

## THE CLASSIFICATION OF THE AMERICAN SIPHON- APTERA.

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A previous paper, entitled *A Revision of American Siphonaptera*, by the present author, which had been completed March 1, 1903, did not finally appear until 1904.<sup>a</sup> In the meantime, and immediately following the publication of this paper, there occurred a most extraordinary activity among students of this group. In 1903 alone at least seventeen papers relating to Siphonaptera were published. New and extensive material was rapidly brought together from all parts of the world, and a more comprehensive classification of the group was gradually evolved. In the extensive paper by Tiraboschi,<sup>b</sup> we have the first conception of subfamilies. Several new genera have been added by Wagner, Rothschild, Wahlgren, and Enderlein.

All of this has profoundly affected the classification of American fleas proposed in my *Revision*. The bringing up to date of that work became increasingly urgent, since it was already being widely used by American students, and quoted by those of other countries.

The writer has had continuously under way extensive supplementary studies of the older species. In addition new material of a very important nature has been accumulating. The following paper is a preliminary study necessary before the new material could be worked up. In the former paper attention was called for the first time to the fact that, as a whole, rat fleas of the Tropics were far more nearly related to the fleas of human beings than were those of temperate regions. Tiraboschi, in his monographic study of the relation of rats to the bubonic plague, does not emphasize this fact, which appears to the writer to be the most important connected with the whole matter. The outbreaks of plague in Mazatlan, and now in Chile, remind us that it may soon come our turn, and that a thorough understanding of the problems involved—as in the case of mosquitoes and yellow fever—is a matter of inestimable importance.

<sup>a</sup> Proc. U. S. Nat. Mus., XXVII, pp. 365-469, pls. x-xxvi.

<sup>b</sup> Archiv. de Parasit., VIII, 1904.

The interest in this subject is further accentuated by the statement that Doctor Carrasquillo, of Bogota, has found the bacillus of Hansen in the intestinal contents of fleas. It is thus open to question if the fleas are not the agents for the communication of leprosy. In accordance with the above generalization it becomes of pressing importance to examine large series of rat fleas from the various tropical and subtropical ports, and likewise those of human beings and cats and dogs from the same places. This will be a difficult matter to accomplish unless the interest of resident physicians and scientific men generally can be enlisted. Their attention is herewith invited to these problems. Material can be gathered very readily, the apparatus needed being simply a rat trap, vials of alcohol, and tweezers. The services of the author are freely offered in connection with the working up of the material, and prompt reports will be submitted. The residence of the author in the vicinity of Habana—a leprosy center—offers exceptional opportunity for an investigation first hand of the problem for Cuba, and this is being carried out as rapidly as possible.

Doctor Lutz, of the Instituto Bacteriologico in São Paulo, Brazil, was one of the first scientists in the Americas to turn his attention to this important problem. The author had the honor of examining the material gathered by Doctor Lutz as long ago as 1899, and it was reported on in the Revision, with most interesting results. This was, however, but a limited material, taken at a single locality, and that in the interior of the country. It sharply emphasized the great importance of gathering a copious material from all the seaport towns of tropical America. Doctor Lutz has lately been making other sendings, from which we expect some very interesting results. Doctor Carter, of Galveston; Doctor Davidson, of Los Angeles, and Mr. W. J. Rainbow, of Sydney, have been making valuable contributions of material.

Collections of fleas actually found biting human beings throughout all the warmer regions of the earth are much needed for this study. It rests with the bacteriologists to prove the actual transmission of disease. If a flea will leave a diseased rat and then bite a human being, this fact should be made known. Fleas of species commonly known to bite human beings may be observed here in Cuba crawling about on foul sores on the innumerable miserable dogs of the streets. Surely this should have a keen interest for all persons concerned—scientist and layman. The actual introduction of bacilli into the intestinal canal of the flea is not an essential premise if dried blood may be found on the rostrum of the flea. Whether a careful study of the species actually occurring on man and the lower animals may show that the transmission of disease in this way is improbable, it remains none the less true that this phase of the problem should be thoroughly worked out. The writer is progressing with a considerable contribution on this subject.

The following paper is to be considered only as a supplement to the Revision. The bibliographical references are either entirely new or are made necessary by changes in nomenclature. For completeness the two papers should always be used together.<sup>a</sup> Repetitions have been avoided wherever possible. The subjects in the body of the paper have been arranged in the same order as in the Revision, so that cross references may be readily made.

The following grouping into families is made with a very meager characterization. Numerous other differential characters of family value can be added. The families as indicated here are sharply defined, the difference in the general habitus of the groups being very clear to anyone who has handled specimens of this order in any numbers. Their fuller characterization must be accomplished by some one who has access to the material sufficient for working out the taxonomy of the whole group for the entire world. General classification can only be built upon a very wide and very special knowledge of the anatomy of species. Hence the classification is here only carried far enough to make clear the relationships of the various groups for the use of American students. It is, however, evident that we can not hope to get even the American forms properly classified without taking cognizance of all that is being done in other parts of the world.

## Order SIPHONAPTERA Latreille.

1904. *Siphonaptera* TRABOSCHI, Archiv. de Parasit., VIII, p. 302.

### SYNOPSIS OF FAMILIES.

- A. Thoracic segments strongly shortened and constricted; labial palpi without pseudo-joints; third joint of antennæ without completely separated pseudo-joints.
- B. Maxillæ without or with very short and broad projecting laminae, their palpi extending beyond anterior coxæ; head strongly angulated anteriorly in both sexes; metathoracic epiphyses extending over nearly two or even three abdominal segments; the female becoming endoparasitic when gravid, with globose, enormously dilated abdomen, in which the original chitinous sclerites are mostly obliterated..... RHYNCHOPRIONIDÆ
- BB. Maxillæ with a long, narrow, curved lamina which projects downward and backward, their palpi equaling the anterior coxæ, or shorter; head evenly rounded in both sexes; metathoracic epiphyses extending over but one abdominal segment; gravid female with abdomen vermiform..... HECTOPSYLLIDÆ
- AA. Thoracic segments not strongly shortened and constricted, their epiphyses extending over but one abdominal segment; labial palpi with three or more pseudo-joints; maxillary palpi almost always shorter than anterior coxæ; third joint of antennæ with nine more or less distinctly separated pseudo-joints.

<sup>a</sup> A complete index (p. 167) has been prepared to accompany this paper in which references to the earlier paper are indicated by italics.

- B. Fifth tarsal joint broadly dilated and greatly lengthened beyond the fourth pair of lateral spines; fore tibiae armed on posterior border, very large black teeth or a few heavy spines; fifth tarsal article on forelegs as long as rest of tarsus, on all the legs with the claws nearly as long as the fifth joint; fore coxæ nearly nude, with but few long spines.....MALACOPSYLLIDÆ
- BB. Fifth tarsal joint never greatly enlarged, never as long as the rest of tarsus, the claws shorter; fore tibiae armed on posterior border with slender spines; fore coxæ always clothed on outer side with several to numerous oblique rows of bristles.
- C. Gena with a large recurved process on lower margin extended downward and backward; labial palpus five-jointed; mandibles not distinctly serrate; maxillæ long, rather narrow, and obtuse at apex; eye distinct; ctenidia absent; antepygial bristles absent; anal style of female absent .....LYCOPSYLLIDÆ
- CC. Gena never with a recurved process; mandibles usually distinctly serrate; anal style present in female.
- D. Maxillæ triangular, acute at apex.
- E. Posterior tibial spines in pairs and few in number, not in a very close-set row .....PULICIDÆ
- EE. Posterior tibial spines numerous, mostly single and in a close-set row .....CTENOPSYLLIDÆ
- EEE. Posterior tibial spines in numerous, short, close-set transverse rows on posterior border with about four spines in each row.  
HYSTRICOPSYLLIDÆ
- DD. Maxillæ clavate or subquadrangular; face strongly sloping forward and recurved just above the mouth, where there are two tooth-like plates on each side; eyes absent; pronotum and usually abdomen with ctenidia; confined to bats ...CERATOPSYLLIDÆ

### Family RHYNCHOPRIONIDÆ.

1880. *Sarcopsyllidæ* TASCHEMBERG, Die Flöhe, p. 43.

It was suggested in the Revision that the name *Rhynchoprion*—based as it was upon a well-known species as a type—should be used instead of *Sarcopsylla*, though in the body of the text the author did not then have the courage to make the change. Since then no dissenting voice has been heard. No less than twenty-seven years after *Sarcopsylla* had been proposed, with the same type, the eminent entomologist, Karsten, adhered to *Rhynchoprion* as the correct name. It is a pity that his judgment could not have been followed, since we are compelled now, after a considerable literature has accumulated under the name *Sarcopsylla*, to use again the older and only correct name.

Mr. W. J. Rainbow, of the Australian Museum, has recently kindly sent to me sketches made from the types of *Echidnophaga ambulans* Olliff, which fortunately are preserved in that museum. These sketches, while they do not enable me to present a diagnosis of the genus, are very important, in that they indicate this form as unmistakably of the Rhynchoprionidæ, a fact wholly impossible to obtain

from the original description. The statement that the insect does not jump is true only, of course, when it fastens itself to the host. The same habit is characteristic of *Argopsylla gallinacea*. Indeed Olliff's species is very close to *Argopsylla*, if not actually a member of that genus. Carefully made detail drawings of its head, mouth parts, and legs are especially needed.

#### Genus RHYNCHOPRION Oken.

1815. *Rhynchoprion* OKEN, Naturgesch. f. alle Stände, III, p. 402.

1840. *Sarcopsylla* WESTWOOD, Trans. Ent. Soc. Lond., II, p. 202.

1893. *Sarcopsylla* BEZZI, Rev. Ital. Sci. Nat. y Boll. Nat., XIII, p. 23.

1904. *Sarcopsylla* TIRABOSCHI, Archiv. de Parasit., VIII, p. 302.

Oken used this name for this genus first, and indicated a well-known species as its type, thus definitely establishing it.

#### SYNOPSIS OF SPECIES.

- A. Last article of anterior and middle tarsi almost spineless; the head angled at about a third of the distance from mouth to base of vertex.....*penetrans*  
 AA. Last article of anterior and middle tarsi normally spined; the head angled at about one-seventh of the distance from mouth to base of vertex .....*cavata*

#### Genus ARGOPSYLLA Enderlein.

1901. *Argopsylla* ENDERLEIN, Deutsches Tief-see Exped., 1898-99, III, p. 263.

1904. *Xestopsylla* BAKER, Proc. U. S. Nat. Mus., XXVII, p. 374.

Between the dates of the conclusion of the Revision and its publication there appeared a new generic name—*Argopsylla*—antedating by publication the name *Xestopsylla*. It was published in the advance sheets of a general article in a rather remote work. Except for the kindness of the author, it would have remained unknown to the writer even now.

#### SYNOPSIS OF SPECIES.

- A. Mandibles a third longer than the length of head from base of mandibles to base of vertex; abdomen in the pregnant female long, subcylindrical, with a broad membranous separation at the pleuræ, the stomata thus high up toward the dorsal line .....*rhynchopsylla*  
 AA. Mandibles about as long as length of head; abdomen of normal form, and with the tergites and sternites overlapping even in the pregnant female ...*gallinacea*

#### Family MALACOPSYLLIDÆ.

1898. *Megapsyllidæ* BAKER, Journ. N. Y. Ent. Soc., VI, p. 53.

1903. *Megapsyllidæ* WAHLGREN, Archiv für Zool., I, p. 191.

With the recognition of the proper name for the unique genus, the name of the family changes also.

#### Genus MALACOPSYLLA Weyenbergh.

1881. *Malacopsylla* WEYENBERGH, Periodico Zoologico, III, p. 271.

1898. *Megapsylla* BAKER, Journ. N. Y. Ent. Soc., VI, p. 53.

1903. *Megapsylla* WAHLGREN, Archiv für Zool., I, p. 191.

1904. *Malacopsylla* ROTHSCHILD, Novitat. Zool., XI, p. 603.

This is another case of a genus published in so remote a place that reference to it had not been found in any of the bibliographies, though it may occur in some to which access was not had. This correction is due to Rothschild, though to other European students the genus had remained unknown down to 1903. The full account by Rothschild, including the description of two new species, enables the writer to straighten out a bad lot of errors in connection with these very interesting forms.

As to species, the errors in the Revision date to receiving from Doctor Berg specimens said by him to be male and female of the true *Pulex grossiventris* of Weyenbergh. This statement was accepted as conclusive, and deductions were based on it. Afterwards Wahlgren unfortunately used the same foundation. As soon as Rothschild's paper was received, the original material was reexamined with the most critical care. What had been called the male of *grossiventris* Weyenbergh turned out to be *agenoris* Rothschild. A proper male was found for the female previously called *grossiventris*. Very little comparison was necessary to determine that *androcti* differed widely from anything we had. A further study of the original description by Weyenbergh convinced me that the female originally called *grossiventris* and the newly found male were of the same species originally examined by Weyenbergh. The detail work in Weyenbergh's description is of little value, and expectedly so, since he could have had no conception of the importance of the minute exactness that is now found to be so necessary. Rothschild says, "According to the description, the four segments of the maxillary palpi of *grossiventris* Weyenbergh are the same in length, the first being a little longer than the others." However, in the language of the original we read, "les articles sont presque tous de même longueur, quoique, pour dire vrai, l'article basal semble un peu plus court que les autres." When we consider this in the light of his statement as to the tarsal joints, where he says "les quatre premiers articles tarsaux sont de longueur égale, presque aussi longs que larges," a condition we do not know to exist in *Malacopsylla* or any other fleas, it becomes evident that his descriptions were made from simple visual estimations unaccompanied by the numerous more exact measurements which we now make. Falling back upon the extended general characterization which Weyenbergh gives, there can be no doubt but that the specimens now before me represent the true *grossiventris*.

Referring to the plates of Rothschild, there may be noticed at once a wide difference in the form of the movable finger of the male of *grossiventris* and that of *androcti*. In *androcti* this sclerite narrows very regularly to a somewhat acute tip. In *grossiventris* the apex is obliquely truncate. Turning to the paper by Wahlgren,<sup>a</sup> this

<sup>a</sup> Archiv für Zool., I, 1903, p. 191.

same condition may be found exactly represented for his *Megapsylla incernis*. Trusting to the very erroneous description of *M. grossiventris* by the writer, he had every reason to suppose his species distinct, but it is undoubtedly identical.

## SYNOPSIS OF SPECIES.

- A. Fore tibiae armed with long, thick, stout teeth; pronotal ctenidium wanting; frontal tubercle present.
- B. Labial palpi reaching scarcely two-thirds of fore coxae or less; tip of male movable finger obliquely truncate.....*grossiventris*
- BB. Labial palpi reaching nearly to apex of coxae; tip of male movable finger evenly narrowed to a rounded tip.....*androchli*
- AA. Fore tibiae armed with slender spines; with a pronotal ctenidium of six spines; no frontal tubercle; labial palpi reaching scarcely one-half of fore coxae.  
*agenoris*

## Family LYCOPSYLLIDÆ, new family.

About the only disposition that can be made of this remarkable new form discovered by Rothschild is to found a new family for it. It is abundantly distinct, and presents many characters which it is believed will at least eventually prove well within the range of family value.

