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# Das Tierreich.

Eine Zusammenstellung und Kennzeichnung der  
rezenten Tierformen.

Herausgegeben

von der

**Deutschen Zoologischen Gesellschaft.**

Generalredakteur: Franz Eilhard Schulze.

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**3. Lieferung.**

**Acarina.**

Redakteur: H. Lohmann.

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## Oribatidae

bearbeitet von

**A. D. Michael, F. L. S., F. Z. S., F. R. M. S., etc.**  
in London.

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Mit 15 Abbildungen im Texte.

Ausgegeben im Juli 1898.

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**Berlin.**

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## Abbreviations of the technical terms.

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|---|---|
| <i>Abd.</i> — Abdomen (see pag. 2)                    | <i>Mdb.</i> — Mandible (see pag. 3)                     |
| <i>Ant.</i> — Anterior                                | <i>Mond.</i> — Monodactyle                              |
| <i>Bid.</i> — Bidactyle                               | <i>Nph.</i> — Nymph                                     |
| <i>Cephth.</i> — Cephalothorax (see pag. 2)           | <i>Post.</i> — Posterior                                |
| <i>C. lam.</i> — Cusp of the lamella (see pag. 3)     | <i>Psstg.</i> — Pseudostigma (see pag. 4)               |
| <i>Dors.</i> — Dorsum, Dorsal                         | <i>Psstg. org.</i> — Pseudostigmatic organ (see pag. 4) |
| <i>Hetd.</i> — Heterodactyle (see pag. 4)             | <i>Ptm.</i> — Pteromorpha (see pag. 4)                  |
| <i>Homd.</i> — Homodactyle (see pag. 4)               | <i>Rost.</i> — Rostrum, Rostral (see pag. 2)            |
| <i>Im.</i> — Imago                                    | <i>Tectp.</i> — Tectopedium (see pag. 4)                |
| <i>Intlam. hair</i> — Interlamellar hair (see pag. 4) | <i>Trid.</i> — Tridactyle                               |
| <i>Lam.</i> — Lamella, Lamellar (see pag. 3)          | <i>Trlam.</i> — Translamella (see pag. 3)               |
| <i>Lat.</i> — Lateral                                 | <i>Ung.</i> — Unguis                                    |
| <i>Lv.</i> — Larva                                    | <i>Ventr.</i> — Ventral                                 |
|   | <hr/>   |
|   | <i>L.</i> — Length                                      |

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## Abbreviations of the titles of literature.

- Abh. Ver. Bremen* — Abhandlungen, herausgegeben vom naturwissenschaftlichen Vereine zu Bremen. Bremen. 8.
- Amer. Natural.* — The American Naturalist. Salem, etc. 8.
- Ann. Sci. nat.* — Annales des Sciences naturelles. — Zoologie. Paris. 8.
- Arch. Dorpat. Ges.* — Archiv für die Naturkunde Liv-, Ehst- und Kurlands. — 2. Ser. Dorpat. 8.
- Arch. Mus. Paris* — Archives du Muséum d'Histoire naturelle. Paris. 4.
- Arch. Naturg.* — Archiv für Naturgeschichte. Berlin. 8.
- Atti Ist. Veneto* — Atti del Reale Istituto Veneto di Scienze, Lettere ed Arti. Venezia. 8.
- Atti Soc. Veneto-Trent.* — Atti della Società Veneto-Trentina di Scienze naturali, residenti in Padova. Padova 8.
- Ber. Ges. Bamberg* — Bericht der naturforschenden Gesellschaft in Bamberg. Bamberg. 8.
- Berlese, A. M. S.* — A. Berlese, Acari, Myriopoda et Scorpiones hucusque in Italia reperta. fasc. 1—79. Padova, 1882—96. 8.
- Berlese, A. M. S., Crypt. II* — A. Berlese, Acari, Myriopoda et Scorpiones hucusque in Italia reperta. — Ordo Cryptostigmata (Oribatidae). Portici, 1896. 8.
- Berlese, A. M. S., Repert.* — A. Berlese, Acari, Myriopoda et Scorpiones hucusque in Italia reperta. — Repertorium Specierum novarum. Padova. 8. [in tegumentis fasciculorum.]
- Berlin. ent. Z.* — Berliner entomologische Zeitschrift. Berlin. 8.
- Bibl. zool.* — Bibliotheca zoologica. Original-Abhandlungen aus dem Gesamtgebiete der Zoologie. Cassel, Stuttgart. 4.
- Biol. Centr.-Amer., Arach. acar.* — F. D. Godman and O. Salvin, Biologia Centrali-Americana. — Arachnida acaridea by O. Stoll. London, 1886—93. 4.
- Buffon, Hist. nat., ed. Sonnini, Ins.* — G. L. L. Comte de Buffon, Histoire naturelle, générale et particulière. Nouvelle Édition. Réd. par Ch. N. S. Sonnini. — Crustacés et Insectes par P. A. Latreille. 14 v. Paris, 1792—1805. 8.
- Bull. Dep. Agric. Ent.* — U. S. Department of Agriculture. Division of Entomology. Bulletin. Washington. 8.
- Bull. Soc. ent. Ital.* — Bollettino della Società entomologica Italiana. Firenze. 8.
- Bull. Soc. Veneto-Trent.* — Bollettino della Società Veneto-Trentina di Scienze naturali. Padova. 8.
- Canad. Ent.* — The Canadian Entomologist. Toronto, London. 8.
- Canestrini, Prosp. Acarof.* — G. Canestrini, Prospetto dell' Acarofauna Italiana. 7 v. Padova, 1885—97. 8. [& in: *Atti Soc. Veneto-Trent.*]
- Carus & Gerstaecker, Zool.* — J. V. Carus und C. E. A. Gerstaecker, Handbuch der Zoologie. 2 v. Leipzig, 1863—75. 8.
- Donnadieu, Rech. Tétranyques* — A. L. Donnadieu, Recherches pour servir à l'Histoire des Tétranyques. Lyon, 1875. 8. [& in: *Ann. Soc. Linn. Lyon*, n. ser. v. 22. 1876.]
- Enc. méth.* — Encyclopédie méthodique, ou par Ordre de Matière. Par une Société de Gens de Lettres. — Histoire naturelle. 10 v. & 17 atl. Paris, 1782—1832. 4.
- Expl. Algérie, An. artic.* — Exploration scientifique de l'Algérie pendant les Années 1840—42. Sciences physiques. Zoologie. — Histoire naturelle des Animaux articulés par H. Lucas. 3 v. & atl. Paris, 1849. 4.

- Fabricius, Ent. syst.* — J. Ch. Fabricius, Entomologia systematica, emendata et aucta, secundum Classes, Ordines . . . 4 v., suppl. & indices. Hafniae, 1792—99. 8.
- Fürstenberg, Krätzm.* — M. H. F. Fürstenberg, Die Krätzmilben der Menschen und Thiere. Leipzig, 1861. 2.
- Gay, Hist. Chilè* — Cl. Gay, Historia fisica y politica de Chile segun Documentos adquiridos . . . Publ. bajo los Auspicios del supremo Gobierno. — Zoologia. 8 v. & atl. Paris, 1847—54. 8 & 2.
- Hermann, Mém. apt.* — J. F. Hermann, Mémoire aptérologique. Ouvrage couronné en 1790 par la Société d'Histoire naturelle de Paris. Publ. par F. L. Hammer. Strasbourg, 1804. 2.
- Hocven, Handb. Dierk.* — J. van der Hoeven, Handboek der Dierkunde. 2 v. Rotterdam. 1828—33. 8. (ed. 2, 1849.)
- Institut* — L'Institut. Journal universel des Sciences et des Sociétés savantes en France et à l'Étranger. — Sect. I, Sciences math., phys. et nat. Paris. 4.
- Isis* — Isis. Encyclopädische Zeitschrift, von L. Oken. Leipzig. 4.
- J. Ac. Philad.* — Journal of the Academy of natural Sciences of Philadelphia. Philadelphia. 4.
- Jahresh. Ver. Württemb.* — Jahreshefte des Vereins für vaterländische Naturkunde in Württemberg. Stuttgart. 8.
- J. Anat. et Physiol.* — Journal de l'Anatomie et de la Physiologie normales et pathologiques de l'Homme et des Animaux. Paris. 8.
- J. N. York ent. Soc.* — Journal of the New York entomological Society. New York. 8.
- J. R. micr. Soc.* — Journal of the Royal microscopical Society. London. 8.
- C. L. Koch, C. M. A.* — C. L. Koch, Deutschlands Crustaceen, Myriapoden und Arachniden. Hrsg. von G. A. W. Herrich-Schäffer. 40 fasc. Regensburg, 1835—44. 12.
- C. L. Koch, Übers. Arach.* — C. L. Koch, Übersicht des Arachnidensystems. 5 v. Nürnberg, 1837—50. 8.
- Latreille, Gen. Crust. Ins.* — P. A. Latreille, Genera Crustaceorum et Insectorum secundum Ordinem naturalem in Familias disposita, Iconibus Exemplisque plurimis explicata. 4 v. Parisiis etc., 1806—09. 8.
- Latreille, Précis Caract. Ins.* — P. A. Latreille, Précis des Caractères génériques des Insectes disposés dans un Ordre naturel. Paris, 1796. 8.
- Linné, Fauna Suec., ed. 2* — C. Linné, Fauna Suecica sistens Animalia Sueciae Regni. ed. 2. Stockholmiae, 1761. 8.
- Linné, Syst. Nat., ed. 10* — C. Linné, Systema Naturae. ed. 10. v. 1. Holmiae, 1758. 8.
- Mag. enc.* — Magasin encyclopédique ou Journal des Sciences, des Lettres et des Arts. Paris. 8.
- Math. naturw. Ber. Ungarn* — Mathematische und naturwissenschaftliche Berichte aus Ungarn. Budapest, Berlin. 8.
- Mem. Ac. Washington* — Memoirs of the national Academy of Sciences. Washington. 4.
- Michael, Brit. Orb.* — A. D. Michael, British Oribatidae. 2 v. London (Ray Soc.), 1884, 88. 8.
- Miss. Cap Horn* — Mission scientifique du Cap Horn 1882—83. 8 v. Paris. 1885—91. 4.
- Mt. Mus. Hamburg.* — Mitteilungen aus dem naturhistorischen Museum in Hamburg. Hamburg. 8.
- Murray, Econ. Ent. Apt.* — A. Murray, Economic Entomology. Aptera. South Kensington Museum Science Handbooks. London, 1877. 8.
- N. Acta Soc. Upsal.* — Nova Acta Regiae Societatis Scientiarum Upsaliensis. Upsaliae. 4.
- Nouv. Dict.* — Nouveau Dictionnaire d'Histoire naturelle appliqué aux Arts, à l'Agriculture . . . Par une Société de Naturalistes et d'Agriculteurs. 24 v. Paris. 1802—04. 8.
- Öfv. Ak. Förh.* — Öfversigt af Kongliga Vetenskaps-Akademiens Förhandlingar. Stockholm. 8.
- Perty, Allg. Naturg.* — M. Perty, Allgemeine Naturgeschichte, als philosophische und Humanitätswissenschaft. 4 v. Bern, 1837—45. 8.
- P. zool. Soc. London* — Proceedings of the zoological Society of London. London. 8.
- Rep. Ins. Missouri* — Annual Report on the noxious, beneficial and other Insects of the State of Missouri. Jefferson City. 8.
- Rep. Ins. N. York* — Report on the noxious, beneficial and other Insects of the State of New York. Albany. 8. [& in: *Tr. N. York Agric. Soc.*]

- Rev. biol. Nord France* — Revue biologique du Nord de la France. Lille. 8.
- Rev. Sci. nat. Ouest* — Revue des Sciences naturelles de l'Ouest. Paris. 8.
- Riv. Acc. Padova* — Rivista periodica dei Lavori della Reale Accademia di Scienze, Lettere ed Arti in Padova. Padova. 8.
- Schrank, Fauna Boica* — F. v. P. Schrank, Fauna Boica. Durchgedachte Geschichte der in Bayern einheimischen und zahmen Thiere. 3 v. Nürnberg, Ingolstadt, 1798, 1801—03. 8.
- Schrank, Ins. Austr.* — F. v. P. Schrank, Enumeratio Insectorum Austriae indigenorum. Augustae Vindelicorum, 1781. 8.
- Scopoli, Ent. Carniol.* — J. A. Scopoli, Entomologia Carniolicæ, exhibens Insecta Carnioliae indigena . . . Vindobonæ, 1763. 8.
- Svenska Ak. Handl.* — Kongliga Svenska Vetenskaps-Akademiens Handlingar. Stockholm. 4.
- Tijdschr. Ent.* — Tijdschrift voor Entomologie. La Haye, Leiden etc. 8.
- Tr. Ac. St. Louis* — The Transactions of the Academy of Science of St. Louis. St. Louis. 8.
- Tr. Amer. ent. Soc.* — Transactions of the American entomological Society. Philadelphia. 8.
- Tr. Berwickshire Club* — Transactions of the Berwickshire Naturalists Field Club.
- Walckenaer, Ins. Apt.* — Baron Walckenaer, Histoire naturelle des Insectes. Aptères. 4 v. & atl. Paris, 1837—47. 8.
- Z. wiss. Zool.* — Zeitschrift für wissenschaftliche Zoologie. Leipzig. 8.

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## Fam. Oribatidae

1834 *Oribatei*, Ant. Dugès in: Ann. Sci. nat., ser. 2 v. 1 p. 21 | 1842 *Carabodides*, C. L. Koch, Übers. Arach., v. 3 p. 96 | 1849 *Notaspidea*, Høeften, Handb. Dierk., ed. 2 p. 669 | 1855 *Oribatides*, Nicolet in: Arch. Mus. Paris, v. 7 p. 384 etc. | 1859 *Carabodides*, Grube in: Arch. Dorpat. Ges., ser. 2 v. 1 p. 417 | 1861 *C.*, Fürstenberg, Krätzm., p. 208 | 1863 *Oribatidae*, Gerstaecker in: Carus & Gerstaecker, Zool., v. 2 p. 342 | 1864 *Oribatides*, Andersén in: Öfv. Ak. Förh., v. 20 p. 181 | 1875 „*Oribatidés*“, Donnadieu, Rech. Tétranyques, p. 9 | 1876 „*O.*“, Mégnin in: J. Anat. et Physiol., v. 12 p. 293 | 1877 *Oribatidae*, Murray, Econ. Ent. Apt., p. 93 | 1877 *O.*, P. Kramer in: Arch. Naturg., v. 43 I p. 215 | 1877 *Oribatidi*, Canestrini & Fanzago in: Atti Ist. Veneto, ser. 5 v. 3 p. 481 | 1877 *Oribatini*, Canestrini & Fanzago in: Atti Ist. Veneto, ser. 5 v. 4 p. 76 | 1884 *Oribatidae*, Michael, Brit. Orib. | 1885 *Oribatina*, Berlese in: Bull. Soc. ent. Ital., v. 17 p. 215 | 1891 *Cryptostigmata*, Canestrini in: Atti Ist. Veneto, ser. 7 v. 2 p. 717 | 1892 *Oribatidae*, Trouessart in: Rev. Sci. nat. Ouest, v. 2 p. 38\* | 1894 *Oribatoidea*, Banks in: Tr. Amer. ent. Soc., v. 21 p. 209 | 1896 *Oribatei*, Oudemans in: Tijdschr. Ent., v. 39 p. 53 | 1896 *Cryptostigmata*, Berlese, A. M. S., Crypt. II.

Acarina with bodies of various forms, those of the Imago oftenest more or less discoidal, hemispherical, pyriform, elliptical, oblong or fusiform, but these shapes are frequently broken by many irregularities. The bodies of the immature creatures oftenest of the above forms, but frequently extremely irregular. The cuticle of Imago usually fully chitinized and hard, occasionally leathery. The Cephalothorax and Abdomen are usually, but not invariably, divided by a transverse constriction between the second and third legs. Imago usually tracheate; tracheae simple and unbranched. Immature forms without tracheae. Stigmata, when existing, sunk in the acetabula of the coxae. No eyes. A pair of Pseudo-stigmata, each bearing a pseudo-stigmatic organ, on the dorsal surface of the Cephalothorax. Legs of five free joints, terminated by tridactyle or monodactyle unguis without sucker or caruncle. Maxillary palps of five free joints (rarely four). Mandibles chelate working perpendicularly, rarely non-chelate and serrated. Maxillary-lip (Hypostome) with dentate organs (Maxillae) working horizontally. Genital opening abdominal in both sexes. Not any external sexual dimorphism. Larvae and Nymphs with soft or leathery cuticle and monodactyle unguis.

The Oribatidae are never parasitic, they are vegetable feeders. They are usually oviparous, sometimes ovo-viviparous, rarely viviparous. The Larva (Lv.) emerges with three pairs of legs; it becomes a Nymph (Nph.) and acquires the fourth pair at the first ecdysis. The Nph. undergoes three ecdyses, at the third (the fourth if the larval ecdysis be included) it becomes an Imago (Im.). The Lv. and Nph. are usually totally unlike the Im., but

in the genera *Neoliodes*, *Nothrus* and *Hypochthonius* there is often a certain resemblance. Legs fitted for walking or crawling, except in the genus *Zetorchestes*, where the fourth pair are fitted for jumping. The Nph. often, and the Im. less frequently, carry on the dorsal surface of the Abdomen the abdominal portions of the dorsal skins cast at all prior ecdyses. they are usually carried concentrically; when they are present the age of the creature may be known by the number of cast skins. In some few species the external layer of the cuticle of the Im. (the epiostracum) is easily detached and is apt to be rubbed off, either wholly or more frequently partly, from the dorsal surface; it generally bears all the markings, so that when it is gone the cuticle of a rough species may appear smooth.

The anatomy of the Exoskeleton, so far as it is necessary for the identification of species and for understanding this work, may be very shortly summarized as follows. The Cephalothorax (Cephth.) and Abdomen (Abd.) are usually divided by a well-marked constriction or transverse line between the second and third legs; this demarcation however is lost in the 2 genera *Scutovertex* and *Amerus*, and almost lost in the one species *Tegeocranus vellatus*. The Cephth. of the Im. is usually firmly anchylosed to the Abd., but that of the immature creatures commonly has a slight motion upon it. In the one subfam. *Phthiracarinae* however the Cephth. of the Im. is moveably articulated to the Abd. and is capable of being folded downward so that its ventral surface then rests against the ventral surface of the Abd.

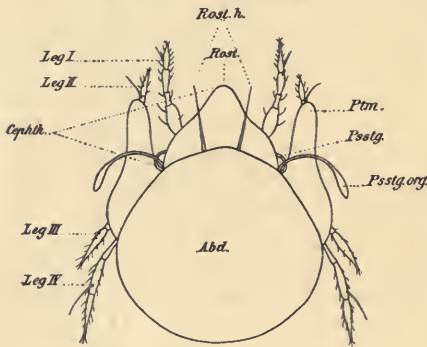


Fig. 1. *Oribata dorsalis* (<sup>50</sup>1).  
Dorsal surface.

The Cephalothorax (Cephth.) may be considered as divided into two parts; an anterior part or Rostrum (Rost.) and a posterior part. These are divided in many species by a transverse line, which may probably be the homologue of the cervical groove in Crustacea (Huxley, *Astacus*); in many other species however there is not any such line and it would then not be possible to fix a posterior limit to the Rost.

The Rostrum (Rost.) is usually a species of hood covering and protecting the Trophi, its sides are called the Genae and each Gena ends anteriorly in a small free point in some few species, which is useful in identification. The Rost. bears 2 curved hairs, called the Rostral hairs (Rost.hairs).

The hood of the Rost. in partly closed below by the articulated maxillary-lip (or Hypostome), it is formed by the coalesced bases of the maxillae, but the distal portions of the maxillae form large projecting organs springing from, but at right-angles to, the lip. These

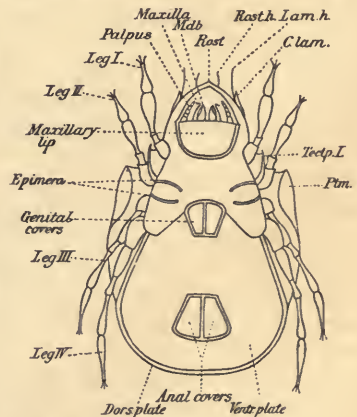


Fig. 2. *Oribata orbicularis* (<sup>55</sup>1).  
Ventral surface.

organs are curved and blade-like, and bear teeth on their anterior edges; they move horizontally and are highly developed in Hoploderma. The maxillary-lip bears the Palpi, which are very mobile, Dugès has called them „fusiform“; the basal joint is usually the shortest and the second the longest. In the Phthiracarinae there are only four joints, apparently from the coalescence of the second and third.

The Mandibles (Mdb.) are of two joints and chelate, the moveable arm of the chela is articulated below the prolonged and narrow anterior end of the first joint, and moves perpendicularly.

The posterior part of the Cepth. bears two outfoldings of the dorsal cuticle, which when well developed are large longitudinal blades usually standing nearly on edge; but they may be horizontal or nearly so; or they may be mere thickened ridges, or entirely absent; they are called the Lamellae (Lam.): they vary greatly in size and form. The two Lam. are frequently joined at or near their anterior ends by a transverse blade or ridge also formed by an out-folding of the dorsal cuticle which is called the Translamella (Trlam.). When the Lam. continue anteriorly beyond the Trlam. their lower edges are not joined to the dorsal cuticle, thus they form free points,

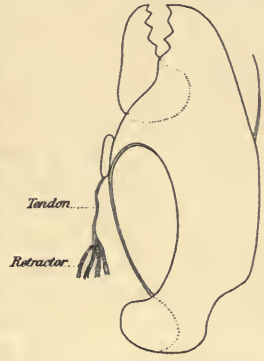


Fig. 3. *Oribata piriformis*. Mdb. (200 $\mu$ ).

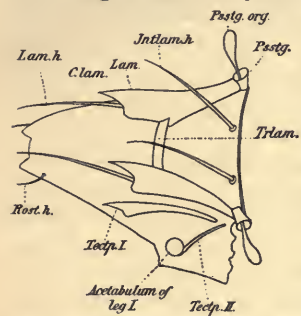


Fig. 4. *Oribata piriformis* (120 $\mu$ ). Cepth., dorsal and lateral surface,  $\frac{3}{4}$  view.

which may be very long; these are called the cusps of the Lamellae (C. lam.). The cusp often exists although there is not any Trlam. The cusp, or the Lam. itself if there be not any cusp, almost always bears at or near its anterior end a hair, usually long, which is called the Lamellar hair (Lam. hair). In species where there is not any Lam. these Lam. hairs generally persist, arising from that portion of the dorsal cuticle, which would be folded outward to form the anterior end of the Lam., if it existed. The portion of the dorsal surface of the Cepth. bounded by the Lam. laterally, the Trlam. anteriorly, and the Abd. posteriorly, is called the Dorso-vertex.

The „Tectum“ of Nicolet, and of many subsequent authors following him, is an imaginary organ which has not any existence in reality; although appearances are very deceptive in this respect; a few sections will at once convince any-one of the error. It was supposed to be a sort of chitinous shelf springing from the hinder part of the Cepth. where it adjoins the Abd. and over-hanging the whole or part of the Cepth., and either standing quite free or anchylosed to its surface; and this shelf was supposed to have upturned lateral edges called the „wings of the Tectum“. In comparing the writings of these writers with this book, or with the creatures, it must be remembered that where the Tectum is said to have wings these wings are the Lam., and the Tectum is the dorsal surface of the Cepth. itself, i. e. the Dorso-vertex, and the Trlam., when present. — Where the Tectum is said to be without wings it represents the Lam., which in these cases are usually large and horizontal.

At or near each outer posterior corner of the Dorso-vertex; and consequently close to the Abd. a very short chitinous tube directed upward,

or somewhat laterally, projects from the dorsal surface of the Cepth.; these two tubes look like stigmata and were formerly supposed to be so; they are now known as the Pseudostigmata (Psstg.), from each a hair-like or fleshy organ projects, known as the Pseudostigmatic organ (Psstg. org.) (Fig. 1, 4). The form of this organ varies greatly in different species, and is most useful in identification; the whole apparatus, which is peculiar to the Oribatidae and some few other Acari, is probably an organ of hearing.

From the Dorso-vertex, between the Psstg., and consequently between the Lam., arise a pair of hairs, often very large; these are the Interlamellar hairs (Intlam. hairs) (Fig. 4).

From the sides of the Cepth. certain blade-like longitudinal outfoldings of the article, not unlike the Lam., are frequently found; there are generally two or more on each side when they are present; they are sometimes prolonged anteriorly and form cusps; their office is to protect the two anterior pairs of legs, which can frequently be bent and placed so as to lie entirely in the deep cavities between these organs which are called Tectopedia (Tectp.) (Fig. 2, 4).

The Abdomen (Abd.) is usually much larger than the Cepth. its dorsal surface is generally wholly covered by a thick chitinous plate, which usually bends over a little and embraces the edge of the ventral plate. In the Oribatinae the anterior part of each lateral edge of this dorsal plate projects considerably beyond the ventral plate, forming a wing-like organ, more or less flexible, which is capable of slight movement from the action of the muscles of the Abd., not of any special muscles of its own. These wing-like processes are called the Pteromorphae (Ptm.) (Fig. 1, 2). — The genital and anal openings are large and placed in the median line of the ventral plate; each is closed by a pair of chitinous folding-doors, called in this treatise the genital covers and the anal covers. — The expulsory vesicles are two paired sacks in the Abd. of some Oribatidae and in certain other Acari („Excretionstaschen“), each of which discharge an excretory fluid to the exterior through a pore in the cuticle.

The legs are always of five free joints, which are called the coxa, femur, genual, tibia, and tarsus. In some cases the coxae and femora (or one of them) have a thin blade-like border on their lower edges. The tarsus is ended by a monodactyle (mond.) or tridactyle (trid.) unguis (ung.) without sucker or caruncle. The trid. ung. may be either homodactyle (homd.), with all three ung. similar, or heterodactyle (hetd.), with the central ung. different from the lateral ones. In one single known instance, i. e. the European specimens of *Nothrus anauniensis*, the lateral ung. on one side is abortive leaving a bidactyle (bid.), hetd. ung. The principal parts useful in the identification of species (in addition to the general shape and appearance) are the Psstg. org., the Lam., the Intlam. hairs, the Trlam., the Ptm., and the ung.

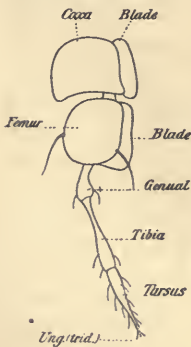


Fig. 5.  
*Oribata mollicoma*.  
Leg. 4. (1891).

Oribatidae have been found in all parts of the world, which have yet been searched for them; they vary extremely little in different countries the distribution being remarkably wide. No genera are known from Tropical America which are not known in Europe, and the species from Franz-Joseph-Land are either identical with, or closely allied

to some of those found in Central Europe. Their principal habitats are in moss, under bark of trees, on leaves of trees either growing or fallen, on lichens and fungi, and under stones. They are chiefly terrestrial but some are known which lead aquatic lives crawling on water-weeds, not swimming. One doubtful species has been described by Dujardin as marine, but it is not sufficiently described and possibly was not one of the Oribatidae at all.

This work only includes recent species; it would make but little difference as regards the Oribatidae if it were otherwise, as there are not any recorded species which have any claim to be considered fossil except four found in amber. The places, or strata in which the amber was found are not mentioned, but supposing it to have been true tertiary amber these creatures would of course belong to that period. The species are: *Oribates convexulus* C. L. Koch & Berendt, *Nothrus sulcatus* Karsch, *Nothrus kühli* Karsch, *Nothrus punctulum* Karsch. The descriptions are somewhat imperfect, indeed it would scarcely be possible that they should be otherwise with such minute creatures imbedded in amber.

In the localities given for the various species most of those in the Netherlands have been taken from Oudemans' „List of Dutch Acari“ (in: Tijdschr. Ent., 1896, v. 39 p. 53); and many of those in Sweden from: C. H. Andersen's „Bidrag till Kannedomen om Nordiska Acariden“ (in: Öf. v. Ak. Förh., 1863 (1864), v. 20 p. 181). It is doubtful whether the identification of species in these papers is quite reliable.

I regret having felt compelled to place so many of W. Banks' American species in the doubtful list, but that gentleman was unable to publish any illustrations, and the descriptions rely greatly upon Nicolet's erroneous anatomy, so that I do not think that it would be possible to identify the species from many of them; I understand however that the author proposes publishing illustrations of some at least of them which will probably remove the difficulty.

7 subfamilies, 20 good and 3 uncertain genera, 199 good and 115 doubtful species, 2 varieties.

Key to the subfamilies.

- |   |   |  |
|---|---|--|
| 1 | { | Abd. with chitinous wing-like expansions . . . . . A. Subfam. <b>Oribatinae</b> . . . . . p. 5 |
|   | { | Abd. without wing-like expansions ( <i>Apterogastera</i> ) — 2.                                |
|   | { | Cephth. anchylosed to Abd. Ventr. plate  |
|   |   | anchylosed to dors. plate — 3.   |
| 2 | { | Cephth. hinged to Abd. and folding down  |
|   |   | on its ventr. surface. Ventr. plate not  |
|   |   | anchylosed to dors. plate . . . . . G. Subfam. <b>Phthiracarinae</b> . p. 77                   |
| 3 | { | Mdb. rod-like, serrated, not chelate . . . . . B. Subfam. <b>Serrariinae</b> . . . . . p. 26   |
|   | { | Mdb. chelate — 4.  |
|   | { | Legs arranged first 3 pairs near together,   |
|   |   | pair 4 distant, jumping organs . . . . . C. Subfam. <b>Zetorchestinae</b> . p. 27              |
| 4 | { | Legs arranged first 2 pairs near together,   |
|   |   | last 2 pairs near together. Pair 4   |
|   |   | crawling organs — 5.   |
| 5 | { | With Lam. . . . . D. Subfam. <b>Notaspidinae</b> . p. 28                                       |
|   | { | Without Lam. — 6.  |
| 6 | { | Legs thin, much longer than body . . . . . E. Subfam. <b>Damaeinae</b> . . . . . p. 52         |
|   | { | Legs short and thick . . . . . F. Subfam. <b>Nothrinae</b> . . . . . p. 61                     |

## A. Subfam. Oribatinae

1884 *Pterogasterinae*, Michael, Brit. Orib., v. 1 p. 202 | 1885 Subfam. *Oribatidae*, Berlese in: Bull. Soc. ent. Ital., v. 17 p. 127 | 1891 *O.*, Canestrini in: Atti Ist. Veneto, ser. 7 v. 2 p. 717 | 1892 *Oribatinae*, Trouessart in: Rev. Sci. nat. Ouest, v. 2 p. 38\* | 1896 Fam. *Pterogasterinae*, Berlese, A. M. S., Crypt. II p. 61.

Abd. with chitinous wing-like expansions (*Pteromorphae*, *Ptm.*).

2 genera, 55 good and 19 doubtful species.

Key to the genera.

- 1 { Mdb. broad at base, suddenly becoming and continuing slender and rod-like, chelae small; Intlam. hair usually spatulate and horizontal . . . . . 1. Gen. **Pelops** . . . p. 6
- 2 { Mdb. thick and stout, not slender nor rod-like in any part; Intlam. hair usually setiform and erect . . . . . 2. Gen. **Oribata** . . . p. 9

### 1. Gen. **Pelops** C. L. Koch

1835 *Pelops* (Im.) + *Celaeno* (Nph.) (*part.*), C. L. Koch, C. M. A., fasc. 2, 3 | 1842 *P.* (Im.) + *C.* (Nph.) (*part.*), C. L. Koch, Übers. Arach., v. 3 p. 102, 108.

Mdb. broad at base, suddenly becoming stiliform, terminated by minute chelae. Intlam. hair usually large and spatulate and horizontal; usually inserted below a rectangular (square or oblong) projection of ant. margin of Abd. Ung. trid.

10 species.

Key to the species.



Fig. 6.

*P. fuliginosus*.  
Mdb. (<sup>300/1</sup>).

- With a rectangular projection from ant. margin of Abd. (Div. I. p. 6) — 2.
- 1 { Without any rectangular projection from ant. margin of Abd. (Div. II. p. 8) — 9.
- 2 { Dors. of Abd. and Ptm. deeply pitted — 3.  
Dors. of Abd. and Ptm. not pitted — 4.
- 3 { Almost the whole median line of Dors. of Abd. occupied by 2 shallow depressions . . . . . 5. *P. occultus* . . . p. 8  
No such depressions . . . . . 7. *P. torulosus* . . . p. 8
- 4 { Hairs on Abd. all setiform . . . . . 4. *P. fuliginosus* . . . p. 7  
Hairs on Abd. all or partly spatulate — 5.
- 5 { Spatulate hairs on Dors. of Abd. — 6.  
Spatulate hairs on actual post. margin only — 8.
- 6 { No true Lam., 4 rows of spatulate hairs on Dors. of Abd. — 7.  
Lam. well marked and meeting anteriorly, 2 rows only of spatulate hairs near lat. margin . . . . . 8. *P. uraceus* . . . p. 8
- 7 { Psstg. org. clavate . . . . . 1. *P. acromius* . . . p. 6  
Psstg. org. falciform . . . . . 3. *P. farinosus* . . . p. 7
- 8 { 2 pairs of spatulate hairs on post. margin . . . . . 6. *P. tardus* . . . p. 8  
1 pair of spatulate hairs on post. margin . . . . . 2. *P. auritus* . . . p. 7
- 9 { Intlam. hair large, broadly falciform; Dors. of Abd. smooth, very finely punctured; 8 or 10 hairs on post. margin not spatulate . . . . . 9. *P. glaber* . . . p. 8  
Intlam. hair small and fine; Dors. of Abd. coarsely pitted; 2 pairs of spatulate hairs on post. margin 10. *P. phaeonotus* . . . p. 9

#### Div. I.

Sp. 1—8. With a rectangular projection from ant. margin of Abd.

1. *P. acromius* (Herm.) 1804 *Notaspis acromios* (corr. *acromius*), Hermann, Mém. apt., p. 91 t. 4 f. 1 | 1855 *Pelops a.*, Nicolet in: Arch. Mus. Paris, v. 7 p. 425 t. 3 f. 1 | 1877 *P. a.*, Canestrini & Fanzago in: Atti Ist. Veneto, ser. 5 v. 4 p. 78 (var.?) | 1884 *P. a.*, Michael, Brit. Orib., v. 1 p. 208 t. 1 f. 1—12; t. 2 f. 13 | 1835 *Celaeno spinosa*, C. L. Koch, C. M. A., fasc. 3 t. 17 (Nph.).

Im. Black, nearly circular, broad posteriorly. Abd. large, broad posteriorly, flattish, rough, with irregular vermiform ridges. The ridges look

black but are secreted matter not present when the creature emerges. Cepth. bulbous posteriorly. Rost. pointed. Rost. hair fine. No true Lam. or Trlam. Psstg. hidden by ant. margin of Abd. Psstg. org. moderate length, gradually clavate, slightly recurved. Int. lam. hair very large, light, spatulate, horizontal, directed forward passing Rost. Tectp. 1 with free points. Ptm. short, rough, like Dors. of Abd. Ant. margin of Abd. has a square projection with undulating margin of 3 lobes. Dors. of Abd. has elliptical depressed, slightly convex space smooth and light. 4 rows of spatulate hairs on dors. of Abd. and a row of similar hairs round post. margin. Genital covers larger than anal. — Nph. Red-brown, or yellow-brown. Cepth. yellow, hairs white. Pyriform, Rost. narrow: Cepth. divided into spaces by regular raised ridges. Psstg. org. almost globular on short peduncles. Intlam. hair thick, slightly spatulate. Abd. has lateral portions raised, central area slightly convex; covered by irregular wavy soft ridges running backward and inward on lateral, and transversely on central area; a row of large, curved, spatulate hairs round margin. — Lv. like Nph., but has only 2 pairs of the marginal hairs. — Im. L. ca. 650  $\mu$ .

On Oak and white thorn trees and among fir needles and elsewhere. Algeria, England, France, Germany, Italy, Netherlands, Switzerland.

2. **P. auritus** C. L. Koch 1840 *P. a.*, C. L. Koch, C. M. A., fasc. 30 t. 11.

Im. Blackish-brown. Intlam. hair awl-shaped. Psstg. org. fusiform. A square projection from ant. margin of Abd. 2 thick clavate hairs on post. margin directed straight backward. No others on Abd. Abd. as broad as long. L. „mittelgross“.

In moss on trees. Germany.

3. **P. farinosus** Nic. 1855 *P. f.*, Nicolet in: Arch. Mus. Paris, v. 7 p. 425 t. 3 f. 2 | 1884 *P. f.*, Michael, Brit. Orib., v. 1 p. 212 t. 1 f. 13.

Very like *P. acromius*, but smaller and with Psstg. org. falciform instead of clavate, secreted ridges often remain white instead of turning black. — Im. L. ca. 550  $\mu$ .

England, France. Probably same distribution as *P. acromius*.

4. **P. fuliginosus** C. L. Koch\*) 1835 *Celaeno plicata*, C. L. Koch, C. M. A., fasc. 3 t. 18 (Nph.!) | 1840 *Pelops acromios* (non *Notaspis acromios* Hermann 1804!), C. L. Koch, C. M. A., fasc. 30 t. 9 | 1844 *Oribata a.*, Gervais in: Walckenaer, Ins. Apt., v. 3 p. 258 | 1840 *Pelops fuliginosus*, C. L. Koch, C. M. A., fasc. 30 t. 10 | ?1844 *Pelops hirsutus*, C. L. Koch, C. M. A., fasc. 38 t. 15 | 1855 *P. laevigatus*, Nicolet in: Arch. Mus. Paris, v. 7 p. 426 t. 3 f. 3 | 1884 *P. l.*, Michael, Brit. Orib., v. 1 p. 213 t. 2 f. 1—7 | ?1882 *P. sculptus*, Haupt in: Ber. Ges. Bamberg, v. 12 p. 29.

Im. Black, dull, smooth but not polished; shortly after emerging Dors. of Abd. becomes coated with white secretion which splits irregularly all over and sometimes rubs off. Rost. sharp. Intlam. hair as in *P. acromius*. Psstg. org. like Intlam. hair in form but smaller, Abd. almost circular,

\*) According to the synonyma enumerated above by the author and in accordance with the „Regeln für die wissenschaftl. Benennung der Thiere“ (§ 2a: „Namen, welche nur auf einem unentwickelten Zustand . . . basieren, sind zulässig, falls die Kennzeichnung zur Wiedererkennung der betreffenden systematischen Einheit ausreicht.“) the name of this species is **P. plicatus** (C. L. Koch). The Editors.

I am not able to agree in this opinion. As the immature forms of the Oribatidae are usually wholly unlike the Imagines I do not think that specific names founded upon them are permissible under the rules referred to, and they are expressly forbidden by the rules of nomenclature of the zoological congress at Moscow. The Author.

slightly narrowed anteriorly. Ptm. longish with straight ant. margin. Central projection of ant. margin of Abd. broad, tri-lobed. No clear depressed space on Dors. of Abd. 4 rows of fine hairs on Dors. of Abd., some of those on post. margin thicker. — Nph. Red or yellow, legs darker, hairs whitish; somewhat like Nph. of *P. acromius*, but hairs at sides of Abd. thick but not spatulate. 2 very long hairs on post. margin. — Im. L. ca. 550  $\mu$ .

In fir-woods, moss etc. England, France, Germany, ?Netherlands.

5. ***P. occultus*** C. L. Koch, Nic. 1835 *P. o.*, C. L. Koch, C. M. A., fasc. 2 t. 15 | 1855 *P. o.*, Nicolet in: Arch. Mus. Paris, v. 7 p. 427 t. 3 f. 5 | 1887 *P. o.*, Berlese, A. M. S., fasc. 35 nr. 4.

Im. Dark brown, coarsely punctured, Psstg. org. with thin peduncle and clavate-fusiform hairy head (Berlese draws, them hairy but describes them as „nudis“). A square projection from ant. margin of Abd. with almost whole median line occupied by 2 shallow depressions of equal width each bordered by a ridge; post. depression oblong, more than twice as long as ant., which is oval. Abd. hairless. L. 430  $\mu$ .

France, Germany, Italy.

6. ***P. tardus*** C. L. Koch 1835 *P. t.*, C. L. Koch, C. M. A., fasc. 2 t. 16 | 1884 *P. auritus*, Berlese, A. M. S., fasc. 15 nr. 8.

Im. Very black, rough. Square projection of ant. margin of Abd. present. Intlam. hair spatulate. Psstg. org. with thin peduncle and fusiform hairy head. Abd. smooth but usually covered with secretion in irregular undulations. No hairs on Dors. of Abd. 2 pairs of spatulate hairs on post. margin, the inner pair curved inward, the outer outward. Abd. a very short ellipse. L. ca. 500  $\mu$  (350  $\mu$  in Berlese, A. M. S., Crypt. II p. 68).

In moss. Germany, Italy.

7. ***P. torulosus*** C. L. Koch 1840 *P. t.*, C. L. Koch, C. M. A., fasc. 30 t. 13 | 1877 *P. t.*, Canestrini & Fanzago in: Atti Ist. Veneto, ser. 5 v. 4 p. 79 | 1896 *P. t.*, Berlese, A. M. S., Crypt. II p. 68 | 1855 *P. variolosus*, Nicolet in: Arch. Mus. Paris, v. 7 p. 427 t. 3 f. 4.

Im. Black. Psstg. org. clavate. Abd. deeply pitted; pits large, close together, irregular in shape; those on Ptm. smaller than those on Dors. of Abd. Square projection from ant. margin of Abd. narrow, white. 3 pairs of clavate hairs on post. margin caducent. L. 500  $\mu$ .

France, Germany, Italy.

8. ***P. uraceus*** C. L. Koch 1840 *P. u.*, C. L. Koch, C. M. A., fasc. 30 t. 12 | 1884 *P. u.*, Berlese, A. M. S., fasc. 15 nr. 7.

Im. Yellow-brown, roughish, strongly punctured. Lam. blades on edge, touching anteriorly. Intlam. hair large fusiform. Psstg. org. long, with thin peduncle and clavate, subfusiform head. Square projection of ant. margin of Abd. large. Abd. long-shaped narrow, much narrowed and truncated anteriorly; rounded posteriorly. A clear smooth oval space near ant. margin of Abd. 1 pair of clavate hairs on hind margin curving outward; 2 pairs on Dors. of Abd. near lat. margin and 1 near post. margin, their ends projecting between the pair on the actual margin. L. ca. 500  $\mu$ .

On bushes, moss etc. Germany, Italy, Switzerland.

## Div. II.

**Sp. 9, 10.** Without any rectangular projection from ant. margin of Abd.

9. ***P. glaber*** G. & R. Can. 1882 *P. g.*, G. & R. Canestrini in: Atti Ist. Veneto, ser. 5 v. 8 p. 915 | 1895 *P. g.*, Berlese, A. M. S., fasc. 74 nr. 2.



