

The legs are usually all formed for walking. The abdomen is composed of six distinct segments, and the uropods are terminal, slender, and style-like, composed of a peduncle and two branches. The outer branches of at least the first two pairs of pleopods (sometimes of all five pairs) contain air-tubes in most cases. In the male the inner branch of the second abdominal appendages, and sometimes that of the first also, is sexually modified. It may be mentioned that a recent paper draws attention to the occurrence of hermaphroditism and parthenogenesis in terrestrial Isopods. The first pair of antennae is always very small and inconspicuous, never composed of more than three joints.

When moulting, some of the woodlice, like some other Isopods, do not relieve themselves of the outer shell in one operation. The exoskeleton of the hinder part of the body is cast off first, and then, after an interval of perhaps several days, the front portion of the old covering is discarded. Many (perhaps all) of the terrestrial Isopods of this suborder have cutaneous glands, which secrete a viscous fluid, and it is supposed that this secretion renders the woodlice unpalatable to enemies.

Members of the four following families will be commonly encountered by the collector. The mouth-parts referred to in the key are detailed in fig. 233.

- a. Flagellum of second antennae very short, with not more than six joints. Mandibles without distinct molar process, there being brush-like, stiff hairs in its place. Inner lobe of first maxilla with two plumose bristles.
  - b. Terminal joints of maxillipeds very small.
    - c. Uropods not projecting beyond edge of last abdominal segment (woodlice capable of rolling into a perfect sphere when alarmed) . . . . . ARMADILLIDAE.
    - cc. Uropods projecting beyond edge of last abdominal segment (woodlice which do not roll into a perfect sphere when alarmed) . . . . . ONISCIDAE.
  - bb. Terminal joints of maxillipeds large . . . . . SCYPHACIDAE.
- aa. Flagellum of second antennae long, with many joints. Mandibles with well-developed molar process. Inner lobe of first maxilla with three plumose bristles LIGIIDAE.

### Family ARMADILLIDAE.

The body is usually convex, and the animals roll themselves into a perfect ball when disturbed—hence the popular name, pill-bugs. The uropoda are usually very short and not produced past the margin of the terminal abdominal segment.

#### CUBARIS (Brandt).

There is usually a posterior cleft or groove in the edge of each lateral part of the first thoracic segment, sometimes in that of the second also; the antero-lateral edge of the following segment fits into this cleft. The first

pair of antennae are very small, composed of only three segments; the second antennae are rarely more than one-third as long as the body, with a two-jointed flagellum. The outer branches of all the pleopods contain air-tubes. The base of the uropods is flattened and expanded to fill the space between the produced lateral portions of the fifth abdominal segment and the telsonic segment; the inner branch of the uropods is small, but is larger than the outer, which is minute. At least four species occur; two are commensals and two are free-living.

- a. Eyes very small with only two or three ocelli. Surface of body usually more or less distinctly tuberculate (species living in nests of ants or white ants).
- b. Size very small (2 mm.). Tubercles of body relatively large . . . . . *minuta*.
- bb. Size moderately large (8 mm.). Tubercles of body relatively smaller . . . . . *commensalis*.
- aa. Eyes larger with many ocelli. Surface of body nearly smooth, minutely granular (free-living species).
- c. Second joint of flagellum of second antennae more than twice as long as first . . . . . *ambitosus*.
- cc. Joints of flagellum of second antennae subequal in length . . . . . *claytonensis*.

**Termites' Pill-bug.** *Cubaris minuta* (Baker). (very small).

The upper surface of the body is covered with large compressed tubercles, most of which are regularly arranged in transverse series. On the head the tubercles are smaller and more rounded. There is a small cleft at the posterior angles of the first thoracic segment, which is longer than any of the other segments. The first antennae are minute; the second are short, with a thick peduncle and a small flagellum, the first joint of which is very short. The animal is white in colour with pale brown markings.



FIG. 332.—*Cubaris minuta* (after Baker, x 20).

Length: 2 mm., or  $\frac{1}{13}$  in. (S.A.M.)

This species was found in a termites' nest.

**Ant-nest Pill-bug.** *Cubaris commensalis* (Baker). (living with another).

The upper surface of the body usually bears distinct tubercles, which are smaller and more numerous than in the preceding species; this sculpture, however, varies considerably, and in some specimens the tubercles are strong, in others they are practically absent. The postero-lateral margins of the first thoracic segment are cleft, the nick not being visible from above; the side parts of the second segment have a strong tooth on

the inner surface near the anterior margin. The antennae are much as in *C. minuta*. The colour is pale slate or pale brown. Length: 8 mm., or  $\frac{3}{10}$  in. (S.A.M.)

