Notes on Fumea Haw. and Proutia Tutt. (Lep.)

By

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In his catalogue of the Scandinavian Macrolepidoptera (1885) Lampa, following Staudinger, counts three species to the genus *Fumea* Hb: *intermediella* Brd (*casta* Pall.), *crassiorella* Brd. with var. *norvegica* (Schöyen) Heyl. and *sepium* Speyer. Aurivillius (Nordens Fjärilar 1888—1891) says that, on account of the posterior tibiae, which have four spurs, the genus should be placed amongst the »Microlepidoptera». The last species was in 1899 set apart by Tutt in a special genus, *Bacotia*, but in »The revised Handbook» Meyrick 1927 placed *sepium* Spey. in the genus *Luffia* amongst the *Tineidae*. In »Svenska Fjärilar» (1941) Wahlgren, following Seitz, replaces *Fumea* and *Bacotia* in the family *Psychidae*.

During my examination of the wing-neuration I made a noteworthy discovery, that throws light upon the systematic placing of this group. By microscopic examination of a fore-wing I found on the base of the dorsal margin a little longitudinal area, densely set with aculei, formed as apically turned hooks (v. fig. VII). Another wing had a little fold upwards in this place, and the profile of the edge here showed a row of aculei, from which I made the conclusion that the aculei are placed also on the underside of the wing. On some wings also the costal base had a similar aculeate area, and I could prove the same thing in *Bacotia* and *Talaeporia*, while on the other hand the true Psychid *Sterrhopteryx* has no trace of aculei. According to the fact, that the aculei represent a primitive character, it is evident that Aurivillius was right, when he considered the Fumeas to be referred to the »Microlepidoptera». They must be phylogenetically separated from that group of the *Psychidae*, who have, like *Sterrhopteryx*, only two spurs on the posterior tibiae, and are to be placed in the *Fam. Tineidae*. Perhaps they should form a separate family.

Chapman has (Ent. Rec. 1900) described a number of new *Fumea* species, and he used the anterior tibial spur as a character for distinguishing the different species. He writes (op. cit. pag. 90): »I express the length of the spur more conveniently not by its own length, but by the percentage of the total length of the tibia that there is beyond the origin

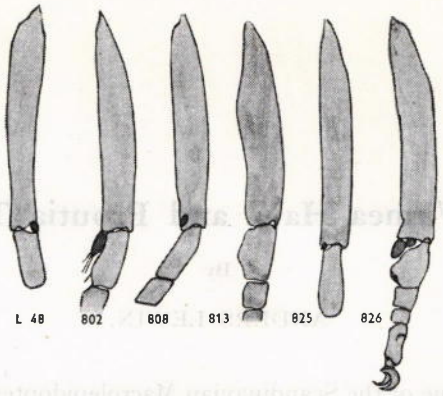

Fig. I. Posterior tibiae and partly tarsus of some female Fumeidae. (Epiphyses darker coloured.)

of the spur.» He found a tibial formula, that was fairly constant to each species. Tutt further divided the species in 4 genera, which together formed the Family

Fumeidae:	*Proutia*	with *betulina* Z.	as type
	Bruandia	» *reticulatella* Brd.	as type
	Masonia	» *crassiorella* Brd.	» »
	Fumea	» *casta* Pall.	» »

In Ent. Rec. 1923—24 and 1932 Burrows presented the result of a revision of the Tutt-Chapman-material, and here he reduced the species that Chapman had described, to local races or aberrations of *casta* resp. *crassiorella*. Burrows has published 3 figures of the genitalia of *casta*, but he was not able to distinguish this organ from that of *crassiorella*. Wehrli writes (Seitz, Suppl. II p. 223): »Der Kopulationsapparat beider ist nach Burrow völlig gleich.» — When I read this, it was clear to me that the revision must have been doubtful, and my own examinations have confirmed me in the conception that Chapman-Tutt were more reliable than Burrows-Wehrli. The results of the study of the Fam. *Fumeidae* that I here present, will show that one must let some of the Chapman-species again be accepted.

The males: Concerning to the anterior tibiae I will refer to the figures beneath. I have found that the spur or epiphysis (sec. Meyrick) really can give good fixed points by distinguishing the several species from each other. The epiphysis usually is superficially attached to the tibia, but in some forms it seems as if its proximale end is deeply immersed in the tibia. On 3 exx. I have found a peculiar chitinous *stylus* (fig. VI: 7), probably a rudimentary spur, that seems to be attached to the epiphysis, and this apparatus corresponds, as far as I can see, with a distinct type of the wing neuration. — — — From the figures, showing the wing

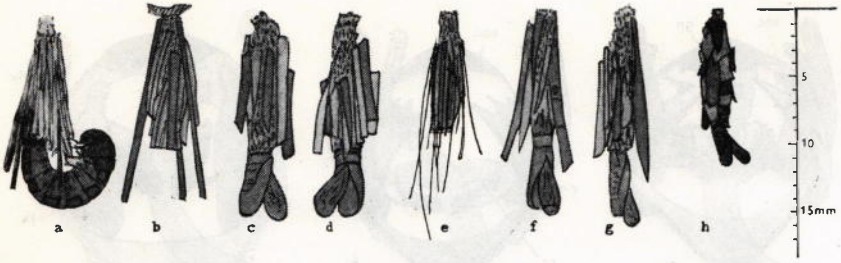

Fig. II. Some cases of Fumeidae. a. Fumea sp. female. b. F. casta. c and d. M. subflavella Mill. (case seen from 2 aspects). e. Proutia roboricolella Brd. f. P. norvegica Heyl. (coll. Nordström). g. The same e. l. 2/6 48 Lerum. h. P. betulina Z. (coll. Lund). c—h are male cases, b belongs to the fem. 807.