Im. Reddish-brown, smooth, very finely punctured. Resembles *P. fuliginus*, but no hairs on Dors. of Abd. 8 or 10 round hind margin; a small elliptical space of thin, light-colored polished chitin in median line not far from ant. margin of Abd. No square chitinous projection from ant. margin of Abd. Psstg. org. moderately clavate. L. 700—850  $\mu$ .

Italy.

10. ***P. phaeonotus*** C. L. Koch 1844 *P. p.*, C. L. Koch, C. M. A., fasc. 39 t. 23 | 1877 *P. p.*, Canestrini & Fanzago in: Atti Ist. Veneto, ser. 5 v. 4 p. 80 | 1884 *P. p.*, Michael, Brit. Orib., v. 1 p. 216 t. 2 f. 8—12 | 1887 *P. p.*, Berlese, A. M. S., fasc. 35 nr. 3.

Im. Red-brown or black. No secreted matter. Shape pyriform, very narrow anteriorly. Lam. large; C. lam. nearly reaching tip of Rost. Psstg. org. clavate, rather long; Psstg. sunk in deep depressions. Intlam. hair small and fine. Abd. bordered by thin edge but without square projection from ant. margin of Abd. Ptm. attached by anterior part of their edges only. Dors. of Abd. with depressed, oval, smooth, light space as in *P. acromius*; rest of Dors. of Abd. with depressed areolations, no hairs on it, 2 pairs of spatulate hairs on post. margin. L. ca. 450  $\mu$ .

In moss. England, Germany, Italy.

## 2. Gen. *Oribata* Latr.

1802 *Oribata*, Latreille in: Buffon, Hist. nat., ed. Sonnini, Ins. v. 3 p. 65 | 1803 *O.*, Latreille in: Nouv. Dict., v. 16 p. 349 | 1811 *O.*, Olivier in: Enc. méth., Art. Oribate | 1855 *O.*, Nicolet in: Arch. Mus. Paris, v. 7 p. 427 | 1859 *O.*, Grube in: Arch. Dorpat. Ges., ser. 2 v. 1 p. 417 | 1884 *O.*, Michael, Brit. Orib., v. 1 p. 218 | 1891 *O.*, Canestrini in: Atti Ist. Veneto, ser. 7 v. 2 p. 579 | 1892 *O.*, Trouessart in: Rev. Sci. nat. Ouest, v. 2 p. 48 | 1826 *Oribata* + *Galumna*, Heyden in: Isis, p. 612 | 1834 *Oribates*, Dugès in: Ann. Sci. nat., ser. 2 v. 1 p. 21 | 1877 *O.*, Canestrini & Fanzago in: Atti Ist. Veneto, ser. 5 v. 4 p. 81 | 1885 *O.*, Canestrini, Prosp. Acarof., v. 1 p. 6 | 1885 *O.* (*O.* + *Achipteria* + *Sphaerozetes*), Berlese in: Bull. Soc. ent. Ital., v. 17 p. 127, 128 | 1896 *O.*, Berlese, A. M. S., fasc. 74 nr. 7 | 1835 *Oribates* + *Zetes* (part.) + *Murcia* (Nph.) (part.), C. L. Koch, C. M. A., fasc. 2 etc. | 1895 *Oribata* + *Oribatella* + *Oribatodes*, Banks in: Tr. Amer. ent. Soc., v. 22 p. 5, 8, 10.

Mdb. of the form usual in the family (Fig. 3). Intlam. hair never spatulate.

45 good and 19 doubtful species.

Key to the good species.

- |   |   |   |                                       |
|---|---|---|---------------------------------------|
| 1 | { | Ung. trid. (Div. I. p. 12) — 2.   |                                       |
|   | { | Ung. mond. (Div. II., Gen. <i>Oribatodes</i> Banks, p. 23) — 40.  |                                       |
| 2 | { | Having a Trlam. (Subdiv. Ia. p. 12) — 3.  |                                       |
|   | { | Without any Trlam. (Subdiv. Ib. p. 18) — 21.  |                                       |
| 3 | { | Trlam. a blade on edge — 4.   |                                       |
|   | { | Trlam. a mere line — 10.  |                                       |
| 4 | { | Lam. hair, Intlam. hair and Rost. hairs setiform or absent — 5.   |                                       |
|   | { | Lam. hair, Intlam. hair and Rost. hairs pectinated — 8.   |                                       |
| 5 | { | Ptm. normal, truncated anteriorly, running posteriorly to about middle of Dors. of Abd. — 6.                              |                                       |
|   | { | Ptm. projecting forward forming a point of moderate length, but only running a short distance posteriorly. — L. 800 $\mu$ | 6. <i>O. gilvipes</i> . . . . . p. 13 |
| 6 | { | Psstg. org. fusiform, horizontal, directed forward. — L. 400 $\mu$ . . . . .  | 16. <i>O. punctum</i> . . . . . p. 16 |
|   | { | Psstg. org. clavate — 7.  |                                       |

- 7 { Abd. round. — L. 650  $\mu$  . . . . . 13. *O. orbicularis* . . . . . p. 15  
 { Abd. pyriform. — L. 650  $\mu$  . . . . . 15. *O. piriformis* . . . . . p. 16
- 8 { Dors. of Abd. bearing a series of long hairs  
 near margin — 9.  
 { Dors. of Abd. hairless. — L. 450  $\mu$  . . . . . 17. *O. rubens* . . . . . p. 17
- 9 { C. lam. truncated; Lam. hair set in middle  
 of ant. truncated edge. — L. 630  $\mu$  . . . . . 5. *O. fuscipes* . . . . . p. 13  
 { C. lam. long and pointed; Lam. hairs springing  
 from a shoulder near base. — L. 540  $\mu$  . . . . . 18. *O. setosa* . . . . . p. 17
- 10 { Dors. of Abd. hairless — 11.  
 { Dors. of Abd. bearing hairs — 18.
- 11 { Ptm. strap-like; aquatic. — L. 320  $\mu$  . . . . . 19. *O. sphagni* . . . . . p. 17  
 { Ptm. normal; terrestrial — 12.
- 12 { Psstg. org. clavate — 13.  
 { Psstg. org. setiform or rod-like — 17.
- 13 { Lam. hair and Intlam. hair setiform — 14.  
 { Lam. hair and Intlam. hair pectinated. —  
 L. 500  $\mu$  . . . . . 3. *O. depauperata* . . . . . p. 13
- 14 { Femur of leg 2 greatly enlarged at distal  
 end. — L. 500  $\mu$  . . . . . 14. *O. pallidula* . . . . . p. 16  
 { Femur of leg 2 normal — 15.
- 15 { Ptm. very small, confined to quite the ant.  
 part of Abd., Psstg. org. pointed  
 anteriorly. — L. 1 mm . . . . . 11. *O. microptera* . . . . . p. 15  
 { Ptm. normal; Psstg. org. rounded anteriorly — 16.
- 16 { Rost. slender; C. lam. long; legs long; no  
 light patch on Dors. of Abd. — L. 480  $\mu$  . . . . . 8. *O. gracilis* . . . . . p. 14  
 { Rost. obtuse; C. lam. short; legs moderate;  
 light patches on Dors. of Abd. — L. 800  $\mu$  . . . . . 9. *O. lapidaria* . . . . . p. 14
- 17 { Abd. globular; Psstg. org. rod-like. —  
 L. 1.05 mm . . . . . 7. *O. globula* . . . . . p. 14  
 { Abd. long, truncated posteriorly. Psstg. org.  
 setiform. — L. 1.13 mm . . . . . 2. *O. clypeata* . . . . . p. 12
- 18 { Hairs on Dors. of Abd. very long — 19.  
 { Hairs on Dors. of Abd. short and fine — 20.
- 19 { Lam. nearly as long as Rost.; Femur 1, 2,  
 with blades; leg 4 hardly passes post.  
 end of Abd. — L. 500  $\mu$  . . . . . 12. *O. mollicoma* . . . . . p. 15  
 { Lam. much shorter than Rost.; Femur 1, 2,  
 without blades; whole Tarsus of leg 4  
 passing post. end of Abd. — L. 750  $\mu$  . . . . . 4. *O. edwardsi* . . . . . p. 13
- 20 { Rost. hairs, Lam. hair and Intlam. hair  
 serrated. — L. 700  $\mu$  . . . . . 1. *O. antarctica* . . . . . p. 12  
 { Rost. hairs, Lam. hair and Intlam. hair  
 setiform. — L. 600  $\mu$  . . . . . 10. *O. lucens* . . . . . p. 15
- 21 { Lam. large, horizontal, attached by post.  
 edge only, the 2 near together, only a  
 narrow cleft between. (Sect. Ib 1. Gen.  
*Oribatella*, Banks) — 22.  
 { Lam. normal on absent (Sect. Ib 2) — 29.
- 22 { Ptm. truncated anteriorly, not projecting  
 forward beyond ant. margin of Abd. — 23.  
 { Ptm. projecting forward nearly to tip of  
 Rost. — 28.

- 23 { Lam. deeply excavated anteriorly so as to end in 2 long free points of about equal length — 24.  
Lam. truncated anteriorly — 27.
- 24 { Dors. of Abd. with a row of hairs near margin; terrestrial — 25.  
Dors. of Abd. hairless; aquatic. — L. 550  $\mu$  21. *O. aquatica* . . . . . p. 18
- 25 { Ptm. reticulate with a dentate ant. margin. — L. 600  $\mu$  . . . . . 26. *O. quadridentata* . . . . . p. 19  
Ptm. not reticulate nor with dentate margin — 26.
- 26 { Psstg. org. clavate; hairs round Dors. of Abd. about 12. — L. 580  $\mu$  . . . . . 25. *O. quadricornuta* . . . . . p. 19  
Psstg. org., setiform, strongly curved toward median line; hairs round Dors. of Abd. about 18. — L. 450  $\mu$  . . . . . 22. *O. berlesei* . . . . . p. 18
- 27 { Outer lat. edge of Lam. strongly and irregularly dentate. — L. 390  $\mu$  . . . . . 20. *O. americana* . . . . . p. 18  
Outer lat. edge of Lam. plain. — L. 210  $\mu$  27. *O. tecta* . . . . . p. 20
- 28 { Dors. of Abd. with transverse furrows. — L. 420  $\mu$  . . . . . 23. *O. languida* . . . . . p. 18  
Dors. of Abd. without transverse furrows. — L. 650  $\mu$  . . . . . 24. *O. ovalis* . . . . . p. 19
- 29 { Ptm. projecting forward nearly to tip of Rost. — 30.  
Ptm. truncated anteriorly not projecting beyond ant. margin of Abd. — 34.
- 30 { Projection of Ptm. pointed anteriorly. — L. 520  $\mu$  . . . . . 35. *O. intermedia* . . . . . p. 21  
Projection of Ptm. rounded anteriorly — 31.
- 31 { Abd. with 2 large chitinous points projecting from centre of hind margin — L. 650  $\mu$  37. *O. mucronata* . . . . . p. 22  
Abd. without such points — 32.
- 32 { Psstg. org. short clavate. — L. 600  $\mu$  . . . . . 29. *O. alata* . . . . . p. 20  
Psstg. org. with long slender recurved peduncle and fusiform head — 33.
- 33 { Dors. of Abd. with fine longitudinal wrinkles. — L. 850  $\mu$  . . . . . 39. *O. rugifrons* . . . . . p. 22  
Dors. of Abd. plain. — L. 700  $\mu$  . . . . . 33. *O. dorsalis* . . . . . p. 21
- 34 { Dors. of Abd. hairless — 35.  
Dors. of Abd. bearing conspicuous hairs — 39.
- 35 { Abd. and Cepth. plainly divided — 36.  
No demarcation between Abd. and Cepth. — L. 900  $\mu$  . . . . . 31. *O. centro-americana* . . . . . p. 21
- 36 { Lam. hair strongly serrated and nearly twice as long as Cepth. Intlam. hair sharply recurved. — L. 430  $\mu$  . . . . . 28. *O. agilis* . . . . . p. 20  
Lam. hair. simple, setiform; Intlam. hair not recurved — 37.
- 37 { Lam. much shorter than Rost. — 38.  
Lam. nearly as long as Rost.; Psstg. org. fusiform, horizontal, directed forward. — L. 320  $\mu$  . . . . . 30. *O. avenifera* . . . . . p. 20
- 38 { Psstg. org. short, clavate, pointed anteriorly, directed forward. — L. 350  $\mu$  . . . . . 32. *O. cuspidata* . . . . . p. 21  
Psstg. org. long, recurved, with slender peduncle and fusiform head. — L. 600  $\mu$  36. *O. lucasi* . . . . . p. 22

- |    |   |   |   |
|----|---|---|---|
| 39 | { | 2 longitudinal rows of hook-shaped hairs on Dors. of Abd. and a bordering row; Psstg. org. with short peduncle and almost globular head. — L. 440 $\mu$ . . . . . | 34. <i>O. halleri</i> . . . . . p. 21     |
|    |   | 4 longitudinal rows of ordinary hairs on Dors. of Abd. and a bordering row, Psstg. org. with long peduncle and recurved fusiform head. — L. 450 $\mu$ . . . . .   | 38. <i>O. peloptoides</i> . . . . . p. 22 |
| 40 | { | Dors. of Abd. bearing hairs — 41.   |   |
|    |   | Dors. of Abd. hairless — 43.  |   |
| 41 | { | Ptm. joined anteriorly by a chitinous bridge; a crescentic indentation in centre of post. margin, C. lam. horizontal, truncated. — L. 500 $\mu$ . . . . .         | 45. <i>O. rileyi</i> . . . . . p. 24      |
|    |   | Ptm. not joined; no indentation of post. margin; C. lam. vertical, pointed — 42.  |   |
| 42 | { | Dors. of Abd. with an irregular network of ridges; hairs on Dors. of Abd. long, stiff, serrated, on post. margin clavate. — L. 500 $\mu$ . . . . .                | 42. <i>O. mirabilis</i> . . . . . p. 23   |
|    |   | Dors. of Abd. smooth; hairs on the same short and simple, on post. margin setiform. — L. 420 $\mu$ . . . . .  | 44. <i>O. parmeliae</i> . . . . . p. 23   |
| 43 | { | Psstg. org. short sessile, fusiform, directed horizontally forward. — L. 300 $\mu$ . . . . .  | 41. <i>O. fusigera</i> . . . . . p. 23    |
|    |   | Psstg. org. long, recurved — 44.  |   |
| 44 | { | Psstg. org. pectinated along distal part of ant. (outer) edge. — L. 390 $\mu$ . . . . .   | 43. <i>O. monodactyla</i> . . . . . p. 23 |
|    |   | Psstg. org. not pectinated. — L. 600 $\mu$ . . . . .  | 40. <i>O. dentata</i> . . . . . p. 23     |

#### Div. I. Sp. 1—39. Ung. trid.

##### Subdiv. Ia. Sp. 1—19. Having a Trlam.

1. *O. antarctica* Michael 1895 *O. a.*, Michael in: Mt. Mus. Hamburg, v. 12 p. 71 textf.

Im. Very like *O. gracilis* but not identical, smooth, not quite so slender as *O. gracilis* nor legs quite so long. Lam. blades, much wider anteriorly than posteriorly. C. lam. very long, standing quite free. Rost. hairs, Lam. hair and Intlam. hair serrated. Psstg. org. with very short peduncle and small, almost globular head. Legs of medium length, femora of legs 3 and 4 with blades. Ung. trid. Tectp. 1 with long free points. Ant. margin of Abd. convex in centre concave at sides. A few very fine hairs on Dors. of Abd. L. ca. 700  $\mu$ .

South Georgia (Antarctic Ocean).

2. *O. clypeata* Nic. 1855 *O. c.*, Nicolet in: Arch. Mus. Paris, v. 7 p. 437 t. 5 f. 7.

Im. Black, highly polished, legs brown. Lam. blades on edge, slightly undulated; C. lam. very long. Trlam. a mere line strongly concave forward. Tectp. 1 forming long free point anteriorly, bearing a hair. Psstg. org. setiform, long. Abd. hairless broadest in centre, narrowed anteriorly and posteriorly but much more suddenly posteriorly; hind margin truncated and much narrower than ant. margin of Abd., which is sinuated, convex forward in centre, concave posteriorly. Ung. trid. L. 1.13 mm.

Under stones. France.

3. **O. depauperata** Berl. 1887 *Oribates depauperatus*, Berlese, A.M.S., fasc. 35 nr. 6 | ?1895 *O. pusillus*, Berlese, A.M.S., fasc. 77 nr. 3.

Im. Smoky-brown to chestnut; polished Cephth. short. Lam. shortish blades on edge; Lam. hair springs from lower corner of Lam. C. lam. rather long, tooth-like; Tectp. I with long free point. Rost. hairs minute. Lam. hair, Intlam. hair and a nearly terminal hair on Tectp. I. pectinated. Psstg. org. shortish, strongly clavate, setose. Abd. a very short ellipse, sub-spherical, hairless. Genua and Tibia 1. 2. each with one strong spine. Ung. trid. L. ca. 500  $\mu$ .

In moss. Italy.

4. **O. edwardsi** Nic. 1855 *O. Edwardsii*, Nicolet in: Arch. Mus. Paris, v. 7 p. 438 t. 5 f. 5 | 1884 *O. E.*, Michael, Brit. Orib., v. 1 p. 229 t. 4 f. 10—17 | 1887 *Oribates E.*, Berlese, A.M.S., fasc. 43 nr. 5.

Im. Dark brown, dull, Dors. of Abd. punctured. Cephth. large; Rost. obtuse; Lam. very short blades on edge, not half the length of Cephth.; no C. lam. Lam. hair large, setiform. Psstg. org. moderate length, clavate, sometimes recurved. Legs long and thin, no blades to front legs; Ung. large, central one very thick. Dors. of Abd. not much arched. Ptm. not running for back; a row of large, flexible hairs of various lengths round Dors. of Abd. and 2 short rows near centre of same. L. ca. 750  $\mu$ .

England, France, Italy.

5. **O. fuscipes** C. L. Koch\*) 1835 *Zetes ephippiatus*, C. L. Koch, C. M. A., fasc. 3 t. 7 (Nph.!) | 1836 *Oribates fuscipes*, C. L. Koch, C. M. A., fasc. 6 t. 8 | 1884 *Oribata f.*, Michael, Brit. Orib., v. 1 p. 241 t. 7 f. 1, 2 | ?1895 *Oribatella bidentata*, Banks in: Tr. Amer. ent. Soc., v. 22 p. 8.

Im. Dark red-brown, highly polished. Cephth. much narrower than Abd. Lam. large, their ant. portions almost horizontal, not on edge. C. lam. long, truncated, horizontal. Lam. hair long, curved, serrated; springing from centre of truncated edge of C. lam. Trlam. a short wide blade nearly horizontal; a strong pectinated hair on each gena the 2 hairs nearly meet. Psstg. org. long, almost upright, thin, rough, slightly thickened toward ends. Intlam. hair serrated. Femora of first 2 pairs of legs with broad blades; in pair 2 produced forward forming a large obtuse point. Abd. a very long ellipse. Ant. margin of Abd. rounded; a row of fine sparse hairs near margin; a few others. Ptm. fade into Dors. of Abd. posteriorly without clear demarcation. — Nph. Yellowish-red or tawny; internal organs show as patches of dark color. Cephth. short, much narrower than Abd. Psstg. org. long, filiform, doubly curved. Intlam. and Rost. hairs setiform. Abd. broad, shield-shaped. Dors. of Abd. arched, with fine granulations, but no hairs except at post. margin. — Im. L. ca. 630  $\mu$ .

In moss. England, Germany, ?New York State America.

6. **O. gilvipes** C. L. Koch 1840 *Oribates g.*, C. L. Koch, C. M. A., fasc. 30 t. 14.

Im. Black, polished. Lam. broad, undulated, slightly convex inward, approaching very near each other anteriorly. C. lam. very long, nearly reaching tip of Rost. horizontal, near together. Trlam. short but

\*) According to the synonyma enumerated above by the author and in accordance with the „Regeln für die wissensch. Benennung der Thiere“ the name of this species is: **O. ephippiata** (C. L. Koch). The Editors.

See my note p. 7. The Author.

strong. Psstg. org. long, filiform. Rost. rather trifid at tip. Abd. obovale, broad, arched, hairless. Ptm. only reaching a very short distance posteriorly, about to insertion of leg 3, but prolonged anteriorly, forming a pointed horizontal blade light in color. Ung. trid. L. ca. 800  $\mu$ \*).

In woods. Germany, Sweden.

7. *O. globula* Nic. 1855 *O. g.*, Nicolet in: Arch. Mus. Paris, v. 7 p. 439 t. 5 f. 1 | 1884 *O. g.*, Michael, Brit. Orib., v. 1 p. 234 t. 5 f. 6—12 | 1887 *Oribates globulus*, Berlese, A. M. S., fasc. 43 nr. 6.

Im. Very black, highly polished, globular. Cepth. short, broad; Lam. narrow blades on edge; C. lam. rather long, slightly truncated; each bears a spine; Trlam. a thickened line. Psstg. org. long, filiform. Dors. of Abd. much arched, no hairs on it; ant. margin of Abd. strongly sinuated; post. margin truncated. — Nph. very like that of *O. alata*. Color varies, reddish pink, straw-color, or olive green; internal organs often shew as dark patches. Cepth. small, very little of it except Rost. seen. Psstg. org. longish, recurved, with slightly lanceolate ends. Abd. globular, Dors. of Abd. polished semi-transparent, without hairs. — Im. L. ca. 1.05 mm.

On lichens and mosses. Algeria, England, France, Germany, Italy.

8. *O. gracilis* Michael 1884 *O. g.*, Michael, Brit. Orib., v. 1 p. 225 t. 3 f. 9, 10 | 1895 *Oribates g.*, Berlese, A. M. S., fasc. 74 nr. 6.

Im. Bright brown, highly polished. Cepth. long, slender, very pointed; Dorso-vertex triangular, narrow anteriorly; Lam. blades on edge, C. lam. long blunt-pointed, standing upward and forward, and with strong hair at point; Tectp. 1 produced to sharp point bearing pectinated hair. Psstg. org. straight, long, moderately clavate. Legs long, slender, hind Femora flattened, with blades. Ant. margin of Abd. strongly undulated. Ptm. reaching far back. No hairs on Dors. of Abd. Nph. Cepth. legs and a large plate on Dors. of Abd. dull brown; remainder of Dors. of Abd. ochre-yellow or greenish. 2 pairs of rostral hairs; Psstg. org. longer and less clavate than in Im. legs shortish, Tibia of front pair enlarged at distal end. Central and post. parts of Dors. of Abd. covered by a coarsely-punctured chitinous plate. The ant. part bears 3 transverse rows of small chitinous sclerites of various forms; a stout hair on each antero-lateral angle of Abd., none on Dors. of Abd. — Im. L. ca. 480  $\mu$ .

In moss on trees. England, Italy. Rare.

9. *O. lapidaria* H. Luc.\*\*) 1841 *Murcia rubra*, C. L. Koch, C. M. A., fasc. 31 t. 30 (Nph.!) | 1849 *Oribata lapidaria*, H. Lucas in: Expl. Algérie, An. artic., p. 318 t. 22 f. 11 | 1855 *O. l.*, Nicolet in: Arch. Mus. Paris, v. 7 p. 437 t. 5 f. 6 | 1884 *O. l.*, Michael, Brit. Orib., v. 1 p. 230 t. 5 f. 1—5 | 1883 *Oribates humeralis* (non Hermann nec C. L. Koch), Berlese, A. M. S., fasc. 3 t. 4.

Im. Dark rich brown, a large patch on Abd. near ant. margin of Abd. and some smaller spots lighter; whole creature usually polished. Genae shew anteriorly as small cusps. Cepth. short wide; Dorso-vertex wide anteriorly, C. lam. very short; Tectp. 1 produced to a long point. Psstg. org. short, clavate, Intlam. hair very long. Apodemata not reaching

\*) Description supplemented from the present author's specimens.

\*\*\*) According to the synonyma enumerated above by the author and in accordance with the „Regeln für die wissenschaftl. Benennung der Thiere“ the name of this species is: *O. rubra* (C. L. Koch). The Editors.

See my note p. 7. The Author.

more than half across sternal plate. Abd. broad much arched, ant. margin of Abd. strongly sinuated. Post. margin very round; genital and anal covers far apart, former much the smaller. — Nph. Orange-red or dark pink, diamond-shaped. Cepth. not above  $\frac{1}{5}$  of entire length, a constriction in front of Psstg. Psstg. org. globular heads on short peduncles. Abd. flat and diamond-shaped when young, more convex and rounded lateral. 2 dark red spots on ant. margin of Abd. with whitish space between; spots joined by a red line; a band of about 6 black clavate hairs a little behind red line; hinder part of Dors. of Abd. mostly covered by a flask-shaped patch darker and thicker than rest of Dors. of Abd. and strongly dotted, broader part forward. Crimson expulsive vesicles at sides of patch. — Im. L. ca. 800  $\mu$ .

In moss and on bark of trees. Algeria, England, France, Germany, Netherlands.

10. *O. lucens* L. Koch 1879 *O. l.*, L. Koch in: Svenska Ak. Handl., v. 16 nr. 5 p. 115 t. 4 f. 2 | ?1879 *Oppia oblonga*, L. Koch, ibid., p. 118 t. 4 f. 6 | ?1879 *Claviceps bimaculatus*, L. Koch, ibid., p. 135 t. 7 f. 9. (Nph.)

Im. Black, very like *O. lapidaria* but Dors. of Abd. said to be strewn with short, fine white hairs distant from each other about their own length; and not quite so wide as *O. lapidaria*. L. 600  $\mu$ —? 1 mm.

Siberia (Yeniseisk), Novaya Zemlya.

11. *O. microptera* Can. 1896 *O. m.*, Canestrini in: Bull. Soc. Veneto-Trent., v. 6 nr. 2 p. 90 | 1897 *O. m.*, Canestrini in: Atti Soc. Veneto-Trent., ser. 2 v. 3 p. 149 t. 4.

Im. Dark-brown, legs and Ptm. yellowish. Very like *O. globula*, but Abd. not truncated posteriorly. Psstg. org. more clavate with pointed distal end. Ptm. small, narrow, confined to ant. part of Abd. Ung. trid. L. ca. 1 mm.

Bolivia.

12. *O. mollicoma* C. L. Koch 1840 *Oribates mollicomus*, C. L. Koch, C. M. A., fasc. 30 t. 20 | 1884 *Oribata m.*, Michael; Brit. Orib., v. 1 p. 227 t. 4 f. 1—9.

Im. Black, legs and a patch on Dors. of Abd. red-brown. Dull but not areolated. Rost. blunt; Dors. vertex little narrowed anteriorly, Lam. narrow blades on edge, nearly as long as Rost. Trlam. a line, far forward. C. lam. pointed, turned down, bearing hair. Psstg. org. long with filiform peduncles and discoidal head. Intlam. hair very long. Legs short, 2 front Femora with large blades. Abd. a long oval; Ptm. running far back; 4 rows of very long flexible hairs on Dors. of Abd. — Nph. olive-brown, polished. Rost. rounded. Cepth. behind Rost. much widened, bearing 2 small ridges. Psstg. dorsal, Psstg. org. long with filiform peduncles and fusiform head. Legs short; pairs 3 and 4 almost hidden by Abd., which is short wide and shield-shaped. — Im. L. ca. 500  $\mu$ .

In moss. England, Germany, Sweden.

13. *O. orbicularis* C. L. Koch 1835 *Oribates o.*, C. L. Koch, C. M. A., fasc. 3 t. 6 | 1855 *Oribata o.*, Nicolet in: Arch. Mus. Paris, v. 7 p. 435 t. 5 f. 2 | 1877 *Oribates o.*, Canestrini & Fanzago in: Atti Ist. Veneto, ser. 5 v. 4 p. 82 | 1883 *O. o.*, Berlese, A. M. S., fasc. 9 nr. 1 | 1884 *Oribata o.*, Michael, Brit. Orib., v. 1 p. 236 t. 6 f. 1, 3—9.

Im. Dark red-brown, a vague lighter patch near ant. margin of Abd. finely punctured. Rost. blunt, genae show as points rather longer than frons. 2 pairs of Rost. hairs. Cepth. long. Lam. large blades nearly on edge, wider anteriorly than posteriorly. C. lam. short, broad, truncated; Lam. hair in middle of truncated edge; corner of C. lam. outside hair rounded.

Trlam. a narrow blade on edge, of even width almost throughout. Psstg. large, open, projecting; Psstg. org. short, spatulate, slightly recurved; Tectp. 1 with long projecting point, 2 rounded. Abd. generally nearly round, but varies, arched, slightly truncated anteriorly. Ant. margin of Abd. strongly sinuated. Dors. of Abd. hairless. — Nph. very like that of *O. lapidaria*, except in color. Pinkish-brown or yellow-brown; much dotted and slightly rough; pyriform or diamond-shaped. Cephth. short, constricted in middle. Psstg. org. short, heads nearly globular. Intlam. hair, Rost. hairs and some of the hairs on legs serrated; Dors. of Abd. with large, flask-shaped, thickened, dotted patch with expulsive vesicles at sides as in *O. lapidaria* Nph. A large, curved, serrated hair on antero-lateral angle; 2 rows of short fine hairs on Dors. of Abd. and 2 pairs on post. margin. — Im. L. ca. 650  $\mu$ .

On oak-trees, etc. England, France, Germany, Italy, Sweden.

14. *O. pallidula* C. L. Koch 1841 *Zetes pallidulus*, C. L. Koch, C. M. A., fasc. 31 t. 9 | 1841 *Z. fuscomaculatus*, C. L. Koch, C. M. A., fasc. 31 t. 11 (Nph.) | 1844 *Z. latipes*, C. L. Koch, C. M. A., fasc. 38 t. 14 | 1886 *Oribates l.*, Berlese, A. M. S., fasc. 30 nr. 3 | 1855 *Oribata femoralis*, Nicolet in: Arch. Mus. Paris, v. 7 p. 433 t. 4 f. 4.

Im. Red-brown or chestnut-brown. Lam. narrow blades widest posteriorly. No C. lam., Trlam. a mere line if visible. Psstg. org. short, clavate, recurved. Intlam. hair very long, reaching tip of Rost. Abd. narrow, small posteriorly. Ant. margin of Abd. convex forward in centre, concave laterally. Ptm. narrow, but long. Dors. of Abd. hairless. Femur of leg 2 greatly enlarged at distal end. Berlese's drawing of Abd. is much narrower posteriorly than Nicolet's. — Im. L. 500—620  $\mu$ .

In moss. France, Germany, Italy.

15. *O. piriformis* Nic. 1855 *O. p.*, Nicolet in: Arch. Mus. Paris, v. 7 p. 436 t. 5 f. 3 | 1884 *O. p.*, Michael, Brit. Orib., v. 1 p. 238 t. 6 f. 2, 10.

It is often impossible to distinguish the Im. of this species from *O. orbicularis*, but the Nph. is quite different. *O. piriformis* is generally narrower than *O. orbicularis* and has outer corner of C. lam. pointed instead of rounded. — Nph. Rost. and legs dark brown, rather rough; provertex light yellow polished, behind this 2 rolls of leathery skin greenish-brown. Cuticle of Abd. whitish but Dors. of Abd. almost entirely covered by a finely punctured chitinous plate which is dark olive-green in fully grown Nph. Rost. pointed. Cephth. behind Rost. in 3 divisions. Intlam. hair and Rost. hairs not serrated. Abd. very square, with rounded corners, not much arched; Dors. of Abd. hairless. — Im. L. ca. 650  $\mu$ .

In moss. England, France.

16. *O. punctum* C. L. Koch, Berl. 1838 *Oribates p.*, C. L. Koch, C. M. A., fasc. 30 t. 22 | 1877 *O. p.*, Canestrini & Fanzago in: Atti Ist. Veneto, ser. 5 v. 4 p. 16 | 1885 *O. p.*, Canestrini, Prosp. Acarof., v. 1 p. 19 | 1886 *O. p.*, Berlese, A. M. S., fasc. 30 nr. 2.

Im. Dark smoky-brown, smooth. Lam. very short blades on edge, much nearer together anteriorly than posteriorly. Trlam. a blade as wide as Lam., which distinguishes this species from *O. avenifera*. No Trlam. Psstg. org. directed horizontally forward with short peduncle and fusiform head. Abd. sub-hemispherical. Ptm. wide, not running far back. Femur 1 with blade. L. ca. 400  $\mu$ .

Koch's species would not be distinguishable, Canestrini's contains erroneous anatomy; the species really is defined by Berlese's figure and description.

In moss. Germany?, Italy, Sweden.



17. *O. rubens* C. L. Koch 1841 *Oribates r.*, C. L. Koch, C. M. A., fasc. 31 t. 10 | 1887 *O. longipes*, Berlese, A. M. S., fasc. 35 nr. 5.

Im. Chestnut-brown; smooth. Cepth. short. Lam. and Trlam. blades on edge; no C. lam. Psstg. org. moderate length, clavate, curved forward. Lam. and Intlam. hairs slightly pectinated. Abd. globular, hairless. Ptm. not reaching far back, terminated suddenly posteriorly, slightly undulated anteriorly. Legs 1 and 2 long, femur 1 passing tip of Rost. L. ca. 450  $\mu$ .

In moss. Germany, Italy.

18. *O. setosa* C. L. Koch\*) 1835 *Murcia trimaculata*, C. L. Koch, C. M. A., fasc. 3 t. 21 (Nph.!) | 1840 *Oribates setosus*, C. L. Koch, C. M. A., fasc. 30 t. 19 | 1855 *Oribata setosa*, Nicolet in: Arch. Mus. Paris, v. 7 p. 436 t. 5 f. 4 | 1884 *O. s.*, Michael, Brit. Orib., v. 1 p. 243 t. 7 f. 3—12 | 1889 *Oribates setosus*, Berlese, A. M. S., fasc. 43 t. 4 | 1872 *Oribata notata*, Thorell in: Öfv. Ak. Förh., v. 28 p. 683.

Im. Dark brown, a lighter patch near ant. margin of Abd. Ptm. and legs lighter. Broadly pyriform, round posteriorly. Lam. large blades on edge; C. lam. almost horizontal, with points nearly as long as Rost. Trlam. a blade with deep central indentation, and forming with Lam. sharp angles which bear strong serrated Lam. hair. Tectp. 1 with long point bearing curved, serrated spine. Psstg. org. longish, rough, clavate, slightly recurved. Intlam. hair long, rigid, serrated. Abd. slightly longer than broad. Ant. margin of Abd. forms 3 shallow lobes, Ptm. vague posteriorly. Dors. of Abd. smooth, dull. 1 or 2 rows of rough thick hairs round margin; a variable species. — Nph. Rost. and legs pink-brown, chitinous, Abd. bluish-white; alimentary canal shows dark, often yellow-green; expulsores vesicles almost black; a constriction between Rost. and remainder of Cepth. 2 pairs of rough Rost. hairs. Psstg. org. short, clavate; Intlam. hair rough spines. Ant. margin of Abd. slightly concave, several rough spines on Dors. of Abd. — Im. L. ca. 540  $\mu$ .

In long grass etc. England, France, Franz-Joseph Archipelago, Germany. Italy, Netherlands, Spitzbergen.

19. *O. sphagni* Michael 1880 *O. s.*, Michael in: J. R. micr. Soc., v. 3 p. 179 t. 4 f. 6—9 | 1884 *O. s.*, Michael, Brit. Orib., v. 1 p. 223 t. 3 f. 1—8.

Im. Yellow-brown, polished. Rost. blunt. Lam. narrow, blades on edge; C. lam. short with curved hair at point. Trlam. a line only. Psstg. small, hidden by Ptm. Psstg. org. minute, entirely hidden within Psstg. No Intlam. hair. Legs short, pair 4 not extending beyond Abd. Abd. oval, ant. margin sinuous. Dors. of Abd. polished and hairless. Ptm. strap-like, only covering about half the femur of leg 2. — Nph. Greenish-white or yellow-grey, legs pinkish or yellow. Rost. bluntly-conical with ridges enclosing spaces, Psstg. near together, Psstg. org. long and filiform. Intlam. hair upright spines. Abd. shield-shaped, Dors. flat, covered with irregular wavy ridges bearing scattered dots. Whole edge of Abd., except ant. margin armed with long spikes. — Im. L. ca. 320  $\mu$ .

On sphagnum. England.

\*) According to the synonyma enumerated above by the author and in accordance with the „Regeln für die wissenschaftl. Benennung der Thiere“ the name of this species is: *O. trimaculata* (C. L. Koch). The Editors.

See my note p. 7. The Author.

**Subdiv. Ib. Sp. 20—39.** Without any Trlam.

**Sect. Ib 1.** Lam. large, horizontal, attached by post. edge only; the 2 near together, leaving only a narrow cleft between. (Gen. *Oribatella* Banks.)

20. *O. americana* Haller 1884 *O. a.*, G. Haller in: Arch. Naturg., v. 50 I p. 222 t. 15 f. 4.

Im. Red-brown, polished. Lam. horizontal, very large, almost covering Cephth. standing free except at hind edge. straight and nearly touching at inner edges as in *O. tecta*, but outer edge strongly and irregularly toothed, ant. end truncated, concave, and without Lam. h.? Intlam. hair extremely long, setiform. Psstg. org. moderate, somewhat clavate, directed forward and inward. Rost. hairs clavate, hairy. Abd. almost globular, with 2 longitudinal rows of long, setiform, strongly-curved hairs. Legs short and thick. L. 390  $\mu$ .

America.

21. *O. aquatica* (Banks) 1895 *Oribatella a.*, Banks in: Tr. Amer. ent. Soc., v. 22 p. 9.

Im. Dark reddish, a pale spot on Dors. of Abd. near ant. margin; body very broad, almost circular, depressed, smooth. Lam. short, each ending anteriorly in 2 spine-like projections, the lateral sinuate, the median curved and bearing Lam. hair. Intlam. hair long, curved forward; Psstg. org. moderate length, clavate. Ant. margin of Abd. convex forward in middle. Ptm. oblong. Dors. of Abd. hairless. L. 550  $\mu$ .

On aquatic plants. New York State.

22. *O. berlesei* Michael\*) 1883 *Oribates calcaratus* (err., non C. L. Koch 1835!), Berlese, A. M. S., fasc. 9 nr. 2 & Crypt. II, p. 65 | 1885 *O. c.* (err.), Canestrini, Prosp. Acarof., v. 1 p. 17 || non 1880 *Oribata quadricornuta*, Michael in: J. R. micr. Soc., v. 3 p. 181 t. 4 f. 1—5.

Im. Like *O. quadricornuta*, but considerably smaller, black instead of brown. Psstg. org. very long and strongly curved inward, instead of clavate. Intlam. hair setiform instead of pectinated. Lam. touching anteriorly and joined in centre by a cross-bar with a central branch running backward; hairs on Dors. of Abd. much more numerous and placed at edge of Abd. instead of far in. No pectinated Rost. hair? and strong spines on Genual and Tibia instead of pectinated hairs. L. ca. 450  $\mu$ .

In moss and dead leaves. Italy.

23. *O. languida* Nic. 1855 *O. l.*, Nicolet in: Arch. Mus. Paris, v. 7 p. 434 t. 4 f. 8.

Im. Black, legs and ant. part of Ptm. brown. Like *O. ovalis*, but Dors. of Abd. covered with large, irregular transverse furrows, or depressions (about 6). Ant. outer angle of Lam. a sharp, drawn out point; post. margin of Abd. slightly undulated. Is this rare species a deformity? L. 420  $\mu$ .

France.

\*) Berlese identifies the species with *O. calcaratus* C. L. Koch — apparently in error; consequently this is nameless. I have therefore named the species in honor of Berlese.

24. *O. ovalis* C. L. Koch 1835 *Oribates ovalis*, C. L. Koch, C. M. A., fasc. 3 t. 5 | 1877 *O. o.*, Canestrini & Fanzago in: Atti Ist. Veneto, ser. 5 v. 4 p. 82 | 1855 *Oribata nitens*, Nicolet in: Arch. Mus. Paris, v. 7 p. 433 t. 4 f. 8 | 1879 *O. n.*, L. Koch in: Svenska Ak. Handl., v. 16 p. 115 t. 4 f. 4 | 1885 *O. punctata*, Nicolet in: Arch. Mus. Paris, v. 7 p. 434 t. 4 f. 7; t. 2 f. 3 | 1884 *O. p.*, Michael, Brit. Orib., v. 1 p. 253 t. 9 f. 1—14 | 1883 *Oribates Nicoletii*, Berlese, A. M. S., fasc. 3 nr. 3 | ?1895 *Oribatella armata*, Banks in: Tr. Amer. ent. Soc., v. 22 p. 9.

Im. Chestnut-brown to black; variable, typically dull and punctured, var. *nitens* Nic. polished; Lam. very large, almost hiding Cepth., broad, horizontal, reaching tip of Rost., their inner edges almost touching, truncated anteriorly; but with a prolonged point at outer angle; Lam. hair from inner angles, short, hooked downward. No Trlam. Psstg. org. medium length, slightly thickened toward tip; Abd. arched, hind margin truncated. Ptm. large, clearly defined posteriorly, prolonged anteriorly, forming points which almost reach tip of Rost. A row of fine hairs round Dors. of Abd. and 2 sparse longitudinal rows on same; a very variable species. — Nph. brown, leathery, deeply wrinkled; Psstg. org. long, rough. — Im. L. ca. 650  $\mu$  (but very variable).

England, France, Germany, Italy, Netherlands, ? New York State America.

25. *O. quadricornuta* Michael 1880 *O. q.*, Michael in: J. R. micr. Soc., v. 3 p. 181 t. 4 f. 1—5 | 1884 *O. q.*, Michael, Brit. Orib., v. 1 p. 247 t. 8 f. 1—10.

Im. Chestnut-brown, a vague lighter patch near ant. margin of Abd. legs light. Broadly pyriform; smooth not polished. Rost. rounded, with flattened margin, Rost. hairs large, curved, strongly pectinated on outer edges. Lam. very large, their hind margins, and those near cusps almost meet, arched, but otherwise horizontal. Ant. edge of Lam. deeply excavated, leaving 2 horns as long as Rost.; Lam. hair in centre of excavation, large, serrated; no Trlam. Intlam. hair long, serrated; Tectp. very large ant. edges of pair 1 strongly serrated. Psstg. org. long, clavate, pointed anteriorly rough. Ant. margin of Abd. much sinuated. Ptm. large. A row of long, flexible hairs on Dors. of Abd. and some on post. margin. — Nph. Pale flesh-colour, Rost. and legs darker, polished, transparent. Psstg. org. like Im. Intlam. hair extremely long, serrated; a similar but smaller pair on Dorso-vertex. Rost. hairs similar. Numerous serrated spines on legs. Dors. of Abd. shield-shaped, arched, a large fold near ant. margin of Abd., a truncated conical projection in centre of post. margin; numerous serrated spines on Dors. of Abd. — Im. L. ca. 580  $\mu$ .

On dead wood etc. Algeria, England.

26. *O. quadridentata* (Banks) 1895 *Oribatella 4-d.*, Banks in: Tr. Amer. ent. Soc., v. 22 p. 8.

