

ACARINA: CRYPTOSTIGMATA OF SOUTH GEORGIA<sup>1</sup>By John A. Wallwork<sup>2</sup>

*Abstract:* 17 species of Cryptostigmatic mites representing 6 families are reported here. Included are 4 new species, 1 new subspecies and 3 new records.

In a recent taxonomic survey of the Cryptostigmata, or oribatid mites, collected on South Georgia by P. J. Tilbrook of the British Antarctic Survey, a list of 13 species was compiled (Wallwork 1966). The results of this survey suggested that the cryptostigmatid fauna of this area has affinities both with that of the South American Andes to the north and of the Antarctic Peninsula region to the south. A third element, circum-subantarctic in distribution is also present.

This present paper deals with a second extensive collection of Cryptostigmata from South Georgia made, for the most part, by H. B. Clagg of Bishop Museum. This material affords an opportunity to increase our knowledge of the terrestrial fauna of a locality which, by virtue of its key position on the Scotia Ridge linking South America and Antarctica, is important from a zoogeographical point of view. The collection is so comprehensive that it has not been possible to complete an entire survey in time for the publication of this volume. This report covers samples taken from 27 localities in which a total of 17 species are represented. The list includes 4 new species, 1 new subspecies and in addition, 3 new records for South Georgia. A complete survey of the whole collection will be published in the near future. I am indebted to Professor J. L. Gressitt for making the collection available for study and also for providing financial assistance for technical help in connection with this work.

*Locality data:* The various collection sites, together with sampling information, are listed numerically below. Subsequently, the sites will be referred to only by number.

1. South Georgia. Grytviken Peninsula, Snowy Coulm. Under moss and rocks: 300-450 m. Hand collected. H. B. Clagg, 16.XI.1963. Cat. SG-38B.
2. South Georgia. Grytviken Peninsula, Cumberland East Bay. From rock crevices, intertidal zone. Hand collected. H. B. Clagg, 18.II.1963. Cat. SG-36.
3. South Georgia. Maiviken. From moss sample off moss dryer. N. V. Jones, 12.II.1961. Cat. SG-43B.
4. South Georgia. Busen Peninsula, Olsen Valley. Under rocks, sea level to 150 m. Hand collected. H. B. Clagg, 27.XII.1963. Cat. SG-126A.
5. South Georgia. Fortuna Bay. From tussock grass in Gentoo Penguin rookery: sea level to 150 m. Hand net collected. H. B. Clagg, 8.I.1964. Cat. SG-169A.
6. South Georgia. Kelpbugten. From tussock grass. N. V. Jones, 14.I.1961. Cat. SG-17B.
7. South Georgia. Moltke Harbor area. From moss samples on dryer. N. V. Jones, 7.III.1961. Cat. SG-63.
8. South Georgia. Moltke Harbor, Lower Valley. From *Acaena*. Hand collected. H. B. Clagg, 6.III.1964. Cat. SG-219B.
9. South Georgia. Moltke Harbor, Lower Valley. Under moss and rocks: sea level to 150 m. H. B. Clagg, 13.III.1964. Cat. SG-224B.

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10. South Georgia. Moltke Harbor, Royal Bay, Lower Valley. From tussock grass: sea level to 150 m. Hand collected. H. B. Clagg, 6.III.1964. Cat. SG-227B.
11. South Georgia. Moltke Harbor, Royal Bay. From rock crevices and inter-tidal sand. H. B. Clagg, 28.II.1964. Cat. SG-204.
12. South Georgia. Moltke Harbor, Royal Bay, Sacramento Bight. From rock crevices. H. B. Clagg, 4.III.1964. Cat. SG-211.
13. South Georgia. Husvik Valley. Under rocks and in crevices next to stream between Husvik and reservoir. N. V. Jones, 27.I.1961. Cat. SG-35B.
14. South Georgia. Husvik, Stromness Peninsula. From grass near sea level. Hand sweeps. H. B. Clagg, 16.XI.1963. Cat. SG-118A.
15. Bird Island. Wanderer Valley. From nest material of Wandering Albatross (*Diomedea exulans*). Berlese funnel extraction. H. B. Clagg, 30.IV.1963. Cat. BI-255.
16. Bird Island. Wanderer Valley. From tussock grass: sea level to 150 m. Berlese funnel extraction. H. B. Clagg, 2.I.1963. Cat. BI-16B.
17. Bird Island. Gentoo Penguins. H. B. Clagg, 18.II.1963. Cat. BI-41.
18. Bird Island. H. B. Clagg, 15.VI.1963. Cat. BI-294.
19. Bird Island. H. B. Clagg, 18.II.1963. Cat. BI-40.
20. Bird Island. Iceberg Point. Under rocks on beach. H. B. Clagg, 3.V.1963. Cat. BI-245D.
21. Bird Island. North Valley. Under rocks: sea level to 150 m. Hand collected. H. B. Clagg, 22.IV.1963. Cat. BI-225A.
22. Bird Island. Sound Coulm. Under rocks: sea level to 150 m. H. B. Clagg, 8.III.1963. Cat. BI-60B.
23. Bird Island. Landing beach. From tussock grass near beach. Hand net sweeps. H. B. Clagg, 27.V.1963. Cat. BI-275B.
24. Bird Island. Landing beach. From rock crevices, inter-tidal zone. Hand collected. H. B. Clagg, 19.IV.1963. Cat. BI-220A.
25. Unknown sources. I-III.1961. N. V. Jones. Cat. SG-67-1.
26. South Georgia. Right Whale Bay. Hand collections and from moss dryer. N. V. Jones, 3.I.1961. Cat. SG-7B.
27. South Georgia. Husvik and Bay of Isles. From moss on moss dryer. N. V. Jones, I.1961. Cat. SG-55B.

Samples from 5 of the above localities, namely 3, 5, 14, 18 and 21, yielded only nymphal Cryptostigmata which could not be identified with any certainty and, consequently, these localities are not referred to again. The sample labeled "Unknown sources" must be discounted from any zoogeographical considerations for obvious reasons; this sample contained 6 species, all of which either have been recorded previously from South Georgia (Wallwork 1966) or are present in other samples examined in this current study.

