NOTES ON ACARI

Eleventh Series [1])

(Classification, Parasitidae, Ixodidae, Thrombidiidae, Labidostomidae, Acaridae)

BY

Dr. A. C. OUDEMANS.

(With Plates 11—13.)

---

1. Remarks on the relative ancienty and mutual relation of the Families of Acari.

Though several classifications have been proposed by several authors, in none of them the author has attached importance to the probable relative ancienty of the groups. In most instances one single character was enough to divide the Acari — or a group of them — in two smaller groups, e. g. the being provided with

---

1) Series I app. 15, I, 1897 in Tijdschr. v. Entom., v. 39.
„ II „ 5, X, 1900 „ „ „ „ „ 43.
„ III „ 30, XI, 1901 „ „ Ned. Dierk. Ver. ser. 2, v. 7.
„ IV „ 18, VII, 1902 „ „ „ „ „ „ 2, v. 7.
„ V „ 14, V, 1903 „ „ v. Entom., v. 45.
„ VI „ 28, VII, 1903 „ „ „ „ „ 46.
„ VII „ 31, X, 1902 „ „ Ned. Dierk. Ver. ser. 2, v. 8.
„ VIII „ „ „ „ „ 2, v. 8.
„ IX „ Abh. Nat. Ver. Bremen. (?)
„ X „ Mém. Soc. Zool. France.

The Series are independant from one another.

tracheae or not, without, however, weighing this character as to the relative ancienty of the two smaller groups.

My considerations about the **Classification of the Acari** have already been laid down in the *Tijdschrift voor Entomologie*, vol. 45, Verslagen, p. 55—64. The following is a mere translation of these pages.

In classifying we have to direct our attention on several facts. Acari with tracheae are certainly older than those without repiration-organs. Acari with a heart are older than those without circulatory organs. Free living Acari with quick motions and predatory qualities are older than free living slow vegetarians; they are also older than Acari which live parasitic on animals; and free living vegetarians are older than Acari which live parasitic on plants. Acari with chelate mandibles are older than those with claw-shaped or even stylet-like mandibles. And so on. Further we must pay attention to the relation of the smaller groups and unite them to higher groups.

Undoubtedly the *Parasitidae* (Gamasidae), *Ixodidae* and *Spelaeorhynchidae* are related. They form the group of *Mesostigmata;* their stigmata are situated behind the 4th pair of legs, or they are moved a little more forward, but they remain always behind the 2d pair of legs; a few *Parasitidae* and *Ixodidae* have a heart; in one species of *Parasitidae* (*Rhodacarus*) and in the *Spelaeorhynchidae* the vulva lies behind the 4th pair of legs, like in the spiders. According to these primitive characters I consider the *Mesostigmata* as a primitive group.

Undoubtedly the *Thrombidiidae*, *Hydrarachnidae*, *Tarsonemidae* and *Halacaridae* are related.

Their two stigmata are situated on the dorsal side of the middle of the capitulum. (In the *Tarsonemidae* the males have no respiratory organs). They form together the group of *Prostigmata.* I consider the *Prostigmata* younger than the *Mesostigmata*, because they have no heart; because the pair of stigmata has moved far forward, even has passed the first pair of legs, and even has got a dorsal situation; because only a few membres of this group

are still provided with chelate mandibles. Yet a few primitive characters have persisted, e. g. the situatien of the genital openings behind the 4th pair of legs; an indication of segmentation in a few members; etc.

BERLESE has proposed a third group, that of the *Crypstostigmata*. This group must fall. The three families of *Oribatidae*, *Nicoletiellidae* and *Acaridae*, as to me, are not to be united.

Their mutual relation and that with other already mentioned families is far from being settled; that of *Oribatidae* with *Acaridae* at least problematic. The *Oribatidae* oftenest have tracheae, and even 4 pair of them, with 4 pair of stigmata, which, however, are invisible, being situated in the thin connective membrane between the body and the first free joint of the legs. But these tracheae are extremely thin tubes, without any indication of a spiral chitinous thread. Probably they have originated undependently from the primitive tracheal system of the *Arachnoidea*, as a necessary consequence of the enormous chitinous cuirass of the *Oribatidae*. (It is obvious that weak Oribatidae miss the tracheae, and these I consider as the oldest forms; see below.). The *Nicoletiellidae* (?) and *Acaridae* are destitute of tracheae and stigmata; therefore one should be inclined to place them in KRAMER'S group of *Atracheata*, or in BERLESE'S *Astigmata*. But I positively reject these groups, because they are no natural ones; because they do not contain two families, which are related. The absence of stigmata or tracheae does not prove any relation; it is a result of convergency; the *Halacaridae*, *Demodicidae*, *Eriophyidae*, a few *Hydrarachnidae*, the ♂ of the *Tarsonemidae* and a few *Oribatidae* too miss the tracheae!

BERLESE'S *Astigmata* contains the *Demodicidae* and *Eriophyidae*. Now *Demodicidae* are parasites in the glandulae sebaceae of mammals, and therefore probably descended from *Sarcoptidae*; whilst the 4-legged *Eriophyidae* inhabit galls, or are free living creatures on the under-side of leaves, so that they probably have plant-inhabiting Acari (e. g. *Tetronychus* e tutti quanti) as progenitores. Summa summarum I admit the following classification:

Acari.
- I. Mesostigmata.
  - 1. Parasitidae.
  - 2. Ixodidae.
  - 3. Spelaeorhynchidae.
- II. Prostigmata.
  - 4. Thrombidiidae.
  - 5. Tarsonemidae.
  - 6. Hydrarachnidae.
  - 7. Halacaridae.
- III. . . . . 8. Nicoletiellidae
- IV. . . . . 9. Oribatidae.
- V. . . . . 10. Acaridae.
- VI. . . . . 11. Demodicidae.
- VII. . . . . 12. Eriophyidae.

I consider superfluous the giving names to the groups III—VII. This is only necessary as soon as two families are united.

Classification of the Parasitidae. Relying upon the facts, which led me in classifying the Acari, I projected a table of the subfamilies of the *Parasitidae* in the *Tijdschrift voor Entomologie*, v. 45, p. 50, which unites possibly the related subfamilies, and puts foremost the possibly most ancient snbfamilies, whilst the younger ones follow. I project here a new table, which contains also the exotic subfamilies. The table is at the same time a «key».

1. ♂ genital opening before the sternal shield 2
   ♂ genital opening in the sternal shield 7
2. ♀ genital shield single. . . . 3
   ♀ genital shield double, a left and a right one. 6
3. ♂ 2*d* leg unequal to that of ♀. I. *Parasitinae.*
   ♂ 2*d* leg equal to that of ♀ . 4
4. The adults live free and are well chitinized . . . . . II. *Laelaptinae.*
   The adults are parasites of Vertebrates and are less chitinized, even often soft 5

5.	With mentum	III. *Dermanyssinae.*
	Without mentum	IV. *Spinturnicinae.*
6.	Only one subfamily	V. *Caelenopsinae.*
7.	♂ genital aperture close to the ant.-edge of the sternal shield	VI. *Rhodocarinae.*
	♂ genital aperture between coxae 3 and 4	8
8.	♀ genital opening behind the sternal shield.	9
	♀ genital opening in the sternal shield	12
9.	♂ and ♀ chelae without appendage	10
	♂ and ♀ chelae with appendage	11
10.	♀ sternal shield single . . .	VII. *Epicriinae.*
	♀ sternal shield double, a left and a right one.	VIII. *Heterozerconinae.*
11.	Only one family	IX. *Antennophorinae.*
12.	Stigma above coxa 3; palps distally thickened	X. *Holothyrinae.*
	Stigma between coxa 3 and 2; palps usual	XI. *Uropodinae.*

Classification of the Ixodidae. I cannot agree with that given by Mr. G. NEUMANN. (Mém. Soc. Zool. Fr. 1901, p 323), in so far as this author does not seem to rely upon the probable relative ancienty of the subfamilies As to me, the *Argasinae* must be called first, as they are the less modified descendants from their probable progenitors. Their palps are usual, cylindric. Then follow the *Ixodinae* with sheathshaped palps (except the ♂ of *Eschatocephalus*). The tribus of the *Ixodinae* are called *Ixodae* and *Rhipicephalae*. The former are apparently older, including *Eschatocephalus*, the ♂ of which have usual palps; whilst the latter with their marvellous difformed palps are of younger date.

Classification of the Spelaeorhynchidae. Contains one species.

Classification of the Thrombidiidae. The *Coeculinae*, *Eupodinae* and *Bdellinae* are in danger to be separated from the remaining *Thrombidiidae*. I will say here some words in favour of their being reunited in the named family.

Coeculinae are tolerably hard, well chitinized creatures, provided with a number of dorsal shields; further their 4 fore-legs are armed with enormous thorns directed inward (medianward). A prey thus is perforated. These characters were important enough to a few authors to separate the *Coeculinae* from the *Thrombidiidae* and to bring them closer to the *Opilionidae*. — It is true that these formidable weapens are found too in some *Opilionidae*, and that *Opilionidae* are well chitinized, so that the *Coeculinae* bear a certain resemblance to certain *Opilionidae;* we nevertheless consider these facts only as mere convergencies, results of the life amoung stones in mountains. Further the same thorns on the fore-legs we find in *Coeculosoma*, a genus of the thrombidiid *Erythraeinae*; one or more dorsal shields are found repeatedly in *Thrombidiidae*, especially in larves, which proves that the presence of shields is a primitive one. The whole organisation of the *Coeculus* is typical *Thrombidiidae*-like. To remove *Coeculus* from the *Thrombidiidae* should be the result of shortsithedness.

So too a few authors will separate the *Eupodinae* and *Bdellinae* from the *Thrombidiidae* simply because the palps of these animals are not so configurated as those of the remaining *Thrombidiidae*; their 5th free joint, viz., is not hung on the ventral side of the 4th joint, but it is implanted on the distal end of it — indeed a primitive arrangement — or there are only 4 joints. Even the 4th joint may be absent. But these facts are also found in members of other families or subfamilies, e. g. in parasitic forms. If the shape of the palp should be a reason to remove these subfamilies from the other, in how many families we should be obliged to break up the *Hydrarachnidae* with their at least 7 shapes of palps? I present here a table of the subfamilies, which may be at the same time a «key».