Im. A species apparently resembling *O. quadricornuta* and *O. berlesei*, but Psstg. org. stated to be short (shape not stated). Dors. of Abd. with about 24 long stiff hairs; Ptm. stated to be „large, finely reticulate, ant. margin finely dentate, terminating below in a small spine“. Species imperfectly described from one specimen, not figured; but if the description of the Ptm. be correct this is a good species. The ant. margin of the Tectp. 1 is dentate in *O. quadricornuta* and *O. berlesei*, but the author (Banks) never describes Tectp. L. 600  $\mu$ .

New York State.

27. **O. tecta** Michael 1884 *O. t.*, Michael, Brit. Orib., v. 1 p. 251 t. 8 f. 11.

Im. Dark-brown, polished, rather long-shaped. Lam. horizontal, very large, almost covering Cepth. standing free except at hind edge, their inner edges almost or quite touch, truncated anteriorly, truncated edge has a shallow notch. Lam. hair near inner angle, rough. Psstg. org. long, filiform or slightly clavate; Intlam. hair long, rough; legs short, pair 4 not reaching far behind Abd. Dors. of Abd. hairless. L. ca. 210  $\mu$ .

In moss. England.

**Sect. Ib 2.** Lam. normal or absent.

28. **O. agilis** Nic. 1855 *O. a.*, Nicolet in: Arch. Mus. Paris, v. 7 p. 432 t. 4 f. 3.

Im. Clear red-brown, polished. Lam. blades narrow posteriorly, widest anteriorly. Lam. hair long and strongly serrated. Intlam. hair recurved. No Trlam. Psstg. org. short, recurved, clavate. Abd. hairless. Ptm. truncated anteriorly. L. 430  $\mu$ .

In moss. France.

29. **O. alata** (Herm.) 1804 *Notaspis alatus*, J. Fr. Hermann, Mém. apt., p. 92 t. 4 f. 6 | 1826 *Galumna alata*, Heyden in: Isis, p. 613 | 1841 *Zetes alatus*, C. L. Koch, C. M. A., fasc. 31 t. 6 | 1844 *Oribata alata*, Gervais in: Walckenaer, Ins. Apt., v. 3 p. 258 | 1855 *O. a.*, Nicolet in: Arch. Mus. Paris, v. 7 p. 431 t. 4 f. 1 | 1877 *Oribates alatus*, Canestrini & Fanzago in: Atti Ist. Veneto, ser. 5 v. 4 p. 81 | 1884 *Oribata alata* (part.), Michael, Brit. Orib., v. 1 p. 257 t. 10 f. 1—5 | 1886 *O. a.*, A. S. Packard in: Mem. Ac. Washington, v. 4 p. 42 | 1896 *Oribates alatus*, Berlese, A. M. S., fasc. 78 nr. 9 | 1841 *Zetes satellitius*, C. L. Koch, C. M. A., fasc. 31 t. 13 (Nph.) | ?1895 *Oribata emarginata*, Banks in: Tr. Amer. ent. Soc., v. 22 p. 7.

Im. Brown or black; short pyriform; very round posteriorly; polished. Cepth. broad, bluntly-pointed, arched; no Lam. nor Trlam.; Psstg. org. short (see *O. dorsalis*) recurved, usually lanceolate or clavate but vary. Abd. almost circular, Ptm. very large, flexible, light-colored, translucent, they project nearly to tip of Rost. and are rounded anteriorly; they have a sinuated (emarginate) lateral margin not seen from above; they have radiating lines. — Nph. Broad, transparent, polished, straw-color to brown; internal organs shew, dark. Rost. blunt, 2 pairs of Rost. hairs. Psstg. org. dark, recurved, thin, slightly thickened distally. Dors. of Abd. arched, hairless. — Im. L. ca. 600  $\mu$ .

In moss and lichen. Algeria, America (Kentucky), Belgium, England, France, Germany, Italy, Netherlands, Switzerland, Sweden.

30. **O. avenifera** Michael 1884 *O. a.*, Michael, Brit. Orib., v. 1 p. 264 t. 11 f. 6—11.

Im. Reddish-brown, not dark; almost globular when Ptm. are pressed to body, more shield-shaped when expanded; polished (punctured under high magnification). Cepth. short, broad; Lam. long, narrow blades on edge; C. lam. long, blunt, Lam. hair terminal. Psstg. org. oat-shaped, or fusiform, sessile, almost horizontal, pointing forward and slightly inward. Tibia of leg 4 with a projection. Ant. margin of Abd. advancing greatly in centre, Dors. of Abd. arched, hairless; Ptm. short but usually extended. L. ca. 320  $\mu$ .

In moss. Algeria, England.

31. *O. centro-americana* Stoll 1891 *O. c.-a.*, O. Stoll in: Biol. Centr.-Amer., Arach. acar., p. 24 t. 15 f. 1.

Im. Black, polished, without hairs or markings on dors. surface. Very broad and rounded posteriorly. No division between Cepth. and Abd. Lam. small narrow. No Trlam. Psstg. org. medium length, slightly clavate, slightly recurved. No Intlam. hair. L. ca. 900  $\mu$ .

Antigua, Guatemala, Brit. Honduras.

32. *O. cuspidata* Michael 1884 *O. c.*, Michael, Brit. Orib., v. 1 p. 260 t. 10 f. 6—11.

Im. Light yellow-brown; appears polished but is very finely punctured; shape broad, rounded posteriorly. Rost. pointed, genae with strong points which shew at sides of frons. Lam. very short, doubly curved, concave on ant. margin; Lam. hair in centre of concavity. No C. lam. nor Intlam. hair. Tectp. 1 with projecting points. Psstg. org. long, gradually clavate. Ant. margin of Abd. sinuous. Dors. of Abd. hairless. — Nph. Cannot be distinguished from Nph. of some Notaspididae, variable white or pinkish, very transparent, internal organs shew, giving color; polished with transverse markings like scratches; long, narrow. Rost. blunt-pointed, Cepth. slightly constricted in middle. 2 pairs of Rost. hairs. Psstg. org. long, slightly clavate. Abd. long, truncated anteriorly; a strong spine on each antero-lateral angle; 2 rows of short hairs on Dors. of Abd. and a row round post. margin. — Im. L. ca. 350  $\mu$ .

In moss. England.

33. *O. dorsalis* (C. L. Koch) 1835 *Zetes d.*, C. L. Koch, C. M. A., fasc. 2 t. 14 | 1841 *Z. climatus* (laps., corr. *climatus*), C. L. Koch, C. M. A., fasc. 31 t. 5 | 1842 *Z. climatus*, C. L. Koch, Übers. Arach., v. 3 p. 100 | 1877 *Oribates climatus*, Canestrini & Fanzago in: Atti Ist. Veneto, ser. 5 v. 4 p. 81 | 1886 *O. climatus*, Berlese, A. M. S., fasc. 30 nr. 1 | 1884 *Oribata alata* (part.), Michael, Brit. Orib., v. 1 p. 257 t. 10 f. 1—5.

Im. Very like *O. alata*, of which it may be a variety, it has long Psstg. org. instead of the short ones of *O. alata*. L. ca. 700  $\mu$ .

Brazil, England, Germany, Italy, Netherlands, Paraguay, Sweden.

34. *O. halleri* Michael\*) 1884 *O. simplex* (non Gervais 1849!), G. Haller in: Arch. Naturg., v. 50 I p. 221.

Im. Light yellow-red. Lam. widest in middle, diminishing anteriorly and posteriorly. Psstg. org. with short peduncle and suddenly clavate head. Abd. almost globular, 2 longitudinal rows and a border of hook-shaped granular hairs on Dors. of Abd. Ptm. truncated anteriorly, scarcely passing ant. margin of Abd., much folded under body. Legs short, thin, hetd. L. 440  $\mu$ .

America.

35. *O. intermedia* Michael\*\*) 1855 *O. ovalis* (err., non C. L. Koch 1835!), Nicolet in: Arch. Mus. Paris, v. 7 p. 438 t. 4 f. 5 || non 1883 *Oribates Nicoletii*, Berlese, A. M. S. fasc. 3 nr. 3.

\*) Haller's name of *simplex* was preoccupied in the genus *Oribata* by Gervais' species (in: Gay, Hist. Chile), which Haller apparently overlooked; I have therefore renamed the species in honor of Haller. A. D. Michael.

\*\*) Nicolet's name *O. ovalis* being preoccupied in this genus; and Berlese's name *O. Nicoletii* which was intended to cure the difficulty; being, in my opinion, applied to a different species, I have renamed this species. A. D. Michael.

Im. Light red-brown, polished, like *O. ovalis* but Lam. different, vizt. large thick blades not transparent, set at angle of about  $45^{\circ}$ , concave inward slightly wider and much further apart posteriorly than anteriorly, truncated anteriorly. Lam. hair from outer (upper) angle. Abd. said to be hairless. L. 520  $\mu$ .

France.

36. *O. lucasi* Nic. 1855 *O. Lucasii*, Nicolet in: Arch. Mus. Paris, t. 7 p. 432 t. 4 f. 2 | 1884 *O. L.*, Michael, Brit. Orib., v. 1 p. 262 t. 11 f. 1—5.

Im. Light reddish-brown. Legs and Ptm. lighter, yellowish; polished. Cepth. long; Rost. sharp; Lam. narrow blades on edge; no C. lam. nor Trlam. Psstg. org. with fusiform head on long slender peduncles, recurved. Rost. hairs long, curved; very large blades to femora 2. Abd. oval, rather long; Dors. of Abd. arched but flattened centrally, hairless. Ant. margin of Abd. slightly sinuous; Ptm. small, transparent. A few short hairs round post. margin. Ventr. plate much embraced by dorsal at sides. Genital covers almost heart-shaped, far forward; anal covers large, square. — Nph. Very like a *Notaspis* Nph. White, transparent; internal organs shew. Cepth. long, constricted in middle. 2 pairs of Rost. hairs. Psstg. org. like Im., but directed forward. Dors. of Abd. hairless, without markings. A fine hair on each antero-lateral angle and a few short ones on post. margin. — Im. L. ca. 600  $\mu$ .

Algeria, England, France.

37. *O. mucronata* G. & R. Can. 1882 *O. m.*, G. & R. Canestrini in: Atti Ist. Veneto, ser. 5 v. 8 p. 916 t. 9 f. 2 | 1892 *Oribates mucronatus*, Berlese. A. M. S., fasc. 62 nr. 8.

Im. Dark-brown, Ptm. yellowish. Like *O. dorsalis*; but. post. margin of Abd. forms 2 chitinous points near median line, and between them a hyaline, median, pointed projection divided longitudinally. L. 650—800  $\mu$ .

C. L. Koch, C. M. A., fasc. 2 t. 14 (1835), states that what is evidently this species is one sex of his *Zetes dorsalis* and that he found them in Copo, but as no such sexual variation is known in the Oribatidae and no one else has ever seen any species in Copo and both sexes of *Oribata (Zetes) dorsalis* are known, this statement is probably an error.

Germany, Italy.

38. *O. peloptoides* Berl. 1888 *Oribates p.*, Berlese in: Bul. Soc. ent. Ital., v. 20 p. 215 t. 13 f. 3.

Im. Chestnut-brown. Lam. long but very narrow. No Trlam. Psstg. org. (as in *O. lucasi*) with long peduncle and fusiform reflexed head. Dors. of Abd. rough, punctured or areolated. Ptm. short, truncated anteriorly and posteriorly. 4 rows of stout hairs on Dors. of Abd. and a row round edge. L. ca. 450  $\mu$ .

Under stones. Brazil, Paraguay.

39. *O. rugifrons* Stoll 1891 *O. r.*, O. Stoll in: Biol. Centr.-Amer., Arach. acar., p. 25 t. 15 f. 2.

Im. Black, smooth, not polished, like *O. dorsalis*, but dors. surface marked with extremely fine longitudinal wrinkles. L. ca. 850  $\mu$ .

Brit. Honduras, Guatemala.

## Div. II. Sp. 40—45. Ung. mond.

40. *O. dentata* Berl. 1883 *Oribates dentatus*, Berlese, A. M. S., fasc. 9 nr. 3.

Im. Chestnut-brown, polished. Lam. very narrow blades on edge. Rost. hairs and Lam. hairs long. Intlam. hair and Psstg. org. very long, would reach far beyond tip of Rost. the former thin, setiform, flexible, the latter recurved with thin peduncle and fusiform head. Ant. margin of Abd. slightly convex; 2 long hairs on post. margin, none on dors. surface of Abd. Femur 2 with large blade ending anteriorly in large curved tooth. Ung. figured trid. on fig. of whole creature, mond. on fig. of separate legs, nothing said in letterpress; is mond. (Berlese, A. M. S., Crypt. II p. 65). L. 600  $\mu$ .

Found in hot-house of Bot. garden in Padua. Native country?

41. *O. fusigera* Michael 1884 *O. f.*, Michael, Brit. Orib., v. 1 p. 268 t. 12 f. 6—11.

Im. Black, front of Abd. and legs lighter. Rost. short. Lam. nearly on edge, near together, almost hidden by Psstg. org. No Trlam.; Psstg. org. long fusiform, terminated distally by a fine hair, they point forward and inward. Ant. margin of Abd. sinuous, Dors. polished, hairless. — Nph. Pinkish, coarsely punctured, long pyriform. Rost. long, narrow; Psstg. org. with fusiform head on slender peduncles. Hind legs much shorter than Abd. Dors. of Abd. shield-shaped, pointed posteriorly, not much arched, hairless. — Im. L. ca. 300  $\mu$ .

In moss. England.

42. *O. mirabilis* (Banks) 1895 *Oribatodes m.*, Banks in: Tr. Amer. ent. Soc., v. 22 p. 10.

Im. Dark red-brown; short, broad, convex. C. lam. strong. Intlam. hair very long, directed forward. Psstg. org. long, clavate. Abd. globose, granular, with an irregular network of ridges. About 16 long stiff serrated hairs in 2 longitudinal rows on Dors. of Abd. 4 clavate on post. margin. Ptm. granulate. L. 500  $\mu$ .

Under bark. New York State.

43. *O. monodaetyla* Haller 1884 *O. m.*, G. Haller in: Arch. Naturg., v. 50 I p. 221 t. 15 f. 3.

Im. Yellow-brown, short pyriform, Cepth. pointed. Lam. long, wide posteriorly deminishing to nothing anteriorly. No Lam. hair nor C. lam. Psstg. org. very long, slightly and gradually clavate, directed backward and outward, distal half pectinated along ant. edge. Abd. long, oval, slightly arched. Without hairs on Dors. of Abd. L. ca. 300  $\mu$ .

Said by Berlese (A. M. S., Crypt. II p. 67) — apparently in error — to be his *Oribates dentatus*.

America.

44. *O. parmeliae* Michael 1884 *O. p.*, Michael, Brit. Orib., v. 1 p. 265 t. 12 f. 1—5.

Im. Dark brown, smooth but not polished, punctured. Cepth. short, Rost. blunt; Lam. very long blades nearly on edge; C. lam. long, bearing strong curved hair; Trlam. a thickened line; Psstg. org. short, pyriform recurved. Genuals of 2 first pairs of legs enlarged distally; Ant. margin of Abd. very curved. A row of long flexible hairs round post. margin and 2 rows on Dors. of Abd. — Nph. Orangeyellow. Cepth.

short. Psstg. protuberant; Psstg. org. short, strongly clavate. Rost. hairs long, 2 pairs of hairs between Rost. hair and Intlam. hair. Legs short, pair 4 not seen from above. Abd. with straight sides; post. margin rounded. Dors. of Abd. arched, divided in middle by a strong transverse indented line. Ant. margin of Abd. curved, with 2 or 3 folds near it; 2 long flexible hairs on each antero-lateral angle and about 6 round post. margin; some smaller hairs on Dors. of Abd. — Im. L. ca. 420  $\mu$ .

On lichens (*Parmelia*). England.

45. *O. rileyi* Haller 1884 *O. R.*, G. Haller in: *Arch. Naturg.*, v. 50 I p. 223.

Im. Dark brown, very pyriform, compressed anteriorly rounded posteriorly, granular, epiostracum loose and easily detachable. Lam. small. C. lam. large, broad, truncated, almost horizontal, Trlam. a blade on edge. Lam. hair and Intlam. hair setiform, small. Psstg. org. rather short, clavate. Abd. pyriform with crescentic indentation in middle of hind margin; a small rounded projection lower in level seen in centre of crescent. Ptm. reaching very far back, the 2 (one each side) joined anteriorly by a long chitinous bridge. 2 rows of short serrated hairs on Dors. of Abd. L. ca. 500  $\mu$ .

Described from a single specimen.

America.

*O. affinis* Banks 1895 *O. a.*, Banks in: *Tr. Amer. ent. Soc.*, v. 22 p. 6.

Im. Resembles *O. pratensis* Banks, but Lam. longer, no Trlam. Ptm. much smaller (half the size); Psstg. org. longer. Dors. of Abd. hairless. Ung. trid. L. 800  $\mu$ .

America (Washington).

*O. arborea* Banks 1895 *O. a.*, Banks in: *Tr. Amer. ent. Soc.*, v. 22 p. 7.

Im. Yellow-brown, often with a white spot. on Dors. of Abd. near ant. margin, moderately convex, highest posteriorly. Psstg. org. very short, clavate; Abd. smooth, Dors. hairless; Ptm. as long in proximo-distal as in antero-posterior measurement, tapering to a rounded tip. Ventr. surface smooth; post. Femur broad. Ung. trid. L. 600  $\mu$ .

On cedar and peach trees. New York State.

*O. calcarata* C. L. Koch 1835 *Oribates c.*, C. L. Koch, C. M. A., fasc. 2 t. 13 || non 1883 *O. calcaratus*, Berlese, A. M. S., fasc. 9 nr. 2 & *Crypt. II* p. 65 (v. *O. berlesei*) | non 1885 *O. c.*, Canestrini, *Prosp. Acarof.*, v. 1 p. 17.

Im. Small, very black, polished. Cephth. with numerous projections. Lam. broad, white, far apart. Psstg. org. long clavate, reaching tip of Rost. Intlam. hair long, thick, white. A pair of thick spatulate hairs or spines at distal end of Genual 1, 2, and 1 at end of Tibiae 3, 4. Abd. globular, truncated anteriorly, 4 minute hairs on post. margin, no others on Abd.

Species probably good but imperfectly described and figured.

In woods. Germany, Sweden.

*O. depressa* Banks 1895 *O. d.*, Banks in: *Tr. Amer. ent. Soc.*, v. 22 p. 6.

Im. Red-brown. Psstg. org. moderate length, capitate. Abd. smooth, depressed plainly longer than broad. Ptm. large, long, projecting in front of Abd., not sinuated at distal margin. Dors. of Abd. hairless. Ung. trid. L. 450  $\mu$ .

New York State.



**O. flammula** C. L. Koch 1840 *Oribates f.*, C. L. Koch, C. M. A., fasc. 30 t. 16 |  
 ?1859 *O. quadricuspis*, Grube in: Arch. Dorpat. Ges., ser. 2 v. 1 p. 476.

Im. Like *O. calcarata* but half the size, 2 longitudinal rows of hairs on Dors. of Abd., none on post. margin. A large, vague, light patch on Dors. of Abd. near ant. margin.

In wet meadows. Germany.

**O. hirsuta** Banks 1895 *O. h.*, Banks in: Tr. Amer. ent. Soc., v. 22 p. 7.

Im. Pale brownish-yellow. Psstg. org. short, capitate. Abd. not high, a little longer than broad, smooth. Ant. margin of Abd. with 2 incisions. Dors. of Abd. bearing about 30 short hairs, those post. longest. Ptm. moderate, rounded, distal margin incurved, ventr. surface granular. Ung. trid. L. 400  $\mu$ .

Under dead leaves. New York State.

**O. homodactyla** Karp. 1893 *O. h.*, Karpelles in: Math. naturw. Ber. Ungarn, v. 11 p. 82.

Im. Ung. said to be homd., other-wise species insufficiently described. Abd. smooth, without hairs. Intlam. hair „chain-shaped“. Leg-hairs feathered. L.?

Hungary.

**O. latirostris** (C. L. Koch) 1844 *Zetes l.*, C. L. Koch, C. M. A., fasc. 38 t. 13.

Im. Small, black, polished. No Lam., Rost. hairs, nor Intlam. hair. Psstg. org. moderate length, clavate. Abd. sub-elliptical, broad, hairless. Ptm. short but wide, ending abruptly posteriorly, slightly prolonged anteriorly.

In wet meadows. Germany.

**O. magna** Banks 1895 *O. m.*, Banks in: Tr. Amer. ent. Soc., v. 22 p. 6.

Im. Apparently very like *O. globula*, but Psstg. org. said to be „moderate, clavate“, and said to be no Intlam. hair. L. 1 mm.

New York State.

**O. minuta** (Banks) 1896 *Oribatella m.*, Banks in: Tr. Amer. ent. Soc., v. 23 p. 76.

Im. Pale reddish brown; legs paler; a pale spot near ant. margin of Abd. Body globose. Lam. each with 2 spine-like processes, as in *O. quadricornuta*. Lam. hair between the 2 spines and as thick as the inner one. Rost. hairs pectinate on their outer sides. Psstg. org. moderate-length, clavate. Abd. finely punctured. Ptm. large, somewhat pointed and incurved at tip; about 20 fine curved hairs on Dors. of Abd. L. 300  $\mu$ .

One specimen under hemlock bark. New York State.

**O. moesta** Banks 1895 *O. m.*, Banks in: Tr. Amer. ent. Soc., v. 22 p. 6.

Im. Red-brown, no Trlam. Intlam. hair long. Abd. depressed, polished; Ptm. small, truncated anteriorly. Psstg. org. moderate length, capitate. Dors. of Abd. hairless. Ung. trid. L. 550  $\mu$ .

New York State.

**O. palustris** Banks 1895 *O. p.*, Banks in: J. N. York ent. Soc., v. 3 p. 128.

Im. Red-brown, legs yellowish, a whitish spot on Abd. near ant. margin. Lam. short. No Intlam. hair. Psstg. org. moderate length, clavate, not as long as depth of Ptm. which are much deeper than long at base. Body short, high, broad, globose; Ptm. prominent. Ventr. surface granular. Legs short. Tibia 1 barely longer than Genual. Post. Femur very broad, margined below. Very like *O. sphagni*, but probably a distinct species. L. 420  $\mu$ .

In a Sphagnum swamp. New York State.

**O. pinnata** Gerv. 1849 *O. p.*, Gervais in: Gay, Hist. Chile, v. 4 p. 48.

Im. Body oval. Description insufficient for identification.

Chili.

**O. pratensis** Banks 1895 *O. p.*, Banks in: Tr. Amer. ent. Soc., v. 22 p. 6.

Im. Yellowish or reddish. Lam. short. Trlam. a ridge. Intlam. hair long, Psstg. org. short capitate. Dors. of Abd. arched hairless, 3 small smooth spots each side. Ptm. small, long, triangular; a short clavate figure in front of anal opening. Ung. trid. L. 700  $\mu$ . — Possibly *O. lapidaria*.

New York State.

**O. reticulata** L. Koch 1879 *O. r.*, L. Koch in: Svenska Ak. Handl. v. 16 p. 115.

Im. Imperfectly described from a single specimen and not figured, probably very like *O. orbicularis*, but long hairs on Dors. of Abd. L. 1 mm.

Siberia (Yeniseisk).

**O. robusta** Banks 1895 *O. r.*, Banks in: Tr. Amer. ent. Soc., v. 22 p. 7.

Im. Black, yellowish near ant. margin of Abd. apparently very like *O. dorsalis*, distal margin of Ptm. said not to be sinuated (emarginate). L. 750  $\mu$ .

Chicago, Illinois, Texas.

**O. signata** (Banks) 1895 *Oribatella s.*, Banks in: Tr. Amer. ent. Soc., v. 22 p. 9.

Im. Dark reddish brown; a pale patch on Dors. of Abd. near ant. margin. Abd. convex, smooth. Lam. long, reaching tip of Rost. truncate anteriorly. C. lam. long, said to be a stiff bristle at each corner (2 all 4 or 2 only). Intlam. hair long, curved, directed forward; Psstg. org. long, clavate. Abd. longer than broad. Ptm. moderately large, triangular, projecting somewhat anteriorly. Apparently somewhat allied to *O. tecta*. L. 450  $\mu$ .

New York State.

**O. simplex** Gerv. 1849 *O. s.*, Gervais in: Gay, Hist. Chile, v. 4 p. 49.

Body oval. Ptm. scarcely visible. Description insufficient for identification.

Chili.

**O. sp.**, Banks 1895 *Oribatella setosa* (non *Oribates setosus* C. L. Koch 1840!), Banks in: J. N. York ent. Soc., v. 3 p. 128.

Im. Red-brown; a pale spot on Dors. of Abd. near ant. margin. Body longer than broad. Lam. short; C. lam. long, spine-like. Intlam. hair erect, nearly as long as leg 1. Psstg. org. nearly  $\frac{2}{3}$  the length of Intlam. hair, slightly clavate. Abd. smooth, evenly convex. Ptm. large, somewhat triangular, tip rounded. Post. margin oblique. Probably has a Trlam. Ung. trid. L. 480  $\mu$ .

In Sphagnum-swamp. New York State.

## B. Subfam. Serrariinae

Without Ptm. Cepth. anchylosed to Abd. Ventr. plate anchylosed to dors. plate. Mdb. rod-like serrated at distal end, not chelate.

1 genus with 2 species.

### 1. Gen. *Serrarius* Michael

1883 *Serrarius*, Michael in: J. R. micr. Soc., ser. 2 v. 3 p. 25 | 1884 *S.*, Michael, Brit. Orib., v. 1 p. 270 | 1896 *S.*, Berlese, A. M. S., Crypt. II p. 56 | 1885 *Neozetes*, Berlese, A. M. S., fasc. 20 nr. 6.

Characters (at present) those of the subfamily. Ung. of known species trid.

2 species.

Key to the species.

Abd. elliptical . . . . . 1. *S. fusifer* . . . p. 27  
Abd. globular . . . . . 2. *S. microcephalus* p. 27

1. *S. fusifer* (C. L. Koch) 1841 *Oribates f.*, C. L. Koch, C. M. A., fasc. 31 t. 3 | 1885 *Neozetes f.*, Berlese, A. M. S., fasc. 20 nr. 6 | 1896 *Serrarius f.*, Berlese, A. M. S., Crypt. II p. 56 || non 1855 *Leiosoma microcephala*, Nicolet in: Arch. Mus. Paris, v. 7 p. 443 | non 1883 *Serrarius microcephalus*, Michael in: J. R. micr. Soc., ser. 2 v. 3 p. 25 | non 1841 *Oribates globulus*, C. L. Koch, C. M. A., fasc. 31 t. 4.

Im. Yellow-brown, smooth; Lam. narrow blades on edge. C. lam. minute, scarcely recognizable. Psstg. org. very long, with thin peduncle and fusiform head. Intlam. hair very long. Abd. elliptical, slightly truncated anteriorly, 2 short hairs on post. margin. Dors. of Abd. hairless. L. ca. 470  $\mu$ .

In moss. Algeria, Germany, Italy.

2. *S. microcephalus* (Nic.) 1855 *Leiosoma m.*, Nicolet in: Arch. Mus. Paris, v. 7 p. 443 t. 6 f. 4 | 1883 *Serrarius m.*, Michael in: J. R. micr. Soc., ser. 2 v. 3 p. 25 | 1884 *S. m.*, Michael, Brit. Orib., v. 1 p. 272 t. 14 f. 7—13 | 1885 *Neozetes bicornis*, Berlese, A. M. S., fasc. 20 nr. 7 | 1896 *Serrarius b.*, Berlese, A. M. S., Crypt. II p. 56 || non 1841 *Oribates fusifer*, C. L. Koch, C. M. A., fasc. 31.

Im. Red-brown, legs lighter; polished; almost globular. Rost. slightly trilobed, 2 longitudinal ridges on its dors. surface; Cepth. short; Lam. blades nearly on edge, widest anteriorly; C. lam. rather long, slightly truncated; Lam. hair terminal. Trlam. a thickened bar. Psstg. org. very long with slender peduncles and small, fusiform head terminating in a curved point; Tectp. 1 blade-like, large, 2 almost obsolete. Dors. of Abd. without hairs or markings. 3 pairs of short hairs round post. margin. Genital covers broader than anal, placed far forward. L. ca. 450  $\mu$ .

England, France, Germany.

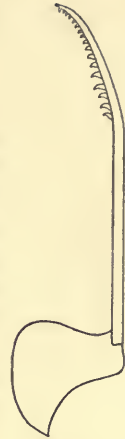


Fig. 7.  
*S. microcephalus*.  
Mdb. (<sup>200</sup>/<sub>1</sub>).

## C. Subfam. Zetorchestinae

Without Ptm. Cepth. anchylosed to Abd. Ventr. plate anchylosed to dors. Mdb. chelate. Legs arranged first 3 pairs near together, pair 4 distant, much larger than the others. Coxae and Femora greatly enlarged; formed for jumping.

1 genus with 1 species.

### 1. Gen. Zetorchestes Berl.

1885 *Carabodes* (part.), Canestrini, Prosp. Acarof., v. 1 p. 44 | 1885 *Leptorchistis* (corr. *Leptorchestes*, non *Leptorchestes* Thorell 1869!), Canestrini & Berlese in: Atti Soc. Veneto-Trent., v. 9 p. 207 | 1888 *Zetorchestes*, Berlese, A. M. S., fasc. 63 nr. 2.

Rost. hairs dorsal, mounted on chitinous apophyses. Lam. present. Second joint of palpus much the longest. Genital and anal covers close together at extreme rear of Abd. Ung. mond.

1 species.

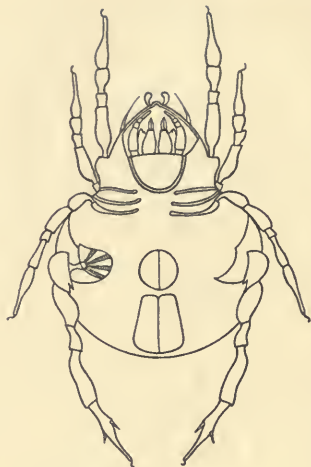


Fig. 8.  
*Zetorchestes micronychus* (<sup>75/1</sup>).  
Ventr. surface. The Acetabulum  
of leg 4 and the muscles moving the  
Coxa are shown on one side.

1. *Z. micronychus* (Berl., Can.) 1883 *Carabodes m.*, Berlese, A. M. S., fasc. 4\*) | 1885 *C. m.*, Canestrini, Prosp. Acarof., v. 1 p. 44 t. 2 bis | 1885 *Leptorchistis m.*, Canestrini & Berlese in: Atti Soc. Veneto-Trent., v. 9 p. 207 t. 7 | 1888 *Zetorchestes m.*, Berlese, A. M. S., fasc. 49 nr. 7.

Im. Blackish brown, polished; Lam. blades on edge broadest and sharply truncated anteriorly, no C. lam. Rost. hairs pectinated, borne on long chitinous apophyses, set further back than usual. Psstg. org. with longish slender peduncles and fusiform hairy head. Intlam. hair at extreme base of Cephth. Abd. sub-globose, without hairs or markings. Tarsus 4 with 2 and Tibia 4 with 1 short lanceolate spine in upper median line. Ung. minute. — Nph. with centre of Dors. of Abd. divided into 6 broad bands of which the 3 broadest are reticulated, the intermediate ones simply dotted. Lat. and post. parts of Abd. irregularly wrinkled. Psstg. org. like Im. No Rost. hairs or apophyses. — Im. L. 450  $\mu$ .

Algeria, Italy, Switzerland.

## D. Subfam. Notaspidae

1885 Subfam. *Nothridae* (part.), Berlese in: Bull. Soc. ent. Ital., v. 17 p. 126 | 1891 *N.*, Canestrini in: Atti Ist. Veneto, ser. 7 v. 2 p. 579 | 1892 *Nothrinae* (part.), Trouessart in: Rev. Sci. nat. Ouest, v. 2 p. 38\* | 1896 *Nothridae* (part.) + *Tegeocranidae* + *Leiosomidae* (part.) + *Damaeidae* (part.), Berlese, A. M. S., Crypt. II p. 36, 41.

Without Ptm. Cephth. ankylosed to Abd. ventr. plate ankylosed to dors. Mdb. chelate; legs 1—2 near together, 3 and 4 near together, crawling organs. With lamellae.

6 genera, 62 good and 8 doubtful species, 2 varieties.

Key to the genera.

- |   |   |   |  |
|---|---|---|--|
| 1 | { | Body rough and sculptured ( <i>Tegeocranidae</i> Berl.) — 2.  |  |
|   | { | Body smooth — 5.  |  |
| 2 | { | Cephth. and Abd. joined by a central projection of  |  |
|   | { | the former, or otherwise . . . . . 1. Gen. <i>Scutovertex</i> . . p. 28                             |  |
|   | { | Cephth. and Abd. separated by an unbroken line — 3.   |  |
| 3 | { | Ung. trid., Femora without thin peduncles . . . . . 2. Gen. <i>Cepheus</i> . . . p. 31              |  |
|   | { | Ung. mond.; Femora with thin peduncles — 4.   |  |
| 4 | { | Lam. very large, light colored blades . . . . . 3. Gen. <i>Tegeocranus</i> . . p. 33                |  |
|   | { | Lam. dark, low, solid ridges . . . . . 4. Gen. <i>Carabodes</i> . . p. 36                           |  |
| 5 | { | Last 3 pairs of legs inserted under the body . . . . . 5. Gen. <i>Liacarus</i> . . . p. 40          |  |
|   | { | Last 3 pairs of legs inserted at the edge of the body . . . . . 6. Gen. <i>Notaspis</i> . . . p. 43 |  |

### 1. Gen. *Scutovertex* Michael

1879 *Scutovertex*, Michael in: J. R. mier. Soc., v. 2 p. 241 | 1884 *S.*, Michael, Brit. Orib., v. 1 p. 296 | 1885 *S.*, Canestrini, Prosp. Acarof., v. 1 p. 7 | ?1895 *S.*, Banks in: Tr. Amer. ent. Soc., v. 22 p. 11 | 1896 *S.* + *Ameronothrus*, Berlese, A. M. S., Crypt. II p. 32, 46.

\*) A short note, printed inside wrapper of fasc.

Body rough and sculptured, dors. surface of Abd. not wholly divided from Cepth., but joined by a central projection or otherwise.

6 good and 1 doubtful species.

Key to the good species.

- |   |   |  |                                   |
|---|---|--|-----------------------------------|
| 1 | { | Terrestrial — 2.   |                                   |
|   | { | Aquatic — 4.   |                                   |
| 2 | { | Lam. blade-like; C. lam. large, rounded — 3.   |                                   |
|   | { | Lam. a mere thickened bar, no C. lam. — L. 540 $\mu$   | 5. <b>S. maculatus</b> . p. 30    |
| 3 | { | Ung. trid. — L. 600 $\mu$ . . . . .  | 6. <b>S. sculptus</b> . . p. 30   |
|   | { | Ung. mond. — L. 500 $\mu$ . . . . .  | 2. <b>S. caelatus</b> . . p. 29   |
| 4 | { | Psstg. org. with short peduncles and small globular head; Ung. trid. — 5.  |                                   |
|   | { | No Psstg. org. visible; Ung. mond. — L. 620 $\mu$ . .  | 1. <b>S. bilineatus</b> . . p. 29 |
| 5 | { | Markings on Dors. of Abd. ridges usually more or less zig-zag; 6 hairs on post. margin of Abd. but no indentations. — L. 680 $\mu$ . . . . .                 | 3. <b>S. corrugatus</b> . p. 29   |
|   | { | Markings on Dors. of Abd. projecting points, coalescing near ant. margin of Abd.; 2 indentations in post. margin of Abd. a spine in each. — L. 700 $\mu$ . . | 4. <b>S. harioti</b> . . . p. 30  |

1. **S. bilineatus** Michael 1888 *S. b.*, Michael, Brit. Orib., v. 2 p. 571 t. 54 f. 8—16 | 1896 *Ameronothrus b.*, Berlese, A. M. S., Crypt. II p. 32.

Im. Dark brown; dull, rough, rather like *S. maculatus*. Rost. blunt; Maxillae with a single median indentation and a small black denticle in the depression; Lam. thick, ill-defined ridges, usually with a similar Trlam. Surface of Cepth. covered with raised dots. No Psstg. nor Psstg. org. Abd. elliptical, with 2 large longitudinal, broken, irregular ridges on Dors. of Abd. sometimes absent, 2 or 3 very irregular transverse ridges anteriorly and posteriorly and raised dots like those on Cepth., but a little larger. Ung. mond. — Nph. very like that of *S. sculptus* but no Psstg. org. — Im. L. ca. 620  $\mu$ .

Aquatic, on fresh-water algae. England.

2. **S. caelatus** Berl. 1895 *S. c.*, Berlese, A. M. S., fasc. 74 nr. 1.

Im. Lightish smoky brown; dull, rough. Lam. very slightly raised; Trlam. mere line; C. lam. very long and large, widest at distal ends which are rounded. Psstg. org with thin peduncle and strongly clavate setose head. Rost. dotted, vertex with irregular vermiform striae; Abd. flatish, reticulated, elliptical, very slightly truncated anteriorly. 3 very small projections from post. margin, the 2 lat. bearing minute hairs, 2 pairs similar on lat. margin. Legs rough, apophysis on tibia 1 very long. Ung. mond. L. ca. 500  $\mu$ .

In moss. Northern Italy.

3. **S. corrugatus** Michael 1888 *S. c.*, Michael, Brit. Orib., v. 2 p. 567 t. 54 f. 1—7 | 1896 *Ameronothrus c.*, Berlese, A. M. S., Crypt. II p. 32.

Im. Dark brown; dull. Cepth. short. Rost. blunt, slightly trid. Lam. straight ridges. Psstg. org. small with short peduncle and head which looks globular, but is cup-shaped if magnified sufficiently. Dors. surface of Cepth. with several irregular ridges. Abd. rounded posteriorly. Dors. of Abd. slightly arched with numerous irregular ridges, mostly longitudinal with short transverse branches, rarely straight; 4 longitudinal rows

of fine small hairs on Dors. of Abd. springing from minute papillae. Dors. plate suffixed. Ung. trid. — Nph. Very like that of *S. sculptus*, but Psstg. org. shorter. — Im. L. ca. 680  $\mu$ .

Aquatic, on fresh-water algae. England.

4. *S. harioti* Michael 1891 *S. h.*, Michael in: Miss. Cap Horn, v. 8 p. L59.

Im. Dark brown; cuticle hard and rough, Cephth. Dors. of Abd., femora and coxae of legs 3, 4 thickly strewn with projecting points which are confluent on Cephth. and ant. part. of Abd., larger, more dispersed, and irregular on remainder of Abd., they are part of the epiostracum and rub off with it. Rost. rounded, Lam. scarcely visible. Cephth. without other markings. Psstg. org. with short peduncle and small globular head. Intlam. hair very small. Ung. large trid., very hetd. Abd. without markings other than the points above mentioned; central part of ant. margin of Abd. projects over Cephth. and coalesces with it. On each side of post. margin of Abd. is an indentation with a spine inserted; 2 longitudinal rows of about 3 extremely small hairs on Dors. of Abd. — Nph. Very like that of *S. bilineatus*, but Intlam. hair very long and thick, flagelliform. — Im. L. ca. 700  $\mu$ .

On marine algae. Terra del Fuego.

5. *S. maculatus* Michael 1882 *S. m.*, Michael in: J. R. micr. Soc., ser. 2 v. 2 p. 13 t. 1 f. 1—5 | 1884 *S. m.*, Michael, Brit. Orib., v. 1 p. 302 t. 18 f. 9—16 | 1896 *Ameronothrus m.*, Berlese, A. M. S., Crypt. II p. 32.

Im. Dark brown, almost black. Elliptical, rough, covered with raised dots. Lam. and Trlam. thickened bars. 2 ridges from the 2 Lam. join forming a V the point whereof lies in a semicircular indentation of ant. margin of Abd. Psstg. org. very short with broadly pyriform head. First 3 joints legs covered with raised dots. Dors. of Abd. with arched centre and broad, flat, peripheral band; all covered with raised dots of even size arranged irregularly on arched part, transversely on ant. margin of Abd., radiatingly on remainder of flattened band; about 10 short knob-headed hairs on hind margin. Ung. trid. — Nph. brown, broad, flat; covered with ridges and wrinkles of the cuticle which are arranged in a definite pattern on Cephth. and ant. margin of Abd., irregularly on remainder of Dors. of Abd. 8 spatulate hairs on post. margin, the 4 central of these the longest. — Im. L. ca. 540  $\mu$ .

On lichen near sea coast. England.

6. *S. sculptus* Michael 1879 *S. s.*, Michael in: J. R. micr. Soc., v. 2 p. 242 | 1884 *S. s.*, Michael, Brit. Orib., v. 1 p. 299 t. 18 f. 1—8 || non 1887 *Eremaeus ovalis*, Berlese, A. M. S., fasc. 35 nr. 7.

Im. Dark brown or black. Rost. blunt. Cephth. small, narrow, dotted. Lam. reticulated blades on edge; C. lam. long, blunt, curved; Trlam. a bar. Psstg. org. long, spatulate, rough; legs with femora enlarged, hind ones with blades. Tactile hair of leg 1 set on apophyses. Abd. oval, produced to a long thin point which is ankylosed to Cephth. Edge of Dors. of Abd. rough, post. margin with central lobe and indented on each side of it. A bag-shaped space of clear smooth chitin bordered by a ridge adjoins the centre of ant. margin of Abd.; a triangular dotted space bordered by a ridge lies on each side of the clear space. Central part of Dors. of Abd. irregularly and deeply pitted, lat. parts with small raised dots. 4 small, spatulate hairs on post. margin; a few similar on Dors. of Abd. Ung. trid.

— Nph. Light brown; very like that of *Oribata ovalis*. 2 square spaces, one in front of the other, in central line of Cepth., each divided by a median ridge. Psstg. dorsal near together. Psstg. org. long, lanceolate; Dors. of Abd. flat, deeply and irregularly wrinkled. — Im. L. ca. 600  $\mu$ .

In moss. Algeria, England.

**S. sp.**, (Berl.) 1887 *Eremaeus ovalis* (err., non C. L. Koch 1841!), Berlese, A. M. S., fasc. 35 nr. 7 | 1896 *Scutovertex o.*, Berlese, A. M. S., Crypt. II p. 46 || non 1879 *S. sculptus*, Michael in: J. R. micr. Soc., v. 2 p. 242.

Im. Blackish brown; dull, rough. Lam. straight, narrow blades on edge. Trlam. a low ridge; C. lam. very short, hardly existing. Psstg. org. with long thin peduncle and fusiform, spinous head. Abd. prolonged anteriorly, rounded posteriorly. Dors. of Abd. with clear polished, trapeze-shaped space near ant. margin, central parts irregularly rough; several diagonal ridges on hind part, the 2 inner forming a V.; 4 small clavate, spinous hairs on hind margin. L. 500  $\mu$ .

In moss. Italy.

