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A REVIEW OF THE MITES OF THE FAMILY  
CHEYLETIDAE IN THE UNITED STATES  
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THE family Cheyletidae Leach, 1814, as previously considered included two groups of mites, those with small, poorly developed, non-grasping palpi (*Myobia*, etc.) and those with large, highly developed, grasping palpi (*Cheyletus*, etc.). The former are parasitic mites and are adapted to live on such hosts as birds, snakes, and rats, while the latter are primarily free-living predators.

Ewing (Proc. Ent. Soc. Washington, vol. 40, No. 7, p. 180, 1938) erected the subfamily Myobiinae to include those mites of the genus *Myobia* and its generic derivatives. In this paper, Myobiinae is raised to family rank and is considered to include the following genera: *Amorphacarus* Ewing, *Harpyrhynchus* Megnin, *Myobia* Heyden, *Ophioptes* Sambon, *Picobia* Haller, *Protomyobia* Ewing, *Psorergates* Tyrrel, *Radfordia* Ewing, and *Syringophilus* Heller.

The family Cheyletidae is now considered to include the following genera: *Acaropsis* Moquin-Tandon, *Chelacaropsis* new genus, *Chel-etoids* Oudemans, *Cheletogenes* Oudemans, *Cheletomimus* Oudemans, *Cheletomorpha* Oudemans, *Cheletonella* Womersley, *Cheletophanes* Oudemans, *Cheletophyes* Oudemans, *Cheletopsis* Oudemans, *Cheletosoma* Oudemans, *Chelonotus* Berlese, *Cheyletia* Haller, *Cheyletiella* Canestrini, *Cheyletus* Latreille, *Eucheylea* Berlese, *Eucheyletia* new genus, *Eutogenes* new genus, and *Neocheyletiella* new genus.

The Cheyletidae are prostigmatic mites with short styletlike chelicerae; with a short palpal tarsus located on the posterior part of the palpal tibia rather than on tip and in most cases bearing comblike and sicklelike setae; palpal tibia with a strong claw which

extends beyond the palpal tarsus; with none, one, or more plates on the dorsum of the body; and with the palpi large and pincerlike.

These mites as a whole are free-living predators, although some are to be found in rabbit fur, squirrel fur, bird feathers, on cats, etc. The free-living forms are found associated with infestations of acarid mites (Acaridae), eriophyid mites (Eriophyidae), and scale insects (Coccoidea), but as yet they do not appear to be of great importance in controlling mites or insects. Carter et al. (Carter, H. F., Wedd, G., and D'Abbrera, V., Indian Med. Gaz., vol. 79, No. 4, pp. 163-168, 1944) report finding numerous mites in the sputum of patients suffering from lung disorders, among these being a *Cheyletus* sp. Habits of each species are listed in the main body of this report. Because of their free-living habits the distribution of many of these mites is world-wide.

Since several of the genera are established on the number of dorsal plates, confusion may arise because some of the nymphal forms have two or more dorsal posterior plates instead of one. For example, the nymph of *Cheletophyes hawaiiensis*, new species, possesses two dorsal posterior plates, the nymph of *Cheyletus cacahuamilpensis*, new species, possesses four dorsal posterior plates, and Oudemans (1921) in discussing the generic status of *Cheletomimus* states that the nymph of *Cheyletia squamosa* (Degeer) has two dorsal posterior plates. Adults of *Cheletonella* and *Cheletopsis* have only the single dorsal anterior plate; adults and nymphs of *Cheletomimus* have a single anterior plate and two posterior plates; and adults of the other genera have the usual anterior and posterior plates.

The descriptions are based on material mounted on slides in balsam, modified Berlese fluid, or polyvinyl alcohol (PVA), and in most cases the material has been flattened to some degree. The so-called balloon setae of certain mites have been seen only on specimens which have been mounted, and have been drawn as seen. The exact nature of these setae on living mites is not known. Certain other types of setae present the same problem.

Only species in the National Museum Collection have been described and figured. The other species are placed in the keys and are listed in the text.

Since Oudemans monographed the family in 1906, only a selected bibliography of publications prior to that date is given, but references to all important taxonomical publications since then are listed. Vitzthum (Die Tierwelt Mitteleuropas, vol. 3, No. 3, pp. 54-56, 1929) gives keys to the European species, and Rodendorf (Wiss. Ber. Moskauer Staats Univ. Zool., vol. 42, pp. 69-98, 1940) gives keys to the Russian species.

Types of new species, unless otherwise stated, are deposited in the United States National Museum.

## KEY TO THE GENERA

1. Palpal tarsus with comblike and/or sicklelike setae..... 3  
 Palpal tarsus with only simple setae..... 2
2. Tarsus I without claws but with a rayed pulvillus.... *Cheyletiella* Canestrini  
 Tarsus I with claws..... *Neocheyletiella*, new genus
3. Palpal tarsus with both sickle- and comblike setae..... 4  
 Palpal tarsus with 2 sickle- and no comblike setae; hysterosomal shield only.  
*Cheletoides* Oudemans
4. Palpal tarsus with 2 sickle- and 2 comblike setae..... 5  
 Palpal tarsus with 2 sickle- and 1 comblike setae..... 15
5. Leg I normal, with 2 claws..... 8  
 Leg I a sensory organ, without claws..... 6
6. With lenslike eyes..... 7  
 Without lenslike eyes; no claws or pulvillus on legs I... *Eutogenes*, new genus
7. Tarsus I attenuate at tip, with pulvillus but without claws.  
*Cheletomorpha* Oudemans  
 Tarsus I ending bluntly, without claws or pulvillus... *Cheletogenes* Oudemans
8. With more than 1 dorsal shield..... 9  
 With a single hysterosomal shield..... *Cheletonella* Womersley
9. With 2 dorsal shields..... 10  
 With 3 dorsal shields, 1 propodosomal and 2 hysterosomal.  
*Cheletomimus* Oudemans
10. With a pair of lenslike eyes..... 11  
 Without lenslike eyes..... 14
11. Both sicklelike palpal tarsal setae normal..... 12  
 One palpal tarsal sicklelike seta clavate; dorsal body setae broad, reticulate;  
 dorsum of body may be reticulate..... *Eucheyla* Berlese
12. Palpal claw with basal teeth..... 13  
 Palpal claw toothed along entire inner margin.... *Cheletophanes* Oudemans
13. Dorsal body setae squamiform..... *Cheyletia* Haller  
 Dorsal body setae long, rodlike, ciliated..... *Cheletophyes* Oudemans
14. Dorsal marginal setae squamiform; dorsal setae cloudlike.  
*Eucheyletia*, new genus  
 Dorsal marginal setae featherlike, or pilose; dorsal setae when present stag-  
 hornlike..... *Cheyletus* Latreille
15. With 1 or more dorsal shields..... 16  
 Without dorsal shields..... *Chelacaropsis*, new genus
16. With propodosomal and hysterosomal shields..... 17  
 With propodosomal shield only..... *Cheletopsis* Oudemans
17. With the 2 dorsal shields separate..... 18  
 With the 2 dorsal shields contiguous, covering entire dorsum and part of  
 venter..... *Chelonotus* Berlese
18. Anterior shield trapezoidal..... *Acaropsis* Moquin-Tandon  
 Anterior shield pentagonal..... *Cheletosoma* Oudemans

In A. M. Buitendijk's paper, "Voorloopige Catalogus van de Acari in de Collectie—Oudemans" (Zool. Meded., vol. 24, p. 332, 1945), a reference is made to *Caenocheyletes franseni* Oudemans, 1933. This is probably a manuscript name, since I have been unable to find a published description.

## Genus CHEYLETIELLA Canestrini

*Cheyletiella* CANESTRINI, Prospetto dell' Acarofauna Italiana, vol. 2, pp. 169, 170, 1886.

*Chelettiella* (Canestrini) OUDEMANS, Mém. Soc. Zool. France, vol. 19, p. 211, 1906.

*Ewingella* VAIL and AUGUSTSON, Journ. Parasitol., vol. 29, No. 6, pp. 419, 421, 1943. (Type, *Ewingella americana* Vail and Augustson (monotypic) = *Cheyletiella parasitivorax* (Megnin).)

Type, *Cheyletus parasitivorax* Megnin (monotypic).

## CHEYLETIELLA PARASITIVORAX (Megnin)

## PLATE 6, FIGURES 1-3

*Cheyletus parasitivorax* MEGNIN, Journ. Anat. and Physiol., 1878, p. 10, pl. 38.

*Cheyletiella parasitivorax* (Megnin) CANESTRINI, Prospetto dell' Acarofauna Italiana, vol. 2, pp. 169, 170, 1886.—BERLESE, Acari, Myriapoda et Scorpiones hucusque in Italia reperta, Prostigmata, fasc. 28, No. 3, 1886.—HIRST, Brit. Mus. Nat. Hist. Econ. Ser. 13, p. 73, fig. 40, 1922.—COOPER, Journ. Parasitol., vol. 32, No. 5, pp. 480-482, 1946.

*Chelettiella parasitivorax* (Megnin) HIRST, Ann. Mag. Nat. Hist., vol. 20, p. 132, 1917.—PILLARS, Vet. Journ., London, vol. 81, pp. 96, 97, 1925.—WOMERSLEY, Rec. South Austral. Mus., vol. 7, p. 59, 1941.

*Ewingella americana* VAIL and AUGUSTSON, Journ. Parasitol., vol. 29, No. 6, pp. 419-421, figs. 1-3, 1943.

*Female*.—Palpi short but strong; palpal femur with a long, serrate, dorsal seta; genu with a short, serrate seta; tibia with a short simple seta; palpal claw curved downward, with many weak teeth. Rostrum short, broad; peritreme with lateral branches composed of large segments, the anterior transverse portion composed of many small segments. Propodosomal shield with three pairs of short anterior lateral setae and a posterior transverse row of four simple setae; two pairs of long, serrate propodosomal shoulder setae. Hysterosoma without shield; with an anterior transverse row of four setae, the outer pair serrate and longer than the simple inner pair (outer setae  $106\mu$  long, inner setae  $83\mu$  long); on the posterior third of the hysterosoma a pair of long, serrate, marginal setae, and anterior to these a pair of short, simple setae. Posterior margin of hysterosoma with a pair of long, simple setae (about  $200\mu$  long), a pair of short simple setae inside the long pair, and two pairs of short, simple setae anterior to anal opening; three pairs of short, simple setae lateral of the anal opening. Two pairs of genital setae and a transverse row of four setae anterior to the genital opening. Legs short; leg I reaches to tip of palpi; leg IV reaches past posterior margin of body. Tarsus I short, without claws but with pulvillus as figured. Length of body  $320\mu$ , including rostrum  $386\mu$ ; width  $266\mu$ .

*Type host*.—Rabbit; preying on listrophorid mites.

*Type locality*.—Probably France.



The foregoing description was taken from mites collected on rabbits at Albany, N. Y., May 7, 1942, by R. D. Glasgow.

This is a well-known species which appears to be universally distributed on rabbits. It has been stated that it preys on species of *Listrophorus*, *Psorergates*, *Myobia*, and *Notoedrus* which inhabit the fur. Pillars (1925) states that he found this mite causing lesions on a rabbit, and also mentions a mange of man attributed to this species. Vail and Augustson (1943) report lesions being found on a rabbit infested with this mite. Cooper (1946), in a review of the literature on the mite, states that he can find no satisfactory evidence that *Cheyletiella parasitivorax* attacks its mammalian hosts or causes mange in rabbits and man. Hirst (1917), Pillars (1925), and Cooper (1946) report finding this species on cat. Cooper (1946) also discusses the synonymy of *Ewingella americana* Vail and Augustson with *Cheyletiella parasitivorax* (Megnin).

H. E. Ewing (Illinois Univ. Studies, vol. 3, No. 6, p. 77, pl. 3, fig. 15, 1909) described a mite as *Cheyletiella americana*. Examination of the type reveals that the original placement is incorrect; it belongs to the genus *Pseudocheylus* in the family Pseudocheylidae.

#### NEOCHEYLETIELLA, new genus

Palpal tarsus without comblike setae; all tarsi with claws. With at least a rudimentary dorsal shield.

Type, *Neochyletiella rohweri*, new species.

This genus has been erected to include the species formerly placed with *Cheyletiella* which possess claws on tarsus I. Biologically this group differs from *Cheyletiella* in being found on birds rather than on rabbits or cats.

#### KEY TO THE SPECIES OF NEOCHEYLETIELLA

1. Empodium split into 2 sections between claws..... 2  
Empodium with 2 small combs..... 3
2. Epimera I separated..... macronycha (Megnin)  
Epimera I joined..... microrhyncha (Berlese and Trouessart)
3. Large protuberance on dorsal distal surface of tarsus I; smaller on tarsus II.. 4  
Tarsi I and II more normal, no protuberance..... 7
4. One dorsal shield..... 5  
Two dorsal shields; dorsal marginal setae about as long as body is wide.  
canadensis (Banks)
5. First three pairs of propodosomal setae of approximately equal length.... 6  
First 2 pairs of propodosomal setae much shorter than third pair.  
heteropalpus (Megnin)
6. Posterior marginal setae about one-third longer than anterior marginal setae;  
1 pair posterior setae serrate..... smallwoodae, new species  
Posterior marginal setae about twice as long as anterior marginal setae; all  
posterior setae simple..... rohweri, new species
7. One dorsal shield; palpal claw very small... chanayi (Berlese and Trouessart)  
Two dorsal shields; palpal claw moderately large..... pinguis (Berlese)

## NEOCHEYLETIELLA MACRONYCHA (Megnin), new combination

*Cheyletus macronycha* MEGNIN, Journ. Anat. and Physiol., 1878, p. 12, pl. 29, figs. 7, 8.

*Cheleticella macronycha* (Megnin) OUDEMANS, Mém. Soc. Zool. France, vol. 19, pp. 212, 213, 1906.

*Type host*.—Passerine birds (exotic).

*Type locality*.—Bengal.

## NEOCHEYLETIELLA MICRORHYNCHA (Berlese and Trouessart), new combination

*Cheleticella microrhyncha* BERLESE and TROUSSERT, Bull. Bibl. Sci. Ouest., vol. 2, p. 136, 1889.

*Cheleticella microrhyncha* (Berlese and Trouessart) OUDEMANS, Mém. Soc. Zool. France, vol. 19, p. 213, 1906.

*Type host*.—Unknown.

*Type locality*.—France.

The publication containing the original description could not be found.

## NEOCHEYLETIELLA CANADENSIS (Banks), new combination

## PLATE 6, FIGURES 4, 5

*Cheleticella canadensis* BANKS, Proc. Ent. Soc. Washington, vol. 11, p. 133, 1909.

*Female*.—Anterior shield covering most of propodosoma, with a pair of long setae in the posterior marginal corners; five pairs of long marginal setae on propodosoma; all setae about length of propodosoma. Posterior shield covering most of hysterosoma, posterior margin of shield concave and with a short seta in each corner as figured; a pair of long shoulder setae, and two pairs of long posterior setae on abdomen, all as long as propodosomal setae. Tarsi I and II with dorsal protuberance. Length  $253\mu$ ; width  $167\mu$ .

*Type host*.—"Bluebird."

*Type locality*.—Guelph, Ontario, Canada.

This species is similar to *Neocheyletiella heteropalpus* (Megnin) in having the tarsal protuberances, but it differs in having two dorsal shields and extremely long dorsal setae; it differs from *N. pinguis* (Berlese) in having the long propodosomal setae and in having two pairs of long posterior setae rather than one long and one short pair. The above description was taken from the type which is in the Museum of Comparative Zoology, Cambridge, Mass.

## NEOCHEYLETIELLA HETEROPALPUS (Megnin), new combination

*Cheyletus heteropalpus* MEGNIN, Journ. Anat. and Physiol., 1878, p. 11, pl. 29.

*Cheleticella heteropalpus* (Megnin) BERLESE, Acari, Myriapoda et Scorpiones hucusque in Italia reperta, Prostigmata, fasc. 28, No. 2, 1886.

*Cheleticella heteropalpa* (Megnin) OZ45fl(&.; Mém. Soc. Zool. France, vol. 19, p. 213, 1906.

*Type host*.—Pigeons and passerine birds.

*Type locality*.—Probably France.

NEOCHEYLETIELLA SMALLWOODAE, new species

PLATE 6, FIGURES 6-9

*Female*.—This species is broad, rounded, with small rostrum and palpi. Palpal setae long, the palpal femur and genual setae serrate, and the tibial and ventral setae appear simple; claw small and simple. Peritreme composed of 10 rather large segments. Propodosomal shield small, longer than wide, angularly pyriform with a pair of anterolateral setae; two pairs of anteromarginal setae and three pairs of shoulder setae; all propodosomal setae appear finely serrate. Hysterosoma with three pairs of anterior setae, the outer two pairs long and distinctly serrate, the inner pair short and appearing slightly serrate; two pairs of simple dorsal setae around anal opening; three pairs of longer setae on posterior margin of body, the anteromarginal pair serrate, the other two pairs simple. Legs short; leg I about  $155\mu$  long; leg IV about same length and reaches to posterior edge of body. Tarsus I as figured, distinctive in having a strong dorsal anterior protuberance with heavy spines. Tibia I with a minute rod-like sensory seta. Length of body  $455\mu$ , including rostrum  $546\mu$ ; width  $323\mu$ .

*Male*.—In general similar to female. Propodosomal setae arranged as in female, but as far as can be determined the shield setae are simple, and the pair of inner shoulder setae appear to be simple. Hysterosoma with few setae, a single pair of long serrate anteromarginal setae; genital opening dorsal and in center of hysterosoma, the genital plates with three pairs of short simple setae, and anterior and lateral to the genital opening are three pairs of short setae as figured, only the outer pair appearing slightly serrate. Leg I not reaching to tip of rostrum; leg IV reaching past posterior margin of body. Length of body  $300\mu$ , including rostrum  $366\mu$ ; width  $260\mu$ .

*Type host*.—*Leucosticte australis*.

*Type locality*.—Guffey, Colo.

*Type*.—U.S.N.M. No. 1755.

The type female, two paratype females, and one male were collected by C. Rohwer, December 5, 1939. Another female was collected from robin at Fort Dupont, Del., April 13, 1933, by H. S. Peters.

This mite differs from *Neochyletiella heteropalpus* (Megnin) as figured, in that Megnin's species possesses much long body setae, except for the two anterior propodosomatic pair which are extremely short in the female.

## NEOCHEYLETIELLA ROHWERI, new species

## PLATE 6, FIGURE 10

*Female*.—Mite with small rostrum; palpal setae long, femur and genual setae serrate; tibial and ventral setae appear simple; palpal claw small; palpi similar to those of *N. heteropalpus*. Peritreme composed of 11 large segments. Propodosomatic shield rather rudimentary, small, longer than wide, and broadest near anterior edge, with a single pair of serrate setae. Anterior to shield is a pair of serrate setae arising from ventral portion of propodosoma; slightly laterad of shield setae is a pair of serrate setae, on posterior corners of propodosoma are three pairs of serrate setae; all propodosomatic setae are of medium length. On anterior portion of hysterosoma are two pairs of medium length lateral serrate setae and a pair of short dorsomedian serrate setae; on posterior margin of mite are three pairs of very long simple setae which are about twice as long as the other setae, two pairs are dorsal and the inner pair is slightly ventral. All body setae large. Tarsi as in *heteropalpus*, with a large tubercle on tarsus I and slightly smaller one on tarsus II; tarsal claws large. Length of body  $300\mu$ , including rostrum  $367\mu$ ; width  $233\mu$ .

*Type host*.—*Sitta pygmaea melanotis*.

*Type locality*.—Guffey, Colo.

*Type*.—U.S.N.M. No. 1756.

A single female was taken at the type locality by C. Rohwer, December 5, 1939.

This species is differentiated from *smallwoodae* by the presence of the long, simple posterior setae, in having larger (stronger) body setae, and in having comparatively larger tarsal claws.

## NEOCHEYLETIELLA CHANAYI (Berlese and Trouessart), new combination

## PLATE 6, FIGURES 11-13

*Cheyletiella chanayi* BERLESE and TROUSSERT, Bull. Bibl. Sci. Ouest., vol. 2, p. 135, 1889.—BERLESE, Acari, Myriapoda et Scorpiones hucusque in Italia reperta, Prostigmata, fasc. 56, No. 3, 1889.

*Female*.—Mite with broad rostrum; slender but short palpi. Femur of palpi with short simple setae on venter and a long serrate dorsal seta; genu with a long dorsal serrate seta and a simple lateral seta; tibia with simple setae of varying lengths as figured; claw small, curved and apparently without teeth. Peritreme composed of long, slender segments. Propodosomal shield small, anterolateral margin with a pair of long outer setae and a pair of short inner setae; posterior portion of shield with a pair of long and a pair of short setae. Hysterosoma without shield; two pairs of short simple anterior setae and a pair of posterior dorsal submedian setae, all of which appear to arise



from small plates; near posterior margin of body a pair of long setae and several pairs short setae. Two pairs of long setae arising near genital opening and extending past margin of body. Legs short, leg I reaching to tip of palpus and leg IV to posterior edge of abdomen. Tarsus I with two claws and comblike pulvillus, and with simple terminal setae. Tibia I with a short rodlike sensory seta and several simple setae of varying lengths. Length of body  $493\mu$ , including rostrum  $553\mu$ ; width  $333\mu$ .

*Type host.*—*Fringilla coelebs*.

*Type locality.*—Lyon, France.

The above description is based on a United States National Museum specimen which is from the Berlese collection. In Europe the mite has been reported from *Motacilla alba* and *Fringilla coelebs*.

#### NEOCHEYLETIELLA PINGUIS (Berlese), new combination

*Cheyletiella pinguis* BERLESE, Acari, Myriapoda et Scorpiones hucusque in Italia reperta, Prostigmata, fasc. 56, No. 3, fig. 2, 1889.

*Cheyletiella pinguis* (Berlese) OUDEMANS, Mém. Soc. Zool. France, vol. 19, p. 213, 1906.—WOMERSLEY, Rec. South Austral. Mus., vol. 7, No. 1, p. 59, figs. 6A, B, C, 1941.

*Type host.*—*Turdus merula* (= *Merula nigra*).

*Type locality.*—Florence, Italy.

#### Genus CHELETOIDES Oudemans

*Cheletoides* OUDEMANS, Ent. Ber. Nederl. Ver., vol. 1, fasc. 17, p. 154, 1904.

*Type*, *Syringophilus uncinatus* Heller (monotypic).

#### CHELETOIDES UNCINATA (Heller)

*Syringophilus uncinatus* HELLER, Die Schmarotzer . . . p. 188, 1880.

*Cheletoides uncinatus* (Heller) OUDEMANS, Ent. Ber. Nederl. Ver., vol. 1, fasc. 17, p. 154, 1904.

*Cheletoides uncinata* (Heller) OUDEMANS, Mém. Soc. Zool. France, vol. 19, pp. 204–211, figs. 63–66, 1906.

*Type host.*—*Pavo cristatus*.

*Type locality.*—Kiel, Germany. According to Oudemans (1906), this species probably is to be found wherever the host is established.