This form is moderately common in nests of ants, and, like other myrmecophiles, may often be taken in company with the insects, by turning over large stones covering the nests.

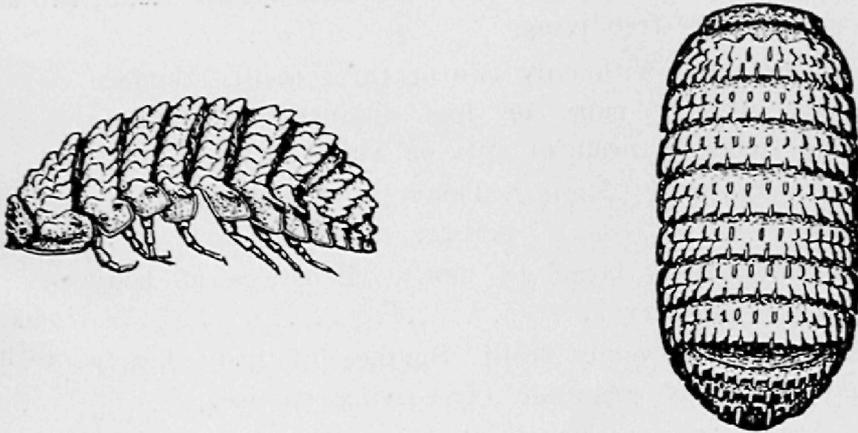


FIG. 333.—*Cubaris commensalis* (after Baker, x 7).

**Common Pill-bug.** *Cubaris ambitiosus* (Budde-Lund). (admired).

The head is wide and short, with a strong ridge at the anterior margin; this ridge projects slightly above the dorsal surface at the sides. The head and body are finely granular with low lateral rugosities on the upper surface. There is a cleft in the postero-lateral margin of the first thoracic segment. The anterior portion of the coxal part of the second segment is thickened on the inner (or lower) surface, the swelling terminating in a small tubercle before it reaches the lateral margin. The telsonic segment is widest anteriorly and its posterior margin is truncate or slightly rounded. The second antennae bear tiny hairs and have the second joint of the flagellum about two and one-half times as long as the first. The colour is brown, or slaty-brown above, usually with pale markings on each side. Length: 15 mm., or  $\frac{3}{2}$  in. (S.A.M.)

This pill-bug is common in damp situations in the Mount Lofty Ranges and elsewhere. It rolls into a perfect ball when alarmed and cannot be confused with the extremely abundant Common Woodlouse (*Porcellio laevis*) which has a less convex body, the uropods projecting well beyond the posterior apex of the body, the telson subacute, etc.

**Central Australian Pill-bug.** *Cubaris claytonensis* (Chilton). (after Clayton Creek).

The head is wide with the frontal ridge not produced above the dorsal surface. The body is minutely granular. The postero-lateral margin of the first thoracic segment is cleft, the inner tooth produced by this nick being very small; there is a tooth on the inner surface of the coxal part

of the second segment also, near the anterior margin. The two joints of the flagellum of the second antennae are subequal in length. The colour is "dark slatish with light brown markings along the lateral and hind margins of the segments." Length: 15 mm., or  $\frac{3}{4}$  in. (S.A.M.)

This species was collected in the interior and was found at Higgins Dam and near the Clayton Creek, which flows into Lake Eyre.

### Family ONISCIDAE.

The body is in general much less convex than in the species dealt with above and the animals do not roll into a perfect sphere. Further, the uropods always extend beyond the margin of the terminal segments of the abdomen. In our genera the flagellum of the second antennae never has more than three joints.

- a. Flagellum of second antennae composed of three joints.
  - b. Surface of body granulate or tuberculate. Telsonic segment narrow, with lateral portions not developed; apically subacute . . . . . *Oniscus*.
  - bb. Surface of body smooth. Telsonic segment wide, with lateral parts well developed; apically rounded . . . . . *Haloniscus*.
- aa. Flagellum of second antennae composed of two joints.
  - c. Abdomen not abruptly narrower than thorax, with the lateral portions of some of the segments large and outstanding . . . . . *Porcellio*.
  - cc. Abdomen abruptly narrower than thorax, with lateral portions of segments small . . . . . *Porcellionides*.