Var. (1887 *Eremaeus ovalis* var. *siculus*, Berlese, A. M. S., fasc. 35 nr. 8.) A central ridge from ant. margin of Abd. along Vertex. 2 short longitudinal ridges on dors. surface of Abd. near ant. margin. Markings on dors. surface of Abd. wavy irregular lines of minute tubercles. No clear polished space. No ridges. — Sicilia (Palermo).

## 2. Gen. **Cepheus** C. L. Koch

1835 *Cepheus*, C. L. Koch, C. M. A., fasc. 3 t. 11 | 1842 *C.*, C. L. Koch, Übers. Arach., v. 3 p. 104 | 1855 *C.*, Nicolet in: Arch. Mus. Paris, v. 7 p. 444 | 1884 *C.*, Michael, Brit. Orib., v. 1 p. 284.

Body rough and sculptured, dotted or reticulated. Dors. surface of Abd. separated from Cepth. by an unbroken line. Lam. large, undulating, blade-like, light-colored, sloping or horizontal. Tectp. usually very large. Femora without thin peduncles. Ung. trid.

5 good and 1 doubtful species.

Key to the good species.

- |   |  |   |
|---|--|---|
| 1 | { Psstg. org. almost globular, sunk in Psstg. Markings on Dors. of Abd. double rows of alternate pits; a ridge between each double row. — L. 600 $\mu$ | 3. <i>C. ocellatus</i> . . . p. 32  |
|   |  | { Psstg. org. projecting from Psstg.; markings on Dors. of Abd. irregularly scattered — 2.                              |
| 2 | { Ung. hetd.; Lam. separated anteriorly by a wide space. — L. 800 $\mu$ . . . . .  | 1. <i>C. bifidatus</i> . . . p. 32  |
|   |  | { Ung. homd.; Lam. nearly touching anteriorly — 3.  |
| 3 | { Psstg. org. fusiform; hairs on Dors. of Abd. long. — L. 1,25 mm . . . . .  | 5. <i>C. variolosus</i> . . . p. 33   |
|   |  | { Psstg. org. clavate — 4.  |
| 4 | { Psstg. org. long and straight; Intlam. hair in the usual position. — L. 900 $\mu$ . . . . .  | 4. <i>C. tegeocranus</i> . p. 32  |
|   |  | { Psstg. org. short and recurved; almost pyriform; Intlam. hair springing from base of Lam. itself. — L. 1 mm . . . . . |

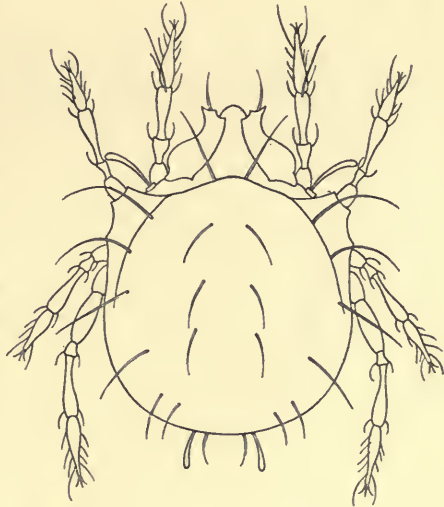


Fig. 9. *C. bifidatus* (55/1).

1. **C. bifidatus** Nic. 1855 *C. b.*, Nicolet in: Arch. Mus. Paris, v. 7 p. 446 t. 31 | 1884 *C. b.*, Michael, Brit. Orib., v. 1 p. 290 t. 16 f. 8; t. 52 f. 2—3.

Im. Dark brown or black, legs lighter; dull, broad. Lam. wide, undulated, reticulated blades set at angle of about 45°; C. lam. broad, truncated; Lam. hair from middle of truncated edge; Lam. widely separated anteriorly; Psstg. at edge of Cepth. directed forward and outward; Psstg. org. long, curved, almost filiform. Ung. very hetd. Abd. broad, rough, rounded posteriorly, truncated anteriorly; antero-lateral angles elongated, rough. 4 rows of large hairs on Dors. of Abd. — Nph. Of the type of that of *Tegeocranus latus*, light buff, almost white, legs and Rost. pinkish; rough granular, elliptical. Psstg. org. serrated spines; Intlam. hair similar; Dors. of Abd. flat; cast dorsal skins of Abd. carried flat, centre of each skin slightly in advance of that below it; larval skin bordered by about 17 thin, curved, sparsely-serrated spines, and has 3 pairs on Dors. of Abd. Each nymphal skin bordered by about 20 chitinous conical papillae, each bearing an extremely long, slender, sparsely serrated spine; some as long as the body, variously curved, hinder spines slightly flexible. — Im. L. ca. 800  $\mu$ .

England, France.

2. **C. latus** Nic. 1855 *C. l.*, Nicolet in: Arch. Mus. Paris, v. 7 p. 446 t. 7 f. 9 | 1877 *C. l.*, Canestrini & Fanzago in: Atti Ist. Veneto, ser. 5 v. 4 p. 87 | 1884 *C. l.*, Michael, Brit. Orib., v. 1 p. 295 t. 17 f. 12 | 1888 *C. l.*, Berlese, A. M. S., fasc. 49 nr. 5.

Im. Walnut-brown, legs lighter; dull, coarsely reticulated or pitted. Rost. blunt, Lam. light colored, very wide, almost horizontal, rounded and meeting anteriorly. Psstg. org. short, pyriform, recurved. No Intlam. hair in the ordinary position, but a large rod-like hair springs from the inside of each Lam. Tectp. very large. Legs shorter than those of *C. tegeocranus*. Abd. broad, rounded posteriorly, truncated anteriorly, Dors. of Abd. arched with 4 rows of very small spines. L. ca. 1 mm.

England, France, Italy, Netherlands.

3. **C. ocellatus** Michael 1882 *C. o.*, Michael in: J. R. micr. Soc., ser. 2 v. 2 p. 1 t. 1 f. 1—9 | 1884 *C. o.*, Michael, Brit. Orib., v. 1 p. 287 t. 16 f. 1—7 | 1896 *Scutovertex o.*, Berlese, A. M. S., Crypt. II p. 46.

Im. Dark brown or almost black; dull without polish. Rost. sharp, Mdb. small, Cepth. more than  $\frac{1}{3}$  of total length, flat. Lam. large, light colored, fleshy-looking blades far apart, usually nearly horizontal, widest posteriorly truncated anteriorly, a thick curved spine from lower angle of truncation nearly touches the point of Röst., a longer thinner spine from upper angle runs parallel to first; Trlam. a low thick ridge. Psstg. large, wide, facing straight upward; Psstg. org. almost globular, slightly pyriform, sunk in Psstg. Legs rough; Abd. oval, truncated anteriorly antero-lateral angles produced forward. A broad flattened margin round Dors. of Abd. (except ant. margin); this margin is transversely striated and bears a row of short, blunt spines. Central part of Dors. of Abd. arched and divided by ridges into bands each containing a double alternating row of pits. — Nph. Very like that of *Liacarus palmicinctus*, but scales much smaller and the nervures branched irregularly instead of reticulated. — Im. L. ca. 600  $\mu$ .

On lichens. England.

4. **C. tegeocranus** (Herm.) 1804 *Notaspis t.*, Hermann, Mém. apt., p. 93 t. 4 f. 3—5 | 1844 *Oribata t.*, Gervais in: Walckenaer, Ins. Apt., v. 3 p. 258 | 1877 *Cepheus t.*,



Canestrini & Fanzago in: Atti Ist. Veneto, ser. 5 v. 4 p. 87 | 1884 *C. t.*, Michael, Brit. Orib., v. 1 p. 293 t. 17 f. 1—11 | 1887 *C. t.*, Berlese, A. M. S., fasc. 36 nr. 2 | 1855 *C. vulgaris*, Nicolet in: Arch. Mus. Paris, v. 7 p. 445 t. 31 f. 8.

Im. Color varies from light yellow-brown to black, legs lighter than body; coarsely reticulated (looks pitted under low amplification), rough. Rost. blunt; Lam. very wide, curved, light-colored blades meeting anteriorly, inner ant. angles pointed. Lam. hair long, rough. Psstg. org. long, straight; clavate. Intlam. hair large, rod-like. Tectp. very large; Ung. almost homd. Abd. rounded posteriorly truncated anteriorly; Dors. of Abd. arched, with 4 rows of short spines, a smaller row round post. margin. — Nph. About twice as long as greatest breadth, polished, colorless, transparent; internal organs shew and are brightly colored; appears divided into 3 parts. Psstg. org. short, clavate, curving backward and outward. Intlam. hair very long, flexible; a similar pair in front of them. Abd. oval, pointed posteriorly about 12 long, flexible hairs round margin, 2 pairs on Dors. of Abd. — Im. L. ca. 900  $\mu$ .

Algeria, Belgium, England, France, Germany, Italy, Netherlands, Sweden.

5. **C. variolosus** Berl. 1888 *C. v.*, Berlese in: Bull. Soc. ent. Ital., v. 20 p. 216 t. 13 f. 4.

Im. Black, dors. and ventr. surfaces deeply pitted; Psstg. org. long with fusiform head. Lam. undulated, separated anteriorly by a narrow slit. Intlam. hair very long. Abd. round posteriorly. Femora 3 and 4 with spine-like process at distal end. Dors. of Abd. with long whitish irregular rod-like hairs. L. ca. 1,25 mm.

Under bark of trees. Brazil (Matto-grosso).

**C. punctulatus** Banks 1895 *Cephus* (sic) *p.*, Banks in: Tr. Amer. ent. Soc., v. 22 p. 10.

Im. Dark reddish „finely punctulate“, Cepth. narrow, Lam. nearly reaching tip of Rost. truncated anteriorly „With several short and 1 long hair each side“. Intlam. hair moderate. Psstg. org. short, clavate. Abd. elliptical, with 2 short stiff hairs on each shoulder; 6 near post. end, one each post. side; ventr. surface granular. L. 850  $\mu$ . — A very insufficiently described species, not figured; doubtful if really a *Cepheus*.

In decaying fungus and on weeds. New York State.

### 3. Gen. **Tegeocranus** Nic.

1835 *Cepheus* (part.), C. L. Koch, C. M. A., fasc. 3 t. 11 | 1842 *C.* (part.), C. L. Koch, Übers. Arach., v. 3 p. 104 | 1855 *Tegeocranus* (part.), Nicolet in: Arch. Mus. Paris, v. 7 p. 464 | 1884 *T.* (part.), Michael, Brit. Orib., v. 1 p. 306 | 1896 *T.* + *Tectocephus*, Berlese, A. M. S., Crypt. II p. 46, 47 | 1885 *Carabodes* (part.), Canestrini, Prosp. Acarof., v. 1 p. 9 | 1892 *C.*, Trouessart in: Rev. Sci. nat. Ouest, v. 2 p. 48\*.

Body rough and sculptured; dors. surfaces of Cepth. and Abd. usually separated by a distinct unbroken line. Lam. large, thin, undulated blades, usually more or less light-colored. Dors. of Abd. usually, but non invariably, with a border different from the centre. Femora of first 2 pairs of legs with thin peduncles. Ung. mond.

6 species.

Key to the species.

- 1 { Cepth. and Abd. divided by a distinct line — 2.  
 { Cepth. and Abd. not demarcated from each other.  
 (*Tectocephus* Berl.) — L. 320  $\mu$  . . . . . 6. **T. velatus** . . . . . p. 35

- 2 { Psstg. org. shortish, clavate — 3.
- 2 { Psstg. org. long, setiform, pectinated on ant. edge  
L. 320  $\mu$  . . . . . 5. **T. leporosus** . . . p. 35
- 3 { Marginal band of Dors. of Abd. different from centre — 4.
- 3 { No different band on Dors. of Abd. Lam. straight  
and rather small. — L. 590  $\mu$  . . . . . 3. **T. hericius** . . . . p. 34
- 4 { Upper edge of Lam. curved, without points — 5.
- 4 { Lam. with 2 strong points or angles projecting  
from upper edge. — L. 800  $\mu$  . . . . . 2. **T. dentatus** . . . . p. 34
- 5 { Lam. separated anteriorly by a considerable space
- 5 { — L. 900  $\mu$  . . . . . 4. **T. latus** . . . . . p. 35
- 5 { Lam. joined at their ant. bases. — L. 620  $\mu$  . . . . . 1. **T. cepheiformis** . . p. 34

1. **T. cepheiformis** Nic. 1855 *T. c.*, Nicolet in: Arch. Mus. Paris, v. 7 p. 465 t. 9 f. 1 | 1885 *T. c.*, Michael in: Abh. Ver. Bremen, v. 9 p. 207 | 1888 *T. c.*, Michael, Brit. Orib., v. 2 p. 340 t. 25 f. 1—7 || non 1886 *T. c.*, Berlese, A. M. S., fasc. 33 nr. 7.

Im. Very like *T. latus*, but Lam. at their ant. ends joined at the base and above the join leaving only a thin line between them instead of a considerable space as in *T. latus*. Dors. of Abd. irregularly reticulated by raised rough ridges, reticulations large, spaces between slightly depressed, granular. — Nph. Resembles that of *T. latus*, but the projections from the edge of Dors. of Abd. and of each skin of the Dors. of Abd. different in form, and each bears a transparent leaf-like scale with spinulated midrib instead of a serrated spine. — Im. L. ca. 620  $\mu$ .

In fir woods etc. England, France, Germany.

2. **T. dentatus** Michael 1888 *T. d.*, Michael, Brit. Orib., v. 2 p. 338 t. 26 f. 1—7, 9.

Im. Very like *T. latus* but differs in having Lam. with a blunt point at ant. end bearing Lam. hair; post. to this outline concave but rises to a large sharp point about the middle. Psstg. org. long, almost filiform, distal end truncated. Dors. of Abd. (except border) reticulated, reticulations large, rough, irregular, spaces between sunk and finely dotted. — Nph. Like that of *T. latus* but the brown projections round margin of Dors. of Abd. are quadrifid, not trifid as in *T. latus*, the extra point being at the insertion of the serrated spine, which spine is longer than in *T. latus* — Im. L. ca. 800  $\mu$ .

On dead wood. England.

3. **T. hericius** Michael 1888 *T. h.*, Michael, Brit. Orib., v. 2 p. 346 t. 25 f. 8—13; t. 26 f. 10.

Im. Dark yellow-brown, very rough, pyriform. Cepth. long narrow; Dorso-vertex reticulated. Lam. nearly straight, reticulated blades on edge, smaller than those of *T. latus*, near together anteriorly. Psstg. org. almost upright, with peduncles of moderate length, and large, shortly pyriform, rough head. Whole edge of Dors. of Abd., except ant. margin, broken by strong, rough projections bearing thick curved hairs. Dors. of Abd. not much arched, edge slightly turned upward; no border, ornamentation similar over whole Dors. of Abd. vizt irregular reticulations formed of very strong rough ridges with deep granular pits between. — Nph. Of the type of that of *T. latus*. but the projections round Dors. of Abd. and dorsal skins mostly split into 3 bifid lobes and the large spines spinulated, not merely serrated. — Im. L. ca. 590  $\mu$ .

On oak-trees. England.

4. **T. latus** (C. L. Koch) 1835 *Cepheus l.*, C. L. Koch, C. M. A., fasc. 3 t. 11 (probably) | 1884 *Tegeocranus l.*, Michael, Brit. Orib., v. 1 p. 310, 340 t. 19 f. 1—9 | 1885 *Carabodes l.*, Canestrini, Prosp. Acarof., v. 1 p. 42 | ? 1886 *Tegeocranus cepheiformis*, Berlese, A. M. S., fasc. 33 t. 7.

Im. Dark, dull brown. Rough; Shape broad, rounded; Cepth. pyramidal; Lam. large, clearly reticulated blades on edge with sinuated upper edge without points, and separated anteriorly by a space. Trlam. a short bar. Psstg. org. medium length, clavate, slightly recurved. Intlam. hair rod-like. Abd. broad, rounded, truncated anteriorly, clearly divided from Cepth. Dors. of Abd. with central part arched, covered with short irregular rough corrugations; periphery (except ant. margin) has 2 borders, which unite anteriorly; inner one broad, granular, sloping; outer with rough edge and transverse striations; ant. corners rough, projecting. No hairs on Dors. of Abd., a few very fine hairs on post. margin. — Lv. Brownish-white, semi-opaque, granular, oval. Intlam. hair strongly serrated, slightly curved spines of clear chitin; 4 pairs of similar spines on dors. surface and 6 pairs on post. margin of Abd. — Nph. Color and texture as in Lv., but rather darker and rougher; form elliptical, getting broader with each ecdysis. Dors. of Abd. nearly flat, cast skins carried, larval in centre, nymphal forming concentric borders. Round margin of each nymphal skin are about 20 large, flat, chitinous, brown, trifid or quadrifid projections. The central lobe of each projection bears a long, doubly curved, strongly serrated spine of clear chitin. — Im. L. ca. 900  $\mu$ .

On dead wood. Algeria, England, France, Germany, Sweden.

5. **T. leporosus** (Haller) 1884 *Eremaeus l.*, Haller in: Arch. Naturg., v. 50 I p. 225.

Im. Covered with irregularly scattered raised dots; Lam. very complicated forming 2 curves joined at their points, both concave inwards, the hinder shell-like, much wider but not longer than the anterior. Trlam. a line. C. lam. large. Rost. hairs and Lam. hair setiform, equal-sized; Psstg. org. long, setiform, pectinated on the ant. edge, Abd. with a distinct border marked like remainder of dors. 8 longitudinal rows of short setiform hairs on Dors. of Abd. L. 320  $\mu$ .

America.

6. **T. velatus** Michael 1880 *T. v.*, Michael in: J. R. micr. Soc., v. 3 p. 189 t. 6 f. 6—9 | 1884 *T. v.*, Michael, Brit. Orib., v. 1 p. 313 t. 31 f. 9—15 | 1895 *Tectocephus v.*, Berlese, A. M. S., fasc. 77 nr. 2.

Im. Dull brown, not dark; roughened by irregular raised dots which are on an outer easily detached skin which rubs off in parts leaving smooth chitin below. Cepth. long; Lam. large, detached, nearly horizontal, dotted blades. C. lam. long, nearly reaching tip of Rost. Trlam. a line only but distinct. Psstg. org. long, with slender peduncles and almost discoidal head bearing scattered points. No Intlam. hair. Legs not half the length of body, coxae and Femora broad and flat. Dors. of Abd. not much arched; without border; antero-lateral corners flat and very projecting, making ant. margin; the widest part of Abd. 6 very short hairs round post. margin. — Nph. Pale grey, slightly granular. Rost. blunt. Cepth. with 4 longitudinal and some transverse ridges. Psstg. org. much like Im., but heads more pyriform. Abd. and Cepth. almost coalesce. There is a

raised, longitudinal, irregular band and about 4 raised transverse curved bands each composed of 3 or 4 parallel wrinkles. — Im. L. ca. 320  $\mu$ .

In moss. England.

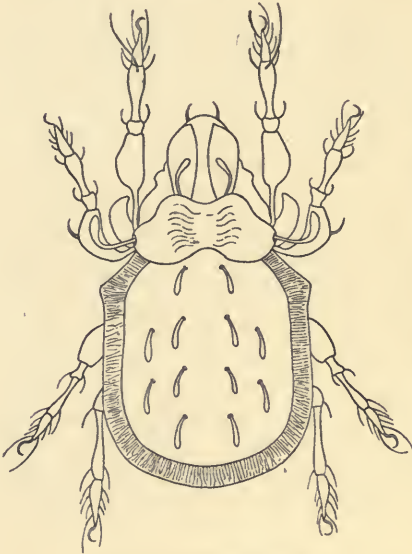


Fig. 10. *C. coriaceus* (<sup>80</sup>/<sub>1</sub>).

4. Gen. **Carabodes** C. L. Koch

1835 *Carabodes*, C. L. Koch, C. M. A., fasc. 3 t. 15 | 1842 *C.*, C. L. Koch, Übers. Arach., v. 3 p. 107 | 1885 *C.* (part.), Cane-strini, Prosp. Acarof., v. 1 p. 9 | 1895 *C.*, Banks in: Tr. Amer. ent. Soc., v. 22 p. 12 | 1896 *C.*, Berlese, A. M. S., Crypt. II p. 45 | 1855 *Tegeocranus* (part.), Nicolet in: Arch. Mus. Paris, v. 7 p. 464 | 1884 *T.* (part.), Michael, Brit. Orib., v. 1 p. 306.

Body rough and sculptured, dors. surface of Cepth. and Abd. separated by a distinct unbroken line or deep furrow. Lam. dark, low, solid ridges or thick horizontal plates. Femora of first 2 pairs of legs with thin peduncles. Ung. mond.

10 good and 3 doubtful species.

Key to the good species.

- 1 { Dors. of Abd. with a marginal band differently marked from the central part — 2.
- 1 { Dors. of Abd. without any differently marked marginal band — 6.
- 2 { Cepth. with longitudinal ridges between the 2 Lam.
- 2 { Dors. of Abd. hairless — 3.
- 2 { No longitudinal ridges between Lam. Dors. of Abd. bearing hairs — 4.
- 3 { 3 toothed ridges between Lam. Markings on central part of Dors. of Abd. deep pits divided from marginal band by a raised ridge. — L. 590  $\mu$  . . . . . 3. *C. clypeatus* . . p. 37
- 3 { Only 1 central, untoothed ridge on Cepth. Markings on central part of Dors. of Abd. a few almost straight bands with undulated sides. — L. 620  $\mu$  . . . . . 6. *C. femoralis* . . p. 38
- 4 { Abd. broad; hairs bordering it short, fine, radial — 5.
- 4 { Abd. very long, hairs bordering it thick and curved, lying along its edge. — L. 680  $\mu$  . . . . . 5. *C. elongatus* . . p. 37
- 5 { Markings on central part of Dors. of Abd. numerous, long, rough, irregular curved bands. — L. 620  $\mu$  . . . . . 4. *C. coriaceus* . . p. 37
- 5 { Markings on Dors. of Abd. raised dots. — L. 500  $\mu$  . . . . . 9. *C. marginatus* . . p. 39
- 6 { Markings on Dors. of Abd. raised dots — 7.
- 6 { Markings on Dors. of Abd. ridges — 9.
- 7 { Hairs on post. margin short and fine — 8.
- 7 { Hairs on post. margin capitate. — L. 400  $\mu$  . . . . . 7. *C. granulatus* . . p. 38
- 8 { Cepth. arched between Lam. — L. 450  $\mu$  . . . . . 8. *C. labyrinthicus* . . p. 38
- 8 { Cepth. with an elevated triangle, with concave sides between Lam. — L. 400  $\mu$  . . . . . 2. *C. brevis* . . . . . p. 37
- 9 { Ridges longitudinal 15 or 16. — L. ca. 1,25 mm . . . . . 10. *C. papillosus* . . p. 39
- 9 { Ridges forming an irregular reticulation. — L. 450  $\mu$  . . . . . 1. *C. apicalis* . . . . . p. 37

1. **C. apicalis** Banks 1895 *C. a.*, Banks in: Tr. Amer. ent. Soc., v. 22 p. 13.

Im. Apparently very like *C. labyrinthicus* but some small ridges on Dorsal-vertex. Dors. of Abd. irregularly reticulate with ridges; only 2 longitudinal sub-median rows of 3 spatulate hairs, but 10 or 12 similar round post. margin; ventr. surface smooth; genital opening circular, close to anal. L. 450  $\mu$ .

New York State.

2. **C. brevis** Banks 1896 *C. b.*, Banks in: Tr. Amer. ent. Soc., v. 23 p. 77.

Im. Dark red-brown, legs yellowish. Cepth. with a long triangular elevated central region with concave sides. Lam. plate-like. Psstg. org. with short peduncles and globular head. Abd. a little longer than broad, truncated anteriorly, rounded posteriorly. Dors. of Abd. strongly pitted and bearing 4 longitudinal rows of stiff curved hairs. Apparently very like *C. labyrinthicus* except for the central triangle on Cepth. L. 400  $\mu$ .

In dead fungus. New York State.

3. **C. clypeatus** (Nic.) 1855 *Tegeocranus c.*, Nicolet in: Arch. Mus. Paris, v. 7 p. 467 t. 9 f. 3.

Im. Black, legs dark brown. Psstg. orange-yellow. Rough, dull. Lam. straight, thick, smooth ridges; between them 3 parallel toothed ridges; Psstg. very lateral; Psstg. org. moderate length, clavate; Abd. much longer than broad, sinuated and projecting in centre over Cepth., rounded posteriorly. An elliptical depression with bordering ridge and reticulated centre occupies centre of Dors. of Abd.; 3 converging conical elevations, point forward, spring from inner post. edge of ridge. In front of ellipse a trapeze-shaped depression bordered by a ridge and with a raised oval in centre. Outside oval and trapeze a concave border with a raised ridge at outer edge. 2 hairs on post. margin, none on Dors. of Abd. L. 590  $\mu$ .

France. Rare.

4. **C. coriaceus** C. L. Koch 1835 *C. c.*, C. L. Koch, C. M. A., fasc. 3 t. 15 | 1884 *Tegeocranus c.*, Michael, Brit. Orib., v. 1 p. 316 t. 20 f. 1-8; t. 22 f. 11 | 1896 *Cepheus c.*, Oudemans in: Tijdschr. Ent., v. 39 p. 54 || non 1886 *Carabodes c.*, Berlese, A. M. S., fasc. 33 nr. 8.

Im. Black, dull, very rough; chitin thick, Cepth. long broad, as wide as ant. margin of Abd. Dorsal-vertex lighter with 2 small curved ridges which join a large, rough, transverse ridge with a central depression, a deep trench between this ridge and ant. margin of Abd. Lam. large, thick, rough, horizontal, almost reaching point of Rost. No Trlam. Psstg. org. long, proximal portion nearly straight, terminal clavate, rough. Legs short, Femur rough. Abd. nearly as broad as long, margin (except ant.) with broad, flat border with irregular edge and radiating ridges. Remainder of Dors. of Abd. divided into numerous rough curved bands marked like Morocco-leather. 4 rows of spatulate white hairs on Dors. of Abd. — Nph. Like a *Tyroglyphus*, semi-transparent, white; Rost. and legs pink, polished, no markings. Body very thick with 2 rows of long hairs. Legs short. — Im. L. ca. 620  $\mu$ .

In fungi etc. Algeria, England, Germany, ?Netherlands.

5. **C. elongatus** (Michael) 1879 *Tegeocranus e.*, Michael in: J. R. micr. Soc., v. 2 p. 250 t. 10 | 1884 *T. e.*, Michael, Brit. Orib., v. 1 p. 324 t. 22 f. 4-10 | 1888 *Car-*

*bodes e.*, Berlese, A. M. S., fasc. 50 nr. 1 | ?1893 *Hermannia oblonga*, Karpelles in: Math. naturw. Ber. Ungarn, v. 11 p. 93 t. 20 f. 3 | ?1895 *Carabodes o.*, Banks in: Tr. Amer. ent. Soc., v. 22 p. 13.

Im. Black, rough, dull; very long-shaped, line of Cephth. and Abd. continous. Cephth. as broad as ant. margin of Abd. Cephth. and Dors. of Abd. coarsely pitted. Lam. narrow, reticulated. No Trlam. Psstg. org. long, recurved, gradually widened, square ended with 3 or more projecting points on the end continued as ridges on the side. Lam. and Intlam. hair long, thick, recurved. Abd. widest posteriorly. Dors. of Abd. (except ant. margin) with narrow, transversely striated border and 4 rows of thick curved hairs; a row round margin of smaller similar hairs recurved and arranged along the margin, not radiating. — Nph. White or grey, having the form of the Im.; otherwise very similar to that of *C. coriaceus*. — Im. L. ca. 680  $\mu$ .

In decayed wood, moss etc., Nph. burrows. Algeria, England, Italy.

6. **C. femoralis** (Nic.) 1855 *Tegeocranus f.*, Nicolet in: Arch. Mus. Paris, v. 7 p. 466 t. 9 f. 2 | 1884 *T. f.*, Michael, Brit. Orib., v. 1 p. 318 t. 20 f. 9 | 1885 *Carabodes f.*, Canestrini, Prosp. Acarof., v. 1 p. 43 | 1886 *C. f.*, Berlese, A. M. S., fasc. 33 nr. 9.

Im. Black, rough; chitin thick. Cephth. narrower than ant. margin of Abd., flat trapeze-shaped. Dorso-vertex with central ridge, and a transverse ridge and trench almost similar to those of *C. coriaceus*. Lam. thick, horizontal, raised in median line forming an angle, massive. No Lam. hair, Intlam. hair nor Trlam. Psstg. org. long filiform. Legs short, femora rough. Abd. longer than broad, almost parallel sided, round posteriorly. Ant. margin of Abd. raised forming a ridge. Abd. (except ant. margin) with border like *C. coriaceus*. Dors. of Abd. within margin divided into 5 or 6 longitudinal irregular raised bands. No hairs on Dors. of Abd. L. ca. 620  $\mu$ .

England, France, Italy.

7. **C. granulatus** Banks 1895 *C. g.*, Banks in: J. N. York ent. Soc., v. 3 p. 128.

Im. Black, Cephth. granular, broad, truncate anteriorly. Lam. „plate-like“. Intlam. hair and Psstg. org. short clavate. Abd. rougly granular, longer than broad, parallel sided, truncated anteriorly, rounded posteriorly. 4 pairs of short capitale hairs on post. margin. 4 longitudinal rows of hairs on Dors. of Abd. Genital opening  $1\frac{1}{2}$  times as long as broad. Very like *C. labyrinthicus*, except capitate hairs on post. margin. L. 400  $\mu$ . — Imperfectly described and not figured.

In sphagnum-swamp. New York State.

8. **C. labyrinthicus** (Michael) 1879 *Tegeocranus l.*, Michael in: J. R. micr. Soc., v. 2 p. 249 t. 11 f. 2, 3 | 1884 *T. l.*, Michael, Brit. Orib., v. 1 p. 319 t. 21 f. 1—4, 6—8; t. 22 f. 3.

Im. Dark red-brown, rough, dull. Rost. blunt, Cephth. broad, rough, reticulated. Lam. thick, narrow, horizontal, almost reaching tip of Rost. No Trlam. nor Intlam. hair. Psstg. org. recurved with slender peduncles and pyriform head excavated on one side. Femora enlarged, rough. Abd. longer than broad, antero-lateral corners projecting. Dors. of Abd. much arched, no border, covered with large irregular raised dots; 4 rows of short curved hairs on Dors. of Abd., a row of straight hairs round post. margin. — Nph. Almost white, Rost. and legs brownish; semi-transparent, thick and fat-looking; a few transverse wrinkles near Dors. of Abd. 4 pairs of

longish straight hairs on post. margin; a few shorter and curved on Dors. of Abd. and sides. — Im. L. ca. 450  $\mu$ .

In moss. England.

9. **C. marginatus** (Michael) 1884 *Tegeocranus m.*, Michael, Brit. Orib., v. 1 p. 322 t. 21 f. 5; t. 22 f. 1—2 | 1886 *Carabodes coriaceus*, Berlese, A. M. S., fasc. 33 nr. 8.

A species intermediate between *C. coriaceus* and *C. labyrinthicus*. — Im. Dark red-brown, rough, dull. Cepth. large, broad, rough. Lam. large, thick horizontal, reticulated, nearly reaching tip of Rost. Trlam. a line but well marked. Transverse ridge and trench as in *C. coriaceus*. Psstg. org. curved forward, gradually thickened till near end, then deminishing. Rough with long spines on outer side of curve. Margin of Dors. of Abd. bordered by a flat band with radiating ridges. Remainder of Dors. of Abd. covered with large irregularly placed, raised dots. — Nph. Very like that of *C. coriaceus*. — Im. L. ca. 500  $\mu$ .

In moss. Algeria, England, Italy.

10. **C. papillosus** (H. Luc.) 1849 *Oribates p.*, H. Lucas in: Expl. Algérie, An. artic., p. 319 t. 22 f. 12.

Im. Black, rough, coarsely granular, a dusty shade in parts. Species somewhat resembles *C. femoralis*. Cepth. narrower than ant. margin of Abd. flat, trapeze-shaped. Dorso-vertex with central ridge and a transverse ridge and trench almost similar to those of *C. coriaceus*. Lam. thick, massive, raised. No Lam. hair, Intlam. hair or Trlam. (apparently) Psstg. org. not described. A strong pointed projection between legs 2—3. Abd. almost orbicular, with numerous (15 or 16) deep irregular longitudinal sulcations with ridges between; 4 sparse longitudinal rows of thick, spatulate whitish hairs on Dors. of Abd. No different border. L. 1,25 mm.

Algeria.

**C. cephalotes** C. L. Koch 1835 *C. c.*, C. L. Koch. C. M. A., fasc. 3 t. 16 | 1840 *Nothrus cynocephalus*, C. L. Koch, C. M. A., fasc. 30 t. 8 | 1842 *Carabodes c.*, C. L. Koch, Übers. Arach., v. 3 p. 107.

Im. Small, dark brown, rough. Psstg. org. long, clavate; Abd. about twice as long as Cepth. half as long again as broad bordered with rather distant short straight hairs arranged radially. Apparently a good species and belonging to this genus from description of Femora, but imperfectly described and not found since Koch.

Germany.

**C. dorsalis** Banks 1896 *C. d.*, Banks in: Tr. Amer. ent. Soc., v. 23 p. 77.

Im. Pale brownish yellow. Cepth. convex with outlines of a broad T-mark. Psstg. org. clavate, of moderate length. Abd.  $1\frac{1}{2}$  longer than broad, sides nearly parallel; rounded posteriorly, coarsely granular; 4 longitudinal rows of stiff curved hairs on Dors. of Abd. L. 450  $\mu$ .

New York State.

**C. niger** Banks 1895 *C. nigra*, Banks in: Tr. Amer. ent. Soc., v. 22 p. 12.

Im. Black, legs yellowish or reddish; apparently very like *C. marginatus*, possibly identical, but with spatulate Intlam. hair. Psstg. org. not stated to be curved or spiniferous; genital and anal openings approximate. L. 500  $\mu$ .

In fungi etc. New York State.

5. Gen. **Liacarus** Michael\*)

1842 *Oribates* (part.), C. L. Koch, Übers. Arach., v. 3 p. 99 | 1855 *Leiosoma* (non Stephens, Coleopt., 1831!), Nicolet in: Arch. Mus. Paris, v. 7 p. 439 | 1884 *L.*, Michael, Brit. Orib., v. 1 p. 273 | 1885 *L.*, Canestrini, Prosp. Acarof., v. 1 p. 7 | 1896 *L.*, Berlese, A. M. S., Crypt. II p. 58 | 1892 *Liosoma*, Trouessart in: Rev. Sci. nat. Ouest, v. 2 p. 48\*.

Body smooth. Last 3 pairs of legs inserted under the body. Ung. trid. in all known species.

9 good and 1 doubtful species.

Key to the good species.

- |   |   |  |                           |       |
|---|---|--|---------------------------|-------|
| 1 | } | Abd. oval, elongated — 2.  |                           |       |
|   |   | Abd. as broad as long — 6.   |                           |       |
| 2 | } | A central mucro between the ant. ends of the Lam. — 3.   |                           |       |
|   |   | No such mucro — 5.   |                           |       |
| 3 | } | Mucro short, scarcely if at all passing points of C. lam. — 4.   |                           |       |
|   |   | Mucro long, almost reaching tip of Rost. — L. 1,25 mm  | 7. <b>L. nitens</b>       | p. 41 |
| 4 | } | Psstg. org. fusiform with a terminal hair. — L. 850 $\mu$  | 1. <b>L. coracinus</b>    | p. 40 |
|   |   | Psstg. org. with short peduncle and globular head<br>— L. 450 $\mu$ . . . . .                                | 2. <b>L. globifer</b>     | p. 41 |
| 5 | } | Abd. with a suture each side forming a lat border.<br>Psstg. org. long and setiform — L. 880 $\mu$ . . . . . | 6. <b>L. marginatus</b>   | p. 41 |
|   |   | Abd. without lat. border. Psstg. org. short and<br>clavate. — L. 650 $\mu$ . . . . .                         | 8. <b>L. ovatus</b>       | p. 42 |
| 6 | } | Abd. globular (hemispherical) — 7.   |                           |       |
|   |   | Abd. shield-shaped. — L. 1,05 mm . . . . .   | 4. <b>L. lativentris</b>  | p. 41 |
| 7 | } | Abd. with 4 long hairs on post. margin — L. 700 $\mu$  | 5. <b>L. longipilis</b>   | p. 41 |
|   |   | Abd. hairless — 8.   |                           |       |
| 8 | } | Lam. far apart anteriorly connected by a slender<br>Trlam. Psstg. org. clavate. — L. 1 mm . . . . .          | 9. <b>L. palmicinctus</b> | p. 42 |
|   |   | Lam. joined anteriorly. Psstg. org. fusiform sessile.<br>— L. 1,02 mm . . . . .                              | 3. <b>L. globosus</b>     | p. 41 |

1. **L. coracinus** (C. L. Koch) 1841 *Oribates c.*, C. L. Koch, C. M. A., fasc. 31 t. 1 | 1885 *Leiosoma c.*, Canestrini, Prosp. Acarof., v. 1 p. 21 | 1885 *L. c.*, Berlese, A. M. S., fasc. 20 nr. 3 | ? 1841 *Oribates fuscus*, C. L. Koch, C. M. A., fasc. 31 t. 2 | ? 1854 *Oribates politus*, C. L. Koch & Berendt, Die im Bernstein befindlichen organischen Reste, v. 1 II p. 110 t. 17 f. 112 | 1855 *Leiosoma similis*, Nicolet in: Arch. Mus. Paris, v. 7 p. 442 t. 6 f. 2 | 1884 *L. simile*, Michael, Brit. Orib., v. 1 p. 276 t. 13 f. 1—7.

Im. Dark brown, polished, Rost. with a small point on each side. Cepth. much narrower than ant. margin of Abd. Dorso-vertex raised in centre, raised part pointed anteriorly. Lam. blades slightly sinuate, their ant. ends deeply indented, terminating in 2 curved points. Lam. hair spines springing between the points and passing tip of Rost. Psstg. org. fusiform, sessile, terminated distally by a fine hair. Blades to femora of all legs. Abd. a long ellipse truncated anteriorly, almost pointed posteriorly; Dors. of Abd. polished, hairless, much arched; anal covers large, square, almost reaching post. margin. — Nph. Almost colorless except tip of Rost. and Tarsus, polished, oblong, Psstg. org. short fusiform. Dors. of Abd. with a sparse marginal row of flexible hairs. — Im. L. ca. 850  $\mu$ , a large variety ca. 1,1 mm, according to Berlese 1,5 mm.

Algeria, England, France.

\*) The name *Leiosoma* Nicolet is preoccupied. The name I have used is derived from λείος (smooth) and ἀκαρί (acarous).



2. **L. globifer** (P. Kram.) 1897 *Leiosoma g.*, P. Kr amer in: *Bibl. zool.*, v. 20 p. 80.

Im. Light coffee-brown; polished. Cepth. long. Rost. rounded. Lam. short, almost meeting at their ant. ends; a short unpaired spine directed forward between them as in *L. nitens*. Psstg. org. short, with thin peduncles and globular head. C. lam. longish, bearing a Lam. hair, which reaches beyond tip of Rost. Tectp. 1 large and scoop-shaped. L. 450  $\mu$ .

Greenland.

3. **L. globosus** (Berl.) ?1844 *Oribates subterraneus*, C. L. Koch, C. M. A., fasc. 38 t. 11 | ?1844 *O. globosus*, C. L. Koch, C. M. A., fasc. 38 t. 12 | 1885 *Leiosoma globosum*, Berlese, A. M. S., fasc. 20 nr. 4.

Im. Black or black-brown, highly polished. Lam. blades on edge, widest anteriorly, not distinctly separated from Trlam., which is also a blade on edge. C. lam. short, broad, much truncated. Psstg. org. fusiform with a terminal distal hair but no peduncle. Tectp. 1 with long terminal hair similar to and close to Lam. hair. Abd. globular; 4 minute hairs on post. margin; Dors. of Abd. hairless. L. 1,02 mm (Berlese's description).

It is not possible to say for certain from Koch's description and plate whether his 2 species (which are one only) are really the same as Berlese's, the present writer inclines to think them different and belonging to the genus *Notaspis*, but Berlese thinks them identical.

In moss. Germany, Italy.

4. **L. lativentris** (Nic.) 1855 *Leiosoma l.*, Nicolet in: *Arch. Mus. Paris*, v. 7 p. 444 t. 6 f. 6.

Im. Cepth. and legs dull red-brown, Abd. black, polished. Like *L. globosus*, but outline of Abd. instead of being circular is „Heraldic shield-shaped“, i. e. truncated and slightly sinuated anteriorly, centre slightly advancing and convex; lateral parts slightly concave. Abd. somewhat pointed posteriorly, as broad as long. L. 1,05 mm.

France.

5. **L. longipilis** (Monz.) 1894 *Leiosoma l.*, R. Moniez in: *Rev. biol. Nord France*, v. 6 p. 201.

Im. Pitch-black, polished. Psstg. org. clavate, finely serrated. Intlam. hair ca. 225  $\mu$ . Abd. hemispherical, truncated anteriorly. About 5 long radiating hairs of ca. 160—170  $\mu$  round post. margin. L. ca. 700  $\mu$ .

In ants' nests. New Zealand.

6. **L. marginatus** (Nic.) 1855 *Leiosoma marginata*, Nicolet in: *Arch. Mus. Paris*, v. 7 p. 442 t. 6 f. 3.

Im. Red-brown, polished. Lam. blades on edge, widest anteriorly. Lam. hair long; no Trlam. Psstg. org. as long as Cepth., setiform, slightly recurved. Abd. elongated, truncated and slightly sinuated anteriorly almost pointed posteriorly, hairless, but with a longitudinal suture on each side of dors. surface forming a lat. border. L. 880  $\mu$ .

Under stones. France. Rare.

7. **L. nitens** (Gerv.) 1844 *Oribata n.*, Gervais in: *Walcenaer, Ins. Apt.*, v. 3 p. 259 t. 35 f. 7 | 1855 *Leiosoma n.*, Nicolet in: *Arch. Mus. Paris*, v. 7 p. 441 t. 6 f. 4 | 1885 *L. n.*, Berlese, A. M. S., fasc. 20 nr. 2.

Im. Black, polished. Lam. short, much widest anteriorly. C. lam. very long and large, slightly truncated anteriorly. Lam. hair very long, passing far beyond tip of Rost. Trlam. with a great central mucro which nearly reaches tip of Rost. Psstg. org. setiform. Abd. oval, rounded anteriorly narrower posteriorly, hairless except 4 short hairs on post. margin. L. ca. 1,25 mm.

In moss and Woods. France, Italy, Netherlands.