#### Genus CHEYLETUS Latreille

*Cheyletus* LATREILLE, Précis des caractères génériques des insectes . . . p. 179, 1796.

*Eutarsus* HESSLING, Illustr. Med. Zeit., vol. 1, p. 258, 1852. (*Type*, *Eutarsus cancriformis* Hessling (monotypic) = *Cheyletus eruditus* (Schrank).)

*Cheletes* (Latreille) OUDEMANS, Tijdschr. Ent., vol. 46, p. 121, 1903.

*Type*, *Acarus eruditus* Schrank (monotypic).

In the other genera of the Cheyletidae most of the species are based on the females, but in *Cheyletus* we find some species based entirely

on heteromorphic males. Because of this difficulty the key to the species is given for both sexes. It is hoped that in the future the sexes can be correlated.

*Cheyletus butleri* Hughes and *C. munroi* Hughes, both males, were described by A. M. Hughes in "The Mites Associated with Stored Food Products," Ministry of Agriculture and Fisheries, London, 1948, which was received after this paper was submitted for publication.

## KEY TO THE SPECIES OF CHEYLETUS

## Females

- |                                                                                                                                |                               |
|--------------------------------------------------------------------------------------------------------------------------------|-------------------------------|
| 1. Dorsal setae pilose.....                                                                                                    | 2                             |
| Dorsal setae smooth (?).....                                                                                                   | parumsetosus Karpelles*       |
| 2. Inner palpal comb with at least 8 teeth.....                                                                                | 3                             |
| Inner palpal comb with 6 teeth.....                                                                                            | promptus Quedemans*           |
| 3. Femur of palpus distinctly longer than wide.....                                                                            | 4                             |
| Femur of palpus about as long as wide.....                                                                                     | 6                             |
| 4. Palpal claw with 3 distinct basal teeth.....                                                                                | 5                             |
| Palpal claw with 2 simple basal teeth; posterior dorsal shield with 3 pairs of setae.....                                      | eruditus (Schrank)            |
| 5. Tarsus I sensory organ shorter than the guard seta.....                                                                     | hendersoni, new species       |
| Tarsus I sensory organ longer than the guard seta.....                                                                         | doddi, new species            |
| 6. Anterior dorsal shield with 4 pairs of dorsal setae; posterior shield with at least 2 pairs.....                            | 7                             |
| Anterior dorsal shield with 6 pairs of dorsal setae; posterior shield with 1 pair.....                                         | strenuus Oudemans             |
| 7. Shoulder setae simple, pilose.....                                                                                          | 8                             |
| Shoulder setae lanceolate; posterior shield with 3 pairs of marginal setae.....                                                | trouessarti Oudemans          |
| 8. Claw of palpus with more than 1 tooth.....                                                                                  | 9                             |
| Claw of palpus with 1 tooth.....                                                                                               | fortis Oudemans               |
| 9. Palpal claw with 2 teeth.....                                                                                               | 12                            |
| Palpal claw with 3 or more teeth.....                                                                                          | 10                            |
| 10. Palpal claw with 3 teeth.....                                                                                              | 11                            |
| Palpal claw with 4 teeth, the basal pair smaller than others.....                                                              | linsdalei, new species        |
| 11. Posterior shield scarcely narrower than anterior shield; dorsal palpal femoral seta pilose.....                            | schneideri Oudemans           |
| Posterior shield considerably narrower than anterior; dorsal palpal femoral seta simple.....                                   | trux Rodendorf                |
| 12. Posterior dorsal shield with less than 4 pairs of marginal setae.....                                                      | 13                            |
| Posterior dorsal shield with 4 pairs of marginal setae; tarsus I guard seta pilose, about 4 times as long as sensory seta..... | cacahuamilpensis, new species |
| 13. Posterior shield with 3 pairs of marginal setae.....                                                                       | 14                            |
| Posterior shield with 2 pairs of marginal setae; tarsus I guard seta pilose, about twice as long as sensory seta.....          | beauchampi, new species       |
| 14. Tarsus I guard seta not longer than sensory seta.....                                                                      | 16                            |
| Tarsus I guard seta about twice as long as sensory seta.....                                                                   | 15                            |
| 15. Sensory seta on tarsus I strongly lanceolate.....                                                                          | aversor Rodendorf             |
| Sensory seta on tarsus I slightly lanceolate.....                                                                              | davisi, new species           |

\* See p. 319.

16. A distinct ventral condyle on venter of rostrum over trochanter; shoulder seta smooth; coxa III with a lanceolate-serrate seta----- *rapax* Oudemans  
 A minute ventral condyle on venter of rostrum over trochanter; shoulder seta pilose; coxa III with a simple pilose seta----- *malaccensis* Oudemans

## Males

1. Palpal claw with a single tooth----- 2  
 Palpal claw with more than 1 tooth----- 15
2. Dorsal anterior plate with 5 pairs of setae----- 3  
 Dorsal anterior plate with 6 pairs of setae----- 4
3. Palpal claw with a strong basal tooth; palpal femoral seta extending to tip of palpal claw----- *trouessarti* Oudemans  
 Palpal claw with a weak, hardly discernible basal tooth; palpal femoral seta not surpassing palpal tibia----- *trux* Rodendorf
4. Femur of palpus swollen----- 5  
 Femur of palpus not swollen----- 8
5. Dorsal posterior plate with 5 pairs of setae----- 6  
 Dorsal posterior plate with 6<sup>1</sup> pairs of setae----- *malaccensis* Oudemans
6. No pilose seta between coxal plates II and III----- 7  
 A pilose seta between coxal plates II and III----- *fortis* Oudemans
7. Small tooth on palpal claw; inner palpal comb without teeth on proximal portion----- *audax* Oudemans  
 Large tooth on palpal claw; inner palpal comb with teeth along entire inner edge----- *rapax* Oudemans
8. Palpal claw tooth lateral----- 9  
 Palpal claw tooth more or less dorsal----- *alacer* Oudemans
9. Palpal claw tooth distinct, width equal to length----- 10  
 Palpal claw tooth very weak, hardly discernible, much longer than wide. *carnifex* Zakhvatkin
10. Inner comb with 5 or 6 teeth----- 11  
 Inner comb with 8 or more teeth----- 12
11. Rostrum narrow, with smooth edges----- *venator* Vitzthum  
 Rostrum broadening toward rear and with tuberculate edges. *rabiosus* Rodendorf
12. Inner comb with 8 or 9 teeth----- 13  
 Inner comb with about 18 teeth----- *acer* Oudemans
13. Anterior to peritreme 4-6 longitudinal rows of tubercles----- 14  
 Anterior to peritreme a transverse row of tubercles directed back toward peritreme----- *ferox* Berlese and Trouessart
14. Dorsal posterior plate with straight lateral border; femur of palpus without swelling; in front of peritreme is a space without tubercles. *intrepidus* Oudemans  
 Dorsal posterior plate with concave lateral borders; femur of palpus with slight inner swelling; a mass of tubercles in front of peritreme. *vorax* Oudemans
15. Rostrum with lateral teeth----- 16  
 Rostrum smooth, without lateral teeth; palpal claw with 2 small but well-defined teeth----- *eruditus* (Schrank)

<sup>1</sup>Based on Oudemans's key (1906). The shield boundary is not distinct, and there may be five pairs of setae present, thus keying out to *rapax*, which, when types can be studied, may prove to be the same as *malaccensis*.

16. Rostrum with sharply angular protuberances or lateral teeth; palpal claw with 2 or 3 weak teeth; palpal claws broad and slightly curved.

furibundus Rodendorf

Rostrum with small, readily discernible lateral teeth; palpal claw with 2 short thick teeth; palpal claw thin and long----- praedabundis Kuzin

CHEYLETUS ERUDITUS (Schrank)

PLATE 7, FIGURES 14-16

*Acarus eruditus* SCHRANK, Enumeratio insectorum Austriae indigenorum, p. 513, 1781.

*Eutarsus cancriformis* HESSLING, Illustr. Med. Zeit., vol. 1, p. 258, 1852.—  
OUDEMANS, Tijdschr. Ent., vol. 81, p. lxxv, 1938.

*Cheyletus ferox* BANKS, Proc. Ent. Soc. Washington, vol. 7, p. 134, 1906 (new synonymy).

*Cheletes eruditus* (Schrank) OUDEMANS, Mém. Soc. Zool. France, vol. 19, pp. 84-88, fig. 18, 1906.

*Cheyletus seminivorus* (Packard) EWING, Illinois Univ. Studies, vol. 3, No. 6, pp. 76, 77, 1909; Journ. Econ. Ent., vol. 5, No. 5, pp. 416-420, 1912.

*Cheyletus eburneus* HARDY, in Andre, Ann. des Epiphyt. Année 19, No. 6, pp. 336, 344, 349, 350, 1933.

*Female*.—Palpus slender; femur of palpus  $1\frac{1}{2}$  times as long as wide, the dorsal seta about as long as the segment; genual seta on posterior margin of segment; palpal claw relatively weak, with 2 basal teeth of equal size; outer comb with 15 teeth, about  $1\frac{1}{2}$  times as long as inner comb which has 16 teeth. Rostrum simple, narrow, broadening slightly to rear; peritreme with 9 or 10 segments. Propodosomatic shield rounded anteriorly, widening posteriorly, covering most of the propodosoma, with four pairs of narrow lanceolate pilose marginal setae. Hysterosomal shield small, rounded, with three pairs of marginal setae. Tarsus I,  $146\mu$  long; tibia I,  $93\mu$  long; tarsal sensory setae about one-fourth as long as tarsus; guard seta simple, one-half as long as sensory seta; small rodlike sensory seta on tibia I. Leg I,  $428\mu$  long; leg IV,  $400\mu$  long. Length of body  $514\mu$ , including rostrum  $714\mu$ ; width  $371\mu$ .

*Male* (after Oudemans, 1906).—Similar to female but with two pairs of dorsosubmedian propodosomatic setae and five pairs of marginal setae on posterior shield.

*Type habitat*.—Unknown.

*Type locality*.—Austria.

This is a widespread, free-living species recorded from Australia, Holland, India, Portugal, Mexico, Scotland, Jugoslavia, England, Germany, Japan, Colombia, Chile, Madeira, and the United States. In the United States it has been taken from house sparrow, Ithaca, N. Y.; on *Sciurus carolinensis* at Thomasville, Ga.; and from California, Minnesota, and Oregon in warehouses, in grains. The description of the female is based on material from Voorhout, Holland, intercepted at Philadelphia, Pa.



## CHEYLETUS HENDERSONI, new species

## PLATE 7, FIGURES 17-19

*Female*.—Femur of palpus  $1\frac{1}{2}$  times as long as wide; genual setae located on posterior margin of segment; palpal claw with 3 basal teeth, but 1 specimen with 4 basal teeth on 1 side; outer comb about one-third longer than inner, with about 17 teeth and inner comb with about 24 teeth. Rostrum simple, widening posteriorly. Anterior shield large, covering propodosoma, with four pairs of pilose marginal setae. Posterior shield large and covering most of hysterosoma, narrowing toward rear, with two pairs of marginal setae. Tarsus I,  $83\mu$  long; tibia I,  $50\mu$  long; tarsus with a short rodlike sensory seta and a longer simple guard seta; short rodlike set on tibia I. Length of body  $313\mu$ , including rostrum  $446\mu$ ; width  $190\mu$ .

*Type habitat*.—On "mummy."

*Type locality*.—Arkansas Cave, Ark.

*Type*.—U. S. N. M. No. 1757.

Female type and three paratypes (two in poor condition) collected on a "mummy" by W. C. Henderson, letter of July 16, 1935.

This mite is similar to *Cheyletus eruditus* (Schrank) but differs in the number of palpal claw teeth, peritreme, dorsal shields, and in the arrangement of the setae on tarsus I.

## CHEYLETUS DODDI, new species

## PLATE 7, FIGURES 20-22

*Female*.—Palpal femur  $1\frac{1}{2}$  times as long as wide; femoral and genual setae long, pilose; genual seta located on posterior margin of segment; palpal claw with 3 basal teeth, the 2 posterior teeth appear to be a bifurcation of a single large tooth; palpal combs of about equal length and both with about 15 teeth. Rostrum simple, widening toward rear; peritreme composed of small segments. Anterior shield large, covering most of propodosoma, rounded anteriorly and convex posteriorly, with four pairs of long, simple, pilose marginal setae. Hysterosomal shield with rounded corners, narrowing posteriorly, and with two pairs of marginal setae. Tarsus I,  $113\mu$  long; tibia I,  $73\mu$  long; tarsus I with a rodlike sensory organ of medium length; guard seta simple, about half as long as sensory organ; tibia with a short rodlike sensory seta and several long simple setae. Leg I about  $335\mu$  long. Length of body  $386\mu$ , including rostrum  $500\mu$ ; width  $233\mu$ .

*Type habitat*.—In "feed."

*Type locality*.—Ithaca, N. Y.

*Type*.—U.S.N.M. No. 1758.

The female type and three paratypes were collected by C. R. Crosby (letter of September 28, 1922) in feed at Cornell University, Ithaca,

N. Y. Three additional female paratypes were collected by F. O. Dodd at New York, March 1, 1935, when intercepted in quarantine in valones (nuts) originating in Turkey.

This species is similar to *Cheyletus hendersoni*, new species, but differs in having the anterior tooth on the palpal claw smaller, in the relative sizes of the palpal comb and number of teeth, in the shape of the dorsal shields, and in the relative lengths of tarsus I guard setae to the sensory setae.

#### CHEYLETUS STRENUUS Oudemans

*Cheletes cruditus (femina monstrosa)* OUDEMANS, Tijdschr. Ent., vol. 46, p. 127, pl. 13, fig. 46, 1904.

*Cheletes strenuus* OUDEMANS, Ent. Ber. Nederl. Ver., vol. 1, fasc. 18, p. 161, 1904; Mém. Soc. Zool. France, vol. 19, p. 83, 1906.

*Type habitat and type locality.*—Unknown.

#### CHEYLETUS TROUSSERTI Oudemans

*Cheyletus trouessarti* OUDEMANS, Tijdschr. Nederl. Dierk. Ver., ser. 2, vol. 8, p. xvi, 1903.

*Cheletes trouessarti* OUDEMANS, Tijdschr. Ent., vol. 46, pp. 129-132, pl. 13, figs. 47-51; Mém. Soc. Zool. France, vol. 19, p. 88, 1906.

*Cheyletus macrocherus* HARDY, in Andre, Ann. des Epiphyt. Année 19, No. 6, pp. 350, 351, 1933.

*Type habitat and type locality.*—Unknown.

#### CHEYLETUS FORTIS Oudemans

##### PLATE 7, FIGURES 23-25

*Cheletes fortis* OUDEMANS, Ent. Ber. Nederl. Ver., vol. 1, fasc. 18, p. 161, 1904; Mém. Soc. Zool. France, vol. 19, pp. 96-99, figs. 22, 23, 1906.

*Female.*—Large mite with strong palpi. Palpal femur as wide as long; dorsal femoral and genual setae pilose, genual seta on posterior margin of segment; palpal claw with a large single basal flat tooth; outer comb with about 20 teeth; inner comb only two-thirds as long as outer and with about 27 teeth. Rostrum simple, broadening toward rear; peritreme composed of medium-sized segments. Anterior shield large but not covering entire propodosoma, anterior corners broadly rounded, widening to rear and with four pairs of lanceolate serrate marginal setae. Hysterosomal shield small, almost square but narrowing slightly to rear, with three pairs of lanceolate serrate marginal setae. Tarsus I, 150 $\mu$  long; tibia I, 100 $\mu$  long; tarsus I with short lanceolate sensory seta and a still shorter simple guard seta; tibia I with a short rodlike sensory seta. Leg I, 460 $\mu$  long; leg IV, 428 $\mu$  long. Length of body 500 $\mu$ , including rostrum 743 $\mu$ ; width 428 $\mu$ .

*Type host.*—On skin of parakeet.

*Type locality*.—New Guinea (specimen in Muséum d'Histoire Naturelle, Paris).

The description was made from two specimens on one slide with the following data (translation, original in Japanese): "Public Health Department of Formosa, Research Laboratory of Medical Zoology." Two other specimens were collected on *Callosciurus sladeni midas* Thomas at Myitkyina, Burma, August 6, 1945, by members of the United States of America Typhus Commission.

This species is closely related to *Cheyletus malaccensis* Oudemans and may prove to be only a variety.

CHEYLETUS LINSDALEI, new species

PLATE 8, FIGURES 26-29

*Female*.—Palpi of normal size; palpal femur perhaps slightly longer than wide; femoral and genual setae serrate, the genual seta short, on posterior margin of segment, reaching only to basal part of palpal claw; palpal claw usually with 4 teeth but occasionally one side with 3 teeth; outer palpal comb with about 17 teeth, inner comb with about 22 teeth. Rostrum short, broadening to rear; peritreme with eight pairs of large segments. Propodosomal shield widening to rear with four pairs of marginal setae which are clublike, serrate; on posterior portion of shield at least three pairs of setal bases which probably bore staghornlike setae. Hysterosomal shield broad, narrowing only slightly to rear, with three pairs of clublike, serrate marginal setae and five pairs of dorsomedian setal bases as found on the anterior shield; a pair of clublike setae laterad of anterior corners of posterior shield; body shoulder setae long, simple, serrate. Tarsus I, 83 $\mu$  long; tibia I, 50 $\mu$  long; sensory seta on tarsus I short, not much longer than width of base of tarsus; guard seta simple, shorter than sensory seta. Body about 353 $\mu$  long, including rostrum about 500 $\mu$ ; width about 140 $\mu$ .

*Type habitat*.—On *Citellus beecheyi*.

*Type locality*.—Monterey, Calif.

*Type*.—U.S.N.M. No. 1760.

The type female was collected January 28, 1943, and four paratypes were taken December 3 and 4, 1942, on *Citellus beecheyi*, Monterey, Calif., by J. M. Linsdale.

This species differs from others in the arrangement of the teeth on the palpal claw and especially in the type of dorsal body setae.

CHEYLETUS SCHNEIDERI Oudemans

*Cheyletus schneideri* OUDEMANS, Tijdschr. Nederland. Dierk. Ver., ser. 2, vol. 8, p. xv, 1903; Mém. Soc. Zool. France, vol. 16, p. 16, pl. 2, figs. 52-54, 1904.  
*Cheletes schneideri* OUDEMANS, Mém. Soc. Zool. France, vol. 19, p. 84, 1906.

*Type habitat*.—Dead leaves.

*Type locality*.—Italy.

CHEYLETUS TRUX Rodendorf

*Cheyletus trux* RODENDORF, Wiss. Ber. Moskauer Staats Univ. Zool., vol. 42, pp. 87, 88, figs. 1, 2, 17, 19, 21, 1940.

*Type habitat*.—Granaries and sheep fodder.

*Type locality*.—Ivanovo; Agriz, Union of Soviet Socialist Republics.

CHEYLETUS CACAHUAMILPENSIS, new species

PLATE 8, FIGURES 30-34

*Female*.—Palpi strong; no basal condyle; femur about as long as wide, with a short pilose seta; genual seta pilose, on posterior margin of segment; palpal claw with 2 basal teeth, the proximal tooth about twice as long as the distal with a nearly flat surface; outer palpal comb with about 18 teeth; inner comb two-thirds as long and with 20 teeth. Rostrum of normal size; peritreme composed of eight large segments. Anterior shield covering most of propodosoma; four pairs of long, lanceolate serrate marginal setae; one pair of posterior dorsosubmedian staghornlike setae. Hysterosomal shield with four pairs of marginal setae and one pair of dorsosubmedian staghornlike setae on anterior margin of shield. Genital-anal setae appear simple, although the anal setae may be serrate. Tarsus I,  $80\mu$  long; tibia I,  $34\mu$  long, tarsus I sensory seta short, rodlike; guard seta pilose, four times as long as sensory seta; tibia I with small clavate seta and short pilose setae. Coxae III with a lanceolate serrate seta. Length of body  $267\mu$ , including rostrum  $380\mu$ ; width  $200\mu$ .

*Type habitat*.—In bat guano.

*Type locality*.—Cave of Cacahuamilpa, Guerrero, Mexico.

*Type*.—In the collection of F. Bonet, Mexico, D. F.

The female type and a nymph were collected December 15, 1939, by F. Bonet.

The setal pattern of the dorsal shields and the tarsus I sensory and guard setae are distinctive.

CHEYLETUS BEAUCHAMPI, new species

PLATE 8, FIGURES 35-38

*Female*.—Palpi and rostrum of normal size. Palpal femur not much longer than broad; genual seta on posterior margin of segment; tarsal claw with 2 basal teeth, the lower tooth flat, not notched; outer comb with about 17 teeth; inner comb with 29 teeth and almost as long as outer comb. Rostrum gradually widening to rear; peritreme simple, composed of medium-sized segments. Lateral margins of pro-



podosomal shield concave; four pairs of lanceolate serrate marginal setae and a pair of posterior dorsosubmedian staghornlike setae. Shoulder setae simple, pilose. Hysterosomal shield almost square, narrowing slightly to rear, with posterior margin concave; two pairs of lanceolate serrate marginal setae and a pair of posterior dorso-submedian staghornlike setae. Anterior to the posterior plate is a pair of lanceolate serrate setae; posterior to plate two pairs of simple, pilose setae. Anal setae pilose; genital setae simple. Legs short, legs I and IV about  $335\mu$  long; tarsus I,  $120\mu$  long; tibia I,  $67\mu$  long; tarsus I sensory seta only one-half as long as the simple guard seta; tibia I sensory seta lanceolate rather than clavate. Length of body  $414\mu$ , including rostrum  $586\mu$ ; width  $300\mu$ .

*Type habitat*.—In straw mats.

*Type locality*.—Portugal, intercepted at Boston, Mass.

*Type*.—U.S.N.M. No. 1761.

The mite was collected December 11, 1939, by J. T. Beauchamp.

The palpal claws, comb, and hysterosomal shield setae are distinctive.

#### CHEYLETUS AVERSOR Rodendorf

*Cheyletus aversor* RODENDORF, *Wiss. Ber. Moskauer Staats Univ. Zool.*, vol. 42, pp. 86-87, figs. 18, 20, 1940.

*Type habitat*.—Unknown.

*Type locality*.—Ordzhonikidze, Union of Soviet Socialist Republics.

#### CHEYLETUS DAVISI, new species

##### PLATE 8, FIGURES 39-42

*Female*.—Palpi and rostrum of normal size. Palpal femur not much longer than broad; genual seta on posterior margin of segment; palpal claw with 2 basal teeth, the lower one large and notched; outer comb with 15 teeth, about one-third longer than inner comb which has 20 teeth. Rostrum broadening posteriorly; peritreme composed of medium-sized segments. Propodosomatic shield rounded anteriorly; lateral margins rounded; posterior margin almost straight; four pairs of lanceolate serrate marginal setae; a single pair of posterior dorsosubmedian staghornlike setae. Shoulder setae simple, pilose. Hysterosomal shield almost square, slightly narrowing toward rear, posterior margin straight; three pairs of lanceolate serrate marginal setae and a single pair of submedian staghornlike setae. Two pairs of dorsoposterior pilose setae. Anal setae pilose; two pairs of long, simple, genital setae. Legs short; leg I,  $280\mu$  long, not reaching much past palpus; leg IV,  $266\mu$  long, reaching past posterior margin of body. Tarsus I,  $97\mu$  long; tibia I,  $57\mu$  long; tarsus I sensory seta short,

about one-half as long as the simple guard seta; ventral tarsal seta pilose; tibia I sensory seta clavate, short. Length of body  $428\mu$ , including rostrum  $571\mu$ ; width  $314\mu$ .