1.	Body hard, brown, with many, well chitinized, black dorsal shields .	I *Coeculinae.*
	Body weak, with very weak shields, or without such.	2
2.	Larves free living, resembling the adults	3
	Larves parasitic, very anomalous .	10
3.	♂ with penis	4
	♂ without penis	7
4.	Mandibles external	5
	Mandibles internal	6
5.	Mandibles uncinate	II *Anystinae.*
	Mandibles stylate	III *Rhaphignathinae.*
6.	Mandibles chelate.	IV *Cryptognathinae.*
	Mandibles stylate	V *Cheletinae.*
7.	Mandibles chelate.	8
	Mandibles otherwise	9
8.	Mandibles short, stout, with large chelae	VI *Poecilophysinae.*
	Mandibles short, with small chelae.	VII *Pachygnathinae.*
	Mandibles long, or very long, with minute chelae; palps distally unarmed	VIII *Bdellinae.*
9.	Mandibles short, with one falciform and one membranous finger . .	XI *Eupodinae.*
	Mandibles long, uncinate; palps distally with claw	X *Cunaxinae.*
10.	Mandibles external, uncinate . .	XI *Thrombidiinae.*
	Mandibles internal, stylate.. . .	XII *Erythraeinae.*

Classification of Tarsonemidae. This family contains only a few genera, which are not united in subfamilies.

Classification of Hydrarachnidae. In the most recent systematic work, viz. that of Dr. R. PIERSIG, *Das Tierreich*, 13e Lief., this family is not broken up or divided in subfamilies, though, as to me, the 55 fresh-water-genera may be arranged in well limited natural

groups. Not long ago PIERSIG (*Zoologica*, 1898) admitted a few subfamilies. Why then has he abandoned them in a rigorously systematic standardwork? Why has he separated the two salt-water-genera from the fresh-water-ones, and has he not placed them in the neighbourhood of the related fresh-water-genera?

The apparently oldest *Hydrarachnidae* are the not swimming *Limnocharinae* (PIERSIG'S genus 1), which moreover are provided with the crista of the thrombidiid progenitors, and which therefore are considered as *Thrombidiidae* by TROUESSART, unjustly in my opinion.

Then follow the related *Eulainae* (PIERSIG'S genus 2), in which the crista is shortened so, that it has less length than breath.

Then follow the remaining *Hydrarachnidae*, in which the crista has disappeared without leaving any trace. Of this natural group PIERSIG'S genera 4—16 are provided with palps, of which the 4th free joint dorsally and distally is lengthened claw-like, so that the 5th joint hangs on the ventral side of the 4th joint; indeed a primitive character, typical that of *Thrombidiidae*, their ancestors. — N°. 6—16 of these genera have mandibles of two joints, a primitiv character; of these two joints the second one is claw-like too. N°. 6—16 of PIERSIG'S genera are called the *Hydryphantinae*.

They are followed in my opinion by PIERSIG'S genera 4 and 5, which possess mandibles of one joint, and this is stylet-shaped. Both these characters are secundary. This little group is called *Hydrarachninae*.

Now we are proceeded to the genera 3 and 17—55 of PIERSIG. They have palps, of which the 4th joint is not lengthened dorsally and distally claw-like, which consequently have lost this thrombidiid character. As to the genera 17—55, they form a natural group: *Hygrobatinae*.

As to genus 3, *Piersigia*, PIERSIG himself places it next to the *Eulainae*. In my opinion unjusfly. It has abnormal palps, somewhat resembling those of *Limnocharinae*, a consequence of convergency (cf. *Ixodinae*). I should like to erect for this genus a subfamily apart: *Piersigiinae*, at the end of the *Hydrarachnidae*.

Genera 17—55, the *Hygrobatinae*, may be divided in three tribus: *Hygrobatae* (sensu novo), with the genera 32—55; *Frontipodae* with the genera 19—31; and *Arrhenurae* with the genera 17 and 18.

Here follows a table, at the same time a «key» of the subfamilies and tribes of the *Hydrarachnidae*.

1.	Eyes near together, joined by a crista	2	
	Eyes far remote, no crista more.	3	
2.	Crista long, longitudinal . . .	I	*Limnocharinae.*
	Crista short, transversal . . .	II	*Eulainae.*
3.	Penultimate joint of palps dorsally and distally lengthened tooth-, poniard-, or hook-like (claw-like)	4	
	Penultimate joint of palps not lengthened dorsally	5	
4.	Mandibles of 2 joints; last joint claw-like	III	*Hydryphantinae.*
	Mandibles of 1 joint, stylet-like.	IV	*Hydrarachninae.*
5.	Last joint of palps free . . .	V	*Hygrobatinae.*
	Last joint of palps partly sunk in a distal pit of penultimate joint.	VI	*Piersigiinae.*

Groups of subfamily V *Hygrobatinae*:

1.	Palps usual	2	
	Fifth joint ending in a claw, which forms pincers with the distally lenthened flexible side of the 4th joint	3	
2.	Coxae of ♀ in 4 groups; in ♂ often close together, rarely joined medianly	A	*Hygrobatae.*
	Coxae of ♂ and ♀ forming one plate.	B	*Frontipodae.*
3.	Only one tribe	C	*Arrhenurae.*

Classification of Halacaridae. The genera are not united in subfamilies.

Classification of Nicoletiellidae. Ditto.

Classification of Oribatidae. There are two well separated immediately recognizable natural groups. The first larger group contains animals, which are not capable to roll up themselves; a primitive character The animals of the second smaller group may roll up themselves, as their cephalothorax is movably articulated to the abdomen, and is capable of being folded downward, so that its ventral surface then rests against the ventral surface of the abdomen; a secundary character. Therefore this smaller, secundary group, the VII *Phthiracarinae*, undoubtedly is of younger date, and must be placed at the end of the *Oribatidae*.

The primitive larger group of *Oribatidae*, which are incapable of rolling up themselves, is again divided in two well separated natural groups; the membres of the smaller, second group are provided with movable leg-protecting wings; a secundary character; therefore they are of younger date and must be placed behind the remaining *Oribatidae*, and before the above mentioned *Phthiracarinae*. Their name is VI *Notaspidinae*.

The primitive, larger group is again broken up in two other natural groups; the smaller of these groups contains membres with one-jointed distally saw-like mandibles, thus these V *Serrariinae* bear secundary characters, therefore they are of younger date than the remaining with chelate mandibles, and consequently they must be placed at the end, but before the above mentioned *Notaspidinae*.

The remaining are divided in two groups, of which the younger one, the IV *Zetorchestinae*, have jumping 4th pair of legs.

Of the remaining the younger ones, the III *Eremaeinae* are provided with chitinous blades, or bars, or ridges on the cephalothorax, known as lamellae.

Of the finally remaining *Oribatidae* the I *Camisiinae* are undoubtedly the oldest more primitive animals, the II *Oribatinae* of younger date.

Therefore the following table:

1.	The animals are incapable of rolling up themselves.	2
	They may roll up themselves . .	11

2.	Abdomen without wings	3
	Abdomen with wings	10
3.	Mandibles chelate	4
	Mandibles one-jointed distally serrate	9
4.	All the legs crawling organs, near together	5
	4th pair of legs far backwards, jumping-organs	8
5.	Ceph. without lamellae	6
	Ceph. with lamellae	7
6.	Legs short and thick	I *Camisiinae.*
	Legs long and slender	II *Oribatinae.*
7.	One subfamily	III *Eremaeinae.*
8.	One subfamily	IV *Zetorchestinae.*
9.	One subfamily	V *Serrariinae.*
10.	One subfamily	VI *Notaspidinae.*
11.	One subfamily	VII *Phthiracarinae.*

Classification of Acaridae (*Sarcoptidae*). The *Tyroglyphinae* are the older, as they are free living; the remaining are parasites, thus of younger date.

Of these parasites those which live free *on* the body of their hosts are older than the others which have burrowed themselves *in* the body of their hosts and therefore are still more degenerated.

Of the parasites living *on* their hosts the *Canestriinae*, which parasite on Insects, are older than the *Listrophorinae*, who parasite on Mammals, and these older than the *Analgesinae*, who live on Birds.

And finally of those who mine the tissues of their hosts, the *Sarcoptinae* with transversal vulva and chelate mandibles are more primitive than the *Cytoditinae*.

Therefore the following table:

1.	Free living; skin without parallel fine ridges	I *Tyroglyphinae.*
	Parasites; skin finely striated parallelly	2

2.	Living *on* their hosts.	3
	Mining the tissues of the hosts. .	5
3.	On Insects; genital suckers of ♂ and ♀ well developped	II *Canestriinae.*
	On Mammals and Birds, genital suckers absent, or rudimentary in ♂.	4
4.	On the hairs of Mammals . . .	III *Listrophorinae.*
	On the feathers of Birds. . . .	IV *Analgesinae.*
5.	Vulva transversal; mandibles chelate.	V *Acarinae.*
	Vulva longitudinal; mandibles and maxillae transformed in sucking tube	VI *Cytodytinae.*

Classification of Demodicidae. One genus.

Classification of Eriophyidae, proposed by NALEPA is correct, based on the probable relative ancienty of the subfamilies. The *Eriophyidae* have got their ringed, cylindrical body and the absence of hind-legs by their manner of living in galls. It is difficult to comprehend why free-living Acari should have such a shape; therefore we must admit that the at present free living *Phyllocoptinae* are descended from the gall-inhabiting *Eriophyinae;* therefore their body has again bocome more broad and flat.

1.	Number of dorsal and ventral half-rings about equal; they live oftenest in galls.	I *Eriophyinae.*
	Number of dorsal half-rings much smaller than that of ventral half-rings thy oftenest live free.	II *Phyllocoptinae.*

2. Acari of France.

Dr. F. HEIM, of Paris, has sent me 1902, Mrch. 1, the following Acari for determination.

Dermacentor reticulatus (Fabr.) on *Homo sapiens* L., in the Monts d'Estinel (Var). 4 ♂, 4 ♀.