8. **L. ovatus** (C. L. Koch) 1840 *Oribates o.*, C. L. Koch, C. M. A., fasc. 30 f. 24 | 1855 *Leiosoma ovata*, Nicolet in: Arch. Mus. Paris. v. 7 p. 443 t. 6 f. 5 | 1884 *L. ovatum*, Michael, Brit. Orib., v. 1 p. 278 t. 13 f. 8—14 | 1896 *L. o.*, Berlese, A. M. S., Crypt. II p. 92 | 1876 *L. truncatum*, Canestrini & Fanzago in: Atti Soc. Veneto Trent., v. 5 p. 105 | 1880 *L. pyrigerum*, Berlese, A. M. S., fasc. 50 nr. 2.

Im. Brown, shades vary in different specimens; smooth, not polished, finely punctured; oval, rather broader than *L. coracinus* and more pointed posteriorly. Dorso-vertex without any median point, Lam. blades on edge, truncated anteriorly. No C. lam. nor indentation of the truncated edge. Lam. hair from bottom of edge. Rost. hairs and Lam. hair very slightly imbricated. Psstg. org. very short and clavate. Dors. of Abd. not much arched, 2 rows of fine hairs on it and a marginal row; anal covers like *L. coracinus*. — Nph. Very like those of *L. coracinus* and *Cepheus tegeocranus*. — Im. L. ca. 650  $\mu$ .

England, France, Germany, Italy, Netherlands.

9. **L. palmicinctus** (Michael) 1884 *Leiosoma palmicinctum*, Michael, Brit. Orib., v. 1 p. 280 t. 14 f. 1—6; t. 15 f. 1—6 | 1896 *L. p.*, Berlese, A. M. S., Crypt. II p. 58.

Im. Dark brown, smooth, not polished. Rost. blunt, Cepth. broad, short. Lam. narrow, slightly undulated blades on edge; C. lam. small but longish, Trlam. distinct, forming a ridge. Psstg. org. of medium length, peduncles thin, head slightly lanceolate; sternum very finely serrated. Abd. almost circular, slightly truncated posteriorly, without markings; ventr. plate much smaller than dors. the latter reflexed posteriorly. — Nph. Very remarkable. Rost. blunt; Cepth. very short and broad; legs short. Abd. elliptical, somewhat raised towards centre; round the edge are about 16 large apophyses, from each of which springs a large transparent scale of a Japanese fan shape, or the shape of the scale of *Lycaena argus*, each scale has radiating nervures and finer cross nervures, the scales overlap all round. Nph. carries the cast skins of Lv. and of its own earlier stages, each skin is bordered by these scales, which entirely cover the whole creature including Rost. and legs, except the larval skin; each nymphal skin also carries 4 apophyses from which spring very long hairs, these are usually, but not invariably, broken off from the cast skins. — Im. L. ca. 1 mm.

England.

**L. olivaceus** (Grube) 1859 *Leiosoma olivaceum*, Grube in: Arch. Dorpat. Ges., ser. 2 v. 1 p. 476.

Im. Olive-brown; very finely granular; most like *L. marginatus*, but has margin finely striated; Psstg. org. clavate; 2 longitudinal rows of 5 conspicuous hairs on Dors. of Abd. near margin, 6 very small clavate hairs on post. margin. L. ca. 400  $\mu$ .

Germany.

6. Gen. **Notaspis** Herm.

1804 *Notaspis*, Hermann, Mém. apt., p. 87  
 | 1855 *N.*, Nicolet in: Arch. Mus. Paris, v. 7  
 p. 446 | 1888 *N.*, Michael, Brit. Orib., v. 2 p. 349  
 | 1891 *N.*, Canestrini in: Atti Ist. Veneto, ser. 7  
 v. 2 p. 718 | 1892 *N.*, Trouessart in: Rev. Sci. nat.  
 Ouest, v. 2 p. 48\* | ?1826 *Belba*, Heyden in: Isis,  
 p. 613 | 1835 & 42 *Eremaeus* + *Oribates* (part.)  
 + *Zetes* (part.) + *Oppia* (part.) + *Murcia* (Nph.)  
 (part.), C. L. Koch, C. M. A., fasc. 3 etc. & Übers.  
 Arach., v. 3 p. 99, 101, 102, 104 | 1859 *Oppia*,  
 Grube in: Arch. Dorpat. Ges., ser. 2 v. 1 p. 417 |  
 1877 *O.*, Canestrini & Fanzago in: Atti Ist.  
 Veneto, ser. 5 v. 4 p. 77 | 1885 *O.*, Canestrini,  
 Prosp. Acarof., v. 1 p. 7 | 1896 *O.*, Oudemans in:  
 Tijdschr. Ent., v. 39 p. 54 | 1896 *O.* + *Dameo-*  
*soma* (part.) + *Oribatula* + *Eremaeus*, Berlese,  
 A. M. S., Crypt. II p. 53, 54, 57, 59.

Body smooth. Last 3 pairs of legs  
 inserted at edge of body.

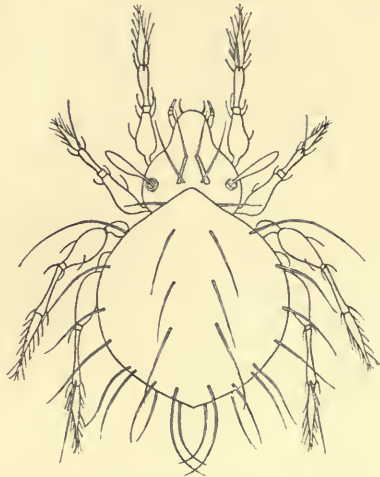


Fig. 11. *N. pilosa* (<sup>100/1</sup>).

26 good and 2 doubtful species, 2 varieties.

Key to the good species.

- |    |   |   |  |
|----|---|---|--|
| 1  | { | Ant. corners of Dors. of Abd. projecting as small free blades. (Div. I. — Genus <i>Oribatula</i> Berl.) — 2.  |  |
|    | { | Ant. corners of Dors. of Abd. not projecting (Div. II.) — 5.  |  |
| 2  | { | Ung. trid. — 3.   |  |
|    | { | Ung. mond. — L. 550 $\mu$ . . . . .   | 3. <i>N. similis</i> . . . . . p. 45   |
| 3  | { | Having hairs on Dors. of Abd. — 4.  |  |
|    | { | Dors. of Abd. hairless. — L. 450 $\mu$ . . . . .  | 2. <i>N. plantivaga</i> . . . p. 45    |
| 4  | { | With C. lam. — L. 370 $\mu$ . . . . .   | 1. <i>N. exilis</i> . . . . . p. 45    |
|    | { | Without C. lam. — L. 480 $\mu$ . . . . .  | 4. <i>N. tibialis</i> . . . . . p. 45  |
| 5  | { | Ung. trid. (Subdiv. IIa.) — 6.  |  |
|    | { | Ung. mond. (Subdiv. IIb.) — 17.   |  |
| 6  | { | Lam. blades on edge — 7.  |  |
|    | { | Lam. mere thickened bars or ridges — 11.  |  |
| 7  | { | Lam. with C. lam. — 8.  |  |
|    | { | No C. lam. — 10.  |  |
| 8  | { | C. lam. very long; Psstg. org. Intlam. hair; Rost. hairs, hairs on Dors. of Abd. and a spine on coxa 3 strongly serrated. — L. 650 $\mu$ . . . . .    | 6. <i>N. bipilis</i> . . . . . p. 46   |
|    | { | C. lam. short; Psstg. org., Intlam. hair; Rost. hairs and hairs on Dors. of Abd., not serrated. — 9.  |  |
| 9  | { | Lam. equal width throughout; much nearer together anteriorly than posteriorly; hairs on Dors. of Abd. thick. — L. 750 $\mu$ . . . . .                 | 7. <i>N. burrowsi</i> . . . p. 46      |
|    | { | Lam. much wider anteriorly than posteriorly very little nearer together anteriorly than posteriorly, hairs on Dors. of Abd. very fine. — L. 340 $\mu$ | 9. <i>N. glabra</i> . . . . . p. 47    |
| 10 | { | Trlam. as broad as and similar to Lam., Dors. of Abd. with long hairs. — L. 420 $\mu$ . . . . .   | 5. <i>N. aequalis</i> . . . . . p. 46  |
|    | { | No Trlam. Dors. of Abd. hairless. — L. 1 mm . . . . .   | 13. <i>N. microptera</i> . . . p. 48   |
| 11 | { | Dors. of Abd. bearing hairs — 12.   |  |
|    | { | Dors. of Abd. hairless — L. 600 $\mu$ . . . . .   | 10. <i>N. hepatica</i> . . . . . p. 47 |

- 12 { Hairs on Dors. of Abd. long and serrated. — L. 560  $\mu$  16. *N. serrata* . . . p. 48  
 { Hairs on Dors. of Abd. not serrated — 13.
- 13 { Psstg. org. clavate or with globular, fusiform or  
 { pyriform heads on thin peduncles — 14.  
 { Psstg. org. flabellate, broad, flat, almost sessile.  
 { — L. 190  $\mu$  . . . . . 11. *N. lienophora* . . . p. 47
- 14 { Psstg. org. hirsute; Intlam. hair reflexed — L. 680  $\mu$  8. *N. conformis* . . . p. 47  
 { Psstg. org. not hirsute; Intlam. hair directed  
 { forward — 15.
- 15 { Intlam. hair longer than Psstg. org. Ung. almost  
 { homd.; a spine on each antero-lateral angle of  
 { Abd. Lam. arising from Psstg. much wider  
 { apart posteriorly than anteriorly — 16.  
 { Intlam. hair shorter than Psstg. org. Ung. very  
 { hetd; no spines on antero-lateral angle of Abd.  
 { Lam. arising some distance, in front of Psstg.  
 { — L. 600  $\mu$  . . . . . 14. *N. oblonga* . . . . . p. 48
- 16 { Abd. almost round; length of hairs on Dors. of  
 { Abd. about  $\frac{2}{3}$  of width of Abd. Psstg. org. with  
 { elongated clavate heads. — L. 450  $\mu$  . . . . . 15. *N. pilosa* . . . . . p. 48  
 { Abd. elongated; length of hairs on Dors. of Abd.  
 { about  $\frac{1}{3}$  of width of Abd. Psstg. org. with almost  
 { globular heads. — L. 670  $\mu$  . . . . . 12. *N. lucorum* . . . . . p. 47
- 17 { Terrestrial — 18.  
 { Aquatic. — L. 500  $\mu$  . . . . . 19. *N. lacustris* . . . . . p. 49
- 18 { Trlam. present — 19.  
 { No Trlam. — 20.
- 19 { C. lam. present; Tibia 1—2 almost globular, Dors.  
 { of Abd. arched in centre with a flattened margin.  
 { — L. 340  $\mu$  . . . . . 22. *N. monilipes* . . . . . p. 50  
 { No C. lam.; Tib. 1—2 not globular; no flattened  
 { margin to Dors. of Abd. 4 longitudinal ridges  
 { on Dors. of Abd. — L. 200  $\mu$  . . . . . 24. *N. quadricarinata* . p. 51
- 20 { Psstg. org. pectinated — 21.  
 { Psstg. org. not pectinated — 22.
- 21 { Psstg. org. clavate with a pectinated club on a  
 { smooth peduncle. — L. 330  $\mu$  . . . . . 17. *N. clavipectinata* . p. 49  
 { Psstg. org. long, not clavate, with a setiform dist.  
 { end. — L. 420  $\mu$  . . . . . 23. *N. pectinata* . . . . . p. 51
- 22 { 2 short bars on Cepth. between Lam. — 23.  
 { No bars between Lam. — 25.
- 23 { Bars not joined by a transverse bar; Rost. not  
 { truncated — 24.  
 { Bars joined anteriorly by a transverse bar Rost.  
 { truncated. — L. 240  $\mu$  . . . . . 26. *N. trigona* . . . . . p. 51
- 24 { Lam. very long, almost reaching tip of Rost. —  
 { L. 330  $\mu$  . . . . . 21. *N. longilamellata* . p. 50  
 { Lam. short, not reaching middle of Cepth. —  
 { L. 310  $\mu$  . . . . . 25. *N. splendens* . . . . . p. 51
- 25 { C. lam. very long. Psstg. org. clavate without  
 { any terminal hair. — L. 220  $\mu$  . . . . . 18. *N. juncta* . . . . . p. 49  
 { No C. lam. Psstg. org. with long thin peduncles  
 { and fusiform head with a terminal hair. —  
 { L. 330  $\mu$  . . . . . 20. *N. lanceolata* . . . . . p. 50

**Div. I. Sp. 1—4.** With ant. corners of Dors. of Abd. projecting as a small, free blade.

1. **N. exilis** Nic. 1855 *N. e.*, Nicolet in: Arch. Mus. Paris, v. 7 p. 448 t. 3 f. 7 | 1888 *N. e.*, Michael, Brit. Orib., v. 2 p. 359 t. 28 f. 1—5 | 1877 *Oppia e.*, Canestrini & Fanzago in: Atti Ist. Veneto, ser. 5 v. 4 p. 89 | 1885 *O. e.*, Canestrini. Prosp. Acarof., v. 1 p. 26 | 1895 *Oribatula e.*, Berlese, A. M. S., fasc. 77 nr. 6 | 1879 *Oribata crassipes*, L. Koch in: Svenska Ak. Handl., v. 16 p. 116 t. 4 f. 3.

Im. Light-yellow-brown, polished, very finely punctured. Lam. long blades on edge, broader at distal than proximal ends; C. lam. short; Trlam. a thickened line. Psstg. org. with short peduncle and pyriform head; Ung. trid., very hetd. Antero-lateral angles of Dors. of Abd. project suddenly like rudimentary Ptm.; projection terminates sharply at post. end. 2 rows of fine hairs on Dors. of Abd. and some round margin. — Nph. White grey or yellowish; semi-transparent, internal organs shew, giving color. Rost. and legs pink. Polished. Antero-lateral angles do not project. Cepth. without markings or Lam. In other respects Nph. like Im. — Im. L. ca. 370  $\mu$ .

In moss etc. England, France, Germany, Italy, ?Netherlands, Siberia, Novaya Zemlya.

2. **N. plantivaga** (Berl.) 1884 *Leiosoma nitens* (err., non *Oribata nitens* Gervais 1844!), Targioni-Tozzetti in: Ann. Minist. Agricool., p. 75 | 1892 *Oppia tibialis* (err., non *Notaspis tibialis* Nicolet 1855!), Berlese, A. M. S., fasc. 64 nr. 1 | 1896 *Oribatula plantivaga*, Berlese, A. M. S., Crypt. II p. 59 || non 1895 *O. tibialis*, Berlese, A. M. S., fasc. 77 nr. 5.

Im. Yellow-brown. Lam. narrow blades deminishing anteriorly. No C. lam. nor Trlam. Intlam. hair long, setiform, would reach tip of Rost. Psstg. org. very short, sessile, pyriform, almost hidden by advancing corner of Abd. obovate; the ant. portion of edge of Dors. of Abd. very slightly projecting; a few very fine hairs round margin, none on Dors. of Abd. Tactile hairs of legs 1, 2, borne on apophyses. Ung. trid. L. ca. 450  $\mu$ .

In moss. Italy.

2 $\alpha$ . **N. plantivaga** var. *sicula* (Berl.) 1892 *Oppia tibialis* var. *s.*, Berlese, A. M. S., fasc. 64 nr. 1.

Abd. hairless, longer than type. — Palermo.

3. **N. similis** Michael 1888 *N. s.*, Michael, Brit. Orib., v. 2 p. 363 t. 31 f. 9—12 | 1896 *Oribatula s.*, Berlese, A. M. S., Crypt. II p. 9.

Im. Almost exactly like *N. tibialis* but a trifle larger and ung. mond. L. ca. 550  $\mu$ .

In moss and leaves. England.

4. **N. tibialis** Nic. 1885 *N. t.*, Nicolet in: Arch. Mus. Paris, v. 7 p. 449 t. 3 f. 8 | 1888 *N. t.*, Michael, Brit. Orib., v. 2 p. 262 t. 28 f. 6—8 | ?1895 *Oribatula t.*, Berlese, A. M. S., fasc. 77 nr. 5 || non 1892 *Oppia t.*, Berlese, A. M. S., fasc. 64 nr. 1.

Im. Chestnut-brown, polished, very finely punctured. Lam. long blades on edge, narrower at distal than proximal ends. No C. lam. Trlam. a line, Psstg. org. with slender peduncle of moderate length and recurved fusiform head roughened by points. Ant. Tibia with rounded elevation at distal end from which tactile hair springs. Ung. trid. strongly hetd. Antero-lateral corners of Dors. of Abd. project strongly, like rudimentary Ptm., they project more than those of *N. exilis*, but not so

suddenly, and the projection is carried further back. Hairs on Dors. of Abd. as in *N. exilis*. — Nph. scarcely distinguishable from that of *N. exilis*. — Im. L. ca. 480  $\mu$ .

In moss and dead leaves. England, France, Germany, ?Italy.

**Div. II. Sp. 5—26.** Ant. corners of Dors. of Abd. not projecting.

**Subdiv. IIa. Sp. 5—16.** Ant. corners of Dors. of Abd. not projecting and Ung. trid.

5. *N. aequalis* Michael 1890 *N. ae.*, Michael in: P. zool. Soc. London, p. 419 t. 37 f. 5.

Im. Yellow-brown, polished. Psstg. org. with long fine peduncle and gradually clavate head. Lam. blades on edge. Lam. and Trlam. forming a continuous band of equal breadth without demarcation between them. No C. lam. Ung. very hetd. Abd. elliptical without markings. 4 longitudinal rows of long curved hairs on Dors. of Abd. a few on post. margin, a spine on shoulder. L. ca. 420  $\mu$ .

Algeria.

6. *N. bipilis* Herm. 1804 *N. b.*, Hermann, Mém. apt., p. 95 | 1855 *N. b.*, Nicolet in: Arch. Mus. Paris, v. 7 p. 448 t. 3 f. 6 | 1883 *N. b.*, Berlese in: Bull. Soc. ent. Ital., v. 15 p. 219 | 1888 *N. b.*, Michael, Brit. Orib., v. 2 p. 356 t. 27 f. 1—9 | 1844 *Oribata b.*, Gervais in: Walekenaer, Ins. Apt., v. 3 p. 295 | 1877 *Oppia b.*, Canestrini & Fanzago in: Atti Ist. Veneto, ser. 5 v. 4 p. 88 | 1885 *O. b.*, Berlese, A. M. S. fasc. 20 nr. 8 | ?1840 *Oribates badius*, C. L. Koch, C. M. A., fasc. 30 t. 23 | ?1842 *Oppia badia*, C. L. Koch, Übers. Arach., v. 3 p. 195 | 1844 *O. cornuta*, C. L. Koch, C. M. A., fasc. 38 t. 8 | 1879 *O. sphaerica*, L. Koch in: Svenska Ak. Handl., v. 16, p. 117 t. 4 f. 5 | 1841 *Murcia acuminata*, C. L. Koch, C. M. A., fasc. 31 t. 24 (Nph.)

Im. Red-brown, polished. Rost. long, pointed. Lam. blades on edge. C. lam. pointed, reaching nearly as far as tip of Rost. Lam. hair and Intlam. hair serrated spines directed forward. Psstg. org. serrated spines directed transversely outward; coxa 3 bears a strong serrated spine directed outward parallel to Psstg. org. — Nph. Translucent, white or grey, Rost. and legs pink, interior organs show through skin, giving color. A few ridges on Cephth. Psstg. dorsal, near together. Psstg. org. long, filiform, recurved. Abd. ovate; 2 papillae on ant. margin of Abd. between Psstg. 2 larger papillae near centre of post. margin, from each springs a hair as long as the body. Dors. of Abd. polished but dotted with minute punctures. — Im. L. ca. 650  $\mu$ .

6a. *N. bipilis* var. *quadridentata* Haller 1882 *N. b. var. q.*, G. Haller in: Jahresh. Ver. Württemb., v. 38 p. 305.

In moss. England, France, Germany, Italy, Netherlands, Switzerland, Sweden, Siberia, Nowaya Zemlya.

7. *N. burrowsi* Michael 1890 *N. Burrowsii*, Michael in: P. zool. Soc. London, p. 418 t. 37 f. 1—4 | 1892 *Oppia lucorum*, Berlese, A. M. S., fasc. 64 nr. 2.

Im. Darkish yellow-brown, smooth; Psstg. at base of Cephth. Psstg. org. with thin shortish peduncle and lanceolate or nearly globular head. Lam. blades on edge not above  $\frac{1}{3}$  the length of Cephth., much nearer together anteriorly than posteriorly. C. lam. small but

distinct. Trlam. rather more than a mere line. Legs with finely pectinated hairs. Ung. hetd. Abd. nearly round. 4 longitudinal rows of thick hairs on Dors. of Abd. and some on post. margin, a thick hair on shoulder and another on edge of Abd. all imbricated. L. ca. 750  $\mu$ .

Algeria, Italy, Canada (Lake Winnipeg).

8. **N. conformis** (Berl.) 1895 *Oppia c.*, Berlese, A. M. S., fasc. 77 nr. 7.

Im. Chestnut-brown, highly polished. Lam. mere lines, scarcely noticeable. No C. lam. nor Trlam. Intlam. hair directed backward. Psstg. org. clavate, setose, curving slightly forward. No markings on Cepth. Abd. long, slightly sinuous and, advancing considerably in centre anteriorly, pointed posteriorly. No markings on Dors. of Abd. a row of fine hairs round margin, another a little within. L. ca. 680  $\mu$ .

In moss. Italy.

9. **N. glabra** Michael 1890 *N. g.*, Michael in: P. zool. Soc. London, p. 419.

Im. Light yellow-brown, polished. Psstg. org. with short peduncle and rough pyriform head. Lam. blades on edge, gradually increasing in width from posterior to anterior ends. C. lam. very short hardly visible. Trlam. not so wide as Lam. Ung. hetd. Abd. broad, short; 4 longitudinal rows of minute white hairs on Dors. of Abd. L. ca. 340  $\mu$ .

Algeria.

10. **N. hepatica** (C. L. Koch) 1835 *Eremaeus hepaticus*, C. L. Koch, C. M. A., fasc. 3 t. 23 | 1884 *E. h.*, Berlese, A. M. S., fasc. 15 nr. 9.

Im. Like *N. oblonga* but smooth, not punctured, and Dors. of Abd. hairless. L. ca. 600  $\mu$ .

In moss. Germany, Italy.

11. **N. licnophora** Michael 1882 *N. licnophorus*, Michael in: J. R. micr. Soc., ser. 2 v. 2 p. 10 t. 2 f. 7—8 | 1888 *N. l.*, Michael, Brit. Orib., v. 2 p. 379 t. 31 f. 6—8.

Im. Light yellow-brown, smooth. Lam. strong bars, not straight, joined by a transverse bar near ant. margin of Abd. Trlam. very strong going right across Cepth. Psstg. org. with very short. Peduncles and extremely large, flat, Japanese fan shaped head. Abd. pointed anteriorly and posteriorly, 2 rows of short spatulate hairs on Dors. of Abd. and a row round margin. — Nph. Very like Im., but white and without the Lam. and other ridges on Cepth. — Im. L. ca. 190  $\mu$ .

On dead wood. England.

12. **N. lucorum** (C. L. Koch) 1841 *Zetes l.*, C. L. Koch, C. M. A., fasc. 31 t. 18 | 1879 *Notaspis l.*, Michael in: J. R. micr. Soc., v. 2 p. 241 | 1888 *N. l.*, Michael, Brit. Orib., v. 2 p. 370 t. 29 f. 11—16 | 1895 *Oppia Berlesii*, Leonardi in: Atti Soc. Veneto-Trent., ser. 2 v. 2 p. 9 | 1895 *O. B.*, Berlese, A. M. S., fasc. 77 nr. 4 || non 1892 *O. lucorum*, Berlese, A. M. S., fasc. 64 nr. 2.

Im. Polished, finely punctured, punctures ca. 8  $\mu$  apart; Rost. slightly trifid. Psstg. org. short with obtusely pyriform head. Lam. hair and Intlam. hair slightly serrated. Lam. very short, slightly raised, nearly straight blades. Ung. almost homd. Abd. elongated, oval; ant. margin slightly sinuated and bordered by a raised line except in middle; a strong, straight spine on edge of Dors. of Abd. between legs 2 and 3. 4 rows of longish fine hairs on Dors. of Abd. and an extra pair near post. margin. A very variable

species. — Nph. Semi-transparent, white, internal organs show trough integument giving bright color, red yellow and green. Rost. and legs rosy brown. Polished, a few dots and vermiform markings. Form, Psstg. org. Lam. hair and Intlam. hair and hairs on Dors. of Abd. similar to those of Im. Abd. sharply divided from Cephth. Spine on edge replaced by a hair. — Im. L. ca. 670  $\mu$ .

Generally distributed, abundant on lichen. England, Germany, Italy.

13. **N. microptera** (Berl.) 1885 *Oppia m.*, Berlese, A. M. S., fasc. 20 nr. 9.

Im. Yellow-brown, polished. Cephth. long, without markings. Rost. pointed. Lam. narrow blades on edge, widest anteriorly, very long. No C. lam. nor Trlam. Psstg. close to ant. margin of Abd. Psstg. org. with long thin peduncle and fusiform, slightly recurved head with terminal hair. Abd. as broad as long, widest behind leg 4; Ant. margin slightly convex; post. margin round. Dors. of Abd. hairless. L. 1 mm or larger.

In moss. Italy.

14. **N. oblonga** (C. L. Koch) 1835 *Eremaeus oblongus*, C. L. Koch, C. M. A., fasc. 3 t. 24 | 1855 *E. o.*, Nicolet in: Arch. Mus. Paris, v. 7 p. 451 t. 10 f. 1 | 1882 *E. o.*, Haller in: Jahresh. Ver. Württemb., v. 38 p. 306 | 1884 *E. o.*, Berlese, A. M. S., fasc. 15 nr. 10 | 1888 *Notaspis oblonga*, Michael, Brit. Orib., v. 2 p. 375 t. 30 f. 6—11 | 1841 *Murcia obsoleta*, C. L. Koch, C. M. A., fasc. 31 f. 23 (Nph.).

Im. Dull red or yellow brown, smooth but not polished. Cephth. constricted where it joins Abd. Lam. short nearly parallel bars commencing some distance in front of Psstg. Trlam. a bar not quite joined to Lam. Psstg. org. longish with slender peduncle and fusiform head, both rough. Intlam. hair much shorter than Psst. org. Ung. very hetd. Abd. oval, very variable in form. Dors. of Abd. punctured, no other markings; 4 rows of curved hairs on same, and some round post. margin. — Nph. Brown dark for a Nph., rough, Cephth. very like that of Im. Abd. shield-shaped, a lat. border transeversely striated, remainder granulated. Cast skins of Dors. of Abd. carried excentrically, the earliest furthest back, a row of short curved hairs on ant. margin of Abd. — Im. L. ca. 600  $\mu$ .

Algeria, England, France, Germany, Italy. Abundant.

15. **N. pilosa** (C. L. Koch) 1841 *Zetes pilosus*, C. L. Koch, C. M. A., fasc. 31 t. 12 | 1888 *Notaspis pilosa*, Michael, Brit. Orib., v. 2 p. 370 t. 29 f. 11, 16 | 1896 *Oppia p.*, Berlese, A. M. S., Crypt. II p. 57 | 1842 *Zetes pilosulus*, C. L. Koch, Übers. Arach., v. 3 p. 101.

Im. Red-brown; polished. Lam. short, slightly raised, nearly straight ridges. Lam. hair and Intlam. hair long, serrated. No Trlam. Psstg. org. with longish filiform peduncle and rough clavate head. Abd. short pyriform. A spike stands outward horizontally between legs 3 and 4. A ring of very long setiform hairs round Dors. of Abd. and 2 rows of similar hairs nearer centre. L. ca. 450  $\mu$ .

On lichen. England, Germany.

16. **N. serrata** Michael 1885 *N. s.*, Michael in: J. R. micr. Soc., ser. 2 v. 5 p. 389 t. 7 f. 2 | 1888 *N. s.*, Michael, Brit. Orib., v. 2 p. 366 t. 29 f. 1—10 | 1896 *Eremaeus serratus*, Berlese, A. M. S., Crypt. II p. 36.

Im. Dull dark brown, coarsely pitted, and cuticle covered with short villous processes, which usually retain fragments of lichen etc.



Pyriform, post. margin very round. No Lam. nor Trlam. yet Lam. hairs persist and are serrated. Psstg. dorsal near together. Psstg. org. medium length, with short peduncle and almost globular head. Intlam. hair long, flexible, pectinated. Some of the hairs on legs pectinated. Dors. of Abd. narrow anteriorly, broad posteriorly and there deflexed on to ventral surface. A circular row of very long, flexible, serrated hairs round Dors. of Abd. and a few similar hairs nearer centre. — Nph. Usually appears like a heap of small pieces of lichen etc. with a forest of long serrated hairs arising from it; when clean, pale fawn, leathery, almost oblong. Rost. narrow; hind part of Cephth. broad. The 2 rostral hairs, cross; these and Intlam. hair and some hairs on legs serrated. Abd. flattish, parallel-sided. Notogastral skins carried flat and concentrically, but shrivelled, each skin has a ring of hairs like those on Dors. of Abd. — Im. L. ca. 560  $\mu$ .

On lichen. England.

**Subdiv. IIb. Sp. 17–26.** Dors. of Abd. without projecting ant. corners; Ung. mond.

17. **N. clavipectinata** Michael 1885 *N. c.*, Michael in: J. R. micr. Soc., ser. 2 v. 5 p. 392 t. 7 f. 6 | 1888 *N. c.*, Michael, Brit. Orib., v. 2 p. 387 t. 32 f. 7–11 | 1896 *Dameosoma clavipectinatum*, Berlese, A. M. S., Crypt. II p. 54.

Im. Lightish yellow-brown, polished. No Lam. or Trlam. Psstg. org. with long thin peduncle and short flat pyriform head; bearing radiating bristles. Abd. elliptical; 2 rows of fine hairs on Dors. of Abd. and a row round margin. — Nph. Much like Im., but nearly white; but Psstg. org. without bristles of Im., but rough. Lam. hair and Intlam. hair bipectinated. — Im. L. ca. 330  $\mu$ .

England.

18. **N. juncta** Michael 1885 *N. j.*, Michael in: J. R. micr. Soc., ser. 2 v. 5 p. 390 t. 7 f. 3 | 1888 *N. j.*, Michael, Brit. Orib., v. 2 p. 365 t. 28 f. 9–12 | 1896 *Oribatula j.*, Berlese, A. M. S., Crypt. II p. 59.

Im. Light yellow-brown; polished, without markings. Short pyriform. Lam. thin blades on edge, widely separated posteriorly, but approaching so close anteriorly as to touch in centre of Cephth. slightly undulated. C. lam. very long. Lam. hair terminal. Psstg. org. with short peduncle and longish fusiform head. Femora broad, thin, with large blades. Tibiae much enlarged at distal end. Ung. mond. Abd. a short ellipse, truncated anteriorly. Antero-lateral corners of Dors. of Abd. slightly projecting, not as much as those of *N. exilis*, *N. tibialis* etc. L. ca. 220  $\mu$ .

In moss on trees. England.

19. **N. lacustris** Michael 1882 *N. l.*, Michael in: J. R. micr. Soc., ser. 2 v. 2 p. 12 t. 2 f. 6 | 1888 *N. l.*, Michael, Brit. Orib., v. 2 p. 399 t. 33 f. 1–9; t. 30 f. 12 | 1896 *Scutovertex* (sic!) *l.*, Berlese, A. M. S., Crypt. II p. 46.

Im. Dull red-brown, generally partly covered with whitish deposit, smooth, not polished, punctured, punctures about 7  $\mu$  apart. Maxillae divided into 2 bifid lobes. No true Lam. or Trlam. but 2 pairs of irregular ridges one of which may represent Lam. No other markings on Cephth. Psstg. minute round holes near base of Cephth. Psstg. org. short, clavate, but almost always broken off, leaving the part of the peduncle within Psstg. only

Ung. very large, minute scale-like irregular projections on each side of ung. Abd. an ellipse, slightly truncated posteriorly and bearing 2 pairs of hairs there, otherwise Dors. of Abd. without hairs or markings except a pale patch near ant. margin. — Nph. Dirty white or pale drab, legs and Rost. pinkish, leathery. Usually no Psstg. Psstg. org., Lam. hair or Intlam. hair visible, but very minute ones do exist at some times of year. Dors. of Abd. covered with broad, irregular, transverse wrinkles, each bearing a line of knobs. Round post. margin are 6 flexible black hairs as long as body and 4 spikes. — Im. L. ca. 500  $\mu$ .

Oudemans's (1896, in: Tijdschr. Ent., v. 39 p. 175) identifies this species with *Acarus confervae* Schrank (1781, Ins. Austr., nr. 1054), but does not give any reason for doing so, except habitat. It would not apparently be possible to say from Schrank's description, which of the many Acari inhabiting confervae he referred to.

Aquatic in fresh water. England.

20. *N. lanceolata* Michael 1885 *N. l.*, Michael in: J. R. micr. Soc., ser. 2 v. 5 p. 394 t. 7 f. 8 | 1888 *N. l.*, Michael, Brit. Orib., v. 2 p. 398 t. 32 f. 12 | 1896 *Dameosoma lanceolatum*, Berlese, A. M. S., Crypt. II p. 54.

Im. Light yellow-brown, polished, almost fusiform. Lam. short ridges starting from Psstg. and running inward and forward until their ends meet only a short distance from ant. margin of Abd. Psstg. org. long, with slender peduncle and fusiform head terminated by a bristle. L. ca. 330  $\mu$ .

In moss. England.

21. *N. longilamellata* Michael 1885 *N. l.*, Michael in: J. R. micr. Soc., ser. 2 v. 5 p. 391 t. 7 f. 4 | 1888 *N. l.*, Michael, Brit. Orib., v. 2 p. 392 t. 28 f. 13—15 | 1896 *Dameosoma longilamellatum*, Berlese, A. M. S., Crypt. II p. 54.

Im. Light yellow-brown, polished; long pyriform. Cepth. very long, ca.  $\frac{5}{12}$  of whole length. Lam. thick ridges, reaching more than half length of Rost. post. part converging, ant. part parallel. No C. lam. nor Trlam. Psstg. org with long filiform peduncle and short fusiform head. 2 small curved ridges between proximal ends of Lam. Abd. truncated anteriorly, rounded posteriorly. 2 rows of longish hairs on Dors. of Abd. and a row round margin. L. ca. 330  $\mu$ .

Algeria, England.

22. *N. monilipes* Michael 1882 *N. m.*, Michael in: J. R. micr. Soc., ser. 2 v. 2 p. 16 t. 2 f. 1—5 | 1888 *N. m.*, Michael, Brit. Orib., v. 2 p. 381 t. 31 f. 1—5 | 1896 *Cymbaeremaeus m.*, Berlese, A. M. S., Crypt. II p. 37.

Im. Brown, shade variable, rough, leathery, covers itself with dirt. Cepth. and Abd. very sharply divided. Cepth. in 3 regions, vizt. a smooth anterior, a reticulated middle part between Tectp. 1 and a posterior roll with raised dots. Lam. and Tectp. 1, which are dorsal rough straight bars. C. lam. long, rough, curving downward; Psstg. org. long, clavate, rough. Legs shortish, femora rough. Tibiae of legs 1 and 2, especially 1, disproportionately large, with almost globular heads on short thin peduncles, an apophysis from upper part of globe supports tactile hair. Abd. shield-shaped. Antero-lateral angles produced forming points. 3 elevated lumps of which the second is the largest, occupy the whole median part of Dors. of Abd., lateral border, flat; whole dors. surface covered with

raised dots. A series of short hairs round margin of border. — Nph. Light-brown, rough. Cepth. with ridges forming a division into areas. Psstg. org. long filiform, rough, sinuous. Abd. shield-shaped, cast skins of Dors. of Abd. carried excentrically, earliest furthest forward. 3 hemispherical lumps arranged longitudinally on larval skin. 2 projections at hind end bear long spatulate hairs. — Im. L. ca. 340  $\mu$ .

On dead wood. England. Rare.

23. **N. pectinata** Michael 1885 *N. p.*, Michael in: J. R. micr. Soc., ser. 2 v. 5 p. 392 t. 7 f. 5 | 1888 *N. p.*, Michael, Brit. Orib., v. 2 p. 389 t. 32 f. 1—6 | ?1892 *Belba p.*, Berlese, A. M. S., fasc. 61 nr. 8 | ?1896 *Dameosoma pectinatum*, Berlese, A. M. S., Crypt. II p. 54.

Im. Light yellow-brown, smooth, not quite polished, almost fusiform. Lam. short ridges; no Trlam. a second pair of ridges at base of Rost. Psstg. org. very long, doubly curved, directed backward, with a few widely separated pectinations on one side of distal portion. Intlam. hair, hairs on Dors. of Abd., and some on leg all pectinated. — Nph. Almost colorless, smooth not polished. Psstg. org. and Intlam. hair long, upright, serrated, curving sharply forward at distal ends. Rost. hair similar but smaller. Abd. almost oblong, 4 large papillae along each side 4 smaller on post. margin, and 2 rows of about 4 on dors. surface, each papilla bears a hair similar in character to Intlam. hair, but of various lengths. — Im. L. ca. 420  $\mu$ .

In dead leaves. England, ?Italy.

24. **N. quadricarinata** Michael 1885 *N. q.*, Michael in: J. R. micr. Soc., ser. 2 v. 5 p. 393 t. 7 | 1888 *N. q.*, Michael, Brit. Orib., v. 2 p. 385 t. 31 f. 13—15 | 1896 *Dameosoma quadricarinatum*, Berlese, A. M. S., Crypt. II p. 54.

Im. Light yellow-brown; polished, short pyriform. Cepth. large. Lam. and Trlam. strong ridges. No C. Lam. Psstg. org. slightly recurved with fusiform head on short peduncles. Abd. short, arched, truncated anteriorly. 4 short longitudinal ridges on ant. part of Dors. of Abd. 4 rows of short hairs on Dors. of Abd. L. ca. 200  $\mu$ .

In moss. England.

25. **N. splendens** (C. L. Koch) 1841 *Oppia s.*, C. L. Koch, C. M. A., fasc. 32 p. 6 | 1879 *Damaeus s.*, Michael in: J. R. micr. Soc., v. 2 p. 247 | 1888 *Notaspis s.*, Michael, Brit. Orib., v. 2 p. 393 t. 33 f. 10—15 | 1895 *Dameosoma s.*, Berlese, A. M. S., fasc. 77 nr. 10.

Im. Light yellow-brown; polished. Lam. zig-zag ridges usually springing from edge of Abd. so that a short part is behind Psstg. distal ends of Lam. widely separated. No Lam. hair nor Trlam. 2 short ridges nearer median line than Lam. Psstg. org. with longish slender peduncle and rough fusiform head. Abd. oval, without markings; 4 rows of small hairs on dors. surface. — Nph. Almost white; no ridges or markings on Cepth. Hairs on Abd. very long, slightly serrated; otherwise Nph. like Im. — Im. L. ca. 310  $\mu$ .

A variable species. Probably Koch's *Oppia splendens* included many species. Algeria, England, Germany, Italy.

26. **N. trigona** Michael 1888 *N. t.*, Michael, Brit. Orib., v. 2 p. 396 t. 28 f. 16 | 1896 *Dameosoma trigonum*, Berlese, A. M. S., Crypt. II p. 54.

Im. Very like *N. splendens*; light yellow-brown, polished. Rost. truncated, very angular with a median and 2 lat. points. Lam. short bars commencing a short distance in front of Psstg. 2 very short bars nearer median line starting from ant. margin of Abd. and joined at their anterior ends by a strong transverse bar with 2 points directed forward. A small pine apple-shaped lump on Dorso-vertex in front of transverse bar. No Trlam. Psstg. org. with slender peduncle and fusiform head. Abd. almost elliptical, slightly pointed posteriorly. Dors. of Abd. without markings, 2 longitudinal rows of very fine hairs on same, and a few round margin. L. ca. 240  $\mu$ .

England.

***N. distincta*** (Karp.) 1893 *Oribata d.*, Karpelles in: Math. naturw. Ber. Ungarn, v. 11 p. 83.

Im. A *Notaspis*, probably *N. bipilis*, but described as having 2 longitudinal rows of 4 short pectinated hairs on Dors. of Abd. Size?

Hungary.

***N. longiuscula*** (C. L. Koch) 1841 *Zetes l.*, C. L. Koch, C. M. A., fasc. 31 t. 19.

Im. Very small, yellow-brown, narrow, highly polished. Psstg. org. with long thin peduncle and suddenly clavate head. Abd. a very long ellipse, narrow. Leg 4 not reaching post. margin.

In wet meadows. Germany.

## E. Subfam. Damaeinae



Fig. 12. *Damaeus geniculatus* (<sup>20/1</sup>).

1885 Subfam. *Nothridae* (part.), Berlese in: Bull. Soc. ent. Ital., v. 17 p. 126 | 1891 *N.*, Canestrini in: Atti Ist. Veneto, ser. 7 v. 2 p. 717 | 1892 *Nothrinae* (part.), Trouessart in: Rev. Sci. nat. Ouest, v. 2 p. 38 | 1896 *Damoeidae* (sic) (part.), Berlese, A. M. S., Crypt. II p. 33.

Without Ptm. Cepth. ankylosed to Abd. Ventr. plate ankylosed to dors. Mdb. chelate. Legs 1—2 near together, 3—4 near together. Leg 4 crawling organ. Without Lamellae. Legs thin, much longer than body.

2 genera, 22 good and 4 doubtful species.

Key to the genera.

Cepth. and Abd. coalescing in the median line . . . 1. Gen. **Amerus** . p. 53

Cepth. and Abd. clearly separated  
2. Gen. **Damaeus** . p. 53

1. Gen. **Amerus** Berl.

1883 *Amerus?*, Berlese, A. M. S., fasc. 3 nr. 5 | 1896 *A.*, Berlese, A. M. S., fasc. 79 nr. 7.

Cepth. and Abd. coalescing in the median line without any demarcation between them.

1 species.

1. **A. troisi** (Berl.) 1883 *Belba Troisii*, Berlese, A. M. S., fasc. 3 nr. 5 | 1896 *Amerus T.*, Berlese, A. M. S., Crypt. II p. 40.

Im. Very dark brown; polished. 2 pairs of Rost. hairs long and flexible; Psstg. near together; Psstg. org. very long, setiform. Abd. long, rounded posteriorly, with 2 sparse longitudinal rows of very long flexible hairs on dors. surface. Chitinous projections at side of body between legs 1 and 2, 2 and 3, 3 and 4. L. 1,1 mm.

Algeria, Italy.