*Type habitat*.—In onions.

*Type locality*.—Italy, intercepted at Boston, Mass.

*Type*.—U.S.N.M. No. 1762.

A single specimen was collected July 6, 1938, by Davis and Freeman.

The palpal claws and combs distinguish this from the closely related species.

#### CHEYLETUS RAPAX Oudemans

*Cheletes rapax* OUDEMANS, Ent. Ber. Nederl. Ver., vol. 1, fasc. 12, p. 84, 1903 (the female of this species is wrongly cited as *Cheletes vorax* Oudemans on p. 84); Mém. Soc. Zool. France, vol. 19, pp. 103–108, figs. 25, 26, 1906.

*Type habitat*.—On skins of birds and mammals.

*Type locality*.—Uncertain, believed to be either the Marianas Islands or Colombia.

There is a possibility that this species may be the same as *C. malaccensis* Oudemans.

#### CHEYLETUS MALACCENSIS Oudemans

##### PLATE 9, FIGURES 43–49

*Cheletes malaccensis* OUDEMANS, Ent. Ber. Nederl. Ver., vol. 1, fasc. 12, p. 84, 1904; Mém. Soc. Zool. France, vol. 19, pp. 88–96, figs. 19–21, 1906.

*Female*.—Strong palpi; a minute ventral condyle between palpal coxa and trochanter; palpal femur longer than wide with dorsal pilose seta; genual seta pilose, on posterior margin of segment; dorsal tibial seta simple but ventral seta pilose; palpal claw with a large flat basal tooth and a smaller single distal tooth as figured; outer palpal comb with 16 teeth; inner comb shorter and with 20 teeth. Rostrum normal; peritreme composed of small segments. Propodosomatic shield relatively small, with rounded corners, four pairs of lanceolate serrate marginal setae. Shoulder setae pilose. Hysterosomal shield rectangular, longer than wide, with three pairs of lanceolate serrate marginal setae. Tarsus I,  $146\mu$  long; tibia I,  $83\mu$  long; tarsus I with a short lanceolate sensory seta and a simple guard seta of equal length; tibia I with a short rodlike sensory seta and several long pilose setae. Legs I and IV,  $428\mu$  long. Coxae III with a pilose seta. Length of body  $514\mu$ , including rostrum  $714\mu$ ; width  $342\mu$ .

*Male*.—Long, slender palpi; palpal femur about twice as long as wide with serrate seta which is shorter than tarsus; femoral and genual setae as in female; palpal tibia with a simple dorsal seta; palpal claw with a single small basal tooth; outer comb with 12 teeth; inner comb shorter, with 9 or 10 teeth. Gnathosoma deeply notched anteriorly; anterior dorsum of rostrum covered with sharp tubercles; peri-

treme small; that part of rostrum overlying the palpal trochanter has two sharp teeth as figured. Anterior shield relatively large, covering most of propodosoma; four pairs of lanceolate serrate marginal setae; two pairs of dorsosubmedian lanceolate serrate setae. Hysterosomal shield narrowing posteriorly; with four or five pairs of lanceolate serrate marginal setae. Tarsus I,  $113\mu$  long; tibia I,  $90\mu$  long; tarsus I with a large lanceolate sensory organ and a small simple guard seta; tibia I with a short rodlike sensory seta. Leg I,  $428\mu$  long; leg IV,  $328\mu$  long. Length of body  $400\mu$ , including rostrum  $571\mu$ ; width  $285\mu$ .

*Type habitat*.—On bird skin, *Psittinus cyanurus* (= *P. incertus*), probably preying on feather mites.

*Type locality*.—Malacca, Straits Settlements.

Oudemans (1906) gave the above information on habitat and distribution. The following interception records are available (if taken on plant material the host is not listed): Azores, at New York, N. Y.; Belgium, at Charleston, S. C.; Holland, at Philadelphia, Pa.; Italy, at New York, N. Y.; Portugal, at New Orleans, La.; China, at Hawaii; Japan, at Seattle, Wash.; Java, at Hawaii; Philippine Island, at San Francisco, Calif.; Straits Settlements, at Norfolk, Va.; Malaya, at Hawaii; west coast of Africa, at Philadelphia, Pa.; Barbados, at New York, N. Y.; British Guinea, at New York, N. Y.; Colombia, at New York, N. Y.; Cuba, at Norfolk, Va.; Mexico, at Brownsville, Tex. Material is also on hand from Cuzco, Peru; Barranquilla, Colombia, on *Araeocerus fasciatus* eggs; St. Croix, Virgin Islands, on domestic fowl; Richmond, Va., on *Ephestia elutiella*; Shreveport, La.; Redwing, Minn., on wheat screenings; Dallas, Tex.; Atlanta, Ga., in "powder"; Farrington, Ill.

*Cheyletus malaccensis* resembles closely *C. rapax* Oudemans, and the differences between them may prove to be a variation within a single species. The fact that there appear to be five pairs of setae on the hysterosomal shield strengthens this belief.

#### CHEYLETUS AUDAX Oudemans

*Cheletes audax* OUDEMANS, Ent. Ber. Nederl. Ver., vol. 1, fasc. 18, p. 162, 1904; Mém. Soc. Zool. France, vol. 19, pp. 99–103, fig. 24, 1906.

*Type host*.—Skin of "bird."

*Type locality*.—New Guinea (in Muséum d'Histoire Naturelle, Paris).

#### CHEYLETUS ALACER Oudemans

*Cheletes alacer* OUDEMANS, Ent. Ber. Nederl. Ver., vol. 1, fasc. 18, p. 162, 1904; Mém. Soc. Zool. France, vol. 19, pp. 108–112, fig. 27, 1906.

*Type host*.—Skin of *Pyrrhura cruentata* (= *Conurus cruentata*).

*Type locality*.—Colombia (in Muséum d'Histoire Naturelle, Paris).

## CHEYLETUS CARNIFEX Zakhvatkin

*Cheyletus carnifex* ZAKHVATKIN, A short key to the granary mites, 2d ed., p. 30, 1935 (?).—RODENDORF, Wiss. Ber. Moskauer Staats Univ. Zool., vol. 42, pp. 89, 90 figs. 27, 28, 1940.

*Type habitat*.—Unknown.

*Type locality*.—Moscow, Union of Soviet Socialist Republics.

## CHEYLETUS VENATOR Vitzthum

*Cheyletus venator* VITZTHUM, Arch. für Naturg., vol. 84A, No. 6, p. 2, figs. 1-3, 1920 (1918).

*Type habitat*.—In nest of *Kopthortosoma nigrita*, preying on acarids.

*Type locality*.—German East Africa.

## CHEYLETUS RABIOSUS Rodendorf

*Cheyletus rabiosus* RODENDORF, Wiss. Ber. Moskauer Staats Univ. Zool., vol. 42, p. 86, fig. 14, 1940.

*Type habitat*.—On wheat.

*Type locality*.—Kazakh, Union of Soviet Socialist Republics.

## CHEYLETUS ACER Oudemans

*Cheletes acer* OUDEMANS, Ent. Ber. Nederl. Ver., vol. 1, fasc. 18, p. 162, 1904; Mém. Soc. Zool. France, vol. 19, pp. 112-115, fig. 28, 1906.

*Type host*.—"Birdskin."

*Type locality*.—Colombia (in Muséum d'Histoire Naturelle, Paris).

## CHEYLETUS FEROX Trouessart

*Cheyletus ferox* TROUËSSART, Bull. Bibl. Sci. Ouest., vol. 2, p. 134, 1889.—OUDEMANS, Mém. Soc. Zool. France, vol. 19, pp. 115-119, fig. 29.

*Type host*.—Bird skin, *Coracopsis nigra barklyi*.

*Type locality*.—Ile Praslin, Seychelles (island in Indian Ocean).

## CHEYLETUS INTREPIDUS Oudemans

*Cheletes intrepidus* OUDEMANS, Ent. Ber. Nederl. Ver., vol. 1, fasc. 12, p. 84, 1903; Mém. Soc. Zool. France, vol. 19, pp. 119-122, fig. 30, 1906.

*Type host*.—Bird skin.

*Type locality*.—Colombia (in Muséum d'Histoire Naturelle, Paris).

## CHEYLETUS VORAX Oudemans

*Cheletes vorax* OUDEMANS, Ent. Ber. Nederl. Ver., vol. 1, fasc. 12, p. 84, 1903 (by error the female of *rapax* is cited here under the name of *vorax*); Mém. Soc. Zool. France, vol. 19, pp. 122-126, fig. 31, 1906.

*Type host*.—On bat.

*Type locality*.—Marianas Islands (in Muséum d'Histoire Naturelle, Paris).

## CHEYLETUS FURIBUNDUS Rodendorf

*Cheyletus furibundus* RODENDORF, Wiss. Ber. Moskauer Staats Univ. Zool., vol. 42, p. 85, fig. 15, 1940.



*Type habitat*.—Unknown.

*Type locality*.—Ivanov, Union of Soviet Socialist Republics.

CHEYLETUS PRAEDABUNDUS Kuzin

*Cheyletus praedabundus* KUZIN, in Rodendorf, Wiss. Ber. Moskauer Staats Univ. Zool., vol. 42, p. 85, 1940.

*Type habitat*.—Unknown.

*Type locality*.—Rostov on Don, Union of Soviet Socialist Republics.

UNCERTAIN SPECIES

CHEYLETUS SAEVUS Oudemans

*Cheletes eruditus* (Schrank) OUDEMANS, Tijdschr. Ent., vol. 46, p. 123, pl. 12, figs. 34–47, 1904 (protonymph).

*Cheletes saevus* OUDEMANS, Ent. Ber. Nederl. Ver., vol. 1, fasc. 18, 161, 1904; Mém. Soc. Zool. France, vol. 19, p. 84, 1906.

*Type habitat*.—In dust.

*Type locality*.—Netherlands.

There is the possibility that this may be an immature stage of *Cheyletus eruditus* (Schrank).

CHEYLETUS CLAVISPINUS Banks

*Cheyletus clavispinus* BANKS, Can. Ent., vol. 34, p. 172, 1902.

*Type habitat*.—Beneath wings of an *Aradus*.

*Type locality*.—Indianapolis, Ind.

Inadequately described and not figured. Type not found.

CHEYLETUS PATAGIATUS Nordenskiöld

*Cheyletus patagiatus* NORDENSKIÖLD, Medd. Soc. Faun. Fenn., vol. 26, p. 37, figured, 1900.

*Type habitat*.—Unknown.

*Type locality*.—Finland?

CHEYLETUS BURMITICUS Cockerell

*Cheyletus burmiticus* COCKERELL, Psyche, vol. 24, p. 41, fig. 2, 1917.

From Burmese amber; inadequately described and figured; palpi similar to those of *Cheyletus eruditus* (Schrank) in length and width of segments.

*Cheyletus nigripes* Mola (Zool. Anz., vol. 32, p. 43, fig. 3, 1907) is not a mite, but an insect.

Genus CHELETOPHYES Oudemans

*Cheletophyes* OUDEMANS, Ent. Ber. Nederl. Ver., vol. 4, fasc. 78, p. 101, 1914.

Type, *Cheletophyes vitzthumi* Oudemans (monotypic).

## KEY TO THE SPECIES OF CHELETOPHYES

1. Palpal femur about as wide as long..... 2  
     Palpal femur longer than broad; palpal setae rodlike, serrate; palpal claw with  
     a single tooth..... philippinensis, new species
2. Palpal femur setae squamiform, V-like..... 3  
     Palpal femur setae rodlike..... 4
3. Posterior part of rostral shield reticulated; tarsus I sensory seta twice as long  
     as guard seta..... hawaiiensis, new species  
     Posterior part of rostral shield longitudinally striated; sensory and guard  
     setae of tarsus I of same length..... marshalli, new species
4. Hysterosomal shield minute, on rear of abdomen..... vitzthumi Oudemans  
     Hysterosomal shield longer than propodosomal shield..... semenovi Kuzin

## CHELETOPHYES PHILIPPINENSIS, new species

## PLATE 9, FIGURES 50-54

*Female*.—Medium to large mite with rather thin palpi and medium-sized rostrum. Palpal femur only slightly swollen externally, about one-third longer than wide, dorsal seta rodlike, serrate, lateral ventral seta same; genual seta rodlike, serrate, on posterior margin of segment; palpal tibial setae simple; single tooth or claw on basal half near center; outer comb about one-third longer than inner, outer with about 23 teeth and inner comb with 26-28 teeth. Rostrum with shield as figured; peritreme simple, composed of small segments. Single pair eyes. Dorsal body setae long, rodlike, serrate, propodosomal setae 133-150 $\mu$  long and posterior abdominal setae 150 $\mu$  long. Propodosomal and hysterosomal shields large, covering entire dorsum of mite, coarsely striated; two pairs of dorsal submedian and four pairs of marginal setae, three pairs near eye and one pair in posterior corner; very long shoulder seta; hysterosoma with six pairs of marginal setae and three pairs of dorsal submedian setae. Legs I and IV long; about 400 $\mu$  long, and IV about 413 $\mu$  long. Tarsus I with sensory seta about twice as long as the simple guard seta, sensory seta about one-third as long as tarsus; tibia I with usual short sensory seta and four long serrate setae. Length of body 366 $\mu$ , including rostrum 520 $\mu$ ; width 280 $\mu$ .

*Type host*.—*Pandanus tectorius*.

*Type locality*.—Bataan, Philippine Islands.

*Type*.—U.S.N.M. No. 1763.

The type and one female paratype were collected July 26, 1920, by H. L. Sanford; a second slide with additional specimens has the same data.

Palpi and tarsi are distinctive.

The anal-genital region of this mite indicates it to be a female, although the dorsal and the marginal setae are rodlike instead of the staghorn type that normally occurs in females.

## CHELETOPHYES HAWAIIENSIS, new species

## PLATE 10, FIGURES 55-59

*Female*.—Rostrum and palpi narrow. Palpal femur swollen on outer margin, dorsal seta rodlike, serrate; dorsolateral setae split as figured; lateral ventral setae rodlike, serrate. There is no dorsal genual seta; the usual number of femoral setae is 4, but in this case there are 5, the extra one appearing to be the dorsolateral seta; tibial setae simple; palpal claw long, slender with 9 basal teeth; inner comb with about 34 teeth, weaker and shorter than outer comb which has about 20 teeth and is not as long as palpal claw. Rostrum covered with shield and patterned as figured; peritreme simple, composed of small segments. Propodosomal and hysterosomal shield of about same length, covering most of body; four pairs of rodlike serrate setae on margin of anterior shield and four pairs of such setae on posterior shield margin; anterior shield with four pairs of dorsal submedian staghorn setae; three pairs of similar setae on shield on hysterosoma. One pair of eyes. Leg I,  $433\mu$  long; leg IV, only  $266\mu$  long. Tarsus I, although superficially like that of *Cheletomorpha lepidopterorum* in general structure, has minute claws; sensory seta rodlike, about as long as segment, guard seta serrate, one-half as long as sensory seta. Tibia with short rodlike sensory seta and three long serrate setae. Length of body  $300\mu$ , including rostrum  $413\mu$ ; width  $213\mu$ .

*Male*.—Similar to female generally but differing in the dorsal shields and type and arrangement of the dorsal setae. Anterior shield not covering all of propodosoma, with four pairs of long rodlike serrate marginal setae and three pairs of dorsosubmedian setae which are similar to the marginal setae. Two pairs dorsal shields on hysterosoma, a large anterior pair bearing three pairs of setae, and a small posterior pair with two pairs of shorter setae; a pair of dorsosubmedian setae between the anterior pair of shields and pair of setae behind the posterior pair of shields. Length of leg I,  $300\mu$ , leg IV,  $180\mu$ . Length of body  $300\mu$ , including rostrum  $400\mu$ ; width  $246\mu$ .

*Type habitat*.—On tropical fruits (free-living predator), associated with other mites.

*Type locality*.—Kailua, Oahu, Hawaii.

*Type*.—U.S.N.M. No. 1764.

The type female was collected from papaya fruits, Kailua, Oahu, Hawaii, March 26, 1941, by W. C. Look. Allotype male and 24 paratype females collected on litchi, Lanapape, Kanai, Hawaii, September 15, 1943, by T. Nishida. Six female paratypes were collected from loquat, Panoa Road, Honolulu, Hawaii, February 23, 1943, by T. Nishida; two from Chinese banana, Wailuku, Maui, Hawaii, August 31, 1943, by Holdaway and six from Hau, Waikiki, Honolulu, Hawaii, July 8, 1943, by W. Storey.

The mouth parts and tarsi I are distinctive.

## CHELETOPHYES MARSHALLI, new species

## PLATE 10, FIGURES 60-64

*Female*.—Rostrum and palpi broad. Palpal femur broadly rounded on outer margin; femoral and genual setae as in *C. hawaiiensis*; dorso-medial seta broadly lanceolate, serrate, dorsolateral seta broad, serrate, split as figured; ventral lateral seta rodlike, serrate; palpal tibial seta simple; claw strong, with 9 or 10 basal teeth; outer comb with about 24-26 teeth, about twice as long as inner comb which has 35-38 teeth. Rostrum broadening toward rear; shield striated longitudinally; peritreme simple, composed of small segments. Dorsal body shields with transverse tuberculate striations, propodosomal shield longer than hysterosomal, both shields covering body; one pair of eyes; four pairs of long rodlike serrate marginal setae on anterior shield and four pairs of dorsosubmedian staghornlike setae; posterior shield with four pairs of marginal setae and two pairs of dorsosubmedian staghornlike setae; anterior marginal setae about  $153\mu$  long, posterior marginal setae about  $146\mu$  long. Leg I,  $406\mu$  long; tarsus I with rodlike sensory seta and serrate guard seta of same length, both about two-thirds as long as tarsus; tibia I with short rodlike seta and three long serrate and one simple setae. Length  $300\mu$ , including rostrum  $366\mu$ ; width  $220\mu$ .

*Type habitat*.—Unknown.

*Type locality*.—Imboden, Ark.

*Type*.—U.S.N.M. No. 1765.

The single specimen was sent in by Byron C. Marshall, January 14, 1935.

The mouth parts and tarsi are distinctive.

## CHELETOPHYES VITZTHUMI Oudemans

*Cheletophyes vitzthumi* OUDEMANS, Ent. Ber. Nederl. Ver., vol. 4, fasc. 78, pp. 101, 102, 1914; Arch. für Naturg., vol. 81A, No. 5, p. 51, 1915; vol. 84A, No. 6, p. 6, 1920 (1918).

*Type habitat*.—From *Coptorthosoma caffra* (Hymenoptera).

*Type locality*.—Willowmore, Cape Colony, Africa.

## CHELETOPHYES SEMENOVII Kuzin

*Cheletophyes semenovii* KUZIN, in Rodendorf, Wiss. Ber. Moskauer Staats Univ. Zool., vol. 42, p. 94, 1940.

*Type habitat*.—On cotton seeds.

*Type locality*.—Uzbekistan, Union of Soviet Socialist Republics.

## Genus EUCHEYLA Berlese

*Eucheylya* BERLESE (subgenus), Redia, vol. 9, pp. 79, 80, 1913.

*Eucheylya* Berlese, VITZTHUM, Handbuch der Zoologie, p. 146, 1931.

*Type*, *Cheyletus* (*Eucheylya*) *loricata* Berlese (monotypic).





## EUCHEYLA WHARTONI, new species

## PLATE 11, FIGURES 69-71

*Female*.—Propodosoma of mite covering rostrum. Palpi short, broad, small, dorsal femoral seta squamiform and lateral ventral seta lanceolate, ventral setae squamiform; dorsal genual seta not seen if present; dorsal tibial seta not seen, ventral seta squamiform; outer palpal comb strong, with about 10 stout teeth; inner palpal comb not as stout and with more teeth. Palpal claw with four large teeth extending almost to tip of claw. Dorsal body surface reticulate; dorsal marginal setae large, squamiform, reticulate, situated on body edge but not on reticulate pattern; shoulder setae similar to marginal setae; no dorsomedian setae seen. A pair of eyes present. Posterior anal setae squamiform; other anal-genital setae simple. Leg I, about  $233\mu$  long; tarsus I,  $83\mu$  long; tibia I,  $33\mu$  long. Leg setae large, broadly squamiform, some quite long; guard seta of tarsus I broad, long, extending to tip of tarsus; sensory seta short, rodlike. Length of body  $366\mu$ , width  $226\mu$ .

*Type habitat*.—Unknown.

*Type locality*.—Birnamwood, Wis.

*Type*.—U.S.N.M. No. 1767.

The type and two paratypes are mounted with *Cheyletia squamosa* (Degeer); all were collected by I. G. Sanders, date unknown.

The dorsal reticulation and rostrum are distinctive.

## Genus CHELETONELLA Womersley

*Cheletonella* WOMERSLEY, Rec. South Austral. Mus., vol. 7, No. 1, p. 60, 1941.

Type, *Cheletonella vespertilionis* Womersley (monotypic).

## KEY TO THE SPECIES OF CHELETONELLA

1. Palpal claw with three basal teeth----- *vespertilionis* Womersley  
Palpal claw toothed along entire margin----- *rugosa* (Womersley)

## CHELETONELLA VESPERTILIONIS Womersley

*Cheletonella vespertilionis* WOMERSLEY, Rec. South Austral. Mus., vol. 7, No. 1, pp. 60, 61, fig. 7, 1941.

*Type host*.—Bat.

*Type locality*.—Glen Osmond, South Australia.

## CHELETONELLA RUGOSA (Womersley), new combination

*Cheletophanes rugosa* WOMERSLEY, Rec. South Austral. Mus., vol. 7, No. 1, pp. 62, 63, fig. 9, 1941.

*Type habitat*.—On *Calymmaderus* (Coleoptera).

*Type locality*.—Brisbane, Queensland, Australia.

Womersley placed this species in the genus *Cheletophanes* since the palpal claw is toothed along the entire margin. It is included here with *Cheletonella* because of the single dorsal shield.

Genus CHELETOMIMUS Oudemans

*Cheletomimus* OUDEMANS, Ent. Ber. Nederl. Ver., vol. 1, fasc. 18, p. 163, 1904;  
vol. 5, fasc. 120, p. 359, 1921.

Type, *Cheletomimus trux* Oudemans = *Cheletes berlesei* Oudemans (monotypic).