## Genus LYCOPSYLLA Rothschild.

1904. *Lycopsylla* ROTHSCHILD, Novitat. Zool., XI, p. 602.

## Family PULICIDÆ.

1893. *Pulicidæ* BEZZI, Rev. Ital. Sci. Nat. y Boll. Nat., XIII, p. 23.

Since the fuller elucidation of *Chartopsylla*, it becomes evident that *Vermipsylla* represents a group of not greater value than a subfamily. The genera *Anomiopsyllus* and *Dolichopsyllus* are in their way equally distinct, if not more so.

## SYNOPSIS OF SUBFAMILIES.

- A. Antepygidial bristles wanting, at least in the female.....VERMIPSYLLINÆ
- AA. Antepygidial bristles present.
- B. Antepygidial bristles, one or three.
- C. Hind coxal epiphysis forming distally with the coxa a deep notch, subtended outwardly by a produced acute limb; female with one antepygidial bristle on each side.....ANOMIPSYLLINÆ
- CC. Hind coxal epiphysis narrowing into the coxa, forming a poorly defined notch or none; female with one or three antepygidial bristles...*Pulicina*
- BB. Antepygidial bristles, five on each side.....DOLICOPSYLLINÆ

## Subfamily VERMIPSYLLINÆ.

1903. *Vermipsyllidæ* WAHLGREN, Archiv für Zool., I, p. 190.

1903. *Vermipsyllidæ* WAGNER, Rev. Russ. d'Ent., No. 5, p. 294.

1904. *Vermipsyllidæ* BAKER, Proc. U. S. Nat. Mus., XXVII, p. 376.

Extensive and carefully made detail drawings of all the forms referred to this group are very much needed.

## SYNOPSIS OF GENERA.

- A. Labial palpi with less than ten pseudojoints ..... *Chaetopsylla* Kohaut  
 AA. Labial palpi with more than ten pseudojoints..... *Vermipsylla* Schimkewitsch

## Genus VERMIPSYLLA Schimkewitsch.

1903. *Vermipsylla* WAGNER, Revue Russe d'Entom., No. 5.

## Genus CHÆTOPSYLLA Kohaut.

1903. *Chaetopsylla* KOHAUT, Magyar. bolhai (May), p. 37.  
 1903. *Oncopsylla* and *Vermipsylla* WAHLGREN, Archiv für Zool., I, July, pp. 186  
 and 190.

## Subfamily PULICINÆ.

1904. *Pulicina* part TIRABOSCHI, Archiv. de Parasit., VIII, pp. 242 and 243.

The generic groups separated in this paper are groups with a characteristic habitus, capable of a fuller definition, which, with fuller material, will be presented later. This separation is also substantiated in part by geographical distribution and host relations. The writer does not believe in the separation of flea genera on a single character, and that the arrangement of some of the weaker spines, as has been done by Wagner with some of his new genera. So far as the writer or any American student is concerned Wagner's genera may stand as he has made them, but should the attempt be made to carry out a similar system among the American fleas, using a single set of uncoordinated characters, it would necessitate the formation of legions of genera, and would also result in throwing together under single generic names species of otherwise very distant relationships. The characters which Wagner uses are of great taxonomic value in themselves, however, and should be carefully indicated in every species described, though unfortunately this has not always been done.

## SYNOPSIS OF GENERA.

- A. Legs stout and thick set; female with one antepygial bristle on either side.  
 B. Head without etenia.  
 C. Head above sloping obliquely forward, angled in front; segments of abdomen each with five to six rows of bristles .... *Goniopsyllus*, new genus  
 (type, *kerquelensis*)  
 CC. Head broadly rounded above and in front.  
 D. Labial palpi four-jointed.  
 E. Pronotum without etenial spines.  
 F. Inner side of hind coxæ distally with a comb of minute teeth.  
*Puler* Linnæus  
 (type, *irritans*)  
 FF. Inner side of hind coxæ distally without a comb of minute teeth.  
*Rhopalopsyllus*, new genus  
 (type, *lutzi*)  
 EE. Pronotum with etenial spines ..... *Hoplopsyllus*, new genus  
 (type, *anomalous*)  
 DD. Labial palpi five-jointed ..... *Parapsyllus* Enderlein  
 (type, *longicornis*)



- BB. Head and prothorax with ctenidia.  
 C. Head long and not deep, the genal area small and provided along its whole length with a ctenidium ..... *Ctenocephalus* Kolenati  
 (type, *canis*)  
 CC. Head short and deep, the genal area very large and with an oblique ctenidium on its posterior portion only ..... *Spilopsyllus*, new genus.  
 (type, *leporis*)  
 AA. Legs more slender; female with two to five antepygidial bristles on either side.  
 B. Head without ctenidia; eyes usually well developed; last joint of hind tarsi with four or five spines on either side.  
 C. Inner side of hind coxæ distally with a comb of minute teeth.  
*Odontopsyllus*, new genus  
 (type, *multispinosus*)  
 CC. Inner side of hind coxæ without a comb of minute teeth.  
 D. Last joint of hind tarsi with five pairs of lateral spines and a supernumerary pair at the middle ..... *Dasyopsyllus*, new genus  
 (type, *perpinnatus*)  
 DD. Last joint of hind tarsi with five pairs of lateral spines, all in line or only the first pair slightly dislocated ..... *Ceratophyllus* Curtis  
 (type, *gallinæ*)  
 BB. Head with ctenidia; eyes usually rudimentary.  
 C. Last article of hind tarsi with five pairs of normally placed lateral spines, and with two minute subapical ones on the disk.  
*Typhloceras* Wagner  
 (type, *poppéi*)  
 CC. Last joint of hind tarsi with four pairs of well developed, normally placed lateral spines, the fifth pair reduced to hairs.  
 D. Last article of hind tarsi with two subbasal and two subapical approximate supernumerary spines on the disk.  
 E. Third pair of lateral spines normal ..... *Paleopsylla* Wagner  
 (type, *sibirica*)  
 EE. Third pair of lateral spines reduced to hairs .. *Ctenophthalmus* Kolenati  
 (type, *bisocdentatus*)  
 DD. Last article of hind tarsi with only two approximate supernumerary spines on the disk and these subapical ..... *Neopsylla* Wagner  
 (type, *bidentatiformis*)

#### Genus PULEX Linnæus.

1893. *Pulex* BEZZI, Rev. Ital. Sci. Nat. y Boll. Nat., XIII, p. 137.  
 1903. *Pulex* KOHAUT, Magyar. bolhai, p. 32.  
 1903. *Pulex* ENDERLEIN, Deutsches Tief-see Exped., 1898-99, III, p. 259.  
 1904. *Pulex* TRABOSCHI, Archiv. de Parasit., VIII, p. 245.

#### SYNOPSIS OF SPECIES.

- A. Teeth in coxal comb numerous and in an irregular row.  
 B. Labial palpi one-half length of anterior coxæ ..... *irritans*  
 BB. Labial palpi three-fourths of anterior coxæ or more ..... *lugesii*  
 AA. Teeth in coxal comb six, and in a regular row ..... *brasiliensis*

#### Genus RHOPALOPSYLLUS, new genus.

This genus will probably prove one of the greatest interest economically in the Siphonaptera. It is here that we find most of those American species of tropical rat fleas which may possibly be concerned

in the transference of bubonic plague and leprosy. The upper edge of the antennal groove has a row of usually many short and thick, but minute, spines or teeth.

SYNOPSIS OF SPECIES.

- A. Frontal notch present.  
 B. Lower edge of genæ with a row of several hairs ..... *corfidii*  
 BB. Lower edge of genæ without a row of hairs ..... *lutzi*
- AA. Frontal notch absent.  
 B. Second joint of maxillary palpi as long as III and IV together ..... *klagesi*  
 BB. Second article of maxillary palpi equaling IV or shorter.  
 C. Third joint of maxillary palpi once and a third the length of II; maxillary palpi much shorter than rostrum ..... *conceitus*  
 CC. Third article of maxillary palpi distinctly shorter than II.  
 D. Spines on outside of hind tibia numerous and arranged in about three longitudinal rows; two complete rows of bristles on all the abdominal tergites ..... *bohlsi*  
 DD. Spines on outside of hind tibia in a single row of about eleven members with a few scattering ones beside; second row of bristles on abdominal tergites always more or less incomplete.  
 E. Harpe of male lanceolate; the upper claspers with long stout spines.  
 F. Claspers in male with three stout spines and several smaller ones on the outer margin.  
 G. Harpe of male with three bristles near tip; head with two rows of bristles before the eye ..... *australis*  
 GG. Harpe of male with a brush of about ten stout bristles below tip; head with but one row of bristles before the eye ..... *elephantis*  
 FF. Claspers with a submarginal vertical row of about fourteen stout spines near outer edge, and others within the margin ..... *simonsi*  
 EE. Harpe of male spatulate, subrectangular; upper claspers with only small, weak spines ..... *cocytii*

Genus HOPLOPSYLLUS, new genus.

This is a genus principally of rabbit fleas. Their general structure is quite characteristic.

SYNOPSIS OF SPECIES.

- A. Pronotal etnidium with about nine spines ..... *anomalous*  
 AA. Pronotal etnidium with fourteen to eighteen spines.  
 B. Articles of hind tarsi with some apical bristles longer than their succeeding articles.  
 C. Vestiture of spines and bristles rather heavy; a spine on hind distal angle of second article of hind tarsi as long as articles III and IV and three-fourths of V together; claspers short and stout; harpe shaggy with hairs ..... *affinis*  
 CC. Vestiture comparatively light; a spine on hind distal angle of second article of hind tarsi as long as articles III and IV, and scarcely one-fourth of V together; claspers long and slender; harpes with few hairs ..... *lynx*  
 BB. Articles of hind tarsi with all the bristles shorter than their succeeding articles ..... *glacialis*

## Genus CTENOCEPHALUS Kolenati.

1904. *Ctenocephalus* TURABOSCHI, Archiv. de Parasit., VIII, p. 252.

## CTENOCEPHALUS CANIS (Curtis) Baker.

Rothschild<sup>a</sup> again asserts the absolute distinctness of *canis* and *felis*. After the reception of this paper the material in the collection here was again gone over, with the result that the conviction remains that *felis* is at most a variety, and that with the recognition of *felis* many other varieties will also have to be recognized. After Rothschild's first paper on the subject the preparation of hundreds of specimens from different parts of the world was begun, taken from dogs and cats, both domestic and wild, for the purpose of making an extensive study in variation, comparing every specimen down to the last hair, just as has also been arranged for in the case of certain species of *Ceratophyllus*. It is hoped to carry these very important studies to a conclusion soon, and at that time the writer will be ready to present various other varieties of *canis* too numerous to name.

## Genus SPILOPSYLLUS, new genus.

The placing of *simplex* and *inæqualis* in *Ctenocephalus* was but a temporary expedient at best. Their separation is inevitable, since they are of totally different relationships.

## SYNOPSIS OF SPECIES.

- A. Mandibles reaching three-fourths of anterior coxæ; head ctenidia in male with eight spines on either side.....*simplex*  
 AA. Mandibles reaching one-fourth to one-half of anterior coxæ; head ctenidia in male with four to six spines on either side.....*inæqualis*

## Genus PARAPSYLLUS Enderlein.

1903. *Parapsyllus* ENDERLEIN, Deutsches Tief-see Exped. 1898-99, III, p. 260.  
(Type, *Pulex longicornis* Enderlein.)

## Genus ODONTOPSYLLUS, new genus.

This group of species, originally referred to *Ceratophyllus*, possesses the strikingly *Pulex*-like character of minute teeth on the inside of hind coxæ.

## SYNOPSIS OF SPECIES.

- A. Teeth on inside of hind coxæ in several rows; eyes well developed.  
 B. Pronotal ctenidium of about forty spines.....*multispinosus*  
 BB. Pronotal ctenidium of about twenty-four spines.....*dentatus*  
 AA. Teeth on inside of hind coxæ in one row; pronotal ctenidium of about fourteen spines.  
 B. In front of eyes a single row of three bristles.....*charlottensis*.  
 BB. In front of eyes a single bristle and two rows of four or six bristles each.  
*telegoni*

<sup>a</sup> Novitates Zoologicae, XII, Jan., 1905.

## Genus CERATOPHYLLUS Curtis.

1903. *Ceratophyllus* KOHAUT, Magyar. bolhai, p. 41.1904. *Ceratophyllus* TIRABOSCHI, Archiv. de Parasit., VIII, p. 260.

A complete revision of this genus—even now much needed—will be a matter of the greatest difficulty. Of many of the species both sexes are not yet known. Many of the American species recently described by Rothschild are not known from specimens in this country; the types have probably permanently left America. The preparation of this second table of the species—although it is a great improvement over the first—has been a very unsatisfactory piece of work. It was impossible to use those characters believed to be of most importance in the separation of species, since they were rarely described for each and every species. No one who has not tried it can appreciate the obstacles to be encountered in the preparation of a synopsis of a great genus of many species from the descriptions of several authors. Every author should at least mention every character used by every other author. The writer has suffered probably as much by his own remissness as by that of any other person, but this does not detract from the truth or vital taxonomical importance of the proposition.

Material of all American *Ceratophyllus* species is greatly desired by the writer, and it is hoped that American entomologists and mammalogists will neglect no opportunity for their collection. The older species must be better known and there unquestionably still remain numerous new ones to discover.

When we came down to the separation of species, by the “turn of a hair” it was realized that the time had come to undertake extensive variational studies. With that in view, certain species in very critical groups were collected in large series, and have been mounted to the number of hundreds of specimens. Important results are expected from their extended comparative study.

## SYNOPSIS OF AMERICAN SPECIES.

(Excepting *grønlandicus*.)

