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# The Dentate Margin of the Abdomen in Chrysis

T. Algernon Chapman

THE

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"It was his faith—perhaps is mine—
That life in all its forms is one,
And that its secret conduits run
Unseen, but in unbroken line,
From the great fountain-head divine,
Through man and beast, through grain and grass."

LONGFELLOW.

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1913.

## DESCRIPTION OF THE MALE OF *CERATOPHYLLUS BOREALIS*, Roths. (1906).

BY THE HON. N. CHARLES ROTHSCHILD, M.A., F.L.S.

PLATE IV.

In Ent. Mo. Mag. (2), XVIII, p. 11, I described a new species of flea as *Ceratophyllus borealis* from a single ♀ obtained by Mr. N. H. Joy on the Island of St. Kilda from the nest of a gannet.

The specimen remained unique until 1912, when the Rev. J. Waterston found a number of examples of this species in the Shetland Islands in a nest of *Anthus obscurus*, of which he kindly gave me some specimens of both sexes.

The ♂ being still undescribed, I submit a drawing of the genital organs which, as usual in *Siphonaptera*, offer easily recognisable distinctions from the allied species.

*C. borealis* comes near *C. columbæ* and *spinosus* in the armature of the ninth abdominal sternite of the ♂. The movable process (F) of the clasping organs bears five bristles in the apical half of the distal (= ventral) margin of which the upper one is somewhat thicker than the others, being, however, slightly shorter than the fourth from the top. The ninth sternite bears three very stout apical bristles on each side, one of them being usually distinctly longer than the others. The apical membranous lobe of this sternite is triangular.

As in the ♀, the hind femur bears a subventral row of four bristles on the inner surface, exclusive of the subapical bristle, and no subventral bristles on the outer side apart from the subapical one. In this *C. borealis* differs from *C. spinosus*, Wagn. (1903), which bears a much larger number of bristles on the hind femur.

Arundel House,
Kensington Palace Gardens, W.:
*May 6th*, 1913.

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## THE DENTATE MARGIN OF THE ABDOMEN IN *CHRYSIS*.

BY T. A. CHAPMAN, M.D., F.Z.S.

The President's address at the Entomological Society set me thinking on this matter. He did not discuss Chrysids but, in the Aculeates, he told us that female secondary characters had relation to maternal duties and that any dorsal apical teeth spines are practically unknown in ♀ ♀ Aculeates.



Chrysids are not Aculeates, and one may not re
latter with much certainty, not only because Chrysids are
but because the female *Chrysis* has no duties toward
beyond oviposition. It is further the case that the
in *Chrysis* is a specific and not a sexual character,
identical in both sexes of the species that possess it
margin is not of a terminal segment. The segment ca
is the last visible one, but so, only the third visible
abdomen, probably really the fourth.

Taking all these circumstances and some others int
the theory of these spines that seems to me probable is
hypothetical, and can only claim acceptance in t
better. In the Ent. Mo. Mag. of 1869 and 1870, I
on the habits of the Chrysids parasitic on *Odynerus sp*
*neglecta* substitutes her own egg for that of the wasp
the cell is still open and even before the tale of green
sistence of the larva is complete. *Chrysis bidenta*
hand does not lay her eggs until the wasp larva has
No special effort is necessary therefore on the part of
the place where her egg is to be laid; *bidentata*, on th
has to burrow through some earthen stopping, and
her ovipositor through the wasp's cocoon. *Chrysis ne*
terminal teeth, *bidentata* has this armature.

It would seem then, that in view of these two sp
terminal spines are correlated with the necessity of
cocoon with the ovipositor.

This ovipositor is not a sting, but it is very s
more than once pricked by it in handling the living
it is, however, considerable force must be necessa
cocoon, a portion of the process, doubtless, being wid
by pushing the silk aside as the ovipositor progresse
displaced returning afterwards to their position, as
the *Chrysis* retires, is practically closed. In making
whole work is done by a direct thrust, not by the alt
by which the Tenthredo's cut their incisions or the
*Rhyssa* group penetrate solid wood. In making such a
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## MARGIN OF THE ABDOMEN IN *CHRYSIS*.

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Chrysids are not Aculeates, and one may not reason from the latter with much certainty, not only because Chrysids are not Aculeates, but because the female *Chrysis* has no duties towards her offspring beyond oviposition. It is further the case that the dentate margin in *Chrysis* is a specific and not a sexual character, *i.e.*, it is nearly identical in both sexes of the species that possess it. The dentate margin is not of a terminal segment. The segment carrying the teeth is the last visible one, but so, only the third visible segment of the abdomen, probably really the fourth.

Taking all these circumstances and some others into consideration, the theory of these spines that seems to me probable is, of course, very hypothetical, and can only claim acceptance in the absence of a better. In the Ent. Mo. Mag. of 1869 and 1870, I gave some notes on the habits of the Chrysids parasitic on *Odynerus spinipes*. *Chrysis neglecta* substitutes her own egg for that of the wasp, laying it whilst the cell is still open and even before the tale of green grubs for subsistence of the larva is complete. *Chrysis bidentata* on the other hand does not lay her eggs until the wasp larva has spun its cocoon. No special effort is necessary therefore on the part of *neglecta* to reach the place where her egg is to be laid; *bidentata*, on the contrary, often has to burrow through some earthen stopping, and always to thrust her ovipositor through the wasp's cocoon. *Chrysis neglecta* is without terminal teeth, *bidentata* has this armature.

