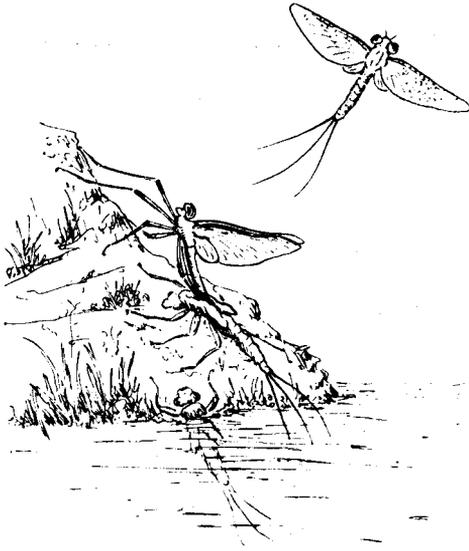
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CAPE MAY-FLIES

By A. CECIL HARRISON

PART II



“ . . . as it sits jauntily on a waterside stone with its nymphal skin stuck just below it . . . ”

Sketch: K. H. B.

AS these notes are written mainly for anglers, some liberty has been taken in the arrangement of the suborders and genera, and the May-flies are mentioned in accordance with their approximate time of appearance in the trout-fishing season. The use of scientific names is inevitable, as there are no common names, except those manufactured by the writer in 1930 and 1931, and which are continued in these articles. But surely there are few more beautiful and euphonious scientific names than those used for the genera and species of May-flies! On the other hand, our old friend F.G.C.—although he gave every possible aid and boundless encouragement to the May-fly hunt—was often heard to murmur “wheelbarrow” whenever a scientific name was inflicted upon him, as a sort of an antidote. (But revenge was sweet! His patronymic was coupled with a classical name “of obscure etymology”—*Cloeon chaplini*, Barnard—to label a little May-fly which he found on his own pond!)

* * *

Most anglers who have given any thought to the matter can recognise the cock-winged May-fly, be it of the large or small kind, but few seem to know the form taken by its aquatic nymph. In this Order of Insects there is no pupation stage intervening between the larva and the adult. The larva is hatched from the egg under water, and retains the same general form right up to the time of the emergence of the fly. The May-fly nymph may be said to bear a superficial resemblance to that primitive wingless insect popularly known as a “silver fish” (or bristle-tail: *Thysanura*) which gets into books and dark corners in houses, and runs off when wall furniture is moved—to the housewife’s horror! Indeed, Dr. G. H. Carpenter says: “Bristle-tails may with high probability be regarded as the most primitive insects now living, and the May-fly larva resembles them not only superficially, but in such important characters as the jaws, limbs and abdominal appendages. It may, therefore, be permissible to regard as the most primitive type of insect larva a form like the May-fly grub before it had been modified for breathing dissolved air.”

According to F. J. Pictet, the types of May-fly nymphs fall into five very broad divisions, viz.:—

I. Burrowing Larvae. Those of the “real May Fly” and allied species (not represented in the Cape), often with the front legs adapted for digging like those of the mole-cricket; inhabiting slow streams, and living in underwater burrows in suitable clay or earth; and feeding on finely divided organic matter.

Ia. Leptophlebiid Larvae: Not adapted for digging, and intermediate between I and II.

II. Larvae with flattened bodies. "March Brown" type, adapted for clinging to stones in strong currents; with disc-shaped head, and all parts of the body flattened out; very active movers on the stones, and said to prey on smaller aquatic larvae.

III. Swimming Larvae. Those of most of the smaller "duns" (*Baetis*, *Centroptilum*, *Cloeon*, etc.), usually with fringed tail-filaments forming an efficient tail-fin for very quick darting amongst the weeds and stones.

IV. Creeping Larvae. Like those of the "Blue Winged Olive"; sluggish, relying on protective coloration and camouflage, and carnivorous.

In many ways the Leptophlebiid nymphs are the least specialised.

* * *

THE FAMILY LEPTOPHLEBIIDAE

"September Brown" (*Adenophlebia peringueyella*, Lestage). June to October.

The writer adopted this name for one of our commonest May-flies, as the month of September is the earliest in which most anglers will see it, and it is somewhat like a large March Brown, although it does not belong to the same family.

The genus *Adenophlebia* was so named by Eaton in 1884 "from the abundance of cross-veinlets in the wings". But this was only relative, as the genus *Leptophlebia*, which gave its name to the family, was named "from the tenuity of the cross-veinlets". The specific name *peringueyella* was given to the May-fly by J. A. Lestage in honour of the late Dr. Peringuey, at that time Director of the South African Museum, Cape Town; but the specimens of adults, which were examined by Lestage, were actually collected by the Rev. H. C. Gladstone-Hawke, rector of Groot Drakenstein, and keen fly-fisherman.