The majority of the species recorded in the collections have been described in detail previously and no redescriptions are necessary. In these cases, the species are merely listed with references to, and comments on, the original description or redescription, and with locality data. New species and subspecies are described in more detail. The complete list of species considered in this paper is given below:

Family Camisiidae

*Platynothrus skottsbergii* Trgdh. 1931 ssp. *expansus* Wallwork 1966

*Camisia segnis* (Hermann)

Family Malaconothridae

*Trimalaconothrus flagelliformis* n. sp.

## Family Oppiidae

*Oppia crozetensis* (Richters 1907)*Oppia scotiae* n. sp.*Globoppia intermedia* Hammer 1962 ssp. *longiseta* n. ssp.

## Family Podacaridae

*Halozetes marinus* (Lohmann 1907)*littoralis* n. sp.*belgicae* (Michael 1903)*Alaskozetes antarcticus* (Michael 1903) ssp. *intermedius* Wallwork 1967*Antarcticola georgiae* n. sp.*Podacarus auberti* Grndj. 1955 ssp. *occidentalis* Wallwork 1966

## Family Ceratozetidae

*Edwardzetes elongatus* Wallwork 1966*Magellozetes antarcticus* (Michael 1895)*Scotiazetes bidens* Wallwork 1966*Porozetes polygonalis* Hammer 1962 ssp. *quadrilobatus* Wallwork 1966

## Family Parakalummidae

*Sandenia georgiae* (Oudms. 1914)

## Family CAMISIIDAE

**Platynothus skottsbergii** Trgdh. ssp. **expansus** Wallwork

The nominate form of this species, described originally from the Juan Fernandez Islands (Trägårdh 1931), is apparently common in southern Chile (Hammer 1962). The subspecies *expansus*, described from samples taken at Hestesletten, South Georgia (Wallwork 1966), differs from the nominate form in having thickened, digitiform hysterosomal setae instead of thin, smooth spines. In the present study, several specimens of the subspecies *expansus* were present in sample No. 25, from "unknown sources", and in sample No. 7.

**Camisia segnis** (Hermann)

This species, which has been reported from Peru, Bolivia and Chile by Marie Hammer, is widely distributed in Europe. Its occurrence on South Georgia, represented by a single specimen from locality No. 27, is a new record. The specimen is identical in all important respects to those described by Hammer.

## Family MALACONOTHRIDAE

**Trimalaconothrus flagelliformis** Wallwork, new species Fig. 1-6.

MATERIAL EXAMINED: 1 adult.

*Measurements*: Length of body: 643.8  $\mu\text{m}$ ; width: 371.2  $\mu\text{m}$ .*Cerotegument*: Lacking over most of body; when present ornamented with a fine granular microsculpture.

*Dorsum*: Details of this region shown in Fig. 1. Rostral and lamellar setae with curled, flagelliform tips, hence the species name. A pair of S-shaped ridges present on prodorsum; lamellar setae inserted posterior to incurved apices of these ridges. Dorsal to insertion of leg I, lateral margin of prodorsum curves strongly outwards to form a sharp, projecting angle. Chaetotaxy of dorsal surface normal, notogastral setae  $e_2$  and  $h_2$  longer than the remainder, smooth, terminating in flagelliform tips. Seta  $d_1$  slightly nearer to  $c_1$  than to  $e_1$ . *Venter*: Details of this region shown in Fig. 2. Coxisternal chaetotaxy expressed by the formula (3-1-3-3); lateral coxisternal setae rather longer than medians. Genital setae longer than coxisternals; 6 genital setae on 1 plate, 7 on the other.