neuration, it appears that (7 and) 9 (sec. Meyrick) generally (excl. *norvegica*) are shortly stalked. In 3 species the median vein runs out directly in 5. By the microscopic study of the wings I also have observed the varying shape of the wing scales, who have proved to be in some way characteristic of the different species. As most easy to localize I have chosen the cilial scales. I have made drawings of the typical scales of the outmost row of the fringes, and my figures give support for my opinion, that Chapmans species really are good species.

Naturally the wing scales show some variations. One can see this clearly on the specimens of *P. norvegica*, which I have on hand. The cilial scales are usually very narrow lanceolate, at tornus nearly hairlike. They have small sideteeth, somewhat obtuse. But one specimen from Djurö, Uppland, has as far as I can see no sideteeth on the cilial scales. Noteworthy is that this specimen has a faint brownish colour on the forewings. The genitalia show some differences, and probably the Djurö-specimen represents a special local race. — The same cilial scales as on *P. norvegica* are found om *P. roboricolella*. The other three Proutia-species have scales, which differ from those on *P. norvegica* by sharp points and sideteeth. If contrary to this one compares the cilial scales on *P. norvegica* with those on *M. crassiorella* — the species have the same size — it is easy to distinguish these species even if one has no chance of controlling the antennae and other things.

The male genitale armatur shows a great variation. By using names for the different parts of the genitalia I have chiefly followed Pierce's terminology. The tegumen, who is rather uniform in all species of *Fumeidae*, wears dorsally two lappets, representing the uncus. Just below this there is in the *Proutiinae* a dual hanging organ, the gnathos. By *P. betulina, eppingella* and *salicolella* there is also on either side of the uncus a pair of socii, but *P. norvegica* and *roboricolella* lack them. With regard to this fact I have selected these two species in a separate subgenus, that

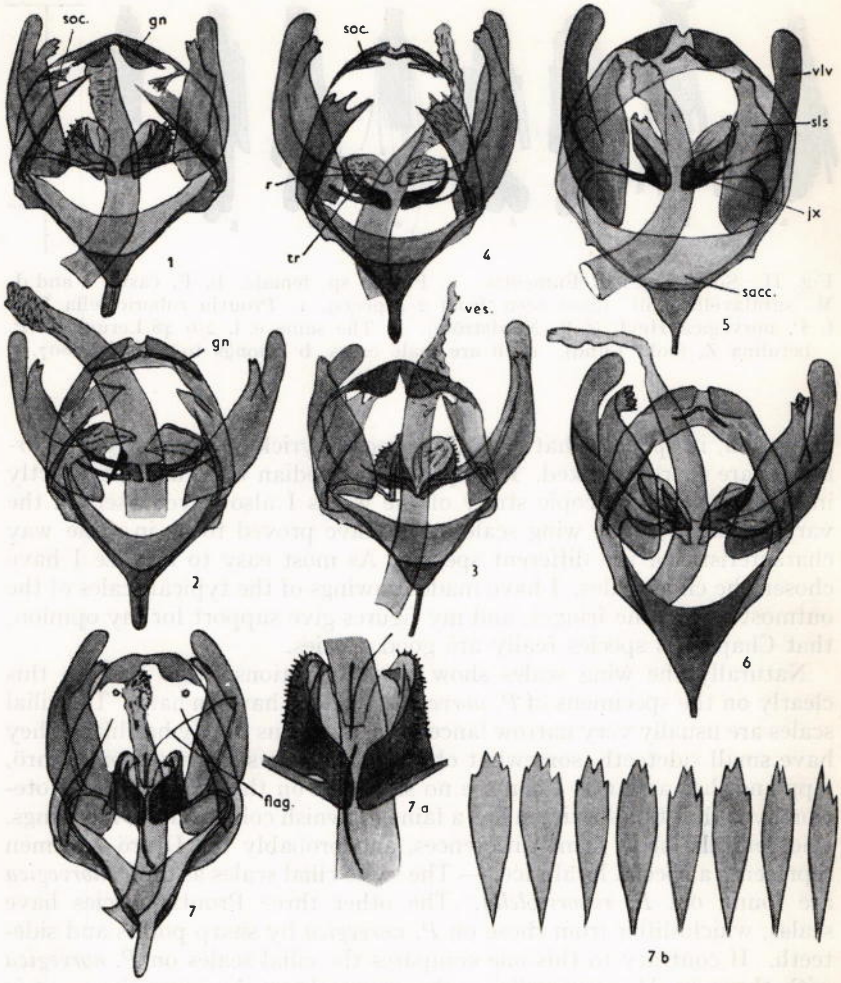

Fig. III. Genitalia of: 1. Proutia betulina Z. 2. The same, ex Denmark. 3. P. eppingella Tutt. 4. P. salicolella Brd. 5. P. roboricolella Brd. 6. P. norvegica (Schöy) Heyl. 7. Masonia subflavella Mill. 7 a. Anellus part of the same. 7 b. Cilial scales of the same. — gn = gnathos, soc = socii, sacc = saccus, sls = sacculus, jx = juxta, flag = flagellum, ves = vesica, vlv = valvula, tr = transtilla.