In the first flush of spring enthusiasm—in September or early October—when the keen-eyed angler renews his acquaintance with one of our stony rivers, he will rarely fail to notice this large brownish insect. It seems by its size and appearance to epitomise all that a spring trout-fly should be—as it sits jauntily on a waterside stone with its nymphal skin stuck just below it; or, at a later stage, performs the famous aerial dance above the water with shimmering wings and trailing tail-filaments. It challenges imitation; there is no doubt that it has been the direct cause of many a hunt through the fly boxes. For size and rough approximation, a No. 8 *Invicta* or March Brown of light dressing may serve; but for substance!—who can really hope to match such elegance and fragility? Fortunately, perhaps, our trout do not seem to have much discrimination when the water flows abundantly at the opening of the season. But the presence of the September Brown, particularly on an open river like the Wemmer, will seem to the angler to be the hallmark of a good trouting day.

The writer has often found both the fly and its nymph in the stomachs of trout, but more often the latter. As October advances, the September Brown gradually disappears, and the slightly smaller Summer Brown takes its place.

* * *

The correct description of colours and shades of the parts of the body of a May-fly is an intricate business, and those who aim at accuracy should refer to the detailed diagnoses of the species—or, better still, go to Nature herself.

When the September Brown subimago has just emerged from its nymphal skin, it is somewhat duller than the perfect insect, and the wing membrane is greyish. It stays in this condition for 1½ to 2½ days (from observations made in captivity), and is rather sluggish, hiding in a sheltered spot amongst the rocks or bushes. It then casts off the pellicle which covers every detail of its external structure—and, presto! we seem to be confronted with two insects, the perfect individual and its pale shadow. After this final moult has occurred, and the

imago is disclosed in its fully beauty and proportions, the writer found that it will still survive for another 10 to 11 days. The female is a little larger than the male—she is the egg-carrier. Her body is about half an inch long, and her wings slightly longer. When the three tail-whisks (*cerci*, *setae* or filaments—what you will) are fully developed in the imago, they are longer than the body—from 15 to 18 m.m. The simple description of the colour of the body is warm brown, relieved by paler yellowish patches. The cerci are uniform brown. The neuration of the wings is dark sepia-brown, and there are usually some oval dark sepia blotches in the foreground—but the latter feature is not so noticeable as in the case of the Summer Brown.

The September Brown nymph is also about half an inch long, with three tail-filaments of about the length of the body. The general coloration is a shiny dark brown, with a certain amount of mottling and paler ochraceous marks, and lighter underparts. When the nymph is nearly ready to disclose the subimago, the wing-cases are usually of a darker brown—almost blackish in some cases—and the disparity in the size of the sexes can be seen.

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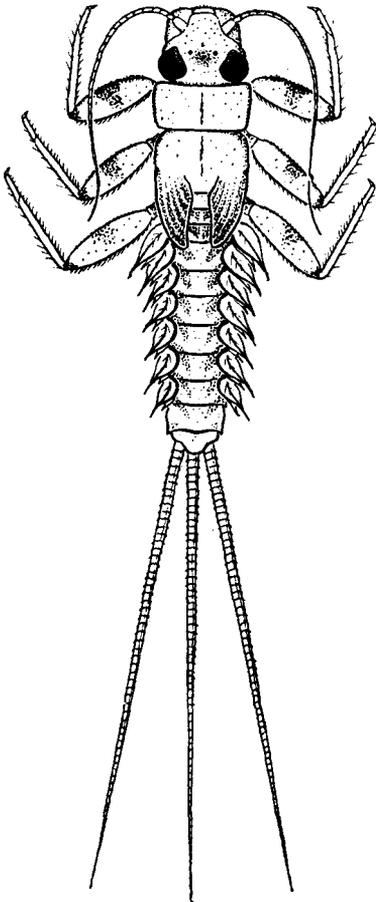
The female September Brown drops her fertilised eggs into the water in late winter or spring. They are oval in shape and covered with small pits, but have no attachment threads in this species, and are .22 m.m. long. By analogy with an allied form which has been more closely studied at this stage (the April Dun), the eggs are dropped or washed from the tail end of the female as she dips down to the surface of the water; and they sink haphazardly to the bottom, hatching in about three weeks. The newly-hatched larva is about .5 m.m. in body length (plus its cerci), and is a tiny replica of the later nymphal stages, and complete with mouth-parts and eyes, six legs for crawling, and three long tail cerci—but with no sign of external gills on the abdominal segments. The gills appear after a few moults; for, like all growing insects, the May-fly nymph casts off its entire chitinous skin at intervals, and appears to “grow by jerks”.

