

On the terms *Calypteratae* and
Acalypteratae, *Calypta* and *Calyptra*,
as they have been used in Dipterology.

(A Supplement to my article: Notice on the terms *tegula*,
antitegula, *squama* and *alula* in the Berl. Ent.
Zeitschr. 1896, p. 285—288),

by

C. R. Osten Sacken.

In my Notice on the terms *tegula* etc. I also mentioned the terms *calypta* and *calyptra*, which had been used by Robineau-Desvoidy and Rondani, but it did not occur to me, at that time, that these terms might be liable to enter into competition, in English publications, with the other terms discussed by me, and for this reason I gave them but a passing notice.

In a recent criticism of my paper, published by an authority in Dipterology in the London Entomologist's Monthly Magazine, Febr. 1896, p. 29, the following question is raised: „These divisional terms (*Calypteratae* and *Acalypteratae*) have been generally adopted; why, then, have the names ceased to be applied to the organs themselves?”

This question induced me to examine the history of these terms more in detail, and I shall now communicate the result. For the benefit of those to whom the Ent. M. M., is not accessible, I reprint the said article in an appendix (Note I). As, in the March number of the same periodical, no less an authority than Dr. D. Sharp vindicated my views most emphatically, any further controversy becomes unnecessary, and I consider the present paper merely as a contribution to the history of entomological literature.

1. Robineau-Desvoidy (1830) divided his *Myodaires* into nine groups, which he called families (*gentes*), and the first of these, from the large size of their *squamae*, he called *Calypteratae*.

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This division was not equivalent to the *Calypteratae* of later authors, because it did not include the *Anthomyidae*. R.-D. seems to have been aware that the size of the *squamae* did not afford a trenchant character for a subdivision of the *Muscidae*, and for this reason he called his second family (gens) *Mesomydae*, on account of their intermediate position (R.-D. 1830, p. 469, at bottom).

Neither the division *Acalypterata*, nor its name occurs in R.-D.'s quarto of 1830.

In R.-D.'s posthumous work (1863), which treats of the *Calypteratae* in the sense of R.-D., and not in that of Macquart, the word *Acalypteratae* appears only once, in Vol. I, p. 81, and this mention is evidently not due to R.-D., but is an interpolation of the Editor, based upon the erroneous assumption of the identity of the *Calypteratae* of R.-D. with the *Calypteratae* of Macquart. The proof and explanation of this mistake, too long for insertion here, will be found in the Note II.

In my sketch of R.-D.'s life (Berl. E. Z. 1893, p. 385) I have mentioned the antagonism which existed between R.-D. and Macquart. Macquart's publications were influenced by this antagonism. In the Hist. Nat. des Dipt. II, p. 55 (1835) Macquart followed R.-D. in adopting his first family *Calypteratae*, but changed its name into *Creophilae* Latreille; he also adopted R.-D.'s *Mesomydae*, which he called *Anthomyzidae* Latr. For the rest of the *Muscidae* he introduced, for the first time, the general name of Acalyptères („*Acalypterae* Nob.", as he has it in the same work Vol. II, p. 354).

This arrangement is discussed in Westw. Introd. II, p. 566 (1840). Meigen, when preparing his seventh, supplementary, volume (1838) was under the influence of Macquart¹⁾ and accepted his three divisions (Vol. VII, p. 172), I cannot make out, however, why he called the first division *Calypterae* Macq. instead of *Creophilae* Latr., as Macquart had it in 1835. Macquart may have advised him in a letter.

And indeed, in Macquart's Dipt. Exot. II, 3, p. 26—27 (1843) we find the term Calyptérées. But this time the *Muscidae* are divided not into three, but into two divisions only, Calyptérées

¹⁾ In 1839 Macquart visited Meigen and purchased his collection for the Museum of Paris for 1200 francs. At the same time, he acquired, for the same Museum, two stout quarto volumes containing Meigen's colored drawings of all the species described by him. The price paid was 1800 francs. What became of these drawings, invaluable for the identification of Meigen's descriptions? (Compare A. Förster's Biography of Meigen in the Stett. Ent. Z. 1846, p. 140.)

and Acalypterées. The Calypterées (*Calypteratae*), although bearing the same name as R.-D.'s first family, represent a different systematic concept: they are the *Calypteratae* R.-D. plus his *Mesomydus*. This adoption of the same name for a different systematic concept was, on the part of Macquart, a great mistake, unless it was done in malice, to spite R.-D., and, in that case, it would deserve a severer designation. It became a source of confusion for more than one author, and, among others, as I have shown, for the Editor of R.-D.'s posthumous work.