- A. Metatarsal article II with apical spines scarcely equaling III or shorter.
- B. Metatarsal article V with lateral spines all in line on margins, though the first pair may be more or less bent inward.
- C. Upper genal row of bristles extended nearly to genal margin and composed of five or six bristles.
- D. Labial palpi not reaching end of coxæ.....*abantis*
- DD. Labial palpi reaching end of coxæ or even of trochanters.
- E. Disk of vertex back of antennal groove with six stout bristles.....*asio*
- EE. Disk of vertex back of antennal groove with one to three bristles.
- F. Subpygidial group of bristles in female with one oblique row of four large bristles and with two smaller bristles above these; ventral group on eighth tergite of three large bristles and about fourteen smaller ones.....*lucifer*
- FF. Subpygidial group of bristles in female with three large bristles only; ventral group on eighth tergite with three or four large bristles.....*lucidus*

- DDD. Labial palpi reaching beyond the trochanters.  
 E. Claspers in male with ventral margin concave and bearing two spines, *quirini*
- EE. Claspers in male with ventral margin nearly straight and bearing large, long teeth.  
 F. Claspers with two teeth ..... *rison*  
 FF. Claspers with three teeth ..... *cutolpi*
- CC. Upper genal row of bristles represented only by:  
 D. Two small ones above near the antennal groove.  
 E. Two large bristles behind the antennal groove ..... *canadensis*  
 EE. Four bristles behind the antennal groove ..... *euphorbi*
- DD. One large one near the genal margin, and one above near the antennal groove; abdominal tergites with three distinctly marked rows of usually numerous bristles ..... *alaskensis*
- DDD. One slender bristle on genal margin ..... *proximus*
- BB. Metatarsal article V with but four pairs of lateral spines on the margins, the normal basal pair strongly dislocated toward the median line and directed straight distad.
- C. Metatarsal article I equaling II, III, and IV together, rarely more or less.  
 D. Labial palpi nearly equaling fore femora: upper genal row with three small bristles near the antennal groove, only ..... *oculatus*
- DD. Labial palpi rarely slightly exceeding the trochanters.  
 E. Frontal part of head with three rows of bristles; vertex with at least one distinct oblique row of bristles ..... *pollionis*  
 EE. Frontal part of head with the two usual rows of bristles—at least no more; vertex with no oblique rows of bristles.
- F. Hind femur with a well defined lateral row of more than three hairs.  
 G. Mesotarsal article I distinctly longer than II or V ..... *californicus*  
 GG. Mesotarsal article I about equal to II and to V ..... *ciliatus*
- FF. Hind femur without a lateral row of hairs on side, though one or two may occur there.
- G. Pronotal ctenidium with twenty spines or less.  
 H. Abdominal sternites with but two bristles on each side; claspers of male with three stout black teeth on expanded middle portion of ventral margin ..... *ragneri*
- HH. Abdominal sternites for the most part with always more than two bristles on either side; claspers of male not as above.  
 I. Mesotarsal article V less than twice the length of IV, II longer than V, and I little longer than III ..... *leucopus*  
 II. Mesotarsal article V always about twice IV in length, and the other proportions different from above.  
 J. Labial palpi abnormally slender ..... *labiatus*  
 JJ. Labial palpi normally stout.  
 K. Claspers in male with ventral margin bearing four short black teeth ..... *wickhami*  
 KK. Claspers with five short teeth and one long bristle ..... *agilis*  
 KKK. Claspers with six short teeth and three bristles, *serdentatus*
- GG. Pronotal ctenidium with 24–28 spines; the second genal row represented by a few bristles near the antennal groove.  
 II. Metatarsal article II with only three pairs of bristles on dorsal side; hind femur without lateral bristles ..... *pseudardomys*  
 III. Metatarsal article II with four pairs of bristles on dorsal side; hind femur with one lateral bristle ..... *keeni*

- AA. Metatarsal article II with an apical spine much exceeding segment III and often III and IV together.
- B. Vertex and front very unusually bristled, with several rows of supernumerary bristles ..... *terribilis*
- BB. Vertex and front with no more than the normal number of bristles.
- C. Metatarsal article V with but four pairs of lateral spines on the margins, the normal basal pair strongly dislocated toward the median line and directed straight distad.
- D. Eye vestigial; metathoracic notum fused with epimerum, and sternum with episternum.
- E. Labial palpi extending beyond trochanters..... *dirisus*
- EE. Labial palpi shorter than coxæ ..... *terminus*
- DD. Eyes distinct; metathoracic notum and sternum not fused with other parts.
- E. Metatarsal article I about equaling II, III, and IV together; bristles of metatarsus abnormally lengthened; labial palpi extending beyond trochanters ..... *telchinum*
- EE. Metatarsal article I equaling the three succeeding segments and three-fourths of V together; bristles of metatarsi not normally lengthened; metatarsal article I with seven groups of spines on dorsal margin and five on ventral; labial palpi shorter than the coxæ.  
*coloradensis*
- CC. Metatarsal article V with the spines all inserted in line on the margins, the first pair sometimes slightly bent inward.
- D. Eyes vestigial; second genal row with five bristles ..... *ignotus*
- DD. Eyes present; second genal row with one to three bristles.
- E. Labial palpi equaling coxæ; one bristle in the second genal row. . . *petiolatus*
- EE. Labial palpi always extending to the femur and often nearly its whole length.
- F. Hind tarsal article I equaling II, III, and IV together..... *bacchi*
- FF. Metatarsal article I about equaling II and III together or less.
- G. Abdominal tergites with three rows of bristles ..... *hirsutus*
- GG. Abdominal tergites with two rows of bristles.
- H. Claspers of male with ventral margin bearing three stout teeth and two bristles..... *peantis*
- HH. Claspers of male with only bristles on ventral margin.
- I. Claspers of male of a very short small, hemispherical type.
- J. Claspers with bristles scattered along entire ventral margin.
- K. Frontal notch very large, its lip projecting in the form of a tubercle ..... *tuberculatus*
- KK. Frontal notch small, its lip not projecting in the form of a tubercle.
- L. Labial palpi reaching at most to one-half of the anterior femora.
- M. Gena below eye pointed posteriorly; on metatarsal article I with groups of spines 6-6; upper male claspers distally obliquely truncate away from the body..... *arizonensis*
- MM. Gena below eye posteriorly subtruncate.
- N. Metatarsal article I with groups of spines 5-6; claspers of male distally obliquely truncate away from body ..... *arctomyx*
- NN. Metatarsal article I with groups of spines 5-5; claspers of male distally gradually narrowed to a point ..... *idahoensis*

- JJ. Claspers of male with bristles in one small group of five near the upper end; metatarsal article I with three groups of spines on dorsal margin and five on ventral.....*bruneri*
- II. Claspers of male large and very long, of a sickle-shaped type; metatarsal article I with but four groups of spines on ventral margin.
- J. Length 3-3.5 mm., pale brown; metatarsal article I with groups of spines 4-4 in female, the whole article about equaling II and III together.....*acutus*
- JJ. Length 1.75-2.75 mm., dark brown; hind tarsal article I with groups of spines 4-5 in female; the whole article shorter than II and III together.....*montanus*

#### Genus CTENOPHTHALMUS Kolenati.

1893. *Typhlopsylla* part BEZZI, Rev. Ital. Sci. Nat. y Bull. Nat., XIII, p. 137.
1903. *Typhlopsylla* WAGNER, HORÆ Soc. Ent. Ross., XXXVI, pp. 138, 140.
1903. *Typhlopsylla* part KOHAUT, Magyar. Magyar. bolhai, p. 53.
1904. *Typhlopsylla* TIRABOSCHI, Archiv. de Parasit., VIII, p. 285.

#### SYNOPSIS OF AMERICAN SPECIES.

- A. Head ctenidia of two superposed spines on either side; size very large.
- B. Genæ lobed; prothoracic ctenidium of twelve spines.....*wenmanni*
- BB. Genæ not lobed; prothoracic ctenidium of twenty spines.....*gigas* and *grandis*
- AA. Head ctenidia of three to five spines on either side; size small.
- B. Spines of head ctenidia in nearly longitudinal rows on lower margins of genæ.
- C. Head ctenidia of three spines each.....*pseudagyrtes*
- CC. Head ctenidia of four spines each.....*antiquorum*
- BB. Spines of head ctenidia in vertical rows on hind margins of genæ.
- C. Spines of head ctenidia very similar in shape; pronotal ctenidium of 20-22 spines.
- D. Head ctenidia each of four spines; head evenly rounded in front; front with a marginal row of six bristles on each side.....*intermedius*
- DD. Head ctenidia each of five spines; head angulate in front; front without marginal bristles.....*fraternus*
- CC. Spines of head ctenidia very dissimilar in shape; pronotal ctenidium of about twenty-eight spines.....*genalis*

#### Genus NEOPSYLLA Wagner.

1903. *Neopsylla* WAGNER, HORÆ Soc. Ent. Ross., XXXVI, pp. 138, 140.
1904. *Neopsylla* TIRABOSCHI, Archiv. de Parasit., VIII, p. 292.

#### Genus PALÆOPSYLLA Wagner.

1903. *Palæopsylla* WAGNER, HORÆ Soc. Ent. Ross., XXXVI, pp. 137, 140.
1904. *Palæopsylla* TIRABOSCHI, Archiv. de Parasit., VIII, p. 294.

#### Genus TYPHLOCERAS Wagner.

1903. *Typhloceras* WAGNER, HORÆ Soc. Ent. Ross., XXXVI, p. 152.
1904. *Typhloceras* TIRABOSCHI, Archiv. de Parasit., VIII, p. 295.

#### Subfamily DOLICHOPSYLLINÆ.

#### Genus DOLICHOPSYLLA, new genus.

This new genus and new subfamily are erected for the reception of the very remarkable *Ceratophyllus stylosus*.

## Family CTENOPSYLLIDÆ, new family.

1904. *Typhlopsyllina* part TIRABOSCHI, Archiv. de Parasit., VIII, p. 242, 275.

Attention had been previously called to the close relationship of *Ctenopsyllus* and *Stephanocircus* as indicated by the most essential characters. They form a group equivalent to the other families of fleas. A name for the group drawn from the wholly untenable "*Typhlopsylla*" could not be used in any event.

## Genus CTENOPSYLLUS Kolenati.

1893. *Typhlopsylla* part BEZZI, Rev. Ital. Soc. Nat. y Bull. Nat., XIII, p. 137.

1903. *Ctenopsylla* WAGNER, Horæ Soc. Ent. Ross., XXXVI, p. 149.

1903. *Typhlopsylla* part and *Ctenopsylla* KOHAUT, Magyar. bolhai, pp. 53, 58.

1904. *Ctenopsyllus* TIRABOSCHI, Archiv. de Parasit., VIII, p. 276.

## SYNOPSIS OF AMERICAN SPECIES.

- A. Head without ctenidia ..... *alpinus*  
 AA. Head with ctenidia.  
 B. Head ctenidia of two spines each..... *hesperomys*  
 BB. Head ctenidia of four spines ..... *musculi*  
 BBB. Head ctenidia of five spines.  
 C. Pronotal ctenidium of thirty to forty spines (female) or fifty to fifty-six spines (male); eighth tergite in female with ventral group of numerous bristles ..... *brooksi*  
 CC. Pronotal ctenidium in female of twenty-four spines.  
 D. Pronotal ctenidium in male of twenty-eight spines; eighth tergite in female with ventral group of two bristles..... *hygini*  
 DD. Pronotal ctenidium in male of thirty-four spines; eighth tergite in female with ventral group of four bristles ..... *hyrtaci*

## Genus STEPHANOCIRCUS Skuse.

1903. *Stephanocircus* RAINBOW, Records of Australian Museum, V, No. 1, p. 53.

Rothschild has worked out the anatomy of the females of several species of this genus most thoroughly. The males still remain undiscovered. The tangle in connection with the original types of the genus has been unraveled by Mr. Rainbow.

## Family HYSTRICHOPSYLLIDÆ, new family.

1904. *Hystrichopsyllina* TIRABOSCHI, Archiv. de Parasit., VIII, pp. 242, 296.

Tiraboschi rightly appreciated the wide distinctness of the genus *Hystrichopsylla*, but it is here given the full standing of a family, which it deserves.



## Genus HYSTRICHOPSYLLA Taschenberg.

1893. *Hystrichopsylla* Bezzi, Rev. Ital. Soc. Nat. y Boll. Nat., XIII, p. 137.

## SYNOPSIS OF AMERICAN SPECIES.

- A. Pronotal etenidium of about fifty spines; genal etenidium of fourteen spines.  
*americana*
- AA. Pronotal etenidium of thirty-six spines; genal etenidium of six spines... *dippiei*

## Family CERATOPSYLLIDÆ, new family.

1904. *Typhlopsyllina* part Tiraboschi, Archiv. de Parasit., VIII, p. 242, 275.

This group is as eligible to family rank as any other in the order.

## Genus CERATOPSYLLUS Kolenati.

1903. *Ceratopsyllus* Kohaut, Magyar. bolhai, p. 59.1904. *Ceratopsyllus* Tiraboschi, Archiv. de Parasit., VIII, p. 276.

## SYNOPSIS OF AMERICAN SPECIES.

- A. Cephalic processes long, curved, and acuminate; metatarsal article I as long as tibia and with fifteen pairs of spines on the margin; pronotal etenidium of twenty spines..... *distinctus*
- AA. Cephalic processes short, blunt, and nearly straight.
- B. Metanotum with bristles and hairs only; none of these developed into etenidial spines; mesonotum much longer than the metanotum; pronotal etenidium of twenty-two spines; metatarsal article I with the lateral spines 7-5..... *palposus*
- BB. Metanotum with the subapical row of bristles developed into a etenidium.
- C. A etenidium on segment I of abdomen only; segments II-IV with a single row of bristles each; pronotal etenidium of 27-29 spines..... *wolffsohni*
- CC. Ctenidia on segments I to IV of abdomen.
- D. Pronotal etenidium of twenty-four spines..... *fosteri*
- DD. Pronotal etenidium of thirty-six spines..... *insignis*
- CCC. Ctenidia on segments I-VII of abdomen; metatarsal article I with spines 7-8, and this segment as long as segments II, III, and IV together; mesonotum nearly twice the length of metanotum on the dorsal line..... *croshyi*, new species

## ADDITIONS AND CORRECTIONS TO THE LIST OF SIPHONAPTERA OF THE WORLD GIVEN IN THE REVISION OF AMERICAN SIPHONAPTERA.

## Family RHYNCHOPRIONIDÆ Baker.

## Genus RHYNCHOPRION Oken.

## RHYNCHOPRION CÆCATA (Enderlein) Baker.

1901. ENDERLEIN, Zool. Jahrb., p. 549 (*Sarcopsylla cæcata*).1901. ENDERLEIN, Deutsches Tief-see Exped., 1898-99, III, p. 263 (*Sarcopsylla cæcata*).1904. TIRABOSCHI, Archiv. de Parasit., VIII, p. 306 (*Sarcopsylla cæcata*).Host.—*Mus rattus*.

Habitat.—Brazil.

## RHYNCHOPRION PENETRANS (Linnæus) Oken.

1815. OKEN, Naturgesch. f. alle Stände, III, p. 402.

1864. KARSTEN, Beitrag. zur Kenntnis des *Rhynchoprion penetrans*.

1901. ENDERLEIN, Zool. Jahrb., p. 551 (*Sarcopsylla penetrans*).

1901. ENDERLEIN, Deutsches Tief-see Exped., 1898-99, III, p. 263 (*Sarcopsylla penetrans*).

1903. WAHLGREN, Archiv für Zool., I, p. 195 (*Sarcopsylla penetrans*).

1904. TIRABOSCHI, Archiv. de Parasit., VIII, p. 307 (*Sarcopsylla penetrans*).

*Habitat.*—Tunis, German East Africa, Cameroon.