### ONISCUS (Linnaeus).

The body is broad and flattened. The antero-lateral angles of the head are produced, but there is no median (or rostral) projection at the front margin. The abdomen is not suddenly narrower than the thorax and has the side portions of the third, fourth, and fifth segments produced and expanded. The telsonic segment is subconical in shape. One species has been recorded.

**Ant-nest Woodlouse.** *Oniscus myrmecophilus* (Baker). (dwelling with ants).

The head is about three times as wide as long and has the antero-lateral angles moderately projecting; the eyes are small, and consist of less than ten ocelli. There are tiny hairs on the upper surface, which is dull and otherwise almost smooth. The first antennae are small; the second have the last joint of the peduncle almost as long as the flagellum, the third joint of which is as long as the first two together; the second segment of the flagellum is shorter than the first. The first legs are partially prehensile.

During life the animal is pale slate, or slaty-brown, in colour, with paler markings. Length: 8 mm., or  $\frac{3}{10}$  in. (S.A.M.)

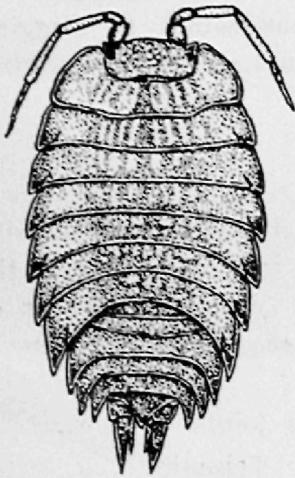


FIG. 334.—*Oniscus myrmecophilus* (after Baker,  $\times 5$ ).

The illustration shows well the general characters of this species, which is common in the nests of various species of ants and is sometimes taken in company with *Cubaris commensalis*, in the same nest. Often quite a number of specimens may be secured from a nest exposed by turning over a stone or log. Some years ago I observed numerous examples under flat stones in the Northern Flinders Ranges. One evening a large beetle (individuals of which had also been noted under stones in the daytime) flew to the camp-fire, and clinging between its legs were two young specimens of this Isopod. The presence of the crustaceans on the beetle may have been more or less accidental, but, nevertheless, the occurrence shows that individuals might easily be transported from the nest of one species of ant to that of another by similar agencies.

#### HALONISCUS (Chilton).

The body is moderately convex, and the lateral portions of the thoracic segments are not greatly expanded. There are no antero-lateral or median projections on the anterior margin of the head, which is almost evenly rounded. The abdomen is a little narrower than the last thoracic segment, and has a wide basal portion, in addition to the triangular terminal part.

#### Salt-lake Louse. *Haloniscus searlei* (Chilton). (personal name).

The body is oval and rather narrow, and in general appearance the animal superficially resembles *Ligia* (fig. 341), which, however, differs in having a much longer second antennal flagellum, and in other marked characters. There are tiny hairs on the upper surface, which is smooth. The eyes are moderately large. The first antennae are minute. The first three joints of the peduncle of the second antennae are subequal in length; the fourth is longer than any of the first three, and the fifth is longer than the fourth. The flagellum is slightly longer than the fifth joint of the peduncle, and has the first and third joints subequal in length, each a little longer than the second segment. There are two series of legs, the first four pairs being prehensile and the last three ambulatory. In the female the fourth legs do not so closely approach a subchelate character as in the male. The outer plate-like branch of each pair of pleopods is very large, delicate, and without air-tubes or cavities; the inner branch is small. As in other members of the family, the endopods of both the first and second abdominal appendages are modified in the male. During life the upper surface of South Australian examples was pale slaty-grey in colour, with numerous tiny

black spots, irregularly arranged in longitudinal groups, producing a faintly striped appearance. Length: 11 mm., or  $\frac{7}{16}$  in. (S.A.M.)

*Haloniscus searlei* was discovered in 1918, in the salt water of Lake Corangamite, Victoria. Two years later specimens of a similar species were collected from the Pool of Siloam, at Beachport, South Australia. The Beachport specimens were described by Mr. W. H. Baker under the name *Philoscia salina*, but are undoubtedly congeneric with *Haloniscus searlei*, and are so close that I have listed our form as Dr. Chilton's species. Further comparison may show that South Australian specimens are worthy of specific distinction, in which case they are referable to *Haloniscus salina* (Baker).