It would seem then, that in view of these two species at least, the terminal spines are correlated with the necessity of piercing a tough cocoon with the ovipositor.

This ovipositor is not a sting, but it is very sharp, and I was more than once pricked by it in handling the living insects; sharp as it is, however, considerable force must be necessary to pierce the cocoon, a portion of the process, doubtless, being widening the opening by pushing the silk aside as the ovipositor progresses, the threads so displaced returning afterwards to their position, as the opening, after the *Chrysis* retires, is practically closed. In making the opening, the whole work is done by a direct thrust, not by the alternate movements by which the Tenthredo's cut their incisions or the ichneumons of the *Rhyssa* group penetrate solid wood. In making such a thrust not only is a fulcrum necessary, but even more important is some guidance in order that the thrust may be throughout in exactly the same line and direction. My idea is that the teeth of the margin do not provide a fulcrum, but by pressing down on to the wasp cocoon, make the end

of the abdomen fixed and steady, so that the thrust may be direct and true.

In pushing a slender object, like a needle, into any resisting mass, if it be held at a distance from the object, it is difficult to advance it so steadily that it does not bend and break; or if, unlike a needle, it is flexible enough not to break, it will double up and go no further. In either case the operation will succeed if the needle be held steadily, fairly close to the object to be pierced. In the case of the *Chrysis*, the short grip and the steadiness of the fulcrum is secured by the terminal teeth engaging the rough surface of the cocoon. The actual fulcrum, however, must be taken by the insect in some other way, either by its legs or by pressure against the wall of the burrow in which the cocoon is.

*Chrysis ignita* has a toothed margin, yet in the only cases in which I noted its ovipositing habits, it did so in the open cell. This would tell against my theory of the use of the teeth, but *ignita* is an abundant species, attacking a number of different hosts, and probably commands with this object different procedures in different cases, procedures that with other species of the genus are each confined to one species.

The dentate margin is not, however, a sexual but a specific character. This seemed to me at first a difficulty, but I think a secondary sexual character is often transferred to the opposite sex, and if not injurious when so transferred, may easily become a specific character. Darwin refers to a good many cases of secondary sexual characters being transferred to the opposite sex. There are really many such cases, which we do not usually recognise: In *Balaninus*, for instance; the female requires a long rostrum to reach the proper point at which to deposit her egg. The shorter, but still very long, rostrum of the male is, so far as I know, of no special use. A curious instance of what seems to be a transfer to the male of what is almost a primary sexual character, occurs in some Sphinges. The cephalic margin of the 8th abdominal sternite is prolonged in a way that can hardly be anything but an echo of the female structure of this plate.

M. du Buysson (André's Hyménoptéres, Vol. VI, p. 32) strongly asserts that *Chrysis* only eats the larva of *Odynerus* and not the provisions. He obviously never saw my paper (Ent. Mo. Mag., Vol. VI, p. 154), nor can he have made any observations on *Chrysis neglecta* with reasonable care, or he would not say it only eats the *Odynerus*



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Betula, Reigate:
*April*, 1913.

## MELANISM AND WET CLIMAT

BY G. V. HUDSON, F.E.S.

In 1885 Lord Walsingham pointed out that t
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sooner than a white or pale coloured species. A d
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followed by prolonged periods of extreme cold, and
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My observations were made five-and-forty years ago, yet they can be repeated at any time by any one who will take the trouble to do so.

The discussion on "Winter Moths" reminds me of the hypothesis I made as to the plumose antennæ of *Pt. plumigera* and *Himera pennaria*, that these are reflections in the male insect of heightened activity of the antennæ of the female, rendered necessary by the weak odours (in winter) of the food plant she has to find to lay her eggs. Such antennæ are quite exceptional in the insects of the groups to which they belong, nor do they occur in winter moths whose females are apterous.

Betula, Reigate:
*April*, 1913.

## MELANISM AND WET CLIMATES.

BY G. V. HUDSON, F.E.S.

In 1885 Lord Walsingham pointed out that the dark coloration of Alpine and Arctic *Lepidoptera* was probably due to the fact that a dark insect, would, on emergence from the pupa, rapidly absorb the heat and thus be ready to take wing, pair, and deposit its eggs much sooner than a white or pale coloured species. A dark coloration was thus shown to be highly advantageous to those species inhabiting high mountains or Arctic regions, where fitful hours of hot sunshine are followed by prolonged periods of extreme cold, and the opportunities for the propagation of the species thus very transient. Excellent instances of almost black coloration adapted to meet Alpine conditions are found in New Zealand, and are well exemplified by practically all the species included in the genera *Erebia*, *Orocrambus*, and *Tauroscopa*, most of which frequent elevations of from 4,000 to 6,000 feet above the sea level. Lord Walsingham's explanation has never, so far as I am aware, been seriously challenged, and is, I think, generally accepted amongst entomologists as correct. A less pronounced form of melanism