CHELETOMIMUS BERLESEI (Oudemans), new combination

PLATE 11, FIGURES 72-75

*Cheyletus ornatus* CANESTRINI and FANZAGO, Berlese, Acari, Myriapoda et Scorpiones hucusque in Italia, reperta, Prostigmata, fasc. 28, No. 6, 1886. (Misidentified.)

*Cheletes berlesei* OUDEMANS, Ent. Ber. Nederl. Ver., vol. 1, fasc. 17, p. 154, 1904.

*Cheletomimus trux* OUDEMANS, Ent. Ber. Nederl. Ver., vol. 1, fasc. 18, p. 163, 1904.

*Cheletomimus ornatus* (Berlese) OUDEMANS, Mém. Soc. Zool. France, vol. 19, pp. 136-139, figs. 34, 35, 1906.—VITZTHUM, Die Tierwelt Mitteleuropas, vol. 3, No. 3, p. 55, 1929.—BAKER, Bull. California Dept. Agr., vol. 28, No. 4, p. 273, 1939.

*Female*.—A small, round mite with a short, broad gnathosoma. Femur of palpus short, broad, rounded externally with a dorsal squamiform serrate seta and a lanceolate serrate ventral seta; genu with a squamiform serrate seta on posterior margin; tibial setae of palpus lanceolate, serrate; palpal claw with 7 basal teeth; outer comb as long as the claw and with 14 teeth; inner comb smaller and with 27 teeth. Rostrum broad, covered with areoli; peritreme composed of simple, strong segments. Propodosomatic shield trapezoidlike with posterior margin convex; single pair of eyes; three pairs of lanceolate serrate marginal setae and four pairs of similar dorsal submedian setae. A pair of longer shoulder setae set in a minute plate as are all the setae which are not on the anterior or posterior shields. Hysterosoma with two small shields, each with a single seta; anterior to shields is a transverse row of four setae; behind the shield a row with two setae; then a row of four, and finally a posterior row of two setae. Two pairs of simple genital setae; three pairs of simple posterodorsal anal setae. Legs short; leg I reaches almost to tip of palpal claw; legs I and IV about 166 $\mu$  long. Tarsus I with a rodlike sensory seta of medium length and a short guard seta; tibia I with a short clublike sensory seta and two lanceolate setae. Femur of leg I with lanceolate serrate dorsal seta; other leg setae lanceolate, serrate; those on tibia I of equal length. Body 313 $\mu$  long, including rostrum 420 $\mu$ ; width 260 $\mu$ .

*Type habitat*.—Plants.

*Type locality*.—Italy.

Two specimens, a female and a nymph, of this European species were found in the leaf bud of fig (*Ficus carica*) at Berkeley, Calif., November 17, 1936, associated with the fig mite, *Aceria ficus* (Cotte); collector, E. W. Baker. A single specimen, which is deposited in the British Museum, was found among mites collected on citrus "branches-leaves," Beit-Hanun (Gaza), Palestine, "4-2-46," by P. Jolles.

#### EUCHEYLETIA, new genus

Palpal tarsus with two sicklelike and two comblike setae; marginal setae of dorsal shields scalelike; dorsomedian setae cloudlike; two dorsal shields; all tarsi with claws; and without a pair of lenslike eyes on anterior shield. This last character and the presence of the cloudlike dorsomedian setae separate this genus from *Cheyletia* Haller.

Type, *Eucheyletia bishoppi*, new species.

#### KEY TO THE SPECIES OF EUCHEYLETIA

1. Palpal claw with 2 basal teeth, guard seta on tarsus I simple..... 2  
Palpal claw with 3 basal teeth, guard seta on tarsus I pilose, about 3 times as long as sensory seta; 5 pairs of marginal setae on posterior dorsal shield..... harpyia (Rodendorf)
2. Posterior anal setae squamiform serrate..... 3  
All anal-genital setae simple..... hardyi, new species
3. Three pairs of marginal setae on posterior dorsal shield. flabellifera (Michael)  
Five or six pairs of marginal setae on posterior dorsal shield.  
bishoppi, new species

#### EUCHEYLETIA HARPYIA (Rodendorf), new combination

#### PLATE 11, FIGURES 76-79

*Cheyletia harpyia* RODENDORF, WISS. BER. MOSKAUER STAATS UNIV. Zool., vol. 42, pp. 90-92, figs. 8, 29, 30, 1940.

*Female*.—Palpi strong; femur as long as wide, swollen on outer side and straight on inner side, dorsal seta long, squamiform serrate, ventral palpal setae shorter and narrower than dorsal seta; broad squamiform serrate seta on posterior margin of genu; palpal claw thin and pointed, with 3 basal teeth; outer comb longer than claw, with 17 or 18 teeth; inner comb only slightly curved, with many fine, short teeth. Rostrum of medium size with an irregular dorsal reticulate design; peritreme simple, composed of small segments. Propodosomatic shield wider than long, with four pairs of lateral squamiform setae; five pairs of dorsal submedian cloudlike setae as figured; no eyes. Hysterosomal shield wider than long, tapering posteriorly, with five pairs of lateral squamiform serrate setae and six pairs of dorsol submedian cloudlike setae. Three pairs anal bristles, the posterior pair squamiform serrate, the other anal and genital bristles simple. Tarsus I, 123 $\mu$  long; tibia I, 53 $\mu$  long; tarsal hairs on tip 113 and 77 $\mu$  long, respectively; sensory rod short; guard (?) seta very long, serrate; long simple ven-



tral seta. Tibia I with a short rodlike sensory seta and four strongly lanceolate serrate setae. Length of body  $366\mu$ , including rostrum  $500\mu$ ; width  $300\mu$ .

*Male*.—As figured and described by Rodendorf, with four pairs of squamiform marginal setae and three pairs of submedian setae on propodosomatic shield; hysterosomal shield with three pairs of marginal and two pairs of submedian setae.

*Type habitat*.—Storehouses.

*Type locality*.—Ivanovo; Agriz, Union of Soviet Socialist Republics.

The description of the female was taken from three specimens collected in *Bombus* nest, Beaver Mountains, Alaska, March 1, 1942, by C. A. Fowler. The peculiar cloudlike setae of the female were apparently overlooked in the original description, and only the setal stems were seen and mentioned as being short, asymmetrical.

**EUCHEYLETIA FLABELLIFERA (Michael), new combination**

*Cheyletus flabellifer* MICHAEL, Trans. Roy. Micr. Soc., vol. 1, p. 135, 1878.

*Cheyletus (Cheyletia) flabellifer* Michael, BERLESE, Acari, Myriapoda et Scorpiones hucusque in Italia reperta, Prostigmata, p. 74, 1893.

*Cheletia flabellifera* (Michael) Oudemans, Ent. Ber. Nederl. Ver., vol. 1, fasc. 18, p. 162, 1904; Mém. Soc. Zool. France, vol. 19, pp. 127-136, fig. 33, 1906.

According to Oudemans' (1906) redescription of this species it is in general like *bishoppi*, new species, but is differentiated in having a simple ventral seta on the genu of palpus, in having smaller shields, in having fewer marginal setae on posterior shield in that the anal squamiform setae are longer than the simple setae, and in having simple ventral setae on the tibia of the third pair of legs.

*Type habitat*.—Dust of caves.

*Type locality*.—England.

**EUCHEYLETIA BISHOPPI, new species**

PLATE 11, FIGURES 80-82; PLATE 12, FIGURES 83-88

*Female*.—Medium-sized mite, small palpi. Palpal femur strongly swollen on outer side and concave on inner side; dorsal palpal setae squamiform serrate; genual seta on posterior margin of segment; genu of palpus with ventral lanceolate serrate seta; palpal claw with 2 long, narrow teeth; outer comb about as long as claw, with about 15 teeth; inner comb about one-half as long as outer and with about 24 teeth. Rostrum of medium size, gradually widening posteriorly, with a few longitudinal sculpturings. Peritreme composed of short, fairly strong segments. Propodosomatic shield wider than long, anterior corners rounded; four pairs of marginal squamiform serrate setae; seven pairs of cloudlike dorsal submedian setae as figured. No eyes. Hysterosomal shield with five or six pairs of marginal squamiform serrate

and eight pairs of dorsosubmedian cloudlike setae (the anterior lateral setae may or may not be on edge of shield); shield about as wide as long, narrowing to rear which is rounded. Three pairs of anal bristles, the posterior pair squamiform serrate, other anal and genital setae simple. Leg I about  $300\mu$  long; IV,  $266\mu$  long. Tarsus I,  $127\mu$  long; tibia I,  $57\mu$  long; all tarsal setae simple, not squamiform; dorsally a long rodlike sensory seta; guard seta slightly longer than sensory seta; tibia I with three squamiform setae and a short, curved clublike sensory seta. Tibia III with two dorsal squamiform serrate setae, and ventrally a lanceolate serrate seta and a simple seta. Length of body  $513\mu$ , length including rostrum  $680\mu$ ; width about  $380\mu$ .

*Male*.—Palpi long, slender; palpal femur  $2\frac{1}{2}$  times as long as broad, the dorsal seta squamiform; genu with a squamiform dorsal and a slightly broadened ventral seta; femoral and genual setae as in female; palpal claw with a single small basal tooth; outer comb with about 19 teeth; inner comb with about 22 teeth. Rostrum long, narrow, with a few longitudinal markings; peritreme composed of seven pairs small segments. Propodosoma entirely covered by shield, with four pairs of marginal and three pairs of dorsal submedian squamiform serrate setae. Shield covering all of hysterosoma; shield with four pairs of marginal and two pairs of dorsal submedian squamiform serrate setae. Genital opening on posterior-rear. Tarsus I,  $116\mu$  long; tibia I,  $90\mu$  long. Tarsus I sensory seta long, extending past tip of tarsus; guard seta simple, less than one-half as long as sensory seta. Tibia I with lanceolate serrate setae. Length of body  $307\mu$ , including rostrum  $513\mu$ ; width about  $266\mu$ .

*Type host*.—*Neotoma fuscipes* (occupied nest).

*Type locality*.—Monterey, Calif.

*Type*.—U.S.N.M. No. 1768.

The female type and a male were collected from an occupied nest of *Neotoma fuscipes*, February 14, 1946, and a female paratype was collected on *N. fuscipes*, March 16, 1946, at Monterey, Calif., by J. M. Linsdale. Two females were collected on pine mouse, College Park, Md., June 14, 1933, by F. C. Bishopp, and another female was collected on pine mouse, Burnt Mills, Md., March 29, 1932, by R. Greenfield.

The peritreme, palpi, and setal arrangement on the dorsal posterior plate and type of setae on tibia III distinguish this species from *Eucheyletia flabellifera* (Michael).

#### EUCHEYLETIA HARDYI, new species

#### PLATE 16, FIGURES 140-144

*Female*.—Palpi and rostrum somewhat large in proportion to body. Palpal femur strongly swollen on outer side; dorsal palpal femoral

seta squamiform serrate; dorsal genual setae squamiform serrate, on posterior margin of segment; ventral seta simple; lateral seta of femur absent; palpal claw stout with 2 large teeth, the basal tooth broader and shorter than the distal tooth; outer comb with approximately 17 teeth; inner comb with approximately 35 teeth. Rostrum of medium size, with a few tubercles. Peritreme composed of six pairs of short, fairly strong segments. Propodosomatic shield wider than long; four pairs of marginal squamiform serrate setae; only three pairs of cloud-like dorsal submedian setae discernible, all such setae with convolutions. No eyes. Hysterosoma shield with two pairs of marginal squamiform serrate and three pairs of dorsosubmedian cloudlike setae; shield wider than long, narrowing to rear. All anal-genital setae simple. Leg I about  $330\mu$  long; IV,  $300\mu$ . Tarsus I,  $116\mu$  long; tibia I,  $57\mu$  long; no squamiform setae present on tarsus I; dorsally a short rodlike sensory seta; guard seta simple and about twice as long as sensory seta; ventral seta only slightly serrate; tibia I with a very short clublike sensory seta and three squamiform serrate setae, as well as a setae base with seta missing. Tibia III with two dorsal squamiform serrate setae, and ventrally a similar seta as well as a simple seta. Length of body about  $430\mu$ , including rostrum  $585\mu$ ; width about  $328\mu$ .

*Type habitat*.—In *Neotoma micropus* nest.

*Type locality*.—Harlingen, Tex.

*Type*.—U. S. N. M. No. 1769.

The single specimen, the female type, was collected August 22, 1945, by Hardy and Wooley.

This species differs from *E. bishoppi* in having two instead of six pairs of setae on the margin of the hysterosomal shield, in the number of cloudlike setae, and in having all simple genital-anal setae.

#### Genus CHEYLETIA Haller

*Cheyletia* HALLER, Arch. für Naturg., vol. 1, pp. 233, 234, 1884.

*Cheletia* Haller, Oudemans, Mém. Soc. Zool. France, vol. 19, p. 126, 1906.

Type, *Cheyletus laureata* Haller=*Acarus squamosus* Degeer (according to Oudemans, 1897) (monotypic).

#### KEY TO THE SPECIES OF CHEYLETIA

1. Dorsal palpal femoral setae strong, but no more than lanceolate serrate in form..... 2
- Dorsal palpal femoral setae squamiform..... 3
2. Palpal claw with 10-12 teeth; dorsum of rostrum with tuberculate shield; dorsal body setae squamiform..... *pyriformis* (Banks)
- Palpal claw with 9 or 10 teeth; dorsum of rostrum with few tubercles and a reticulate pattern; dorsal body setae long and broadly lanceolate.  
*virginiensis*, new species

3. Palpal claw with 8 teeth; palpal tibial seta lanceolate serrate; inner palpal femoral seta squamiform; dorsal setae of tibia I of leg short, squamiform; ventral seta simple; dorsomedian setae of body appear staghornlike or squamiform----- wells, new species
- Palpal claw with 5 teeth; palpal tibial seta large, squamiform; inner palpal femoral seta squamiform-split; dorsal and ventral setae of tibia I of leg long, broadly lanceolate; serrate; dorsomedian body setae not known.
- squamosa (Degeer)

CHEYLETIA PYRIFORMIS (Banks), new combination

PLATE 12, FIGURES 89-94

*Cheyletus pyriformis* BANKS, Proc. U. S. Nat. Mus., vol. 28, pp. 17, 19, fig. 17, 1904; Proc. Ent. Soc. Washington, vol. 7, p. 135, 1906.

*Cheletia flabellifera* (Michael), male of OUDEMANS, Mém. Soc. Zool. France, vol. 19, pp. 127-146, fig. 32, 1906. (Misidentification.)

*Cheyletus longipalpus* EWING, Trans. St. Louis Acad. Sci., vol. 18, p. 54, pl. 7, fig. 1, 1909 (new synonymy).

*Female*.—Rostrum long, narrow. Femur of palpus swollen laterally, with a dorsal strongly lanceolate serrate seta; genual seta lanceolate serrate, on posterior margin of segment; other setae simple; palpal claw with 12 teeth; palpal combs of about equal length, outer comb with 17 teeth, inner comb with about 24 teeth; tarsal sensory seta of palpus strongly clavate. Tuberculate shield covering posterior portion of rostrum; peritreme simple, composed of narrow segments. Propodosomatic shield tuberculate; wider than long; with a single pair of eyes; with four pairs of squamiform serrate marginal setae and five pairs of dorsosubmedian staghornlike setae. Hysterosomal shield tuberculate, as long as wide, with five pairs of squamiform serrate marginal setae and four pairs of dorsosubmedian staghornlike setae. Genital region not seen. Tarsus I,  $60\mu$  long; tibia I,  $50\mu$  long; tarsus I with minute claws, almost invisible under low power; sensory rod long, more than one-half as long as tarsus; tibia with a small clavate sensory organ and two dorsal squamiform serrate setae. Length of body  $353\mu$ , including rostrum  $466\mu$ ; width  $246\mu$ .

*Male*.—Palpi, rostrum long, narrow. Femur of palpus long, narrow, with almost parallel sides, distally and dorsally with a long narrow tubercle bearing a strong lanceolate serrate seta; genu with a smaller similar seta but not arising from tubercle, on posterior margin of segments, other setae simple; palpal claw with 8 basal teeth; outer palpal comb with about 17 teeth; inner combs with about 24 teeth; palpal tarsal sensory seta clavate. Rostrum covered with tuberculate shield. Body shields tuberculate; anterior shield with a single pair of eyes, four pairs of squamiform serrate marginal setae and three pairs of similar dorsosubmedian setae. Posterior shield with three pairs of marginal setae and two pairs of dorsosubmedian setae. Genital area not seen. Leg I,  $333\mu$  long; tarsus I,  $73\mu$  long;



tibia I,  $110\mu$  long; tarsus I with minute claws and a long rodlike sensory organ more than one-half as long as tarsus; tibia I with long clavate sensory seta and one large and two small lanceolate serrate setae. Claws on legs II, III, and IV normal as in female. Length of body  $266\mu$ , including rostrum  $380\mu$ ; width  $166\mu$ .

*Type habitat*.—Associated with grapevine scale.

*Type locality*.—Kirkwood, Mo.

The mite was first named and figured by Banks in 1904 and described in 1906. In his 1906 description Banks stated that the mites were collected from grapevine scale (*Aspidiotus uvae*) by Professor Webster at Lafayette, Ind., in December. However, in checking over the original notes made by Pergande it was found that the mites were sent in by Miss Murtfeldt from Kirkwood, Mo., in December 1888, from grapevine scale. These mites were of both sexes. Other specimens examined were Ewing's type, male, which was taken under log, Urbana, Ill., July 1, 1908, by H. E. Ewing; male and female specimens on slide without data; males from gall on sycamore branches, Jacksonville, Ill., March 1926; a female collected in rice straw from India by Lennox and Rosanoff at New York, December 15, 1944; and a male and a nymph collected in 1947 at Mount Holyoke College, South Hadley, Mass., by Alice Deardorff.

CHEYLETIA VIRGINIENSIS, new species

PLATE 13, FIGURES 95-98

*Female*.—Medium-sized mite. Palpi only slightly swollen; palpal femur about as long as broad, rounded laterally, with 2 dorsal lanceolate serrate setae, one near anterior margin; the outer ventral setae smaller and lanceolate serrate; no dorsal seta on genu; palpal claw with 9 basal teeth; outer combs shorter than claw, with 29 teeth; inner comb shorter than outer with at least twice as many teeth. Rostrum normal; tuberculate dorsally with a slight reticulate pattern, peritreme simple, composed of slender segments. Propodosomatic shield wider than long, with rounded corners; a single pair of eyes; four pairs of lanceolate serrate marginal setae; five pairs of dorsosubmedian staghornlike setae. Hysterosomal shield wider than long, rounded posteriorly, with five pairs of lanceolate serrate marginal setae and four pairs of dorsosubmedian staghornlike setae. Areas around anterior and posterior shields striated-tuberculated, the tubercles being very large. Genital area normal, all setae simple. Leg I,  $643\mu$  long; leg IV,  $428\mu$  long. Tarsus I,  $166\mu$  long; tibia I,  $150\mu$  long; tarsus I with a rodlike sensory seta which is punctate on basal half and more than one-half as long as tarsus; tibia I with a short rodlike sensory organ and four long serrate setae and one simple seta. Length of body  $455\mu$ , including rostrum  $655\mu$ ; width about  $350\mu$ .

*Type habitat*.—Associated with *Dendroctonus frontalis* Zimmermann.

*Type locality*.—Gloucester County, Va.

*Type*.—U.S.N.M. No. 1770.

Described from a single female collected by L. A. Hetrick, May 1939.

The palpi, dorsal setae, and tarsal tibial setae arrangement are distinctive for this species.

CHEYLETIA WELLSI, new species

PLATE 13, FIGURES 99-102

*Female*.—Small mite. Palpi short, thick; palpal femur wider than long, swollen, with small dorsal tubercles and squamiform dorsal seta; genu with similar seta on posterior margin of segment; seta on palpal tibia narrow, slightly spined; claw with 6-8 teeth; outer comb as long as claw with about 15 teeth; inner comb shorter and with about 20 teeth. Rostrum covered with tuberculate shield; peritreme composed of medium-sized segments; posterior of rostrum without tubercles, striated. Anterior shield trapezoidlike, covering most of propodosoma, corners rounded, with four pairs of squamiform serrate marginal setae and five pairs of dorsosubmedian staghornlike setae. A single pair of eyes on edge of shield. Hysterosomal shield narrowing rapidly toward rear, corners broadly rounded, with four pairs of squamiform serrate marginal setae and two pairs of dorsosubmedian staghornlike setae; a single pair of squamiform serrate setae near anterior corners of shield. Genital setae simple; anal setae serrate. Tarsus I,  $76\mu$  long; tibia I,  $30\mu$  long; tarsus with a simple sensory organ more than one-half as long as tarsus; guard seta not seen but probably short, fine, and simple; tibia with a large dorsal squamiform serrate seta and a small clavate sense organ. Legs I and IV short, about  $186\mu$  long. Length of body  $253\mu$ , including rostrum  $363\mu$ ; width  $200\mu$ .

*Type habitat*.—On navel orange.

*Type locality*.—Azores, intercepted at Philadelphia, Pa.

*Type*.—U.S.N.M. No. 1771.

The female type was collected from navel orange, Azores, intercepted at Philadelphia, Pa., February 9, 1945, by A. B. Wells, for whom the mite is named. Other specimens were collected as follows: On *Hibiscus* leaf, Mexico, at Hidalgo, Tex., May 1, 1936, by F. E. Swan and A. L. Williamson; on *Saccharum officinarum*, Mayagüez, Puerto Rico, April 29, 1942, by H. K. Plank; on *Ananas sp.*, Canal Zone, at Hawaii, July 16, 1936, by Uyeda; on *Lantana camara*, St. Augustine, Trinidad, British West Indies, May 28, 1937, by R. G. Fennah; on pineapple leaf, Cuba, at New York, May 18, 1936, by

Woodbury; on pineapple leaves, Jamaica, at Portland, Oreg., June 8, 1936, by L. M. Scott; and free-living in Takabannare Shima, an island off Okinawa, June 17, 1945, by A. B. Hardcastle.

These mites show variation in the number of dorsomedian propodosomal setae. This variation ranges from one pair in the Okinawa specimen to five pairs in the type specimen. However, of two specimens from Puerto Rico, one has one pair of setae and the other has two pairs, and of the two specimens from Mexico, one has three pairs and the other has four pairs of setae.

The species is distinctive in the number of palpal claw teeth, and in the type of the setae. The specimen from Jamaica possesses dorsal propodosomal setae which are normally squamiform, not staghorn-like. This would indicate that the staghornlike structure is an artifact, probably due to mounting technique. This may be true of the other types of setae found.

CHEYLETIA SQUAMOSA (Degeer)

PLATE 13, FIGURES 103-105

*Acarus squamosus* DEGEER, Mémoires pour servir à l'histoire des insectes, vol. 7, p. 116, pl. 7, fig. 4, 1778.

*Cheyletia laureata* HALLER, Arch. für Naturg., vol. 1, pp. 234, 235, pl. 16, fig. 9, 1884.—KARPELLES, Math. Naturw. Ber. Ungarn., vol. 11, p. 124, pls. 18, 19, figs. 3, 6, 6a, 1893.