The animal is apparently common in the aforementioned Pool of Siloam at most times of the year, and residents of the South-Eastern districts state that they have seen similar crustaceans in other salt-lakes. It is quite probable that further investigation will show that the creature lives in other of the numerous South Australian salt-lakes. In the Pool of Siloam some specimens were obtained on the bottom, or slightly buried in the fine sand, well away from the shore, in about six feet of water; others were taken on the limbs of bathers. The water in this small lake is always very saline, and when the creatures were first observed therein, was over three times saltier than the sea.

*Haloniscus* presents an anomaly, for all other members of the family are of strictly terrestrial habit. It may be mentioned that three exotic species of the related Trichoniscidae are aquatic. It has been pointed out that there is little doubt that *Haloniscus searlei* is a land form which has become re-adapted to an aquatic life. Professor Nicholls, of the Western Australian University, collected a further species of the genus (*H. stephensi*, Nicholls and Barnes) in the bed of Kokatea Creek, Western Australia, "which had been strongly salt for several years." Where the specimens were collected "the creek at this time was dry, but the surface crust, thickly spread with salt crystals, covered a viscid mud beneath. . . . They were quite active, and a number succeeded in making good their escape down tiny burrows into the softer mud beneath."

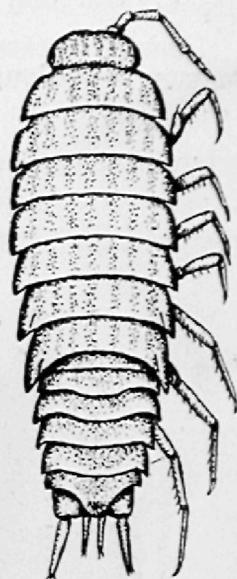


FIG. 335.—*Haloniscus searlei* (after Baker, x 5).

#### PORCELLIO (Latreille).

The body is not very convex, and the lateral parts of the thorax are expanded. The anterior margin of the head is trilobed, the antero-lateral lobes and a median lobe being developed. The abdomen is not abruptly narrower than the last thoracic segment, and the lateral parts of the third,

fourth, and fifth segments are well-developed and produced. The telsonic segment is subconical in shape.

- a. First joint of flagellum of second antennae longer than second . . . . . *laevis*.
- aa. First joint of flagellum of second antennae shorter than second.
  - b. Whole surface of body covered with small tubercles. . . . . *scaber*.
  - bb. The three anterior segments of thorax with irregular tubercles; posterior thoracic segments and abdomen almost smooth . . . . . *strzelecki*.

These species have been placed in different subgenera, but for the present purpose these need not be considered.

**Common Woodlouse or Slater.** *Porcellio laevis* (Latreille). (smooth).

The body is suboval in shape, about twice as long as wide; the upper surface is almost smooth, without tubercles. The head is about twice as wide as long; its anterior margin is trilobed, the antero-lateral lobes being prominent and rounded, and the median projection triangular. The eyes



FIG. 336.—*Porcellio laevis* (after Sars,  $\times 4$ ).

are well developed, and the first antennae are tiny. The second and third joints of the peduncle of the second antennae are subequal in length, each longer than the first; the fourth joint is twice as long as the third, and two-thirds as long as the fifth; the first joint of the flagellum is slightly longer than the second. The uropoda are prominent; the outer branch of each reaches for almost the whole of its length beyond the apex of the telsonic segment. During life the colour is slaty-grey, with wavy pale markings on each side, massed to produce an effect of two broad, longitudinal stripes on the thorax. Length: 15 mm., or  $\frac{3}{4}$  in. (S.A.M.)

This is the "Slater" which occurs so plentifully under debris in our gardens and elsewhere. It is so abundant that the student need suffer from no lack of material for the purpose of gaining a knowledge of the general structure of an Isopod. Unlike the pill-lice (*Cubaris*, etc.), the Slater does not roll into a ball when disturbed, but runs to the nearest shelter. It feeds largely on vegetable matter, and, under damp conditions, is certainly injurious to some garden plants. On the other hand, it is of some importance as a scavenger, devouring decaying vegetation, or insect eggs, dead insects, and other animal matter. If it be considered

necessary, woodlice may be destroyed by dusting the soil with arsenical compounds, or by spraying their food material with arsenate of lead.

*P. laevis* is the most widely distributed member of the family, being almost cosmopolitan. It was evidently introduced at a very early period of the colonization of Australia and is now found practically all over the continent.

**Beaded Slater.** *Porcellio scaber* (Latreille). (scurfy, or rough).

Somewhat resembling the Common Slater, but readily distinguished from it by the following obvious features:—The upper surface of the body is roughened with transverse rows of tubercles.