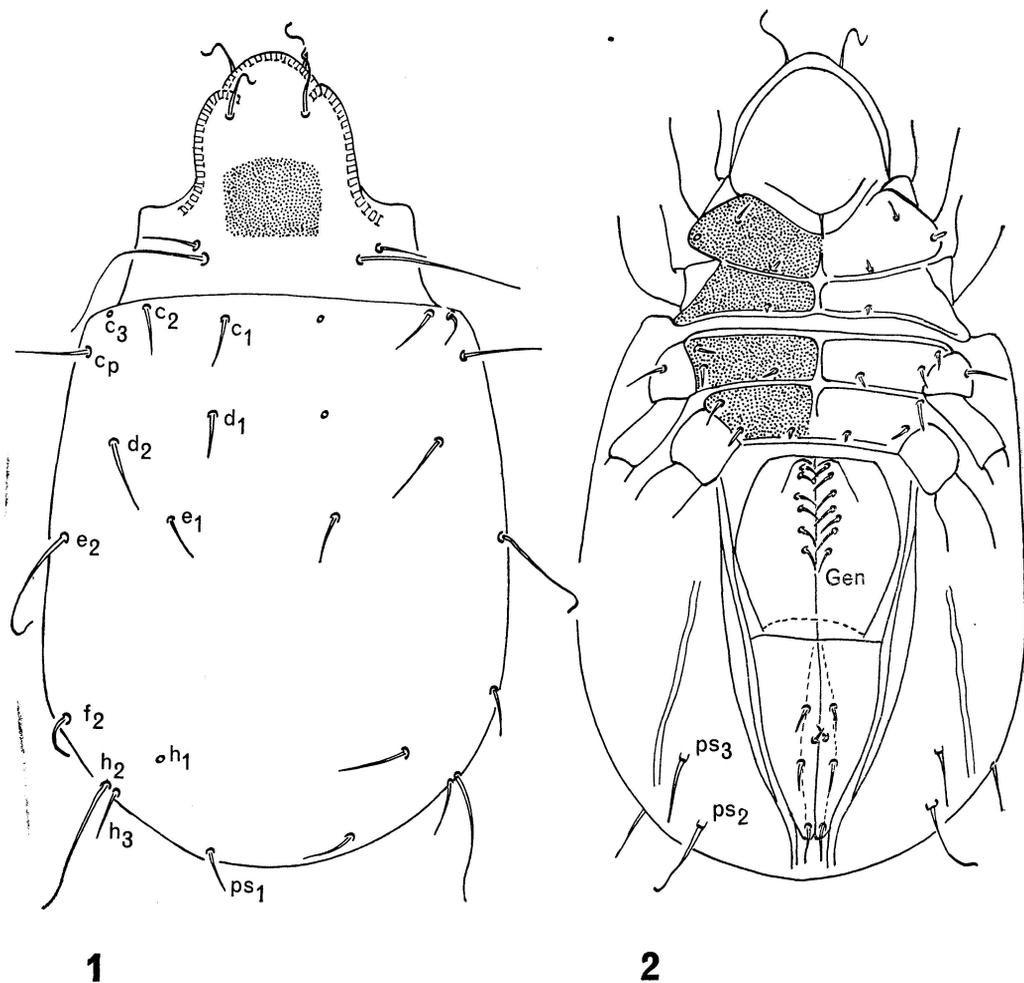


Fig. 1-2. *Trimalaconothrus flagelliformis* n. sp. 1, dorsal; 2, ventral. ( $c_1$ ,  $c_2$ ,  $c_3$ ,  $c_p$ ,  $d_1$ ,  $d_2$ ,  $e_1$ ,  $e_2$ ,  $f_2$ ,  $h_1$ ,  $h_2$ ,  $h_3$ ,  $ps_1$ ,  $ps_2$ ,  $ps_3$  = notogastral setae; Gen = genital plate).

Genital field approximately as large as anal field. Three pairs of adanal setae; setae of posteriormost pair inserted on posterior extremities of adanal plates. One pair of short anal setae inserted midway along anal part of paraproctal plates, close to mid-line. Anterior part of adano-anal plates hidden beneath posterior part of genital field. Anal and adanal fissures could not be identified. *Legs*: All tarsi tridactyle, with 2 lateral claws more weakly developed than the median. Tarsal chaetotaxy illustrated in Fig. 3-6. Setae *tc* are long and flagelliform on all tarsi; setae *ft* are strongly thickened, tips bluntly rounded on tarsi I-III; seta *ft'* lacking on tarsus IV; seta *ft''* IV curved and terminating in a fine point. All other tarsal setae thickened and bluntly rounded, except for setae *p* on tarsus I which are pointed. Solenidion  $\omega_3$  was not identified on tarsus I.

*Locality data*: The single specimen (holotype BISHOP 8844) was collected from a sample taken at locality No. 7.

*Remarks*: This lone specimen has been assigned to a new species because it can be distinguished from others included in this genus by Knulle (1957) on the basis of leg chaetotaxy,

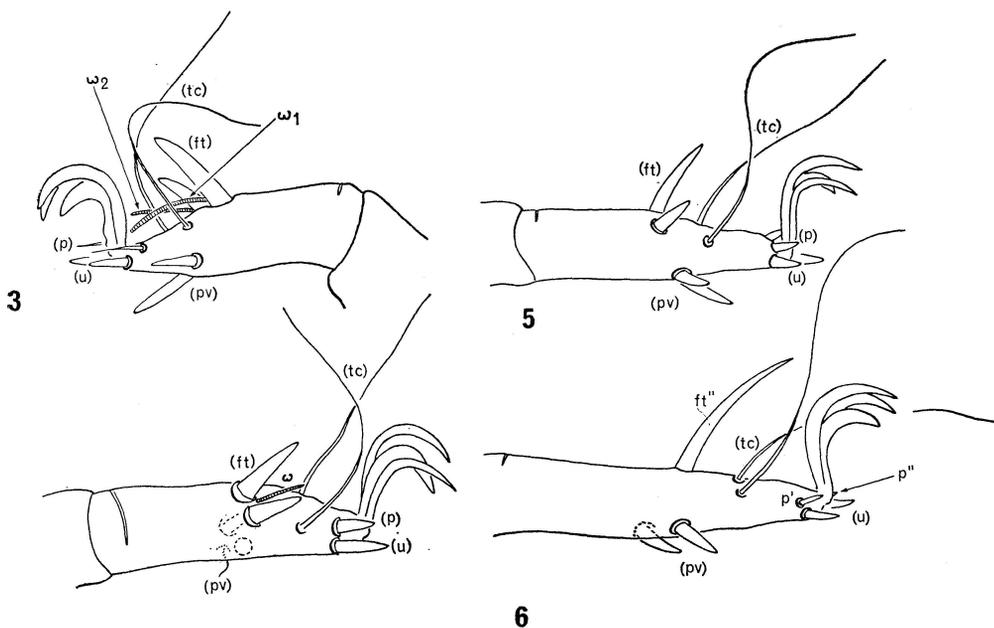


Fig. 3-6. *Trimalaconothrus flagelliformis* n. sp. 3, tarsus I, paraxial (solenidion  $\omega_3$  not shown); 4, tarsus II, dorsolateral; 5, tarsus III, antiaxial; 6, tarsus IV, antiaxial. Setal notations follow Grandjean's scheme.

particularly the form of setae *ft* on tarsus III. In all of the species in which this character has been observed, these setae are sword-shaped with fine, pointed tips; in *T. flagelliformis* they are short and bluntly rounded, identical in form to the corresponding setae on tarsi I and II.

As far as I am aware, the genus *Trimalaconothrus* has not been recorded as far south as South Georgia before. It is a genus usually associated with very damp habitats and is often encountered, in temperate localities, in clumps of wet moss. Dr Hammer has described several species belonging in this genus from various parts of South America, but none appear to be conspecific with *T. flagelliformis*.

#### Family OPPIIDAE

##### ***Oppia crozetensis* (Richters)**

This species has a circum-subantarctic distribution, having been described originally from Crozet (Richters 1907) and recorded subsequently from Macquarie I., South Georgia and the South Sandwich Is. (Wallwork 1963, 1966, 1967). A closely related form, *O. magellanicus* Hammer, occurs in southern Chile. The previous record for South Georgia was for a sample taken on the beach at Maiviken. In the present work the species occurs in 2 samples, numbers 7 and 25, which may be composite collections from several sites. The specimens from sample No. 7 comprise 21 adults, and although all have been assigned to the species *O. crozetensis*, they show variation in the length of body setae and the form of the sensillus. The latter is sometimes club-shaped, occasionally spindle-shaped, sometimes with terminal and/or lateral barbs. There is also some variation in the form of the lamellar and translamellar ridges. It is possible that these variations may reflect subspecific