I name *Anaproutia* n. subgen. Ventral the tegumen runs out in two arms, basally connected and forming the triangular saccus, ending in a shaft, often characteristic of the different species.

On the articulation between the tegumen and the saccus the valva is attached. The ventral part of this, the sacculus — distally ending in a process — is fused together with the valvula. From the point of articulation there also rises a chitinous ribbon (fig. III r), which in *Proutia* s. str. is bordered with a thin, distally lobate membrane. In the middle of booth valvae the aedoeagus is surrounded by the anellus, which has various shapes in the different species. *Proutia* has a bipartite anellus, while M. *crassiorella* has a dorsally entire, some emarginate ring, other species having a dorsally almost cleft ring. The ventral part of the anellus, the juxta, has a caudallike appendix, forming a kind of connection to the medial part of the sacculus-valvula. The dorsal part of anellus is connected with the valvula by the transtilla (tr), whose lateral end furcates in a cranial branch, forming the basal margin of the jointed valvula and sacculus, and a caudal branch, attached to the dorsal side of the valvula and representing the costa. The conjunction of the transtilla to the anellus is rather similar in the *Fumeidae*, except in the group *Proutia* s. str. In these the transtilla seems to have a direct transition to the dorsomedial parts of the cleft anellus.

The aedoeagus represents a proximal curved, stout tube, whose distal part (the vesica) consists of a thin membrane, lying turned inwards within the chitinized lower part. When protruding (turned outwards) from the orifice of the latter, the vesica proves to be densely covered with a great number of very fine spines, but only in the *Fumeinae*. In *Proutiinae* the protruded vesica basally is furnished with transverse folds and wrinkles. Some species also have a strongly chitinized greater cornutus or a long slender, flagellarlike one, hardly chitinized. Such a cornutus I have not been able to find in *crassiorella*, and it seems me, as this difference states a reason for the division, that Tutt had made in *Masonia* Tutt and *Fumea* Haw. In one species there also is a cornutus lying free between the juxta and the aedoeagus (v. fig. III, 7, 7 a). I have seen a such one in several specimens, but in spite of greatest caution it has been lost in mounting the organ. Finally there is on one *Proutia* a kind of spine, attached ventrally on the base of aedoeagus. In prep. III, 2 it is visible, hardly chitinized and directed obliquely downwards. In *M. crassiorella* there is on the dorsal side of anellus a dual structure, that I hesitate to call the *labides*. The same structure can also be found in *P. salicolella* and *eppingella*, but here they are much longer. In *M. subflavella* (fig. III: 7) at last I have found a very long hairlike structure, that seems to have its origin behind the anellus and which I here call *flagellum*.

»Female: Bruand describes the female as araneiform, entirely apterous, short, bent in semicircle . . .» (Tutt op. cit. p. 308). The head is small,