2. Gen. **Damaeus** C. L. Koch

?1796 *Acarus* (non *Acarus*, Typ.: *A. coleoptratus* L., Latreille 1795!), Latreille, Précis Caract. Ins., p. 184 (Typ.: *A. geniculatus* L.) | 1835 *Damaeus*, C. L. Koch, C. M. A., fasc. 3 | 1842 *D.*, C. L. Koch, Übers. Arach., v. 3 p. 106 | 1855 *D.*, Nicolet in: Arch. Mus. Paris, v. 7 p. 459 | 1888 *D.*, Michael, Brit. Orib., v. 2 p. 404 | 1891 *D.*, Canestrini in: Atti Ist. Veneto, ser. 7 v. 2 p. 580 | 1892 *D.*, Trouessart in: Rev. Sci. nat. Ouest, v. 2 p. 48\* | 1877 *Belba* (non Heyden 1826!), Canestrini & Fanzago in: Atti Ist. Veneto, ser. 5 v. 4 p. 77 | 1895 *B.*, Banks in: Tr. Amer. ent. Soc., v. 22 p. 12 | 1896 *B.*, Oudemans in: Tijdschr. Ent., v. 39 p. 55 | 1885 *Belba* + *Damaeus*, Canestrini, Prosp. Acarof., v. 1 p. 8, 9 | 1896 *B.* + *D.* + *Dameosoma* (part.), Berlese, A. M. S., Crypt. II p. 38, 39, 54.

Cepth. and Abd. clearly separated.

21 good and 4 doubtful species.

Key to the good species.

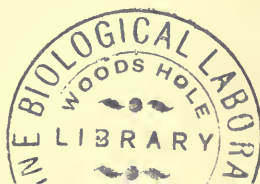
1 { Ung. mond. (Div. I. — Gen. *Belba* Berl.) — 2.  
 { Ung. trid. (Div. II. — Gen. *Damaeus* Berl.) — 7.

2 { Abd. oval in outline — 3.  
 { Abd. round in outline — 4.

3 { Abd. rounded posteriorly, Dors. of Abd. covered  
 with fine short hairs distant from each other  
 about their own length. L. 1 mm . . . . . 8. *D. nigro-femoratus* . p. 57  
 { Abd. pointed posteriorly, hairs on Dors. of Abd.  
 long and few. — L. 510  $\mu$  . . . . . 9. *D. nitens* . . . . . p. 57

4 { Psstg. org. long and flagelliform (i. e. setiform  
 and flexible) — 5.  
 { Psstg. org. not flagelliform — 9.

5 { Joints of legs mostly moniliform; i. e. with  
 very short peduncle and almost globular  
 head; Im. usually carrying cast skins of Dors.  
 of Abd. — 6.  
 { Joints of legs not moniliform, Im. not carrying  
 cast skins — 7.



- 6 { A strong curved point projecting from Abd. between legs 1 and 2 and a similar point between legs 3 and 4; hairs on Dors. of Abd. shortish flexible, not projecting beyond its margin except a little at post. margin. — L. 360  $\mu$  . . . . . 16. *D. verticillipes* . . . p. 59
- 6 { No curved points between legs 2 and 3 or 3 and 4; hairs on Dors. of Abd. stiff, projecting half their length beyond its margin. — L. 550  $\mu$  . . . . . 7. *D. globipes* . . . . . p. 57
- 7 { Leg 4 4-times as long as whole body. — L. 520  $\mu$  . . . . . 11. *D. phalangoides* . . . p. 58
- 7 { Leg 4 not above twice the length of body — 8.
- 8 { Inner hair on Femur 4 much longer than the Femur; hairs on Genua 4 three times as long as the Genua. — L. 650  $\mu$  . . . . . 5. *D. flagellifer* . . . . . p. 56
- 8 { Inner hair on Femur 4 about  $\frac{1}{3}$  of the length of the Femur; hairs on Genua 4 about  $\frac{1}{3}$  the length of the Genua. — L. 450  $\mu$  . . . . . 2. *D. berlesei* . . . . . p. 55
- 9 { Hairs on Dors. of Abd. thick, straight or slightly curved — 10.
- 9 { Hairs on Dors. of Abd. sharply hooked — L. 850  $\mu$  . . . . . 1. *D. auritus* . . . . . p. 55
- 10 { Dors. of Abd. arched (hemispherical) — 11.
- 10 { Dors. of Abd. conical, usually plastered with mud. — L. 660  $\mu$  . . . . . 10. *D. patelloides* . . . . . p. 58
- 11 { Ventr. plate small, dors. greatly reflexed posteriorly; covering about  $\frac{1}{3}$  of ventr. surface. — L. 650  $\mu$  . . . . . 13. *D. sufflexus* . . . . . p. 58
- 11 { Ventr. plate large; dors. scarcely reflexed. — 12.
- 12 { Hairs on legs spatulate, Im. usually covered with white powder. — L. 500  $\mu$  . . . . . 12. *D. pulverulentus* . . . p. 58
- 12 { Hairs on legs not spatulate; Im. without white powder — 13.
- 13 { Psstg. org. setiform serrated. — L. 650  $\mu$  . . . . . 14. *D. tecticola* . . . . . p. 58
- 13 { Psstg. org. not serrated — 14.
- 14 { Psstg. org. rod-like; a projection from Cepth. between legs 1 and 2 — 15.
- 14 { Psstg. org. clavate; no projection between legs 1 and 2 — 16.
- 15 { Femora with thin proximal part, distal suddenly enlarged; projection between legs 1 and 2 pointed anteriorly. — L. 1,05 mm . . . . . 3. *D. clavipes* . . . . . p. 55
- 15 { Femora gradually clavate, projection between legs 1 and 2 blunt anteriorly. — L. 1,5 mm . . . . . 6. *D. geniculatus* . . . . . p. 56
- 16 { Psstg. org. short with thin peduncle and suddenly enlarged elongated head (like a pileus); Intlam. hair short, rough, rod-like. — L. 670  $\mu$  . . . . . 15. *D. tenuipes* . . . . . p. 59
- 16 { Psstg. org. long, with thin peduncle and gradually and slightly clavate head, pointed anteriorly almost fusiform; Intlam. hair long setiform. L. 690  $\mu$  . . . . . 4. *D. concolor* . . . . . p. 56

- 17 { Dors. of Abd. convex; cast skins carried — 18.  
 Dors. of Abd. concave or flat, cast skins not carried — 19.
- 18 { Psstg. org. flagelliform; 4 central hairs on hind margin much longer than the others; a square, central, post. projection from each cast skin bearing similar hairs, cast skins shield-shaped. — L. 650  $\mu$  . . . . . 21. *D. setosus* . . . . . p. 60  
 Psstg. org. thick, rod-like on slightly clavate, only 4 hairs on hind margin, no central projection, cast skins marked with radiating lines . . . . . 18. *D. craterifer* . . . . . p. 60
- 19 { Dors. of Abd. discoidal — 20.  
 Dors. of Abd. truncated anteriorly, pointed posteriorly. — L. 1 mm . . . . . 19. *D. femoratus* . . . . . p. 60
- 20 { Psstg. org. flagelliform, legs with broad rough borders; a large curved projection between legs 1 and 2. — L. 1 mm . . . . . 20. *D. ornatissimus* . . . . . p. 60  
 Psstg. org. with long thin peduncle and clavate spinous head; no borders to legs; no projection between legs 1 and 2. — L. 500  $\mu$  17. *D. bicostatus* . . . . . p. 59

**Div. I. Sp. 1–16. Ung. mond.**

1. *D. auritus* C. L. Koch 1835 *D. a.*, C. L. Koch, C. M. A., fasc. 2 t. 11 | 1888 *D. a.*, Michael, Brit. Orib., v. 2 p. 435 t. 40 | 1844 *Oribata aurita*, Gervais in: Walckenaer, Ins. Apt., v. 3 p. 257 | ?1885 *Belba a.*, Canestrini, Prosp. Acarof., v. 1 p. 39 || non 1855 *Damaeus auritus*, Nicolet in: Arch. Mus. Paris, v. 7 p. 462 t. 8 f. 3.

Im. Very like *D. geniculatus*, but smaller and hairs on Dors. of Abd. short, fine, very sharply curved, almost hooked. Portions of the cast skins of Dors. of Abd. usually carried. — Nph. Like that of *D. geniculatus* but smaller. — Im. L. ca. 850  $\mu$ .

England, Germany.

2. *D. berleseii* Michael\*) 1887 *Belba nodipes* (err., non *Damaeus nodipes* C. L. Koch 1840!), Berlese, A. M. S., fasc. 43 nr. 2 | 1896 *Dameosoma n.*, Berlese, A. M. S., Crypt. II p. 54.

Im. Cepth. without ridges or markings. Psstg. much raised; Psstg. org. very long, whip-like (as in *D. globipes*). Abd. hemispherical, polished; bearing 2 longitudinal rows of short curved hairs. Legs very long. Femur of leg 4 considerably passing post. margin of Abd. joints of legs with long thin peduncles and suddenly clavate heads. L. ca. 450  $\mu$ .

In moss. Italy.

3. *D. clavipes* (Herm.) 1804 *Notaspis c.*, Hermann, Mém. apt., p. 88 t. 4 f. 7 | 1888 *Damaeus c.*, Michael, Brit. Orib., v. 2 p. 423 t. 38 | 1835 *Oppia glaucina*, C. L. Koch, C. M. A., fasc. 3 t. 9 (Nph.) | 1840 *Damaeus nodipes*, C. L. Koch, C. M. A., fasc. 30

\*) Berlese identifies this species, I think erroneously, with *Damaeus nodipes*. C. L. Koch (which is, in my opinion, a synonym of *D. clavipes*); the species therefore appears to be unnamed and I name it in honor of Professor Berlese. A. D. Michael.

t. 6 | 1855 *D. auritus*, Nicolet in: Arch. Mus. Paris, v. 7 p. 462 t. 8 f. 3 || non 1887 *Belba nodipes*, Berlese, A. M. S., fasc. 43 nr. 2.

Im. Dark brown, lighter when lately emerged; smooth not polished, often powdery, often carries dirt. Cepth. with 2 transverse furrows, between them are 2 short longitudinal ridges and rectangular projections bearing leg 1. Psstg. very projecting on mamilliform elevations. Psstg. org. filiform not so long as those of *D. geniculatus*, 4 short ridges behind Psstg. between legs 1 and 2 is a chitinous projection longer narrower and more pointed anteriorly than in *D. geniculatus*. Legs very long and thin, joints mostly with long thin peduncle and suddenly enlarged head. Abd. almost globular. About 14 black curved hairs on Dors. of Abd. and 4 on post. margin. — Nph. Light yellow or reddish, legs pink, smooth; 4 rows of large papillae on Dors. of Abd.; in young specimens and Nph.; often only the post. pair persist in fully-grown Nphs.; each papilla bears a long, black, slightly serrated hair. Carries dirt and débris. — Im. L. ca. 1,05 mm, L. of leg 4 ca. 1,8 mm.

All early writers except Hermann, and also Canestrini & Fanzago (1877, in: Atti Ist. Veneto, ser. 5 v. 4) confuse this species with *D. geniculatus*.

Algeria, England, France, Germany, Italy, Sweden, Switzerland.

4. **D. concolor** C. L. Koch 1840 *D. c.*, C. L. Koch, C. M. A., fasc. 30 t. 6 | 1887 *Belba c.*, Berlese, A. M. S., fasc. 43 nr. 1 | 1896 *Dameosoma c.*, Berlese, A. M. S., Crypt. II p. 54 | ?1882 *Belba denticulata*, G. & R. Canestrini in: Atti Ist. Veneto, ser. 5 v. 8 p. 914 t. 8 f. 4 | 1885 *B. d.*, Canestrini, Prosp. Acarof., v. 1 p. 40.

Im. Chestnut-brown Cepth. and Abd. without markings. Psstg. org. long, slightly clavate, pointed at distal ends. Abd. globose. Dors. of Abd. and post. margin with long flexible hairs. L. ca. 690  $\mu$ .

Germany, Italy.

5. **D. flagellifer** Michael 1890 *D. f.*, Michael in: P. zool. Soc. London, p. 422 t. 38 f. 2.

Im. Dark brown, smooth, not polished, very finely punctured. Cepth. slightly spotted, but without true markings. Psstg. org. long, setiform, flexible, curled or undulated near distal end. Legs with joints clavate, Femora suddenly so, leg 4 ca. 850  $\mu$ . One hair on Femur and Genua of this leg like Psstg. org. and greatly larger than any other hair on creature. L. ca. 650  $\mu$ .

Algeria.

6. **D. geniculatus** (L.), C. L. Koch ?1758 *Acarus g.*, Linné, Syst. Nat., ed. 10 p. 617 | ?1761 *A. g.*, Linné, Fauna Suec., ed. 2 nr. 1977 | ?1796 *A. g.*, Latreille, Précis Caract. Ins., p. 184 | ?1803 *A. g.*, Schrank, Fauna Boica, v. 3 p. 208 nr. 2666 | ?1806 *Oribata geniculata*, Latreille, Gen. Crust. Ins., v. 1 p. 149 | 1835 *Damaeus geniculatus*, C. L. Koch, C. M. A., fasc. 3 t. 13 | 1855 *D. g.*, Nicolet in: Arch. Mus. Paris, v. 7 p. 460 t. 8 f. 1 | 1888 *D. g.*, Michael, Brit. Orib., v. 2 p. 428 t. 39 | 1844 *Belba geniculata*, Gervais in: Walekenaer, Ins. Apt., v. 3 p. 256 | 1877 *B. g.*, Canestrini & Fanzago in: Atti Ist. Veneto, ser. 5 v. 4 p. 101 | 1887 *B. g.*, Berlese, A. M. S., fasc. 36 nr. 4 | ?1835 *Damaeus torvus*, C. L. Koch, C. M. A., fasc. 3 f. 14 (Nph.) | ?1844 *D. onustus*, C. L. Koch, C. M. A., fasc. 38 t. 7.

Im. Dark brown or black, dull, slightly rough. Cepth. with 2 transverse furrows and 2 triangular depressions bordered laterally by ridges;



a chitinous projection carries leg 1. Psstg. on mamilliform projection, trumpet-mouthed, ridged inside. Psstg. org. long, filiform; a projection between legs 1 and 2 blunt-pointed anteriorly, rounded posteriorly. Legs thick for genus; coxae of 2 hind pairs with projecting blades on post. edge; Femora thicken gradually. Abd. slightly pyriform; about 18 large black hairs on dorsal surface. — Nph. Pale yellowish, leathery; generally concealed by dirt, legs pink. Psstg. org. S-shaped. Abd. usually concealed by mud, but oval with 2 points posteriorly, bearing black hairs, 2 rows of similar hairs on dors. surface. — Im. L. ca. 1,5 mm, L. of leg 4 ca. 1,75 mm.

All the earlier writers and Canestrini & Fanzago confuse this species with *D. clavipes*.

Belgium, England, France, Germany, Italy, Netherlands, Sweden, Switzerland, Port Clarence (Vega-Exp.).

7. *D. globipes* (Can. & Berl.) 1884 *Belba g.*, Canestrini & Berlese in: Atti Soc. Veneto-Trent., v. 9 fasc. 1 p. 177 t. 5 f. 3—5 | 1886 *B. g.*, Berlese, A. M. S., fasc. 33 nr. 4.

Im. Chestnut-brown, smooth. Psstg. org. very long, much longer than Cephth. flagelliform; projections which carry legs 1 and 2 only moderately developed. Abd. globular, with a curved row of 5 long, thick, curved hairs near each lat. margin, and 2 pairs on post. margin. Femora with thin peduncle and suddenly clavate head, other joints globose (moniliform), each joint with a whorl of very strong, almost straight hairs. Often carries cast skins on Dors. of Abd. excentrically, earliest posteriorly. L. 550  $\mu$ .

In moss etc. Algeria, Italy.

8. *D. nigro-femoratus* (L. Koch) 1879 *Nothrus n.*, L. Koch in: Svenska Ak. Handl., v. 16 p. 112 t. 3 f. 23.

Im. Body Coxae and Femora black; remainder of legs yellow; smooth not polished, Cephth. and Abd. covered with short fine hairs distant from each other about their own length. Psstg. org. short, very clavate. Abd. oval, widest and rounded posteriorly. L. 1 mm.

Yugor-Straits, North Russia.

9. *D. nitens* (C. L. Koch) 1835 *Oppia n.*, C. L. Koch, C. M. A., fasc. 3 t. 10 | 1888 *Damaeus n.*, Michael, Brit. Orib., v. 2 p. 409 t. 34 f. 1—8 || non 1896 *Dameosoma concolor*, Berlese, A. M. S., Crypt. II p. 38 (C. L. Koch, C. M. A., fasc. 30 t. 6, although said to be so by Berlese).

Im. Yellow-brown to chestnut-brown polished, oval. Psstg. org. with long slender peduncle and slightly lanceolate head. Legs not so long nor the joints so clavate as usual in genus. Abd. oval, rounded anteriorly almost pointed posteriorly, no markings. 2 rows and 2 inner pairs of longish filiform white hairs on Dors. of Abd. and 1 or 2 shorter pairs on post. margin, all slightly imbricated if magnified 500 diam. — Nph. White, legs and Rost. pinkish; translucent. Psstg. org. long, rough, gradually thickened. Intlam. hair slightly serrated; Abd. truncated anteriorly, rounded posteriorly; hairs on Dors. of Abd. long, serrated. — Im. L. ca. 510  $\mu$ .

In moss and dead wood. England, Germany, Sweden.

10. **D. patelloides** Michael 1890 *D. p.*, Michael in: P. zool. Soc. London, p. 420 t. 38 f. 3.

Im. Dark brown, smooth, not polished. Cepth. without sculpture but a vague ridge between the 2 Psstg., which are raised, cup-shaped, but outer side of cup produced to a point. Psstg. org. long, rod-like, slightly tapering. Legs with gradually clavate joints; leg 4 ca. 680  $\mu$  long. Abd. almost conical, leans a little backward; 2 rows of short, thick, rough hairs on Dors. of Abd. forming almost a ring. L. ca. 660  $\mu$ .

Algeria.

11. **D. phalangoides** Michael 1890 *D. p.*, Michael in: P. zool. Soc. London, p. 421 t. 38 f. 1.

Im. Yellow-brown, smooth, not polished. Rost. narrow, hind part of Cepth. broad. Intlam. hair and Psstg. org. long, fine, setiform, flexible. Legs extraordinarily long and thin; leg 4 1,5 mm. Ung. small. Abd. a short ellipse without markings; dors. with 2 longitudinal rows of hairs of which the anterior are black, short and curved, the posterior flexible and lighter. L. ca. 520  $\mu$ .

Algeria.

12. **D. pulverulentus** (C. L. Koch) 1840 *Nothrus p.*, C. L. Koch, C. M. A., fasc. 29 f. 3 | 1855 *Damaeus papillipes*, Nicolet in: Arch. Mus. Paris, v. 7 p. 463 t. 8 f. 4.

Im. Bright yellow or red, above, violet at sides. Legs red. Rost. and sides of Cepth. rough, central and hind part of Cepth. covered by a trapeze-shaped plate with raised edges and a transverse bar between the 2 Psstg., which are wide and oval. Psstg. org. very long clavate. Abd. slightly elliptical, highly polished; a circle of long setiform hairs on Dors. No spines on ant. margin of Abd. Hairs on legs spatulate. Creature generally covered with white powder. L. 500  $\mu$ .

Berlese (1896, A. M. S., Crypt. p. 38) says this species is the same as *D. verticillipes* Nic.

In woods. France, Germany. Uncommon.

13. **D. sufflexus** Michael 1885 *D. s.*, Michael in: J. R. micr. Soc., ser. 2 v. 5 p. 394 t. 7 f. 9 | 1888 *D. s.*, Michael, Brit. Orib., v. 2 p. 415 t. 34 f. 9, 10 | 1895 *Belba sufflexa*, Berlese, A. M. S., fasc. 74 nr. 4.

Im. Dark brown, dull; Cepth. and legs roughish. Cepth. with a transverse division behind leg 1; a median carination and 2 bosses each side. Psstg. projecting. Psstg. org. long rod-like. Abd. globose finely punctured. Dors. plate of Abd. turned over posteriorly on to ventr. surface. Ventr. plate of Abd. small. A row of spines round hinder part of Dors. of Abd. L. ca. 650  $\mu$ .

England, Italy.

14. **D. tecticola** Michael 1888 *D. t.*, Michael, Brit. Orib., v. 2 p. 416 t. 35 | 1895 *Belba t.*, Berlese, A. M. S., fasc. 77 nr. 9 | 1893 *B. mirabilis*, Karpelles in: Math. naturw. Ber. Ungarn, v. 11 p. 85.

Im. Brown with a purplish shade, often dusted with white powder. Cepth. dull, roughish, no sculpturing but elevated opposite insertions of legs, depressed between; a small projection to which leg 1 is articulated, a larger projection with a strong curved point anteriorly between legs 1 and 2, a smaller curved point behind leg 2. Psstg. org. serrated rod-

like. Legs slender with clavate joints. Many hairs on legs imbricated. Abd. almost globular, 2 rows of curved, black, imbricated hairs on Dors. of Abd., and a pair on post. margin. — Nph. Light flaxen, polished. Psstg. org. long, curved, setiform, often have particles of matter attached. Abd. oval with bifid point posteriorly from which spring 2 long hairs, a pair of long, black hairs on ant. margin and 2 rows on Dors. of Abd. Cast shrunk skins of Dors. of Abd. carried concentrically on hind part of Abd. — Im. L. ca. 650  $\mu$ .

In thatch and moss. England, Italy.

15. **D. tenuipes** Michael 1885 *D. t.*, Michael in: J. R. micr. Soc., ser. 2 v. 5 p. 395 t. 7 f. 10 | 1888 *D. t.*, Michael, Brit. Orib., v. 2 p. 420 t. 36 | 1896 *Belba t.*, Berlese, A. M. S., Crypt. II p. 39.

Im. Brown with a purplish shade, often dusted with white powder. Cepth. very like *D. tecticola*, but projection between legs 1 and 2 rounded and without anterior point. Psstg. org. short with rod-like peduncle and rough bluntly conical head. Legs very long and slender, pair 4 twice as long as body. Abd. almost globular. Hairs on Dors. of Abd. black, almost straight, deminishing in length from before backward. — Nph. Like that of *D. tecticola* but legs longer. Psstg. org. like those of Im. and cast skins of Dors. of Abd. carried not flat but in a pyramid, supported by an internal column. — Im. L. ca. 670  $\mu$ .

In thatch. England.

16. **D. verticillipes** Nic. ?1840 *Nothrus pollinosus*, C. L. Koch, C. M. A., fasc. 29 t. 12 (Nph. aut Im.) | 1855 *Damaeus verticillipes*, Nicolet in: Arch. Mus. Paris, v. 7 p. 462 t. 8 f. 2 | ?1888 *D. v.*, Michael, Brit. Orib., v. 2 p. 412 t. 37.

Im. Usually covered with white or grey powder; when cleaned dark red-brown, smooth not polished. Cepth. with large, lat., trifid projection bearing leg 2. Psstg. near together, trumpet-shaped. Psstg. org. long setiform with undulated distal ends, often matted up or broken. Inflam. hair setiform, curved; a shorter more curved hair on outside of each Psstg. Legs short for genus; joints with thin proximal ends and sudden, almost globular, enlargements; each joint with a whorl of curved hairs. Abd. almost globular without markings; projecting points between legs. 2 hairs standing forward from ant. margin, 2 rows of hairs on Dors. of Abd. Cast skins of Dors. of Abd. often carried, earliest posteriorly. — Nph. Very like Im., but yellowish white, soft, very finely reticulated; legs a little shorter. Abd. a little longer than Im. Hairs on Dors. of Abd. black. — Im. L. ca. 360  $\mu$ .

Berlese (1896, A. M. S., Crypt. II p. 38) identifies this species (as well as *D. papillipes* Nic.) with *Nothrus pulverulentus* C. L. Koch. — It is doubtful, if the species of Nicolet and Michael are identical, if not Nicolet's has not been refund.

England, France, ?Germany.

## Div. II. Sp. 17—21. Ung. trid. \*)

17. **D. bicostatus** C. L. Koch 1835 *D. b.*, C. L. Koch, C. M. A., fasc. 2 t. 12 | 1886 *D. b.*, Berlese, A. M. S., fasc. 33 nr. 5 | 1877 *Belba bicostata*, Canestrini & Fanzago in: Atti Ist. Veneto, ser. 5 v. 4 p. 103.

\*) The genus *Damaeus* is divided by Berlese, only this group being retained in the genus, but this is not permissible, because Koch's type of the genus is *auritus* a mond. species.  
A. D. Michael.

Im. Chestnut-brown, dull roughish, areolated and raised in scattered hemispherical dots. 2 pairs of Rost. hairs, the outer pair thick. Psstg. org. directed backward and outward, with long thin peduncle and clavate spinous head. Abd. discoidal, dors. plate concave, but with slight longitudinal convexity along median line. Post. margin with a small central projection bearing 2 short hairs, which turn sharply forward. Tactile hair of Tibia 1 borne on an apophysis. L. ca. 500  $\mu$ .

Berlese suggests, that this species may be the young form of *D. femoratus* C. L. Koch, but it is not, it is adult.

In moss. Algeria, Germany, Italy.

18. *D. craterifer* Haller 1884 *D. c.*, G. Haller in: Arch. Naturg., v. 50 t. p. 226 t. 16 f. 1—4.

Im. Dark brown or black. Cepth. simple, pointed. Psstg. org. described short and thick, drawn long and thick. Abd. globular, 2 pairs of fine hairs on post. margin. Haller draws and describes the species as carrying a cast abdominal and cephalothoracic skin, the former marked with radiating lines. Coxae enlarged, rest of leg thin. Tactile hair on Tibia 1 mounted on a chitinous projection. Size „mittelgross“.

Southern France.

19. *D. femoratus* C. L. Koch 1840 *D. f.*, C. L. Koch, C. M. A., fasc. 30 t. 7 | 1876 *Belba Dugesii*, Canestrini & Fanzago in: Atti Soc. Veneto-Trent., v. 5 p. 104 | 1883 *Damaeus D.*, Berlese, A. M. S., fasc. 3 nr. 6 | 1885 *D. D.*, Canestrini, Prosp. Acarof., v. 1 p. 33 | 1877 *Belba gibba*, Canestrini & Fanzago in: Atti Ist. Veneto, ser. 5 v. 4 p. 104 (Nph.).

Im. Dark red-brown, smooth; large bifid projections between legs 1 and 2 and between 3 and 4. Psstg. org. long, filiform. Rost. hairs most hairs on legs and those on border of Abd. clavate. Abd. oval truncated anteriorly slightly pointed posteriorly; Dors. of Abd. hollow, edge raised, centre very slightly arched, no hairs on it, only round border. L. ca. 1 mm.

Algeria, Germany, Italy.

20. *D. ornaticissimus* Berl. 1888 *D. o.*, Berlese in: Bull. Soc. ent. Ital., v. 20 p. 217 t. 13 f. 1.

Im. Chestnut-brown. Psstg. org. very long, flagelliform. Intlam. hair large, slightly plumose. Abd. discoidal, concave with a raised border. A strong curved, pointed horn-like projection between legs 1 and 2. Legs with broad rough borders. L. ca. 1 mm.

Under bark of trees. Brazil (Matto-grosso).

21. *D. setosus* Berl. 1883 *D. s.*, Berlese in: Riv. Acc. Padova, v. 33 p. 51 | 1887 *D. s.*, Berlese, A. M. S., fasc. 43 nr. 3.

Im. Yellow-brown, smooth; Cepth. without special markings. Psstg. org. very long, flagelliform. Abd. sub-hemispherical, without markings or hairs on dors. plate, except a row of shortish hairs curved inward springing from minute tubercles on post. margin, and 4 very long flexible hairs from similar tubercles just within centre of post. margin close together transversely. Abd. however usually hidden by cast skins of Dors. of Abd., which are flat, shield-shaped, concentric, with square central projection

posteriorly having 4 tubercles on post. margin, which bear hairs (usually broken off). Whole creature usually covered with white dust. L. ca. 650  $\mu$ .

In moss. Sicilia.

**D. bulbipes** (Karp.) 1893 *Belba b.*, Karpelles in: Math. naturw. Ber. Ungarn, v. 11 p. 91 t. 13 f. 2.

Im. Like *D. sufflexus*, probably it, but some of the hairs on legs said to be pectinated.

Hungary.

**D. carinulatus** (Berl.) 1888 *Eremaeus c.*, Berlese in: Bull. Soc. ent. Ital., v. 20 p. 217 t. 13 f. 2.

Im. Brown, very like. *D. bicostatus*, but Psstg. org. not so much enlarged at distal end; a few transverse ridges on Cephth. Described from a single specimen. L. 800  $\mu$ .

Under bark of trees. Brazil (Matto grosso).

**D. formica** Gerv. 1849 *D. f.*, Gervais in: Gay, Hist. Chile, v. 4 p. 47.

Im. Somewhat like *D. clavipes*. Chestnut-brown, joints of legs not so much incrassated as in *D. crassipes*. L. ca. 1 mm.

Chile.

**D. riparius** Nic. 1855 *D. r.*, Nicolet in: Arch. Mus. Paris, v. 7 p. 461 t. 8 f. 5 | 1887 *Belba aurita*, Berlese, A. M. S., fasc. 36 nr. 5.

Im. Nicolet and Berlese identify this species with *D. auritus* C. L. Koch, if so Nicolet's name fails, but his drawing and Berlese's show 4 concave longitudinal furrows on Dors. of Abd., ending in points on ant. margin, these are not present in Koch's drawing nor on the English specimens, and the hairs on Dors. of Abd. are larger and less curved than those of *D. auritus*, probably therefore this is a good species, but it may be a variety of *D. auritus*. L. ca. 1 mm.

France, Italy.

## F. Subfam. Nothrinae

1885 Subfam. *Nothridae* (part.), Berlese in: Bull. Soc. ent. Ital., v. 17 p. 126 | 1891 *N.*, Canestrini in: Atti Ist. Veneto, ser. 7 v. 2 p. 579 | 1892 *Nothrinae* (part.), Trouessart in: Rev. Sci. nat. Ouest, v. 2 p. 48\* | 1896 *Nothridae* (part.) + *Damaeidae* (part.), Berlese, A. M. S., Crypt. II p. 24—35.

Without Ptm. Cephth. anchylosed to Abd. Ventr. plate anchylosed to dors. Mdb. chelate, legs 1 and 2 near together, 3 and 4 near together. Leg 4 a crawling organ. Without Lam., legs short and thick.

6 Genera, 42 good and 7 doubtful species.

Key to the Genera.

- 1 { Abd. not segmented — 2.
- { Abd. transversely divided as if segmented
- 6. *Hypochthonius* . p. 76
- 2 { Dors. of Abd. convex — 3.
- { Dors. of Abd. flat, concave, or undulated — 5.

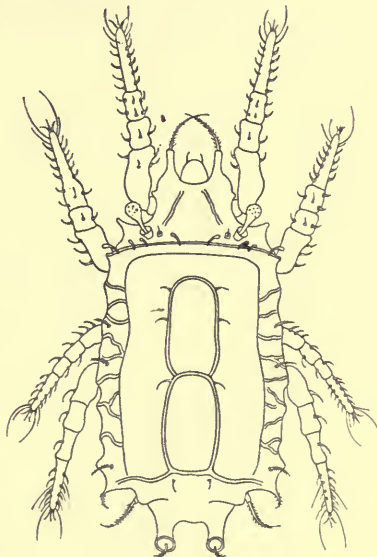


Fig. 13. *Nothrus biverrucatus* (<sup>50</sup>/<sub>1</sub>).

- |   |   |  |  |
|---|---|--|--|
| 3 | } | Dors. of Abd. of Im. fully chitinized, not carrying cast nymphal skins. Ung. mond — 4.   |  |
|   |   | Dors. of Abd. of Im. not fully chitinized, but carrying cast nymphal skins of Dors. of Abd. Ung. trid. 2. <i>Neoliodes</i> . . . . . p. 65   |  |
| 4 | } | Genital and anal covers quite separate and inserted in a large ventr. plate . . . . . 1. <i>Hermannia</i> . . . . . p. 62  |  |
|   |   | Genital and anal covers only separated by a rim common to both; not inserted in a ventr. plate, but touching the deflexed dors. plate at sides 5. <i>Lohmannia</i> . . . . . p. 75 |  |
| 5 | } | Tectp. present at leg 2 . . . . . 3. <i>Cymbaeremaeus</i> . . . . . p. 66  |  |
|   |   | No Tectp. for leg 2 . . . . . 4. <i>Nothrus</i> . . . . . p. 68  |  |

### 1. Gen. *Hermannia* Nic.

1842 *Nothrus* (part.), C. L. Koch, *Übers. Arach.*, v. 3 p. 110 | 1855 *Hermannia*, Nicolet in: *Arch. Mus. Paris*, v. 7 p. 468 | 1885 *H.*, Canestrini, *Prosp. Acarof.*, v. 1 p. 9 | 1888 *H.*, Michael, *Brit. Orib.*, v. 2 p. 439 | 1896 *H.*, + *Angelia* (part.), Berlese, *A. M. S.*, *Crypt. II* p. 24, 26, 31.

Abd. unsegmented. Dors. plate of Abd. convex, full chitinized, not carrying cast larval or nymphal skins of Dors. of Abd. Genital and anal covers separate and inserted in a ventr. plate. Dors. of Abd. rough in all known species. Legs short, pair 4 scarcely passing post. margin. Ung. mond.

9 species.

Key to the species.

- |   |   |  |  |
|---|---|--|--|
| 1 | } | With a tubular projection on each side of Abd. — 2.  |  |
|   |   | No tubular projection — 3.   |  |
| 2 | } | A quadrangular plate with slightly raised edge on Cepth. between Psstg. — L. 750 $\mu$ . . . . . 5. <i>H. granulata</i> . . . . . p. 64  |  |
|   |   | No such plate. — L. 720 $\mu$ . . . . . 1. <i>H. arrecta</i> . . . . . p. 62   |  |
| 3 | } | Dors. of Abd. without any margin differently marked from central portion — 4.  |  |
|   |   | Dors. of Abd. with a lat. margin different from central portion and separated from it by a ridge — 8.  |  |
| 4 | } | Dors. of Abd. thickly strewn with raised dots or pits — 5.   |  |
|   |   | Dors. of Abd. very coarsely and irregularly reticulated. — L. 850 $\mu$ . . . . . 8. <i>H. reticulata</i> . . . . . p. 64  |  |
| 5 | } | Abd. globose or oval — 6.  |  |
|   |   | Abd. long, sack shaped — L. 500 $\mu$ . . . . . 6. <i>H. nanus</i> . . . . . p. 64   |  |
| 6 | } | Psstg. org. long, filiform — 7.  |  |
|   |   | Psstg. org. short, clavate. — L. 870 $\mu$ . . . . . 9. <i>H. scabra</i> . . . . . p. 65   |  |
| 7 | } | Hairs on first 3 joints of legs spatulate; 4 rows and a border of hairs on Dors. of Abd. — L. 820 $\mu$ . . . . . 4. <i>H. convexa</i> . . . . . p. 63   |  |
|   |   | Hairs on first 3 joints of legs setiform; 2 rows and a border of hairs on Dors. of Abd. — L. 250 $\mu$ . . . . . 7. <i>H. ovulum</i> . . . . . p. 64   |  |
| 8 | } | Margin of Dors. of Abd. with transverse ridges; the 2 ridges which divide margin from centre of dors. having a spoon-shaped depression between them posteriorly. — L. 850 $\mu$ . . . . . 2. <i>H. bistriata</i> . . . . . p. 63 |  |
|   |   | No transverse ridges on margin; no spoon-shaped depression. — L. 750 $\mu$ . . . . . 3. <i>H. carinata</i> . . . . . p. 63   |  |

1. *H. arrecta* Nic. 1855 *H. a.*, Nicolet in: *Arch. Mus. Paris*, v. 7 p. 470 t. 9 f. 5 | 1888 *H. a.*, Michael, *Brit. Orib.*, v. 2 p. 445 t. 43 f. 8—15.

Im. Dull red-brown, often carries cast skins. Cepth. triangular, granular, no other markings. Psstg. projecting, cup-shaped. Psstg. org.

long, slightly incrassated towards distal end. Abd. finely granular with a chitinous tubular projection on each side. — Nph. Very light rosy purple, almost white, legs and tip of Rost. reddish, leathery; Abd. with small scattered papillae and a roll of cuticle along ant. margin, otherwise resembles. Im. — L. ca. 720  $\mu$ .

On dead wood and moss. Algeria, England, France.

2. *H. bistrriata* (Nic.)\* 1840 *Nothrus palliatus*, C. L. Koch, C. M. A., fasc. 30 f. 4 (Nph.!) | 1896 *Angelia palliata*, Berlese, A. M. S., Crypt. II p. 26 | 1855 *Nothrus bistrriatus* (err., non C. L. Koch 1840!), Nicolet in: Arch. Mus. Paris, v. 7 p. 397 t. 7 f. 7 | 1885 *N. b.*, Berlese, A. M. S., fasc. 17 t. 9 | 1880 *Hermannia bistrriata*, Michael in: J. R. micr. Soc., v. 3 p. 42 | 1888 *H. b.*, Michael, Brit. Orib., v. 2 p. 462 t. 42 f. 8—14 | 1876 *Nothrus cirrosus*, Canestrini & Fanzago in: Atti Soc. Veneto-Trent., v. 5 fasc. 1 p. 103 (Nph!).

Im. Dark brown or black. Cepth. rough, deeply pitted; Psstg. org. moderately long, rod-like or clavate. Intlam. hair short, thick, white; legs short, thick. Abd. long somewhat rounded posteriorly, ant. margin a rough ridge. Dors. of Abd. sparsely but irregularly punctured, bears 6, (sometimes 4) longitudinal ridges the whole length of Dors. of Abd. 2 form lat. edge; short, irregular, transverse ridges unite lat. ridge to next (where there are 6). A basin-shaped depression in centre of post. margin between the 2 median ridges. Curved hairs round post. margin. — Nph. Legs and part of Cepth. red-brown, chitinous; remainder and Abd. yellowish white, leathery, granular. No Psstg. or Psstg. org. visible. Abd. sack-shaped, slightly wrinkled, a row of curved hairs round post. margin, and 2 longitudinal rows on Dors. of Abd. — Im. L. ca. 850  $\mu$ .

Im. terrestrial on moss, Nph. amphibious on land moss or Sphagnum. France, Germany, Italy.

3. *H. carinata* P. Kram. 1897 *H. c.*, P. Kramer in: Bibl. zool., v. 20 p. 81.

Im. Very like *H. bistrriata*, but without the spoon-shaped depression at post. end of Dors. of Abd. and without the transverse ridges on the marginal band of Dors. and the hairs on the same rather shorter, and ridges on Cepth. more curved than in *H. bistrriata*. There are 2 small apodemata on ant. part of Cepth. not found in *H. bistrriata*. L. ca. 750  $\mu$ .

Greenland.

4. *H. convexa* (C. L. Koch)\*\* 1840 *Nothrus convexus*, C. L. Koch, C. M. A., fasc. 29 t. 1 | 1840 *N. piceus*, C. L. Koch, C. M. A., fasc. 29 t. 2 | 1886 *N. p.*, Berlese, A. M. S., fasc. 33 t. 6 | 1888 *Hermannia picea*, Michael, Brit. Orib., v. 2 p. 448 t. 41 f. 1—9 | 1896 *H. p.*, Berlese, A. M. S., Crypt. II p. 91 | 1840 *Nothrus gibbus*, C. L. Koch,

\*) According to the synonyma enumerated above by the author and in accordance with the „Regeln für die wissenschaftliche Benennung der Thiere“ the name of this species is: *H. palliata* (C. L. Koch). The Editors.

See my note p. 7. The Author.

\*\*\*) The well-known name of this species generally employed is *H. picea*. Koch's *Nothrus piceus* and his *N. convexus*, are the same species (synonyms). Koch's work was published in fasciculi of loose sheets (one to a species) without any arrangement creatures of different families and orders being frequently mixed in the same fasciculus; they were intended to be arranged subsequently; but a number, to render reference convenient, was put on each sheet; *N. picea* and *N. convexa* were in the same fasciculus but the latter had the distinctive number 1. the former. 2. Under these circumstances I should not have considered it necessary to disturb the well-known name of „*picea*“ but the Editors hold that „*convexa*“ has the priority. A. D. Michael.

C. M. A., fasc. 29 t. 4 | 1855 *Hermannia crassipes*, Nicolet in: Arch. Mus. Paris, v. 7 p. 469 t. 9 f. 4 | 1882 *H. c.*, Haller in: Jahresh. Ver. Würtemb., v. 38 p. 306.

Im. Black, rough, coarsely dotted. Cepth. almost as broad at base as Abd. Psstg. org. long, filiform. Intlam. hair thick, spatulate, slightly curved. Legs thick, rough, with whorls of spatulate hairs Genua nearly as long as Tibia Abd. very convex, raised dots on Dors. of Abd. about 90 to mm 6 longitudinal rows of thick spatulate white hairs on Dors. of Abd. — Nph. Yellow-brown, dull. Cepth. and legs granular. Cepth. with median longitudinal sulcation and mamilliform elevation on each side. Psstg. org. and Intlam. hair as in Im. Abd. less convex than in Im. Dors. of Abd. covered with wavy wrinkles mostly transverse. Hairs on Dors. of Abd. as in Im. — m. L. ca. 820  $\mu$ .

On moss and wood. England, France, Germany, Sweden.

5. **H. granulata** Nic. 1855 *H. g.*, Nicolet in: Arch. Mus. Paris, v. 7 p. 469 t. 9 f. 6 | 1883 *H. g.*, Berlese, A. M. S., fasc. 9 nr. 4.

Im. Like *H. arrecta* except, that there is a quadrangular chitinous plate on Cepth., and Dors. of Abd. coarsely granular. L. ca. 750  $\mu$ .

In moss and wood. France, Sicilia.

6. **H. nanus** (Nic.) 1855 *Nothrus n.*, Nicolet in: Arch. Mus. Paris, v. 7 p. 458 t. 7 f. 5 | 1888 *Hermannia n.*, Michael, Brit. Orib., v. 2 p. 455 t. 43 f. 1—7 | 1892 *H. nana*, Berlese, A. M. S., fasc. 63 nr. 1.

Im. Dark reddish brown, rough, dull, coarsely pitted, long and narrow. Cepth. conical, deeply excavated for insertion of legs. Psstg. on chitinous mammillae. Psstg. org. moderately long, slightly thickened toward distal end. 2 longitudinal ridges on Cepth. Dors. of Abd. very arched with 8 longitudinal rows of white rod-like hairs. — Nph. Very like Im., but Abd. white. — Im. L. ca. 500  $\mu$ .

In moss. England, France, Italy.

7. **H. ovulum** (Haupt) 1882 *Nothrus o.*, Haupt in: Ber. Ges. Bamberg, v. 12 p. 21.

Im. Said to be like *Nothrus gibbus* (i. e. *H. convexa*), but smaller, and hairs on first 3 joints of legs setiform, not clavate; and only 2 rows of about 3 hairs each on Dors. of Abd. but a marginal row of 4 hairs is present. L. ca. 250  $\mu$ .

In moss. Germany.

8. **H. reticulata** Thor. 1871 *H. r.*, Thorell in: Öfv. Ak. Förh., v. 28 p. 696 | 1879 *H. r.*, L. Koch in: Svenska Ak. Handl., v. 16 p. 112 t. 3 f. 21 | 1888 *H. r.*, Michael, Brit. Orib., v. 2 p. 458 t. 42 f. 1—7.

