

## Monstrosities in Siphonaptera IV

by

F. G. A. M. SMIT

### More cases of castration

Through the courtesy of Mr. J. COOREMAN of the Institut royal des Sciences Naturelles de Belgique, Brussels, I have been able to examine a castrated male specimen of *Ctenophthalmus* (subgenus *Euctenophthalmus*), which was collected by J. BERNARD at Orchimont, Luxembourg, 20/25-III-1952, "sur rongeurs". Two representatives of the subgenus *Euctenophthalmus* occur in Luxembourg (*assimilis* (Taschenberg) and *congener congener* (Rothschild)) and at first it seemed difficult to identify the castrated specimen, since the two *Euctenophthalmus* mentioned were only known to differ in the genitalia. The effects of castration greatly reduce the taxonomic value of the genitalia, and in this instance practically destroyed it, since the genitalia of this specimen might belong to any member of *Euctenophthalmus*. A close comparison between males of *assimilis* and those of *congener*, however, revealed an additional character which separates the two forms: in *assimilis* the dorso-anterior part of sternum VIII of the male bears numerous minute spicules along the cuticular striae (Fig. 3), while in *congener* these spicules are absent (Fig. 4), though in exceptional instances very few may be present. The relevant part of sternum VIII of the castrated specimen under discussion is densely spiculate and therefore the specimen can be identified as *C. (E.) assimilis* (Taschenberg).

The whole of the genitalia of this specimen of *assimilis* is shown in Fig. 1. It will be seen that this type of castration is similar to that in the male of *Ceratophyllus gallinae* (Schrank) described by me in 1952: the entire phallosome is absent; the manubria and the apodeme of tergum IX are strongly reduced; the fixed process of the clasper is also extremely ill-developed and bears only two setae; the movable process of the clasper is entirely absent; sternum IX is malformed (especially its proximal arm), but the chaetotaxy of the apical part of the distal arm is quite normal. For comparison a figure is given of the genitalia of a normal specimen of *C. assimilis* (Fig. 2).

The condition found in the specimen described above and also in the *C. gallinae* described by me in 1952, could be called *complete castration*, and is easily recognizable as such, though to those who are not familiar with the effects of castration the phenomenon may be puzzling; no sensible taxonomist would describe specimens so obviously abnormal as new species or subspecies. However, castration can also appear in a less drastic form, the genitalia being only partly ill-developed or malformed. This type of castration, which I will call *partial castration*, is much less obvious than is complete castration and it is therefore not surprising that in a few such instances castrated specimens have been thought to represent new species. The following cases of partial castration have come to my notice:

(a) *Meringis walkeri*, described from a single male by HUBBARD in 1940, is said to be characterized by having two antesensorial setae each side and by the chaetotaxy of sternum VIII and IX; the holotype "was taken by the writer [HUBBARD] off an Oregon Pocket Mouse, *Perognathus parvus*