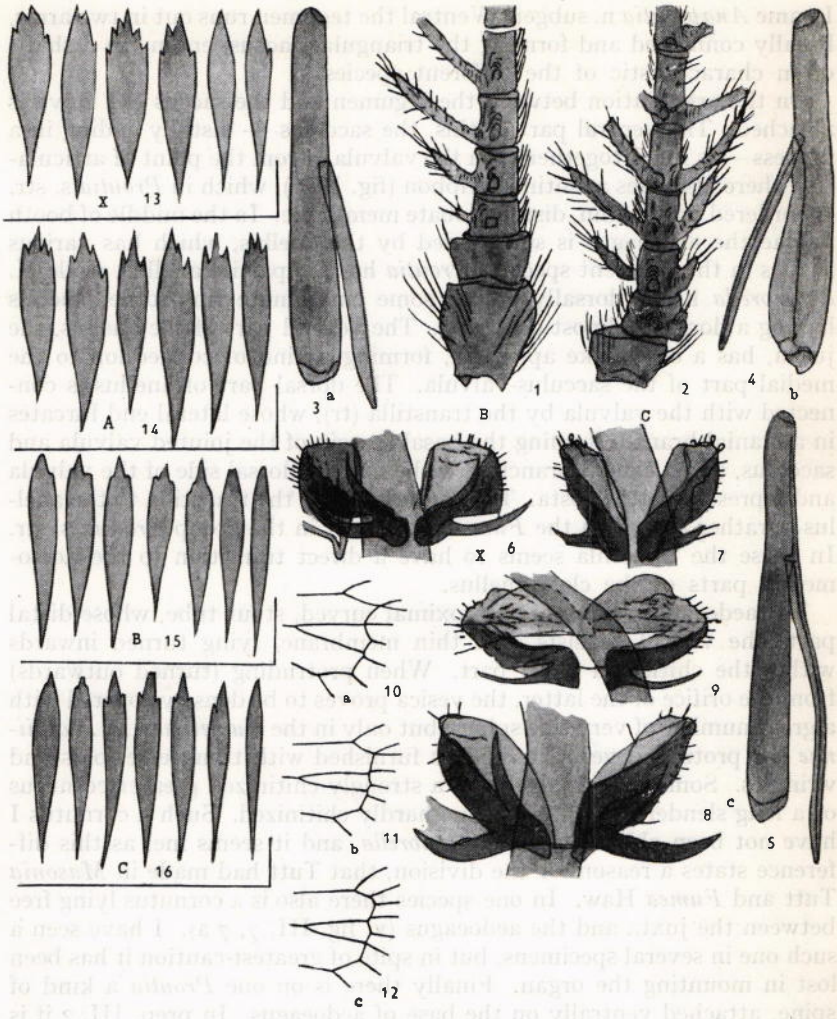

Fig. IV. Antennal base of: 1. Proutia roboricolella Brd. 2. P. norvegica Heyl. Anterior tibia of: 3. P. betulina. 4. P. roboricolella. 5. P. norvegica. Anellus of: 6. P. betulina. 7. P. roboricolella. 8. P. norvegica. 9. P. salicolella. Wing-neuration of: 10. P. salicolella. 11. P. roboricolella. 12. P. norvegica. Cilial scales: 13 P. betulina. 14. P. salicolella. 15. P. roboricolella. 16. P. norvegica.

downward bent, and only provided with one pair of facetted eyes and antennae. In place of the mouth is a little swelling, which carries some hairs. The antennae of the 11 females, which have been closely examined, show great variations both in length and look. The free thoracal segments have rather different length. The first segment forms a narrow circle back of the head. The second segment, which by Hofmann is taken as the first (»Das erste Segment hat ein breites Rückenschild . . .» op. cit. p. 33) is 3—4 times as long as the first, and the third segment is about half as long as the second. The colour of the thorax varies from blackish brown to greyish-yellow. Some species have the head and the two first thoracal segments wholly clothed with greyish-white hairs. Others are quite naked.

The abdomen is swollen by the mass of eggs, which even fills the thoracal segments up to the head. On the first 7 abdominal segments there is a dorsal broader and a ventral narrower brownish chitine plate The interspace between these plates has a greyish-yellow colour, which sometimes changes into a faint reddish or purple tint. The 8:th abdominal segment is very densely covered all round with long, very fine, wavy hairs (the anal tuft), like a girdle or skirt surrounding the base of the ovipositor, which consists of the 9:th—11:th abdominal segments (sec. Tutt 8:th—10:th). During the egg-laying the abdomen shrinkes and turns into a pitch-brown colour. One can also see, that it is evenly covered with short hairs. — After having laid the eggs in the empty exuvium, remaining in the case, the female, as is known, uses the anal tuft to cover the eggs — a perfect organization!

The legs have as a rule five tarsal joints. One of the examined females has four joints on the anterior legs. A noteworthy fact is, that in some species the posterior tibiae are distally provided with one or two small epiphyses. V. following chart!

Prep. females	Antennal joints	Anterior tarsus	Posterior tibia with	Thorax	Species
L 48 (coll. Lund)	14	5 joints	1 epiphyse		*P. betulina*
802 Vg Jonsered	13	5 »	1 »		
808 » Lerum	11[1]	5 »	1 »	keeled	*F. intermediella*
813 » »	13	5 »	0 »	not »	*F. casta*
815 » »	11[1]	5 »	1 »	— »	*F. intermediella*
820 » Styrsö	12[1]	5 »	0 »		*Masonia* sp.
821 » Brottkärr	13	5 »	1 »		
823 » »	14[2]	5 »	0 »		
824 » Jonsered	14	5 »	1 »		
825 » Brottkärr	13	5 »	1 »		
826 » Lerum		4 »	2 »		

[1] Last antennal joint ending in a sensory hair.
[2] The case covering also consisting of 2 scales from a birch-katkin.

The larval case has on the outside a ground-covering of small pieces, orally turned, which like fish-scales cover the whole area. The newly bred larvae also very soon get such a case-covering, and the first hours after hatching they sit on the outside of the mother-case, the twigs and straws of which they get the material for the small new-spun cases. — The cases of the full-grown larvae of all *Fumea* s. lat. (and *Anaproutia* n. subgen.) have also an outer covering of pieces of straws and tiny twigs, which always are longitudinally arranged. Already on the second or third day some cases of the newly hatched larvae have also got one or two longitudinal pieces. On most of the cases the oral end (1—2 mm) is quite free from outer covering, and the groundcovering forms on the opening a corona of small forward pointed teeth.

The outer covering is made in a certain way by each species and there is a possibility to distinguish at least some species by the look of the cases. The covering reaches backwards (at least on some species) not further than the anal end of the case, but on most species there are always one or more straws, that reach so far that the case seems to be much longer than it really is. The cases of *P. norvegica* (3 cases observed) have 1 or 2 straws rather longer than the others, and some pieces are get from Pinus-needles. In this species the (male) case is not wholly covered, and on some rather wide spaces the ground-covering is visible. Contrary to this, other species have the cases very thickly covered. So it is on the case of *M. affinis*, who probably lives on Calluna. Here the outer covering chiefly consists of pieces of twigs from this plantspecies, some pieces being longer than the case itself. Typically for 3 male cases of *M. subflavella* is that the pieces of straw lie irregularly, and no straw reaches the same length as the case. The larvae of *Proutia betulina* cover their cases with pieces of leaf and bark placed irregularly. — The cases of the males are generally more narrow and covered with more tiny straws, and pieces.

After having spun down the case (the oral end) for pupation the larva turns in the case, and the imago emerges from the anal end of the case.

Parthenogenese — Copulation.

