While pursuing the development of these glands opportunity was taken of proving that Engelmann's so-called "neuroid filaments" (Neuroidfasern) were not of a neural nature.

Under the heading "function" Schiemenz treats of some curious views that have been advanced by authors in regard to the different salivary glands of bees. Ramdohr at first mistook system II for an olfactory organ and system III for its continuation in open communication with the tracheae of the thorax. He later corrected this error. Fischer thought that system III was an "insect-lung." Wolff and Graber properly receive sharp criticism at the hands of Schiemenz because they

thought that system IV was a gland for moistening an olfactory organ beneath the labrum, the place where Wolff, in his wild search for analogies between vertebrates and insects, had located the olfactory organ of the bee. Schiemenz regards the glands of system IV as used in the preparation of food, and the glands of system I as producing, in part at least, the nutrient fluid used for the larvae. The functions of the other systems still remain doubtful.

As an appendix the author describes and figures the structures of the antennae of *Apis mellifica*, since it is now settled that the antennae are the seat of the olfactory sense.

CONTRIBUTION TO THE KNOWLEDGE OF PARASITIC LIFE IN GALLS.

[Translated, with some change, from G. Fr. Möllers "Bidrag till kännedomen om parasitlifvet i galläpplen och dylika bildningar" (Entom. tidskr., 1882, årg. 3, p. 182-186).]

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In his work, *Die ichneumoniden der forstinsecten*, bd. 2, p. 217 and 219, Ratzeburg gives a list of all the parasites which Tischbein, Nördlinger, Reising, and others had hatched from galls of species of *Cynips* and *Nematus*. Since however the list is very incomplete as regards our fauna I will here give a list of the parasites and inquiries which I have obtained from such gall-formations during several years' continuous investigations.

In the determination of the species I have followed exclusively Thomson's *Hymenoptera Scandinaviae* and *Opuscula entomologica*. Where the sex is

not mentioned it is to be understood that both males and females were obtained, and where the quantity of specimens is not mentioned that a moderate number were obtained; (a) indicates an abundance, (aa) a great abundance, and (r) a scarcity of specimens.

1. From galls of *Cynips folii*, collected in Scania, September 1868, were raised, in March 1869:—*Torymus viridissimus* (r), *T. cingulatus*, *T. flavipes* ♀ (unique); in April:—*Synergus vulgaris*; in May:—*Eurytoma appendigaster* ♀ (unique).

2. From galls of *Cynips longiventris*, collected in Scania, September

1875, were raised, in May 1876:—*Torymus nigricornis* ♀ (unique), *Syntomaspis cyanea*, *Synergus nervosus* (a), *Platytermus fasciculatus*, *Decatoma biguttata* ♀ (r).

3. From galls of *Cynips terminalis*, collected in Blekinge, July 1876, were raised, in July 1876:—*Torymus viridissimus* (a), *Synergus facialis*, *Decatoma biguttata* ♀, *Torymus euchlorus* (r), *T. cingulatus* ♀ (unique), *Platytermus simplex* (r), *Cecidostiba truncata* (r), *Megastigmus dorsalis* ♂ (unique); in February and March 1877:—*Olinx gallarum* (aa); in March:—*Syntomaspis saphirina* (a), *Megastigmus dorsalis* (r); in May:—*Eupelmus urozonus* (r), *Cecidostiba rugifrons*.

4. From galls of *Cynips terminalis* from Öland, collected in September 1876, were raised, in February to April 1877:—*Syntomaspis saphirina* (aa); in March:—*Pimpla inanis* ♂ (r); in April to July:—*Megastigmus dorsalis*; in April:—*Synergus nervosus* (a), *Tortrix* (? *Grapholitha puncticostana*) (r), *Cecidostiba rugifrons*, larvae of *Balaninus villosus* (a), *Eurytoma intermedia*; in May:—*Eupelmus urozonus* (a), *Cecidomyia longicornis* ♂ (rather rare), *Cecidostiba truncata* (r), *C. collaris*, *Eupelmus azureus* (rather rare); in June:—*Tetrastichus terminalis* ♀.

Remark. The small lepidoptera and diptera which occur here, as well as the coleopterous larvae, are inquilines. The little *Pimpla* has probably been raised as a parasite upon the *tortrici-*

dae, as also presumably the *Tetrastichus* from the *Cecidomyia*, analogously with its related genus *Oxymorpha*, which lives parasitically on *Cecidomyia fagi*. The *Eupelmus* have perhaps lived as parasites in the *Curculio*-larvae.

5. From galls of *Cynips gemmae*, from Scania, autumn of 1876, were raised, in March 1877:—*Synergus vulgaris* (a), *Olinx gallarum* (a), *Syntomaspis saphirina* (a).