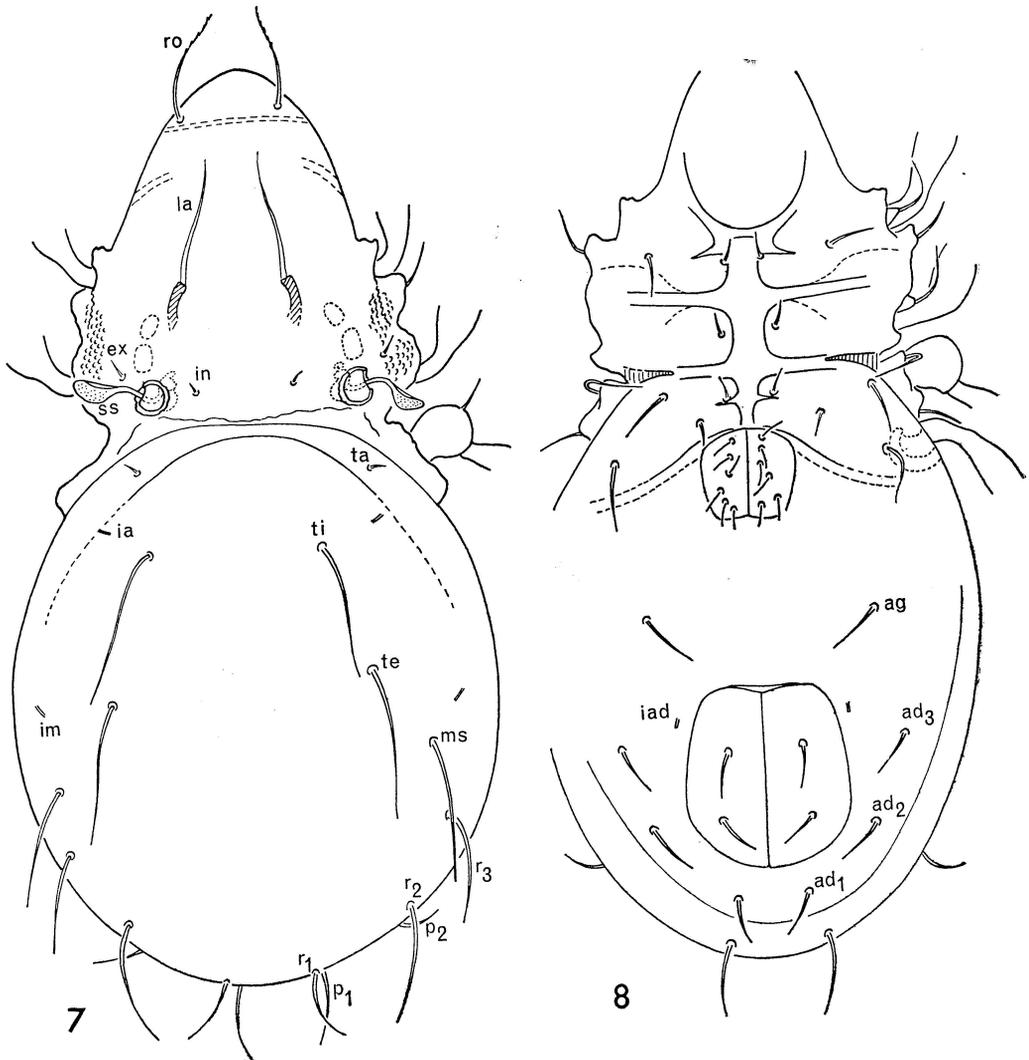


Fig. 7-8. *Oppia scotiae* n. sp. 7, dorsal; 8 ventral. (ro = rostral setae; la = lamellar setae; in = interlamellar setae; ex = exopseudostigmatic setae; ss = sensillus; ta, ti, te, ms, r<sub>1</sub>, r<sub>2</sub>, r<sub>3</sub>, p<sub>1</sub>, p<sub>2</sub> = notogastral setae; ia, im = notogastral fissures; ag = aggenital setae; ad<sub>1</sub>, ad<sub>2</sub>, ad<sub>3</sub> = adanal setae; iad = adanal fissure).

differences within the Moltke Harbor area, but since the sample may be a composite of several unspecified collections, no further analysis of subspecific trends is possible at the present time.

***Oppia scotiae*** Wallwork, new species      Fig. 7-8.

**MATERIAL EXAMINED:** 3 adults.

**Measurements:** Average length of body: 385.7  $\mu\text{m}$  (range: 377.0-394.4) Width: 203.0  $\mu\text{m}$

**Integument:** Generally smooth over body and legs except on region of pedotectum I lateral to pseudostigma which is markedly granular in appearance. In 1 specimen the integument of the prodorsum immediately