Concerning to the *Fumeids* it has been supposed and sometimes mentioned in the literature — latest by Eliasson in Ent. Tidskrift 1945, pag. 154 — that these species could breed parthenogenetic like some species of *Solenobia*. I myself have during the past three years get larvae bred, but as I suspected that these came either from gathered cases, which already had been left by the female, or from such a case, where a bred female in the larval cage had been visited by an emerged male beyond my control, I decided, this summer (1948) to separate all females as soon as they had emerged and to observe ev. egg-laying. A couple of females

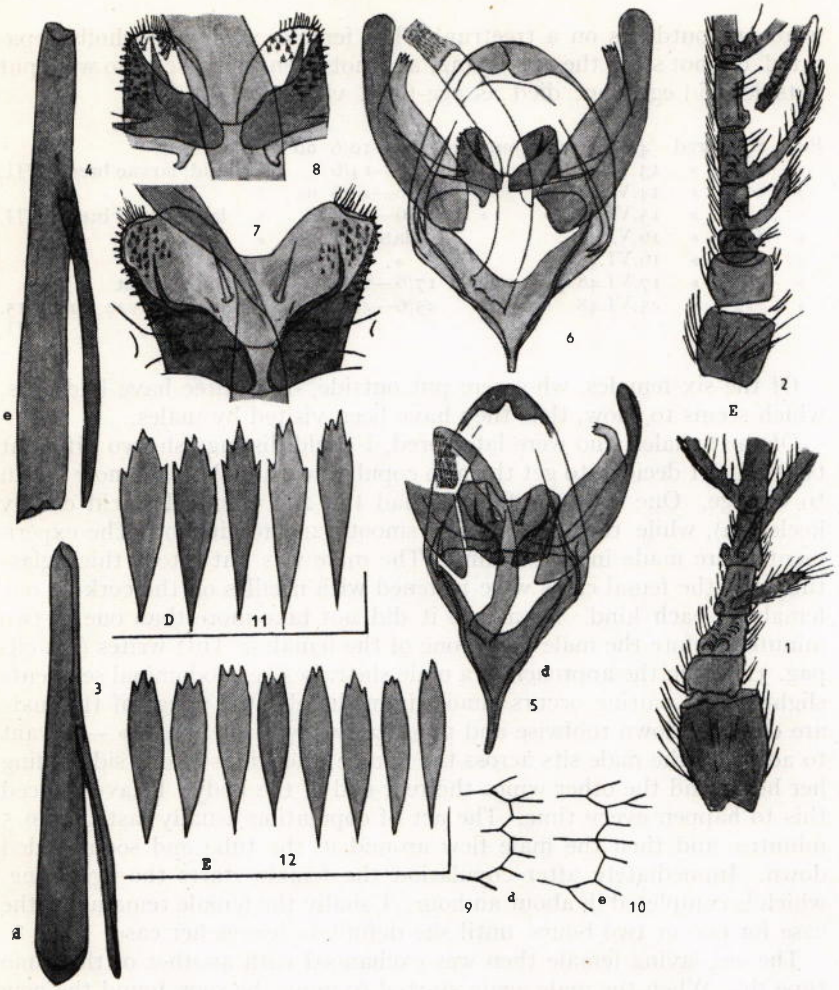

Fig. V. Antennal base of: 1. Masonia crassiorella Brd. 2. M. affinis Reutti.
Anterior tibia of: 3. » » » 4. » » »
Genitalia of: 5. » » » 6. » » »
Anellus part in: 7. » » » 8. » » »
Wing neuration in: 9. » » » 10. » » »
Cilial scales: 11. » » » 12. » » »

were put outdoors on a treetrunk. The females who were wholly separated, did not start the egg-laying, and not even all those, who were put outside, laid eggs but died as egg-filled virgines.

Fem.	801	bred	4.VI.48	put	outside	7/6—10/6	no	eggs
»	810	»	13.VI.48	»	»	13/6—14/6	»	laid; larvae bred 2.VII.
»	803	»	14.VI.48	»	»	17/6—20/6	no	»
»		»	15.VI.48	»	»	15/6—16/6	»	laid; larvae bred 7.VII.
»	811	»	16.VI.48			isolated	no	»
»	802	»	16.VI.48			»	»	»
»		»	17.VI.48	put	outside	17/6—18/6	»	» female lost
»	812	»	25.VI.48	»	»	25/6—26/6	»	laid; larvae bred 15. VII.

Of the six females, who were put outside, only three have laid eggs, which seems to show, that they have been visited by males.

Of the females who were later bred, I could distinguish two different types, and I decided to get them to copulate with males, who now began to emerge. One type of females had the 2nd thoracal shield clearly keeled (a), while the others had a smooth 2nd tergite (b). The experiments were made in this manner: The male was put into a thick glass tube and the femal cases were fastened with needles on the cork — one female of each kind. As a rule it did not take more than one or two minutes, before the male found one of the females. Tutt writes (op. cit. pag. 313): »On the approach of a male she raises her abdominal segments slighty, and pairing occurs almost immediately, the wings of the male are dropped down roofwise and practically cover the female;» — I want to add that the male sits across the female, the wings of one side hiding her head, and the other wings the rear end of the body. I have noticed this to happen every time. The act of copulation usually lasted 4 to 5 minutes, and then the male flew around in the tube and soon settled down. Immediately after copulation the female starts the egglaying, which is completed in about an hour. Usually the female remains on the case for one or two hours, until she definitely leaves her case.