## Genus ARGOPSYLLA Enderlein.

## ARGOPSYLLA GALLINACEA (Westwood) Enderlein.

1875. WESTWOOD, The Entom. Mo. Mag., XI, p. 246 (*Sarcopsyllus gallinaceus*).

1901. ENDERLEIN, Zool. Jahrb. Abth. f. syst., XIV, p. 552 (*Sarcopsylla gallinacea*).

1901. ENDERLEIN, Deutsches Tief-see Exped., 1898-99, III, p. 263.

1903. TIRABOSCHI, Archiv. de Parasit., VII, p. 124-132 (*Sarcopsylla gallinacea*).

1904. BAKER, Proc. U. S. Nat. Mus., XXVII, p. 375 (*Nestopsylla gallinacea*).

1904. TIRABOSCHI, Archiv. de Parasit., VIII, p. 303 (*Sarcopsylla gallinacea*).

*Habitat.*—German East Africa.

## ARGOPSYLLA RHYNCHOPSYLLA (Tiraboschi) Baker.

1904. TIRABOSCHI, Archiv. de Parasit., VIII, p. 309 (*Sarcopsylla rhynchopsylla*).

*Host.*—*Mus alexandrinus*.

*Habitat.*—Italy.

## Genus ECHIDNOPHAGA Olliff.

## ECHIDNOPHAGA AMBULANS Olliff.

1886. OLLIFF, Proc. Linn. Soc. N. S. Wales (2), I, p. 172.

1904. BAKER, Proc. U. S. Nat. Mus., XXVII, p. 439.

## Family MALACOPSYLLIDÆ.

## Genus MALACOPSYLLA Weyenbergh.

## MALACOPSYLLA AGENORIS Rothschild.

1898. BAKER, Journ. N. Y. Ent. Soc., VI, p. 53 (*Megapsylla grossiventris*, male—not Weyenbergh).

1904. ROTHSCHILD, Novitat. Zool., XI, p. 606.

*Hosts.*—*Dasyppus minutus*, *Cataphractus minutus*.

*Habitat.*—Argentine and Patagonia.

## MALACOPSYLLA ANDROCLI Rothschild.

1904. ROTHSCHILD, Novitat. Zool., XI, p. 604.

*Host.*—*Canis griseus*.

*Habitat.*—Santa Cruz, Brazil.

## MALACOPSYLLA GROSSIVENTRIS Weyenbergh.

1879. WEYENBERGH, Bull. Acad. Nat. Cienc. Répub. Arg., III, pp. 188-193  
(*Pulex grossiventris*).  
1881. WEYENBERGH, Periódico Zoológico, III, pp. 270, 271.  
1898. BAKER, Journ. N. Y. Ent. Soc., VI, p. 53 (*Megapsylla grossiventris*, female).  
1903. WAHLGREN, Archiv für Zool., I, p. 194 (*Megapsylla inermis*).  
1904. ROTHSCHILD, Novitat. Zool., XI, p. 604.

## Family LYCOPSYLLIDÆ Baker.

## Genus LYCOPSYLLA Rothschild.

## LYCOPSYLLA NOVUS Rothschild.

1904. ROTHSCHILD, Novitat. Zool., XI, p. 602.  
*Host.*—*Phascocomys mitchelli*.  
*Habitat.*—New South Wales.

## Family PULICIDÆ.

## Subfamily VERMIPSYLLINÆ.

## Genus VERMIPSYLLA Schimkewitsch.

## VERMIPSYLLA ALACURT Schimkewitsch.

1903. WAGNER, Revue Russe d'Entom., No. 5, p. 296.

## Genus CHÆTOPSYLLA Kohaut.

## CHÆTOPSYLLA MIKADO Rothschild.

1904. ROTHSCHILD, Novitat. Zool., XI, p. 645.  
*Host.*—*Mustela itatsi*.  
*Habitat.*—Japan.

## CHÆTOPSYLLA ROTHSCHILDI Kohaut.

1903. KOHAUT, Magyar. bolhai, p. 40.  
1903. WAGNER, Revue Russe d'Entom., No. 5, p. 295 (*Vermipsylla rothschildi*).  
*Host.*—*Putorius putorius*.  
*Habitat.*—Hungary.

## CHÆTOPSYLLA STRANDI (Wahlgren) Baker.

1903. WAHLGREN, Archiv für Zool., I, p. 190 (*Vermipsylla strandi*).  
*Host.*—*Ursos arctos*.  
*Habitat.*—Norway.

## CHÆTOPSYLLA TRICHOSA Kohaut.

1903. KOHAUT, Magyar. bolhai, p. 39.  
1903. WAGNER, Revue Russe d'Entom., No. 5, p. 296 (*Vermipsylla trichosa*).  
*Host.*—*Meles tarus*.  
*Habitat.*—Hungary.

## CHÆTOPSYLLA TUBERCULATICEPS (Bezzi) Baker.

1890. BEZZI, Bull. Soc. Ent. Ital., XXII, pp. 30-33 (*Pulex tuberculaticeps*).1903. WAGNER, Revue Russe d'Entom., No. 5, p. 296 (*Vermipsylla tuberculaticeps*).

## CHÆTOPSYLLA URSI (Rothschild) Baker.

1902. ROTHSCHILD, Entom. Record, XIV, No. 3 (*Pulex ursi*).1904. BAKER, Proc. U. S. Nat. Mus., XXVII, p. 468 (*Pulex ursi*).1903. WAGNER, Revue Russe d'Entom., No. 5, p. 296 (*Vermipsylla ursi*).*Host.*—*Ursus horribilis*.*Habitat.*—Alberta, Canada.

## CHÆTOPSYLLA VULPES (Motschulsky) Baker.

1840. MOTSCHULSKY, Bull. Soc. Imp. Moscou, p. 171 (*Pulex vulpes*).1880. TASCHENBERG, Die Flöhe, p. 66 (*Pulex globiceps*).1896. MEINERT, Pulicidæ Danicæ, p. 4 (*Pulex vulpes*).1903. KOHLAUT, Magyar. bolhai, p. 38 (*Chætopsylla globiceps*).1903. WAHLGREN, Archiv für Zool., I, p. 188 (*Oncopsylla vulpes*).1903. WAGNER, Revue Russ. d'Entom., No. 5, p. 295 (*Vermipsylla globiceps*).*Habitat.*—Sweden, Norway, Denmark, Greenland (?).

## Subfamily ANOMIOPSYLLINÆ Baker.

## Genus ANOMIOPSYLLUS Baker.

## ANOMIOPSYLLUS CALIFORNICUS Baker.

1904. BAKER, Invert. Pacifica, I, p. 39.

*Host.*—*Spilogale phenax*.*Habitat.*—Claremont, California.

## Subfamily PULICINÆ.

## Genus GONIOPSYLLUS Baker.

## GONIOPSYLLUS KERQUELENSIS (Taschenberg) Baker.

1880. TASCHENBERG, Die Flöhe, p. 67 (*Pulex kerguelensis*).

## Genus PULEX Linnæus.

## PULEX ÆQUISETOSUS Enderlein.

1901. ENDERLEIN, Zool. Jahrb., p. 554.

*Host.*—*Cricetomys* sp.*Habitat.*—Mangu, Togo.

## PULEX ALTERNANS Wahlgren.

1903 (?). WAHLGREN, Results of Swed. Zool. Exped. to Egypt and the White Nile, 1901. Paper No. 16.

*Host.*—*Acomys cahirinus*.*Habitat.*—Egypt.

## PULEX CHEOPIS Rothschild.

? TIRABOSCHI (*Pulex pallidus*).

1903. ROTHSCHILD, Ent. Mo. Mag., 2nd ser., XIV, p. 85.

1903. WAGNER, Revue Russe d'Entom., No. 5, p. 308 (*Pulex pallidus*).

*Hosts*.—*Mus gentilis*, *Acomys witherbyi*, *Gerbillus robustus*, *Arvicanthis testicularis*, *Dipodillus watersi*, *Dipus jaculus*, *Genetta douglana*.

*Habitat*.—Near Shendi and Suez, Egypt.

## PULEX CHEPHRENSIS Rothschild.

1903. ROTHSCHILD, Ent. Mo. Mag., 2d ser., XIV, p. 86.

*Hosts*.—*Dipus jaculus*, *Acomys calhirus*.

*Habitat*.—Cairo, Egypt.

## PULEX CLEOPATRÆ Rothschild.

1903. ROTHSCHILD, Ent. Mo. Mag., 2d ser., XIV, p. 84.

*Hosts*.—*Gerbillus pygargus*, *Gerbillus robustus*, *Lepus aethiopicus*, *Dipodillus watersi*, *Dipus jaculus*, *Erinaceus aethiopicus*, *Arvicanthis testicularis*.

*Habitat*.—Near Shendi, Egypt.

## PULEX CONFORMIS Wagner.

1894. WAGNER, Hoffe Soc. Ent. Ross., XXVIII, p. 440 (*Pulex pallidus* part).

1903. WAGNER, Revue Russe d'Ent., No. 5, p. 310.

*Host*.—?

*Habitat*.—?

## PULEX CREUSÆ Rothschild.

1904. ROTHSCHILD, Novitat. Zool., XI, p. 608.

*Hosts*.—*Felis caracal*, "*Spreo bicolor*," *Procaravia capensis*.

*Habitat*.—Cape Colony.

## PULEX ERIDOS Rothschild.

1904. ROTHSCHILD, Novitat. Zool., XI, p. 611.

*Host*.—*Otomys branti*.

*Habitat*.—Cape Colony.

## PULEX ERILLI Rothschild.

1904. ROTHSCHILD, Novitat. Zool., XI, p. 610.

*Hosts*.—*Zorilla striata*, *Xerus capensis*, *Luricata tetradactyla*.

*Habitat*.—Cape Colony.

## PULEX GERBILLI Wagner.

1894. WAGNER, Hoffe Soc. Ent. Ross., XXVIII, p. 440 (*Pulex pallidus* part).

1903. WAGNER, Revue Russe d'Ent., No. 5, p. 309.

*Host*.—*Gerbillus* sp.

*Habitat*.—?

## PULEX IRRITANS Linnæus.

1882. BRUHL, Zootom. aller Thierklassen, fasc. 26-27.

1896. MEINERT, Pulicidæ Danicæ, p. 3.

1903. KOHAUT, Magyar. bolhai, p. 33.

1903. WAHLGREN, Archiv für Zool., I, p. 185.

1903. ROTHSCHILD, Novitat. Zool., X, p. 314.

1904. TIRABOSCHI, Archiv. de Parasit., VIII, p. 246.

*Hosts.*—*Gallus domesticus*, *Canis familiaris*.

*Habitat.*—Tenerife; Australia; Berber.

## PULEX ISIDIS Rothschild.

1903. ROTHSCHILD, Novitat. Zool., X, p. 313.

*Host.*—*Procavia erlangeri*.

*Habitat.*—Near Harar.

## PULEX LONGISPINUS Wagner.

1901. ENDERLEIN, Zool. Jahrb., p. 556.

## PULEX MURINUS Tiraboschi.

1904. TIRABOSCHI, Archiv. de Parasit., VIII, p. 252.

*Hosts.*—*Mus decumanus*, *Mus rattus alexandrinus*.

*Habitat.*—Italy.

## PULEX MYCERINI Rothschild.

1904. ROTHSCHILD, Entomologist, Jan., p. 1.

*Hosts.*—*Gerbillus tarabuli*, *Pachyuromys duprasi natronensis*.

*Habitat.*—Bir Victoria, Egypt.

## PULEX NUBICUS Rothschild.

1903. ROTHSCHILD, Ent. Mo. Mag., 2d ser., XIV, p. 84.

*Hosts.*—*Arvicanthus testicularis*, *Gerbillus robustus*, *Herpestes albicauda*, *Genetta dongolana*.

*Habitat.*—Near Shendi, Egypt.

## PULEX PALLIDUS Taschenberg.

1902. WITHERBY, Bird Hunting on the White Nile, p. 60 (*Pulex witherbyi*).

1903. ROTHSCHILD, Ent. Mo. Mag., 2d ser., XIV, p. 86 (*Pulex witherbyi*).

1903. ROTHSCHILD, Novitat. Zool., X, p. 542.

1904. TIRABOSCHI, Archiv. de Parasit., VIII, p. 249.

*Hosts.*—*Erinaceus albiventris*, *Erinaceus aethiopicus*, *Vulpes niloticus*, *Hyæna hyæna*.

*Habitat.*—Near Gebel Auli and at Shendi, Egypt.

## PULEX PHILIPPINENSIS Herzog.

1904. HERZOG, Bull. 23, Bureau of Govt. Laboratories, p. 77, figs. 26-27.

*Host.*—Rats.

*Habitat.*—Manila, Philippine Islands.

## PULEX PYRAMIDIS Rothschild.

1904. ROTHSCHILD, Entomologist, Jan., p. 3.

*Host.*—*Jaculus jaculus*.*Habitat.*—Bir Victoria, Egypt.

## PULEX RAMESIS Rothschild.

1904. ROTHSCHILD, Entomologist, Jan., p. 2.

*Hosts.*—*Gerbillus tarabuli*, *Pachyromys duprasi natronensis*.*Habitat.*—Bir Victoria, Egypt.

## PULEX REGIS Rothschild.

1903. ROTHSCHILD, Novitat. Zool., X, p. 312.

*Host.*—*Meriones rex*.*Habitat.*—South Arabia.

## PULEX RIGGENBACHI Rothschild.

1904. ROTHSCHILD, Novitat. Zool., XI, p. 611.

*Host.*—*Hystrix cristata*.*Habitat.*—Morocco and Cape Colony.

## Genus RHOPALOPSYLLUS Baker.

## RHOPALOPSYLLUS AUSTRALIS (Rothschild) Baker.

1904. ROTHSCHILD, Novitat. Zool., XI, p. 613 (*Pulex australis*).*Hosts.*—*Dicotyles labiatus*, *Tatusia noveboracensis*, *Sprothos venaticus*.*Habitat.*—Brazil and Bolivia.

## RHOPALOPSYLLUS BOHLSI (Wagner) Baker.

1901. WAGNER, HORR. SOC. ENT. ROSS., XXXV, p. 21 (*Pulex bohlsi*).

## RHOPALOPSYLLUS CLEOPHONTIS (Rothschild) Baker.

1904. ROTHSCHILD, Novitat. Zool., XI, p. 614 (*Pulex cleopfontis*).*Host.*—*Muletia septemcincta*.*Habitat.*—Argentina, Paraguay, and Minas Geraes, Brazil.