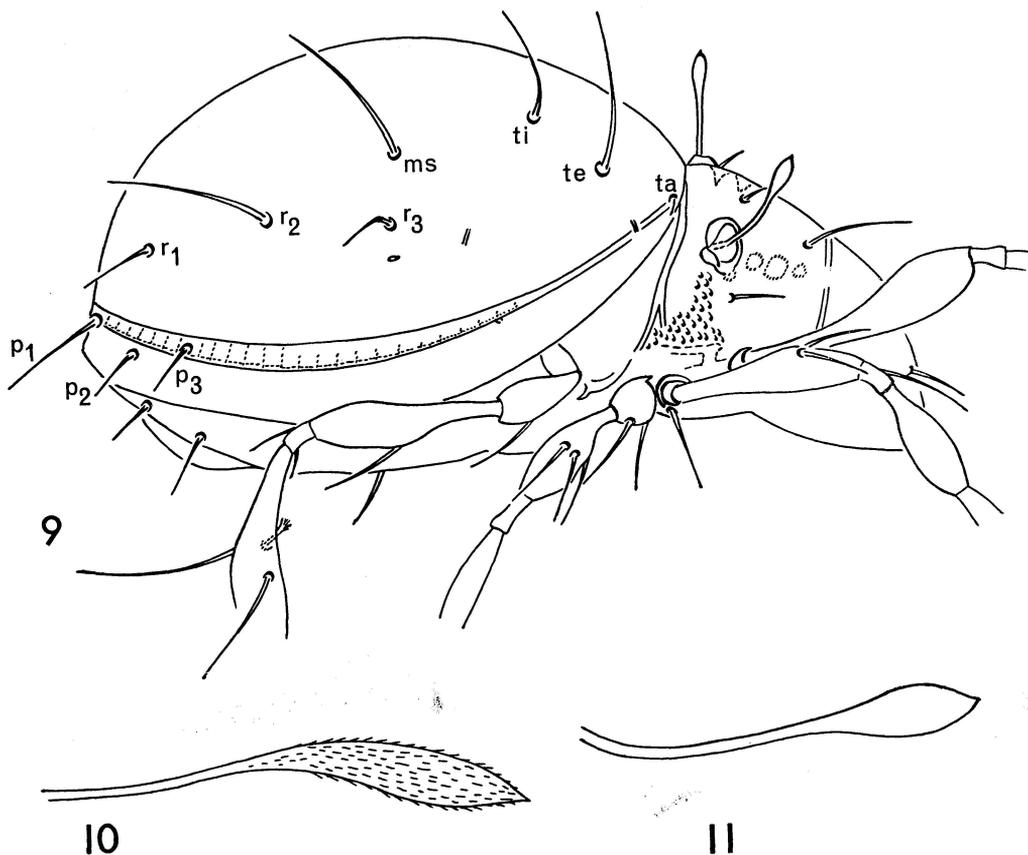


Fig. 9-11. *Globoppia intermedia* Hammer ssp. *longiseta* n. ssp. 9, lateral; 10, sensillus, Maiviken specimens; 11, sensillus, Moltke Harbor specimens.

anterior to the level of insertion of lamellar setae has a reticulate pattern; this pattern not evident in the other 2 specimens. *Prodorsum*: Rostrum rounded and entire; rostral setae longer than their mutual distance, inserted laterally, extending in front of anterior rim of rostrum for a distance at least as great as  $1/2$  their length; each seta bow-shaped, barbed, with slender fine tip. Lamellar setae similar in form to rostrals, but slightly longer, each inserted at apex of a short lamellar ridge. Lamellar ridge rod-shaped, parallel-sided or slightly curved, lying flush with surface of prodorsum and not projecting anteriorly as a cusp, variable in length in the specimens examined but not extending posteriorly to pseudostigmatic region. Interlamellar setae very short, inserted in interpseudostigmatic region just anterior to posterior limit of prodorsum. Each pseudostigma is a strongly chitinised cup with aperture directed dorsolaterad; sensillus with short stem and globular head which appears flattened or spoon-shaped in certain orientations. Immediately anterior to each pseudostigma are 2 pale areas. A fine exopseudostigmatic seta is inserted lateral to the pseudostigma. *Notogaster*: Ovoid in shape, anterior margin strongly chitinised. Setae *ta* inserted on this margin, very short; remainder of notogastral setae long, particularly *ti*, *te*, *ms*, *r<sub>3</sub>*, and *r<sub>2</sub>*. A total of 9 pairs of notogastral setae present; setae *p<sub>3</sub>* lacking in all 3 specimens and without any trace of insertions. Fissures *ia* and *im* located in their usual positions. Details of dorsal surface are shown in Fig. 7. *Venter*: Details of ventral surface shown in Fig. 8. Ventral chaetotaxy of usual pattern for genus; setae of lateral coxisternal regions, aggenital, anal and adanal regions moderately long; length of these setae varies somewhat from specimen to specimen, being rather longer in holotype (Fig. 8) than in the 2 para-

types. Coxisternal setal formula: (3-1-3-3); each genital plate bears 6 straight setae. Adanal fissure small but distinct, located on anterolateral margins of anal field. *Lateral region of podosoma and legs*: Discidium present, heavily developed with posterior angle bluntly rounded, bearing insertion of coxisternal seta  $4c$ . All tarsi monodactyle, leg chaetotaxy not examined in detail.

*Locality data*: The 3 specimens originate from 2 localities; the holotype (BISHOP 8845), from locality No. 26 and the 2 paratypes from locality 27.

*Remarks*: To the present time 4 oppioid species have been described from the western part of Antarctica and the subantarctic, namely *Oppia crozetensis* (Richters), *O. loxolineata* Wallw., *O. pepitensis* Hammer, and *Globoppia intermedia* Hammer (Wallwork 1967, Covarrubias 1968). The description of the new species given above adds a 5th to this list, and the following distinguishing characters may be used to separate this new species from those previously described.

*Oppia scotiae* shows some resemblance to *Globoppia intermedia longiseta* (see below), notably in possessing long rostral, lamellar and notogastral setae, short interlamellar setae, a reduced pair of setae  $ta$  on the anterior notogastral margin, abbreviated lamellae and a globular sensillus; the pattern of ventral chaetotaxy is also very similar in the 2 species. *O. scotiae* is smaller, on average, than *G. intermedia*, however, and the latter species has a sharply pointed discidium, 10 pairs of notogastral setae and notogastral heterotrichy. In *O. scotiae* the discidium is bluntly rounded, there are 9 pairs of notogastral setae and no marked notogastral heterotrichy. In *O. crozetensis* and *O. loxolineata* the prodorsal lamellae are much more strongly developed, as a rule, than in *O. scotiae* and, in addition, a translamella is usually present; both of these species possess 10 pairs of notogastral setae which are relatively shorter than in *O. scotiae*, and interlamellar setae that are relatively longer than in the new species.

***Globoppia intermedia* Hammer ssp. *longiseta* Wallwork, new subspecies** Fig. 9-11.

The species *Globoppia intermedia*, described originally from the Puerto Montt and Punta Arenas regions of southern Chile (Hammer 1962), has been recorded previously from Maiviken beach, South Georgia (Wallwork 1966). The species is also present in Bishop Museum collections from localities (7) and (16); these specimens differ slightly but consistently from those described by Hammer and, accordingly, are designated as a new subspecies, *G. intermedia* ssp. *longiseta* (Holotype BISHOP 8846).

*Diagnosis*: The nominate form described by Hammer is characterized by strong notogastral heterotrichy, with setae  $te$ ,  $ms$  and  $r_2$  long and curved, and the remainder appreciably shorter than these. The specimens from South Georgia differ with respect to this character in that notogastral setae  $ti$  and  $p_1$  are relatively longer than the corresponding setae in the nominate form, and almost as long as  $te$ ,  $ms$  and  $r_2$  (Fig. 9). Thus, in this new subspecies, only notogastral setae  $ta$ , inserted on the anterior notogastral rim,  $r_3$ ,  $r_1$ ,  $p_2$  and  $p_3$  are short.