In the Dwars River, Groot Drakenstein (where most of the studies took place), it was difficult to identify the early larval stages, or instars, of the September Brown before mid-summer, as there was such a welter of allied forms at that time of the year; but the nymphs could be recognised by the first week of February.

The external gills of May-fly nymphs take various forms according to the mode of life of the species. They are arranged along the sides of the abdomen, or tail-half of the body, and are discarded when the subimago emerges. In the September Brown nymph the gills take the form of pointed leaflets with a system of branching veins—the main central vein being produced as a fine projecting filament. Each gill consists of two of these leaf-like processes joined together to a single stem. There are seven of these double gills on each side of the abdomen, and in life they are held away from the body, and are frequently in motion. The leaflets are of no assistance in swimming, and their function is solely to assist the nymph to absorb oxygen dissolved in the water.

Half-grown larvae of the September Brown become plentiful during the late summer, and towards autumn their wing-cases are visible, and they can truly be styled as “nymphs”. In the aquarium work it was found that batches of these nymphs underwent a moult about once a fortnight at that stage. It was observed that the old cuticle splits open along the back of the thorax (the thicker front half of the body), and the nymph draws itself out very quickly—of course, under water. The newly-moulted, or teneral, nymph is pearly-white with grey markings, but soon regains the usual pitch-brown colour with yellowish markings. The old skin floats away, having all the appearance of a complete nymph without gills. These aquatic nymphal moults should not be confused with the final nymphal moult to be described later.

The September Brown nymphs abound in many of our upland rivers in the vicinity of stones. They can be found by lifting out stones from the stream bed, when often as not they will be seen sinking or swimming away, as they do not cling so tenaciously as do other forms of nymphs—notably the Tawny Yellow. They swim fairly well by flexions of the body, but cannot progress against a current in this manner, and have to rely on crawling for upstream movement. If care be taken, and a quiet spot selected just out of the main current, they can be watched moving about on the bottom, but never far from the protection of a stone, to which they scurry at the least alarm.



K. H. Barnard del.
The September Brown Nymph

The nymphs feed on organic fragments, and swallow mud or ooze for what it contains. In the tank experiments it was found that September Brown nymphs were liable to resort to cannibalism if deprived of their usual food media. For example, nine nymphs were kept from April 13th to May 16th without the addition of food to their tank, and during that time they all moulted twice. Then a horrible wave of cannibalism set in. The first aggressor attacked the gills of its weaker victim, and then consumed the soft parts of the body with the ready assistance of the other survivors—proving that the grinding mouthparts can be used for dealing with other food than vegetable detritus. The sole victor of the orgy moulted a third time, and then died—probably with too much on its conscience!

It was then found that an excellent food substance was the greenish-black ooze obtained from Sandvlei, near Muizenberg, added in small quantities so that the water was not fouled. This was used throughout the whole series of tank experiments with various kinds of nymphs. The September Brown nymphs were seen to swallow this ooze in quite large amounts, and doubtless in its passage through the digestive system all nutritive matter was extracted.

The emergence of September Brown adults is known to commence about the middle of June. The first emergence noted in captivity from nymphs obtained from the Dwars River was on July 18th, when a nymph climbed out on a stone in the tank, and disclosed a male subimago.

A summary of many observations made on the "hatching" of September Brown May-flies in captivity is given, as this culminating point of the aquatic state may be of interest to the more discerning fly-fisherman.

Just before the transformation the nymph shows great restlessness, and swims about with unusual activity, often approaching the surface film. This has been noted with a number of species, and it is suggested that many of the mature nymphs of the stone-haunting kinds are taken by the trout at this stage, when they have lost their usual wariness in their urge to leave the water.

The process of the emergence of the fly is as follows: The skin of the thorax of the nymph splits lengthways between the wing-cases; the upper part of the pro-thorax of the fly bulges upwards from the slit in the effort of withdrawing the head and legs; and then the insect appears to be growing steadily longer before one's eyes. In less time than it takes to relate the fly is lying in front of the empty nymph skin, with only the coiled tail-filaments yet to be disengaged and straightened out. Meanwhile, the creased wings have been hoisted and spread, and after a brief pause the subimago is able to take off from the stone or from the surface film. The whole process seems to take place in one smooth movement after the first upheaval—and the fly is out. Actually, when viewed under a magnifying glass, the withdrawal of all the members is done in a series of jerks; and if a serious hitch does occur, from weakness or injury, it is nearly always fatal—as in the cases of a chick or trout-alevin “stuck in the shell”. In rare cases a leg, tail-filament or even both front wings are left behind in the nymph skin. The gill leaflets are always broken away, and the fly has become an aerial creature breathing air by means of its spiracles.