The egg-laying female then was exchanged with another of the same type (b). When the male again started to move, he soon found the new female (b), while the female (a) in vain had to wait for the delivering act. The results of the experiments made is shown in the following chart. (x = copulation, — = none copulation)

Male	724	emerged	26.VI.48						
a. fem.	804	»	21.VI.48		keeled	2nd	tergite,	—	—
b. »	805	»	25.VI.48	not	»	»	»	× 5 minutes, eggs, larvae bred 15.VII.	
Male	724								
a. fem.	804							— no eggs	
b. »	806	emerged	25.VI.48	not	keeled	2nd	tergite,	× during night, larvae bred 15.VII.	

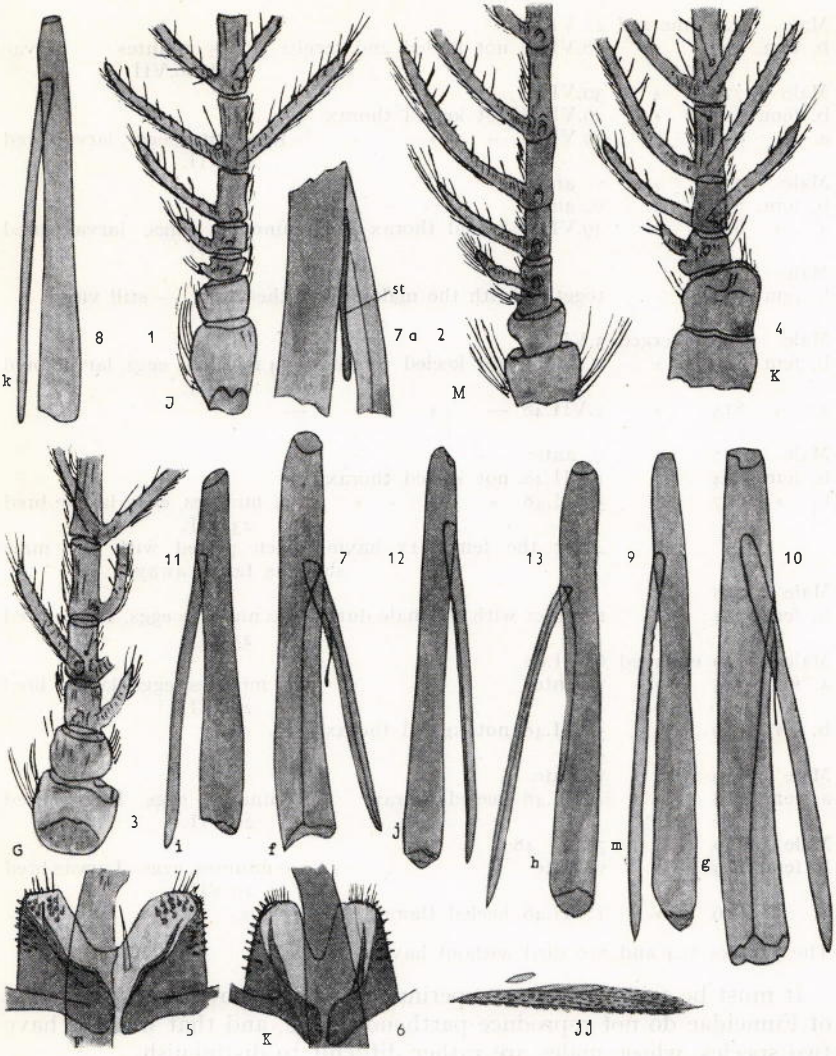

Fig. VI. Antennal base of: 1. F. casta. 2 and 3. F. intermediella. 4. F. germanica Chapm. Anellus part of: 5. Masonia sp. 6. F. germanica Chapm. Anterior tibia: 7. Masonia sp. 7 a detail magnified. 8 F. germanica Chapm. 9 and 10. F. intermediella. 11, 12 and 13. F. casta different types. 14. Dorsal fold of forewing, magnified (about 30 times). st = stylus.

Male 725 emerged 28.VI.48
b. fem. 807 » 28.VI.48 not keeled 2nd tergite, × 15 minutes, larvae bred 16.VII.
Male 727 » 30.VI.48
b. fem. 813 » 29.VI.48 not keeled thorax —
a. » 809 » 30.VI.48 — » » × 14 minutes, eggs, larvae bred 17.VII.
Male 727 » v. ante
b. fem. 813 » v. ante
a. » 808 » 29.VI.48 keeled thorax × 25 minutes, eggs, larvae bred 17.VII.
Male 727
b. fem. 813 together with the male during the night, — still virgo!

Male 728 emerged 3.VII.48
b. fem. 813 » v. ante not keeled thorax, × 4 minutes, eggs, larvae bred 24.VII.
a. » 815 » 1.VII.48 — » » —

Male 728 » v. ante
b. fem. 814 » 1.VII.48 not keeled thorax
b. » 817 » 3.VII.48 » » » , × 4 minutes, eggs, larvae bred 23.VII.
After the fem. 817 having been paired with the male she was taken away.
Male 728
b. fem. 814 together with the male during the night, × eggs, larvae bred 23.VII.
Male 729 emerged 6.VII.48
a. fem. 815 » v. ante × 6 minutes, eggs, larvae bred 26.VII.
b. » 819 » 5.VII.48 not keeled thorax, —

Male 729 » v. ante
a. fem. 818 » 4.VII.48 keeled thorax, × 4 minutes, eggs, larvae bred 26.VII.
Male 730 » 7.VII. 48
b. fem. 819 » v. ante × 6 minutes, eggs. Larvae bred 20.VII!
a. » 816 » 1.VII.48 keeled thorax, — no eggs.