*Cheyletus squamosa* (Degeer) OUDEMANS, Tijdschr. Ent., vol. 40, pp. 126-135, pl. 5, 1897.—VITZTHUM, Die Tierwelt Mitteleuropas, vol. 3, No. 3, p. 55, 1929.—RODENDORF, Wiss. Ber. Moskauer Staats Univ. Zool., vol. 42, p. 90, 1940.

*Cheletia squamosa* (Degeer) OUDEMANS, Mém. Soc. Zool. France, vol. 19, pp. 126, 127, 1906.

*Female*.—Small mite. Femur of palpus strongly elbowed on outer side, with two dorsal squamiform serrate setae, the inner seta split; genual seta similar and covering most of claw, located on anterior portion of genu; a ventral lanceolate serrate seta present; palpal claw with only five basal teeth; outer comb strong, as long as claw, inner comb about three-fourths as long as claw; sickle setae two in number, normal; rodlike sensory seta on palpal tarsus. Rostrum stout, peritreme simple. Body of mite covered by two shields; no dorsosubmedian setae but several setal bases located; one pair of lateral eyes; four pairs of squamiform serrate setae on anterior shield and six pairs on posterior shield. A pair of squamiform anal bristles, other anal and genital setae simple. Legs short; leg setae, except those on tibiae and tarsi, broadly squamiform; those on tibiae-tarsi broadly lanceolate serrate. Tarsus I,  $63\mu$  long; tibia I,  $29\mu$  long; tarsus I with a short rodlike sensory seta. Length of body  $280\mu$ , including rostrum  $366\mu$ ; width  $213\mu$ .

*Type habitat*.—Associated with scale insects.

*Type locality*.—France.

Specimens examined were collected at Birnamwood, Wis., May 14 (?), by I. G. Sanders.

These mites check almost perfectly with the figures given by Oudemans (1897), whose interpretation is being followed.

### Genus CHELETOMORPHA Oudemans

*Cheletomorpha* OUDEMANS, Ent. Ber. Nederl. Ver., vol. 1, fasc. 18, p. 162, 1904.

Type, *Acarus lepidopterorum* Shaw, 1794 (= *Cheyletus venustissima* Koch, 1839) (synonymy of Oudemans, 1937) (monotypic).

#### CHELETOMORPHA LEPIDOPTERORUM (Shaw)

#### PLATE 13, FIGURES 106, 107; PLATE 14, FIGURES 108-112

*Acarus lepidopterorum* SHAW, Nat. Misc., vol. 6, pl. 187, 1794.

*Cheyletus venustissimus* KOCH, Deutschlands Crustaceen, Myriapoden und Arachniden, fasc. 23, fig. 22, 1839.

*Cheyletus seminivorus* PACKARD, A guide to the study of insects, p. 665, 1869.

*Cheyletus longipes* MEGNIN, Journ. Anat. and Physiol., 1878, p. 8.—BANKS, Proc. Ent. Soc. Washington, vol. 11, p. 133, fig. 9, 1909 (new synonymy).

*Cheletomorpha venustissima* (Koch) OUDEMANS, Ent. Ber. Nederl. Ver., vol. 1, fasc. 18, p. 162, 1904; Mém. Soc. Zool. France, vol. 19, pp. 144-153, figs. 37-39, 1906.—CHERIAN, Journ. Asiatic Soc. Bengal, new ser., vol. 27, No. 1, p. 145, 1932 (1931).—RODENDORF, Wiss. Ber. Moskauer Staats Univ. Zool., vol. 42, p. 92, 1940.—WOMERSLEY, Rec. South Austral. Mus., vol. 7, No. 1, p. 62, 1941.

*Cheyletus rufus* HARDY, in Andre, Ann. des Épiphyt. Année 19, No. 6, p. 352, 1933.

*Cheletomorpha lepidopterorum* (Shaw), OUDEMANS, Kritisch Historisch Overzicht der Acarologie IIIc, pp. 1115-1117, 1937.

*Female*.—Long-legged mite with long body and leg setae which are serrate, rodlike, and slightly flattened on end. Palpal femur strongly swollen externally and straight internally, with 3 long, rodlike, serrate setae and 2 single ventral setae; no dorsal seta on genu; other palpal setae simple; palpal claw long, slender, with a single basal tooth; outer comb about as long as claw, with approximately 24 teeth; inner comb shorter and with perhaps twice as many teeth. Rostrum long, narrow, sides concave; covered with a simple shield. Peritreme simple, of small segments. Propodosomatic shield slightly wider than long, with broadly rounded corners, three pairs of long, serrate rodlike marginal setae near eye and one pair on posterior corner; two pairs of dorsal submedian short simple setae; a pair of long serrate rodlike shoulder setae. Hysterosomal shield wider than long, rounded posteriorly, with two pairs of lateral marginal anterior setae and three pairs of posterior marginal setae, as well as two pairs of short simple dorsal submedian setae; a pair of long setae on posterior edge of abdomen. Leg I, 670 $\mu$  long; IV, 457 $\mu$  long; legs II and III shorter. Tarsus, 106 $\mu$  long; tibia I, 166 $\mu$  long; tarsus I sensory seta short, rodlike, with a serrate guard seta of about three



times the length of the sensory; sensory seta on tibia 1 very short. Tarsus I lacking claws but with pulvillus. Length of body  $500\mu$ , including rostrum  $643\mu$ ; width  $340\mu$ .

*Male*.—Similar to female; palpal claw with two or three smaller teeth; femoral and genual setae rodlike, serrate, and in normal position; body setae longer than in female; dorsal submedian setae short, spatulate, and serrate; tarsus I sensory seta about one-half as long as guard seta. Length of body  $314\mu$ , including rostrum  $428\mu$ ; width  $228\mu$ .

*Type habitat*.—Moth wing.

*Type locality*.—England.

These mites are found on various importations from all parts of the world and are one of the most striking of the cheyletids. The description of the female is based on material collected on cauliflower leaf, "British," at Boston, Mass., October 24, 1937, by J. T. Beauchamp; and the description of the male was taken from a specimen collected in straw packing, Spain, at St. Louis, Mo., March 24, 1944 (no collector's name given). Other United States National Museum records are England, France, Holland, Italy, Portugal, Australia, Java, Philippines, Japan, China, India, Mexico; and in the United States, Texas, Virginia, Maryland, and California.

#### CHELETOMORPHA ORIENTALIS Oudemans

*Cheletomorpha orientalis* OUDEMANS, Ent. Ber. Nederl. Ver., vol. 7, fasc. 162, p. 343, 1928.

The species supposedly differs from *C. lepidopterorum* in having eyes located near the shield, not on it, and in having rodlike setae instead of the somewhat flattened ones. Possibly a synonym of *C. lepidopterorum*. Not seen.

*Type habitat*.—On leaves of an orchid, *Phalaenopsis* sp.

*Type locality*.—Java.

#### Genus CHELETOPHANES Oudemans

*Cheletophanes* OUDEMANS, Ent. Ber. Nederl. Ver., vol. 1, fasc. 18, p. 162, 1904.

Type, *Cheyletus montandoni* Berlese and Trouessart (monotypic).

#### KEY TO SPECIES OF CHELETOPHANES

1. Palpal claw with 13 teeth; dorsal body striations forming concentric rings..... *montandoni* (Berlese and Trouessart)
- Palpal claw with 10 teeth; dorsal body surface rugose.... *peregrinus* Berlese

#### CHELETOPHANES MONTANDONI (Berlese and Trouessart)

*Cheyletus montandoni* BERLESE and TROUESSART, Bull. Bibl. Sci. Ouest., vol. 2, p. 133, 1889.

*Cheletophanes montandoni* (Berlese and Trouessart) Oudemans, Ent. Ber. Nederl. Ver., vol. 1, fasc. 18, p. 162, 1904; Mém. Soc. Zool. France, vol. 19, pp. 140-144, fig. 36, 1906.

*Type habitat*.—Taken on elytra of *Aradus varius*.

*Type locality*.—"Brostenii (Valache de Nord)." The town of Brosteni in northern Rumania is evidently this locality.

#### CHELETOPHANES PEREGRINUS Berlese

*Cheletophanes peregrinus* BERLESE, Redia, vol. 14, p. 194, 1921.

*Type habitat*.—Rotten bark on ground.

*Type locality*.—Florence, Italy.

#### EUTOGENES, new genus

Tarsus I lacks claws and pulvillus. No eyes. Two dorsal shields, dorsal setae squamiform serrate, with two comblike and two sicklelike setae on palpal tarsus.

This genus is similar to *Cheletogenes* in lacking tarsal I claws and pulvillus, but differs in not having the lenslike eyes.

Type, *Eutogenes foxi*, new species.

#### EUTOGENES FOXI, new species

#### PLATE 14, FIGURE 113-116

*Female*.—A small mite. Palpal femur with few dorsal tubercles; dorsal setae of femur and genu broad, serrate; genual seta on posterior margin of segment; other palpal setae simple; no teeth on palpal claw. Few tubercles or dorsum of rostrum; peritreme simple, composed of four segments. Propodosomal shield without eyes; 12 pairs of squamiform serrate setae on shield; 12 pairs of similar setae on hysterosomal shield. Genital-anal setae simple. Tip of tarsus I with two very long and a slightly shorter seta; approximate and anterior to sensory seta is a long seta; sensory seta rodlike, about as long as tarsus. Tibia I with lanceolate serrate setae. Tarsus I,  $36.6\mu$  long; tibia I,  $60\mu$  long. Squamiform serrate setae on coxa, femur, genu, and tibia of all legs. Length of body  $253\mu$ , including rostrum  $316\mu$ ; width about  $200\mu$ .

*Type habitat*.—On rose stems.

*Type locality*.—Brownsville, Tex.

*Type*.—U.S.N.M. No. 1772.

The type female, a paratype, and nymph were collected on rose stem, originating in Mexico, at Brownsville, Tex., December 27, 1946, by Edgeworth. Another specimen was collected on rat at Camp O'Reilly, Puerto Rico, September 7, 1945, by Irving Fox, and is in the collection at the School of Tropical Medicine, San Juan, Puerto Rico.

## Genus CHELETOGENES Oudemans

*Cheletogenes* OUDEMANS, Ent. Ber. Nederl. Ver., vol. 1, fasc. 21, p. 208, 1905.

Type, *Cheyletus ornatus* Canestrini and Fanzago (monotypic).

## KEY TO THE SPECIES OF CHELETOGENES

1. Palpal claw with teeth..... 2  
Palpal claw without teeth..... quadrisetosus Berlese
2. Palpal claw not toothed along entire inner margin; rostral pattern of areoli or tubercles..... 3  
Palpal claw with teeth along entire edge; rostral shield pattern of striations..... ornatus (Canestrini and Fanzago)
3. Palpal femoral setae broadly clavate or squamiform; palpal tibial setae broadly clavate..... 4  
Palpal femoral setae strong, serrate, but not squamiform; palpal tibial setae simple; gnathosoma with areoli only..... buckneri, new species
4. Dorsal shields with areoli; palpal femur about as long as wide.  
oaklandia, new species  
Dorsal shields punctate and with large tubercles; palpal femur longer than wide..... traubi, new species

## CHELETOGENES QUADRISETOSUS Berlese

*Cheletogenes quadrisetosus* BERLESE, Redia, vol. 9, p. 79, pl. 1, fig. 6, 1913.

*Type habitat*.—Not given.

*Type locality*.—Java.

In the figure by Berlese the single pair of eyes are located dorsally, far in from the margin, and not in the usual marginal position between the second and third pair of setae.

## CHELETOGENES ORNATUS (Canestrini and Fanzago)

## PLATE 14, FIGURES 117-119

*Cheyletus ornatus* CANESTRINI and FANZAGO, Att. Soc. Veneto-Trentina, 1876, p. 106.

*Cheyletus saccardianus* BERLESE, Acari, Myriapoda et Scorpiones hucusque in Italia, Prostigmata, fasc. 32, No. 2, 1886.

*Cheletia ornatus* (Canestrini and Fanzago) OUDEMANS, Ent. Ber. Nederl. Ver., vol. 1, fasc. 154, 1904.

*Cheletogenes ornatus* (Canestrini and Fanzago) OUDEMANS, Ent. Ber. Nederl. Ver., vol. 1, fasc. 21, p. 208, 1905; Mém. Soc. Zool. France, vol. 19, pp. 153-159, figs. 40, 41, 1906.—WOMERSLEY, Trans. Roy. Soc. South Australia, vol. 66, No. 1, p. 85, fig. 2, 1942—MCGREGOR, California Citrograph, vol. 30, No. 2, p. 53, illus., 1944.

*Cheyletus cocciphilus* BANKS, Journ. Ent. and Zool., vol. 6, p. 56, fig. 10, 1914 (new synonymy).

*Female*.—A small round mite with short broad rostrum and palpi. Femur of palpus strongly swollen on outer margin; femoral and genual setae squamiform, serrate; genual seta on posterior margin of segment; palpal claw of medium size, curved, with many teeth along entire inner margin; outer comb about same length as claw, stout; inner comb about same length as outer but finer; both combs with

many teeth. Rostrum broad, covered with a peculiar striated shield as figured; peritreme composed of sausage-like segments. Anterior shield covering most of propodosoma, covered with large rounded tubercles. Single pair of eyes; four pairs of squamiform serrate marginal setae and three pairs of similar dorsal submedian setae; single pair of shoulder setae. Hysterosomal shield not touching anterior shield, small, covering about one-half of anterior part of hysterosoma; tuberculate, with one pair of anteriomarginal setae and one pair of dorsal submedian setae. Three pairs of setae off lateral margin of shield on hysterosoma and four pairs behind shield; hysterosoma with sinuous irregular striations. Anal and genital setae simple. Legs short, I and IV about  $133\mu$  long. Tarsus I,  $23\mu$  long; tibia I,  $36.5\mu$  long; tarsus I with two long terminal setae and a short rodlike sensory seta which is about one-half as long as tarsus; tibia I with a short minute clavate sensory seta and four squamiform serrate setae. Length of body  $246\mu$ , including rostrum  $320\mu$ ; width about  $213\mu$ .

*Male*.—Similar to female but with large rodlike sensory setae on tarsi III and IV. Length of body  $167\mu$ , including rostrum  $213\mu$ ; width  $120\mu$ .

*Type habitat*.—On plants.

*Type locality*.—Italy.

The above description is based on specimens collected by A. M. Boyce in lemon buds with *Aceria sheldoni* (Ewing) at Santa Paula, Calif., July 30, 1937. United States National Museum records are Italy, China, Hawaiian Islands, West Indies, and Florida, Louisiana, and California in the United States. Womersley (1942) records it from Australia. It is usually found associated with scale insects or with eriophyid mites on which it preys, and McGregor has reported it predaceous on *Tarsonemus bakeri* Ewing in California. The mite referred to in an article by Boyce and Korsmeier (Journ. Econ. Ent., vol. 34, No. 6, p. 754, 1942) as *Cheletomimus ornatus* Berlese is actually *Cheletogenes ornatus* (Canestrini and Fanzago).

#### CHELETOGENES OAKLANDIA, new species

#### PLATE 15, FIGURES 120-122

*Female*.—Small mite, more elongated than *Cheletogenes ornatus*, with narrow rostrum. Femur of palpus short, broad, swollen on outer margin, with broadly squamiform dorsal seta and two simple ventral setae, the lateral seta missing; genu with broadly squamiform serrate seta on posterior margin; other palpal setae simple; palpal claw toothed for about two-thirds of its length, with 11 teeth; outer palpal comb large, with about 20 teeth; inner comb small, about one-half as long as outer, with about same number of teeth. Rostrum long, narrow, covered with a very characteristic shield, which is



tuberculate in front of the peritreme and behind the peritreme has longitudinally directed areoli as figured. Propodosomatic shield with longitudinal pattern similar to that of the posterior portion of rostral shield. Single pair of eyes. Laterad to shield are coarse striations with large tubercles; shield with four pairs of squamiform serrate marginal setae and two pairs of similar dorsal submedian setae. A shoulder seta, longer and narrower than the dorsal setae, is present. Hysterosomal shield of same pattern as anterior shield but much narrower; five pairs of marginal setae and three pairs of dorsal submedian setae which are squamiform, serrate. One pair of anal setae are squamiform and the other anal and genital setae are simple. Legs short, leg I about  $166\mu$  long; tarsus I,  $48\mu$  long; tibia I,  $34\mu$  long; tarsus I with two long and two short terminal setae and two very minute distal setae, a long rodlike sensory organ and a simple ventral seta of medium length; tibia I with a short, slightly clavate sensory seta, three squamiform serrate setae, and one simple and one serrate ventral seta. Length of body  $300\mu$ , including rostrum  $393\mu$ ; width  $200\mu$ .

*Type habitat*.—In fig buds.

*Type locality*.—Oakland, Calif.

*Type*.—U.S.N.M. No. 1773.

The type and two paratype females (on the same slide) were collected January 12, 1938, by E. W. Baker.

This species differs from *Cheletogenes quadrisetosus* Berlese in having squamiform setae on tibia I and in having teeth on the palpal claws. The rostral shield pattern is also distinctive.

#### CHELETOGENES TRAUBI, new species

#### PLATE 17, FIGURES 145-148

*Female*.—Medium-sized mite, somewhat elongated, with narrow rostrum. Femur of palpus  $1\frac{1}{2}$  times as long as wide, with a dorsal squamiform seta and 2 simple ventral setae, the lateral seta missing; genu with a squamiform seta on posterior margin; palpal claw with 8 basal teeth; outer comb with about 20 teeth; inner comb about two-thirds as long and with about 17 teeth. Rostrum long, narrow, widening toward rear; rostral shield tuberculate on anterior portion and with a few longitudinal areoli on posterior portion. Peritreme simple, composed of four pairs of long segments. Propodosomatic shield large, widening to rear with a single pair of eyes and four pairs of squamiform marginal setae. Hysterosomal shield large, touching propodosomatic shield, with five pairs of squamiform marginal setae. Both shields covered with a pattern composed of minute and large tubercles as figured. Genital and anal setae simple except for a single

posterior pair of squamiform setae. Legs relatively long, about  $260\mu$  in length. Tarsus I,  $47\mu$  long; tibia I,  $60\mu$  long; tarsus similar to that of *Cheletogenes oaklandia*; tibia, however, with only a single squamiform seta. Length of body  $366\mu$ , including rostrum  $533\mu$ ; width about  $260\mu$ .

*Type habitat*.—Crawling in tent.

*Type locality*.—Assam, Stillwell Road, near Ledo at 12.4-mile mark.

*Type*.—U.S.N.M. No. 1778.

The single female was collected by members of the United States of America Typhus Commission in 1945.

The dorsal shields and palpi distinguish this species from others in the genus.

CHELETOGENES BUCKNERI, new species

PLATE 15, FIGURES 123-125

*Female*.—Medium-sized mite, somewhat elongated, with narrow rostrum. Femur of palpus  $1\frac{1}{2}$  times as long as wide, with a dorsal, slightly broadened serrate seta and 2 simple ventral setae, the lateral seta missing; genu with a simple dorsal seta on posterior margin; palpal claw with 6 basal teeth; outer comb broad, with 12 teeth; inner comb about one-half as long as outer comb, with about 9 small teeth. Rostrum widening toward rear; rostral shield outline indistinct, with a pattern of longitudinally lined areoli; peritreme simple, composed of long slender segments. Propodosomatic shield rounded, narrowing toward rear, with a single pair of eyes, and five pairs of squamiform serrate marginal setae; inside shoulder setae is another pair of setae. Hysterosomal shield in center of hysterosoma, rounded anteriorly, and slightly pointed toward rear, with two pairs of marginal setae; six other pairs of dorsal setae on body off shield as figured. Both shields with areoli. Anal and genital setae simple. Legs short, I and IV  $166\mu$  long. Tarsus I,  $45\mu$  long; tibia I,  $37\mu$  long; tarsus similar to that of *Cheletogenes oaklandia*, but sensory seta shorter, guard seta simple, short; tibia with rodlike sensory seta and four simple setae of medium length. Length of body  $320\mu$ , including rostrum  $413\mu$ ; width  $200\mu$ .

*Type habitat*.—On lemon fruits.

*Type locality*.—Santa Paula, Calif.

*Type*.—U.S.N.M. No. 1774.

The type was collected under the button of a lemon fruit, February 23, 1939, by E. W. Baker; paratype with same data but collected March 25, 1939. Another paratype collected on same host and locality October 29, 1938, by W. E. Buckner.

The shields, mouth parts, and tarsal-tibial setal arrangements are distinctive. The tibia I setae are simple, rather than narrowly clavate as in *Cheletogenes quadrisetosus* Berlese.

The mite was found associated with the citrus bud mite, *Aceria sheldoni* (Ewing), and is probably predaceous on that species.

Genus CHELETOPSIS Oudemans

*Cheletopsis* OUDEMANS, Ent. Ber. Nederl. Ver., vol. 1, fasc. 18, p. 163, 1904.

Type, *Cheyletus norneri* Poppe (original designation).

KEY TO THE SPECIES OF CHELETOPSIS<sup>2</sup>

1. Propodosomatic shield trapezoidal with straight rear edge; the 3 pairs of setae are outside the shield----- 2  
Propodosomatic shield usually oval, with strongly rounded posterior margin; the 3 pairs of setae on the shield----- major Oudemans
2. Body very long, narrow; legs longer than body is broad----- 3  
Body at most twice as long as broad; legs shorter than width of body.  
anax Oudemans
3. The 2 pairs of anterior marginal shield setae of equal length----- 4  
The inner anterior and posterior pairs of marginal setae of shields short, of equal length; the outer anterior pair about 3 times as long as inner and posterior pairs----- impavida Oudemans
4. Propodosomatic shield at most 1½ times as long as wide; the lateral dorsal setae over trochanter III long----- 5  
Propodosomatic shield at least twice as long as wide; the lateral dorsal setae over trochanter III short----- 6
5. The lateral dorsal setae over trochanter IV short, about as long as trochanter.  
norneri (Poppe)  
The lateral dorsal setae over trochanter IV long, twice as long as trochanter.  
basilica Oudemans
6. Claw of palpus with 2 basal teeth----- animosa Oudemans  
Claw of palpus with 1 basal tooth----- magnanima Oudemans

CHELETOPSIS MAJOR Oudemans

*Cheyletus major* TROUËSSART, in Berlese, Acari, Myriapoda et Scorpioncs lucusque in Italia, Prostigmata, pp. 74-75, 1893 (*nomen nudum*).

*Cheletopsis major* OUDEMANS, Ent. Ber. Nederl. Ver., vol. 1, fasc. 18, p. 163, 1904; Mém. Soc. Zool. France, vol. 19, pp. 200-204, fig. 62, 1906.

Type habitat.—On *Hemiproctne mystacea* (= *Dendrochelidon mystacea*).

Type locality.—New Guinea.

CHELETOPSIS ANAX Oudemans

*Cheletopsis anax* OUDEMANS, Ent. Ber. Nederl. Ver., vol. 1, fasc. 19, p. 170, 1904; Mém. Soc. Zool. France, vol. 19, pp. 195-200, figs. 59-61, 1906.