Glycyphagus destructor (Schrank). They were abundant in a house at Angers (Maine et Loire).

3. Acari of Brasil.

From Mr. S. A. POPPE at Bremen I received some Acari to determinate them. They were caught on a *Musca domestica* at San Paulo, Brazil, by Prof. H. VON JHERING. The species proved to be nothing but our wel known *Macrocheles badius* (C. L. Koch), which seems to be a cosmopolitan.

4. Parasitus coleoptratorum (L.) ♂

I have only to add the following observations about the so-called *deutonympha masculina.*

The *peritrema* reaches the anterior margin of the body.

The *anus* is almost terminal, so that the postanal hair and the *enormus cribrum* are *dorsal*!

The *horns of the hypostoma* in my specimen are short, at least twice shorter and wider than BERLESE draws them, and *bifid,* the two parts lying in a sagittal plan, so that with a ventral view the ventral part almost hides the dorsal one.

My specimen measures about 900 μ in length.

5. Parasitus crassipes (L.)

(With Plate 11, fig. 1—4).

As the *protonympha* and the *deutonympha* are not yet accurately described and figured I will try to do this here.

Protonympha (fig. 1). — *Length* varying from 300—620 μ. — *Colour* pale. — *Shape* like that of *Parasitus coleoptratorum* (L.) — *Texture.* The shields are largely-scaly, but the scales are scarcely visible; the unprotected skin finely wrinkled. — *Dorsal side* (fig. 1) protected by two shields, the anterior being twice longer than the posterior one. The anterior shield has only about 12 pair of hairs; the posterior shield has the same number, but as it is smaller, the hairs stand nearer one to another, and it appears as if this shield has more hairs, which is in fact the case in the well-known tritonympha. The two small shoulder-hairs are directe outward and gently bent forward.

Ventral side (fig. 2). Here we have a sternal shield of the usual shape, provided with 3 pair of hairs, and an anal shield, almost circular, with the usual 3 hairs and the *cribrum*. Between these two shields 4 pair of hairs. On each side of the anal shield a hair.

Peritrema (fig. 2). The stigma lies *behind the coxa* 4! The peritrema is very short, extending scarcely the middle of coxa 4.

Mandibles chelate, multidentate, resembling those of the tritonympha feminina.

Maxillae, The *hypostoma* (fig. 4) resembles that of the tritonympha fenimina. The palps are slender (fig. 1),

Legs. The legs are slender; leg 1 much longer than the body, from 600—950 μ.; leg 4 smaller, leg 2 and 3 almost equal in length and as long as the body.

Epistoma (fig. 3) quite different from that of the tritonympha and adult, viz. almost trapezoidal with denticulated free edges. The front-edge with 3 large cusps: one median and two lateral ones. The intermediate denticulations may however grow sometimes larger so that the front-edge is liable to many variations.

Deutonympha. Length from 600—900 μ. — *Colour* pale. — *Shape* more resembling that of the tritonympha. — *Texture.* The shields scaly; scales more distinct than in the protonympha; unprotected skin finely wrinkled. — *Dorsal side.* There are *two* shields. The anterior about two times longer than the posterior one. Both the shields with about 20 pair of hairs; the unprotected margin is hairy too, but the hairs a little smaller and all directed backward and bent inward; in this respect strongly remembering of the tritonympha. The two small shoulder-hairs as usual directed outward and gently bent forward.

Ventral side. Sternal and anal shields like in the protonympha. Between these shields a row of 5 pair of hairs; moreover the belly with 13—18 pair of hairs.

Peritrema. The stigma lies a little before the level of the middle of coxae 4. The peritrema reaches the anterior edge of the body, beyond coxae 1.

Epistoma very variable; the variations lying between the usual types of the protonympha and of the tritonympha.

Mandibles chelate, multidentate, resembling those of the tritonympha feminina.

Maxillae. Hypostoma and palps resembling those of the tritonympha feminina.

Legs slender; no particulars.

6. Macrocheles longispinosus (Kram.)

In the Tijdschrift voor Entomologie, v. 45, p. 42 and 43, (10 Sept. 1902) I described and delineated (pl. 5, fig. 97—100) a protonympha of *Macrocheles longispinosus* (Kram.) under the name of *Macrocheles tridentinus* (G. et R. Can.). After careful examination I even observe now, that I have delineated and described the epistoma quite wrongly. It ends only in a long spine, *not* in a bifurcate hairy appendage!

7. Macrocheles tridentinus (G. et R. Can.)

In the same Tijdschrift, v. 45, p. 43, I described and delineated (pl. 5, fig. 101—103) a protonympha of *Macrocheles tridentinus* (G. et R. Can.) under the name of deutonympha! This was a severe mistake of mine, as a deutonympha must be provided with a long peritrema, not with a very short handle-shaped peritrema, as are only known in protonymphae!

8. Pachylaelaps furcifer Oudms. nov. sp.

(With Plate 11 fig. 5—9.)

Nympha generans feminina. *Length* 880 μ. — *Colour* egg-yellow. — *Shape* resembling that of the creature called *P. strigifer var. siculus* by BERLESE (Ac. Myr. Scorp. Ital. 64. 5.) but relatively wider and still more shouldered. — *Texture.* Chitinized parts with large scales; unprotected parts finely wrinkled.

Dorsal side (fig. 5) with one dorsal shield, covering the whole dorsal side, with about six longitudinal irregular rows of hairs, and two quite marginal rows (one on each side).

Ventral side (fig. 6). Peritrematic and sternal shields fused, with demarcations between the coxae though. Peritrematic or lateral shields very wide and with wide metapodial prolongations. Sternal shield wide, wider behind coxae 2, provided with 4 pair of hairs, and a little excavated posteriorly. — Genital and ventral shields fused, almost pentagonal; the posterior edge almost parallel to the anterior edge of the anal shield; the two posterior-lateral ones free and in the same curved line with the free edges of the peritrematic and metapodial shields; and the two anterior-lateral edges partly parallel to the inner egdes of the metapodial shields, partly lying *over* the sternal shield. Anal shield wider than long, with the usual 3 hairs and *cribrum*. To the sides of the ventral and anal shields and behind them about 10 pair of hairs.

Peritrema (fig. 6) in the middle of the lateral shields, with curve directed inward between coxae 2 and 3, extending beyond coxae 1.

Epistoma (fig. 7) differing from that of all the known *Pachylaelaps* in being deeply incised at its top, in this way still more resembling that of *Macrocheles*. The inner sides of the top deeply denticulate, or pectinate, but irregularly, some of the teeth being split, or better said: some of the teeth basally united. Lateral edges finely denticulate. Dorsal side with some markings, better understand by a figure than by a long description.

Mandibles (fig. 8). Upper jaw with a blunt molar, a wide canine tooth, directed slightly backward, and two incisors close together, a smaller one behind the larger top-tooth. A distinct sense-organ. Lower jaw with a wide canine tooth directed shightly backward, behind that of the upper jaw, and a small incisor between this canine tooth and the top-tooth.

Maxillae (fig. 9). Hypostome simple; the inner malae simple, finely hairy, fused in their proximal half, as long as the outer malae; outer malae or horns simple, wide. Tongue twice longer than the inner malae.

Mentum as usual.

Legs. Tarsus 2 has a thick, blunt thorn or spur distally and outward (fig. 5).

Habitat. Decaying leaves.

Patria. Netherlands.

Remarks. 1. This creature differs from *P. strigifer var. siculus* in the following features: its body is wider; the line formed by the lateral sides of the lateral, metapodial, ventral and anal shields is more convex outward; the sternal and ventral shields are wider; the genital shield lies anteriorly over the sternal shield (most probably not discerned by BERLESE in his *P. strigifer var. siculus*); behind the anal shield there is a cribrum (most probably not discerned by BERLESE in his species); the epistoma is deeply excavated or incised.

2. The mandible, however, resembles so exactly that of *P. str. var. sic.*, that I at first supposed my *P. furcifer* to be nothing else but BERLESE'S *P. strigifer var. siculus*; and that BERLESE'S drawings were wrong (he does not give any description and in stead of the sense-organ of the mandible the italian acarologist has drawn a tooth!)

9. Pachylaelaps ensifer Oudms., nov. sp.

(With Plate 11, fig. 10—15).

Male. Length 1340 μ. — *Colour* gold-gellow. — *Shape* differing from that of the known species in its anterior part being rapidly falling off between the vertex and the shoulders, which are far forward. — *Texture*: large-scaly. — *Dorsal side* (fig, 10) wholly protected by one dorsal shield. Hairs as usual. — *Ventral side* (fig. 11). All the shields have fused. There are, however, demarcations between the coxae. The shield is long-triangular, with its top backward. The sternal and the ventral parts have three pair of hairs each. Around the anus the usual three hairs, and behind the anus the *cribrum*.

Peritrema (fig. 11) extending beyond coxae 1.

Epistoma (fig. 12) almost triangular, with the comb in top; the

peduncle of this comb is not longer than its teeth. The markings are widely varying from those op *P. siculus* (Berl.); there is no question of granulation; it is striated. Four parts, resembling scales, are striated transversely, and the striaton is concave anteriorly. A median feather-like marking before the 4 scales.

Mandibles (fig. 13). The immovable finger with an incisor and a dog-tooth; the latter directed backward. Between these teeth a distinct sense-organ. The movable finger almost equal in length and shape to the immovable one; its copulation organ exactly *three* times longer, sabre-like.

Maxillae. Horns of the hypostome (fig. 14) on short peduncles (so-called bi-articulate), long, slender, with shorter, slenderer, inner branch, provided with a hyalin, irregular membrane, slightly longer than the real horn, and forming apparently pincers with this. Inner malae fused on their proximal half, free on their distal one, finely hairy, as usual. Lingula one and a half time longer than horns, hairy as usual. — *Palps* (fig. 12). The trochanter (first free joint) is convex ventrally and unarmed. The femur is convex dorsally, has short thin peduncle, and inward a short chitinous appendage and a short bristle on its inner proximal half. The genu has inward and distally a short, chitinous, sharp thorn and a short bristle. The tibia on its middle, outward and downward a short chitinous appendage, provided with a still shorter knob and a short bristle.