The females 804 and 816 died without having laid eggs.

It must be said that these experiments clearly show that the females of Fumeidae do not reproduce parthenogenetic, and that we here have two species, whose males are rather difficult to distinguish.

It is evident that in experiments like these a certain risk of promiscuity is at hand, which does not happen so easy in nature. But it is just as evident that the refused females have been of a different kind of species than the resp. males.

It can be mentioned that most of the cases of these males and females were collected in a rather limited territory of an old pine wood, mixed with oak and birch, the cases usually spun down on pine stems near wet localities with Sphagnum.

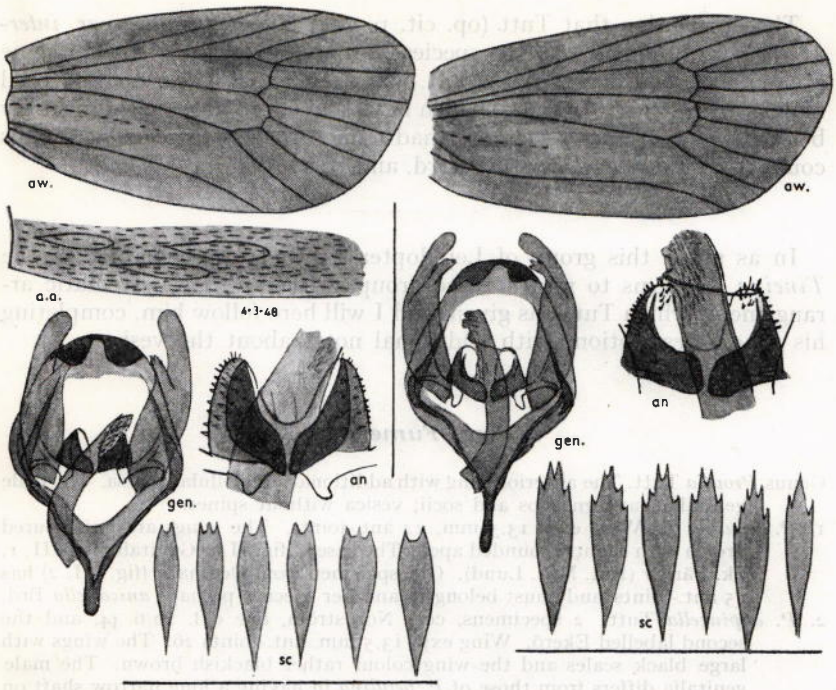

Fig. VII. Fumea casta Pall. Fumea intermediella Brd.
aw. Neuration of forewing. a.a. Aculeate area. gen. The genitalia. an. Anellus part, higher magnified. sc. Cilial scales.

The following differences between the two species I have found:

Male A. Wing exp. 12,5—14 mm, antennae (18) 19—20 joints. Forewing termen somewhat oblique and apex more acute. Colour of recent specimens black with tips of cilia whitish. Cilial scales with sharp points (v. fig. 3).

fem. a. 1st thoracal tergite also with a little keel, naked. 2nd with 1 deep-point in the middle on either side of the keel, and anal edge straight. No visible hairs. The colour of thorax pitch-brown. Antenne with 11 joints; posterior tibia with 1 epiphyse.

Male B. Wing exp. 12—13 mm, antennae 18—19 joints. The apex of fore-wings more rounded. No visible difference (from A) in wing-colour. Cilial scales with tips of equal length, usually 2—3, but some broader scales with 5—8 tips about equal.

fem. b. 1st tergite smooth, laterally thickly haired, 2nd with 1 or 2 small deep-points on either side of the middle line, and anal edge slightly emarginate. Some scattered hairs. The colour somewhat brighter, partly yellowish brown. Antennae with 13 joints; posterior tibia without epiphyse.

The description that Tutt (op. cit. p. 324) gives of *Fumea var. intermediella* Brd. agrees with the species A. above. He says i. a. that some greater specimens have only 18 ant.-joints, and I have also 2 earlier bred males with w.-exp. of 15 mm, which have 18-jointed antennae and surely belong to this species. At first I had named them *F. scotica.* — I thus count A. as *Fumea intermediella* Brd. and B. as *Fumea casta* Pall.

In as much this group of Lepidoptera is to be placed amongst the *Tineina*, it seems to me that the group shall have the systematic arrangement, which Tutt has given, and I will here follow him, completing his genera-descriptions with additional notes about the vesica.

Fam. *Fumeidae*.

Genus *Proutia* Tutt. The anterior wing with additional cell, cellula intrusa. The male genitalia have gnathos and socii; vesica without spines.