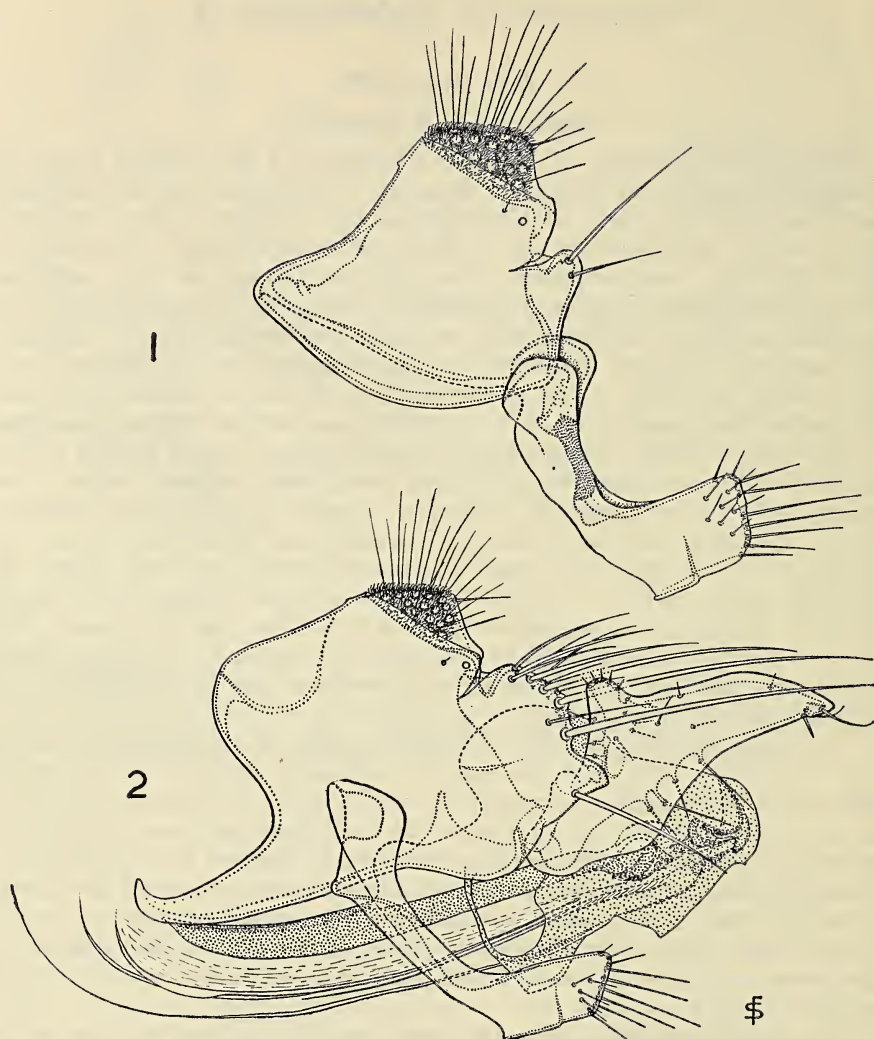
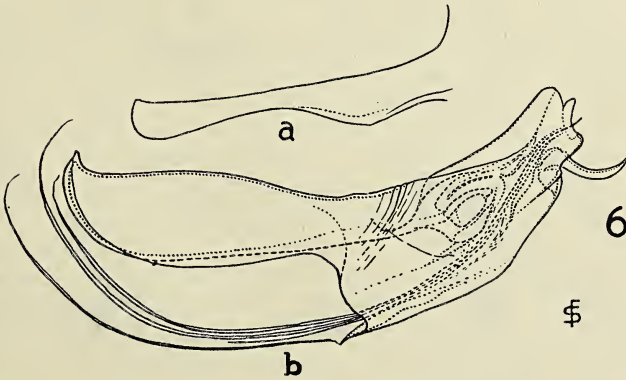
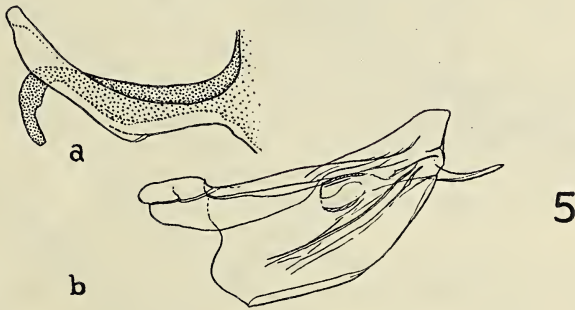
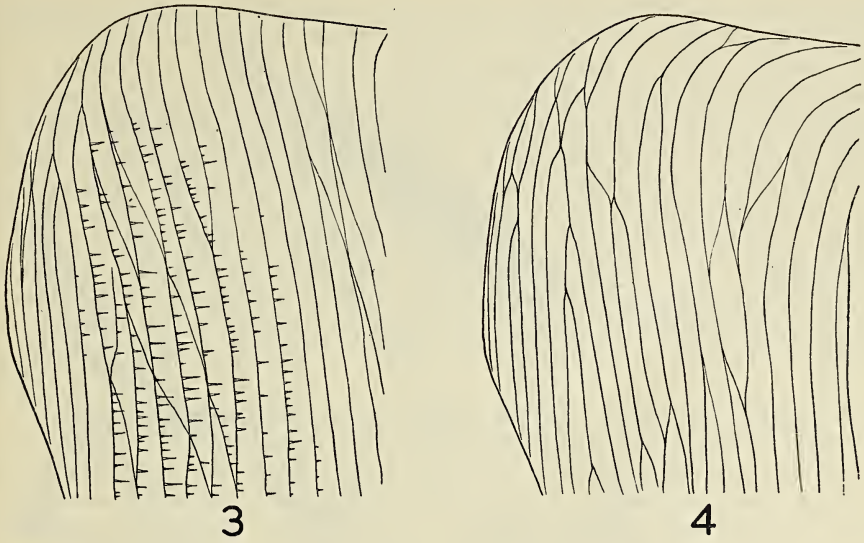