Im. Black or dark brown, rough, dull. Cepth. finely and regularly reticulated. Psstg. org. with very short peduncle and short pyriform head. Intlam. hair short spatulate. Legs reticulated, Genua as long as Tibia. Abd. elliptical with a projecting post. lobe, rather long, covered with irregular ridges forming very irregular reticulation; ridges composed of coalesced dots; surface between ridges finely granular. 4 longitudinal rows of spatulate hairs on Dors. of Abd. and 3 pairs on post. margin. Ventral surface finely reticulated. — Nph. Like a *Nothrus*; light yellow brown, leathery, rough; legs and Rost. reddish, chitinous. Cepth. and legs resemble Im. Abd. oblong, constricted a little before post. margin, post angles



formed by raised lobes. Dors. of Abd. flat with raised lumps and rolls. hairs resemble Im. — Im. L. ca. 850  $\mu$ .

In lichen and moss near the sea. England, Spitzbergen, Novaya Zemlya.

9. **H. scabra** (L. Koch) 1879 *Nothrus scaber*, L. Koch in: Svenska Ak. Handl., v. 16 p. 113 t. 3 f. 24 | 1888 *Hermannia nodosa*, Michael, Brit. Orib., v. 2 p. 452 t. 41 f. 10—11 | 1896 *H. n.*, Berlese, A. M. S., Crypt. II p. 31.

Im. Very like *H. convexa*, but Psstg. org. short, clavate, blunt-ended, roughened with small points near distal end. Abd. rather longer than in *H. convexa*. Dots on Dors. of Abd. sometimes coalesce and form ridges or network. L. ca. 870  $\mu$ .

Amphibious on moss lichen and fresh-water algae. England, Novaya Zembla, Siberia (Yeniseisk).

## 2. Gen. **Neoliodes** Berl.

1826 *Liodes* (non *Leiodes*, corr. *Liodes*, Latreille, Coleopt., 1796!), Heyden in: Isis p. 608 | 1885 *L.*, Berlese, A. M. S., fasc. 17 nr. 10 | 1895 *L.*, Banks in: Tr. Amer. ent. Soc., v. 22 p. 5 | 1842 *Nothrus* (part.), C. L. Koch, Übers. Arach., v. 3 p. 110 | 1877 *N.* (part.), Canestrini & Fanzago in: Atti Ist. Veneto, ser. 5 v. 4 p. 77 | 1885 *N.* (part.), Canestrini, Prosp. Acarof., v. 1 p. 28 | 1888 *N.* (part.), Michael, Brit. Orib., v. 2 p. 479 | 1888 *Neoliodes*, Berlese in: Bull. Soc. ent. Ital., v. 20 p. 47 | 1896 *N.*, Berlese, A. M. S., Crypt. II p. 32.

Abd. unsegmented. Dors. of Abd. convex, not fully chitinized, but carrying cast larval and nymphal skins of Dors. of Abd. Ung. trid.

3 good and 2 doubtful species.

Key to the good species.

- |   |   |   |
|---|---|---|
| 1 | { Dors. of Abd. without bordering hairs — 2.<br>Dors. of Abd. bordered by strong semicircular<br>hairs, which spring from margin and also touch<br>it with their tips . . . . . | 2. <b>N. peltifer</b> . . . . . p. 65   |
|   |   |   |
| 2 | { Cast skins of Dors. of Abd. shield-shaped, pitted,<br>with a post. point bearing 2 spatulate hairs. —<br>L. 1—1,6 mm . . . . .  | 3. <b>N. theleproctus</b> . . p. 66   |
|   |   | { Cast skins of Dors. of Abd. oval without post. point;<br>markings on them radiating striae. — L. 1,5 mm |

1. **N. concentricus** (Say) 1821 *Oribata concentrica*, Say in: J. Ac. Philad., v. 2 p. 68, coll. writ. v. 2 p. 16 | 1895 *Liodes concentricus*, Banks in: Tr. Amer. ent. Soc., v. 22 p. 15 | 1840 *Nothrus scaliger*, C. L. Koch, C. M. A., fasc. 29 t. 11 | 1890 *N. s.*, Michael in: P. zool. Soc. London, p. 418 | 1883 *N. theleproctus*, Berlese, A. M. S., fasc. 3 nr. 1 | 1885 *Liodes t.*, Berlese, A. M. S., notes fasc. 3 p. 6 | 1896 *Neoliodes t.*, Berlese, A. M. S., Crypt. II p. 32.

Im. Like *N. theleproctus*, but Abd. less sharply truncated anteriorly, hardly at all drawn out posteriorly and hairs at post. end much smaller, no raised margin to cast skins; they slope down from the centre and except the central part between larval skin and ant. margin of Abd. are marked with radiating striations instead of areolations. L. ca. 1,5 mm.

Algeria, Germany, Italy, Sweden.

2. **N. peltifer** (C. L. Koch) 1840 *Nothrus p.*, C. L. Koch, C. M. A., fasc. 29 t. 9 | 1879 *N. punctatus*, L. Koch in: Svenska Ak. Handl., v. 16 p. 114 t. 3 f. 25 (Nph.?) | 1882 *N. bicristatus* + ?*N. spirofilus*, Haupt in: Ber. Ges. Bamberg, v. 12 p. 23, 24.

Im. Blackish brown, resembles *N. theleproctus*, but Abd. more oval and bordered by curved setiform hairs which spring from the margin and form about a semi-circle so that their tips also touch the margin. Size „mehr als mittelgross“.

In moss and dead wood. Germany, Sweden.

3. *N. theleproctus* (Herm.) 1804 *Notaspis t.*, Hermann, Mém. apt., p. 91 t. 7 f. 5 | 1826 *Liodes t.*, Heyden in: Isis, p. 608 | 1840 *Nothrus t.*, C. L. Koch, C. M. A., fasc. 29 t. 10 | 1888 *N. t.*, Michael, Brit. Orib., v. 2 p. 522 t. 45 f. 1—9 | 1840 *N. farinosus*, C. L. Koch, C. M. A., fasc. 29 f. 8 (with one cast skin only) | 1876 *N. dorsatus*, Canestrini & Fanzago in: Atti Soc. Veneto-Trent., v. 5 p. 101 (Nph.) | ?1882 *N. circumvallatus* + *N. dimera*, Haupt in: Ber. Ges. Bamberg, v. 12 p. 22, 23 | ?1883 *N. malleolus*, Karpelles in: Berlin. ent. Z., v. 28 p. 38 | 1883 *N. Doderléinii*, Berlese, A. M. S., fasc. 3 nr. 2 | 1885 *Liodes D.*, Berlese, A. M. S., notes fasc. 3 p. 6 | 1896 *Neoliodes D.*, Berlese, A. M. S., Crypt. II p. 32 || non 1883 *Nothrus theleproctus*, Berlese, A. M. S., fasc. 3 nr. 1.

Im. Dark chestnut-brown, rough, dull. Cepth. broad, a sulcation between it and Abd. covered with vermiform ridges; 2 broad lobes on post. median portion. Psstg. large, projecting. Psstg. org. of moderate length, slightly clavate, directed backward. Legs thick, flat, rough; most leg-hairs spatulate. Abd. truncated and straight anteriorly, curved laterally, drawn out to a rounded point bearing 2 spatulate hairs posteriorly entirely hidden by cast skins of Dors. of Abd., which are carried flat and almost concentrically, each skin bordered by a raised roll, cast skins coarsely areolated all over. — Nph. Resembles Im. except in color. — Im. L. ca. 1—1,6 mm.

In moss. England, Germany, Italy, Paraguay, Switzerland, ?Pennsylvania.

*N. kornhuberi* (Karp.) 1883 *Nothrus k.*, Karpelles in: Arch. Naturg., v. 49 I p. 455.

Im. Dark brown, pentagonal; Cepth. small. Abd. large, arched; cast skins carried on Dors. of Abd. in a cornucopia-shape. Body and legs covered with short hairs. Ung. trid. Size? — Imperfectly described from a broken specimen in the Berlin Museum. Probably a good species, probably a *Neoliodes*.

Japan.

*N. venosus* (Grube) 1859 *Nothrus v.*, Grube in: Arch. Dorpat. Ges., ser. 2 v. 1 p. 476.

Im. Said to be something like *Nothrus farinosus* C. L. Koch, which is probably *Neoliodes theleproctus*, without the larval and nymphal skins, but present species has 8 small processes on post. margin. L. ca. 400  $\mu$ . — Probably a *Neoliodes*, possibly immature, but not improbably a distinct species.

Germany.

### 3. Gén. *Cymbaeremaeus* Berl.

1855 *Eremaeus* (part.) (non *Eremaeus* C. L. Koch 1835!), Nicolet in: Arch. Mus. Paris, v. 7 p. 450 | 1877 *E.* (part.), Canestrini & Fanzago in: Atti Ist. Veneto, ser. 5 v. 4 p. 77 | 1885 *E.* (part.), Canestrini, Prosp. Acarof., v. 1 p. 9 | 1886 *E.* (part.), Berlese, A. M. S., fasc. 33 nr. 10 | 1888 *E.*, Michael, Brit. Orib., v. 2 p. 467 | 1896 *E.* (part.), Oudemans in: Tijdschr. Ent., v. 39 p. 56 | 1896 *Cymbaeremaeus*, Berlese, A. M. S., fasc. 78 nr. 1.

Abd. unsegmented; Dors. of Abd. flattened, undulated or concave, rough and sculptured. Tectp. present to leg 2. Ung. trid.

4 good and 1 doubtful species.

Key to the good species.

- |   |   |  |
|---|---|--|
| 1 | { | Psstg. org. short, with short peduncle and small almost globular head — 2.   |
|   |   | Psstg. org. long, straight, rod-like — L. 700 $\mu$ . . . 4. <b>C. tibialis</b> . . . p. 68  |
| 2 | { | Markings on Dors. of Abd. coarse reticulations — 3.  |
|   |   | Markings on Dors. of Abd. ridges, more or less transverse, radiating on margin. — L. 380 $\mu$ . . . 3. <b>C. fimbriatus</b> . p. 67 |
| 3 | { | Margin of Dors. of Abd. turned up. — L. 400  |
|   |   | —700 $\mu$ . . . . . 2. <b>C. cymba</b> . . . p. 67  |
|   |   | Margin of Dors. of Abd. turned down. — L. 290 $\mu$ 1. <b>C. brevipes</b> . . p. 67  |

1. **C. brevipes** (Michael) 1888 *Eremaeus b.*, Michael, Brit. Orib., v. 2 p. 475 t. 44 f. 12—19 | 1896 *E. b.*, Berlese, A. M. S., Crypt. II p. 36 | 1891 *E. minimus*, Berlese, A. M. S., fasc. 58 nr. 9 | 1891 *E. Fockeui*, Moniez in: Rev. biol. Nord France, v. 3 nr. 6.

Im. Light to dark brown, dull, rough; short pyriform. Cepth. with raised dots but no regular markings. Psstg. org. with short peduncle and globular head. Legs short, 4 scarcely reaches post. margin. Ung. almost homd. Abd. widest near post. margin; convex in centre; a broad margin flat or sloping downward. Dors. of Abd. rather regularly reticulated, reticulations about 9  $\mu$ ; a few very fine curved caducous hairs on Dors. of Abd. and post. margin. — Nph. Yellow-brown, dull, leathery. A sulcation between Rost. and remainder of Cepth., which has longitudinal folds. Psstg. org. like Im. Dors. of Abd. with some large cuticular folds regularly arranged, 6 short clavate hairs on post. margin in groups of 3. — Im. L. ca. 290  $\mu$ .

On trees, particularly Oaks. England.

2. **C. cymba** (Nic.) 1855 *Eremaeus c.*, Nicolet in: Arch. Mus. Paris, v. 7 p. 452 t. 10 f. 3 | 1877 *E. c.*, Canestrini & Fanzago in: Atti Ist. Veneto, ser. 5 v. 4 p. 90 | ?1886 *E. c.*, Berlese, A. M. S., fasc. 33 nr. 10 | 1888 *E. c.*, Michael, Brit. Orib., v. 2 p. 470 t. 44 f. 1—11 | 1896 *Cymbaeremaus c.*, Berlese, A. M. S., Crypt. II p. 37.

Im. Light yellow-brown, dull, rough; almost pyriform; slightly pointed posteriorly. Rost. very blunt and round; Psstg. org. with very short peduncle and globular head. Cepth. coarsely granulated and bears longitudinal and transverse ridges. Legs short, rough, femora large, those of legs 1 and 2 with slender peduncles. Ung. hetd. Abd. oval, truncated, ant. margin sharply raised, centre slightly convex. Whole Dors. of Abd. coarsely and irregularly reticulated by ridges, interspaces more finely reticulated. Some very short thick caducous hairs on dors. plate of Abd. and post. margin. Ventr. surface reticulated like dorsal. — Nph. Buff. Legs and rostr. reddish; dull, leathery, resembles Im., but rostr. less broad, femora without fine peduncles. Dors. of Abd. and ventr. surface irregularly wrinkled instead of reticulated, hairs minute with short peduncle and globular head. — Im. L. ca. 400—700  $\mu$ .

On Oak trees etc. England, France, ?Italy, Netherlands.

3. **C. fimbriatus** (Michael) 1890 *Eremaeus f.*, Michael in: P. zool. Soc. London, p. 422 t. 37 f. 6 | ?1896 *E. marginalis*, Banks in: Tr. Amer. ent. Soc., v. 23 p. 76.

Im. Red-brown, rough, dull. Cepth. arched, bears numerous irregular rough dots and ridges. Psstg. org. very short, peduncle hardly shows, head globular. Legs short, 4. not reaching post. margin. Abd. compressed dorso-ventrally. Ant. margin of Abd. truncated, post. margin round. Central part of Dors. of Abd. arched, elliptical, has slightly turned-up edge; outside this a deep trench and then a broad, slightly arched border. Whole

Dors. of Abd. bears numerous rough, broken, irregular, more or less transverse ridges, which are radiating on margin. Ung. hetd. L. ca. 380  $\mu$ .

Algeria, ? America.

4. **C. tibialis** (Nic.) 1855 *Eremaeus t.*, Nicolet in: Arch. Mus. Paris, v. 7 p. 452 t. 10 f. 2.

Im. Dark red-brown, finely granulated, legs yellow, smooth. Psstg. org. long, straight, rigid, directed obliquely backward. Abd. oval, Dors. of Abd. concave, hairless, a red, polished, almost circular boss in median line close to ant. margin, a similar projection, but rough, on post. margin. — Nph. Greenish-yellow with red shades, sub-fusiform, almost flat. Rost. sharply demarcated from remainder of Cepth., 2 or 3 transverse lines like segmentations on Cepth., not always seen on fully grown Nph. Psstg. org. like Im. Abd. widest anteriorly much narrowed posteriorly, terminating in 2 papillae each bearing a hair longer than body. — Im. L. 700  $\mu$ .

France. Rare.

**C. minutus** (C. L. Koch) 1835 *Cepheus m.*, C. L. Koch, C. M. A., fasc. 3 t. 12.

Im. Dark brown; dull, rough. Psstg. org. long, gradually clavate. Abd. elliptical, centre slightly convex, finely wrinkled, a border with edge raised; 4 short hairs on post. margin, generally a light smooth spot on Dors. of Abd. near ant. margin. L. ?

Germany.

#### 4. Gen. **Nothrus** C. L. Koch

1835 *Nothrus* (part.), C. L. Koch, C. M. A., fasc. 2 | 1842 *N.* (part.), C. L. Koch, Übers. Arach., v. 3 p. 110 | 1855 *N.* (part.), Nicolet in: Arch. Mus. Paris, v. 7 p. 453 | 1859 *N.* (part.), Grube in: Arch. Dorpat. Ges., ser. 2 v. 1 p. 417 | 1877 *N.* (part.), Canestrini & Fanzago in: Atti Ist. Veneto, ser. 5 v. 4 p. 77 | 1885 *N.* (part.), Canestrini, Prosp. Acarof., v. 1 p. 9 | 1888 *N.* (part.), Michael, Brit. Orb., v. 2 p. 479 | 1895 *N.*, Banks in: Tr. Amer. ent. Soc., v. 22 p. 13 | 1896 *N.* + *Angelia* (part.), Berlese, A. M. S., Crypt. II p. 24, 26.\*)

Abd. unsegmented, dors. plate flat, concave or undulated; without Tectp. Legs short.

19 good and 4 doubtful species.

Key to the good species.

- |   |   |  |
|---|---|--|
| 1 | { | Ung. mond. — 2.  |
|   | { | Ung. trid. — 4.  |
| 2 | { | Abd. not pointed posteriorly; Psstg. of the ordinary type — 3.   |
|   | { | Abd. shield-shaped (pointed posteriorly); no projecting tubular Psstg. — L. 290 $\mu$ . . . . . 12 <i>N. monodaetylus</i> . p. 72    |
| 3 | { | Post. margin of Abd. rounded, hairs thereon arising from apophyses. — L. 830 $\mu$ . . . . . 19. <i>N. targionii</i> . . . . . p. 74 |
|   | { | Post. margin truncated, hairs thereon sessile. — L. 660 $\mu$ . . . . . 17. <i>N. sylvestris</i> . . . . . p. 73                     |

\*) The genus *Angelia* is formed to receive part of Koch's genus *Nothrus* including *N. palustris*, which appears to be Berlese's type, but as this is Koch's type it cannot be moved into a new genus but must remain the type of *Nothrus*, if the genus were divided the other group should be renamed, but the present author does not consider division necessary.

- 4 } Abd. shield-shaped, pointed posteriorly — 5.  
 } Abd. not pointed posteriorly — 6.
- 5 { Cuticle finely reticulated — L. 360  $\mu$  . . . . . 18. *N. tardus* . . . . . p. 74  
 { Cuticle smooth. — L. 600  $\mu$  . . . . . 9. *N. glaber* . . . . . p. 71
- 6 { Psstg. org. filiform — 7.  
 { Psstg. org. clavate — 10.
- 7 { Abd. truncated posteriorly — 8.  
 { Abd. rounded posteriorly — 9.
- 8 { Hairs on Dors. of Abd. setiform; the pair on  
 post. corners 4 times as long as the others  
 on post. margin. — L. 1,1 mm . . . . . 13. *N. palustris* . . . . . p. 72  
 { Hairs on Dors. of Abd. spatulate or rod-like; the  
 pair on post. corners not twice as long as the  
 others on post. margin. — L. 800  $\mu$  . . . . . 1. *N. anauniensis* . . . . . p. 70
- 9 { Dors. of Abd. convex; hairs thereon clavate . . . . . 4. *N. biciliatus* . . . . . p. 70  
 { Dors. of Abd. concave, hairs thereon setiform. —  
 L. 700  $\mu$  . . . . . 2. *N. banksi* . . . . . p. 70
- 10 { Spines on lat. margin of Abd. as long as width  
 of Abd. and arising from apophyses which  
 project beyond the margin — 11.  
 { Spines (or hairs) on lat. margin of Abd. short;  
 no projecting apophyses — 12.
- 11 { Apophyses long; Abd. oblong, truncated and  
 slightly concave posteriorly, the 2 apophyses at  
 postero-lateral corner of Abd. with bulbous  
 proximal parts. — L. 900  $\mu$  . . . . . 16. *N. spinifer* . . . . . p. 73  
 { Apophyses short; sides of Abd. somewhat curved,  
 it is narrowed and deeply bifid posteriorly,  
 apophyses at postero-lateral corners without  
 bulbous bases . . . . . 6. *N. echinatus* . . . . . p. 71
- 12 { Im. carrying the cast skin of post. margin and  
 of 2 long conical projections at post. angles  
 of Abd. of Nph., these enclose the same part  
 in Im. as in a bag. — L. 0,8—1,2 mm . . . . . 15. *N. segnis* . . . . . p. 73  
 { Im. not carrying any cast skin. — 13.
- 13 { Post. margin deeply incised (emarginate) — 14.  
 { Post. margin truncated or slightly concave or  
 convex — 15.
- 14 { Incision comencing near lat. margin, causing post.  
 margin to be bifid; Dors. of Abd. flat without  
 raised margin; 6 clavate hairs on post. margin.  
 — L. 700  $\mu$  . . . . . 7. *N. excisus* . . . . . p. 71  
 { Incision only central; Dors. of Abd. with strongly  
 raised margin; 4 pectinated hairs with reflexed  
 distal ends on post. margin; central pair  
 transverse and nearly as long as Abd. —  
 L. 700  $\mu$  . . . . . 8. *N. flagellatus* . . . . . p. 71
- 15 { Post. margin with a broad central projection  
 lower in level than the Dors. of Abd. — 16.  
 { Post. margin without any central projection — 17.
- 16 { Central projection with small tubercles at corners  
 each bearing a large thick hair. — L. 800  $\mu$  . . . . . 10. *N. horridus* . . . . . p. 71  
 { Central projection with very large, almost  
 cylindrical tubercles at corners, each bearing  
 a very small sharply curved hair. — L. 1 mm . . . . . 5. *N. biverrucatus* . . . . . p. 71

- 17 { Hairs on margin of Abd. and Rost. hairs setiform  
and pectinated — 18.  
Hairs on margin of Abd. and Rost. hairs clavate.  
L. 700  $\mu$  . . . . . 14. *N. rugulosus* . . . p. 73
- 18 { Post. margin convex. — L. 660  $\mu$  . . . . . 11. *N. invenustus* . . . p. 72  
Post. margin concave — L. 750  $\mu$  . . . . . 3. *N. bicarinatus* . . . p. 70

1. *N. anauniensis* Can. & Fanz. 1876 *N. a.*, Canestrini & Fanzago in: Atti Soc. Veneto-Trent., v. 5 p. 102 | 1877 *N. a.*, Canestrini & Fanzago in: Atti Ist. Veneto, ser. 5 v. 4 p. 92 t. 2 f. 2 | 1885 *N. a.*, Berlese, A. M. S., fasc. 17 nr. 7 | ?1895 *N. truncatus*, Banks in: Tr. Amer. ent. Soc., v. 22 p. 14 | 1896 *Angelia sylvestris*, Berlese, A. M. S., Crypt. II p. 26.

Im. Like *N. sylvestris*, but ung. trid. or bid. through the atrophy of one lateral Ung. of trid. Ung. Post. and lat. margins of Abd. rounder. L. ca. 800  $\mu$ .

This Species is stated in error by Canestrini (1885, Prosp. Acarof., v. 1 p. 30) to be identical with *N. palustris*.

Algeria, Italy and ?New York State.

2. *N. banksi* Michael\*) 1895 *N. furcatus* (non C. L. Koch 1844!), Banks in: Tr. Amer. ent. Soc., v. 22 p. 14.

Im. Reddish brown. Apparently very like *N. targionii*, but hairs round Abd. and Rost. hairs not stated to be pectinated, and there is stated to be a curved transverse ridge between the post. ends of the raised lateral margin, and in median line of Dors. of Abd. a forked ridge reaching from ant. margin to near transverse ridge. 4 simple hairs on each branch of fork. Ung. trid. L. 700  $\mu$ .

Washington State.

3. *N. bicarinatus* C. L. Koch 1840 *N. b.*, C. L. Koch, C. M. A., fasc. 29 t. 16 | 1855 *N. b.*, Nicolet in: Arch. Mus. Paris, v. 7 p. 456 t. 7 f. 3 | 1877 *N. b.*, Canestrini & Fanzago in: Atti Ist. Veneto, ser. 5 v. 4 p. 94 | 1885 *N. b.*, Berlese, A. M. S., fasc. 17 nr. 4 | 1888 *N. b.*, Michael, Brit. Orib., v. 2 p. 514 t. 47 A f. 1—5 | 1840 *N. ventricosus*, C. L. Koch, C. M. A., fasc. 29 t. 17 | 1840 *N. rostratus*, C. L. Koch, C. M. A., fasc. 29 t. 19 (with dirt on Lam. hair) | 1844 *N. pigerrimus*, C. L. Koch, C. M. A., fasc. 38 t. 3.

Im. Resembles *N. horridus*, but has not central flat projection below post. margin of Dors. of Abd. L. ca. 750  $\mu$ .

On trees etc., especially Oaks. England, France, Germany, Italy.

4. *N. biciliatus* C. L. Koch 1844 *N. b.*, C. L. Koch, C. M. A., fasc. 38 t. 2.

Im. Cepth. black, Abd. red-brown. Psstg. org. very long, thick at base, but thin and setiform for the greater part of length. Abd. oval, truncated anteriorly, flat; central part slightly raised and bearing at its edge a row of curved clavate hairs, then comes a deep sulcation then a broad raised border bearing a row of similar but larger hairs on outer edge. Legs with clavate hairs. Ung.? L. „mittelgross“. — A good species imperfectly described.

In moss on wood. Germany.

\*) The name of *furcatus* used by Banks is preoccupied in the genus *Nothrus*, C. L. Koch having used it for a creature which is really a Nymph of *Nothrus segnis*, but although Koch's name has failed it cannot, under the rules which govern „Das Tierreich“ be repeated in the same genus. I have therefore named the species in honor of Mr. Banks.

5. **N. biverrucatus** C. L. Koch ?1840 *N. angulatus*, C. L. Koch, C. M. A., fasc. 29 t. 14 | 1840 *N. biverrucatus*, C. L. Koch, C. M. A., fasc. 29 t. 15 | 1888 *N. b.*, Michael, Brit. Orib., v. 2 p. 510 t. 47 A f. 6—10 | ?1855 *N. horridus*, Nicolet in: Arch. Mus. Paris, v. 7 p. 456 t. 7 f. 4 | ?1885 *N. h.*, Berlese, A. M. S., fasc. 17 nr. 1.

Im. Very like *N. horridus* but larger, heads of Psstg. org. less globular, and flat projection below post. margin of Abd. with a large truncated tubercle at each post. corner bearing a minute sharply curved hair in the centre of distal surface. L. ca. 1 mm.

England, Germany, France?, Italy?, Sweden.

6. **N. echinatus** C. L. Koch 1835 *N. e.*, C. L. Koch, C. M. A., fasc. 2 t. 17 | 1882 *N. ansatus*, Haupt in: Ber. Ges. Bamberg, v. 12 p. 24.

Very like *N. spinifer*, but Abd. longer and bifurcating at post. end so as to form 2 conical tails, as in *N. segnis*, when that species is carrying the post. part of the nymphal skin of Dors. of Abd.

In moss etc. Germany.

7. **N. excisus** Banks 1895 *N. e.*, Banks in: Tr. Amer. ent. Soc., v. 22 p. 15.

Im. Apparently intermediate between *N. segnis* and *N. bicarinatus*. Pale brown, Cepth. truncate anteriorly. Psstg. org. short, capitate; Abd. flat without raised margin; truncated anteriorly, deeply emarginate posteriorly; a rough clavate hair on each post. angle, a sub-clavate hair just ant. to angle; a pair of shorter clavate hairs in centre of post. margin. A sub-median ridge each side from near ant. margin, which near post. margin curves outward to lat. angle; where curve starts is a transverse ridge; 3 or 4 short clavate hairs on each lat. margin. Vent. surface and legs rough; numerous curved stiff hairs on legs. Most hairs on body finely serrated. Ung. trid. L 700  $\mu$ .

On bark of spruce firs. New York state.

8. **N. flagellatus** Berl. 1888 *N. f.*, Berlese in: Bull. Soc. ent. Ital., v. 20 p. 216 t. 13 f. 5.

Im. Earthy-brown. Abd. almost quadrangular, elongated, concave; margins raised, with 4 transverse ridges on them; post. margin with a central incision its whole depth, a tubercle projects at each side of the incision forming a prolongation of it; each tubercle bears a strong pectinated hair almost as long as Abd. but sharply recurved toward distal end; this hair directed transversely; one other pair of similar but shorter hairs on post. margin directed backward. L. ca. 700  $\mu$ .

Under bark of trees. Argentina (Buenos-Ayres).

9. **N. glaber** Michael 1888 *N. g.*, Michael, Brit. Orib., v. 2 p. 525 | 1896 *Angelia glabra*, Berlese, A. M. S., Crypt. II. p. 26.

Im. Like *N. tardus*, but larger, smooth without reticulations; Rost. more pointed and ant. margin of Abd. without projecting corners. — Nph. Like Im., but lighter. — Im. L. ca. 600  $\mu$ .

Ambipious, in moss and sphagnum. England.

10. **N. horridus** (Herm.) 1804 *Notaspis h.*, Hermann, Mém. apt., p. 90 t. 6 f. 3 | 1842 *Nothrus h.*, C. L. Koch, Übers. Arach., v. 3 p. 113 | 1888 *N. h.*, Michael, Brit. Orib., v. 2 p. 503 t. 47 f. 1—4, 7—13 | 1844 *Oribata horrida*, Gervais in: Walckenaer, Ins. Apt., v. 3 p. 254 | 1840 *Nothrus mutilus*, C. L. Koch, C. M. A., fasc. 29 t. 18 | 1840 *N. bistriatus*, C. L. Koch, C. M. A., fasc. 29 t. 21 | 1840 *N. sinuatus*, C. L. Koch.

C. M. A., fasc. 29 t. 22 (Nph.) | 1840 *N. runcinatus*, C. L. Koch, C. M. A., fasc. 29 t. 23 | ? 1871 *N. borealis*, Thorell in: Öfv. Ak. Förh., v. 28 p. 697 | ? 1885 *N. angulatus*, Berlese, A. M. S., fasc. 17 nr. 5 || non 1855 *N. horridus*, Nicolet in: Arch. Mus. Paris, v. 7 p. 456 t. 7 f. 1 | non 1885 *N. h.*, Berlese, A. M. S., fasc. 17 nr. 1.

Im. Brown, dull, rough, covered with short villous processes, usually so concealed by dirt that neither color nor texture can be seen. 2 apophyses on Rost. bear thick villous hairs, Psstg. org. with very short peduncle and globular head. Legs fringed with thick hairs on apophyses. Ung. trid., almost homd. Abd. oblong, Dors. of Abd. flat or hollow, post. margin concave with 2 apophyses near the angles bearing hairs; a flat projection at a lower level bearing 2 hairs occupies the concavity. A sub-elliptical raised ridge on Dors. of Abd. with 2 transverse ridges within and 4 diagonal from angles. 6 small apophyses on outside of this ridge bear very short hairs but do not project beyond lat. margin of Abd. — Nph. Yellowish-white, covered with dirt. Somewhat like Im., but Dors. of Abd. and margins of Abd. bear about 24 papillae, each with a thick curved hair. — Im. L. ca. 800  $\mu$ .

At the roots of moss etc. Algeria, England, Germany, Switzerland.

11. **N. invenustus** Michael 1888 *N. i.*, Michael, Brit. Orib., v. 2 p. 500 t. 47 A f. 12.

Im. Very like *N. horridus* but post. margin of Abd. convex and without central projection. Apophyses on Cephth. smaller than in *N. horridus*, does not carry dirt. L. ca. 660  $\mu$ .

On lichen. England.

12. **N. monodactylus** Michael 1888 *N. m.*, Michael, Brit. Orib., v. 2 p. 529 t. 45 f. 10—13 | 1896 *Angelia monodactyla*, Berlese, A. M. S., Crypt. II p. 26.

Im. Very like *N. tardus* but whitey-brown, slightly chitinized, not reticulated. Legs 3 and 4 usually concealed beneath Abd. Ung. mond. with a small square projection from tarsus on each side of Ung. A few hairs round margin, none on Dors. of Abd. L. ca. 290  $\mu$ .

On moss and sphagnum. England.

13. **N. palustris** C. L. Koch 1840 *N. p.*, C. L. Koch, C. M. A., fasc. 29 t. 13 | 1855 *N. p.*, Nicolet in: Arch. Mus. Paris, v. 7 p. 457 t. 7 f. 6 | 1886 *N. p.*, Berlese, A. M. S., fasc. 30 nr. 4 | 1888 *N. p.*, Michael, Brit. Orib., v. 2 p. 494 t. 46 f. 8—13 | 1896 *Angelia p.*, Berlese, A. M. S., Crypt. II p. 26 | 1844 *Nothrus pallens*, C. L. Koch, C. M. A., fasc. 38 t. 4 (Nph.) | ? 1895 *N. bipilis*, Banks in: Tr. Amer. ent. Soc., v. 22 p. 14.

Im. Dark red-brown, rough, dull; central parts coarsely pitted, pits about 85 to mm peripheral parts finely granular. 2 longitudinal rolls of cuticle on Cephth. ending posteriorly in mamilliform elevations, which bear the Psstg. Psstg. org. very long, filiform, directed outward, usually doubly curved. Legs long for genus; leg 4 articulated to a tubular projection of ventr. plate. Ung. very hetd. Abd. wider posteriorly than anteriorly, its lat. margins broad, curved, and raised at an angle, terminating posteriorly in large bosses, median part of Dors. of Abd. arched. Ant. and post. margin of Abd. almost straight, each post. angle bears a very long hair directed backward and concave inward, 2 pairs of shorter hairs on post. margin, 2 rows on Dors. of Abd. and some on lat. edges. — Nph. like Im., but Abd. white and post. angles form conical projections. — Im. L. ca. 1,1 mm.

In moss. England, France, Germany, Italy, Netherlands, Sweden and ? New York State.



14. *N. rugulosus* Banks 1895 *N. r.*, Banks in: Tr. Amer. ent. Soc., v. 22 p. 15.

Im. Cepth. dark, Abd. pale brown. Like *N. excisus* but Abd. truncated, slightly concave or convex posteriorly not deeply emarginate; 4 large clavate hairs on each lat. margin, margins roughened, but Dors. of Abd. smooth. Rost. hairs very clavate. Ung. trid. L. 700  $\mu$ .

Under bark of dead trees. New York State and Illinois.

15. *N. segnis* (Herm.) 1804 *Notaspis s.*, Hermann, Mém. apt., p. 94 t. 4 f. 8 | 1844 *Nothrus s.*, C. L. Koch, C. M. A., fasc. 30 t. 1 | 1885 *N. s.*, Berlese, A. M. S., fasc. 17 nr. 2 | 1888 *N. s.*, Michael, Brit. Orib., v. 2 p. 517 t. 48 f. 1-6 | 1844 *Oribata s.*, Gervais in: Walekenaer. Ins. Apt., v. 3 p. 254 | ?1840 *Nothrus biurus*, C. L. Koch, C. M. A., fasc. 30 t. 2 (Nph.) | 1840 *N. furcatus*, C. L. Koch, C. M. A., fasc. 30 t. 3 (Nph.).

Im. Yellow-brown, dull, covered with raised dots, but usually partly concealed by dirt. Cepth. flat, 2 apophyses extend beyond Rost. carrying at their ant. ends thick, villous, curved hairs which cross. Psstg. org. with short thin peduncle and pyriform head. Intlam. hair long villous. Legs not reaching post. margin; broad, flat, bordered with curved spines. Ung. trid. Abd. very long oblong, post. corners project and turn outward; adjoining inner side of projection is an apophysis bearing a thick, curved, villous hair; but corners apophysis and hair are hidden in a conical bag which is part of the nymphal skin; the 2 bags are joined by a strip of nymphal skin which hides the post. margin and bears a thick curved hair. An irregularly oval ridge on Dors. of Abd. — Nph. Like Im., but yellowish white, Rost. and legs reddish, Abd. bifurcate posteriorly, forming 2 long conical tails with a hair at post. end of each. Psstg. org. rod-like. — Im. L. ca. 0,8—1,2 mm.

At the roots of mosses. England, Germany, Italy, Norway, Sweden.

16. *N. spinifer* C. L. Koch 1835 *N. s.*, C. L. Koch, C. M. A., fasc. 2 t. 18 | 1885 *N. s.*, Berlese, A. M. S., fasc. 17 nr. 3 | 1885 *N. s.*, Canestrini, Prosp. Acarof., v. 1 p. 32 | 1855 *N. spiniger*, Nicolet in: Arch. Mus. Paris, v. 7 p. 455 t. 7 f. 2 | 1888 *N. s.*, Michael, Brit. Orib., v. 2 p. 497 t. 48 f. 7—13 | 1882 *N. concavus*, Haupt in: Ber. Ges. Bamberg, v. 12 p. 25.

Im. Chitinous brown, rough, leathery, granular, covered with villous processes, but usually so hidden by dirt that neither color nor texture are seen. Rost. hairs short, Intlam. hair long, both curved, villous, springing from short apophyses; 2 very long similar hairs on long apophyses between Rost. hairs and Intlam. hair, these cross in front of Rost. Psstg. org. with very short peduncle and pyriform head. Legs thick, flat, rough, with numerous thick curved hairs. Ung. trid. Abd. oblong, Dors. thereof hollow, lat. margins and ant. margin raised. Ant. margin of Abd. bears 3 pairs of villous curved spines on apophyses. Each lat. margin has 5 similar spiniferous processes larger and more curved; a very large apophysis and straight spine at post. angle, and 2 pairs with curved spines on post. margin; all curved spines cross forming a basket. — Nph. Like Im., but lighter and apophyses not so long or chitinized. — Im. L. ca. 900  $\mu$ .

Algeria, England, France, Germany, Italy.

17. *N. sylvestris* Nic. 1855 *N. s.*, Nicolet in: Arch. Mus. Paris, v. 7 p. 458 t. 7 f. 4 | 1888 *N. s.*, Michael, Brit. Orib., v. 2 p. 490 t. 46 f. 1—7 || non 1896 *Angelia s.*, Berlese, A. M. S., Crypt. II p. 26.

Im. Light chestnut-brown, dull, reticulated, almost oblong; reticulations on Cepth. and lat. part. of Abd. ca.  $8\ \mu$  on ventral part of Abd. ca.  $16\ \mu$ . Psstg. on chitinous mammillae; a longitudinal sulcation between them. Psstg. org. long, curved, filiform. Intlam. hair similar but shorter and thicker. Coxae 3 and 4 inserted in tubular projections of sternal plate. Ung. mond. Abd. almost oblong. Lat. parts of Abd. sharply raised at an angle, particularly anteriorly. Ant. margin of Abd. raised; central part of Dors. of Abd. slightly arched; 4 rows of thick, curved, slightly spatulate, slightly imbricated, white hairs on Dors. of Abd., 2 pairs on post. margin sessile, and a few others. — Nph. Very like Im., but Abd. yellowish white and with raised dots instead of reticulations, but post. angles project and there are 2 projections near centre of post. margin lower in level and bearing hairs. — Im. L. ca.  $660\ \mu$ .

Algeria, England, France.

18. **N. tardus** Michael 1888 *N. t.*, Michael, Brit. Orib., v. 2 p. 526 t. 47 f. 14 | 1896 *Angelia tarda*, Berlese, A. M. S., Crypt. II p. 26.

Im. Yellow-brown, finely and evenly reticulated, reticulations about  $3\ \mu$ . No exterior Psstg. of the ordinary type but a long setiform hair on each side which is the homologue either of the Psstg. org. or the Intlam. hair. Legs very short, thick, pairs 3 and 4 set under Abd. Ung. trid. Abd. flat, shield-shaped, ant. margin straight, but antero-lat. corners of Abd. form rounded projections each bearing a large hair directed outward. Central and lat. parts of Dors. of Abd. slightly raised and rounded leaving a shallow depression between, 2 longitudinal rows of about 3 hairs on Dors. of Abd. — Nph. Like Im. but cuticle softer, not reticulated and with numerous broad wrinkles. — Im. L. ca.  $360\ \mu$ .

On lichen. England.

19. **N. targionii** Berl. 1885 *N. T.*, Berlese, A. M. S., fasc. 17 nr. 8 | 1888 *N. T.*, Michael, Brit. Orib., v. 2 p. 488 t. 47 A f. 11 | 1896 *Angelia T.*, Berlese, A. M. S., Crypt. II p. 26.

Im. Dark brown. Cepth. pitted. Abd. smooth, not polished; Rost. small, leg 1 set in deep excavation. Psstg. org. long filiform. Legs fringed with thick curved hairs; Ung. mond. Abd. long, truncated anteriorly rounded posteriorly hollow in centre; lat. and ant. margins sharply raised, post. raised gradually; 4 large and 2 small apophyses on post. margin bearing large, thick, sharply curved hairs; 4 similar hairs without apophyses on each side of Abd. and some small hairs on Dors. of Abd., all the large curved hairs on the creature are villous. L. ca.  $830\ \mu$ .

This species is an approach to a *Hermannia*, particularly *H. bistrata*.

England, Italy; rare.

**N. pileiformis** Karp. 1883 *N. p.*, Karpelles in: Berlin. ent. Z., v. 28 p. 37.

Im. Dark-brown, oval, broad anteriorly, slender posteriorly. Pileus-shaped when seen from side; carries cast skins of Dors. of Abd. each of which has a wedge-shaped incision. No hairs on body. Ung. trid. L.? — Probably a good species, but imperfectly described from broken specimens in Berlin Museum.

Pennsylvania.

**N. quadracanthus** Haupt 1882 *N. q.*, Haupt in: Ber. Ges. Bamberg, v. 12 p. 24.

Im. Apparently like *N. spinifer*, but post. margin of Abd. more like *N. horridus*. L.? In moss. Germany.

**N. simplex** Banks 1895 *N. s.*, Banks in: J. N. York ent. Soc., v. 3 p. 128.

Im. Pale yellow-brown. Cepth. „fat“, triangular, concave in middle, sides rounded. Intlam. hair long, Psstg. org. moderate length, clavate. Abd. much depressed, Dors. of Abd. smooth with shallow depressions, truncate anteriorly broader and rounded posteriorly, 2 simple hairs on margin, one central, one near post. end; ventr. surface granular. — Young said to be obovate with corrugated epidermis. — Im. L. 900  $\mu$ .

In sphagnum-swamp. New York State.

**N. sordidus** C. L. Koch 1840 *N. s.*, C. L. Koch, C. M. A., fasc. 29 t. 20.

Im. Yellowish-brown. Rost. hairs not borne on apophyses. Abd. oblong, post. margin concave. 2 very long hairs at post. angles standing outward and backward but curving forward; a row of longish curved hairs on lat. margin and 2 on post. margin. L. „mittelgross.“

In woods. Germany.

### 5. Gen. **Lohmannia** Michael\*)

1884 (18. December) *Michaelia* (non Trouessart, Sarcopt., November 1884!), G. Haller in: Arch. Naturg., v. 50 I p. 234 | 1885 *Angelia* (part.), Berlese, A. M. S., Crypt. II p. 26.

Cepth. and Abd. only divided by a simple line. Abd. almost cylindrical, rounded posteriorly. Dors. plate much sufflexed on to the ventr. surface. Genital and anal covers close together, only separated by a rim common to both, the latter reaching the post. margin, and these 2 pairs of covers occupying the whole central part of the ventr. surface from a little behind the insertion of legs 4 backward and touching the reflexed dors. plate on each side. Mdb. very large. Maxillary palpus not so long as moveable arm of chela of Mdb. Ung. mond.

Canestrini (1891, in: Atti Ist. Veneto, ser. 7 v. 2 p. 718) and Banks (1895, in: Tr. Amer. ent. Soc., v. 22 p. 2) state, that this genus is composed of immature creatures, but this is an error.

2 species.

Key to the species.