1. *P. betulina* Z. Wing exp. 13,5 mm, 22 ant.-joints. The wings are unicoloured brown with slightly rounded apex. The case v. fig. II h. Genitalia fig. III, 1, Sk. Färlöv (Ent. Mus. Lund). One specimen from Denmark (fig. III, 2) has 25 ant.-joints and must belong to another species, perhaps *anicanella* Brd.
2. *P. eppingella* Tutt. 2 specimens, coll. Nordström, one e. l. 20/6 44, and the second labelled Ekerö. Wing exp. 13,5 mm, ant.-joints 26. The wings with large black scales and the wing colour rather blackish brown. The male genitalia differs from those of *P. betulina* in having a long narrow shaft on saccus. Fig. III, 3.
3. *P. salicolella* Bruand. Wing exp. 14,5 mm, ant.-joints 21. The fore-wings (neuration fig. IV, 10) have the termen somewhat oblique and the apex is more pointed than in *P. betulina.* The colour somewhat darker brown, unicolorous. — 1 specimen captured in Öl. Vickleby 10/7 42. 1 ex. Upl. Djurö (coll. Nordström).

Subgen. *Anaproutia n. subgen.* The wings with cellula intrusa. The male genitalia have gnathos but not socii. Larval case with longitudinally placed pieces of straws. Type: *norvegica* (Schöy) Heyl.

4. *P.* (*Anaproutia*) *norvegica* (Schöy) Heyl. The species »was first made known by Schöyen, he evidently used a name that had been previously given (in MS) by Heylaerts» (Tutt op. cit. p. 305). After the original description the antennae are 20-articulatis, but all the specimens I have seen, have 23—24 ant.-joints. The wing colour is light grey, newly emerged darker grey, not brownish. Wing exp. 17—18 mm. — 2 specimens captured: Vg. Landvetter 26/6 32 and Öxnered 4/7 32. 1 ex. Lerum e. l. 2/6 48. 1 ex. Jonsered e. p. 7/6 48. One specimen (coll. Nordström) from Djurö, Upl. has a faint brownish tint on fore-wings. V. figg. III, 6, IV, 2, 5, 8, 16 and 12 (wing-neuration).
5. *P.* (*Anapr.*) *roboricolella* Brd. 1 specimen bred 5/7 46. Vg Lerum. At first I intended to describe this as a new sp., but after having read what Tutt writes about Speyer and his opinion (op. cit. p. 281), I was sure that my specimen must belong to *roboricolella* Brd. Unfortionally the antennae are broken, but they have not scaled pectination. Exp. 13 mm. — »somewhat smaller than *nitidella* . . ., a little shorter in the fore-wings, which are rather more rounded at the apex; the shape of the wing differs greatly from that of *betulina.*» (op. cit. p. 281). — The wing colour is light grey, without brown

(neuration fig. IV, 11). The genitalia (fig. III, 5, IV, 7) have the anellus lobes distally furnished w. 2 rhopaliform growths. — I would have named the species *rhopalella* m. — Wing neuration f. IV, 11. Larval case f. 2 e.

Genus *Masonia* Tutt. Ant. joints 20—24, with scaled pectination. No cellula intrusa. Vesica with fine spines.

1. *M. crassiorella* Brd. 1 specimen captured Vg Mölndal 19/6 31. Wing exp. 16.5 mm. 23 ant.-joints. Puzzlingly like *P. norvegica*, but with mousebrown coloured fore-wings. Genitalia (fig. V, 5, 7) shows a very large anellus, taller than that of *M. affinis*. 1st antennal joint very great.
2. *M. subflavella* Mill. — 4 specimens, coll. Nordström, labelled Ekerö, have all yellowish-grey fore-wings and agree with the description, related by Tutt (op. cit. p. 315). Exp. 15—16 mm. Genitalia resembles those of *M. crassiorella*, anellus of about the same size, but the *flagellum* is a specific structure, and the wing neuration also differing, like that of *M. affinis* Reutti. 22 ant. joints.
3. *M. affinis* Reutti. — »Larger, and with more pointed apex to forewings (than *F. intermediella*), grey in colour, not glossy; fringes shiny, of the colour of the fore-wings.» This orig. description related by Tutt (p. 310) agrees with 2 specimens which I have bred, from Vg Göteborg, Utbynäs 7/7 46 and 26/7 48. Genitalia (fig. V, 6, 8) shows a relatively short saccus. Probably Calluna-feeding, as above mentioned.

Masonia sp. — 2 specimens from Vg Styrsö, bred 29/6 46, exp. 14 mm, 20 ant. joints, and 3/7 46, exp. 13 mm, 23 ant. joints, differ from the preceeding species in having faint reddish-brown coloured fore-wings. Genitalia fig. VI, 5, tibia f. VI, 7, 7 a. — The female (820) also resembles that of *M. affinis* (825) in having the thoracal tergites wholly clothed with (scattered) whitish-grey hairs. The head is yellowish with 2 dark brown frontal spots between the antennae, which like the legs also differ from those of *M. affinis* Reutti.

Genus *Fumea* Haw. — Vesica with fine spines and also with at least one greater cornutus.

1. *F. casta* Pall. — Besides the above mentioned form there must, owing to the various shape of the tibiae (fig. VI, 11, 12, 13), be some other forms, which are not dealt with here. Vesica with a short cornutus, strongly chitinized.
2. *F. intermediella* Brd. — Here I will add that the vesica has a long slender, hardly chitinized cornutus (fig. 7), and that the saccus has a long narrow shaft. Habitat: Vg Lerum, Upl. Djurö.
3. *F. germanica* Chapm. — 1 specimen captured Vg. Öxnered 8/7 32, differs from other specimens in having the 2nd joint of antennae bulbed and much greater than the 1st. The anterior tibia has a very long epiphyse (fig. VI, 8) and thus I count this specimen as belonging to a separate species (fig. VI, 4, 6).

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