Type habitat.—In shafts of wing feathers of *Crocethia alba* (= *Totanus calidris*).

Type locality.—France.

<sup>2</sup> None of these species is represented in the National Museum.

## CHELETOPSIS IMPAVIDA Oudemans

*Cheletopsis impavida* OUDEMANS, Ent. Ber. Nederl. Ver., vol. 1, fasc. 19, p. 170, 1904; Mém. Soc. Zool. France, vol. 19, pp. 175-180, fig. 48, 1906.

*Type habitat*.—In shafts of wing feathers of *Crocethia alba* (= *Totanus calidris*), and also free living.

*Type locality*.—France.

## CHELETOPSIS NORNERI (Poppe)

*Cheyletus norneri* POPPE, Abh. Naturw. Ver. Bremen, vol. 10, p. 239, pl. 2, figs. 4, 5, 1888.

*Cheletopsis norneri* (Poppe) OUDEMANS, Ent. Ber. Nederl. Ver., vol. 1, fasc. 19, p. 170, 1904; Mém. Soc. Zool. France, vol. 19, pp. 180-186, figs. 52-54, 1906.

*Type habitat*.—In shafts of tail feathers of *Sterna hirundo*.

*Type locality*.—France.

## CHELETOPSIS BASILICA Oudemans

*Cheletopsis basilica* OUDEMANS, Ent. Ber. Nederl. Ver., vol. 1, fasc. 19, p. 170, 1904; Mém. Soc. Zool. France, vol. 19, pp. 186-189, fig. 55, 1906.

*Type habitat*.—In shafts of feathers of *Crocethia alba* (= *Totanus calidris*).

*Type locality*.—France.

## CHELETOPSIS ANIMOSA Oudemans

*Cheletopsis animosa* OUDEMANS, Ent. Ber. Nederl. Ver., vol. 1, fasc. 19, p. 170, 1904; Mém. Soc. Zool. France, vol. 19, pp. 189-193, figs. 56, 57, 1906.

*Type habitat*.—In wing-feather shafts of *Tringa totanus* (= *Totanus totanus*).

*Type locality*.—France.

## CHELETOPSIS MAGNANIMA Oudemans

*Cheletopsis magnanima* OUDEMANS, Ent. Ber. Nederl. Ver., vol. 1, fasc. 19, p. 170, 1904; Mém. Soc. Zool. France, vol. 19, pp. 193-195, fig. 58, 1906.

*Type habitat*.—On *Tringa flavipes* (= *Gambetta flavipes*), probably in shafts of the large feathers.

*Type locality*.—Angers, France. Material collected on bird skin in museum.

## Genus CHELONOTUS Berlese

*Chelonotus* BERLESE, Acari, Myriapoda et Scorpiones hucusque in Italia reperta, Prostigmata, p. 73, 1893.

*Chelonotus* TROUËSSART, Oudemans, Mém. Soc. Zool. France, vol. 19, pp. 158, 159, 1906.

Type, *Chelonotus selenirhynchus* Berlese (monotypic).



The original description is based on a key to the genera by Berlese. Although he credits the genus and species to Trouessart, who sent him specimens, the description and figure are actually by Berlese, who is here established as the author.

## KEY TO THE SPECIES OF CHELONOTUS

1. Gnathosoma not covered by propodosoma; coxae II and III not touching--- 2  
Gnathosoma covered by propodosoma; coxae I, II, III, and IV contiguous. oudemansi, new species
2. Rostrum sharp, conical; palpal comb slender, with 10 teeth; peritreme composed of 17 pairs of segments----- ewingi, new species  
Rostrum blunt, not conical; palpal comb short, broad, with 5 teeth; peritreme composed of 9 pairs of segments----- selenirhynchus Berlese

## CHELONOTUS OUDEMANSI, new species

## PLATE 15, FIGURES 126, 127

*Female*.—Medium-sized mite, blunt on anterior end, and sharply narrowing to rear. Gnathosoma entirely covered by propodosoma. Palpal segments short, broad; femur broader than long, with simple seta; genu with simple seta on posterior margin; palpal claw with a single basal tooth about two-thirds as long as claw; palpal comb slender, with 11 teeth; sensory organ on palpal thumb short, lanceolate. Peritreme made of approximately eight pairs of large segments. Dorsal body setae long, simple, as figured for *C. ewingi*, new species. Tarsus I  $84\mu$  long, tibia I  $50\mu$  long; tarsus I with a long sensory rod-like seta; guard seta, if present, not seen. Coxae I, II, III, and IV contiguous. Length of body  $585\mu$ ; width  $328\mu$ .

*Type host*.—*Baginia tenuis evidens* Miller and Hollister (squirrel).

*Type locality*.—Pulosembeh, Celebes.

*Type*.—U.S.N.M. No. 1775.

The single female was taken from a squirrel received from the Celebes by the United States National Museum.

The covered rostrum and arrangement of the coxae distinguish this species from the others in the genus.

## CHELONOTUS EWINGI, new species

## PLATE 15, FIGURES 128-130

*Female*.—Elongated mite; body narrowing rapidly anteriorly and posteriorly; rostrum almost triangular; palpi short and swollen. Femur of palpus large, swollen, about as long as wide, dorsal and ventral setae simple; other palpal setae simple; palpal claw large with a single large basal tooth; a single coarse palpal comb with 10 teeth and a short, broad, lanceolate sensory organ on palpal tarsus. Peritreme distinctive, as figured. Dorsal body setae long, simple, discernible only on lateral margins of body; three pairs of setae on propodoso-

matic shield and four pairs on hysterosomal shield; shields contiguous on dorsum and covering part of venter. Ventral setae long, simple. Legs not long in proportion to body; leg setae simple; tarsus I with sensory seta missing (broken), but otherwise as figured for *C. oudemansi*, new species; tibia I with a very short rodlike sensory seta. Coxae I-II and III-IV separated into two groups. Length of body 628 $\mu$ , including rostrum 743 $\mu$ ; width 328 $\mu$ .

*Type host.*—*Callosciurus prevostii rubiventer* Müller and Schlegel.

*Type locality.*—Temboan, Celebes.

The type, U.S.N.M. No. 1776, was collected on a squirrel from the Celebes in the collection of the United States National Museum. No other data given.

The gnathosomal characters distinguish this species from *Chelonotus selenirhynchus*.

CHELONOTUS SELENIRHYNCHUS Berlese, new author combination

*Chelonotus selenirhynchus* BERLESE, Acari, Myriapoda et Scorpiones hucusque in Italia, Prostigmata, p. 77, pl. 1, fig. 6, 1893.

*Chelonotus selenirhynchus* Trouessart, OUDEMANS, Mém. Soc. Zool. France, vol. 19, pp. 159-162, fig. 42, 1906.

*Type host.*—*Baginia tenuis lowii* Thomas (= *Sciurus lowii*).

*Type locality.*—Borneo.

Since the original description is by Berlese and not by Trouessart, Berlese is here established as the author.

Genus ACAROPSIS Moquin-Tandon

*Acaropsis* MOQUIN-TANDON, Éléments de zoologie médicale . . ., p. 314, 1863.

Type, *Tyroglyphus mericourti* Laboulbene, 1851 (monotypic).

KEY TO THE SPECIES OF ACAROPSIS

- |                                                                                                                                                                                                                  |                         |
|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------|
| 1. Dorsal setae pilose.....                                                                                                                                                                                      | 2                       |
| Dorsal setae smooth.....                                                                                                                                                                                         | mericourti (Laboulbene) |
| 2. Palpal claw with a single tooth.....                                                                                                                                                                          | 3                       |
| Palpal claw with more than 1 tooth.....                                                                                                                                                                          | 4                       |
| 3. Male: Palpi very long, palpal femur 4 times as long as wide; anterior shield very broad, even with width of body; posterior shield shorter and narrower than anterior and with 2 pairs of marginal setae..... | sollers Kuzin           |
| Male: Palpi and palpal claw long, with a single tarsal tooth; 9 pairs of dorsal setae.....                                                                                                                       | rufus (Karpelles)       |
| 4. With not more than 4 teeth on palpal claw.....                                                                                                                                                                | 6                       |
| With more than 6 teeth on palpal claw.....                                                                                                                                                                       | 5                       |
| 5. Palpal claw with 6 teeth; anterior shield widening toward rear; posterior shield covering most of abdomen; dorsal setae clavate, serrate.                                                                     |                         |
|                                                                                                                                                                                                                  | kulagini Rodendorf      |
| Palpal claw with 8 teeth; anterior shield wider anteriorly than posteriorly; posterior shield minute; dorsal setae lanceolate, serrate.                                                                          |                         |
|                                                                                                                                                                                                                  | travisi, new species    |

6. Palpal femur  $1\frac{1}{2}$  to  $1\frac{2}{3}$  as long as wide; palpal claws with 2 or 3 teeth.

Palpal femur more than twice as long as wide; palpal claw with 3 or 4 teeth.  
docta Berlese  
callida Kuzin

**ACAROPSIS MERICOURTI (Laboulbene)**

*Tyroglyphus mericourti* LABOULBENE, Ann. Soc. Ent. France, ser. 2, vol. 9, p. 302, pl. 9, fig. 4, 1851.

*Acaropsis pectinata* (Laboulbene) MOQUIN-TANDON, Éléments de zoologie médicale . . . , p. 314, 1863.

*Acaropsis mericourti* (Laboulbene) OUDEMANS, Mém. Soc. Zool. France, vol. 19, p. 163, 1906.

*Type habitat*.—Unknown.

*Type locality*.—Newfoundland, Canada.

**ACAROPSIS KULAGINI Rodendorf**

*Acaropsis kulagini* RODENDORF, Wiss. Ber. Moskauer Staats Univ. Zool., vol. 42, p. 78, 1940.

*Type habitat*.—In Indian-corn grain.

*Type locality*.—Stavropolsk and Blagodarnoe, Union of Soviet Socialist Republics.

**ACAROPSIS TRAVISI, new species**

PLATE 16, FIGURES 131–135

*Female*.—Palpi and rostrum long; palpal femur about  $1\frac{1}{2}$  times as long as broad, outer margin swollen and inner margin more or less straight; palpal setae simple; genual seta on posterior margin of segment; apparently 8 basal teeth on palpal claw; palpal comb about two-thirds as long as claw, with about 14 long teeth. Peritreme of strong segments as figured. Single pair of eyes; dorsal setae short, lanceolate, serrate. Propodosomal shield hard to distinguish, wider anteriorly than posteriorly, longer than wide, with five pairs of marginal setae, three pairs in the anterior corners and two pairs in the posterior corners. A pair of very long shoulder setae about  $100\mu$  long, and anterior to these a pair of short setae. Hysterosomal shield very small, hard to distinguish, without setae but with setae near the anterior and posterior margins as figured; other dorsal hysterosomal setae arranged as figured. Genital area with two pairs of simple setae; three pairs of anal setae. Legs normal, leg I about  $200\mu$  long; leg IV about  $166\mu$  long; leg setae similar to body setae; tarsus I,  $73\mu$  long, tibia I,  $33\mu$  long; tarsus sensory seta long, rodlike, guard seta minute; tibia with short, slightly clavate sensory seta, other setae simple. Length of body  $253\mu$ , including rostrum  $386\mu$ ; width  $153\mu$ .

*Type host*.—*Sceloporus woodi*.

*Type locality*.—Newton, Ga.

*Type*.—U.S.N.M. No. 1776.

Described from the type collected September 1, 1937, by B. V. Travis. A paratype mite is on the same slide.

ACAROOPSIS SOLLERS Kuzin

*Acaropsis sollers* KUZIN, in Rodendorf, Wiss. Ber. Moskauer Staats Univ. Zool., vol. 42, pp. 78, 79, 1940.

*Type habitat*.—Unknown.

*Type locality*.—Leningrad, Union of Soviet Socialist Republics.

ACAROOPSIS RUFUS (Karpelles)

*Cheyletus rufus* KARPELLES, Berlin. Ent. Zeitschr., vol. 28, p. 231, figs. 104, 1884.  
*Acaropsis rufa* (Karpelles) OUDEMANS, Mém. Soc. Zool. France, vol. 19, p. 163, 1906.

*Type habitat*.—Associated with Coleoptera.

*Type locality*.—Congo region of central Africa.

ACAROOPSIS DOCTA (Berlese)

PLATE 16, FIGURES 136-139

*Cheyletus docta* BERLESE, Acari, Myriapoda et Scorpiones hucusque in Italia reperta, Prostigmata, fasc. 33, No. 1, 1886.

*Acaropsis docta* (Berlese) OUDEMANS, Ent. Ber. Nederl. Ver., vol. 1, fasc. 21, p. 209, 1905 (1904); Mém. Soc. Zool. France, vol. 19, pp. 163-168, figs. 43, 44, 1906.—VITZTHUM, Die Tierwelt Mitteleuropas, vol. 3, No. 3, p. 55, 1929.—RODENDORF, Wiss. Ber. Moskauer Staats Univ. Zool., vol. 42, pp. 80, 81, 1940.

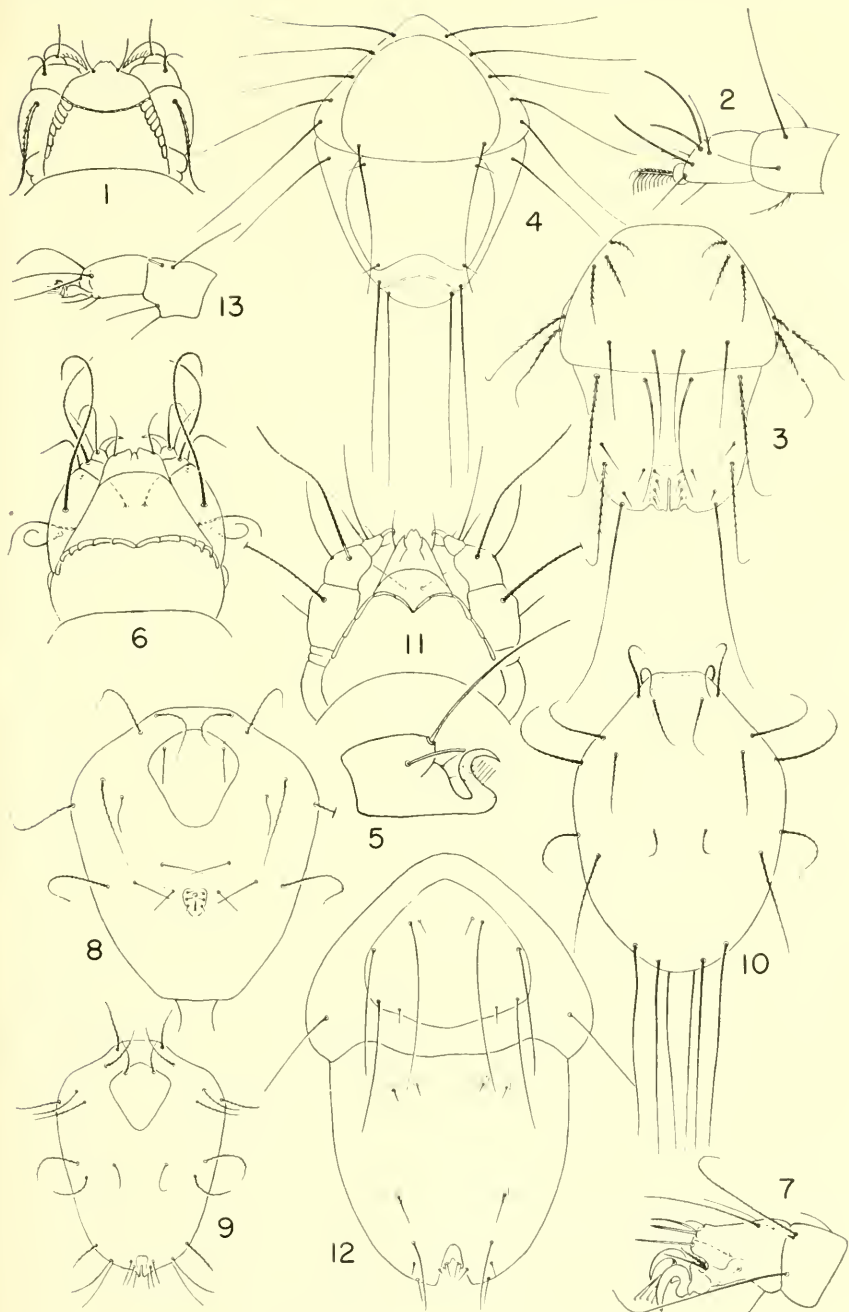
*Female*.—Palpal femur about  $1\frac{1}{2}$  to  $1\frac{2}{3}$  as long as wide; palpal femur seta long, finely pilose; other setae simple; genual seta on posterior margin of segment; palpal claw thin, with 3 basal teeth; comb about two-thirds as long as claw, with about 15 heavy teeth. Peritreme simple, rounded. Propodosomatic shield with single pair of eyes; setae broadening distally, elongate, pilose, three pairs on anterolateral margin of shield, four pairs of dorsal submedian setae; a pair of long simple shoulder seta not on shield. Hysterosomal shield widely separated from anterior shield, longer than wide and broadly rounded posteriorly, tending to narrow somewhat toward rear; two pairs of lateral lanceolate setae and four pairs of similar dorsal submedian setae; a single pair of setae posterior to the shield; a single pair of setae on body near anterior angles of shield. Genital opening with three pairs of simple setae, one median and two posterior; three pairs of simple anal setae. Legs normal; leg I,  $333\mu$  long; tarsus I,  $90\mu$  long; tibia I,  $73\mu$  long; tarsus I with a simple, long, straight, rod-like sensory seta; sensory seta on tibia I short, rodlike. Length of body  $571\mu$ , including rostrum  $714\mu$ ; width about  $385\mu$ .

*Male*.—Not seen, but as figured by Rodendorf very similar to female but with long anterior pair of legs and larger anterior shield.

*Type habitat*.—In building.

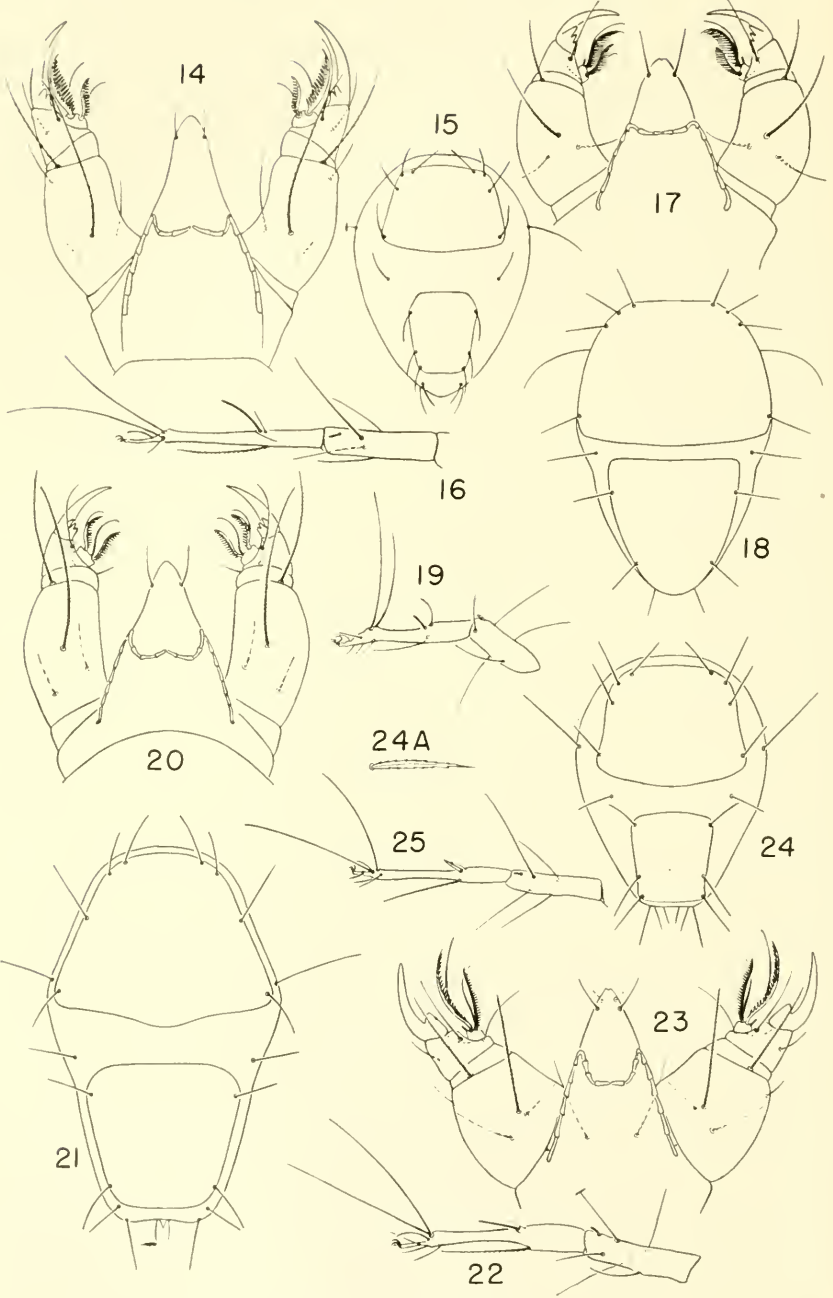
*Type locality*.—Florence, Italy.