Macquart's publication of 1843 became the starting point of the division of the *Muscidae* into *Calypteratae* and *Acalypteratae*, adopted by later authors. It owed its success to its fallacious simplicity, rather than to any intrinsic merit. And if the name *Calypterata* was ill chosen by R.-D. because the covering function of the *squama* is not proved, and, at any rate, of but secondary importance, Macquart's name *Acalypterata* was still more unfortunate and misleading, because it means without *squamae*, although the anterior *squama* is in most cases present. Macquart's division became, nevertheless, popular through Walker's *Insecta Britannica*, Diptera, Vol. II, p. 2 (1853) and through Schiner's *Fauna*, Vol. I, p. LXX (the volume is dated 1863, but the first instalments of it appeared in 1860; compare Gerstaecker's *Bericht* etc. 1860, p. 276). The division was not adopted by Loew in his sketch of the classification of Diptera in the *Monogr. N.-Am. Dipt.* I (1862), nor do I find any trace of its adoption in Rondani's writings (compare, for instance, his survey of the families of Diptera in the *Prodrome* I, p. 12, 1856). But Rondani made use of the terms *calyptra* and *squama calyptrorum*, as I shall explain below.

It seems to me that R.-D. treatment of this question was a rational one, and recent authors have come to the same conclusion that "a distinct limit between *Calypterata* and *Acalypterata* cannot be traced" (Girschner, *Entom. Nachr.* 1895, p. 84).

II. Robineau-Desvoidy adopted the terms *cuillerons* and *calypta* at the same time, at the very beginning of his work of 1830. *Cuillerons* had been previously used by Geoffroy and Latreille (*Comp. my paper*, p. 286). Hence R.-D. had the right to say (l. c. p. 16): "Je conserve à ce double appareil le nom français de *cuillerons*, mais je le traduis en latin par le mot *calypta*, de *calypto*, je couvre." R.-D. always used the word *calypta* in the plural (in the *Myodaires*, 1830, p. 153: *calyptis limpidis* and *passim*; in the *Hist. Nat. des Dipt. des Env. de Paris*, I, p. 55, at top: *calypta mediocria*). *Calyptum*, in the singular I have not

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succeeded in finding in his volumes. *Calypta* (*cuillerons*) constituted for him what he calls (compare above) ce double appareil. But whenever he wanted to designate the *squamae* separately, he called them *squama*: „je désigne par les mots *squama* superior et *squama* inferior les deux squames qui le composent." This is found in the volume of 1830, and repeated, word for word, thirty years later (H. N. des Dipt. etc. I, p. 77, 1863). The intention of R.-D. in making this distinction is obvious: he, very correctly, recognized in the *squamae* organs of flight, subsidiary to the wings, rather than mere covers for the halteres. „Ces développements membraneux servent à soutenir le corps pendant le vol, et à donner plus d'étendue à la base des ailes pour le tenir suspendue sur la colonne d'air. Alors ils se déploient, s'étendent, s'ajustent ensemble, et se font suite les uns aux autres. Les espèces qui ont le vol faible manquent de cet appareil si développé chez les races éminemment volantes; il devient alors évident que son usage n'est pas de recouvrir, de protéger les balanciers." It is rather unfortunate that, after such a distinct declaration, R.-D. should have chosen, for this double flying-apparatus, a name derived from the verb *calypto*, I cover. And it was an inconsistency or an inadvertence on his part when he named the two *squamae*, forming this apparatus, as if they were always at rest, *squama* superior and inferior, instead of anterior and posterior, as they appear when in motion. Nevertheless, he never failed, in his letter-press, to follow the rule he had himself established to call them *calypta* when he took them collectively, and *squama* when he mentioned them apart. So we have, on p. 529 (1830): *Calypta media*; *squamà inferiore longiore quam latiore et bilongiore superiore*; p. 567: *Calypta media*; *squamà inferiore excedente superiorem*; p. 153: *Calyptis limpidis*; p. 214: *Calypta ampliora* etc.