6. From galls of *Cynips* (*Spathogaster*) *baccarum*, collected in Scania during April and May 1876-1879, were raised, in May 1876:—*Synergus apicalis* (r), *Figites anthomyiarum* ♀ (unique); in June 1877:—*Torymus viridissimus* (a), *Amblymerus crassicornis* ♀ (rather rare), *A. pedunculi* ♀ (rather rare); in March 1879:—*Olinx fulvicrus* ♀; in April:—*Synergus thaumacerus* ♂ (unique); in July:—*Torymus viridissimus* (a), *Eutelus heterotomus* ♂ (unique), *E. collaris*, *Synergus vulgaris* (a), *Platytermus fasciculatus* ♀ (r), *Ormyrus gastris* ♂ (common) ♀ (r).

7. From galls of *Cynips* (*Trigonaspis*) *crustalis*, collected in Scania, April 1878 and 1879, were raised, in June 1878:—*Synergus thaumacerus* (a); in April 1879:—*Syntomaspis fastuosa* (a); in July:—*Synergus thaumacerus*.

Remark. At the end of April 1878 quite numerous individuals of *Trigonaspis* of both sexes came forth, whenever *Synergus* exterminated *Syntomaspis*; in 1879 not a single *Trigonaspis* came forth whenever they were exterminated by *Syntomaspis*, whose para-

site *Synergus* was now present in small numbers.

8. From galls of *Cynips* (*Andricus*) *inflator*, from Scania, April 1877, were raised in the same month:—*Synergus* (*Sapholytus*) *connatus* ♀ (r).

9. From galls of *Cynips* (*Andricus*) *curvator*, collected in Scania, June 1879, were raised, in July 1879:—*Platytermus fasciculatus*.

10. From galls of *Cynips* (*Andricus*) *ramuli*, from Scania, June 1881, were raised, in July 1881:—*Olinx gallarum* (a), *Eutelus tibialis* ♀, *Decatoma incrassata* ♀ (unique).

11. From galls of *Cynips* (*Aulax*) *glechomae*, from Scania, were raised, in April 1882:—*Torymus glechomae* n. sp. ♀ (2 specimens).

12. From galls of *Cynips* (*Aulax*) *foveiger* on *Hieracium umbellatum*, were raised, in 1882:—*Decatoma submutica* (a).

13. From bedeguar galls [*Rhodites rosae*] on *Rosa canina*, collected in Scania during March 1881 and April 1882, were raised, in May to July 1881:—*Cynips* (*Rhodites*) *rosae* ♂ (r) ♀ (a), *Ortopelma luteolator* (a); in May and June:—*Habrocytus bedeguaris* (r); in June and July:—*Torymus bedeguaris* (r); in April to June 1882:—*Ortopelma luteolator* (a), *Torymus bedeguaris* (a); in May and June:—*Eurytoma pubicornis*, *Rhodites rosae* ♀ (r), *Aulax brandti* (aa).

14. From swelling on the branches of *Salix caprea*, collected near Stehag, in Scania, during March 1881 and April 1882, were raised, in May 1881:—

Nematus viduatus (r), *Pimpla inanis* ♂ (r), *P. vesicaria* ♂ (common) ♀ (unique), *P. brevicornis*, *P. mandibularis* (r); in May and June, *Nematus pentandreae* (a); in June:—*Limneria chrysosticta* (aa), *Sympiezus sericeicornis* ♂ (unique); in June and July:—*Habrocytus capreae* (aa), *Eurytoma salicis* (a); in April 1882:—*Nematus pendandreae* (a); in April and May:—*Limneria chrysosticta* (a); in May and June:—*Eurytoma salicis* (a), *Habrocytus capreae* (r).

A part of the species of the genus *Torymus* and of the genera *Syntomaspis* and *Megastigmus* are constant parasites in galls on oak, like *Ortopelma* and *Torymus bedeguaris* in rose-galls and *Limneria chrysosticta* in willow-galls. The genera *Synergus*, *Eurytoma* and *Decatoma* are all secondary parasites, that is to say, they attack in their turn the parasites on gall-formations and destroy them. The other *pteromalini* (*Eutelus*, *Platytermus*, *Habrocytus*, etc.) are probably also secondary parasites. In regard to *Aulax brandti*, on the other hand, which often occurs so numerously in bedeguars, it can hardly be considered as a parasite, since all its congeners form gall-like swellings on the branches of plants or live in swollen seed-capsules, but it may be considered to be an inquiline or the possible fellow-builder with *Rhodites rosae*. The *Pimpla* raised from willow galls of the year 1881 have probably all lived parasitically on the larger *Nematus viduatus*.