Mentum (fig. 11), like in *P. siculus*, with short base and long flagellae, reaching almost the middle of the horns of the hypostome.

Legs. All the legs shorter than the body. — The coxae of the first leg crooked ∽ like, which is already visible on a ventral view. The femur 2 (fig. 15) is provided with a large blade-like, ventral, almost square appendage (fig 15 is an *inner* aspect of the *left* leg 2). Moreover it has on its inner side and proximally two short bristles which are planted in a shallow excavation. Most probably this is a sense-organ: I have found it on *P. siculus* (Berl.) too. The genu 2 and the tibia 2 both with a central knob.

Habitat. Decaying leaves.

Patria. Netherlands (Nijkerk).

Found by Mr. K. J. W. Kempers.

Remark. P. pectinifer Can. measures from 700 to 800 μ. — G. and. R. CANESTRINI, describing *P. pectinifer* Can. in *Att. Real Istit. Venet. Sc. Lett. ed Art.* ser. 5, v. 7, p. 6, say: «Un nostro esemplare gigante supera le misure esposte più sopra, perchè è lungo mill. 1,28 e largo mill. 0,80». Most problably this «giant» was *not* a *P. pectinifer* Can. but another species, e. g. my *P. ensifer.*

10. Liponyssus pipistrelli Oudms.

Liponyssus musculi (C. L. Koch) *deutonympha* Oudms., in *Tijdschr. d. Ned. Dierk. Vereen.*, ser. 2, v. 8, p. 18, 19. Pl. 1, fig. 1, 2. 31 October 1902.

In the Tijdschrift der Nederlandsche Dierkundige Vereeniging, ser. 2, v. 8, p. 17 and 18, I described a protonympha of *Liponissus* as the deutonympha of *Liponissus musculi* (C. L. Koch). This was an ugly fault of mine. A deutonympha would have been provided with a long peritrema; the creature described and delineated by me (Pl. I, fig. 1 and 2), however, has a very short peritrema, as is only known in protonymphae. Therefore it is a protonympha of a hitherto unknown species, for which I chose the name of *Liponyssus pipistrelli* Oudms.

It was caught by Mr. S. A. Poppe, on *Vespertilio pipistrellus.*

11. On the larva of Spinturnix.

In July 1902 my *Notes, Fourth Series,* issued from the press (Tijdschr. d. Ned. Dierk. Vereen., ser. 2, v. 7). Here, p. 299, I showed that an embryo, which I had dissected from the mother's uterus, was provided with 8 legs, of which «legs 1, 2 and 3 have already their difinitive position, i. e. quite close together, whilst legs 4 are still remote a considerable distance; the legs 4 are not so far developed as legs 1, 2 and 3, being still wrinkled. This is a proof that the embryo passes through a *larval stage* with 3 pairs of legs, after which stage it gets its *nymphal* pair

of legs. The stigma is ventral; between coxae 2 and 3 the top of the peritrema and a hole, the opening of the excretory gland, are discernable.»

I could have added: a further proof that the newly-born young of *Spinturnix* is a *nymph* and not a *larva*, lies in the fact that the creature is provided with tracheae, whereas it is well-known, that larvae of Acari miss them.

Now-a-days, April 1903, my attention was arrested on a paper of NITZSCH, entitled *Ueber die Fortpflanzung des Pteroptus vespertilionis* DUFOUR (*Arch. f. Naturg.* v. 3, 1837, I, p. 327—330), where he tells us, p. 329:

«Wirklich fand ich in jedem dieser Individuen (trächtige Weibchen) zwei bis drei, ein Mal sogar vier als solche leicht erkennbare Foetus, und zwar theils *unreife sechsfüssige* von verschiedener Grösse, theils meist ausserdem noch einen *ausgetragenen*, zur Geburt reifen, mit *acht Füssen*, ...»

«Die sechsfüssigen Embryonen sind weich, milchweiss und durchaus ohne Haare. Ihre eingekrümmten, an die Brust angelegten Füsse sind ungegliedert, konisch und am Ende abgestumpft, indem sie des Haftapparats noch gänzlich ermangeln Die von oben wie von unten gut sichtbaren Palpen ebenfalls gliederlos, dick, kurz. Der hintere Theil des Rumpfs ragt fusslos und frei gleich einem Abdomen noch hinten hervor und endet mit geringer Abnahme der ziemlich gleichen Breite, bei jüngern und kleinern mehr abgerundet, bei den grössern wie queer abgeschnitten, mit einer stumpfen, den Hinterrand begrenzenden Seitenecke».

The paper is illustrated with two drawings of such larvae.

Thus, my supposition that the embryo of *Spinturnix* passes the stage of six-legged larva was quite right.

12. Neoseius Oudms.

Neoseius Oudms., in Entom. Bericht p. 101; 2, XI, 1903.

In the *Tijdschrift voor Entomologie*, v. 45, p. 47, tab. 6, fig. 112—114, 10, IX, 1902, I described and delineated a creature under the name of *Uroseius novus*. I am now convinced of the fact,

that we have before us a creature which is characteristic enough to be placed in a new genus, closely related to *Uroseius* Berl. For this new genus I chose the name of *Neoseius*. The differences between these two genera are mentioned in the *Tijdschrift*, v. 45, p. 48. The species therefore is named *Neoseius novus* Oudms.

13. Uropoda ritzemai Oudms.

(With Plate 11, fig. 16—19).

Uropoda ritzemai Oudms., nov. sp., in Entomologische Berichten, p. 88; 17, VIII, 1903.

Deutonympha. — *Length:* 376 μ. — *Colour:* light brown. — *Shape* nearly that of *Ur. wagneri* Oudms. — *Texture* polished.

Dorsal side. (Fig. 16). Body oval, with top forward; somewhat hexagonal. Dorsal and marginal shields perfectly fused. Two median rows of minute pores. To the sides of these two rows of pores there are about 3 or 4 longitudinal rows of minute hairs, of which one row is marginal.

Ventral side. (Fig. 17). Sterni-genital shield long, provided with 4 pair of minute hairs and two rows of light spots beginning and converging behind coxae 2, ending and diverging behind coxae 4. Ventri-anal shield semicircular, with anterior edge convex; without any hairs. Pits of legs 3 and 4 distinct. Metapodial shields distinct, posteriorly rounded. *Stigma* at a level just behind coxae 2. *Peritrema* complicate: behind the stigma a small part directed backward; before it first directed outward and forward, then two sinuations, then deeply inward and suddenly forward, nearly straight, till it reaches the edge of the body to the sides of the coxae 1, far forward.

Hypostome (Fig. 18) narrow, with the usual 6 hairs, which are small and smooth. Horns minute, sinuated outward; inner malae bifid; their lobes are minute, transparent, blunt, rounded anteriorly.

Legs small, without striking characters. Femurs 1, 2, 3, 4 with two blades (Fig. 19). Coxa 1 with a small outer blade. Trochanter 1 with a distal blade too.

Habitat: most probably humus or decaying leaves, for the deutonymph was attached to an *Oniscus asellus*.

Patria: Netherlands (Leiden).

Found by Prof. Dr. Ritzema Bos of Amsterdam.

14. Uropoda bosi Oudms.

(With Plate 12, fig. 20—22).

Uropoda bosi Oudms., nov. sp., in Entomologische Berichten, p. 88; 17, VIII, 1903.

Deutonympha. — *Length* 496 μ. — *Colour* light brown. — *Shape* like that of *Ur. javensis* Oudms. — *Texture* perfectly polished.

Dorsal side (Fig. 20). Dorsal and marginal shields wholly fused. Many minute hairs arranged in almost concentrical rows, following the oval contour of the body.

Ventral side (Fig. 21). Sterni-genital shield long, narrow, with 8 pair of minute hairs. Ventri-anal shield nearly semicircular, with 3 pair of minute hairs, and two bristles flanking the anal aperture. Pits of the legs 4 bowed inward. Metapodial shields fused with ventral, at least there is no demarcation of them. Margin of body provided with minute hairs. *Stigma* at a level just before leg 3. *Peritrema* very complicate: a small portion bihind the stigma is convex inward and directed hindward, the remaining is directed first forward, then outward, then forward, then inward, then bowed forward and outward, then bowed forward and deeply inward, then almost straight forward to reach the margin far before the implantation of leg 1.

Legs. Coxa 1 with small lateral blade. Trochanter 1 with strong horizontal blade distally. Femur 1, 2, 3, 4 with ventral longitudinal blade. Tarsus 1 with claw on a long peduncle and with a long tactile hair. Tarsus 2, 3, 4, with 3 short, thick spines outward.

Maxillae. (Fig. 22). Hypostome very elongate, with the usual 6 hairs, which are hairy; horns long, minute; inner malae bifid, long, hairy; lingua long, hairy; so that between the horns 5 long

hairy cusps are visible. Tarsus of palp dorsally and distally with 2 long tactile hairs, ventrally with 3 long tactile hairs and an inner knife-shaped hair.

Habitat most probally in humus, or in decaying leaves, for the deutonymphae were attached to an *Oniscus asellus*.

Patria: Netherlands (Leiden).

Found by Prof. Dr. J. Ritzema Bos, of Amsterdam.

Type in collection Oudemans.

15. Caligonus humilis (C. L. Koch).

(With Plate 12, fig. 23—33).

1838. *Stigmaeus humilis* Koch, Deu. Cr. Myr. Ar. 17.3.
1842. —— Koch, Ueb. Ar. Syst. v. 3, p. 54.
1885. *Caligonus humilis* Berl. Ac. Myr. Scorp. Ital. 22.5.
1886. —— Berl. Ac. Myr. Scorp. Ital. 30.5 fig. 1, 5, 10.
1890. —— R. Can. in G. Can. Prosp. Acarof. Ital. v. 4, p. 464.
1903, Nov. 1. *Acheles mirabilis* Oudms. in Ent. Bericht. p. 101.

I have found many specimens, but always dead. being drowned in the ring of glycerine around the covering glass of unmounted microscopical preparations. According to the length and slenderness of the legs, we may admit that these animals run as quickly as *Anystis baccarum* (L.).