Fig. 1. *Ctenophthalmus assimilis* (Taschenberg). Genitalia of castrated male (from Orchimont, Luxembourg).

Fig. 2. *Ctenophthalmus assimilis* (Taschenberg). Genitalia of a normal male (from Nieuw en St. Joosland, Walcheren, Holland).

parvus Peale at a point in the Central Oregon desert 15 miles south of Boardman, Oregon (type locality) on May 12, 1939." (HUBBARD, 1940: 3). Having no access to the holotype, which is in the United States National Museum at Washington D.C., I enquired about it from Miss Phyllis T. JOHNSON, parasitologist at the Walter Reed Army Medical Center, Washington D.C., who most kindly offered to make drawings of the holotype and also of other specimens which are mentioned below. I am greatly indebted to her for having made the various drawings required and for allowing me to reproduce several of them in this paper (Figs. 7, 8, 10, 11, 12), for from these drawings a decision on the status of two



Figs. 3 and 4. Dorso-anterior part of sternum VIII of: 3. *Ctenophthalmus assimilis* (Taschenberg) ♂, 4. *Ctenophthalmus congener congener* (Rothschild) ♂. Fig. 5. *Delotelis hollandi* Smit. Partially castrated specimen (from Salmon Creek, Alaska).

a. Manubria, b. Phallosome.  
Fig. 6. *Delotelis hollandi* Smit. Normal male specimen (holotype).  
a. Manubrium, b. Phallosome.



Fig. 7. *Meringis walkeri* Hubbard (holotype). Genitalia.  
 Fig. 8. *Meringis walkeri* Hubbard (from Hampton, Oregon). Distal arm of sternum IX.  
 Fig. 9. *Meringis parkeri* (Jordan) (from Adel, Oregon). Distal arm of sternum IX.

supposed species of *Meringis* can be made. The genitalia of the holotype of *Meringis walkeri* are shown in Fig. 7. They show the characteristics of a partially castrated specimen: the phallosome is much reduced, the manubria are distorted, and the chaetotaxy of sternum IX can be assumed to be abnormal, though sometimes this may be only slightly so. Partially castrated specimens are often difficult to identify, but the castrated holotype of *M. walkeri* agrees with *M. hubbardi* Kohls better than with any other species of *Meringis*. *M. hubbardi* has a fairly wide distribution, occurring in Oregon, Washington, California, Nevada and Idaho, and it has been collected in the area of Oregon where *M. walkeri* was found. Although the castrated specimen cannot be given a specific or subspecific status with any certainty, it seems advisable to regard the holotype of *Meringis walkeri* Hubbard as synonymous with *M. hubbardi* Kohls.

A second male specimen of *Meringis walkeri* (determined as such by HUBBARD) is in the United States National Museum; it was collected by C. A. HUBBARD at Hampton, Oregon, 6-X-1940, ex *Dipodomys ordi columbianus*. Miss JOHNSON informed me that this male has three antesensorial setae each side and the anterior margin of the fixed process of the clasper shows no preapical shallow concavity, characters which (in the group of *Meringis* to which this specimen of *walkeri* clearly belongs) only males of *M. parkeri* (Jordan) are known to possess. This specimen, too, is partially castrated and though as a result of this the chaetotaxy of sternum IX (Figs. 7, 8) differs in some respects from typical *parkeri* (Fig. 9), it is safe to assume, also on geographical grounds, that this castrated male of *M. walkeri* is in fact true *M. parkeri*. HUBBARD's later drawing (1947, fig. 191) of *walkeri* is markedly different in certain respects from that of 1940 and the specimen from Hampton is probably the one used by him for his 1947 figure.