III. The article (E. M. M.) says: „Haliday used the name *calyptra* in some of his publications, but the only author who has adopted it altogether is Rondani." In verifying this statement, I do not find it justified. As I have said above, I did not succeed in finding in the writings of Rondani traces of the subdivision in *Calypterata* and *Acalypterata*; he seems to have followed R.-D. in not adopting it. As to the use of the term *calyptra*, Rondani always used *squama* in his earlier publications, up to 1856. In the Prodrôme (1856) and his later works, Rondani adopted the practice of R.-D. and used the term *calyptra*, always in the plural, when he meant the anterior and posterior *squamae* collectively, in the sense of the term „post-alar membrane". But,

whenever Rondani meant to mention, or to describe, one of the pairs of *squamae* separately, the anterior pair or the posterior, or to institute a comparison between them, he, like R.-D., used the term *squamae*, always adding the word *calyptrosum*, to indicate that *calyptra* meant the complex, the ensemble of the post-alar membrane (abundant references to Rondani's terminology will, be found in Note III). The insistence of Rondani in making this distinction leaves no doubt about his intention. I again repeat, that neither *calyptum* nor *calyptrum* have ever been used in the singular, either by R.-D. or by Rondani; both used *squama* for it, a term that, as I have shown in my article (p. 286), has been used, since Linné, by the majority of authors (and not only by Swedish ones, as the article in the E. M. M. has it, p. 30 at top). About the philology of the terms derived from the Greek *calypto* (I cover) I have added a notice, sub No. IV.

IV. The services of the *squamae* as coverings of the halteres have been for a long time assumed. There may be some truth in this assumption, but, as far as I know, it has never been thoroughly investigated or proved. A quaint interpretation of the use of these organs is found in the old, but very original and praiseworthy publication:

v Gleichen, gen. Russwurm, Gesch. d. Stubenfliege, 1764, p. 16.

"Mit diesen Schlägeln rührt die Fliege gleichsam die Trommel, wenn sie damit von unten hinauf an die ausgespannten Schallbläschen schlägt. In welcher Absicht sie dieses thue, wird so leicht nicht ausfindig gemacht werden; vielleicht aber dienet das Geräusche dazu, die Verliebten zusammen zu rufen."

(Translation.)

"With these drumsticks (the halteres) the fly seems to beat the drum, when it strikes from below the distended sound-follicles above (*squamae*). For what purpose the fly does it, is not easy to find out; the noise may serve to bring together the amorous couples."

A long interval occurred between this assumption and the opinion of R.-D. who considered the post-alar membrane as a subsidiary organ of flight (1830). But as R.-D.'s specialty were the *Muscidae*, he did not further develop his idea for the rest of the *Diptera*. Léon Dufour was on the right track when he attempted to establish a relation between the structural modifications of the post-alar membrane with the organs of breathing and the aerostatic bladders existing in the head (*bulles cephaliques*), in the thorax (*utricules thoraciques*), and especially in the abdomen of *Diptera* (*ballons ou aërostats*). Although he confesses

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his failure in discovering a general principle of correlation between these organs, his suggestions are instructive and worthy of attention (*Recherches anatomiques etc. sur les Diptères*; *Mém. Mathém. des savants étrangers*, Vol. XI, p. 190—191, 1851). Lately Weinland (1890) likewise considered the post-alar membrane as a part of the wing.