If you will draw your attention for a moment to my figures 27 and 30 which show the rostrum seen from above and from below, you may imagine how I at first was deceived and interpreted the mandibles wrongly, viz. they being stylet-shaped and internal. The consequence of this having wrongly interpreted the mandibles was that I took the creatures as belonging to the *Cheletinae*, to a new genus, which I called *Acheles*, and to a new species named *Acheles mirabilis*.

Accidentally I got under my eyes BERLESE'S representations of the ♀ *Caligonus humilis* and I was struck by the close resemblance of his drawings of the rostrum seen from above and from below, and of the palps. Finally I was convinced of the fact that my *Acheles mirabilis* is nothing but *Caligonus humilis* of C. L.

KOCH. But the drawings and descriptions of KOCH, BERLESE and R. CANESTRINI are so wrong in all particulars, that I am compelled to publish the mine.

Larva (fig. 23). *Length* 220 μ. — *Colour* carmine. — *Shape* oval; top forward. — *Texture* of dorsal shield and coxal shields smooth, of unprotected skin finely wrinkled. — *Dorsal side*; rostrum triangular, sharp; body divided by a transverse line in a cephalothorax and abdomen Cephalothorax short, wider than rostrum; abdomen slightly longer than wide, wider than cephalothorax, almost pentangular, with one of the angles backward. On the base of the rostrum the two *stigmata* so close together, that they seem to coalesce in one hole. *Peritrema* tubular, not areolate, shaped like an accolade (—⌒—). Over cephalothorax and abdomen lies a *dorsal shield*; this is elongate, truncate anteriorly, convex at the sides, pointed posteriorly, and bears 3 pair of hairs. On the abdomen, on the shoulders, a pair of *eyes* directed forward and outward. Moreover 9 pair of hairs, arranged as shown in the figure. *Anus* terminal, large, partly dorsal.

Ventral side (fig. 24) hairless; before the anus a pair of distinct folds.

Mandibles external with thick base and styliform ends. (Fig. 27.)

Maxillae. The *coxae* (fig. 24) fused, to form the underside of the head, and the base of the palps.

Trochanter (fig. 27) short but distinct. *Femur* nearly as long as the remaining 3 joints together, cylindrical, somewhat swollen; *genu* slightly longer than wide; *tibia* slightly longer than wide, almost oval, with distal inside rod-like somewhat crooked (fig. 23) hair or claw. *Tarsus* fixed on ventral distal end of tibia, sometimes directed downward, as if hanging on the tibia. (Fig. 23).

Legs (Fig. 23) slender, cylindrical, diminishing in thickness distalward. *Coxae* (fig. 24) 1 and 2 contiguous, coxa 3 close to coxae 2. Coxa 1 with 2, coxa 3 with 1 hair, coxa 2 bare. *Tarsi* dorsally (fig. 28, 29), with an ellipsoidal olfactory hair on their proximal half. *Claws* didactyle, between the claws two extremely thin (fig. 28) nodded hairs ending in a little comb ventralward.

Male (fig. 25). *Length* 330—340 μ. — *Colour* carmine. —

Shape long oval, top backward; yet the rostrum is pointed, and the sides, from the shoulders to the rostrum run almost straight. *Texture* like in the larva. — Cephalothorax for the greater part covered by the anterior top of the abdomen. — *Dorsal side* protected bij 2 dorsal *shields*. Anterior shield about $\frac{4}{7}$, posterior one about $\frac{3}{7}$ of body length. Anterior shield concave posteriorly; posterior shield concave anteriorly; so that between the shields there is a horizontal spoolshaped unprotected part, which forms a pit, at the bottom of it is attached the anterior bifid top of the penis apparatus. — *Anterior shield* anteriorly with 2 fine hairs (fig. 27). A little before the shoulders the *eyes* between two hairs. Moreover 3 pair of hairs arranged as shown in the figure. *Posterior dorsal* shield with 6 pair of hairs or bristles, arranged like in the figure, and posteriorly pierced by the longitudinal *genital opening* (fig. 25 and 31). By transparency the whole penis apparatus is visible. *Anus* terminal. — *Stigma* and *peritremata* like in the larva, discernable by transparency through the anterior part of the abdomen.

Penis apparatus (fig. 31). The penis itself has a distinct gland and is proximally trifurcate. In its distal half it is attached on a quadrangular chitinous frame, which in its turn is attached to the basal piece. The distal half of this piece is oval; the proximal half bifurcate and attached at the dorsal skin in the bottom of the dorsal pit between the two dorsal shields.

Ventral side (fig. 26). Between coxae 1 one pair of hairs; between coxae 3 one pair; between coxae 4 and the anus 4 pair; a littie before the anus a pair of minute rings with a point in the centre.

Mandibles (fig. 27, 30) like in the larva.

Maxilae (fig. 26, 27, 30) like in the larva.

Legs. Coxae (fig. 26) 1 and 2 contiguous; coxae 3 and 4 contiguous, close to coxae 2. Coxae 1, 2, 3 with 2, coxae 4 with 1 hair. Tarsi with a thick rod-like olfactoric hair in their proximal half (fig. 28, 29). This hair is situated more proximally the more you advances from leg 1 (fig. 28) to leg 4 (fig. 29).

Female (fig. 32). *Length* 360—520 μ. — *Colour* carmine. —

Shape oval, top forward, rounded tops, straight flanks. *Texture* like that of the larva. — *Dorsal side.* There are *five dorsal shields.* The *anterior shield* is elongate, truncate anteriorly, convex laterally, rounded posteriorly, and bears 3 pair of fine hairs. The 2 *shoulder-shields* are elongate, a little shorter and narrower than the anterior shield, each with an *eye* anteriorly, a hole porteriorly and 3 hairs. The *posterior shield* sub-trapezoidal, shorter than wide, wider anteriorly than posteriorly, with a hole in each anterior angle, 4 pair of bristles and with a deep posterior median excavation. The *supra-anal* shield small with one pair of bristles. Between the 3 fore-shields and the 2 hinder shields 3 pair of hairs and one pair of holes.

Ventral side (fig. 33). Between coxae 1 one pair of fine hairs; between coxae 3 one pair of ditto; quite terminal the *anus*; before this opening the genital split; before this aperture one pair of fine hairs; genital and anal apertures flanked by 5 pair of bristles.

Mandibles like in the larva.

Maxillae like in the larva.

Legs like in the male. Olfactoric hair of tarsi much smaller.

Habitat: in dust, in houses; in moss.

Patria. Netherlands, Germany, Italy.

16. Cheletes eruditus (Schrank).

(With Plate 12, fig. 34—38, and Plate 13, fig. 39—46).

1697. *Mijt van een gansch ander maaksel van gepelde garst.* Leeuwenhoek, Brieven, 102e missive, p. 276.

1781. *Acarus eruditus* Schrank, En. Ins. Austr. n°. 1058, Tab. 2, f. I.

1790. — — Gmel. Syst. Nat. n°. 62.

1792. — — Oliv. Encycl. Méth, v. 7, p. 696.

1796. *Cheyletus eruditus* Latr. Préc. caract. génériques Ins., p. 179.

1802. *Acarus eruditus* Turton, Syst. Nat., p. 707.

1804. *Cheyletus eruditus* Latr., Hist. Nat. Crust. Ins., v. 8, p. 54.

1806. — — Latr, Gen. Crust. Ins., p. 153.

1817. — — Latr., in Cuv. Regn. Anim., v. 3, p. 119.

1826. *Cheyletus capulatus* Von Heyden, in Oken's Isis, p. 609.

1829. *Cheyletus eruditus* Latr., in Cuv. Regn. Anim., Ed. 2, p. 285.
1836. — — Latr., in Cuv Regn. Anim., Ed. 3, p. 303.
1836. *Cheyletus hirundinis* Koch, Deu Cr. Myr. Ar., fasc. 1, n°. 20.
1836. *Cheyletus marginatus* Koch, Deu. Cr. Myr. Ar., fasc. 1, n°. 21.
1839. *Cheyletus eruditus* Koch, Deu. Cr. Myr. Ar., fasc. 23, n°. 20.
1839. *Cheyletus casalis* Koch, Deu. Cr. Myr. Ar., fasc. 23, n°. 21.
1842. *Cheyletus eruditus* Koch, Ueb. Ar. Syst., p. 80, t. 9, f 45.
1842. *Cheyletus casalis*
1842. *Cheyletus hirundinis* } Koch, Ueb. Ar. Syst., p. 80.
1842. *Cheyletus marginatus*
1843. *Cheyletus eruditus* Contarini, Cat. ucc. et ins., p. 16.
1843. — — Contarini, Venez. lagun., v. 2, p. 162.
1843. *Cheyletus marginatus* Guér. Mén., Icon. Regn. Anim. v. 3, p. 14, t. 5, f. 8.
1844. *Cheylétus* Dujardin, in Ann. Sc. Nat. ser. 3, v. 3, Zool. p. 13, 14.
1844. — Dujardin, in Compt. Rend. Séances Acad. Sc., v. 19, p. 1160.
1844. *Cheyletus eruditus*
1844. *Cheyletus marginatus* } Gerv. Hist. Nat. Apt., v. 3, p. 165.
1847. *Acarus eruditus*
1847. *Cheyletus eruditus* } Van Leeuwen, Verh. Schurft, p. 10.
1849. — — Dug. et Miln. Edw. in Cuv. Regn. An., p. 96.
1852. *Eutarsus cancriformis* Hessling, in Ill. med. Ztg. München.
1853. — — Förster, Man. Anat. path.
1859. *Cheyletus eruditus* Grube, in Arch. Nat. Liv.-, Ehst.-, Kurl., ser. 2, v. 2, p. 465.
1860. — — van der Hoeven in *Tijdschr. v. Entom.* v. 3, p. 158, t. 12, f. 1—3.
1863. — — Anders., in Oefv. K. Vet. Ak. Forh., p. 185.
1866. (sine nomine) Beck, in Trans. Micr. Soc. p. 30.
1867 *Cheylète à deux tubérosités*, etc., Fum. et Rob., in Journ. Anat. Physiol., n°. 5, p. 14 et 25 (sép.).
1869. *Cheyletus eruditus* Johnston, in Trans. Berw. Nat. Fld. Club, v. 3, p. , f. .