## RHOPALOPSYLLUS COCYTI (Rothschild) Baker.

1904. ROTHSCHILD, Novitat. Zool., XI, p. 617 (*Pulex cocyti*).*Host.*—“Burrowing rat.”*Habitat.*—Chile.

## RHOPALOPSYLLUS CONCITUS (Rothschild) Baker.

1904. ROTHSCHILD, Novitat. Zool., XI, p. 615 (*Pulex concitus*).*Host.*—*Kerodon boliviensis*.*Habitat.*—Sucre, Bolivia.

## RHOPALOPSYLLUS CORFIDII (Rothschild) Baker.

1904. ROTHSCHILD, Novitat. Zool., XI, p. 619 (*Pulex corfidii*).

*Host*.—*Octodon degus*.

*Habitat*.—Valparaíso, Chile.

## RHOPALOPSYLLUS KLAGESI (Rothschild) Baker.

1904. ROTHSCHILD, Novitat. Zool., XI, p. 620 (*Pulex klagesi*).

*Host*.—"Spring rat."

*Habitat*.—Venezuela.

## RHOPALOPSYLLUS LUTZII Baker.

1903. BAKER, Proc. U. S. Nat. Mus., XXVII, p. 380 (*Pulex lutzii*).

## RHOPALOPSYLLUS SIMONSI (Rothschild) Baker.

1904. ROTHSCHILD, Novitat. Zool., XI, p. 616 (*Pulex simonsi*).

*Hosts*.—*Neotodon simonsi*, *Akodon albivener*.

*Habitat*.—Bolivia.

## Genus HOPLOPSYLLUS Baker.

## HOPLOPSYLLUS AFFINIS Baker.

1903. BAKER, Proc. U. S. Nat. Mus., XXVII, p. 382 (*Pulex affinis*).

## HOPLOPSYLLUS ANOMALUS Baker.

1903. BAKER, Proc. U. S. Nat. Mus., XXVII, p. 381 (*Pulex anomalus*).

## HOPLOPSYLLUS LYNX Baker.

1903. BAKER, Proc. U. S. Nat. Mus., XXVII, p. 383 (*Pulex lynx*).

## HOPLOPSYLLUS GLACIALIS (Taschenberg) Baker.

1880. TASCHENBERG, Die Flöhe, p. 76 (*Pulex glacialis*).

1903. WAHLGREN, Archiv für Zool., I, p. 185 (*Pulex glacialis*).

*Host*.—*Lepus glacialis*.

*Habitat*.—Greenland.

## Genus PARAPSYLLUS Enderlein.

## PARAPSYLLUS LONGICORNIS Enderlein.

1901. ENDERLEIN, Zool. Jahrb. Abth. f. syst., XIV, p. 553 (*Pulex longicornis*).

1903. ENDERLEIN, Deutsches Tief-see Exped., 1898-99, III, p. 261.

*Host*.—*Eudyptes chusocome* (Penguin).

*Habitat*.—St. Paul Island.



## Genus CTENOCEPHALUS Kolenati.

## CTENOCEPHALUS CANIS (Curtis) Baker.

1882. BRUHL, Zootom. aller Thierklassen, fasc. 26-27 (*Pulex canis*).  
 1896. MEINERT, Pulicidae Danice, p. 7 (*Pulex canis*).  
 1903. KOHAUT, Magyar. bolhai, p. 34 (*Pulex canis*) and p. 35 (*Pulex felis*).  
 1903. WAHLGREN, Archiv für Zool., I, p. 185 (*Pulex canis*).  
 1903. ROTHSCHILD, Novitat. Zool., X, p. 315 (*Pulex felis*).  
 1904. TRABOSCHI, Archiv. de Parasit., VIII (*Ctenocephalus serraticeps*, p. 254, and *C. serraticeps* var. *marina*, p. 259).  
 1905. ROTHSCHILD, Novitat. Zool., XII, p. 192 (*Pulex canis* and *Pulex felis*).

*Hosts*.—*Canis mesomelas*, *Mus decumanus*, *Mus rattus alexandrinus*.

*Habitat*.—Italy.

## Genus SPILOPSYLLUS Baker.

## SPILOPSYLLUS ERINACEI (Leach) Baker.

1832. LEACH, in Curtis Brit. Ent., IX, no. 417 (*Ceratophyllus erinacei*).  
 1878. DALE, Hist. of Gilanvilles Wootton, p. 291 (*Pulex glanis* part).  
 1896. MEINERT, Pulicidae Danice, p. 7 (*Pulex erinacei*).  
 1903. KOHAUT, Magyar. bolhai, p. 36.  
 1903. ROTHSCHILD, Ent. Mo. Mag., 2d ser., XIV, p. 145.

## SPILOPSYLLUS INAEQUALIS Baker.

1895. BAKER, Canad. Ent., XXVII, p. 164 (*Pulex inaequalis*).

## SPILOPSYLLUS LEPORIS (Leach) Baker.

1832. LEACH, in Curtis Brit. Ent., IX, no. 417 (*Ceratophyllus leporis*).  
 1878. DALE, Hist. of Gilanvilles Wootton, p. 291 (*Pulex cuniculi*).  
 1880. TASCHENBERG, Die Flöhe, p. 82 (*Pulex goniocephalus*).  
 1903. ROTHSCHILD, Ent. Mo. Mag., 2d ser., XLV, p. 145 (*Pulex cuniculi*).

## SPILOPSYLLUS SIMPLEX Baker.

1895. BAKER, Canad. Ent., XXVII, p. 164 (*Pulex inaequalis* var. *simplex*).

## Genus ODONTOPSYLLUS Baker.

## ODONTOPSYLLUS MULTISPINOSUS Baker.

1898. BAKER, Journ. N. Y. Ent. Soc., VI, p. 54 (*Pulex multispinosus*).  
 1903. BAKER, Proc. U. S. Nat. Mus., XXVII, pp. 389, 445 (*Ceratophyllus multispinosus*).

## ODONTOPSYLLUS DENTATUS Baker.

1903. BAKER, Proc. U. S. Nat. Mus., XXVII, p. 390 (*Ceratophyllus dentatus*).

## ODONTOPSYLLUS CHARLOTTENSIS Baker.

1898. BAKER, Journ. N. Y. Ent. Soc., VI, p. 56 (*Pulex charlottensis*).  
 1905. ROTHSCHILD, Novitat. Zool., XII, p. 174 (*Ceratophyllus charlottensis*).

*Hosts*.—*Peromyscus leucopus*, *Peromyscus arcticus*, *Neotoma cinerea*, *Ectomys saturatus*.

*Habitat*.—British Columbia and Alberta, Canada.

## ODONTOPSYLLUS TELEGONI (Rothschild) Baker.

1905. ROTHSCHILD, Novitat. Zool., XII, p. 172 (*Ceratophyllus telegoni*).

*Hosts*.—*Microtus drummondii*, *Erotomys gapperi*.

*Habitat*.—Western Canada.

## Genus DASYPSYLLUS Baker.

## DASYPSYLLUS PERPINNATUS Baker.

1903. BAKER, Proc. U. S. Nat. Mus., XXVII, p. 391 (*Ceratophyllus perpinnatus*).

## Genus CERATOPHYLLUS Curtis.

## CERATOPHYLLUS ABANTIS Rothschild.

1905. ROTHSCHILD, Novitat. Zool., XII, p. 164.

*Hosts*.—*Putorius longicaudatus*, *Microtus drummondii*.

*Habitat*.—British Columbia and Alberta, Canada.

## CERATOPHYLLUS ACAMANTIS Rothschild.

1905. ROTHSCHILD, Novitat. Zool., XII, p. 156.

*Hosts*.—*Mephitis spissigrada*, *Arctomys flaviventer ararus*, *Lutreola energumenos*, *Canis latrans*.

*Habitat*.—British Columbia.

## CERATOPHYLLUS ACUTUS Baker.

1904. BAKER, Invert. Pacifica, 1, p. 40.

*Host*.—*Spermophilus* sp.

*Habitat*.—Stanford University, California.

## CERATOPHYLLUS AGILIS Rothschild.

1905. ROTHSCHILD, Novitat. Zool., XII, p. 167.

*Hosts*.—*Neotoma cinerea*, *Ochotoma princeps*, *Putorius longicaudatus*, *Sciurus richardsoni baileyi*.

*Habitat*.—British Columbia and Alberta, Canada.

## CERATOPHYLLUS AGRIPPINÆ Rothschild.

1904. ROTHSCHILD, Novitat. Zool., XI, p. 634.

*Hosts*.—*Otomys branti*, *Otomys unisulcatus*.

*Habitat*.—Cape Colony.

## CERATOPHYLLUS AHALÆ Rothschild.

1904. ROTHSCHILD, Novitat. Zool., XI, p. 631.

*Host*.—"Small jungle squirrel."

*Habitat*.—Sidapur, India.

## CERATOPHYLLUS ALLADINIS Rothschild.

1904. ROTHSCHILD, Novitat. Zool., XI, p. 632.

*Host.*—"Small jungle squirrel."*Habitat.*—Sidapur, India.

## CERATOPHYLLUS ANGULATUS Wahlgren.

1903. WAHLGREN, Archiv für Zool., I, p. 184.

*Host.*—*Lestris parasitica*.*Habitat.*—Norway.

## CERATOPHYLLUS BACCHI Rothschild.

1905. ROTHSCHILD, Novitat. Zool., XII, p. 159.

*Host.*—*Spermophilus 13-lineatus*.*Habitat.*—Alberta, Canada.

## CERATOPHYLLUS CALIFORNICUS Baker, var.

## ENDYMIONIS (Rothschild) Baker.

1904. ROTHSCHILD, Novitat. Zool., XI, p. 634 (*Ceratophyllus endymionis*).*Host.*—*Marmosa degans*.*Habitat.*—Valparaiso, Chile.

## CERATOPHYLLUS COLUMBÆ Walker.

1903. WAGNER, Horie Soc. Ent. Ross., XXXVI, p. 292.

## CERATOPHYLLUS CONSIMILIS Wagner.

1904. THRABOSCHI, Archiv. de Parasit., VIII, p. 268.

## CERATOPHYLLUS DALEI Rothschild.

1903. ROTHSCHILD, Entomologist, Dec., p. 297.

*Host.*—"Wood pigeon."*Habitat.*—Glanvilles Wooton, Dorsetshire, England.

## CERATOPHYLLUS DORIPPÆ Rothschild.

1904. ROTHSCHILD, Novitat. Zool., XI, p. 636.

*Host.*—*Herpestes badius*.*Habitat.*—Cape Colony.

## CERATOPHYLLUS EUMOLPI Rothschild.

1905. ROTHSCHILD, Novitat. Zool., XII, p. 161.

*Hosts.*—*Tamias borealis*, *Eutamias quadricittatus affinis*.*Habitat.*—British Columbia and Alberta, Canada.

## CERATOPHYLLUS EUPHORBI Rothschild.

1905. ROTHSCHILD, Novitat. Zool., XII, p. 165.

*Host.*—*Peromyscus canadensis*.

*Habitat.*—British Columbia.

## CERATOPHYLLUS FASCIATUS Bosc.

1878. DALE, Hist. of Glanvilles Wooton, p. 291 (*Pulex furoris*).

1896. MEINERT, Pulicidæ Danicæ, p. 5.

1903. KOHAUT, Magyar. bolhai, p. 42.

1903. ROTHSCHILD, Ent. Mo. Mag., 2d ser., XIV, p. 145.

1904. TIRABOSCHI, Archiv. de Parasit., VIII, p. 262.

*Habitat.*—Sydney.

## CERATOPHYLLUS FRINGILLÆ (Walker).

1856. WALKER, Dipt. Britt., III, p. 4 (*Pulex fringilla*).

1903. ROTHSCHILD, Entom. Record, XV, No. 12, p. 308.

## CERATOPHYLLUS GALLINÆ Schrank.

1878. DALE, Hist. of Glanvilles Wooton, p. 291 (*Ceratopsyllus monedula*, *Ceratopsyllus turdi* part, *Ceratopsyllus merula* part, *Ceratopsyllus cinerea* part, *Ceratopsyllus spini*, *Ceratopsyllus ænas*).

1896. MEINERT, Pulicidæ Danicæ, p. 5.

1903. KOHAUT, Magyar. bolhai, p. 45.

1903. WAGNER, Hore Soc. Ent. Ross., XXXVI, p. 292.

1903. ROTHSCHILD, Ent. Mo. Mag., 2d ser., XIV, pp. 145-146.

1904. TIRABOSCHI, Archiv. de Parasit., VIII, p. 273.

## CERATOPHYLLUS GALLINULÆ (Dale).

1878. DALE, Hist. of Glanvilles Wooton, pp. 291, 292 (*Ceratopsyllus gallinula*, *Ceratopsyllus turdi* part, *Ceratopsyllus merula* part, *Ceratopsyllus garruli*, *Ceratopsyllus pyrrolula*, *Ceratopsyllus citrinella*, *Ceratopsyllus pratensis*, *Ceratopsyllus atricapilla*, *Ceratopsyllus cinerea* part, *Ceratopsyllus caudati*).

1901. ROTHSCHILD, Ent. Record, XIII, p. 284 (*Ceratophyllus newsteadi*).

1903. WAGNER, Hore Soc. Ent. Ross., XXXVI, p. 291 (*Ceratophyllus newsteadi*).

1903. ROTHSCHILD, Ent. Mo. Mag., 2d ser., XIV, pp. 145-146.

## CERATOPHYLLUS GRÆNLANDICUS Wahlgren.

1903. WAHLGREN, Archiv für Zool., I, p. 183.

*Host.*—*Myodes torquatus*.

*Habitat.*—Greenland.

## CERATOPHYLLUS HENLEYI Rothschild.

1904. ROTHSCHILD, Entomologist, Jan., p. 3.

*Hosts.*—*Gerbillus tarabuli*, *Pachyuromys duprasi natronensis*.

*Habitat.*—Bir Victoria, Egypt.

## CERATOPHYLLUS HILLI Rothschild.

1904. ROTHSCHILD, Novitat. Zool., XI, p. 622.

*Hosts*.—*Bettongia penicillata*, *Dasyurus viverrinus*, *Perameles nasuta*.

*Habitat*.—West Australia and New South Wales.

## CERATOPHYLLUS HIRUNDINIS Curtis.

1903. WAGNER, Horv. Soc. Ent. Ross., XXXVI, p. 292.

## CERATOPHYLLUS ITALICUS Tiraboschi.

1904. TIRABOSCHI, Archiv. de Parasit., VIII, p. 266.

*Hosts*.—*Mus decumanus*, *Mus rattus alexandrinus*, *Mus musculus*, *Mus sibiricus*.

*Habitat*.—Italy.

## CERATOPHYLLUS LAGOMYS Wagner.

1904. TIRABOSCHI, Archiv. de Parasit., VIII, p. 269.

## CERATOPHYLLUS LUCIFER Rothschild.

1905. ROTHSCHILD, Novitat. Zool., XII, p. 170.

*Host*.—*Microtus drummondii*.