A great deal remains to be done in that direction, and the principal purpose of my „little paper“ of 1896 was to call attention to the necessity of a suitable terminology for that purpose.¹⁾

I introduced this matter for the first time in my paper: „On the characters of the three divisions“ etc. (*Berl. E. Z.* 1892, p. 428, footnote), where I said „I call *antitegula* what is usually called upper *tegula*, but which has no name, and is generally overlooked, when there is no lower *tegula* present“ etc. It was then that I worked up an historical survey of the terms used in that connection, and found that *squama* was the oldest, and the most convenient term for general adoption, but I did not publish the result till four years later in my article: „Notice on the terms *tegula*, *antitegula*“ etc. (1896), and I stated at the end of it: „The present paper is the result of a compilation, which I made in 1891, before introducing the term *antitegula*; I publish it in the hope of saving some labour to those who may be interested in the same subject“ (*Berl. Ent. Z.* 1896, p. 288). In the same paper, I explained l. c. p. 287, how I came to use the term *tegula*, adopted by Loew, against my inclination which was for *squama* (this disinclination to use *tegula* I had already expressed, as early as 1862, in a footnote in the *Mon. N.-Am. Dipt. I*, p. XIV, 1862). I added at the same time that, until my recommendation of *squama* and *antisquama* was generally adopted, I would use *tegula* and *antitegula*, as I had done before. Those, who do not like the term *antisquama*²⁾ may use anterior *squama* instead, which, according to my opinion is preferable to the designation of superior *squama*.

¹⁾ As an instance of the neglect of this group of characters by dipterologists. I would call attention to the anterior *squama* (*antisquama*) of the *Bombylina* and *Anthracina*. As far as I know, it has never been mentioned in descriptions, and yet it has a considerable development, especially in some species of *Anthrax*, where it is larger than the axillary lobe (*alula* Lw).

²⁾ The combination of anti, a Greek preposition, with words that are not Greek, is consecrated by general usage of most European languages, as in antislavery, antisocial, antifebrile, antisabbatarian etc. For this reason the criticism of Mik (*Wien. E. Z.* 1897, p. 43) that *antisquama* is a *vox hybrida* is rather futile.

In the present paper I call post-alar membrane the connecting membrane of my previous publication. It occurred to me since, that the latter term is too vague, and may be applied to any membrane connecting the sclerites of the body (for instance, the abdominal ones). The term post-alar membrane does not allow such a misunderstanding. Weinland, in his „Beitr. zur Kenntn. d. Baues des Dipteren-Schwingers“, Berlin 1890, p. 16, uses „Verbindungsschüppchen“ for the same organ. He, like R.-D., quite correctly considers the post-alar membrane as a part of the wing: „Der Theil des Flügels, welcher denselben innen (hinten) mit dem Thorax verbindet“ (l. c. p. 16, line 7 from top).

A celebrated French painter, I believe it was Ingres, used to say: „Le dessin est la probité de l'art.“ So it may be said: „Literature is probity in science.“ If, during the last six or seven years I have spent a considerable amount of time in apparently tedious researches in entomological literature, I had some reason for considering such researches as my special duty. I have the advantage of possessing a rather complete dipterological library, over the contents of which, by dint of indexes, extracts and cross-references, I have acquired a certain (although still very insufficient) mastery. Another advantage which I enjoy, consists in an almost absolute freedom in the disposal of my time. Under such favorable circumstances, it is much easier for me, than it would be for others, to fulfil some duties of drudgery, indispensable, among the deluge of literature, for maintaining a decent level of scientific probity. And I believe that my labour is not lost, so long as I am helping others to maintain that level.

Note I.

On the terminology of the scale-like organs which lie between the roots of the wings and the scutellum of Diptera, — by R. H. Meade. (Entom. Monthly Mag. London, Febr. 1897, p. 29—30.)

„Bon C. R. Osten Sacken has lately published an interesting little paper upon these small lobes or scales which are very conspicuous in the higher *Muscidae*. They have received very different names from different entomologists. The term *alulae* or winglets has been most frequently used by those in Britain, as Westwood, Walker etc., but it is incorrect, for they have no real alliance with the wings; the halteres or poisers being considered as the represen-

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tatives of the second pair of wings of the Hymenoptera etc. The name *alula* has also been applied by Loew and others to the axillary lobe of the wing, sometimes called *lobulus* (Afterlappen or Flügellappen, Schiner), which is a more correct application of the term.¹⁾