1875. *Cheyletus robertsoni* Brady in Proc. Zool. Soc. p. 302, 308, t. 41, f. 1—4.
1876. *Cheyletus eruditus* Van Beneden, Schmar. Thierr. p. 144, f. 25.
1876. — — Kram., in Arch. f. Nat., v. 42, tom. 1. p. 40, t. 3, f. 8, 9.
1877. — — Can. et Fanz., in Att. R. Ist. Ven. Sc. Lett. Art., ser. 5 v, 4, p. 77.
1877. — — Murr., Econ. Entom. Apt., p. 286, fig.
1877. *Cheyletus casalis*
1877. *Cheyletus hirundinis* } Murr. Econ. Entom. Apt. p. 289.
1877. *Cheyletus marginatus*
1880. *Cheyletus eruditus* Haller, Milb. Par. Wirbell. p. 40.
1880. — — Haller in Ann. d. Oenol., p. 6.
1880. *Eutarsus cancriformis* Mégn. Paras. Mal. Par. 147.
1880. *Cheyletus eruditus* Mégn. Paras. Mal. Par. p. 241, f. 55.
1881. — — Kram., in Zeit. ges. Nat. v. 54, p. 5, t. 3, f. 2—7.
1882. — — Berl., in Att R. Ist. Ven. Sc. Lett. Art., ser. 5, v. 8, p. 27.
1882. — — Haller in Jahresb. Ver. vaterl. Naturk. Württ., p. 312.
1886. — — Berl., Ac. Myr. Scorp., Ital., fasc. 28, n°. 4.
1886. — — *muscicolus* Berl., Ac. Myr. Scorp. Ital., fasc. 28, n°. 4.
1886. — — G. Can., Prosp. Acarof. It., v. 2, p. 173, t. 12, f. 1.
1887. — — Groult, Ac. Crust. Myr. Fr., p. 49, t. 1, f. 11.
1890. — — Mon., Ac. Observ. Fr., p. 9.
1893. — — Berl., Prostigmata, p. 74.
1897. — — Oudms., in *Tijdschr. v. Entom.*, v. 40, p. 120.

The oldest mention of a *Cheletes* is made by VAN LEEUWENHOEK, 1697. His description is even more correct than that of SCHRANK. (See Tijdschr. v. Entom. v. 40, p. 124 and 125).

1781. Then follows the *Acarus eruditus* of SCHRANK, whose description and figure are bad. He considers the palps as legs, and yet he describes and figures 8 legs in stead op 10 (including the palps). So we should have reason to admit that SCHRANK has only observed larvae, if he did not assert, that he saw larvae coming out of the eggs, which were laid by the mother, under his eyes! Further he asserts that these larvae resembled the mother, «etiam pedum numero» (sic!). SCHRANK especially draws our attention on the two long setae at the distal end of tarsi and on two lateral hairs standing perpendicularly to the animal's axis, and situated between legs 2 and 3.

1796. LATREILLE is the first who proposed a genus for this species. He spells the name *Cheyletus*. Orthographically we must write **Cheletes.** He most probably did not observe the creature himself, else he would have given a better description, though he has well interpreted the palps, and has placed his *Cheletes* among the *Acari* with 8 legs. Type *Acarus eruditus* Schrank.

1826. VON HEYDEN quoting the genus *Cheyletus* Latr. says only: «Type *Cheyletus capulatus* nob. (= ? *Cheyl. eruditus* Latr.)." He is right in doing this query. It is possible that his species was the same as SCHRANK'S.

1836. In Heft 1, n°. 20, Koch describes and figures a *Cheyletus hirundinis*, found in a nest of *Apus apus* L. The species may have been the same as SCHRANK'S. It is known that *Cheleti* often frequent nests of birds and mammals. The beautiful colours depend from food-particules in the intestinal track and from concrements in the extretory organs. Most probably it is a ♀.

1836. His *Cheyletus marginatus* (Heft 1, n°. 21) is found in moss, is larger than the foregoing species. Yet is is possible that it is the same, specimens of which vary in length and breadth according to their being young or old (after having left the nymphal skin), more or less fed, or more or less pregnant. Most probably it is a ♀. The difference in the possession of 6 posterior hairs in stead of 4, and of a lateral smaller hair behind the long one, are of little value. How often are we mistaken in the number

and situation of hairs, when we contemplate such small creatures under low magnifying powers.

1839. His *Cheyletus eruditus* (Heft 23, n°. 20) found by him in great quantities in dust of corn, of pulse, of hemp-seed, etc., possibly is the same species as SCHRANK's, and certainly that of which I present to my readers new drawings and description.

1839. *Cheyletus casalis* Koch (Heft 23, n°. 21) is found accompanying *Ch. eruditus*, bot not often. Possibly it is *Ch. eruditus* itself, and a ♀.

1843. I have not been in the opportunity to consult CONTARINI's works.

1843. GUERIN's figure is a copy of that of KOCH.

1844. DUJARDIN is the first who describes the styliform mandibles and the pectiniform hairs on the palpal tarsus (Ann. Sc. Nat.), and who discovered tracheae (Compt. Rend.)

1852. *Eutarsus cancriformis* is the name, given by a physician, HESSLING, to a creature found by him on the head of men, visited by *plica polonica* (*cirragra*, Weichzelzopf, Wichtelzopf, Judenzopf), together with other mites. We have possibly to do with *Cheletes eruditus*.

1860. VAN DER HOEVEN; not anything new to science.

1866. BECK is the discoverer of parthenogenetic reproduction of «an Acarus», which positively is *Cheletes eruditus*. His drawing is the best I ever saw (Compare his drawing with mine, fig. 44). He never was able to detect a ♂, which is strange, as ♂ are not so rare as is usually believed. He has bred only *one* nympha, which is still stranger, for there are *two*!!

1867. FUMOUZE and ROBIN are the first wo give an ample description (and tolerably good figures) of a species of *Cheletes*, which I consider different from *Ch. eruditus* Schrank. Yet they mention a species with *two knobs at the inner side of the base of the claw of the palp, and with a spine only* (not accompanyed by a tactile hair) *on the middle of the dorsal side of tarsus* 1, characters of that animal which I consider as *Ch. eruditus* SCHRANK.

1869. JOHNSTON's paper was inaccessible to me.

1875. BRADY'S *Cheyletus robertsoni* apparently is our friend, though it «was dredged off Hawthorn, on the Durham coast, in a depth of 27 fathoms,» where it may have arrived after a fatal fall off from any water fowl; or it floated on the surface and sticked to the dredge when it erose from the unknown depths; or it was accidentally in the conservation-tube.

1876. VAN BENEDEN, without giving any description, presents us a new drawing, possibly representing our *Ch. eruditus.*

1876. KRAMER treats the mouth parts, possibly of the same species.

1877. CANESTRINI and FANZAGO give a description too short to recognize the species. Possibly it was *Ch. eruditus*

1877. MURRAY tells us only what KOCH, FUMOUZE, ROBIN and BECK observed of the animal's habits.

1880. MÉGNIN, without any description presents us a new drawing, possibly representiug *Ch eruditus.*

1881. KRAMER publishes the results of his examinations on the development of a *Cheletes*, probably *Ch. eruditus* Schrank.

1886. *Cheyletus eruditus* of BERLESE seems to me to be the same species, but the situations and the number of the hairs, and the shape of the posterior shield are wrongly represented.

1886. CANESTRINI'S drawing of a real *eruditus* misses thedorsal shields and hairs.

1893. BERLESE tell us: «in mari rima genitalis omnino in medio dorso aperitur» which is only the case in some *Chelitidae*, not in the genus *Cheletes*, however.

Protonympha. Length. (fig. 34). 400—480 μ. — *Colour* pale. *Shape* well known. *Texture* smooth in the shields, finely wrinkled in the unprotected parts. — *Dorsal side* protected by an anterior shield, which is trapezoidal, wider posteriorly, slightly longer than wide, and provided with 5 pair of hairs. In the posterior half of the dorsum there are 5 pairs of hairs, first a row of 4, and then three pairs one after another. The *hairs* are very narrow feathers (fig 36).

Ventral side (fig. 35) coxae 1 and 3 with 2 hairs each, coxae 2 with 1 hair, coxae 4 bare. Between coxae 2 one pair; in the

centre op the body one pair; behind coxae 4 one pair. All these hairs are fine and smooth. *Anus* flanked by a pair of feathers. *Lateral hair* (fig. 37) proximally hairy.

Maxillae. Trochanter of palp (Fig. 34 and 35) very short; femur well developed; genu and tibia short; tarsus well known as the appendiculum. Femur *dorsally* with 1 hair almost in the middle; genu with 1 hair proximally; tibia with 1 hair close to the tarsus and, quite distally, the «claw» with 2 basal inner tubercles; tarsus with 2 combs. Coxae *ventrally* with 1 hair close to the trochanter; femur with 1 hair in its proximal half; genu bare; tibia with 2 hairs one inner and one outer; tarsus with 2 long crooked claw-like hairs.

Legs (fig. 34). The two fore-pairs slenderer than the two hind pairs. Femur 1, 2, 3, 4 and genu 1 2, 3 with a feather-like hair each. Tibia 1 with 1, and tibia 3 and 4 with 2 tactile hairs each. All the tarsi distally with 2 tactile hairs each. Other *sense* (olfactoric?) *hairs:* genu 1 distally with a minute rodlike hair; tibia 1 distally with a ditto; tarsus 1 in the middle with a long rod or sausage-like hair, *accompanied by a long tactile hair.*

Deutonympha (fig. 38). *Length* 480—560 μ. *Colour* pale. — *Shape* known. — *Texture* smooth in the shields, finely wrinkled in the unprotected parts. *Dorsal side.* There is but one (anterior) shield, this is almost trapezoidal, wider than long, wider posteriorly, with 3 hairs in each corner. On the unprotected part 4 transverse rows of 4 hairs each, giving together 28 hairs on the dorsum. The *hairs* are feathers (fig. 36).