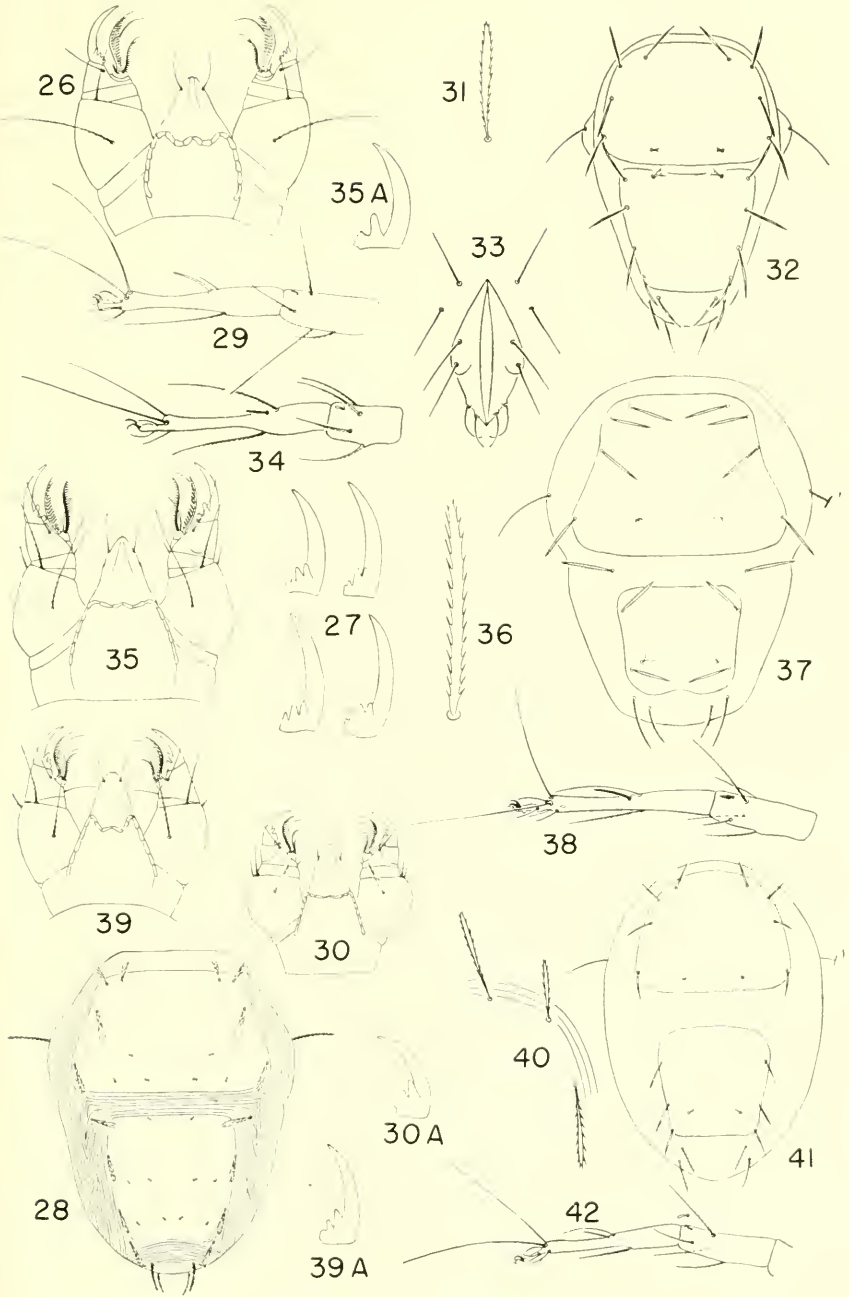
SPECIES OF CHEYLETIELLA AND NEOCHEYLETIELLA.

FOR EXPLANATION SEE PAGE 316.



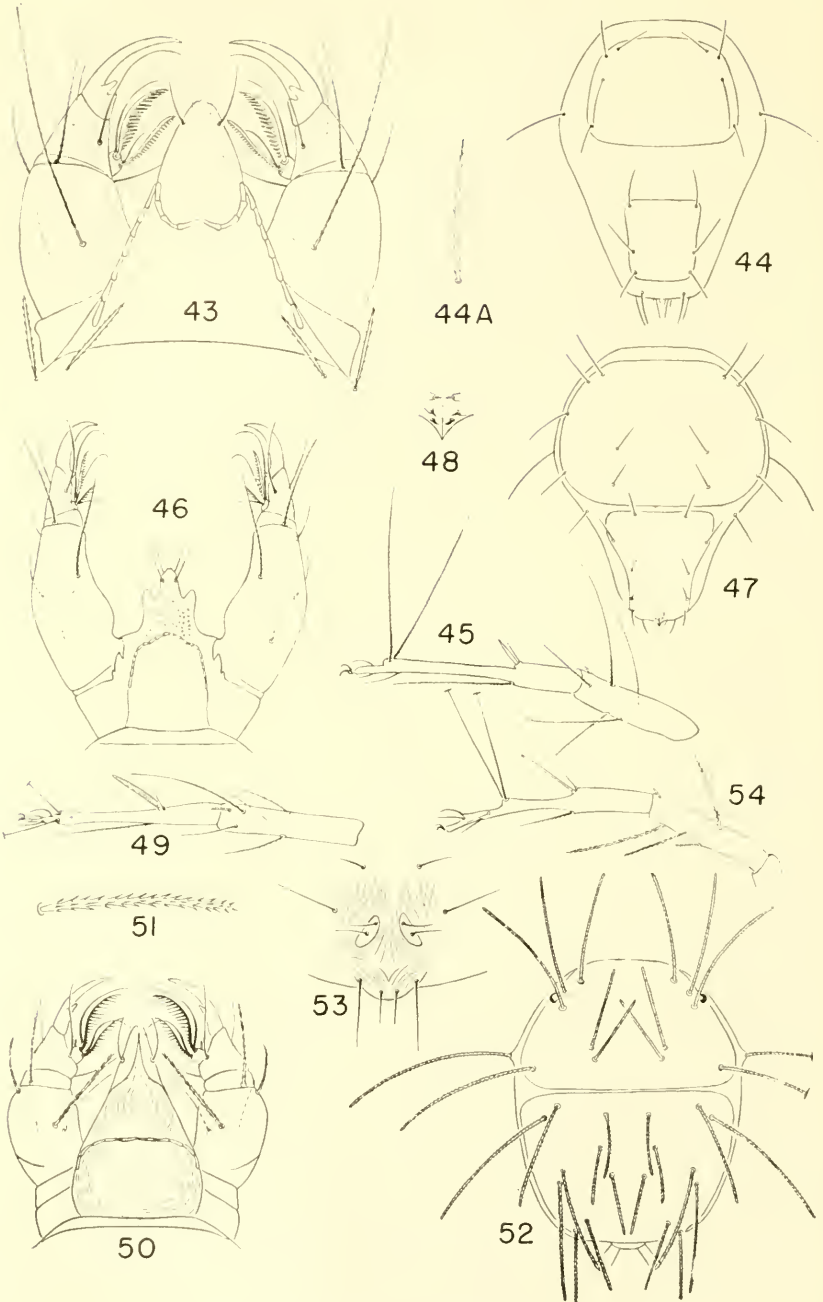
SPECIES OF CHEYLETUS.

FOR EXPLANATION SEE PAGE 316.



SPECIES OF CHEYLETUS.

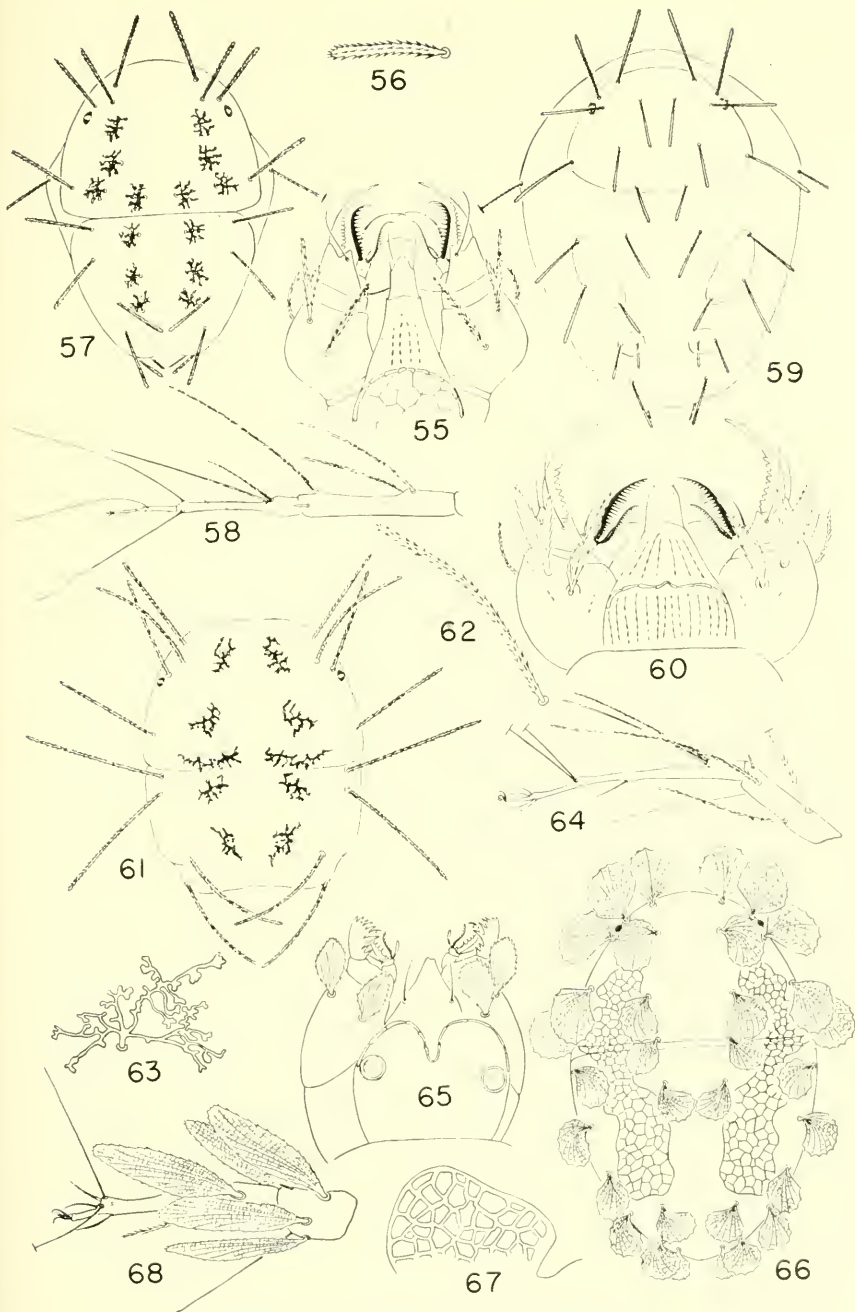
FOR EXPLANATION SEE PAGE 317.



SPECIES OF CHEyleTUS AND CHELETOPHYES.

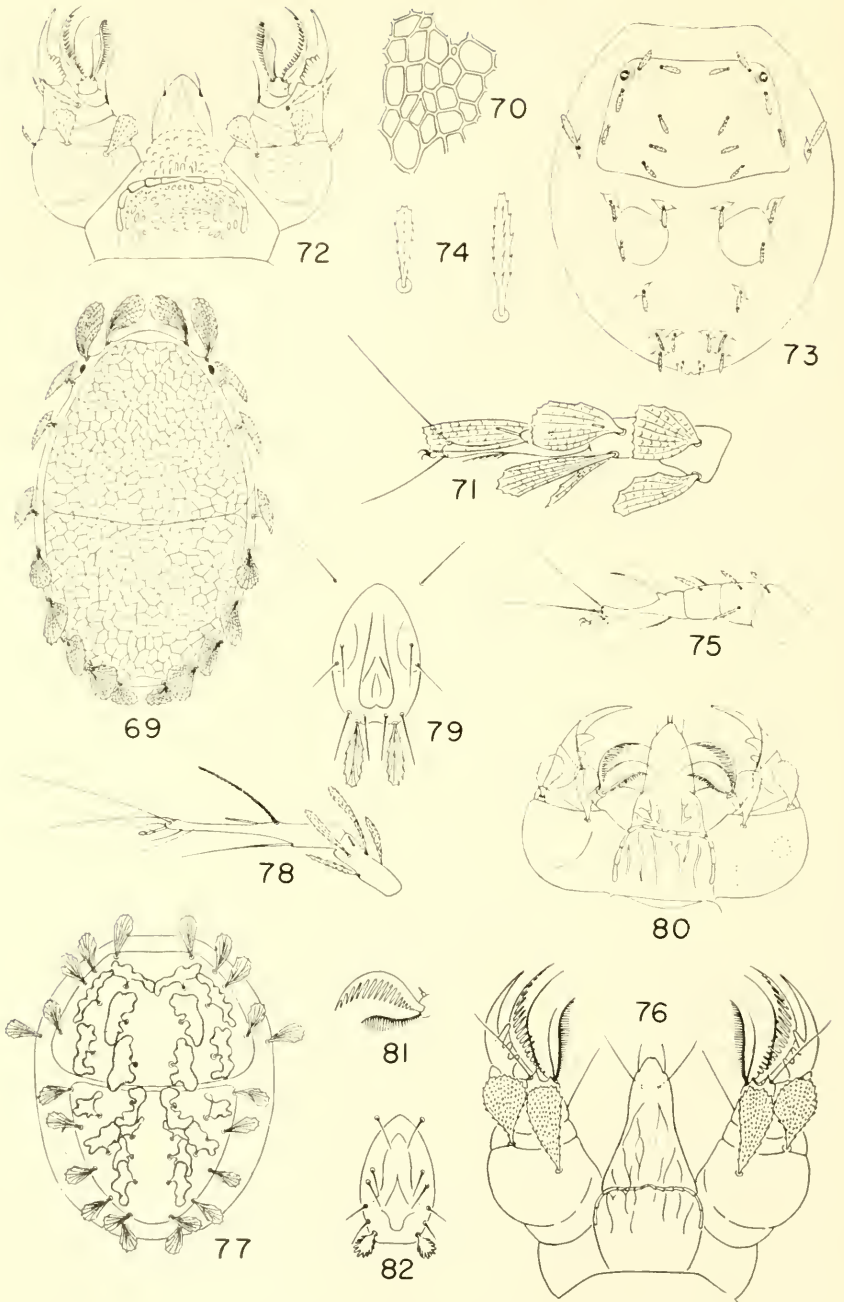
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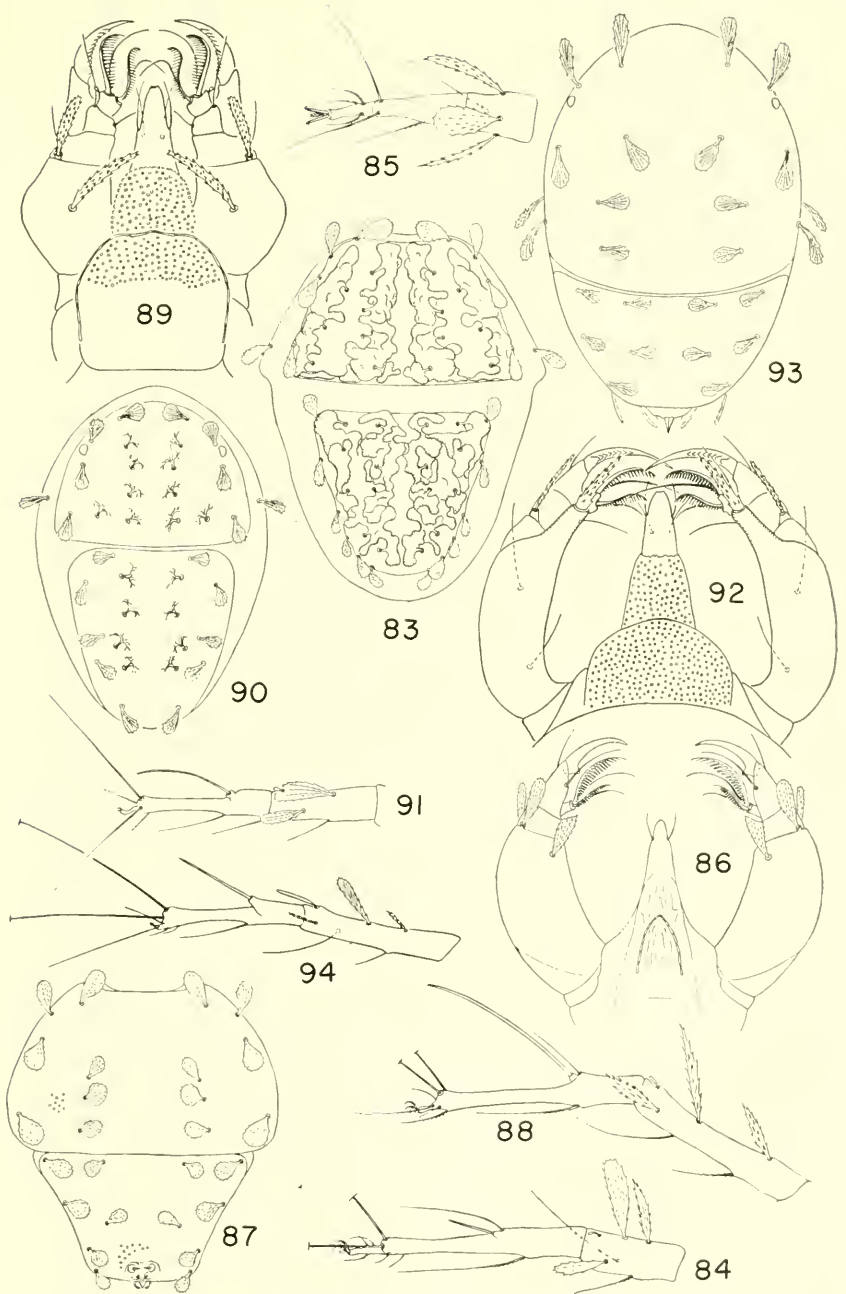
SPECIES OF CHELETOPHYES AND EUCHEYLYA.

FOR EXPLANATION SEE PAGE 317.



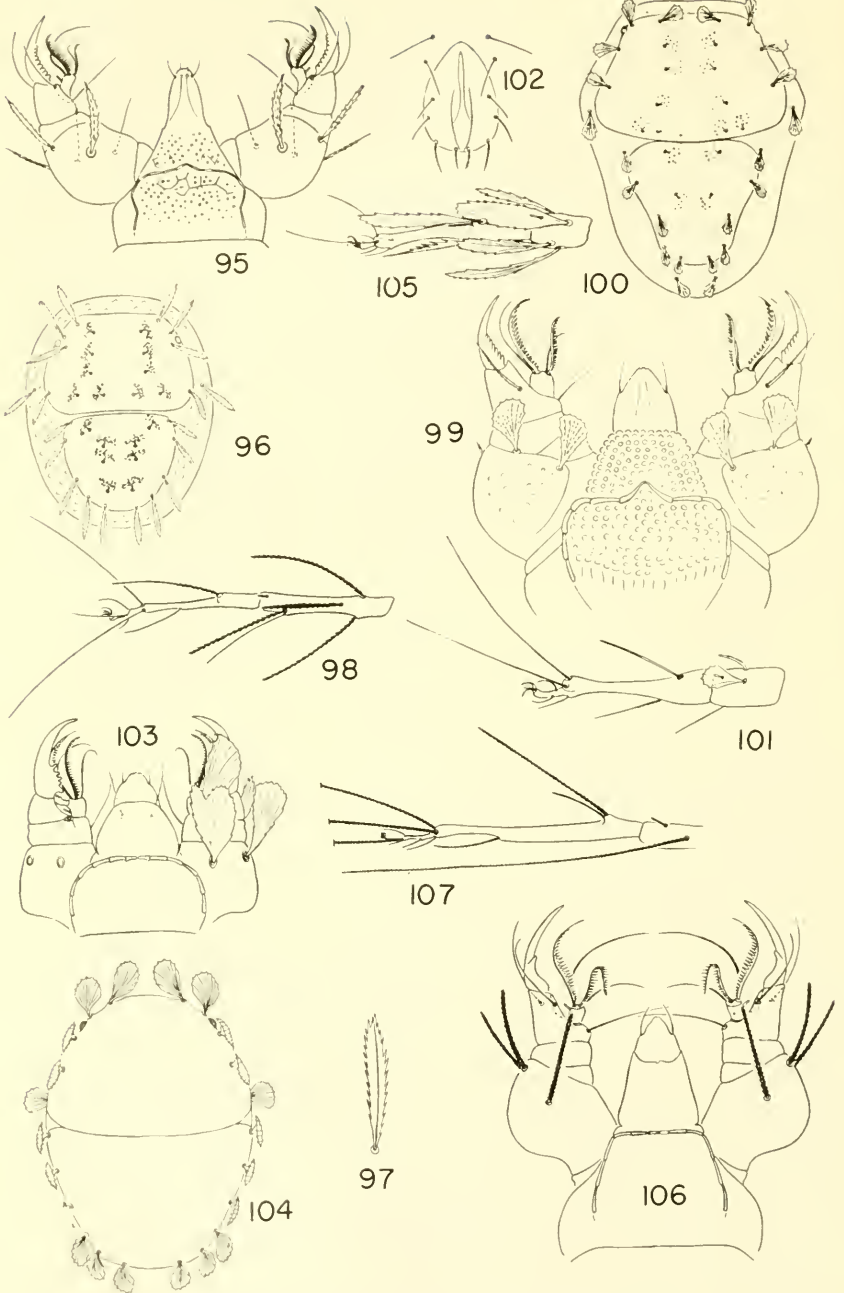
SPECIES OF EUCHEYLA, CHELETOMIMUS, AND EUCHEYLETIA.

FOR EXPLANATION SEE PAGE 317.



SPECIES OF EUCHEYLETIA AND CHEYLETIA.

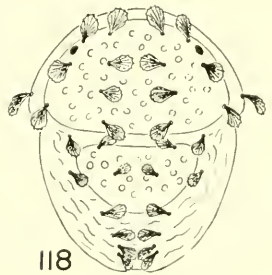
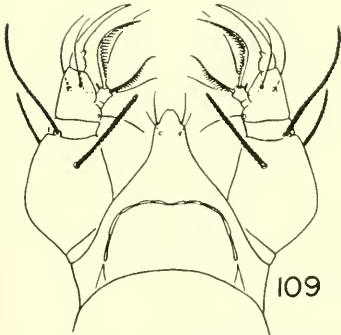
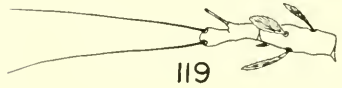
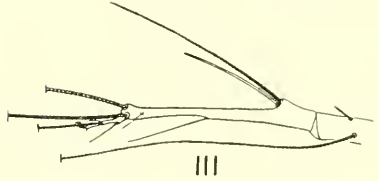
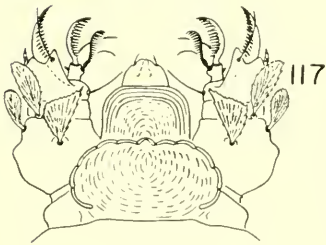
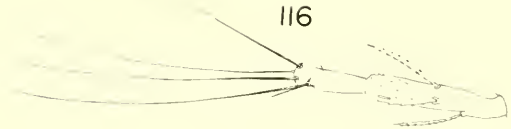
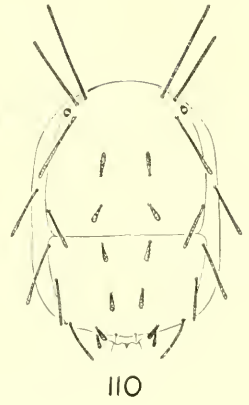
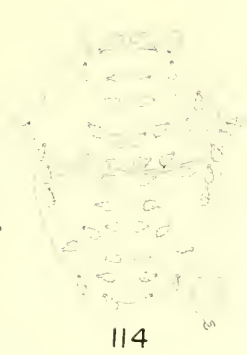
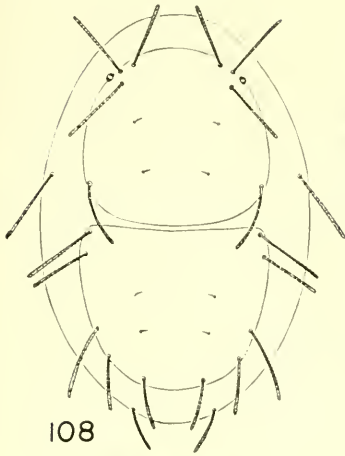
FOR EXPLANATION SEE PAGE 318.



SPECIES OF CHEYLETIA AND CHELETOMORPHA.