*Habitat*.—Alberta, Canada.

## CERATOPHYLLUS MELIS (Leach) Curtis.

1896. MEINERT, Pulicidae Danice, p. 6.

1903. KOHAUT, Magyar. bolhai, p. 44.

## CERATOPHYLLUS MUSTELÆ Dale.

1878. DALE, Hist. of Glamvilles Wooton, p. 291 (*Pulex mustelæ*).

1898. WAGNER, Horv. Soc. Ent. Ross., XXXI, p. 565.

1903. ROTHSCHILD, Ent. Mo. Mag., 2d ser., XIV, p. 145 (*Pulex mustelæ*).

1904. TIRABOSCHI, Archiv. de Parasit., VIII, p. 268.

## CERATOPHYLLUS NOVÆGUINEÆ Rothschild.

1904. ROTHSCHILD, Novitat. Zool., XI, p. 629.

*Host*.—*Perameles raffrayanus*.

*Habitat*.—New Guinea.

## CERATOPHYLLUS NUMÆ Rothschild.

1904. ROTHSCHILD, Novitat. Zool., XI, p. 637.

*Host*.—*Otomys branti*.

*Habitat*.—Cape Colony.

## CERATOPHYLLUS OCHI Rothschild.

1904. ROTHSCHILD, Novitat. Zool., XI, p. 628.

*Host.*—“An opossum.”

*Habitat.*—Victoria, Australia.

## CERATOPHYLLUS OCTAVII Rothschild.

1904. ROTHSCHILD, Novitat. Zool., XI, p. 638.

*Host.*—*Graphocularis biurus*.

*Habitat.*—Cape Colony.

## CERATOPHYLLUS OLIGOCHÆTUS Wagner.

1903. WAGNER, Horv. Soc. Ent. Ross., XXXVI, pp. 290, 292.

*Host.*—“Vogel.”

*Habitat.*—Vege sack, Germany.

## CERATOPHYLLUS PENCILLIGER (Grube) Wagner.

1903. WAHLGREN, Archiv für Zool., I, p. 182.

1904. TIRABOSCHI, Archiv. de Parasit., p. 270.

*Hosts.*—*Myodes lemmus*, *Putorius sibiricus*.

*Habitat.*—Norway and Siberia.

## CERATOPHYLLUS PINNATUS Wagner.

1904. TIRABOSCHI, Archiv. de Parasit., VIII, p. 271.

## CERATOPHYLLUS PŒANTIS Rothschild.

1905. ROTHSCHILD, Novitat. Zool., XII, p. 155.

*Hosts.* *Tamias* spp., *Spermophilus columbianus*, *Putorius longicaudatus*, *Sciurus aberti*.

*Habitat.*—Arizona and Alberta, Canada.

## CERATOPHYLLUS POLLIONIS Rothschild.

1905. ROTHSCHILD, Novitat. Zool., XII, p. 171.

*Hosts.*—*Microtus drummondii*, *Erotomys saturatus*.

*Habitat.*—Alberta, Canada.

CERATOPHYLLUS PSEUDARCTOMYS Baker, var. ACASTI (Rothschild)  
Baker.

1905. ROTHSCHILD, Novitat. Zool., XII, p. 168 (*Ceratophyllus acasti*).

*Host.* *Sciuropterus sabrinus*.

*Habitat.*—British Columbia.

## CERATOPHYLLUS QUIRINI Rothschild.

1905. ROTHSCHILD, Novitat. Zool., XII, p. 163.

*Hosts.*—*Erotomys gapperi*, *Erotomys saturatus*.

*Habitat.*—Alberta, Canada.

## CERATOPHYLLUS RECTANGULATUS Wahlgren.

1903. WAHLGREN, Archiv für Zool., 1, p. 182.

*Host.*—*Myodes lemnus*.*Habitat.*—Norway.

## CERATOPHYLLUS RUSTICUS Wagner.

1903. WAGNER, Horae Soc. Ent. Ross., XXXVI, p. 288 and 292.

*Host.*—“Vogel.”*Habitat.*—Vege sack, Germany.

## CERATOPHYLLUS SCIURORUM (Schrank) Curtis.

1878. DALE, Hist. of Glanvilles Wooton, pp. 291 and 293 (*Pulex gliris* part).

1896. MEINERT, Pulicidae Danica, p. 6.

1903. KOHAUT, Magyar. bolhai, p. 43.

1903. ROTHSCHILD, Ent. Mo. Mag., 2d ser., XIV, p. 145.

## CERATOPHYLLUS SEXDENTATUS Baker.

1904. TIRABOSCHI, Archiv. de Parasit., VIII, p. 272.

## CERATOPHYLLUS SILANTIEWI Wagner.

1904. TIRABOSCHI, Archiv. de Parasit., VIII, p. 274.

## CERATOPHYLLUS SPINOSUS Wagner.

1894. WAGNER, Horae Soc. Ent. Ross., XXVIII, p. 440 (*Ceratophyllus arium*).

1903. WAGNER, Horae Soc. Ent. Ross., XXXVI, p. 287 and 292.

*Host.*—“Vogel.”*Habitat.*—Vege sack, Germany.

## CERATOPHYLLUS STYX Rothschild.

1903. WAGNER, Horae Soc. Ent. Ross., XXXVI, p. 292.

## CERATOPHYLLUS TELCHINUM Rothschild.

1905. ROTHSCHILD, Novitat. Zool., XII, p. 153.

*Hosts.*—*Erotomys gapperi*, *Sorex richardsoni*.*Habitat.*—British Columbia.

## CERATOPHYLLUS TERINUS Rothschild.

1905. ROTHSCHILD, Novitat. Zool., XII, p. 158.

*Host.*—*Spermophilus columbianus*.*Habitat.*—British Columbia.

## CERATOPHYLLUS TERRIBILIS Rothschild.

1903. ROTHSCHILD, Novitat. Zool., X, p. 317.

*Host.*—*Lagomys princeps*.*Habitat.*—Alberta, Canada.

## CERATOPHYLLUS THOMASI Rothschild.

1904. ROTHSCHILD, Novitat. Zool., XI, p. 625.

*Host.*—*Acrobates pygmaea*.

*Habitat.*—Australia.

## CERATOPHYLLUS TRISTIS Rothschild.

1900. ROTHSCHILD, Ent. Record, XII, p. 36 (*Typhlopsylla tristis*).

1904. BAKER, Proc. U. S. Nat. Mus., XXVII, p. 451 (*Ctenophthalmus tristis*).

1904. ROTHSCHILD, Novitat. Zool., XI, p. 625.

## CERATOPHYLLUS VAGABUNDUS (Boheman) Wahlgren.

1865. BOHEMAN, Ofvers. of K. Vet. Akad. Forh., p. 576 (*Pulex vagabunda*).

1903. WAHLGREN, Archiv für Zool., I, p. 184 (*Ceratophyllus digitalis*).

1903. WAHLGREN, Entom. Tidskr., July, p. 219.

*Host.*—?

*Habitat.*—Spitzbergen.

## CERATOPHYLLUS WICKHAMI Baker, var.

ÆGER (Rothschild) Baker.

1905. ROTHSCHILD, Novitat. Zool., XII, p. 166 (*Ceratophyllus æger*).

*Hosts.*—*Peromyscus arcticus*, *Erotomys saturatus*.

## CERATOPHYLLUS WICKHAMI Baker, var.

NEPOS (Rothschild) Baker.

1905. ROTHSCHILD, Novitat. Zool., XII, p. 168 (*Ceratophyllus nepos*).

*Host.*—*Spilogale latifrons*.

*Habitat.*—British Columbia.

## CERATOPHYLLUS WOODWARDI Rothschild.

1904. ROTHSCHILD, Novitat. Zool., XI, p. 623.

*Host.*—?

*Habitat.*—West Australia.

## CERATOPHYLLUS ZETHI Rothschild.

1904. ROTHSCHILD, Novitat. Zool., XI, p. 626.

*Host.*—*Bettongia cuniculus*.

*Habitat.*—Gippsland, Victoria.

## Genus TYPHLOCERAS Wagner.

## TYPHLOCERAS POPPEI Wagner.

1903. WAGNER, Hore Soc. Ent. Ross., XXXVI, p. 154.

1903. ROTHSCHILD, Ent. Record, XV, p. 196.

1904. TIRABOSCHI, Archiv. de Parasit., VIII, p. 295.

*Host.*—*Mus sylvaticus*.

*Habitat.*—Vegeesack in Germany; Tharandt in Saxony; England.



## Genus PALÆOPSYLLA Wagner.

## PALÆOPSYLLA DASYCNEMUS Rothschild.

1897. ROTHSCHILD, The Ent. Record, IX, No. 7, p. 159 (*Typhlopsylla dasyncnemus*).  
 1903. WAGNER, Horv Soc. Ent. Ross., XXXVI, pp. 140, 142.

## PALÆOPSYLLA GRACILIS (Taschenberg) Wagner.

1880. TASCHENBERG, Die Flöhe, p. 96 (*Typhlopsylla gracilis*).  
 1903. WAGNER, Horv Soc. Ent. Ross., XXXVI, pp. 140, 142.

## PALÆOPSYLLA ROSENBERGI (Rothschild) Baker.

1904. ROTHSCHILD, Novitat. Zool., XI, p. 639 (*Typhloceras rosenbergi*).

*Hosts.*—*Metachirus opposum*, *Didelphys azaræ*.

*Habitat.*—Ecuador.

## PALÆOPSYLLA SIBIRICA Wagner.

1901. WAGNER, Horv Soc. Ent. Ross., XXXV, p. 26 (*Typhlopsylla sibirica*).  
 1903. WAGNER, Horv Soc. Ent. Ross., XXXVI, p. 140.

## Genus CTENOPHTHALMUS Kolenati.

## CTENOPHTHALMUS AGYRTES (Heller) Baker.

1903. WAGNER, Horv Soc. Ent. Ross., XXXVI, pp. 141, 148 (*Typhlopsylla agyrtes*).  
 1903. WAHLGREN, Archiv für Zool., I, p. 189 (*Typhlopsylla agyrtes*).  
 1904. TRABOSCHI, Archiv. de Parasit., VIII, p. 288 (*Typhlopsylla agyrtes*).

## CTENOPHTHALMUS ANTIQUORUM Rothschild.

1904. ROTHSCHILD, Novitates Zool., XI, p. 643.

*Host.*—*Didelphys aurita*.

*Habitat.*—Tigneti Zech, Brazil.

## CTENOPHTHALMUS ASSIMILIS (Taschenberg) Baker.

1896. MEINERT, Pulicida Danica, p. 11 (*Typhlopsylla assimilis*).  
 1903. WAGNER, Horv Soc. Ent. Ross., XXXVI, p. 141 (*Typhlopsylla assimilis*).  
 1903. KOHAUT, Magyar. bolhai, p. 54 (*Typhlopsylla assimilis*).  
 1904. TRABOSCHI, Archiv. de Parasit., VIII, p. 286 (*Typhlopsylla assimilis*).

## CTENOPHTHALMUS BISODDENTATUS Kolenati.

1903. KOHAUT, Magyar. bolhai, p. 56.

## CTENOPHTHALMUS CAUCASICA Taschenberg.

1903. WAGNER, Horv Soc. Ent. Ross., XXXVI, p. 141 (*Typhlopsylla caucasica*).

## CTENOPHTHALMUS GRANDIS (Rothschild) Baker.

1902. ROTHSCHILD, Ent. Record, XIV, No. 3 (*Typhlopsylla grandis*).  
 1904. BAKER, Proc. U. S. Nat. Mus., XXVII, p. 468.

*Host.*—*Tamias striatus*.

*Habitat.*—Branchtown, Ontario.

## CTENOPHTHALMUS MONTICOLA (Kohaut) Baker.

1904. KOHAUT, Ann. Mus. Nat. Hung., p. 86, (*Typhlopsylla monticola*).

*Host.*—*Spalax monticola*.

*Habitat.*—Bosnia.

## CTENOPHTHALMUS ORIENTALIS (Wagner) Baker.

1903. WAGNER, Hore Soc. Ent. Ross., XXXVI, p. 142 (*Typhlopsylla orientalis*).

## CTENOPHTHALMUS PROXIMA (Wagner) Baker.

1903. WAGNER, Hore Soc. Ent. Ross., XXXVI, pp. 141, 147 (*Typhlopsylla proxima*).

1904. TIRABOSCHI, Archiv. de Parasit., VIII, p. 292 (*Typhlopsylla proxima*).

*Hosts.*—*Crocidura aranca*, *Mus sylvaticus*.

*Habitat.*—Caucasus.

## CTENOPHTHALMUS PSEUDAGYRTES Baker.

1904. ROTHSCHILD, Novitat. Zool., XI, p. 641.

*Hosts.*—*Scalops aquaticus*, *Microtus drumondii*, *Microtus saturatus*.

*Habitat.*—Alberta, Canada, and North Carolina.

## CTENOPHTHALMUS TYPHLUS (Motschulsky) Baker.

1903. KOHAUT, Magyar. bolhai, p. 55.

*Host.*—*Spalax hungaricus*.

## CTENOPHTHALMUS UNCINATA (Wagner) Baker.

1903. WAGNER, Hore Soc. Ent. Ross., XXXVI, p. 142 (*Typhlopsylla uncinata*).

1903. WAHLGREN, Archiv für Zool., I, p. 188 (*Typhlopsylla uncinata*).

*Host.*—*Modex lemmus*.

*Habitat.*—Norway.

## CTENOPHTHALMUS WENMANNI Rothschild.

1904. ROTHSCHILD, Novitat. Zool., XI, p. 642.

*Hosts.*—*Peromyscus leucopus*, *Neotoma cinerea*.

*Habitat.*—British Columbia.

## Genus NEOPSYLLA Wagner.

## NEOPSYLLA ALTAICA Wagner.

1901. WAGNER, Hore Soc. Ent. Ross., XXXV, p. 27 (*Typhlopsylla altaica*).

1903. WAGNER, Hore Soc. Ent. Ross., XXXVI, p. 141.

## NEOPSYLLA BIDENTATIFORMIS Wagner.

1898. WAGNER, Hore Soc. Ent. Ross., XXXI, p. 292 (*Typhlopsylla setosa*).

1903. WAGNER, Hore Soc. Ent. Ross., XXXVI, pp. 141, 143, 146.

1904. TIRABOSCHI, Archiv. de Parasit., VIII, p. 292.

## NEOPSYLLA PENTACANTHUS (Rothschild).

1897. ROTHSCHILD, The Ent. Record, IX, No. 3 (*Typhlopsylla pentacanthus*).  
 1903. WAGNER, Horæ Soc. Ent. Ross., XXXVI, pp. 141, 146.  
 1904. TIRABOSCHI, Archiv. de Parasit., VIII, p. 293.