Ventral side (fig. 39). On coxae 1, 3 and 4 two hairs each; on coxae 2 one hair. Between coxae 1 one pair; in the space between coxae 2 and 3 one pair; between coxae 4 two pair; before the anus 2 pair of *fine smooth* hairs. Aside of the anus one pair of feathers. *Lateral hair* hairy.

Maxillae. (Fig. 38 and 39) The palps are distinctly 5-jointed; the trochanter being very short; the femur wel developed; the genu very short, better discernable on the ventral side; the tibia short but distinct; the tarsus is known as the «appendiculum».

The coxae are fused to form the underside of the capitulum, and provided each with 1 hair. Femur dorsally with 1, ventrally with 2 hairs. Genu ventrally proximally and outward with 1 hair. Tibia dorsally distally and inward 1 hair, ventrally and inward 1 hair and at its top the known enormous claw with 2 basal inner tubercles. Tarsus dorsally with the known 2 combs, and ventrally with the known 2 curved claw-like hairs.

Legs. (Fig. 38). The two fore-pairs slenderer than the two hindpairs. Feather-like hairs on femur 1, genu 1, genu 2, tibia 2, trochanter 3, femur 3, genu 3, trochanter 4, femur 4, genu 4. Other *sense* (olfactoric?) hairs: genu 1 distally with a minute rod-like hair; tibia 1 distally with 1 ditto; tarsus 1 in the middle with a long rod- or sauvage- like hair, *accompanied by a long tactile hair.*

Male (fig. 40). *Length.* 424 μ. *Colour* pale but darker than in the female, with a brownish hue. *Shape* slenderer than that of the ♀; especially the rostrum is narrower. *Texture* finely wrinkled in the unprotected parts. — *Dorsal side* (fig. 40) with 2 shields, both subtrapezoidal; anterior shield wider than posterior one. *Anterior shield* slightly wider than long, wider posteriorly; in the fore-corners 3 hairs each, in de hind-corners 4 hairs each. *Laterally*, between the shields a hair. *Posterior shield* one and a half time longer than wide; wider anteriorly; with rounded angles and sides; anteriorly with 1 pair; laterally with 3 pair of hairs; and more inward and central 1 pair. All these *hairs* are feathers but when viewed from a side they resemble hairy hairs! So there are 13 pairs, or 26 feathers on the dorsum. Moreover, quite posteriorly, but *in* the dorsal shield is the minute *genital aperture*, surrounded by 3 pair of crooked minute pins.

Ventral side (fig. 41). *Sternal shield* short, contignous to the capitulum, surrounding it laterally, without any hair. There is also a *ventral shield* which is almost round, with 1 pair of hairs posteriorly. Between coxae 2 one pair; between coxae 4 one pair; before the ventral shield one pair; behind it one pair of fine smooth hairs. On coxae 1 and 3 *two*, on coxae 2 and 4 *one* hair each. All these hairs are fine and smooth. *Lateral hair* (fig. 42) *smooth* (!),

even observed with immersion. *Anus* flanked by a pair of feather-like hairs.

Penis visible by transparency of dorsal shield, somewhat crooked (fig. 40); sometimes straight (fig. 43) according to its situation in the body.

Maxillae. Coxae forming the underside of the capitulum, with a rounded lobe anteriorly, lying somewhat over the trochanter, or base of palp. At the base of this lobe is planted a hairy hair, reaching the top of the «claw.» *Palps* 5-jointed. Trochanter short, dorsally by a fold apparently two-jointed. Femur well-developed. Genu and tibia short. Tarsus known as the appendelicum. *Dorsally* the femur with 1 hair almost centrally; the genu proximally and outward; the tibia close to the tarsus, and quite distally the so called «claw», which has basally and inward 2 tubercles; *tarsus with only one comb, which comparatively is smaller than the larger one of the* ♀. *Ventrally* the femur with 2 long hairs in its proximal half, one more in-, the other more outward; genu bare; tibia with 2 hairs, one close to the tarsus, the other outward; tarsus with the known 2 claw-like hairs.

Peritrema not forming a fold forward like in the nymphae and females, but gently bowed backward, so that it forms with its congener an arched line (fig. 40.)

Legs (fig. 40). The two fore-pairs slenderer than the two hind-ones. Femur 1, 2, 3, 4, genu 1, 2, 3, 4, and trochanter 3 with a feather each. Tarsus 1 with a tolerably long «olfactoric» hair in the middle of it dorsal side. Other *sense-organs*: on genu 1, tibia 1, 2, 3, 4, distally and dorsally there is a more or less short, sausage-like hair; this is almost egg shaped on genu 4.

Female (fig. 44). *Length* 560—800 μ. — *Colour* pale yellow, with a longitudinal white stripe over the dorsum (light refracting contents of intestinal track; this stripe is dark, almost black under the microscope.) *Shape* well known. — *Texture* smooth in the shields, finely wrinkled in the unprotected parts. — *Dorsal side* (fig 44) protected by two shields. *Anterior shield* trapezoidal, wider than long, wider posteriorly, with 3 hairs in each anterior and 1 hair

in each posterior corner. Between the shields, laterally, a hair. Posterior shield trapezoidal, with rounded angles and rounded posterior edge, longer than wide, wider anteriorly, much narrower than the anterior shield; with one hair in each anterior, and 2 in each posterior corner. Behind this shield 2 pair of hairs. So that there are 20 hairs on the dorsal side. These *hairs* are narrow feathers.

Ventral side (fig. 45). Coxae 1, 3 and 4 with 2, coxae 2 with 1 hair each. Between coxae 1 one pair of hairs; behind coxae 2 one pair; between coxae 4 one pair; behind coxae 4 one pair. All these hairs are fine and smooth. *Genital aperture* long, surrounded by 4 pair of small bristles. Anal aperture on its usual protuberance, surrounded by 3 pair of crooked pins, and flanked by a pair of feather-shaped hairs. The lateral hair hairy.

Maxillae. Dorsally (fig. 44) the very short trochanter is visible; the stout femur with one almost central hair; the short genu with one hair proximally; the short tibia with one hair close to the tarsus, and distally with the claw which has 2 basal and inner tubercles; the tarsus with 2 combs. *Ventrally* (fig. 45) the coxae with 1 hair close to the trochanter; the very short trochanter bare; the femur with 2 hairs in the proximal half, one inner and one outer one; the genu with one outer hair; the tibia with one inner an one outer hair; the tarsus with 2 crooked claw-like hairs.

Legs (fig. 44). Femur 1, 2, 3, 4, genu 1, 2, 3, 4, and trochanter 3 with a feather-shaped hair. Tibia 1, 2, 3, 4, and tarsi 1, 2, 3, 4, with 2 tactile hairs each. *Sense organs*: genu 1 distally with a small, tibia 1 distally with a larger, tarsus 1 in the middle with a still larger rod- or sausage-shaped sense-hair; this last *not accompanied by a long tactile hair*

Monstrous female (fig. 46). I hesitate to call this female a heteromorphous one. I only found *one* specimen, which I have delineated. It is possible that other investigators after me will meet with such an animal; then they will carefully examine if there are more specimes present, if it is a distinct species, etc. The only characters that distinguish it from the other females are

so far as I could observe: *dorsally*: in the posterior half of the anterior shield 4 hairs that characterize a deutonympha; the foremost pair of these hairs is developed normally, the posterior pair is minute. The posterior shield is ill developed, not taking in its circumference the posterior 4 hairs; *ventrally*: the two hairs on the femur of the palp are closer together and more approaching, the median line of the femur.

17. Cheletes schneideri Oudms.

1867. *Cheyletus eruditus* Fumouze et Robin, in Journ. Anat. Physiol. p. 1—31 (sép.), t. 22.

1867. — — Fum. Catharide offic., p. 51, t. 5.

1876. — — Troupeau, in Bull. Soc. Angers, p. 107—110. t. 3. f. 20—26.

1902. *Cheyletus schneideri* Oudms., in Tijdschr. d Ned. Dierk. Ver., ser. 2, v. 8, p. XV.

1903. *Cheletes schneideri* Oudms., in Mém. Soc. Zool. Fr., v. 16, p. , t. 2, fig. 52—54.

FUMOUZE and ROBIN are the first who present to their readers an ample description and tolerably good drawings of a species of *Cheletes*, which they call *Cheyletus eruditus*, and which I do dot consider as such. They delineate the tracheae (discovered by DUJARDIN, 1844), the inner basal knobs of the palpal claw, and the hexapod larva. They describe the two dorsal shields and the octopod nympha. — They are wrong in delineating the tergum and venter smooth, the coxal shields 3 and 4 wrinkled, the palps 3-articulate, the dorsum with 8 pair of hairs; they are wrong in the denomination of the joints of the legs, in their considering the anus as «appendice conoide terminal» and the female genital aperture as the anus, and in their attributing 3 stigmata (better said 4) in stead of 2. — They do not say anything about, nor do they delineate, the number, shape and position of the dorsal hairs, neither about sexes. — They further mention that there are two forms, *one* with 3 inner basal knobs on the palpal claw, with a tactile hair accompainyig the spine on the dorsal side of the tarsi 1, and

with a short spine before the anus (read female genital aperture), and *another* with 2 basal knobs on the claw, without that tactile hair, and without the short spine.

As I already pointed out above (p. 122). I consider *the other* form as the real *Cheletes eruditus* (Schrank), whilst the *first*, on which is based the whole paper of Fumouze and Robin is a quite different species. After scrupulous comparison of this species with my preparation of *Cheletes schneideri* I do not hesitate more a moment to declare them identic, notwithstanding the numerous inaccuracies of Robin's drawing, even in the number and situation of the hairs of the ventral side. (N. B. The so-called minute pin before the anal aperture is nothing but the semicircular chitinous beginning of the genital split, distinctly observable in every ♀ *Cheletes!*).

And what to say of *Troupeau*'s mite? I think I have well done to remove it from the real *eruditus* and to consider it a *schneideri*, on account of his mite is provided with 3 inner protuberances on the base of the palpal claw, and with a long tactile hair in the middle of the dorsal side of the tarsus 1; admitting that the transparent «olfactoric» hair is not observed by Troupeau.