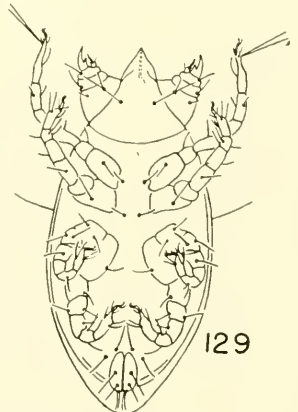
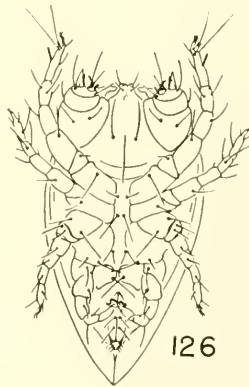
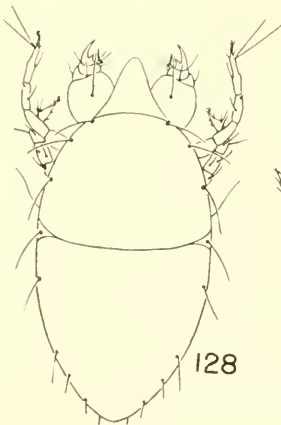
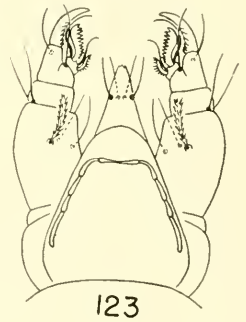
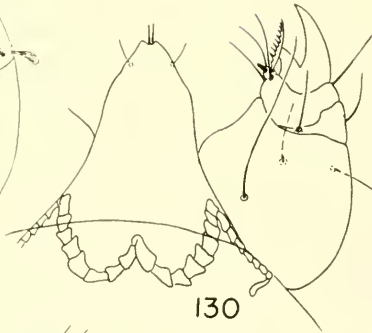
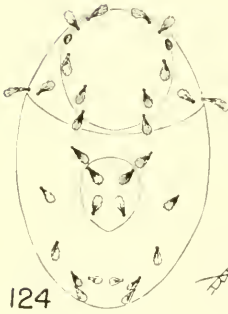
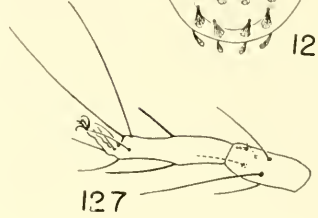
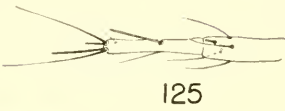
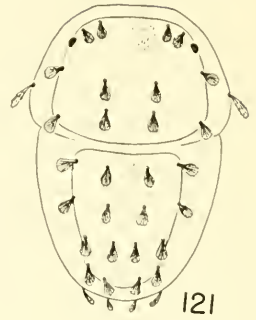
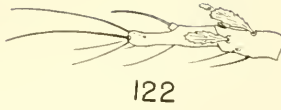
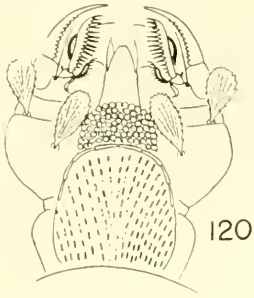
FOR EXPLANATION SEE PAGE 318.





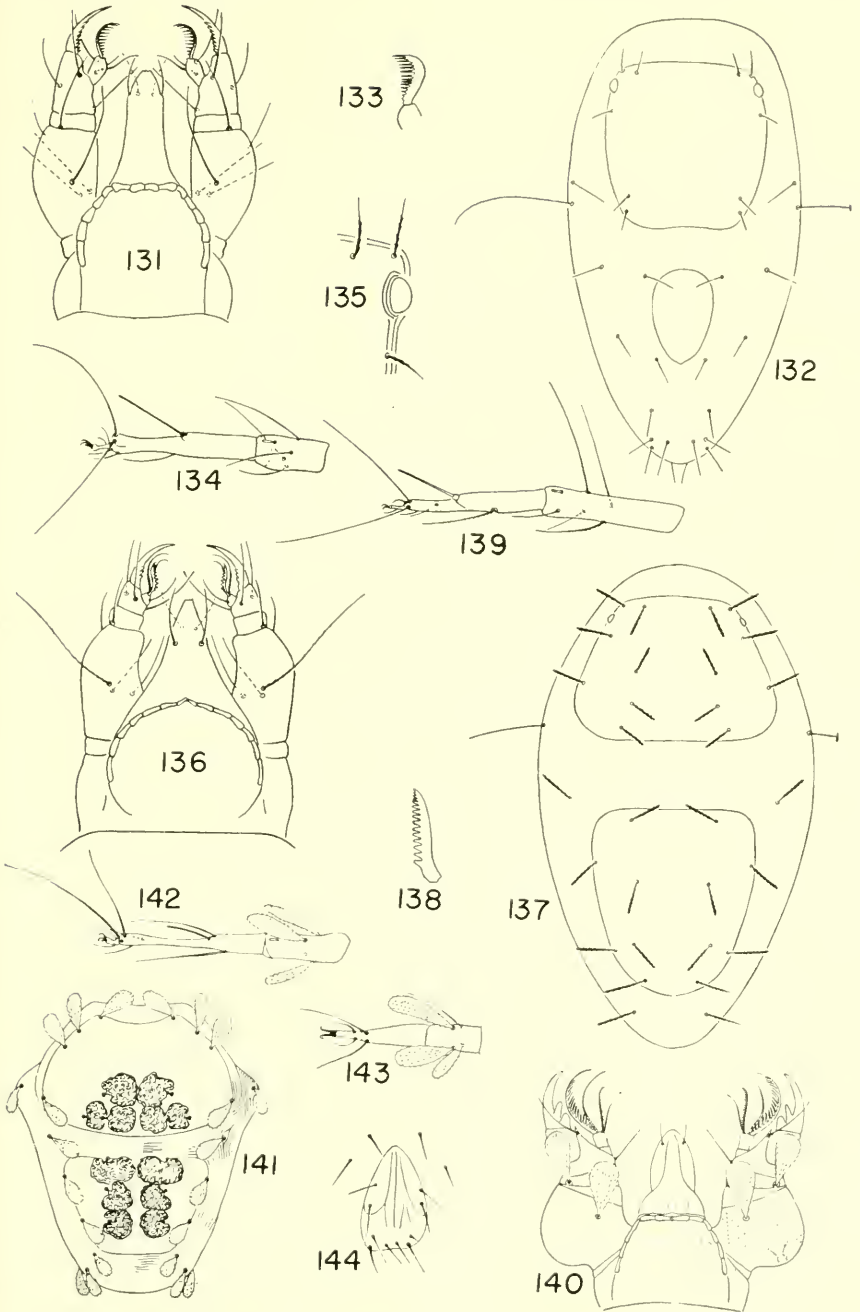
SPECIES OF CHELETOMORPHA, EUTOGENES, AND CHELETOKENES.

FOR EXPLANATION SEE PAGE 315.



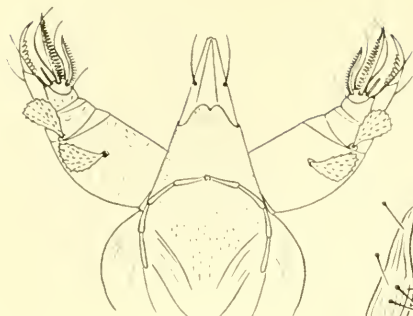
SPECIES OF CHELETOGENES AND CHELONOTUS.

FOR EXPLANATION SEE PAGE 318.

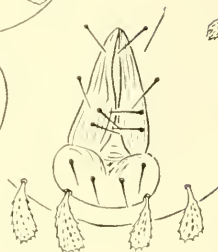


SPECIES OF ACAROPSIS AND EUCHEYLETIA.

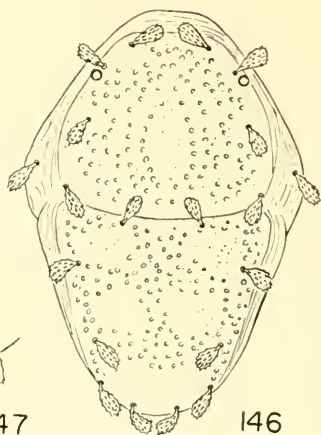
FOR EXPLANATION SEE PAGES 318-319.



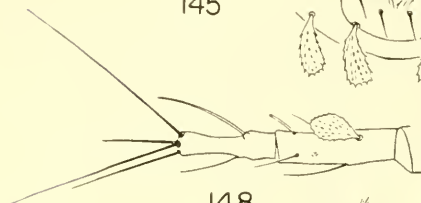
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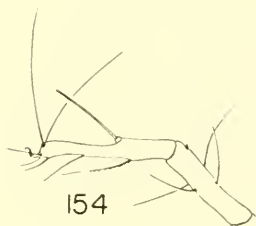
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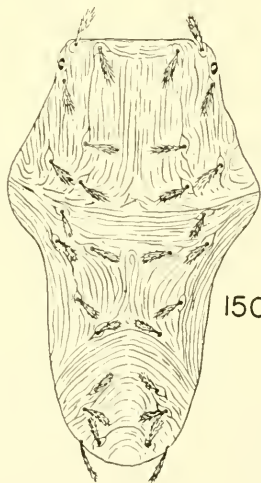
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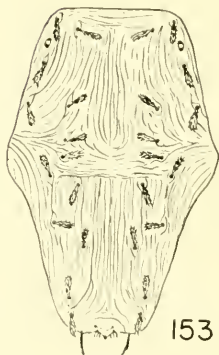
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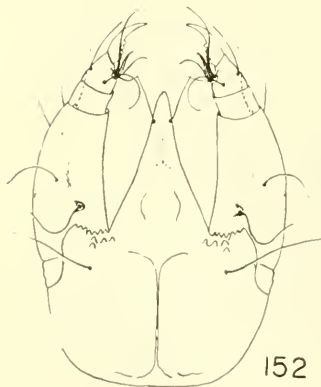
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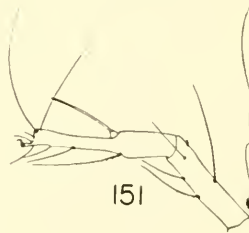
150



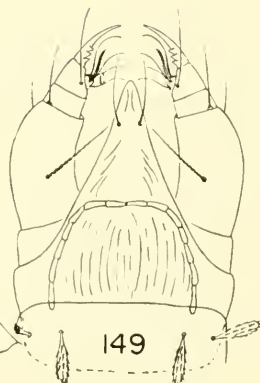
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SPECIES OF CHELETOGENES AND CHELACAROPSIS.

FOR EXPLANATION SEE PAGE 319.



This appears to be a cosmopolitan species. The specimens in the United States National Museum collection were taken on wheat at Chambersburg, Pa., November 14, 1930, by J. O. Chambers.

**ACAROPSIS CALLIDA** Kuzin

*Acaropsis callida* KUZIN, in Rodendorf, Wiss. Ber. Moskauer Staats Univ. Zool., vol. 42, pp. 79, 80, 1940.

*Type habitat*.—In grain infested with mites.

*Type locality*.—Rostov on Don, Union of Soviet Socialist Republics.

**Genus CHELETOSOMA** Oudemans

*Cheletosoma* OUDEMANS, Ent. Ber. Nederl. Ver., vol. 1, fasc. 21, p. 207, 1905 (1904).

Type, *Cheletosoma tyrannus* Oudemans (monotypic).

**CHELETOSOMA TYRANNUS** Oudemans

*Cheletosoma tyrannus* OUDEMANS, Ent. Ber. Nederl. Ver., vol. 1, fasc. 21, p. 207, 1905 (1904); Mém. Soc. Zool. France, vol. 19, pp. 168-174, 1906.

*Type habitat*.—In shafts of wing feathers of *Aramus guarana* (= *A. scolopaceus*).

*Type locality*.—"Tropical America."

**CHELACAROPSIS**, new genus

Palpal tarsus possessing only one comblike seta and two sicklelike setae; a pair of eyes present on propodosoma; dorsal body setae broadly clavate-serrate; no dorsal shields.

Type, *Chelacaropsis moorei*, new species.

This genus, erected to include a male and female cheyletid, is related to the genus *Acaropsis*, but differs in having no indication of dorsal shields and in having broadly clavate-serrate dorsal body setae.

**CHELACAROPSIS MOOREI**, new species

PLATE 17, FIGURES 149-154

*Female*.—Small mite with narrow body and rostrum. Palpi elongate, femur almost twice as long as wide, the dorsal seta simple, serrate; other palpal setae simple; palpal claw long, narrow, with 3 basal teeth; palpal tarsus with 2 sicklelike setae and only 1 comblike seta which possesses 13 short teeth. Pattern on dorsum of rostrum composed of longitudinal striations; peritreme simple, possessing seven pairs of segments. No dorsal shields or indications of shields; striations on anterior portion of propodosoma and hysterosoma longitudinal striations on posterior portions transverse. A pair of lateral

eyes. Dorsal setae broadly squamiform, serrate, six pairs on propodosoma and eight pairs on hysterosoma. Leg I about  $230\mu$  long; femur of all legs with a dorsal squamiform serrate seta similar to those on dorsum of mite. Tarsus I,  $24\mu$  long; tibia I,  $52\mu$  long; sensory seta of tarsus I almost half as long as tarsus; guard seta, if present, not seen. Length of body  $300\mu$ , including rostrum  $407\mu$ ; approximate width  $186\mu$ .

*Male*.—Similar to female. Palpi elongate; femur about twice as long as wide, dorsal seta simple, serrate; ventral seta appears to be on large tubercle; other palpi setae simple; palpal claw with 4 basal teeth; venter of rostrum with a series of about 11 teeth jutting out beneath base of palpus. Peritreme with seven pairs of segments; dorsal pattern between peritreme composed of longitudinal striations. Body setae and striations more or less as in female; seven pairs of setae on propodosoma and six pairs on hysterosoma. Leg I about  $213\mu$  long; femur of all legs with squamiform-serrate seta. Tarsus I,  $67\mu$  long; tibia I,  $47\mu$  long; sensory seta on tarsus I slightly more than half as long as tarsus; guard seta, if present, not seen. Length of body  $233\mu$ , including rostrum  $400\mu$ ; width  $140\mu$ .

*Type habitat*.—Found on *Glaucomya volans querceti* (Bangs).

*Type locality*.—Welaka, Fla.

*Type*.—U.S.N.M. No. 1777.

The single type female and allotype male were collected by S. C. Moore, August 16, 1946.

#### EXPLANATION OF PLATES

##### PLATE 6

- 1-3. *Cheyletiella parasitivorax* (Megnin): 1, Gnathosoma, female; 2, tarsus and tibia I, female; 3, dorsal view of body, female.  
 4, 5. *Neocheyletiella canadensis* (Banks): 4, Dorsal view of body, female; 5, tarsus I, female.  
 6-9. *Neocheyletiella smallwoodae*, new species: 6, Gnathosoma, female; 7, tarsus and tibia I, female; 8, dorsal view of body, male; 9, dorsal view of body, female.  
 10. *Neocheyletiella rohweri*, new species: 10, Dorsal view of body, female.  
 11-13. *Neocheyletiella chanayi* (Berlese and Trouessart): 11, Gnathosoma, female; 12, dorsal view of body, female; 13, tarsus and tibia I, female.

##### PLATE 7

- 14-16. *Cheyletus cruditus* (Schrank): 14, Gnathosoma, female; 15, dorsal view of body, female; 16, tarsus and tibia I, female.  
 17-19. *Cheyletus hendersoni*, new species: 17, Gnathosoma, female; 18, dorsal view of body, female; 19, tarsus and tibia I, female.  
 20-22. *Cheyletus doddi*, new species: 20, Gnathosoma, female; 21, dorsal view of body, female; 22, tarsus and tibia I, female.  
 23-25. *Cheyletus fortis* Oudemans: 23, Gnathosoma, female; 24, dorsal view of body, female; 24A, dorsal body seta; 25, tarsus and tibia I, female.

## PLATE 8

- 26-29. *Cheyletus linsdalei*, new species: 26, Gnathosoma, female; 27, palpal claw variations in female; 28, dorsal view of body, female; 29, tarsus and tibia I, female.
- 30-34. *Cheyletus cacahuamilpensis*, new species: 30, Gnathosoma, female; 30A palpal claw, female; 31, dorsal body seta, female; 32, dorsal view of body, female; 33, genital-anal region, female; 34, tarsus and tibia I, female.
- 35-38. *Cheyletus beauchampi*, new species: 35, Gnathosoma, female; 35A, palpal claw, female; 36, dorsal body seta, female; 37, dorsal view of body, female; 38, tarsus and tibia I, female.
- 39-42. *Cheyletus davisii*, new species: 39, Gnathosoma, female; 39A, palpal claw of female; 40, anterior corner of propodosomatic shield, female; 41, dorsal view of body, female; 42, tarsus and tibia I, female.

## PLATE 9

- 43-49. *Cheyletus malaccensis* Oudemans: 43, Gnathosoma, female; 44, dorsal view of body, female; 44A, dorsal body seta, female; 45, tarsus and tibia I, female; 46, gnathosoma, male; 47, dorsal view of body, male; 48, detail of genital region, male; 49, tarsus and tibia I, male.
- 50-54. *Cheletophyes philippinensis*, new species: 50, Gnathosoma, female; 51, dorsal palpal seta, female; 52, dorsal view of body, female; 53, genital-anal region, female; 54, tarsus and tibia I, female.

## PLATE 10

- 55-59. *Cheletophyes hawaiiensis*, new species: 55, Gnathosoma, female; 56, dorsal seta of palpus, female; 57, dorsal view of body, female; 58, tarsus and tibia I, female; 59, nymph.
- 60-64. *Cheletophyes marshalli*, new species: 60, Gnathosoma, female; 61, dorsal view of body, female; 62, dorsal marginal body seta, female; 63, dorsal submedian seta, female; 64, tarsus and tibia I, female.
- 65-68. *Eucheyletia panamensis*, new species: 65, Gnathosoma, female; 66, dorsal view of body, female; 67, detail of reticulation, female; 68, tarsus and tibia I, female.

## PLATE 11

- 69-71. *Eucheyletia whartoni*, new species: 69, Dorsal view of body, female; 70, detail of dorsal reticulation, female; 71, tarsus, tibia and genu of leg I, female.
- 72-75. *Cheletomimus berlesei* (Oudemans): 72, Gnathosoma, female; 73, dorsal view of body, female; 74, dorsal body setae, female; 75, tarsus and tibia I, female.
- 76-79. *Eucheyletia harpyia* (Rodendorf): 76, Gnathosoma, female; 77, dorsal view of body, female; 78, tarsus and tibia I, female; 79, genital-anal region, female.
- 80-82. *Eucheyletia bishoppi*, new species: 80, Gnathosoma, female; 81, palpal combs, female; 82, genital-anal region, female.

## PLATE 12

- 83-88. *Eucheyletia bishoppi*, new species: 83, Dorsal view of body, female; 84, tarsus and tibia I, female; 85, tarsus and tibia III, female; 86, gnathosoma, male; 87, dorsal view of body, male; 88, tarsus and tibia I, male.
- 89-94. *Cheyletia pyriformis* (Banks): 89, Gnathosoma, female; 90, dorsal view of body, female; 91, tarsus and tibia I, female; 92, gnathosoma, male; 93, dorsal view of body, male; 94, tarsus and tibia I, male.

## PLATE 13

- 95-98. *Cheyletia virginiensis*, new species: 95 Gnathosoma, female; 96, dorsal view of body, female; 97, dorsal body seta, female; 98, tarsus and tibia I, female.
- 99-102. *Cheyletia wellsii*, new species: 99, Gnathosoma, female; 100, dorsal view of body, female; 101, tarsus and tibia I, female; 102, genital-anal region, female.
- 103-105. *Cheyletia squamosa* (Degeer): 103, Gnathosoma, female; 104, dorsal view of body, female; 105, tarsus and tibia I, female.
- 106-107. *Cheletomorpha lepidopterorum* (Shaw): 106, Gnathosoma, female; 107, tarsus and tibia I, female.

## PLATE 14

- 108-112. *Cheletomorpha lepidopterorum* (Shaw): 108, Dorsal view of body, female; 109, gnathosoma, male; 110, dorsal view of body, male; 111, tarsus and tibia I, male; 112, dorsal submedian seta, male.
- 113-116. *Eutogones foxi*, new species: 113, Gnathosoma, female; 114, dorsal view of body, female; 115, genital-anal region, female; 116, tarsus and tibia I, female.
- 117-119. *Cheletogones ornatus* (Canestrini and Fanzago): 117, Gnathosoma, female; 118, dorsal view of body, female; 119, tarsus and tibia I, female.

## PLATE 15

- 120-122. *Cheletogones oaklandia*, new species: 120, Gnathosoma, female; 121, dorsal view of body, female; 122, tarsus and tibia I, female.
- 123-125. *Cheletogones buckneri*, new species: 123, Gnathosoma, female; 124, dorsal view of body, female; 125, tarsus and tibia I, female.
- 126, 127. *Chelonotus oudemansi*, new species: 126, Ventral view of body, female; 127, tarsus and tibia I, female.
- 128-130. *Chelonotus cwingi*, new species: 128, Dorsal view of body, female; 129, ventral view of body, female; 130, detail of gnathosoma, female.

## PLATE 16

- 131-135. *Acaropsis travisi*, new species: 131, Gnathosoma, female; 132, dorsal view of body, female; 133, palpal comb, female; 134, tarsus and tibia I, female; 135, detail of anterolateral margin of propodosomatic shield.
- 136-139. *Acaropsis docta* (Berlese): 136, Gnathosoma, female; 137, dorsal view of body, female; 138, palpal comb, female; 139, tarsus and tibia I, female.



140-144. *Eucheyletia hardyi*, new species: 140, Gnathosoma, female; 141, dorsal view of body, female; 142, tarsus and tibia I, female; 143, tarsus and tibia III, female; 144, genital-anal region, female.

## PLATE 17

145-148. *Cheletogenes traubi*, new species: 145, Gnathosoma, female; 146, dorsal view of body, female; 147, genital-anal region, female; 148, tarsus and tibia I, female.

149-154. *Chelacaropsis moorei*, new species: 149, Gnathosoma, female; 150, dorsal view of body, female; 151, tarsus and tibia I, female; 152, ventral view of gnathosoma, male; 153, dorsal view of body, male; 154, tarsus and tibia I, male.

## NOTE

The following two species were inadvertently omitted from the general text:

*Cheyletus parumsetosus* KARPELLES, Berlin. Ent. Zeitschr., vol. 28, fasc. 2, pp. 232, 238, 1884.—OUDEMANS, Mém. Soc. Zool. France, vol. 19, p. 81, 1906.

*Cheyletus promptus* OUDEMANS, Ent. Ber. Nederl. Ver., vol. 1, fasc. 18, p. 161, 1904; Mém. Soc. Zool. France, vol. 19, p. 81, 1906.

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(Synonyms are printed in *italics*)

- |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
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