The place of emergence must depend to some extent on the condition of the river at the time when the nymph's “zero hour” arrives. In the tanks it was found that September Browns may emerge at any time during daylight, and also in the early part of the evening. True nocturnal emergence was not at all evident in this species as it is, unfortunately, in others at the Cape. If the river flow is moderate, the nymph can swim until it gets to a suitable protruding stone, or crawl up from its submerged base. On the other hand, if it cannot manage to crawl out in time, the nymph can hang from the surface film by the upper part of the thorax, and the subimago emerges on the water. This is assisted by the fact that, just before the time of emergence, the nymph becomes very buoyant on account of air collected under its skin. Indeed, this buoyancy remains with the discarded nymph skin, which can often be found drifting downstream with the gills attached. When the insect makes its emergence from the surface of the water, it is again very much at the mercy of any feeding trout.

* * *

“Summer Brown” (*Adenophlebia dislocans*, Walker). October to February.

The nymphs of the Summer Brown are indistinguishable from those of its larger relation, the September Brown—in colour, structure and habits. The fact that they are somewhat smaller, and are abundant in the fully-fed state after the end of October (by which time those of the September Brown have completely disappeared) gives the only clue to the difference.

The Summer Brown flies also resemble the September Brown, but their wings are marked with heavier and warmer brown blotches and spots. In size the average female Summer Brown would equal a male September Brown; whilst the male could be confused with one of the smaller Leptophlebiids (the Chestnut Dun and the Darkening Dun) were it not for his prettily-marked wings.

This fly was first noticed on the Groot Drakenstein Dwars River on November 23rd, 1930. On December 7th adults were found on the Eerste River at Jonkershoek, and a large batch of nymphs was collected; and from these a number of Summer Browns emerged before the end of the year. All the transformations in captivity took place on protruding stones, usually just at the water-line, or the nymph crawled up the glass side of the tank and the fly emerged, leaving the empty shuck stuck on the glass barely clear of the water. No Summer Brown flies were seen to emerge from the nymph skin on the surface

film of the water, which is an alternative method used by the September Brown. This difference in habits might be associated with the moderate flow of the streams of the south-western Cape at mid-summer, and the presence of much convenient slack water and handy stones; but it would not be wise to assume too much—as we do get occasional summer spates. But even if the vulnerable “surface film emergence” is not a frequent habit of the Summer Brown, the nymph is at least subject to easy capture by the trout when it leaves the protection of the bottom stones in its final swim or crawl towards the surface.

The period of existence remaining to the adult Summer Brown after its emergence seems to be shorter than in the case of the September Brown; and in captivity the subimago took only about 24 hours to achieve its final moult to the perfect insect, and the longest span of the fly from the nymphal state was $6\frac{1}{2}$ days. The nymphs disappear from the Eerste and Dwars rivers as January advances; but Dr. Barnard found that the Summer Brown season extended into March in the Table Mountain streams. He remarks (rather feelingly, and one suspects that a hectic bit of hunting must have taken place): “The male is remarkably active in hot sunshine; when pursued it takes short, quick flights from stone to stone, and when it settles it faces the pursuer; when it settles on bushes it has the habit of many grasshoppers of sidling round the stem to keep out of sight.”

* * *

In subsequent articles on the Cape May-flies it is proposed to deal with other species which are of interest to anglers in the sequence:—

LEPTOPHLEBIIDAE: The Pied Dun (*Aprionyx peterseni*) of summer, and the April Dun (*Aprionyx tabularis*) of autumn; and the smaller Leptophlebiids—the Chestnut Dun (*Castanophlebia calida*), the Darkening Dun (*Choroterpes nigrescens*), and the Elegant Dun (*Euthraulus elegans*).

ECDYONURIDAE: The intriguing Tawny Yellow (*Afronurus harrisoni*) in its major and minor forms, and its flattened nymph of the “March Brown” type.

BAETIDAE: The host of smaller “duns”, mostly with quick-darting swimming nymphs, *Cloen*, *Baetis*, *Acentrella* and *Centroptilum*.

BRACHYCERCIDAE and EPHEMERELLIDAE: May-flies belonging to separate families, but with creeping nymphs, viz., the Cape Cain-fly (*Austrocaenis capensis*), and the Worcester Dark Blue (*Tricorythus discolor*); and the Blue-winged Orange (*Lithogloea harrisoni*).