18. Cheletes trouessarti Oudms.

(With Plate 13, fig. 47—51).

Cheyletus trouessarti Oudms., nov. sp., Tijdschr. der Ned Dierk. Vereen., ser. 2, v. 8, p. XVI; 17, IX, 1902.

Male. Length 464 μ. — *Colour* pale. — *Shape* like that of *Ch. eruditus* (Schrank), but with formidable maxillar palps. — *Texture* smooth in the shields, finely wrinkled in the unprotected parts.

Dorsal side (fig. 47) protected by two large and two smaller shields. Anterior dorsal shield very wide, occupying the whole width of the body and more than the half of its length, almost quadrangular, with rounded anterior angles and rounded edges. The posterior shield much smaller, almost triangular, with rounded anterior angles. Two minute lateral shields. On the anterior shield 5 pair of feather-like hairs (four on the lateral smargin and one

posteriorly). On the posterior shield 4 pair of feather-like hairs (one on the anterior, and 3 on the lateral margin). On each of the minute lateral shields 1 feather-like hair. So there are 10 pair of feather-like hairs on the dorsum. On the posterior dorsal shield, quite posteriorly, the minute genital aperture is flanked by 3 pair of minute crooked pins. The penis, which is visible by the transparency of the shield, projects its top through the genital aperture.

Fig. 49 represents a feather-like hair of the dorsum under high amplifications.

Before the body we observe the capitulum, which is very wide by the enormous development of the maxillar palps. A square, horizontal, median portion of it is distinct from the lateral sloping parts. If we follow the two lines of demarcation between these three parts forward, we meet with two short claw-like prominences.

In front of the median horizontal part we observe a circle of tubercles resembling a crown. If we bring the posterior (most dorsal) part of the crown in the focus of the microscope with a high amplification, we do not observe the stigmata, nor the lower part of the crown. If we lower the microscope, we observe first the stigmata, and finally the lower part of the crown. We may safely conclude therefore, that the stigmata are situated at the bottom of a cup with a crownlike margin. Behind the crown the peritremata are visible, of the usual type. Before the crown the rostrum is provided with many lower tubercles, two lateral square apophyses, and a median flat portion, flankled by two bristles. The utmost tip of the rostrum itself is flanked by two extremely minute organs (tactile ?). —

Ventral side (fig. 48). The ventral side is finely winkled, except the sternal shield, the parts occupied by the coxae of the legs (the so-called epimera), the underside of the head, and the anal covers. In the space between the 8 coxae 2 pair of little hairs; behind the coxae 4 pair of little hairs. The anal covers project a little beyond the hind-margin of the abdomen. Between coxae 3 and 4, quite laterally a featherlike hair.

Maxillar palps. Dorsal side (Fig. 47). Second (first free) joint

or trochanter very short, scarcely visible. Third joint or femur enormously developed, with a hairy hair, which reaches the tip of the tibial claw. Fourth joint or genu very short. Fifth joint or tibia with a hair and the usual claw with *one* inner basal tubercle. Sixth joint or tarsus as usual with the two nearly straight combs. *Ventral side* (Fig. 48). The first joint or coxa, with one hair, is fused with that of the other side to form the under side of the head and a tube around the stylet-shaped mandibles. The second joint or trochanter short but distinct. The third joint or femur with two hairs. The fourth joint or genu short but distinct. The fifth joint or tibia with the formidable claw. The sixth joint or tarsus with the usual two claw-like hairs.

Legs. The coxae (fig. 48) 1, 3 and 4 with two fine hairs each; coxae 2, as far a I could discern, with one hair. All the femurs (fig. 47) and trochanter 4 with a feather-like hair. The proximal third part of tarsus 1 wider than the distal two thirds of it, and provided with a small hair and a thorn-like sense hair.

Female. Length 584 μ. — *Colour*, *shape* and *texture* like in the male. — *Dorsal side* (Fig. 50) protected by two dorsal shields. The anterior shield trapezoidal, wider than long; the posterior shield trapezoidal, longer than wide. On the lateral margin of the anterior shield 4 feather-like hairs; between the two shields, quite laterally 1 ditto; on the lateral margin of the posterior shield 3 ditto; behind the posterior shield 2 ditto; so that on the dorsal side we observe two somewhat wavy longitudinal rows of 10 feather-like hairs each. N. B. The last pair sometimes may be placed on the ventral side!

Ventral side (Fig. 51). The skin is finely wrinkled, except the spaces occupied by the underside of the head, by the 8 coxae (generally called epimera), and by the genital and anal covers. In the space between the 8 coxae 2 pair of little hairs. Behind coxae 4 one pair of ditto. Before the genital covers 2 pair of smaller hairs; the genital covers with 2 small hairs each; the anal aperture flanked by three small feather-like hairs. Laterally of coxae 2 a large feather-like hair.

Mandibles as usual, stylet-shaped; internal.

Maxillar palps. Dorsal side (Fig. 50). Second (first free) joint or trochanter very short, scarcely visible. Third joint or femur with two hairs. Fourth joint or genu very short. Fifth joint or tibia with the usual claw provided with *three* inner basal tubercles. Sixth joint or tarsus as usual, with the two usual combs. *Ventral side* (Fig. 51) The first joint or coxa fused with that of the other side to form the underside of the head and a tube around the mandibles, with one hair. The second joint or trochanter very short, scarcely visible. The third joint or femur with 3 hairs; the fourth joint or genu short; the fifth joint or tibia with the claw; and the sixth joint or tarsus with the usual claw-like hairs.

Legs. Coxae 1, 3 and 4 (Fig. 51) with 2 hairs; coxae 2 with one hair. Femur 1, 2, 3, 4 (Fig. 50) and genu 3 and 4 with a feather-like hair Tarsus 1 like in the male, but proportionally smaller,

Habitat. Amoung meal-shop articles.

Patria: Netherlands

Found by me.

Type in collection Oudemans.

19. Labidostoma denticulatum (Schrank).

Fam. *Labidostomidae.*

In 1776 SCHRANK described an Acarus under the name of *Acarus corpore antice dentibus quatuor* (SCHRANK, *Beiträge zur Naturgeschichte*, p. 125, tab. VI, fig. 8). The creature is larger than the well known *Parasitus crassipes* (L.); it is brown; it has no eyes; the anterior edge of the undivided body is quite straight, as if cut off transversally, so that to the sides of this straight line the body has *a* rectangular *distinct angle;* between the second and third legs the body has on its sides *a distinct protuberance.* Hence the definition « *dentibus quatuor* ». The two mandibles, attached under the body are projecting forward. Palps are absent or at least invisible when the animal is viewed from the dorsal side. — According to SCHRANK «the legs end in a two-pieced sole, between which is a minute

claw. — He found it under a flowerpot, apparently in his garden, consequently in moist vegetable earth. —

In 1781 SCHRANK gave it the name of *Acarus denticulatus* (SCHRANK, *Enumeratio Insectorum Austriae indigenorum*, p. 520, n°. 1070).

In 1826 VON HEYDEN (*Isis*, p. 608) gives a systematic division of the Acari. We will follow him verbally: Legion I, with 8 legs; Phalanx 2, without eyes; Section 2, the mouth parts on the underside of the body; Division 6, head, thorax and abdomen have fused; Subdivion 2, without visible palps; *b*, all the legs with a bifid claw: 54th genus: *Panoplia*, type *Acarus denticulatus* SCHRANK. — We observe that VON HEYDEN has changed SCHRANK'S discription of the ends of the legs: «a two-pieced sole» into «a bifid claw.» We may safely admit that VON HEYDEN has not had the creature under examination. — At all events the generic name *Panoplia* must be abandoned, as it is preoccupied by HÜBNER, 1816, for *Lepidoptera*.

In 1877 CANESTRINI and FANZAGO described and delineated an Acarus under the name of *Nicoletia cornuta* (*Att. R. Ist. Ven. Sc. Lett. ed Art.*, ser 5, v. IV, p. 52, tab. 3, fig. 2). When we carefully compare their drawing and description with those of SCHRANK, we are obliged to admit the identity of the two creatures. There may be one objection: SCHRANK describes the legs ending in «a two-pieced sole», whilst CANESTRINI and FANZAGO do not describe these parts, but delineate all the legs ending in two claws. We may safely admit that the instruments of SCHRANK were so imperfect, that he has not well interpreted what he saw. I say we may safely do this, because latter examinators of this singular Acarus unanimously describe the fore-legs ending in *two* claws, and the other six legs in *three* claws, so that even CANESTRINI and FANZAGO are mistaken in this respect! — At all events the generic name of *Nicoletia* must be abandoned, as it is preoccupied by GERVAIS, 18 . ., for *Thysanura*.

In 1879 KRAMER (Arch. f. Naturg., v. 45, p. 13, tab. 2, fig. 1a—1i) described and delineated an Acarus under the name of *Labidostomma luteum*. The first leg end in *two* claws, whilst the

other six legs end in *three* claws. It is proved that this animal belongs to the same genus as the *Acarus denticulatus* SCHRANK = *Nicoletia corunta* CAN. et FANZ. — The name *Labidostomma* is wrongly spelled; orthographically we must write **Labidostoma.** — Here we have a generic name, which is not preoccupied and therefore must be adopted.

In 1882 G. and R. CANESTRINI proposed the generic name *Nicoletiella* to substitute *Nicoletia*, which was preoccupied. This was quite superfluous.

Thus we have the genus *Labidostoma* KRAMER, 1879; synonyms: *Panoplia* VON HEYDEN, 1826 (non *Panoplia* HÜBNER, 1816); *Nicoletia* CAN. et FANZ., 1877 (non *Nicoletia* GERVAIS, 18..); *Nicoletiella* G. et R. CAN., 1882.

The two species, belonging to this genus are:

1. *Labidostoma denticulatum* (SCHRANK). Synonyms: *Acarus denticulatus* SCHRANK, 1781; *Panoplia denticulata* (VON HEYDEN), 1826; *Nicoletia cornuta* CAN. et FANZ., 1877.

2. *Labidostoma luteum* Kram. 1879.

The family therefore must be called *Labidostomidae.*

Arnhem, 5 Mei 1903.