(b) *Meringis jewetti*, described from three males by HUBBARD in 1940, is characterized by the possession of two antesensorial setae each side and by the chaetotaxy of sterna VIII and IX and by the shape of the latter sternum. The holotype and the two paratypes "were taken off Oregon Pocket Mice, *Perognathus parvus parvus* Peale, at the south city limits of Baker, Oregon (type locality), July 12, 1939." (HUBBARD, 1940: 4). One of these paratypes was kindly presented by Professor HUBBARD to the British Museum and was therefore available for study. This paratype proved to be partially castrated, and the holotype (Fig. 10) and paratype (Fig. 11) in the United States National Museum are also partially castrated, according to Miss JOHNSON, who kindly studied and drew these specimens for me. Apart from the type-series, there is another male specimen in the United States National Museum, collected by HUBBARD ex *Peromyscus maniculatus gambeli*, McDoel, Siskiyou County, California, 26-VIII-1942, and identified by HUBBARD as *Meringis jewetti*. Again, this specimen is also partially castrated (Fig. 12). One of the characteristics of castration in the genus *Meringis* proves to be that the distal arm of sternum IX is straighter than in normal specimens and the lobe on its posterior (ventral) margin is only poorly developed and the seta at the apex of this lobe is generally less spiniform than in normal specimens, varying from practically normal to being a long seta. This variability is not subspecific, since the three original specimens of *jewetti*,