These scale-like flat processes are usually named Schüppchen by the German Dipterists, cuillerons by the French and squamae by the Swedish. Robineau-Desvoidy divided the *Muscidae* into two great divisions by the difference in size (the presence or comparative absence) of these organs, naming them *calypteratae* and *acalypteratae* from the Greek word Kalupteer, a cover. These divisional terms have been generally adopted; why then have the names ceased to be applied to the organs themselves? Rob.-Desv. used the term *calypta* sometimes, but he abandoned it for the rather curious one of *cuilleron*, or bowl of a spoon. Haliday used the name *calyptra* in some of his publications, but the only author who has adopted it altogether is Rondani. It seems to me to possess a claim over all the others, especially when applied to the *Muscidae*.

The two scales constituting these organs are in some respect independent of each other, the larger one being attached to the scutellum, and lying behind, or rather beneath the other, with the smaller one is connected with the wing, and moves with it independently of the other. Osten Sacken would therefore give the two scales different names, calling the lower and larger one the *tegula*, as it covers the poiser, and the smaller one *antitegula*. The term *tegula* has exactly the same meaning as calyptrum, only one is derived from Greek and the other is latin, and has no advantage over it. I think, therefore, that we are bound to call these scales *calyptra*, as that name has the claim of priority, and is especially applicable to the calyptrated *Muscidae*."

Bradford, December 1896.

Note II.

The Editor's, Mr. H. Monceaux's, Preface to R.-D.'s posthumous Hist. Nat. des Diptères des environs de Paris (Vol. I, p. IV, 1863) contains the following passage: "C'est ainsi que les *Mydaires*

¹⁾ The term *alula*, applied by Loew has the inconvenience of having been used for *squama* by some English authors, and thus may easily be misunderstood. In other respects it is very appropriate, and Réaumur was right in describing it: "là, il semble qu'une petite aile soit soudée à la grande." If *alula* is not adopted, axillary lobe, which has been used by Haliday and Walker, would certainly be the most proper term. (Compare my article, l. c. p. 287.) Upon consideration, I now prefer the latter. — O. S.

calyptérées, tant de fois remaniées et remises sur le métier, étaient prêtes, et lui ont enfin paru dignes de voir le jour. Les *Acalyptérées* auraient suivi bientôt, ainsi que l'attestent les matériaux amassés par l'auteur et les manuscrits que nous possédons." This collocation of *Calyptérées* and *Acalyptérées* proves, that the Editor laboured under the mistaken notion that these divisions, introduced by Macquart (1843), were equivalent to the distribution adopted by R.-D. in 1830. But this is by no means the case. The *Calyptérées* Macq. (1843), as I have shown (p. 330) are equivalent to the *Calyptérées* R.-D. (1830) plus his *Mesomyidae* (*Anthomyiæ auctorum*). The rest of the *Myodaires* or *Muscidae*, which Macquart called *Acalyptérées*, had no general name in R.-D.'s work of 1830. This misapprehension induced the Editor to introduce, on p. 81, after line 5: I. Les *Calyptérées*, the line II. Les *Acalyptérées*, which certainly did not exist in R.-D.'s manuscript. If R.-D. had adopted this important innovation, that is, Macquart's definition of the *Calyptérées*, he would have mentioned it in his letterpress somewhere. Nevertheless, not a word about it is to be found.

The family (gens) *Calyptérées* of R.-D., in his work of 1830, ends on p. 468 of the volume with the genera *Pyrellia* and *Phormia*. The *Calyptérées* of the same R.-D. in his posthumous work (1863), volume second, end with the same genera. In both cases, the *Mesomyidae* R.-D. (*Anthomyiæ auctorum*) are not included. Except in that single line (p. 81, line 6), the term *Acalyptérées* does not occur in the two volumes of 1863. And in the alphabetical Index at the end of Vol. II, p. 869, under the vocable *Acalyptérées*, that single line alone is referred to.

This misapprehension of the Editor was a puzzle to me for some time, before I succeeded in unravelling it. I take care therefore to call the attention of dipterologists to it.

Note III.

On Rondani's use of terms *squamae*, *calyptra* and *squamae calyptrorum* (1843—1877).