*Remarks*: A comparison between the Bishop Museum specimens and those recorded previously in the British Antarctic Survey collections from Maiviken (Wallwork 1966) has shown that the latter must also be included in this new subspecies, for setae  $te$ ,  $ti$ ,  $ms$ ,  $r_2$  and  $p_1$  are long. There is, however, a slight difference in the form of the sensillus between the Moltke Harbor specimens and those from Maiviken; in the latter, the sensillus has a spindle-shaped head beset with minute bristles, whereas this structure is more strongly rounded, almost globular, and apparently smooth in the Bishop Museum collection from Moltke Harbor (cf. Fig. 10, 11).

Family PODACARIDAE

***Halozetes marinus* (Lohmann)**

This species, redescribed from Macquarie I. (Wallwork 1963), has not previously been recorded from South Georgia although it is known to occur on Signy I. in the South Orkney group (Wall-

work 1967). It is a species which, according to all the records, is most common in intertidal situations. It is present, in the Bishop Museum collections, sometimes in large numbers, in samples from localities 2, 11, 12 and 24. The specimens examined evidently belong to the nominate form of the species, for the interlamellar setae are long, more than  $2 \times$  as long as their mutual distance. However, it was noted that the posterior notogastral setae of the adult, particularly setae  $h_2$ , are rather longer than the remainder, a character more commonly associated with the subspecies *H. marinus minor* from Campbell I. (Wallwork 1966a). Further, in the South Georgia material, notogastral setae  $c_3$  are occasionally present on one side.

***Halozetes littoralis*** Wallwork. new species Fig. 12-15.

**MATERIAL EXAMINED:** 30 adults (20 ♂♂, 10 ♀♀), 12 immatures.

**Measurements:** ♂. Average length of body: 742.4  $\mu\text{m}$  (range: 701.8-783.0); average width: 411.8  $\mu\text{m}$  (range 406.0-464.0). ♀. Average length of body: 788.8  $\mu\text{m}$  (range: 759.8-841.0); average width: 464.0  $\mu\text{m}$  (range: 435.0-487.2).

**Cerotegument:** Dorsal surface of body and legs covered with black, rounded granules, varying in size to a maximum diameter of 5  $\mu\text{m}$ . These granules densely clustered over notogaster and centrodorsal part of prodorsum. **Prodorsum:** Rostral, lamellar and interlamellar setae thickened, dark colored, divergent, smooth spines. Rostrals and lamellars approximately equal in length, shorter than interlamellars. Interlamellar setae as long as, or only slightly longer than, their mutual distance. Pseudostigma and sensillus well developed; sensillus

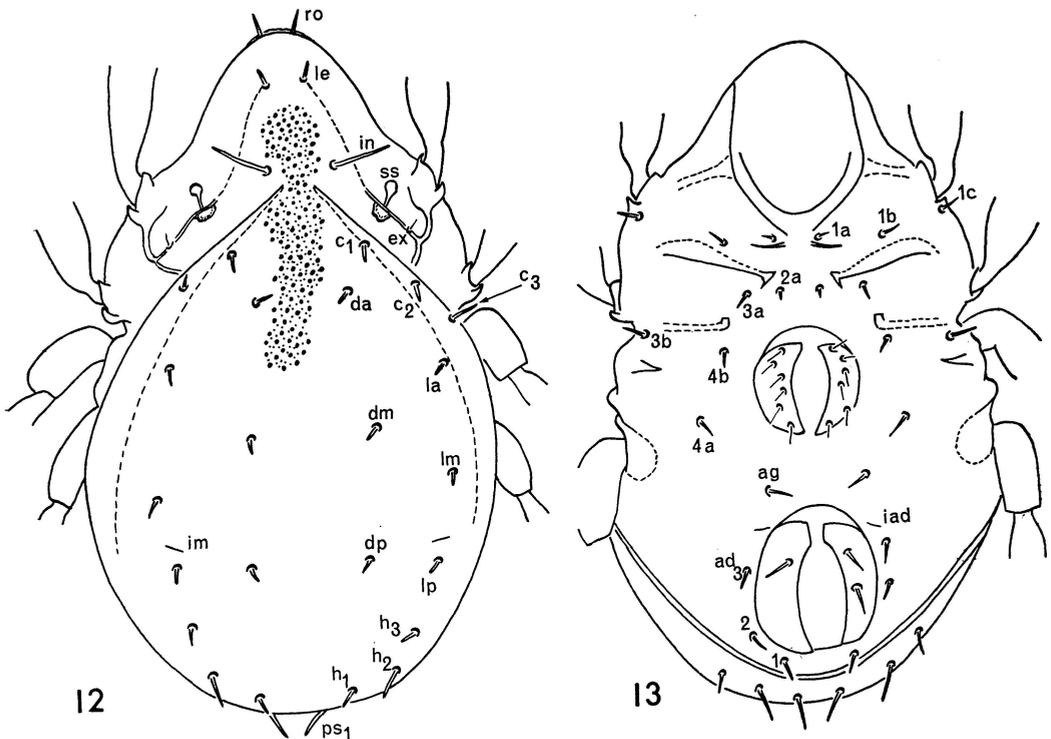


Fig. 12-13. *Halozetes littoralis* n. sp. 12, dorsal; 13, ventral. (ro = rostral setae; le = lamellar setae; in = interlamellar setae; ss = sensillus; ex = exopseudostigmatic setae;  $c_{1-3}$ , da, dm, dp, la, lm, lp,  $h_{1-3}$ ,  $ps_1$  = notogastral setae; 1a, 1b.....4b = coxisternal setae; ag = aggenital setae; ad = adanal setae).