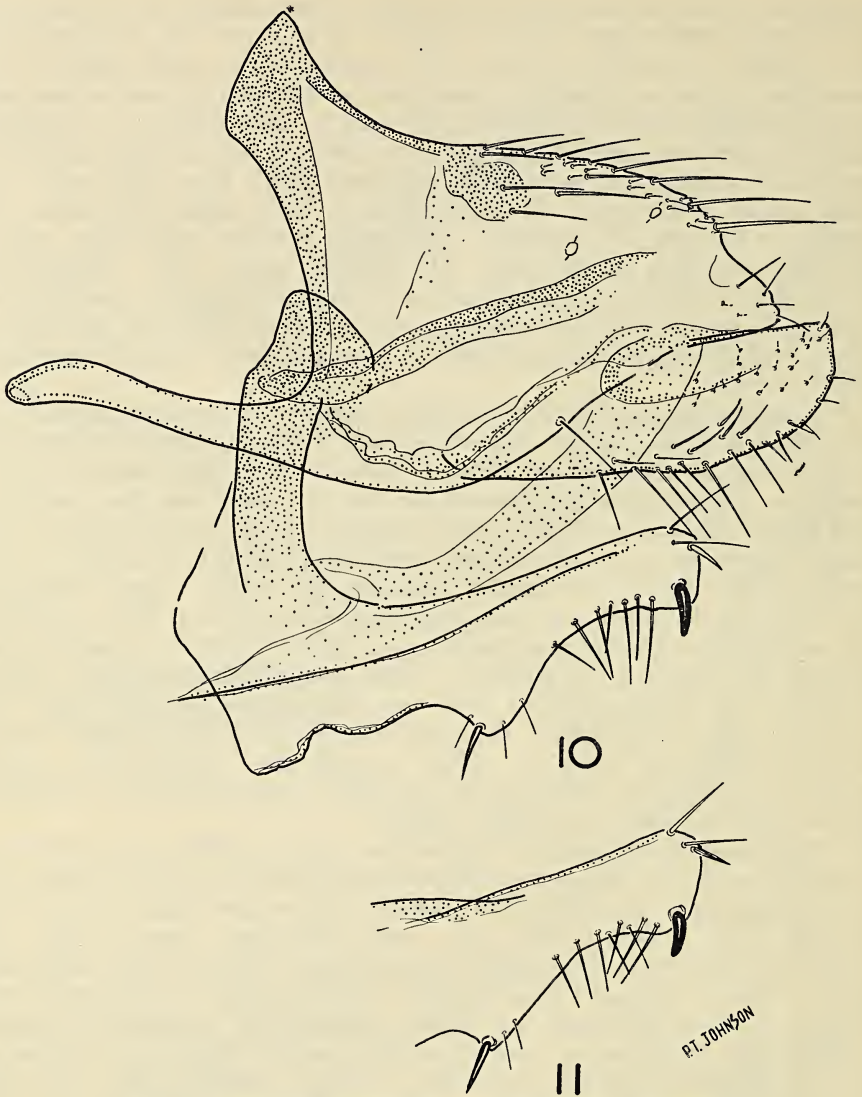


Fig. 10. *Meringis jewetti* Hubbard (holotype). Genitalia.

Fig. 11. *Meringis jewetti* Hubbard (paratype in U.S.N.M.). Distal arm of sternum IX.

all belonging to the same batch, all have differently shaped movable processes and the seta at the apex of the ventral lobe of sternum IX is fairly strongly spiniform in one of these three, subspiniform in another, and with hardly any tendency to be spiniform in the holotype.

The four known specimens of *M. jewetti* Hubbard (all males) are probably all castrates of *M. hubbardi* Kohls, for the only other at all likely identity would be *M. shannoni* (Jordan), but on the whole they fit *M. hubbardi* better; moreover, the type-series of *M. jewetti* was collected at Baker on the same day (but from a different host) as a male of *M. hubbardi*. It will therefore be advisable to regard *M. jewetti* Hubbard, which