## Subfamily DOLICHOPSYLLINÆ Baker.

## Genus DOLICHOPSYLLUS Baker.

## DOLICHOPSYLLUS STYLOSUS Baker.

1903. BAKER, Proc. U. S. Nat. Mus., XXVII, p. 418 (*Ceratophyllus stylosus*).

## Family CTENOPSYLLIDÆ Baker.

## Genus CTENOPSYLLUS Kolenati.

## CTENOPSYLLUS AGANIPPES Rothschild.

1904. ROTHSCHILD, Novitat. Zool., XI, p. 647.

*Host.*—*Mus* sp.

*Habitat.*—Cape Colony.

## CTENOPSYLLUS ALPINUS Baker.

1903. WAGNER, Horæ Soc. Ent. Ross., XXXVI, p. 151 (*Ctenopsylla alpina*).  
 1904. TIRABOSCHI, Archiv. de Parasit., VIII, p. 285 (*Ctenopsylla alpina*).

## CTENOPSYLLUS BIDENTATUS (Kolenati) Wagner.

1903. WAGNER, Horæ Soc. Ent. Ross., XXXVI, p. 151 (*Ctenopsylla bidentata*).

## CTENOPSYLLUS BROOKSI Rothschild.

1904. ROTHSCHILD, Novitat. Zool., XI, p. 649.

*Hosts.*—*Putorius richardsoni*, *Putorius longicaudatus*, *Mustela americana*.

*Habitat.*—British Columbia and Alberta, Canada.

## CTENOPSYLLUS GRANTI Rothschild.

1904. ROTHSCHILD, Novitat. Zool., XI, p. 646.

*Host.*—“*Macro proboscideus*.”

*Habitat.*—Cape Colony.

## CTENOPSYLLUS HYGINI Rothschild.

1904. ROTHSCHILD, Novitat. Zool., XI, p. 650.

*Host.*—*Putorius richardsoni*.

*Habitat.*—Alberta, Canada.

## CTENOPSYLLUS HYRTACI Rothschild.

1904. ROTHSCHILD, Novitat. Zool., XI, p. 652.

*Hosts.*—*Lutreola eneygmenos*, *Sorex obscurus*.

*Habitat.*—British Columbia

**CTENOPSYLLUS MUSCULI** (Duges) Wagner.

1896. BAKER, *Cabad. Ent.*, XXVIII, p. 85 (*Typhlopsylla mexicana*).  
 1896. MEINERT, *Pulicidæ Danicæ*, p. 10.  
 1903. WAGNER, *Hortæ Soc. Ent. Ross.*, XXXVI, pp. 150, 152.  
 1903. KOHAUT, *Magyar. bolhai*, p. 58.  
 1904. BAKER, *Proc. U. S. Nat. Mus.*, XXVII, p. 430 (*Ctenopsyllus mexicanus*).  
 1904. TIRABOSCHI, *Archiv. de Parasit.*, VIII, p. 277.

*Habitat.*—Mexico and the United States.

**CTENOPSYLLUS PECTINICEPS** Wagner.

1903. WAGNER, *Hortæ Soc. Ent. Ross.*, XXXVI, p. 150.  
 1904. TIRABOSCHI, *Archiv. de Parasit.*, VIII, p. 283.

**CTENOPSYLLUS SIBIRICUS** Wagner.

1903. WAGNER, *Hortæ Soc. Ent. Ross.*, XXXVI, p. 151 (*Ctenopsylla sibirica*).

**CTENOPSYLLUS SILVATICUS** (Meinert) Baker.

1903. WAGNER, *Hortæ Soc. Ent. Ross.*, XXXVI, p. 151 (*Ctenopsylla silvatica*).

**CTENOPSYLLUS SORECIS** (Dale) Baker.

1878. DALE, *Hist. of Glanvilles Wootton*, p. 291 (*Ceratophyllus sorecis*).  
 1880. TASCHENBERG, *Die Flöhe*, p. 96 (*Typhlopsylla gracilis*).  
 1903. KOHAUT, *Magyar. bolhai*, p. 56 (*Typhlopsylla gracilis*).  
 1903. ROTHSCHILD, *Ent. Mo. Mag.*, 2d ser., XIV, p. 145.  
 1904. BAKER, *Proc. U. S. Nat. Mus.*, XXVII, p. 452 (*Ctenopsyllus gracilis*).

**CTENOPSYLLUS SPECTABILIS** (Rothschild) Baker.

1903. WAGNER, *Hortæ Soc. Ent. Ross.*, XXXVI, p. 151.  
 1904. TIRABOSCHI, *Archiv. de Parasit.*, VIII, p. 282.

**CTENOPSYLLUS TASCHENBERGI** Wagner.

1903. WAGNER, *Hortæ Soc. Ent. Ross.*, XXXVI, pp. 150, 151.  
 1904. TIRABOSCHI, *Archiv. de Parasit.*, VIII, p. 284.

Genus **STEPHANOCIRCUS** Skuse.**STEPHANOCIRCUS DASYURI** Skuse.

1903. RAINBOW, *Record Austrl. Mus.*, V, p. 53.  
 1903. ROTHSCHILD, *Novitat. Zool.*, X, p. 319.  
 1905. ROTHSCHILD, *Ent. Mo. Mag.*, XVI, p. 61.

*Hosts.*—*Bettongia penicillata*, *Mus velutinus*, *Perameles gunni*.

*Habitat.*—West Australia and Tasmania.

**STEPHANOCIRCUS MINERVA** Rothschild.

1903. ROTHSCHILD, *Novitat. Zool.*, X, p. 319.

*Host.*—*Didelphys azaræ*.

*Habitat.*—Sapucay, Paraguay.

## STEPHANOCIRCUS SIMPSONI Rothschild.

1905. ROTHSCHILD, Ent. Mo. Mag., XVI, p. 61.

*Hosts.*—*Mus velutinus*, *Dasyurus maculatus*.*Habitat.*—Tasmania.

## STEPHANOCIRCUS THOMASI Rothschild.

1903. ROTHSCHILD, Novitat. Zool., X, p. 318.

*Host.*—*Mus ferculinus*.*Habitat.*—Northwest Australia.

## Family HYSTRICHOPSYLLIDÆ Baker.

## Genus HYSTRICHOPSYLLA Taschenberg.

## HYSTRICHOPSYLLA DIPPIEI Rothschild.

1902. ROTHSCHILD, Ent. Record, XIV, No. 3.

1904. BAKER, Proc. U. S. Nat. Mus., XXVII, p. 468.

*Hosts.*—*Putorius longicaudatus*, *Lutreola encyrgmenos*.*Habitat.*—British Columbia and Alberta, Canada.

## HYSTRICHOPSYLLA NARBELI Galli-Valerio.

1900. GALLI-VALERIO, Archiv. de Parasit., III, pp. 96-100.

1904. TIRABOSCHI, Archiv. de Parasit., VIII, p. 301.

*Host.*—*Microtus nivalis*.*Habitat.*—Italy and Switzerland.

## HYSTRICHOPSYLLA TALPÆ (Curtis) Rothschild.

1903. WAHLGREN, Archiv für Zool., I, p. 188 (*Hystrichopsylla obtusiceps*).

1904. TIRABOSCHI, Archiv. de Parasit., VIII, p. 299.

*Habitat.*—Sweden.

## HYSTRICHOPSYLLA TRIPECTINATA Tiraboschi.

1902. TIRABOSCHI, Boll. della Soc. Zool. Ital.

1903. TIRABOSCHI, Archiv für Hygiene, XLVI, p. 257.

1904. TIRABOSCHI, Archiv. de Parasit., VIII, p. 297.

*Host.*—*Mus musculus*.*Habitat.*—Rome.

## Family CERATOPSYLLIDÆ Baker.

## Genus CERATOPSYLLUS Kolenati.

## CERATOPSYLLUS ÆGYPTIUS Rothschild.

1903. ROTHSCHILD, Ent. Mo. Mag., 2d ser., XIV, p. 83 (*Ceratopsylla*).*Host.*—*Taphozous perforatus*.*Habitat.*—Near Cairo, Egypt.

## CERATOPSYLLUS CAMINÆ Rothschild.

1903. ROTHSCHILD, *Novitat. Zool.*, X, p. 323 (*Ceratopsylla*).

*Host.*—“A bat.”

*Habitat.*—West Australia.

## CERATOPSYLLUS CAMINÆ Rothschild var. REDUCTUS (Rothschild) Baker.

1903. ROTHSCHILD, *Novitat. Zool.*, X, p. 323 (*Ceratopsylla reductus*).

*Host.*—*Vespertilio macropus*.

*Habitat.*—Melbourne, Australia.

## CERATOPSYLLUS CONSIMILIS Wahlgren.

1903?. WAHLGREN, *Results of Swedish Zool. Exped. to Egypt and the White Nile*, 1901.

*Host.*—*Rhinopoma microphyllum*.

*Habitat.*—Egypt.

## CERATOPSYLLUS CROSBYI Baker.

1905. BAKER, see p. 137.

*Host.*—Little brown bat.

*Habitat.*—Rockport, Missouri.

## CERATOPSYLLUS DICTENUS Kolenati.

1903. KOHAUT, *Magyar. bolhai*, p. 65.

## CERATOPSYLLUS DISTINCTUS Rothschild.

1903. ROTHSCHILD, *Novitat. Zool.*, X, p. 325 (*Ceratopsylla*).

*Host.*—?

*Habitat.*—Villa Rica, Paraguay.

## CERATOPSYLLUS ELONGATUS Curtis.

1903. KOHAUT, *Magyar. bolhai*, p. 60.

## CERATOPSYLLUS FOSTERI Rothschild.

1903. ROTHSCHILD, *Novitat. Zool.*, X, p. 324 (*Ceratopsylla*).

*Hosts.*—*Molossus bonariensis*, *Nyctinomus laticaudatus*.

*Habitat.*—Sapucay, Paraguay.

## CERATOPSYLLUS HEXACTENUS Kolenati.

1903. KOHAUT, *Magyar. bolhai*, p. 63.

## CERATOPSYLLUS INSIGNIS Rothschild.

1903. ROTHSCHILD, *Novitat. Zool.*, X, p. 319 (*Ceratopsylla*).

*Host.*—*Myotis lucifugus*.

*Habitat.*—Ontario, Canada.

## CERATOPSYLLUS JUBATUS Wagner.

1903. KOHAUT, Magyar. bolhai, p. 61.

*Habitat.*—Hungary.

## CERATOPSYLLUS MARTIALIS Rothschild.

1903. ROTHSCHILD, Novitat. Zool., X, p. 322 (*Ceratopsylla*).*Host.*—*Nyctinomus acetabulosus*.*Habitat.*—Island of Reunion.

## CERATOPSYLLUS PALPOSUS Rothschild.

1904. ROTHSCHILD, Novitat. Zool., XI, p. 652 (*Ceratopsylla*).*Host.*—"Brown bat."*Habitat.*—British Columbia.

## CERATOPSYLLUS PENTACTENUS Kolenati.

1903. KOHAUT, Magyar. bolhai, p. 64.

## CERATOPSYLLUS SIGNATUS Wahlgren.

1903. WAHLGREN, Archiv für Zool., I, p. 189 (*Ceratopsylla signata*).*Host.*—*Nyctinomus plicatus*.*Habitat.*—Java.

## CERATOPSYLLUS UNIPECTINATUS Wagner.

1903. KOHAUT, Magyar. bolhai, p. 66.

*Host.*—*Rhinolophus ferrum-equinum*.*Habitat.*—Hungary.

## CERATOPSYLLUS WAGNERI Kohaut.

1903. KOHAUT, Magyar. bolhai, p. 62.

*Host.*—*Myotis myotis*.*Habitat.*—Hungary.

## CERATOPSYLLUS WOLFFSOHNI Rothschild.

1903. ROTHSCHILD, Novitat. Zool., X, p. 321 (*Ceratopsylla*).*Hosts.* *Myotis nigricans*, *Myotis albescens*.*Habitat.*—Sapucay, Paraguay, and Valparaiso, Chile.

## SUPPLEMENTAL HOST INDEX.

## Class AVES.

<i>Eudypetes clusocome</i> .....	<i>Parapsyllus longicornis</i> Enderlein.
<i>Gallus domesticus</i> .....	<i>Pulex irritans</i> Linnaeus.

## Class MAMMALIA.

## Order MARSUPALIA.

## Family DASYURIDÆ.

<i>Dasyurus maculatus</i> .....	<i>Stephanocircus simpsoni</i> Rothschild.
<i>Dasyurus viverinus</i> .....	<i>Ceratophyllus hilli</i> Rothschild.

## Family DIDELPHYIDÆ.

<i>Didelphys aurita</i> .....	<i>Ctenophthalmus antiquorum</i> Rothschild.
<i>Didelphys azaræ</i> .....	<i>Palaeopsylla rosenbergi</i> (Rothschild) Baker.
	<i>Stephanocircus minerva</i> Rothschild.
<i>Marmosa elegans</i> .....	<i>Ceratophyllus californicus</i> Baker, var. <i>endymionis</i> (Rothschild) Baker.
<i>Metachirus opposum</i> .....	<i>Palaeopsylla rosenbergi</i> (Rothschild) Baker.

## Family MACROPODIDÆ.

<i>Bettongia cuniculus</i> .....	<i>Ceratophyllus zethi</i> Rothschild.
<i>Bettongia penicillata</i> .....	<i>Ceratophyllus hilli</i> Rothschild.
	<i>Stephanocircus dasguri</i> Skuse.

## Family PERAMELIDÆ.

<i>Perameles gunni</i> .....	<i>Stephanocircus dasguri</i> Skuse.
<i>Perameles nasuta</i> .....	<i>Ceratophyllus hilli</i> Rothschild.
<i>Perameles raffrayanus</i> .....	<i>Ceratophyllus numax</i> Rothschild.

## Family PHALANGERIDÆ.

<i>Acrobates pygmæa</i> .....	<i>Ceratophyllus thomasi</i> Rothschild.
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## Family PHASCOLOMYIDÆ.

<i>Phascolomys mitchelli</i> .....	<i>Lycopsylla norris</i> Rothschild.
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## Order EDENTATA.

## Family DASYPODIDÆ.

<i>Cataphractus minutus</i> .....	<i>Malacopsylla agenoris</i> Rothschild.
<i>Muletia septemcincta</i> .....	<i>Rhopalopsyllus cleophrontis</i> (Rothschild) Baker.
<i>Tatusia novemcincta</i> .....	<i>Rhopalopsyllus australis</i> (Rothschild) Baker.
<i>Zaedyus</i> (' <i>Dasypus</i> ') <i>minutus</i> .....	<i>Malacopsylla agenoris</i> Rothschild.
	<i>Malacopsylla grossirentis</i> Weyenbergh.

## Order GLIRES.

## Family CAVIIDÆ.

<i>Procavia capensis</i> .....	<i>Pulex creusa</i> Rothschild.
<i>Procavia erlangeri</i> .....	<i>Pulex isidis</i> Rothschild.