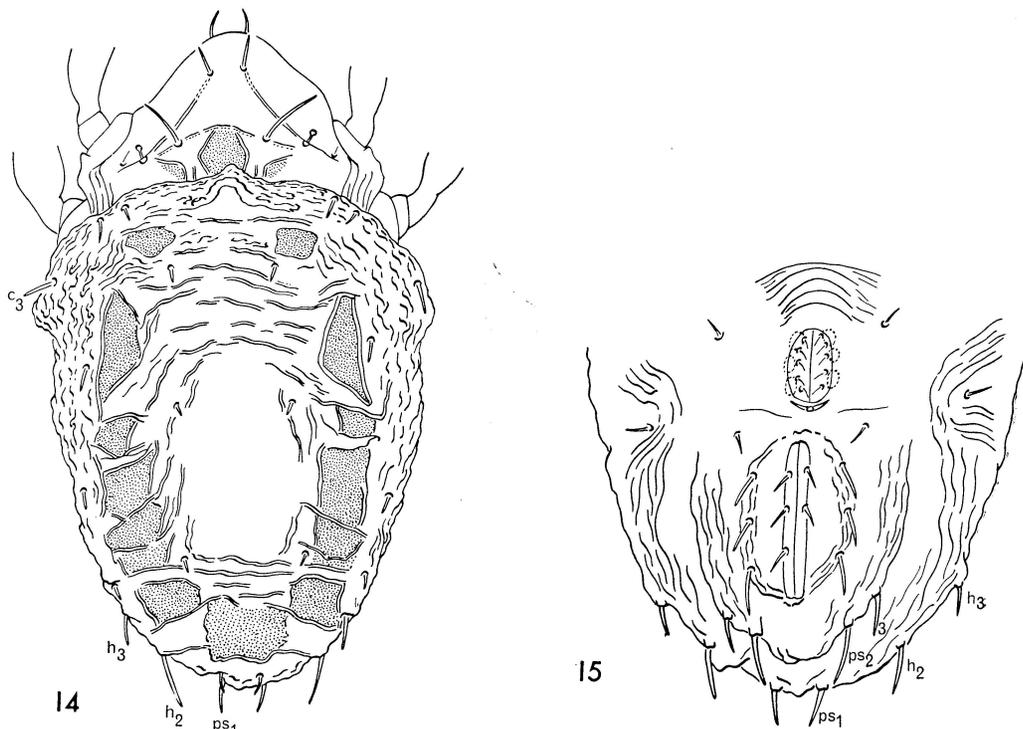


Fig. 14–15. *Halozetes littoralis* n. sp. 14, tritonymph, dorsal; 15, tritonymph, ventral, genito-anal region. Notations as in Fig. 12–13.

with rounded head. Exopseudostigmatic setae slender, inserted, on each side, on the pseudostigmatic ridge, posterolateral to pseudostigma. These features are illustrated in Fig. 12. *Notogaster*: This region ovoid in shape, narrowing to a peak in middorsal anterior region. This peak apparently “open”, so that prodorsum and notogaster appear confluent through this narrow isthmus. Notogastral setae short, smooth spines, dark brown in color. Basic pattern of notogastral chaetotaxy is that of bideficience, i.e. 14 pairs of setae present; occasionally seta  $c_3$  present (frequency: 24%), as on the right side in the holotype (Fig. 12). Setae  $h_2$ ,  $ps_1$  and  $ps_2$  markedly longer than the other notogastral setae. Fissure *im* is located just anterior to seta *lp* on each side. *Venter*: Almost identical in appearance to that of *H. intermedius* (cf. Fig. 13 with Wallwork 1963, Fig. 23). All ventral setae thickened spines, smooth and brown in color. Coxisternal formula (3-1-2-2), with setae  $4c$  lacking in all specimens examined. Aggenital neotrichy lacking in ♂♂ and ♀♀. Anal setae strong spines, longer and thicker than other ventral setae. Holotype lacks the posterior anal seta on 1 plate; this is an abnormal condition. *Legs*: All tarsi tridactyle, with central claw strongly developed and more darkly colored than laterals. Lateral claws apparently without subsidiary teeth. Chaetotaxy was not examined in detail, although the general form of the tarsal setae resembles that of other Podacarids.

*Tritonymph*: The development of body chaetotaxy through the immature stages is normal, and the tritonymph is selected to illustrate the diagnostic features of the nymphal stages. Details of dorsal and ventral aspects of the tritonymph are given in Fig. 14, 15. Integument covering body strongly pleated, except for a smooth area located centrodorsally on notogaster. Porose hysterosomal sclerites present; form and distribution of these sclerites very similar to the condition in *Halozetes marinus* (cf. Fig. 14 with Wallwork 1963, Fig. 20). All dorsal setae are thickened spines, roughened, but not conspicuously barbed. Pseudostigma and sensillus reduced, the latter with a very slender stem and small rounded head, as in *Halozetes intermedius*. Noto-

gastral setae  $c_3$ ,  $h_2$ ,  $ps_1$ ,  $ps_2$  and  $ps_3$  longer than centro and laterodorsals. Ventrally, chaetotaxy of coxisternal, genital, aggenital, adanal and anal region very similar to that of *H. intermedius*: coxisternal setal formula (3-1-2-2), as in the adult. Adanal setae strongly developed as dark-colored spines. Fig. 15 shows an abnormal condition in which 3 anal setae are present on 1 anal plate.

*Locality data*: Present in only 1 sample examined, from locality No. 24 (Holotype BISHOP 8847).

*Remarks*: The adults of this new species bear a striking resemblance to those of *H. intermedius*, a species described previously from Macquarie I. (Wallwork 1963). Features in common with the adults of both species include: 1. Development of body setae, particularly the prodorsals and notogastrals as thickened, dark colored spines. There is also a close similarity between the lengths of the corresponding setae in the 2 species. 2. The well developed pseudostigmata and sensilli. 3. The bifid condition of the notogastral chaetotaxy, modified occasionally by the presence of setae  $c_3$ . 4. The coxisternal setal formula: (3-1-2-2), i.e. seta 4c lacking in both species. 5. The absence of aggenital neotrichy.

In contrast, the differences between the adults of the 2 species are slight. *H. littoralis* is, on average, slightly larger than *H. intermedius*; dorsal setae are more conspicuously barbed in the latter than in the former; notogastral setae  $ps_2$  and  $ps_3$  are relatively longer in *H. littoralis* than in *H. intermedius*.

The distinction between the 2 species is more marked when the immature stages are compared, however. Nymphs of *H. intermedius* are easily recognisable by the strongly barbed body setae; the dorsal setae in particular are much longer than those of *H. littoralis* (cf. Fig. 14 with Wallwork 1963, Fig. 26). Nymphs of the 2 species are similar in 2 important respects, namely the form and distribution of porose hysterosomal sclerites, and the regressive condition of the sensillus.