The joints of the peduncle of the second antennae are approximately as in *P. laevis*, but the first joint of the flagellum is shorter than the second. The uropoda are relatively shorter, the outer branch reaching for only about half its length beyond the apex of the telsonic segment. The colour is somewhat variable, being dark grey with dark mottlings, or blackish margined with pale yellow. Length: 11 mm., or  $\frac{7}{16}$  in. (S.A.M.)

While this introduced species is far more rarely met with than the preceding, it is apparently widely scattered over at least the southern parts of South Australia, and, like *P. laevis*, has been observed in unlikely places (near salt-lakes, on the Coorong, etc.), as well as in gardens, shade-houses, and so on. It is very common in New Zealand.



FIG. 337. *Porcellio scaber*  
(after Sars, x 5).

**Central Australian Slater.** *Porcellio strzelecki* (Chilton). (after Strzelecki Creek).

The body is of the usual suboval shape and is covered with tiny stiff hairs; there are some irregular tuberculations on the upper surface of the head and first three thoracic segments; the remaining segments of the thorax, and those of the abdomen, are smooth. The anterior margin of the head is trilobed, the lateral lobes being conspicuous and the rostral projection broadly triangular. There is a distinct carina (or ridge) on the fifth joint of the second antennae; this joint is nearly half as long again as the fourth, which is about one and two-thirds times as long as the third. The first segment of the flagellum is only half as long as the second. The uropoda are moderately stout, with about two-thirds of the length of the outer branch extending beyond the apex of the telsonic segment. In colour

the animal is "light brown with marblings and median stripe dark brown." Length: 6 mm., or  $\frac{1}{4}$  in. (S.A.M.)

As the specific name implies the species was found near Strzelecki Creek in the interior.

#### PORCELLIONIDES (Miers).

The body is flattened and little convex. The antero-lateral angles of the head are not much produced and there is no rostral projection as in *Porcellio*. The abdomen is abruptly and decidedly narrower than the thorax and the lateral parts of its third, fourth, and fifth segments are small and not much expanded. The telsonic segment is short and triangular. One common species occurs.

#### Delicate Woodlouse. *Porcellionides pruniosus* (Brandt). (frosty).

The surface of the body is very slightly roughened with granules. The head is twice as wide as long, with the front margin a little convex and the antero-lateral lobes small. The fourth joint of the peduncle of the second

antennae is two-thirds as long as the fifth and twice as long as the third, which is equal in length to the second; the first joint of the flagellum is twice as long as the second. The uropoda are prominent, the outer branch extending for the whole of its length past the apex of the telsonic segment, which is short, twice as wide as long. The life colour is bluish grey, tinged with a rusty bloom in the female, or various shades of reddish-brown. There are often wavy, pale yellow markings on each side of the upper surface.

Length: 9.5 mm., or  $\frac{3}{8}$  in. (S.A.M.)

A somewhat fragile woodlouse which runs much more rapidly than the two

*Porcellios* described above. It has been remarked that "this is another species which has been carried by navigation to all parts of the world." Like the Slaters it lives under debris and stones in damp situations.

#### Family SCYPHACIDAE.

The flagellum of the second antennae is composed of four joints. The abdomen is not abruptly narrower than the thorax and the uropods extend well beyond the tip of the telson. The maxillipeds have the terminal joints fairly well developed, not very small as in the two preceding families. At least two species live on our beaches or rocky coasts.

- a. Animal not capable of rolling itself into a ball. Uropods produced, reaching beyond the outline of the body . . . . . *Deto.*
- aa. Animal capable of rolling itself into a ball. Uropods short, not, or scarcely, reaching beyond the outline of the body . . . *Actaecia.*

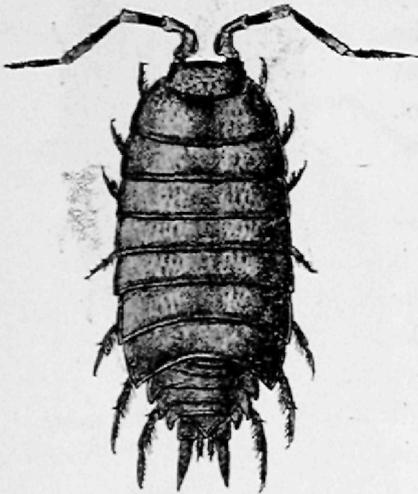


FIG. 338.—*Porcellionides pruniosus* (after Sars, x 6).