Hairs on Dors. of Abd. setiform. — L. 750  $\mu$  . . . . . 1. **L. murcioides** . p. 75  
Hairs on Dors. of Abd. leaf-like. — L. over 1 mm . . . . . 2. **L. paradoxa** . . p. 75

1. **L. murcioides** (Berl.) 1896 *Angelia m.*, Berlese, A. M. S., fasc. 78 nr. 7.

Im. Similar to *L. paradoxa*, but indentations of Cepth. not quite equal nor quite half-moon shaped. Pectinations on Psstg. org. longer, and hairs on Abd. setiform, not leaf-like. L. 750  $\mu$ .

In moss. Italy; rare.

2. **L. paradoxa** (Haller) 1884 *Michaelia p.*, G. Haller in: Arch. Naturg., v. 50 I, p. 229 t. 16 f. 5—8.

Im. Light brown, twice as long as broad. Cepth. each side with 2 equal half-moon-shaped indentations, concave outward, occupying its whole lat. edge except tip of Rost. anterior of the 2 bordered by a ridge. Psstg. org. long, setiform, sparsely pectinated on one side. All the hairs except some of those on the legs leaf-like, mostly fusiform or laceolate. Legs short, not reaching post. end of Abd. L. over 1 mm.

In decaying Vines. Germany.

\*) As the name *Michaelia* was preoccupied I have renamed Haller's genus in honor of Dr. H. Lohmann. Berlese's gen. *Michaelia* (Trombidiidae), in: A. M. S., fasc. 16 nr. 6 & fasc. 57 nr. 8, was published 29. December 1884. A. D. Michael.

6. Gen. **Hypochthonius** C. L. Koch

1835 *Hypochthonius*, C. L. Koch, C. M. A., fasc. 3 | 1842 *H.*, C. L. Koch, Übers. Arach., v. 3 p. 109 | 1888 *Hypochthonius*, Michael, Brit. Orib., v. 2 p. 530 | 1896 *H.*, Berlese, A. M. S., Crypt. II p. 24, 25.

Dors. surface of Abd. divided by transverse sutures as if segmented. Cuticle imperfectly chitinized.

This genus is said by Nicolet (1855, in: Arch. Mus. Paris, v. 7 p. 389). Canestrini (1885, Prosp. Acarof., v. 1 p. 4) and Banks (1895, in: Tr. Amer. ent. Soc., v. 22 p. 2) to be composed of immature creatures, but they are really adult.

5 species.

Key to the species.

- |   |   |  |  |
|---|---|--|--|
| 1 | { | Abd. of 2 segments — 2.  |  |
|   | { | Abd. of more than 2 segments — 3.  |  |
| 2 | { | Segments almost equal. — L. 550—750 $\mu$ . . . . . 4. <i>H. rufulus</i> . . . p. 77   |  |
|   | { | Ant. segment much larger than post. — L. 750 $\mu$ . . . . . 5. <i>H. tectorum</i> . . p. 77   |  |
| 3 | { | Abd. of 3 segments, central the narrowest, others about equal — 4.   |  |
|   | { | Abd. of 4 segments, the 2 central narrow and equal,<br>the ant. and post. wider and equal. — L. 330 $\mu$ 2. <i>H. lanatus</i> . . p. 76 |  |
| 4 | { | Psstg. org. long. filiform, curved, strongly pectinated. —<br>L. 360 $\mu$ . . . . . 3. <i>H. pallidulus</i> . . p. 76                   |  |
|   | { | Psstg. org. with short thin peduncle and fusiform hairy<br>head. — L. 180 $\mu$ . . . . . 1. <i>H. brevis</i> . . . p. 76                |  |

1. *H. brevis* Michael 1888 *Hypochthonius b.*, Michael, Brit. Orib., v. 2 p. 539 t. 49 f. 14.

Im. Yellow, dull, rather rough. Cepth. broad Rost. hairs serrated. Psstg. dorsal; Psstg. org. white, directed backward, with short peduncle and fusiform hairy head. Intlam. hair white spines. Abd. slightly arched, truncated anteriorly, rounded posteriorly, divided into 3 segments by transverse cuts, central segment narrowest, other 2 equal. 2 longitudinal rows of thick white hairs on Dors. of Abd. and some round periphery Ung. mond. L. ca. 180  $\mu$ .

On sphagnum etc. England.

2. *H. lanatus* Michael 1885 *Hypochthonius l.*, Michael in: J. R. micr. Soc., ser. 2 v. 5 p. 396 t. 7 f. 11 | 1888 *H. l.*, Michael, Brit. Orib., v. 2 p. 541 t. 49 f. 15—22.

Im. Light yellow-ochre, dull, reticulated, slightly pulverescent. 2 low ridges represent Lam. Rost. hairs, Lam. hair, Intlam. hair and 2 other pairs of hairs on Cepth. all like bunches of white wool. Psstg. org. long, straight, directed backward, with rod-like peduncle and fusiform woolly head. Mdb. with fixed chela having 2 branches, both toothed. Abd. pyriform, Dors. thereof coarsely reticulated; reticulations about 8  $\mu$ . Dors. of Abd. divided into 4 segments by transverse cuts. 2 central segments equal, ant. and post. segments about equal. On each segment a row of colorless serrated spines which usually lie flat but can be erected. Ung. mond. L. ca. 330  $\mu$ .

In wood, thatched roofs etc. England.

3. *H. pallidulus* C. L. Koch 1835 *H. p.*, C. L. Koch, C. M. A., fasc. 3 f. 20 | 1888 *Hypochthonius p.*, Michael, Brit. Orib., v. 2 p. 537 t. 49 f. 1—5.

Im. Light yellow-brown redder at edges of Abd.; slightly polished. Rost. long, pointed, narrow. Palpi and Psstg. dorsal. Psstg. org. as in *H. rufulus*. Abd. almost diamond-shaped truncated anteriorly divided into 3 segments by 2 transverse cuts, central segment much the smallest, other 2 about equal. 4 longitudinal rows of thick white hairs on Dors. of Abd. and about 5 on each side. Ung. mond. L. ca. 360  $\mu$ .

In moss. England, Germany, Netherlands.

4. *H. rufulus* C. L. Koch 1835 *H. r.*, C. L. Koch, C. M. A., fasc. 3 t. 19 | 1888 *Hypochothonius r.*, Michael, Brit. Orib., v. 2 p. 534 t. 49 f. 6—13 | 1855 *Leiosoma ovata* Nph., Nicolet in: Arch. Mus. Paris, v. 7 p. 395 t. 2 f. 5.

Im. Yellow-red (tawny) smooth, slightly polished. Cepth. much narrower than Abd. Rost. pointed, palpi conspicuous. Psstg. dorsal Psstg. org. very long, almost filiform, but pointed at distal end, doubly curved, with sparse regularly placed hairs along the ant. edge. Intlam. hair long, filiform. Abd. shield-shaped, divided into 2 equal segments by a transverse cut. Middle of Abd. a continuation of the cone of Cepth. with transverse sulcations, lat. parts broad, thin, semi-transparent blades; 4 longitudinal rows of curved filiform hairs on Dors. of Abd. and 2 at edge of ant. division of blade. Ung. mond. — Nph. Like Im., but paler. — Im. L. 550—750  $\mu$ .

In moss. England, France, Germany, Italy, Switzerland.

5. *H. tectorum* Berl. 1896 *Hypochothonius t.*, Berlese, A. M. S., fasc. 78 nr. 8.

Im. Varied with yellow-brown, flesh-color and smoky-brown. Psstg. org. and all hairs on body clavate, setose. Abd. truncated anteriorly, pointed posteriorly, divided by a transverse line into 2 unequal segments, anterior the larger. Ung. trid. L. 750  $\mu$ .

In moss, chiefly on roofs. Italy.

## G. Subfam. Phthiracarinae

1841 *Phthiracarea*, Perty, Allg. Naturg., v. 3 p. 874 | 1885 Subfam. *Hoplophoridae*, Berlese in: Bull. Soc. ent. Ital., v. 17 p. 127 | 1891 *H.*, Canestrini in: Atti Ist. Veneto, ser. 7 v. 2 p. 718 | 1892 *Hoplophorinae*, Trouessart in: Rev. Sci. nat. Ouest, v. 2 p. 38\* | 1896 *Phthiracarea*, Oudemans in: Tijdschr. Ent., v. 39 p. 53 | 1896 *Hoplophoridae*, Berlese, A. M. S., Crypt. II p. 14.

Without Ptm. Cepth. moveably hinged to Abd. and folding down against its ventr. surface. Dors. surface of Cepth. is covered by a simple, more or less convex, chitinous plate (*Aspis*), this frequently bears a median longitudinal ridge (*Carina*) (Fig. 14 & 15). Ventr. plate not ankylosed to dors.

2 genera, 15 good and 3 doubtful species.

Key to the genera.

Genital and anal covers separate, Ung. mond. . . . 1. Gen. *Hoploderma* . p. 77  
Genital and anal covers coalescing or joined; Ung. trid. 2. Gen. *Phthiracarus* . p. 80

### 1. Gen. *Hoploderma* Michael\*)

1835 *Hoplophora* (non Perty, Orthopt., 1830!), C. L. Koch, C. M. A., fasc. 2 | 1842 *H.*, C. L. Koch, Übers. Arach., v. 3 p. 116 | 1855 *H.*, Nicolet in: Arch. Mus. Paris,

\*) The name *Hoplophora* is preoccupied. The new name is derived from ὄπλον and δέρμα.  
A. D. Michael.

v. 7 p. 470 | 1868 *H.*, Claparède in: *Z. wiss. Zool.*, v. 18 p. 507 | 1877 *H.*, Canestrini & Fanzago in: *Atti Ist. Veneto*, ser. 5 v. 4 p. 77 | 1885 *H.*, Canestrini, *Prosp. Acarof.*, v. 1 p. 9 | 1888 *H.*, Michael, *Brit. Orib.*, v. 2 p. 543 | 1895 *H.*, Banks in: *Tr. Amer. ent. Soc.*, v. 22 p. 16 | 1896 *H.*, Berlese, *A. M. S.*, *Crypt. II* p. 19.

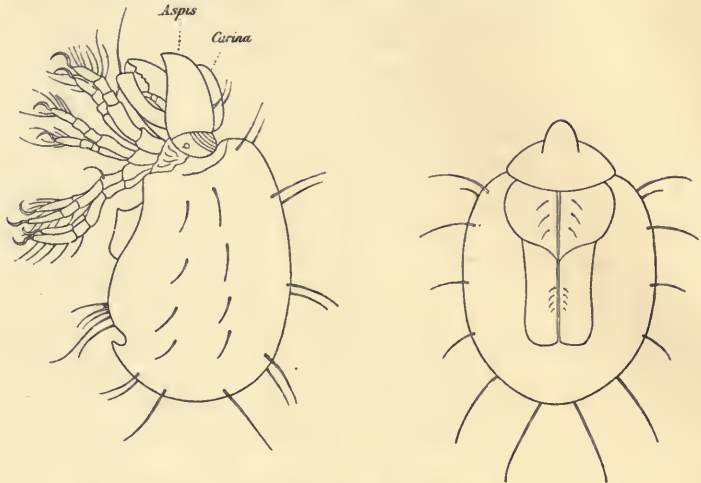


Fig. 14 & 15. *Hoploderma magnum*, open and closed (<sup>40/1</sup>).

Genital and anal covers separate and squarish. Ung. mond.

8 good and 2 doubtful species.

Key to the good species.

- |   |   |  |                                     |
|---|---|--|-------------------------------------|
| 1 | { | Aspis with a median carina — 2.  |                                     |
|   |   | Aspis without carina — 5.  |                                     |
| 2 | { | Ant. margin of Abd. with a large projection overhanging Cepth. — 3.                              |                                     |
|   |   | Ant. margin of Abd. without any projection — 4.  |                                     |
| 3 | { | Projection square and shelf-like. — L. 0,75—1,6 mm   | 1. <i>H. anomalum</i> . . . p. 78   |
|   |   | Projection rounded, concave, hood-like. — L. 800 $\mu$   | 6. <i>H. pulcherrimum</i> . p. 79   |
| 4 | { | Abd. with a median carina its whole length, no hairs on it; Psstg. org. setiform. — L. 800 $\mu$ | 2. <i>H. carinatum</i> . . . p. 79  |
|   |   | Abd. without carina, numerous large hairs on it. Psstg. org. falciform. — L. 0,9—1,4 mm . . .    | 5. <i>H. magnum</i> . . . p. 79     |
| 5 | { | Abd. smooth — 6.   |                                     |
|   |   | Abd. pitted — 7.   |                                     |
| 6 | { | Aspis with a yellow, elliptical depression on each side. — L. 800 $\mu$ . . . . .                | 4. <i>H. globosum</i> . . . p. 79   |
|   |   | Aspis without depression. — L. 0,5—1,3 mm . . .  | 3. <i>H. dasypus</i> . . . p. 79    |
| 7 | { | Pittings fine, Psstg. org. long and filiform — L. 820 $\mu$ . . . . .                            | 7. <i>H. striculum</i> . . . p. 80  |
|   |   | Pittings coarse; Psstg. org. short truncated. — L. 900 $\mu$ . . . . .                           | 8. <i>H. variolosum</i> . . . p. 80 |

1. *H. anomalum* (Berl.) 1883 *Hoplophora anomala*, Berlese, *A. M. S.*, fasc. 6 nr. 5 | 1888 *H. a.*, Michael, *Brit. Orib.*, v. 2 p. 558 t. 51 f. 5—6.

Im. Resembles *H. magnum* but Psstg. more conspicuous. Psstg. org. setiform, somewhat recurved, and a large squarish chitinous shelf-like projection from ant. margin of Abd. occupying nearly its whole width and overhanging Cepth. when creature extended. L. ca. 0,75—1,6 mm.

In moss. England, Italy.

2. **H. carinatum** (C. L. Koch) 1841 *Hoplophora carinata*, C. L. Koch, C. M. A., fasc. 32 t. 9 | 1887 *H. c.*, Berlese, A. M. S., fasc. 36 nr. 1.

Im. Coarsely granular. Aspis coarsely punctured, with a carina. Psstg. org. long, thin, slightly fusiform. Abd. with smooth central carina its whole length, remainder of dors. and lat. surface divided into concave diamond-shaped spaces by fine ridges; a raised knob at each angle of diamond. Genital and anal covers do not occupy the whole ventr. surface. L. ca. 800  $\mu$ .

In moss. Algeria, Germany, Italy.

3. **H. dasypus** (Ant. Dug.) 1834 *Oribates d.*, Ant. Dugès in: Ann. Sci. nat., ser. 2 v. 2 p. 47 | ?1883 *Hoplophora d.*, Berlese, A. M. S., fasc. 6 nr. 4 | ?1885 *H. d.*, Canestrini, Prosp. Acarof., v. 1 p. 46 | 1888 *H. d.*, Michael, Brit. Orib. v. 2 p. 560 t. 50 f. 8—14 | 1835 *H. decumana*, C. L. Koch, C. M. A., fasc. 2 t. 9 | 1882 *H. d.*, Haller in: Jahresh. Ver. Württemb., v. 38 p. 307 | 1841 *H. lucida*, C. L. Koch, C. M. A., fasc. 32 t. 14 | 1841 *H. lentula*, C. L. Koch, C. M. A., fasc. 32 t. 16 | 1855 *H. nitens*, Nicolet in: Arch. Mus. Paris, v. 7 p. 472 | 1868 *H. contractilis*, Claparède in: Z. wiss. Zool., v. 18 p. 507 | 1877 *H. c.*, Murray, Econ. Ent. Apt., p. 222 | ?1882 *H. maxima*, Haupt in: Ber. Ges. Bamberg, v. 12 p. 27 || non 1887 *Tritia lentula*, Berlese, A. M. S., fasc. 36 nr. 3 | non 1841 *Phthiracarus contractilis*, Perty, Allg. Naturg., v. 3 p. 874.

Im. Pale drab to red-brown; smooth, often polished when living; elliptical, rounded posteriorly. Aspis without carina. Psstg. org. minute, hardly to be seen without dissection, with short peduncle and curved lanceolate head. 6 rows of long setiform hairs on Abd. — Nph. Not distinguishable from that of *H. magnum*. — Im. L. 0,5—1,3 mm.

In decayed wood. Algeria, England, France, Germany, ?Italy, Netherlands, Sweden, Switzerland.

4. **H. globosum** (C. L. Koch) 1841 *Hoplophora globosa*, C. L. Koch, C. M. A., fasc. 32 t. 12 | 1883 *H. g.*, Berlese, A. M. S., fasc. 6 nr. 3 | 1895 *H. sphaerula*, Banks in: Tr. Amer. ent. Soc., v. 22 p. 16.

Im. Chestnut-brown, smooth. Aspis with a yellow depressed ellipse each side, but no true carina. Psstg. org. sessile, fusiform. Abd. a very short ellipse, almost globular, 2 longitudinal rows of long very fine hairs on Dors. of Abd. L. ca. 800  $\mu$ . — ? if really distinct from *H. dasypus*.

In moss. Germany, Italy, Netherlands.

5. **H. magnum** (Nic.) 1855 *Hoplophora magna*, Nicolet in: Arch. Mus. Paris, v. 7 p. 472 t. 10 f. 4 | 1888 *H. m.*, Michael, Brit. Orib., v. 2 p. 556 t. 50 f. 1—7 | 1892 *H. m.*, Berlese, A. M. S., fasc. 67 nr. 9.

Im. Brown of variable depth, dull, coarsely pitted, pits on Abd. about 60 to mm finer on Cephth. A long oval, broader seen from side. Aspis with strong rough longitudinal carina. Psstg.-org. short, fine, sickle-shaped. Abd. round posteriorly. Dors. plate much suffixed on to ventr. surface. 2 longitudinal rows of long rod-like hairs on Dors. of Abd. and 2 rows of smaller hairs along each side. — Nph. Fat, soft, yellowish white, can scarcely stand, Cephth. without aspis. Abd. very rounded with mamilliform projection posteriorly. — Im. L. ca. 0,9—1,4 mm.

Nph. bores in wood. Im. generally in moss. England, France, Germany, Netherlands.

6. **H. pulcherrimum** (Berl.) 1887 *Hoplophora carinata* var. *pucherrima*, Berlese, A. M. S., fasc. 36 nr. 10.

Im. Like *H. carinatum* but a large, hood-like, rounded projection from ant. margin of Abd. overhanging Cepth. L. ca. 550  $\mu$ .

Italy.

7. *H. striculum* (C. L. Koch) 1835 *Hoplophora stricula*, C. L. Koch, C. M. A., fasc. 2 t. 10 | 1855 *H. s.*, Nicolet in: Arch. Mus. Paris, v. 7 p. 472 t. 10 f. 5 | 1888 *H. s.*, Michael, Brit. Orib., v. 2 p. 563 t. 51 f. 7 || non 1896 *H. s.*, Berlese, A. M. S., fasc. 78 nr. 3.

Im. Pinkish faun-color, dull, semitransparent, chitin thin, strongly pitted, pits about 100 to mm. Aspis without carina. Psstg. org. long sickle-shaped. Intlam. hair short rod-like. Abd. elliptical, bearing 8 longitudinal rows of rod-like, blunt-ended, imbricated hairs. L. ca. 520  $\mu$ .

*H. stricula* Berlese is similar, but has a Carina on Aspis and hairs on Abd. are not imbricated. — Berlese (1887, A. M. S., fasc. 36 nr. 2) says in error. that *H. stricula* C. L. Koch is a young form of *H. carinata* C. L. Koch.

England, France, Germany.

8. *H. variolosum* (Berl.) 1888 *Hoplophora variolosa*, Berlese in: Bull. Soc. ent. Ital., v. 20 p. 218 t. 13 f. 6.

Im. Brown, rough; Aspis and Abd. without carina. Psstg. org. short truncated. Abd. coarsely pitted all over, ant. margin not produced forward, 2 longitudinal rows of about 6 long hairs on Dors. of Abd. Ung. mond. L. ca. 900  $\mu$ .

Under bark of trees. Brazil.

*H. crinitum* (C. L. Koch) 1841 *Hoplophora crinita*, C. L. Koch, C. M. A., fasc. 32 t. 8 | 1841 *H. ferruginea*, C. L. Koch, C. M. A., fasc. 32 t. 10.

Possibly the same as *H. globulosum*, but Im. seems rather longer in Abd. and hairs on Dors. of Abd. longer and more flexible. Im. „mittelgross“.

Germany, Netherlands?

*H. quadriseriatum* (Haupt) 1882 *Hoplophora quadriseriata*, Haupt in: Ber. Ges. Bamberg, v. 12 p. 26.

Probably the same as *H. globulosum*, but Abd. rough, like shagreen, instead of smooth, and hairs thereon thicker. — Im. „mittelgross“.

In moss. Germany.

## 2. Gen. Phthiracarus Perty

1841 *Phthiracarus*, Perty, Allg. Naturg., v. 3 p. 874 | 1896 *P.*, Oudemans in: Tijdschr. Ent., v. 39 p. 53 | 1883 *Tritia*, Berlese, A. M. S., fasc. 6 nr. 1 | 1885 *T.*, Cane-strini, Prosp. Acarof., v. 1 p. 9 | 1892 *T.*, Trouessart in: Rev. Sci. nat. Ouest, v. 2 p. 48\* | 1895 *T.*, Banks in: Tr. Amer. ent. Soc., v. 22 p. 16 | *Hoplophora* (part.), Autor. plurim.

Genital and anal covers anchylosed, or connected together, both long and narrow. Ung. trid.

7 good and 1 doubtful species.

Key to the good species.

- |   |   |                                     |
|---|---|-------------------------------------|
| 1 | { | Abd. bearing conspicuous hairs — 2. |
|   | { | Abd. hairless — 5.                  |
| 2 | { | Abd. rounded posteriorly — 3.       |
|   | { | Abd. pointed posteriorly — 4.       |



- |   |   |  |                                   |
|---|---|--|-----------------------------------|
| 3 | { | Dors. of Abd. (when creature upright) $\frac{1}{3}$ longer than broad. Psstg. org. setiform. — L. 1,5 mm . . . . . | 2. <i>P. berlesei</i> . . . p. 81 |
|   |   | Dors. of Abd. twice as long as broad. Psstg. org. very clavate. — L. 700 $\mu$ . . . . .                           | 5. <i>P. longulus</i> . . . p. 82 |
| 4 | { | Psstg. org. filiform. — L. 800 $\mu$ . . . . .   | 1. <i>P. arduus</i> . . . p. 81   |
|   |   | Psstg. org. with thin peduncle and flattened expanded head. — L. 480 $\mu$ . . . . .                               | 3. <i>P. canestrinii</i> . p. 81  |
| 5 | { | Abd. rounded posteriorly. — L. 1,1 mm . . . . .  | 4. <i>P. contractilis</i> . p. 81 |
|   |   | Abd. pointed posteriorly — 6.  |                                   |
| 6 | { | Psstg. org. with thin peduncle and fusiform head. — L. 800 $\mu$ . . . . .   | 6. <i>P. nudus</i> . . . p. 82    |
|   |   | No Psstg. org. visible externally. — L. 1 mm . . . . .   | 7. <i>P. retaltecus</i> . p. 82   |

1. *P. arduus* (C. L. Koch) ?1841 *Hoplophora testudinea*, C. L. Koch, C. M. A., fasc. 32 t. 11 | 1841 *H. ardua*, C. L. Koch, C. M. A., fasc. 32 t. 15 | 1888 *H. a.*, Michael, Brit. Orib., v. 2 p. 564 t. 51 f. 8—15.

Im. Light red-brown and yellow-brown, varies in different parts of creature; smooth, dull, Abd. sometimes polished, marked with fine undulating lines, frequently covered with fine dust. Psstg. org. long; upright, filiform. Intlam. hair very long; 2 parallel ridges on each side of aspis running forward from Psstg. Abd. truncated anteriorly pointed posteriorly. 2 long and 2 short rows of long setiform hairs on Abd., and 2 pairs on Cepth. besides the Rost. hairs and Intlam. hair. Ung. hetd. L. ca. 800  $\mu$ .

England, Germany.

2. *P. berlesei* Michael\*) 1883 *Tritia decumana*, (err., non *Hoplophora decumana* C. L. Koch 1835!), Berlese, A. M. S., fasc. 6 nr. 2 | 1885 *T. d.*, Canestrini, Prosp. Acarof., v. 1 p. 45.

Im. Chestnut-brown, smooth. Psstg. org. setiform. Abd. rounded posteriorly a few very fine longish hairs near edge. L. ca. 1,5 mm.

In moss. Italy.

3. *P. canestrinii* Michael\*\*) ?1885 *Tritia lentula*, Canestrini, Prosp. Acarof., v. 1 p. 45 | 1887 *T. l.*, (err., non *Hoplophora lentula* C. L. Koch 1841!), Berlese, A. M. S., fasc. 36 nr. 3.

Im. Yellowish to reddish brown, polished, nearly pointed posteriorly. Psstg. org. with longish thin peduncle and flattened expanded head; curved and simple posteriorly; straight and pectinated anteriorly. 2 rows of long setiform hairs on Cepth. and Abd., post. part of anal covers hairy. Ung. very hetd. Central claw thickest. L. ca. 480  $\mu$ .

In moss. Italy.

4. *P. contractilis* Perty 1841 *P. c.*, Perty, Allg. Naturg., v. 3 p. 874 | 1868, Perty (in: Claparède) in: Z. wiss. Zool., v. 18 t. 36 f. 15—19 || non 1868 *Hoplophora c.*, Claparède in: Z. wiss. Zool., v. 18 p. 507.

\*) Berlese identifies this species, I think erroneously, with *Hoplophora decumana* C. L. Koch (which is in my opinion a synonym of *Hoploderma dasyopus*); therefore under the rules which govern „Das Tierreich“ the name cannot stand although in a different genus, I have therefore named the species in honor of Prof. Berlese. A. D. Michael.

\*\*) Berlese identifies this species, I think erroneously, with *Hoplophora lentula* C. L. Koch, therefore under the rules which govern „Das Tierreich“ the name cannot stand, although in a different genus. I have therefore named the species in honor of Prof. Canestrini. A. D. Michael.

Im. Chestnut-brown semitransparent; Abd. long, rounded posteriorly, hairless. Genital and anal covers broad for the genus. (Description chiefly taken from Perty's figure in Claparède's plate). L. 1,1 mm.

In decayed wood. Germany.

5. **P. longulus** (C. L. Koch) 1841 *Hoplophora longula*, C. L. Koch, C. M. A., fasc. 32 t. 17 | ?1874 *H. arcata*, Riley in: Rep. Ins. Missouri, v. 6 p. 52 & in: Tr. Ac. St. Louis, v. 3 p. 215 | ?1895 *Tritia glabrata*, Banks in: Tr. Amer. ent. Soc., v. 22 p. 16.

Im. Yellow-brown, polished. Psstg. org. short, very clavate, head almost globular. Abd. very long-shaped, very narrow, thick from ventr. to dors. surfaces, slightly truncated anteriorly, rounded posteriorly, numerous long fine hairs on Dors. of Abd., the longest pair on the shoulders. L. 700  $\mu$  (Riley).

Riley says his species is the shape of a mussel — probably a Phthiracarus — neither of first two authors describe Ung.

In woods, Germany; at roots of vines America, supposed (probably in error) to be feeding on Phylloxera and correctly on cotton-wood logs.

6. **P. nudus** (Berl.) ?1844 *Hoplophora laevigata*, C. L. Koch, C. M. A., fasc. 38 t. 16 | 1887 *Tritia nuda*, Berlese. A. M. S., fasc. 35 nr. 21.

Im. Earthy to sooty brown. Almond-shaped, polished, pointed posteriorly. Dors. surface hairless. Psstg. org. with short thin peduncle and fusiform head. L. ca. 800  $\mu$ .

In moss and dead wood. Italy.

7. **P. retaltecus** (Stoll) 1891 *Hoplophora retalteca*, Stoll in: Biol. Centr.-Amer., Arach. acar. p. 27 t. 15 f. 4.

Im. Like *P. nudus*, but no Psstg. org. visible externally, and central Ung. said to be thinner than the 2 outer.

Guatemala.

**P. glabratus** (Say) 1821 *Oribata glabrata*, Say in: J. Ac. Philad., v. 2 p. 68, Coll. Writ., v. 2 p. 16.

Im. Black, spheroidal, somewhat oval, polished. Psstg. org. apparently with globular head on very short peduncle.

### Uncertain genera and species of Oribatidae.\*)

**Acarus** L., em. Latr. 1758 *A.* (part.), Linné, Syst. Nat., ed. 10 v. 1 p. 615 | 1795 *A.*, Latreille in: Mag. enc., v. 4 p. 19 (Typus: *A. coleoptratus* L.).

**Acarus coleoptratus** L. 1758 *A. c.*, Linné, Syst. Nat., ed. 10 v. 1 p. 616 | 1761 *A. c.*, Linné, Fauna Suec., ed. 2 nr. 1973 | 1795 *A. c.*, Latreille in: Mag. enc., v. 4 p. 19 (Typus generis *Acarus* L.).

**Acarus piger** Scop. 1763 *A. p.*, Scopoli, Ent. Carniol., p. 392.  
Probably a Hoploderma.

**Acarus rupestris** F. 1794 *A. r.*, J. Ch. Fabricius, Ent. syst., v. 4 p. 433.

\*) The following genera and species have been rejected as being either immature creatures, too imperfectly described for identification, not Oribatidae at all although called so; or for some other reason.  
A. D. Michael.

**Acarus sp.**, G. Shaw 1807 *A. coleoptratus* (err., non Linné 1758!), G. Shaw, Zool. Misc., v. 17 t. 714.

Probably a Notaspis.

**Belba floridana** Banks 1896 *B. f.*, Banks in: Tr. Amer. ent. Soc., v. 23 p. 76.

Probably a Notaspis.

**Belba minuta** Banks 1895 *B. m.*, Banks in: Tr. Amer. ent. Soc., v. 22 p. 1.

Probably a Notaspis.

**Carabodes nitens** Johnst. 1847 *C. n.*, G. Johnston in: Tr. Berwickshire Club, v. 2 p. 221.

Probably a Notaspis.

**Celaeno aegrota** C. L. Koch 1841 *C. a.*, C. L. Koch, C. M. A., fasc. 32 t. 5.

A Gamasid.

**Celaeno coccinea** C. L. Koch 1841 *C. c.*, C. L. Koch, C. M. A., fasc. 32 t. 1.

A Nymph.

**Celaeno obsoleta** C. L. Koch 1841 *C. o.*, C. L. Koch, C. M. A., fasc. 32 t. 4.

A Nymph.

**Celaeno rhodomela** C. L. Koch 1841 *C. r.*, C. L. Koch, C. M. A., fasc. 32 t. 2.

A Nymph.

**Cepheus ovalis** C. L. Koch 1841 *C. o.*, C. L. Koch, C. M. A., fasc. 32 t. 7.

**Cepheus pertusus** Haupt 1882 *C. p.*, Haupt in: Ber. Ges. Bamberg, v. 12 p. 27.

**Cephus** (sic) **nitidus** Banks 1895 *C. n.*, Banks in: Tr. Amer. ent. Soc., v. 22 p. 10.

Probably a Liacarus.

**Claviceps** Can. & Fanz. 1877 *C.*, Canestrini & Fanzago in: Atti Ist. Veneto, ser. 5 v. 4 p. 196.

Immature Oribatidae included in Acarini (= Tyroglyphinae), before their life-histories were known.

**Claviceps hirtus** Can. & Fanz. 1877 *C. h.*, Canestrini & Fanzago in: Atti Ist. Veneto, ser. 5 v. 4 p. 203.

**Claviceps laeviusculus** Can. & Fanz. 1877 *C. l.*, Canestrini & Fanzago in: Atti Ist. Veneto, ser. 5 v. 4 p. 204.

**Claviceps ruber** Can. & Fanz. 1877 *C. r.*, Canestrini & Fanzago in: Atti Ist. Veneto, ser. 5 v. 4 p. 205.

**Claviceps rugosus** L. Koch 1879 *C. r.*, L. Koch in: Svenska Ak. Handl., v. 16 p. 135.

A Nymph, possibly of *Hermannia convexa*.

**Claviceps trimaculatus** L. Koch 1879 *C. t.*, L. Koch in: Svenska Ak. Handl., v. 16 p. 134.

A Nymph, probably of an Oribata.

**Damaeus bulbipedata** Pack. 1886 *D. b.*, Packard in: Mem. Ac. Washington, v. 4 p. 42.

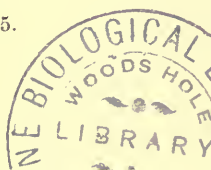
**Damaeus curtus** Haupt 1882 *D. c.*, Haupt in: Ber. Ges. Bamberg, v. 12 p. 28.

**Damaeus onustus** C. L. Koch 1844 *D. o.*, C. L. Koch, C. M. A., fasc. 38 t. 7

Not a species, only coated with dirt.

- Eremaeus asperulus** Berl. *E. a.*, Berlese, A. M. S., Repert.
- Eremaeus lineatus** Thor. 1871 *E. l.*, Thorell in: Öfv. Ak. Förh., v. 28 p. 696.
- Hermannia trinebulosa** Riley 1885 *H. t.*, Riley in: Bull. Dep. Agric. Ent., p. 216.
- Hoplophora straminea** C. L. Koch 1841 *H. s.*, C. L. Koch, C. M. A., fasc. 32 t. 13.
- Hoplophora testacea** C. L. Koch 1841 *H. t.*, C. L. Koch, C. M. A., fasc. 32 t. 11.
- Murcia acaroides** C. L. Koch 1835 *M. a.*, C. L. Koch, C. M. A., fasc. 3 t. 22.  
A Nymph.
- Murcia ephippiata** C. L. Koch 1841 *M. e.*, C. L. Koch, C. M. A., fasc. 31 t. 22.  
A Nymph.
- Murcia fumigata** C. L. Koch 1841 *M. f.*, C. L. Koch, C. M. A., fasc. 31 t. 21.  
A Nymph.
- Notaspis cassideus** Herm. 1804 *N. c.*, Hermann, Mém. apt., p. 93.  
A Gamasid.
- Notaspis castaneus** Herm. 1804 *N. c.*, Hermann, Mém. apt., p. 89.
- Notaspis conchaeformis** Koll. *N. c.*, Kollar — — —
- Notaspis corynopus** Herm. 1804 *N. c.*, Hermann. Mém. apt., p. 89.
- Notaspis globulus** Koll. *N. g.*, Kollar — — —
- Notaspis humeralis** Herm. 1804 *N. h.*, Hermann, Mém. apt., p. 92 | 1840  
*N. h.*, C. L. Koch, C. M. A., fasc. 30 t. 18.
- Nothrus bicolor** C. L. Koch 1844 *N. b.*, C. L. Koch, C. M. A., fasc. 38 t. 5.  
A Nymph.
- Nothrus bispinosus** C. L. Koch 1840 *N. b.*, C. L. Koch, C. M. A., fasc. 29 t. 24.  
A Nymph.
- Nothrus canaliculatus** C. L. Koch 1840 *N. c.*, C. L. Koch, C. M. A., fasc. 29  
t. 7 | 1842 *Carabodes c.*, C. L. Koch, Übers. Arach., v. 3 p. 107.  
Probably an immature Neoliodes.
- Nothrus corticalis** Karp. 1893 *N. c.*, Karpelles in: Math. naturw. Ber. Ungarn,  
v. 11 p. 86.
- Nothrus doliaris** C. L. Koch 1840 *N. d.*, C. L. Koch, C. M. A., fasc. 29 t. 5, 6.  
A Nymph.
- Nothrus ellipticus** Haupt 1882 *N. e.*, Haupt in: Ber. Ges. Bamberg, v. 12 p. 22.
- Nothrus marinus** Banks 1896 *N. m.*, Banks in: Tr. Amer. ent. Soc., v. 23 p. 77.  
Possibly a Scutovertex.
- Nothrus minimus** C. L. Koch 1844 *N. m.*, C. L. Koch, C. M. A., fasc. 38 t. 1  
A Nymph.
- Nothrus ovivorus** Paek. 1870 *N. o.*, Packard in: Amer. Natural., v. 3 p. 366.
- Nothrus posticus** C. L. Koch 1840 *N. p.*, C. L. Koch, C. M. A., fasc. 30 t. 5.  
A Nymph.
- Oppia hungarica** Karp. 1893 *O. h.*, Karpelles in: Math. naturw. Ber. Ungarn,  
v. 11 p. 89.

- Oribata aspidioli** Ashm. 1879 *O. a.*, Ashmead in: *Canad. Ent.*, v.11 p.93.  
Not an Oribata, probably a Nymph.
- Oribata cyclonotus** Gerv. 1849 *O. c.*, Gervais in: *Gay, Hist. Chile*, v.4 p.48.  
A Nymph.
- Oribata demersa** Duj. 1842, Dujardin in: *Institut*, v.10 p.316 | 1844 *O. d.*  
Duj., Gervais in: *Walckenaer, Ins. Apt.*, v.3 p.253.
- Oribata marina** Duj. 1842, Dujardin in: *Institut*, v.10 p.316 | 1844 *O. m.* Duj.,  
Gervais in: *Walckenaer, Ins. Apt.*, v.3 p.254.
- Oribata notactis** Gerv. 1849 *O. n.*, Gervais in: *Gay, Hist. Chile*, v.4 p.48.  
Possibly *Neoliodes concentricus*.
- Oribata quadripilis** Fitch 1859 *O. q.*, Fitch in: *Rep. Ins. N. York* v.3 sect.159.
- Oribates angulatus** C. L. Koch 1840 *O. a.*, C. L. Koch, C. M. A., fasc.30 t.21.  
Founded on a deformed or injured type.
- Oribates aterrimus** C. L. Koch 1844 *O. a.*, C. L. Koch, C. M. A., fasc.38 t.10.
- Oribates facula** C. L. Koch 1840 *O. f.*, C. L. Koch, C. M. A., fasc.30 t.17.  
According to Berlese same as *O. lapidaria*.
- Oribates globosus** C. L. Koch 1841 *O. g.*, C. L. Koch, C. M. A., fasc.31 t.4.  
A *Notaspis* or a *Serrarius*.
- Oribates picipes** C. L. Koch 1840 *O. p.*, C. L. Koch, C. M. A., fasc.30 t.15.
- Oribatella obesa** Banks 1895 *O. o.*, Banks in: *Tr. Amer. ent. Soc.*, v.22 p.9.
- Oribatella perfecta** Banks 1896 *O. p.*, Banks in: *Tr. Amer. ent. Soc.*, p.23 p.77.
- Oxynamba liliputana** Karsch 1881 *O. l.*, Karsch in: *Berlin. ent. Z.*, v.25 p.37.  
*Oribatidae?* Included in *Gamasidae* (*Oxynamba* nomen nov.).
- Pelonia** Grube 1859 *P.*, Grube in: *Arch. Dorpat. Ges.*, ser.2 v.1 p.477.  
Immature creatures.
- Pelonia crinita** Grube 1859 *P. c.*, Grube in: *Arch. Dorpat. Ges.*, ser.2 v.1 p.478.  
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- Pelonia foliosa** Grube 1859 *P. f.*, Grube in: *Arch. Dorpat. Ges.*, ser.2 v.1 p.477.  
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- Pelonia tricuspadata** Grube 1859 *P. t.*, Grube in: *Arch. Dorpat. Ges.*, ser.2  
v.1 p.478 | 1863 *P. t.*, Andersén in: *Öfv. Ak. Förh.*, v.20 p.188.  
A Nymph.
- Scutovertex concolor** Banks 1895 *S. c.*, Banks in: *Tr. Amer. ent. Soc.*, v.22 p.11.  
Apparently not a *Scutovertex*, probably a *Notaspis* (said to be so by Banks  
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- Scutovertex pilosus** Banks 1895 *S. p.*, Banks in: *Tr. Amer. ent. Soc.*, v.22 p.11.  
Apparently not a *Scutovertex*, probably a *Notaspis* (said to be so by Banks  
in *litera*).
- Zetes cespitum** C. L. Koch 1841 *Z. c.*, C. L. Koch, C. M. A., fasc.31 t.8.
- Zetes dorsatus** C. L. Koch 1841 *Z. d.*, C. L. Koch, C. M. A., fasc.31 t.15.  
A Nymph.



- Zetes flavipes** C. L. Koch 1841 *Z. f.*, C. L. Koch, C. M. A., fasc. 31 t. 16.
- Zetes gilvulus** C. L. Koch 1841 *Z. g.*, C. L. Koch, C. M. A., fasc. 31 t. 17.  
A Notaspis.
- Zetes laevigatus** C. L. Koch 1835 *Z. l.*, C. L. Koch, C. M. A., fasc. 3 t. 8.
- Zetes latirostris** C. L. Koch 1844 *Z. l.*, C. L. Koch, C. M. A., fasc. 38 t. 13.
- Zetes mortacinus** C. L. Koch 1841 *Z. m.*, C. L. Koch, C. M. A., fasc. 31 t. 14.  
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- Zetes semirufus** C. L. Koch 1841 *Z. s.*, C. L. Koch, C. M. A., fasc. 31 t. 7.  
Founded on some accidental monstrosity.
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tectorum ( <i>Hypothonius</i> ) . . . . .	77	<i>variolosa</i> ( <i>Hoplophora</i> ) . . . . .	80
<i>Tegeocranidae</i> . . . . .	28	variolosum ( <i>Hoplophora</i> ) . . . . .	80
Tegeocranus . . . . .	33	variolosus ( <i>Cepheus</i> ) . . . . .	33
<i>Tegeocranus</i> . . . . .	36	<i>variolosus</i> ( <i>Pelops</i> ) . . . . .	8
tegeocranus ( <i>Cepheus</i> ) . . . . .	32	velatus ( <i>Tectocephus</i> ) . . . . .	35
tegeocranus ( <i>Notaspis</i> ) . . . . .	32	velatus ( <i>Tegeocranus</i> ) . . . . .	35
tegeocranus ( <i>Oribata</i> ) . . . . .	32	venosus ( <i>Neoliodes</i> ) . . . . .	66
tenuipes ( <i>Belba</i> ) . . . . .	59	venosus ( <i>Nothrus</i> ) . . . . .	66
tenuipes ( <i>Damaeus</i> ) . . . . .	59	<i>ventricosus</i> ( <i>Nothrus</i> ) . . . . .	70
testacea ( <i>Hoplophora</i> ) . . . . .	84	verticillipes ( <i>Damaeus</i> ) . . . . .	59
<i>testudinea</i> ( <i>Hoplophora</i> ) . . . . .	81	<i>vulgaris</i> ( <i>Cepheus</i> ) . . . . .	33
<i>theleproctus</i> ( <i>Liodes</i> ) . . . . .	66	<i>Zetes</i> . . . . .	9, 42
<i>theleproctus</i> ( <i>Liodes</i> ) . . . . .	65	<i>Zetorchestes</i> . . . . .	27
<i>theleproctus</i> ( <i>Neoliodes</i> ) . . . . .	66	<i>Zetorchestinae</i> . . . . .	27
<i>theleproctus</i> ( <i>Neoliodes</i> ) . . . . .	65		











