



XVI. *On a Probable Explanation of an Unverified Observation relative to the Family Fulgoridæ.*
By WILLIAM LUCAS DISTANT, F.E.S.

[Read May 1st, 1895.]

IN the early years of the last century Madame Maria Sibilla Merian, in her large folio work, "*Metamorphosis Insectorum Surinamensium*," described in a very lucid and definite manner an observation she had made on the luminous properties of the large Surinam Lantern-fly, which has been generally known in entomological science as *Fulgora laternaria*.* The Indians had brought her several of these insects, which by daylight exhibited no extraordinary appearance, and which she had enclosed in a box until she should have an opportunity of drawing them. In the middle of the night the confined insects made such a noise as to awake her, and on opening the box, to her great astonishment the inside seemed to be in a blaze, which caused her in fright to drop the same, when she was no less surprised to see each of the escaped insects apparently on fire. She added that the light emitted from one of these insects was sufficiently bright to enable her to read a newspaper.

All we know of Madame Merian proves her to be a disinterested and truthful observer, and yet scarcely any other entomological record has been so consistently controverted by such an amount of negative evidence contributed by excellent authorities. Inhabitants of Cayenne have denied that the insect possesses luminous properties,† as did also M. Richard, who reared the species.‡ Count Hoffmansegg, on the authority of his

* I here use this well-known name, but the species does not really belong to the genus *Fulgora*, as I have shown, with a synopsis of the described species, in my contribution on Homoptera to Godman and Salvin's "*Biologia Centrali Americana*," a publication to which I cannot now refer while writing in the Transvaal.

† "*Dictionnaire d'Histoire Naturelle*."

‡ "*Encyclopédie*," art. "*Fulgora*."

collector, Sieber, who passed some years in Brazil and took many specimens, also became a hostile witness.* Lacordaire never saw a luminous individual of this species either in Brazil or Cayenne,† nor had the Prince von Nieuwied;‡ whilst Dr. Hancock published a paper in which he considered the recorded luminosity as entirely fabulous.§ Since then the observations of all entomologists in the East have shown that the so-called Lantern-flies of that region are universally non-luminous, and, as I have for years particularly studied and collected the group, I have made many enquiries on the point of collectors abroad, and always eliciting the same negative testimony.

On the other hand, Madame Merian's statement has been supported by M. Wesmael, on the authority of a friend who had seen the insect alive,|| and this induced the Marquis Spinola to contend for the luminous character of the cephalic protuberance in the whole group.¶

Now the reconciling of these conflicting testimonies has long been to me a complete enigma, for I stipulate for the truth of Madame Merian being admitted, whilst my study of the family has constantly drawn my attention to the question. Lacordaire proposed that the explanation might be found in the fact of only one of the sexes being luminous. But this proposition does not help us. The question is, *What* did Madame Merian really see? If a man whom I knew to be sane and truthful tells me he has seen the great sea-serpent, I neither believe in that animal nor doubt his veracity. I merely ask the same question. What did he see to induce him to form that conclusion?

I think the key, at least, to such an explanation may be found in an excellent paper quite recently published by Peter Schmidt, of the Zoological Laboratory of the

* "Der Gesellschaft Naturf. Fr. zu Berlin Mag.," i., p. 153.

† "Introd. à l'Ent.," ii., p. 143.

‡ "Reise nach Bras." tom. ii., p. 111.

§ "Proc. Zool. Soc., 1834."

|| "Ann. Soc. Ent. Fr.," App., 1837.

¶ Ibid., viii., p. 163.

For these references, I am now, away from my library, entirely dependent on those two entomological epoch-making publications, Kirby and Spence's "Introduction," and Westwood's "Modern Classification."—W. L. D.

Imperial University at St. Petersburg, "On the Luminescence of Midges (*Chironomidæ*)"* of which an excellent translation has been published by our Dipterological associate, Mr. E. E. Austen.†

The first observation on the luminosity of Midges (*Chironomus*) appears to have been made by Pallas, who ascribed the same to a species of gnat (*Culex pipiens*, L.)‡. This observation slept till it was confirmed in 1874 by W. D. Alenizyn, and published in a communication addressed to the "Naturalists' Society of St. Petersburg." Subsequently Brischke, Ssorokin, and Tarnani reported the same phenomena, and this was again seen by Schmidt while staying at Lake Issykkul in 1892.

This luminous species did not, as was at first imagined, prove to be undescribed, but was merely—according to Schiner—a variety of *Chironomus plumosus*, L., whilst certain smaller specimens appeared to belong to *Chironomus tendens*, Fb., thus demonstrating that, as these well-known species were not always, or to say the least, usually luminous, the luminosity observed must be of an occasional or aberrant character.

Herr Schmidt proceeds in a deductive manner to seek the explanation of this luminosity; and he, firstly, separates two known causes, viz.:—

- A. Animals which are luminous by being provided with special luminous organs.
- B. Animals which are luminous by means of luminous micro-organisms living upon or in them.

In the second category may be instanced the micro-organisms occurring as veritable parasites injurious to their host, such as the discovery by A. Giard of the luminosity of *Talitrus*, a genus of *Crustacea*, belonging to the order *Amphipoda*. On examining a foot belonging to one of these luminous crustaceans under the microscope, it was found swarming with micro-organisms

* "Zoologische Jahrbücher—Abtheilung für Systematik, Geographie und Biologie der Thiere, Bd. viii., Heft. 1 (Jena, 1894), pp. 58–66.

† "Ann. and Mag. Nat. Hist.," ser. 6, vol. xv., p. 133.

‡ It is unnecessary to give, or rather to repeat, references which have been given by Schmidt, reproduced by Austen, and republished in the "Ann. and Mag. Nat. Hist."—W. L. D.

(*Micrococcus phosphoreus* ?); and that these possessed the luminous properties was proved by infecting non-luminous crustaceans with such organisms, when the infected specimens of *Talitrus* became also luminous.

Arguing from these premises, Herr Schmidt concludes from the spasmodic manner in which luminosity appears in these Midges; from the non-localisation of the light and its appearance even on dead specimens; from the weak and sickly condition of a Midge which has become luminous; from the non-discovery of any luminous organs, and by the males and females being both able to acquire the same character, that the analogy with *Talitrus* is complete, and that both animals owe their luminous qualities to an infection by luminous micro-organisms.

We may now return to the observation of Madame Merian on her captured Lantern-flies, supported by a similar sight witnessed by the friend of M. Wesmael; when a like explanation of luminous properties by the aid of micro-organisms is at least very suggestive. These would account for the rarity of the phenomenon, as with the Midges and the *Talitrus*, and though we have no positive evidence to support such a conclusion, it at least suggests a known cause for the reconciliation of Madame Merian's observation with absolute truth; nay, more, opens a door for fresh investigation in one of the many unworked paths of entomology.

That the *Fulgoridæ* are liable to the visits of parasites, was proved before the Society some years ago by Prof. Westwood, who described a Lepidopteral pupa found in the abdominal waxy-secretion of a species of Eastern *Fulgora*.



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