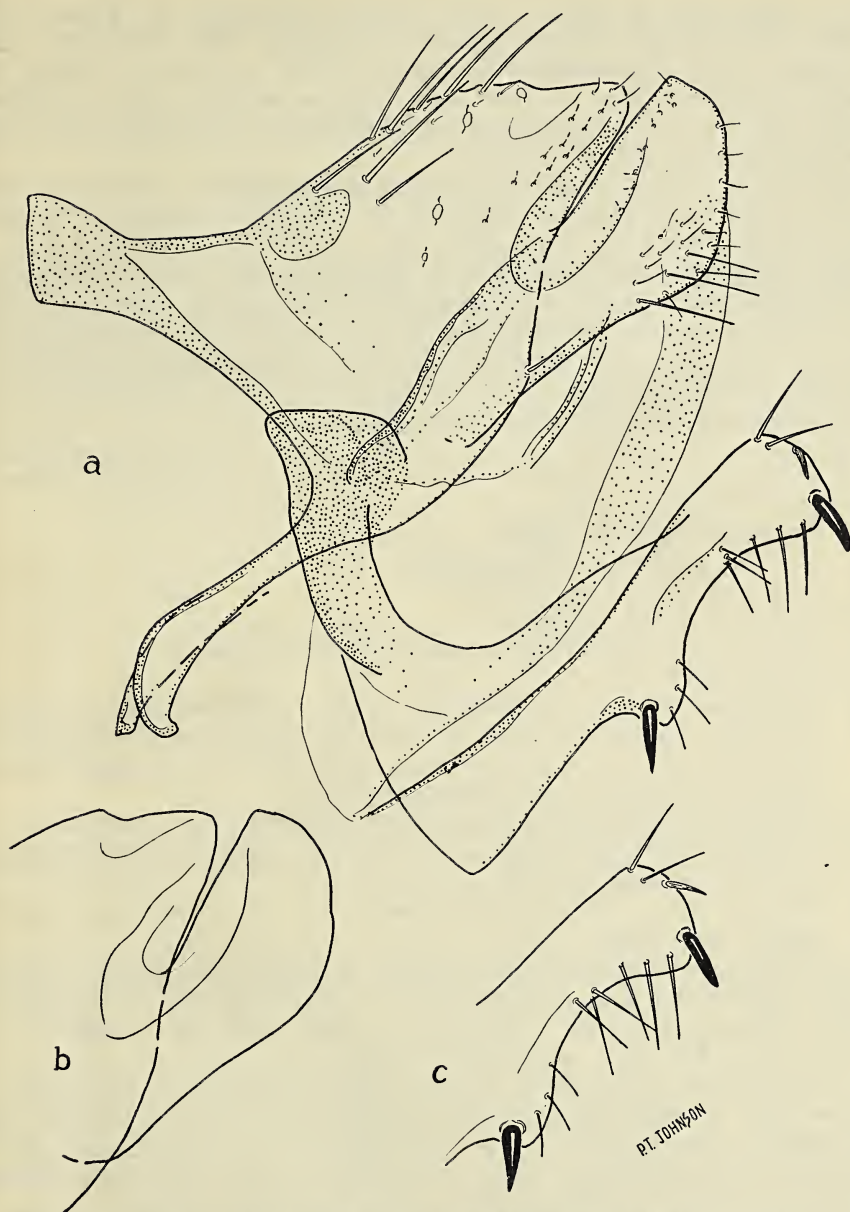


Fig. 12. *Meringis*, misdetermined as *jewetti* Hubbard (from McDoel, California).  
 a. Genitalia. b. Outline of the clasper of the other side. c. Distal arm of sternum IX.

is only known from four castrated males, as synonymic with *Meringis hubbardi* Kohls.

(c) Through the courtesy of Dr. C. F. W. MUESEBECK of the U.S. Dept. of Agriculture, Bureau of Entomology and Plant Quarantine, Washington D.C., I have been able to study a male of *Delotelis hollandi* Smit, 1952, which was collected by R. B. WILLIAMS at Salmon Creek, Alaska

(3½ miles north of Juneau), 30-IV-1950, ex *Microtus* sp. Though the clasper and sternum IX are normally developed (thus rendering the specimen easily identifiable), the shape of the manubria is typical of partial castration (Fig. 5a), and so is also the strongly reduced phallosome (Fig. 5b); for comparison the manubrium and phallosome of a normal specimen are shown in Fig. 6.

(d) In the ROTHSCHILD collection of fleas at Tring there are three castrated males of *Malaraeus sinomus* (Jordan), all collected at Paradise, Arizona, two of the males being from "Mus sp.", 21-XI-1913, the third from a skunk, 1-XII-1913; collected by O. C. DUFFNER. The effects of castration in these specimens are more drastic than in the cases described above (a—c), but the case cannot be called one of complete castration: the phallosome is vestigial, the apodeme of tergum IX and the manubria are strongly reduced, sternum IX is slightly abnormal and the movable process of the clasper is present, but atypical.

The two types of castration can be recognized in general as follows:

*Complete castration:*

- (a) Phallosome entirely absent.
- (b) Movable process of clasper absent.
- (c) Corpus of clasper malformed.
- (d) Manubria not developed.
- (e) Sternum IX, especially its proximal arm, malformed.

*Partial castration:*

- (a) Phallosome present, but strongly reduced, sometimes even vestigial.
- (b) Movable process of clasper present, but (sometimes only slightly) abnormal and very variable in shape (tending to be narrower than in normal specimens) and in chaetotaxy.
- (c) Corpus of clasper not much modified, showing little variation.
- (d) Manubria distorted, often twisted apically, but not absent although generally reduced in length.
- (e) Sternum IX not strongly malformed, but its chaetotaxy usually slightly abnormal.

In both types of castration the affected specimens are distinctly larger than normal individuals; it is therefore not surprising e.g. that HUBBARD (1940: 3) remarked that "The holotype male [*Meringis walkeri*]..... is large for a *Meringis*, measuring 2.4 mm."

In all cases described above no clue could be found as to the nature of the possible causative agent of the phenomenon. In view of the fact that castration is apparently not rare in members of the Neotropical genus *Meringis*, it would be very much worth while if some American workers would try and find out the cause of castration in this genus.

References

- HUBBARD, C. A., 1940, A review of the fleas of the genus *Meringis* with two new species, *Pacif. Univ. Bull.*, **37** (5): 1—4, figs.  
 ———, 1947, Fleas of Western North America. Ames, Iowa. pp. IX + 533, figs. 1—235.  
 SMIT, F. G. A. M., 1952, Monstrosities in Siphonaptera III. *Ent. Ber.*, **14** (330): 182—187, figs. 1—4.  
 British Museum (Natural History).  
 The Zoological Museum. Tring, Herts., 13 February 1953.