I. *Squamae* (1843—1856), before the Prodrôme,
Vol. I, (1856).

Squamae albidissimæ N. Ann. di Bologna 1843 (n. g. *Albertia*).

Squamae albae ibid. 1845 (Merodon).

" *fusco-lutescentes* ibid. 1845 (n. g. *Phytomycetæ*).

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Squamae pallide-sublutescentes ibid. 1845 (n. g. *Bigonicheta*).

Squamae linea marginali etc. Ann. S. E. Fr. 1844, p. 66 (*Callicera*).

Squamae albae ibid. 1849, p. 122 (*Eumerus*)
etc. etc.

II. Calyptra and Squamae calyptrorum (1856—1877)

after the Prodrôme, Vol. I (1856).

A. Calyptra, taken collectively, as equivalent of „post-alar membrane“.

Calyptra albida Prodr. V, p. 57, l. 3 fr. bott; p. 49, l. 8 fr. bott. (1862); Atti di Milano etc. IX, p. 136. at bott. (1866; *Anthom.*).

Calyptra albicantia, *Calyptra nigricantia* same vol., p. 82.

Calyptra albis same vol., p. 85.

Calyptra parva Atti di Milano XI, p. 200 at top (1868, *Sciomyz.*).

Calyptra minima Annuar. di Modena, Ann. XI, p. 8, l. 6 fr. bott. (1877).

B. Squamae calyptrorum supera and infera (equivalent to my *squama* and *antisquama*).

Calyptra squamis inferis nigricantibus, Prodr. V, p. 18 (1862).

Calyptra plus minusve ampla, squama infera semper et distincte latiore, Prodr. III, p. 7, (1857).

Calyptrorum squamae plus minusve latae, squama infera saepius longiore supera, Atti di Milano, IX, p. 69 (*Anthom.* 1866).

Calyptrorum squamae superae inferas non nisi partim tegentes etc. (on the same page).

The same combination *calyptrorum squamae* etc. occurs very often in the same volume about *Anthomyia*, as on p. 73, 74, 75 (three times), 77, 86, 87 etc. etc.

Squamae calyptrorum subaequales, Prodr. VI, p. 259 (1877).

Squamis inferis calyptrorum longioribus, on the same page.

Note IV.

I leave to philologists the task of pronouncing upon the correctness of the technical terms derived from the Greek, and I submit to them the following suggestions:

In the dictionaries accessible to me, I find three Greek words derived from the verb „I cover“ (calypto):

1. **Calypter** (covering), a substantive, the latinized plural of which would be calypteres, in analogy with halteres.
2. **Calyptra** (a substantive, likewise meaning covering), with the latinized plural calyptrae.
3. **Calyptos, calypton**, adjective, meaning covered, has no application in our case, because a *squama* may be a covering, but is not covered. Therefore R.-D.'s *calypta* (plural) cannot be justified.

Calyptron does not exist in Greek, and therefore the latinized calyptrum (plural calyptra), proposed for use in the article in the E. M. M., cannot, it seems to me, be accepted.

The different ways of spelling the terms *Calyptrata* or *Calypterata* may both be considered as correct, as they may be derived either from calypter or calyptra (compare above).

In practice, they appeared in the following sequence:

Rob.-Desvoidy (Myod. p. 20—22, 1830) has Calypteratae, Calyptérées.

Macquart, Hist. Nat. etc. II, p. 354, 1835. Acalyptères (Acalypterae).

Meigen, VII, p. 172, 1838. Calypterae Macq. — Acalypterae Macq.

Macquart, Dipt. Exot. II, 3, p. 26—27, 1843. Calyptérées (Calypteratae) and Acalyptérées; but on p. 173 of the same volume, Macquart has, inconsistently, Acalyptères (Acalypterae).

Several authors followed Meigen, in spelling Calypterae and Acalypterae. So Walker, Ins. Brit. Dipt. II, p. 2 (1853); Schiner (Fauna I, p. LXX, 1862) etc. — Others authors followed the original spelling of R.-D.: calypteratae. (So R. H. Meade.)



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