## Family DIPODIDÆ.

<i>Alactaga</i> ( <i>Dipus</i> ) <i>jaculus</i> .....	<i>Pulex cheopis</i> Rothschild.
	<i>Pulex chephrensis</i> Rothschild.
	<i>Pulex cleopatra</i> Rothschild.
	<i>Pulex pyramidis</i> Rothschild.

## Family HYSTRICIDÆ.

<i>Hystrix cristata</i> .....	<i>Pulex riggenbachi</i> Rothschild.
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## Family LEPORIDÆ.

<i>Lepus æthiopicus</i> .....	<i>Pulex cleopatra</i> Rothschild.
<i>Lepus glacialis</i> .....	<i>Hoplopsyllus glacialis</i> (Taschenberg) Baker.



## Family MURIDÆ.

<i>Acomys cahirinus</i> .....	<i>Pulex alternans</i> Wahlgren.
	<i>Pulex chephrensensis</i> Rothschild.
<i>Acomys witherbyi</i> .....	<i>Pulex cheopis</i> Rothschild.
<i>Arvicanthis testicularis</i> .....	<i>Pulex cheopis</i> Rothschild.
	<i>Pulex cleopatra</i> Rothschild.
	<i>Pulex nubicus</i> Rothschild.
<i>Crietomys</i> sp. ....	<i>Pulex aquisetosus</i> Enderlein.
<i>Dipodillus watersi</i> .....	<i>Pulex cheopis</i> Rothschild.
	<i>Pulex cleopatra</i> Rothschild.
<i>Evotomys gapperi</i> .....	<i>Ceratophyllus quirini</i> Rothschild.
	<i>Ceratophyllus telchinum</i> Rothschild.
	<i>Odontopsyllus telegoni</i> (Rothschild) Baker.
<i>Evotomys saturatus</i> .....	<i>Ceratophyllus wickhami</i> Baker, var. <i>ager</i> (Rothschild) Baker.
	<i>Ceratophyllus pollionis</i> Rothschild.
	<i>Ceratophyllus quirini</i> Rothschild.
	<i>Odontopsyllus charlottensis</i> Baker.
<i>Gerbillus pygargus</i> .....	<i>Pulex cleopatra</i> Rothschild.
<i>Gerbillus robustus</i> .....	<i>Pulex cheopis</i> Rothschild.
	<i>Pulex nubicus</i> Rothschild.
<i>Gerbillus</i> sp .....	<i>Pulex gerbilli</i> Wagner.
<i>Gerbillus tarabuli</i> .....	<i>Ceratophyllus henleyi</i> Rothschild.
	<i>Pulex mycerini</i> Rothschild.
	<i>Pulex ramesis</i> Rothschild.
<i>Lemmus</i> (' <i>Myodes</i> ') <i>lemmus</i> .....	<i>Ceratophyllus penicilliger</i> (Grube) Wagner.
	<i>Ceratophyllus rectangulatus</i> Wahlgren.
	<i>Ctenophthalmus uncinata</i> (Wagner) Baker.
<i>Lemmus</i> (' <i>Myodes</i> ') <i>torquatus</i> .....	<i>Ceratophyllus grandaicus</i> Wahlgren.
<i>Meriones rex</i> .....	<i>Pulex regis</i> Rothschild.
<i>Microtus drummondii</i> .....	<i>Ceratophyllus abantis</i> Rothschild.
	<i>Ceratophyllus lucifer</i> Rothschild.
	<i>Ceratophyllus pollionis</i> Rothschild.
	<i>Ctenophthalmus pseudagyrtes</i> Baker.
	<i>Odontopsyllus telegoni</i> (Rothschild) Wagner.
<i>Microtus nivalis</i> .....	<i>Hystriechopsylla narbeli</i> Galli-Valerio.
<i>Microtus saturatus</i> .....	<i>Ctenophthalmus pseudagyrtes</i> Baker.
<i>Mus ferulinus</i> .....	<i>Stephanocircus thomasi</i> Rothschild.
<i>Mus gentilis</i> .....	<i>Pulex cheopis</i> Rothschild.
<i>Mus musculus</i> .....	<i>Ceratophyllus italicus</i> Tiraboschi.
	<i>Hystriechopsylla tripunctata</i> Tiraboschi.
<i>Mus norvegicus</i> (' <i>decumanus</i> ') .....	<i>Ceratophyllus italicus</i> Tiraboschi.
	<i>Pulex murinus</i> Tiraboschi.
<i>Mus rattus</i> .....	<i>Rhynchoprion cucata</i> (Enderlein) Baker.
<i>Mus rattus alexandrinus</i> .....	<i>Argopsylla rhynchopsylla</i> (Tiraboschi) Baker.
	<i>Ceratophyllus italicus</i> Tiraboschi.
	<i>Pulex murinus</i> Tiraboschi.
<i>Mus sylvaticus</i> .....	<i>Ceratophyllus italicus</i> Tiraboschi.
	<i>Ctenophthalmus proxima</i> (Wagner) Baker.
	<i>Typhlocerus poppei</i> Wagner.
<i>Mus</i> sp. ....	<i>Ctenopsyllus agrippes</i> Rothschild.
<i>Mus velutinus</i> .....	<i>Stephanocircus dasypuri</i> Skuse.
	<i>Stephanocircus simpsoni</i> Rothschild.

<i>Neotoma cinerea</i> .....	<i>Ceratophyllus agilis</i> Rothschild. <i>Ctenophthalmus wenmani</i> Rothschild. <i>Odontopsyllus charlottensis</i> Baker.
<i>Otomys branti</i> .....	<i>Ceratophyllus agrippinæ</i> Rothschild. <i>Pulex eridos</i> Rothschild.
<i>Otomys unisulcatus</i> .....	<i>Ceratophyllus agrippinæ</i> Rothschild.
<i>Pachyuromys duprasi natronensis</i> .....	<i>Ceratophyllus huleyi</i> Rothschild. <i>Pulex ramesis</i> Rothschild.
<i>Peromyscus arcticus</i> .....	<i>Ceratophyllus wickhami</i> Baker, var. <i>ager</i> Rothschild) Baker. <i>Odontopsyllus charlottensis</i> Baker.
<i>Peromyscus canadensis</i> .....	<i>Ceratophyllus euphorbi</i> Rothschild.
<i>Peromyscus leucopus</i> .....	<i>Ctenophthalmus acamanti</i> Rothschild. <i>Odontopsyllus charlottensis</i> Baker.

## Family OCTODONTIDÆ.

<i>Akodon albivener</i> .....	<i>Rhopalopsyllus simonsi</i> (Rothschild) Baker.
<i>Kerodon boliviensis</i> .....	<i>Rhopalopsyllus concitus</i> (Rothschild) Baker.
<i>Neoctodon simonsi</i> .....	<i>Rhopalopsyllus simonsi</i> (Rothschild) Baker.
<i>Ochotona</i> ('Lagomys') <i>princeps</i> .....	<i>Ceratophyllus agilis</i> Rothschild. <i>Ceratophyllus terribilis</i> Rothschild.
<i>Octodon degus</i> .....	<i>Rhopalopsyllus confidii</i> (Rothschild) Baker.

## Family SCIURIDÆ.

<i>Arctomys flaviventer avarus</i> .....	<i>Ceratophyllus acamantis</i> Rothschild.
<i>Citellus</i> ('Spermophilus') <i>columbianus</i> .....	<i>Ceratophyllus pectentis</i> Rothschild. <i>Ceratophyllus terinus</i> Rothschild.
<i>Citellus</i> ('Spermophilus') <i>13-lineatus</i> .....	<i>Ceratophyllus bacchi</i> Rothschild.
<i>Citellus</i> ('Spermophilus') <i>sp.</i> .....	<i>Ceratophyllus acutus</i> Baker.
<i>Eutamias quadrivittatus affinis</i> .....	<i>Ceratophyllus eumolpi</i> Rothschild.
<i>Sciuropterus sabinus</i> .....	<i>Ceratophyllus pseudarctomys</i> Baker, var. <i>acasti</i> (Rothschild) Baker.
<i>Sciurus aberti</i> .....	<i>Ceratophyllus pectentis</i> Rothschild.
<i>Sciurus richardsoni baileyi</i> .....	<i>Ceratophyllus agilis</i> Rothschild.
<i>Tamias borealis</i> .....	<i>Ceratophyllus eumolpi</i> Rothschild.
<i>Tamias sp.</i> .....	<i>Ceratophyllus pectentis</i> Rothschild.
<i>Tamias striatus</i> .....	<i>Ctenophthalmus grandis</i> (Rothschild) Baker.
<i>Xerus capensis</i> .....	<i>Pulex erilli</i> Rothschild.

## Family SPALACIDÆ.

<i>Spalax hungaricus</i> .....	<i>Ctenophthalmus typhlus</i> (Motschulsky) Baker.
<i>Spalax monticola</i> .....	<i>Ctenophthalmus monticola</i> (Kohaut) Baker.

## Order INSECTIVORA.

## Family ERINACEIDÆ.

<i>Erinaceus æthiopicus</i> .....	<i>Pulex cleopatra</i> Rothschild. <i>Pulex pallidus</i> Taschenberg.
<i>Erinaceus albiventris</i> .....	<i>Pulex pallidus</i> Taschenberg.

## Family SORECIDÆ.

<i>Crocidura aranea</i> .....	<i>Ctenophthalmus proxima</i> (Wagner) Baker.
<i>Sorex obscurus</i> .....	<i>Ctenopsyllus hygini</i> Rothschild.
<i>Sorex richardsoni</i> .....	<i>Ceratophyllus telehinum</i> Rothschild.

## Family TALPIDÆ.

Scalops aquaticus ..... *Ctenophthalmus pseudagyptus* Baker.

## Order CHIROPTERA.

## Family NOCTILIONIDÆ.

Molossus bonariensis ..... *Ceratopsyllus fosteri* Rothschild.  
 Nyctinomus acetabulosus ..... *Ceratopsyllus martialis* Rothschild.  
 Nyctinomus laticaudatus ..... *Ceratopsyllus fosteri* Rothschild.  
 Nyctinomus plicatus ..... *Ceratopsyllus signatus* Waldgren.  
 Rhinopoma microphyllum ..... *Ceratopsyllus consimilis* Waldgren.  
 Taphozous perforatus ..... *Ceratopsyllus agyptius* Rothschild.

## Family RHINOLOPHIDÆ.

Rhinolophus ferrum-equinum ..... *Ceratopsyllus unipectinatus* Wagner.

## Family VESPERTILIONIDÆ.

Myotis albescens ..... *Ceratopsyllus wolffsohni* Rothschild.  
 Myotis lucifugus ..... *Ceratopsyllus insignis* Rothschild.  
 Myotis myotis ..... *Ceratopsyllus wagneri* Kohaut.  
 Myotis ('Vespertilio') nigricans ..... *Ceratopsyllus wolffsohni* Rothschild.  
 Vespertilio ('Myotis') macropus ..... *Ceratopsyllus canina* Rothschild var. *reductus*  
 (Rothschild) Baker.

## Order UNGULATA.

## Family TAYASSUIDÆ.

Dicotyles labiatus ..... *Rhopalopsyllus australis* (Rothschild) Baker.

## Order FERÆ.

## Family CANIDÆ.

Canis griseus ..... *Malacopsylla androchi* Rothschild.  
 Canis latrans ..... *Ceratophyllus acamantis* Rothschild.  
 Canis mesomelas ..... *Ctenocephalus canis* (Curtis) Baker.  
 Speothos venaticus ..... *Rhopalopsyllus australis* (Rothschild) Baker.  
 Vulpes niloticus ..... *Pulex pallidus* Taschenberg.  
 Vulpes vulpes ..... *Chatopsylla vulpes* (Motschulsky) Baker.

## Family FELIDÆ.

Felis caracal ..... *Pulex cecuse* Rothschild.

## Family HYLENIDÆ.

Hyæna hyæna ..... *Pulex pallidus* Taschenberg.

## Family MUSTELIDÆ.

Lutreola ('Putorius') energumenos ..... *Hystrihopsylla dippicii* Rothschild.  
 ..... *Ceratophyllus acamantis* Rothschild.  
 ..... *Ctenopsyllus hygini* Rothschild.  
 Meles taxus ..... *Chatopsylla trichosa* Kohaut.  
 Mephitis spissigrada ..... *Ceratophyllus acamantis* Rothschild.  
 Mustela americana ..... *Ctenopsyllus brooksi* Rothschild.  
 Mustela itatsi ..... *Chatopsylla mikado* Rothschild.

<i>Putorius longicaudatus</i> .....	<i>Ceratophyllus abantis</i> Rothschild.
	<i>Ceratophyllus agilis</i> Rothschild.
	<i>Ceratophyllus pevanis</i> Rothschild.
	<i>Ctenopsyllus brooksi</i> Rothschild.
	<i>Hystriopsylla dippei</i> Rothschild.
<i>Putorius putorius</i> .....	<i>Chatopsylla rothschildi</i> Kohaut.
<i>Putorius richardsoni</i> .....	<i>Ctenopsyllus brooksi</i> Rothschild.
	<i>Ctenopsyllus hygini</i> Rothschild.
<i>Putorius sibiricus</i> .....	<i>Ceratophyllus pencilliger</i> (Grube) Wagner.
<i>Spilogale latifrons</i> .....	<i>Ceratophyllus wickhami</i> Baker var. <i>nepos</i> (Rothschild) Baker.
<i>Spilogale phenax</i> .....	<i>Anoniopsyllus californicus</i> Baker.
<i>Zorilla striata</i> .....	<i>Pulex erilli</i> Rothschild.

#### Family URSIDÆ.

<i>Ursus arctos</i> .....	<i>Chatopsylla strandi</i> (Wahlgren) Baker.
	<i>Chatopsylla tuberculiceps</i> (Bezzi) Baker.
<i>Ursus horribilis</i> .....	<i>Chatopsylla ursi</i> (Rothschild) Baker.

#### Family VIVERRIDÆ.

<i>Genetta dongolana</i> .....	<i>Pulex cheopis</i> Rothschild.
	<i>Pulex nubicus</i> Rothschild.
<i>Herpestes albicauda</i> .....	<i>Pulex nubicus</i> Rothschild.
<i>Herpestes badius</i> .....	<i>Ceratophyllus dorippe</i> Rothschild.

#### NOT IN ABOVE LIST.

<i>Graphocularis biurus</i> .....	<i>Ceratophyllus octarii</i> Rothschild.
<i>Lestris parasitica</i> .....	<i>Ceratophyllus angulatus</i> Wahlgren.
<i>Suricata tetradaactyla</i> .....	<i>Pulex erilli</i> Rothschild.
"Macro proboscideus" .....	<i>Ctenopsyllus granti</i> Rothschild.
"Spreo bicolor" .....	<i>Pulex creusa</i> Rothschild.

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*Habitat*.—England.

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