*Halozetes intermedius* is, as far as present records show, an eastern subantarctic species. It is of interest, then, to record a species from the western subantarctic, *H. littoralis*, showing a close morphological resemblance, at least as far as the adult characters are concerned, to the eastern species. The 2 species evidently fill a similar ecological niche, also, for both have been collected in samples from the inter-tidal region in admixture with *Halozetes marinus*.

#### **Halozetes belgicae** (Mich.)

This species has been recorded previously from South Georgia (Wallwork 1966), and the specimens examined in the present work show no appreciable differences from those studied previously. A ♀ specimen, collected from locality No. (6), is noteworthy in that it exhibits slight aggenital neotrichy, evidenced by the duplication of the left aggenital seta. Aggenital neotrichy is usually confined to ♂♂ in this species, in which it is strongly developed.

*LOCALITY DATA*: Present in samples from localities No. 6, 7, 15 and 19.

#### **Alaskozetes antarcticus** (Mich.) ssp. **intermedius** Wallwork

This species, which is relatively common in the Peninsula region and on the eastern subantarctic island of Macquarie, has not been previously recorded from South Georgia by me. Trägårdh (1908) included a reference to *A. antarcticus* from South Georgia but, as noted previously (Wallwork 1966), this record was probably erroneous and should have referred to a locality in Gerlache Strait.

The subspecies *intermedius* was originally described from specimens collected on Bouvet I. and South Sandwich Is. by the British Antarctic Survey (Wallwork 1967), and was so named because of characters it shares with the nominate form, common in the Peninsula region, and the subspecies *grandjeani*, described from Macquarie I. (Dalenius & Wilson 1958). Thus, it resembles the latter in possessing long posterior notogastral setae  $ps_1$ ; these setae are longer than setae  $ps_2$  and  $ps_3$  in

*grandjeani*, but not so in the nominate form. The subspecies *grandjeani* has interlamellar setae which are rarely longer than their mutual distance, however, whereas these setae are approximately  $3 \times$  their mutual distance in the nominate form and in the subspecies *intermedius*.

The Bishop Museum collections contain immature stages of the subspecies *intermedius*. These differ from the immatures of the nominate form principally in having longer hysterosomal setae, anteriorly (setae  $c_3$ ) and dorsolaterally.

*Locality data:* Present in samples from localities No. 20 and 22.

***Antarcticola georgiae* Wallwork, new species** Fig. 16-22

The genus *Antarcticola* was described recently from collections made in the vicinity of Molo-dezhnaya on the eastern coast of continental Antarctica (Wallwork 1967) and, to the present, contains only 1 species, the type *A. meyeri* Wallwork. This species is distinguished from all other known podacarids by the multi-deficient condition of the adult notogaster, which lacks the centrodorsal setae, for the most part, and consequently bears only 10 pairs of setae. The nymphal stages are also easily identified by the strongly pleated integument and lack of porose hysterosomal sclerites.

The genus is represented in the South Georgia fauna by a species which differs markedly from *A. meyeri* and, therefore, has been designated as a new species, *Antarcticola georgiae*. A comparison between this species and *A. meyeri* is given after the following description.

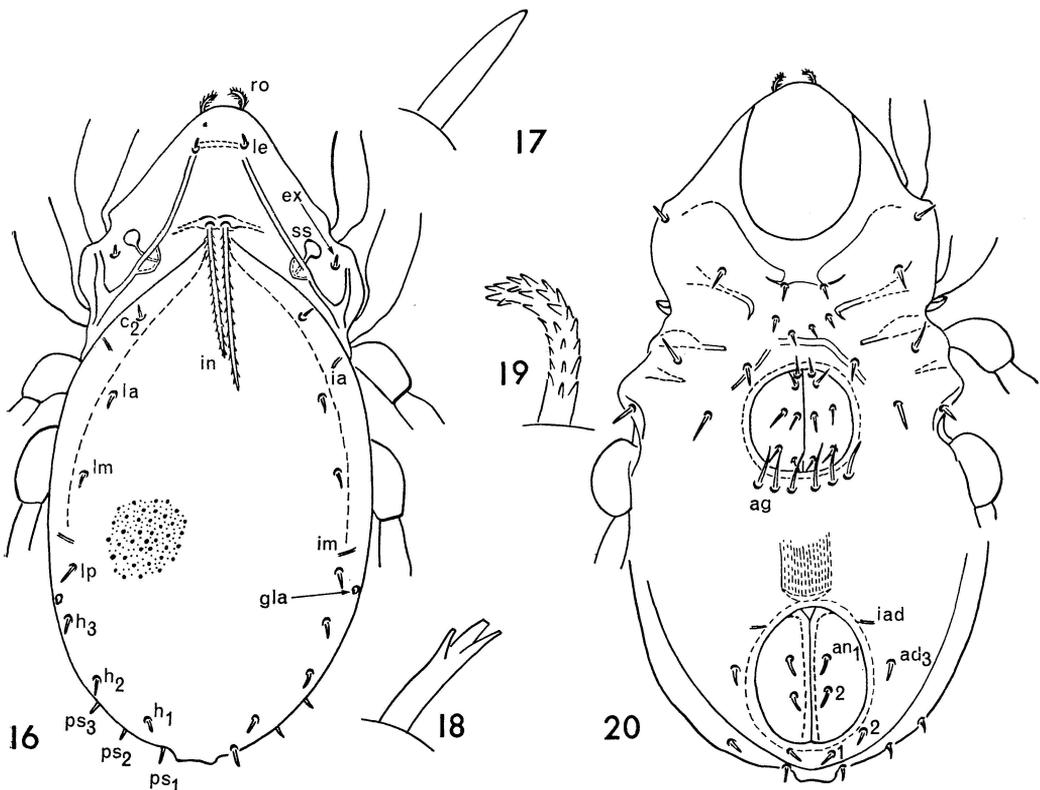


Fig. 16-20. *Antarcticola georgiae* n. sp. 16, dorsal, 17 & 18, 2 forms of notogastral setae; 19, rostral seta; 20, ventral. (gla = aperture of lateral abdominal gland; ia, im, iad = fissures; other notations as in Figs. 12-13).

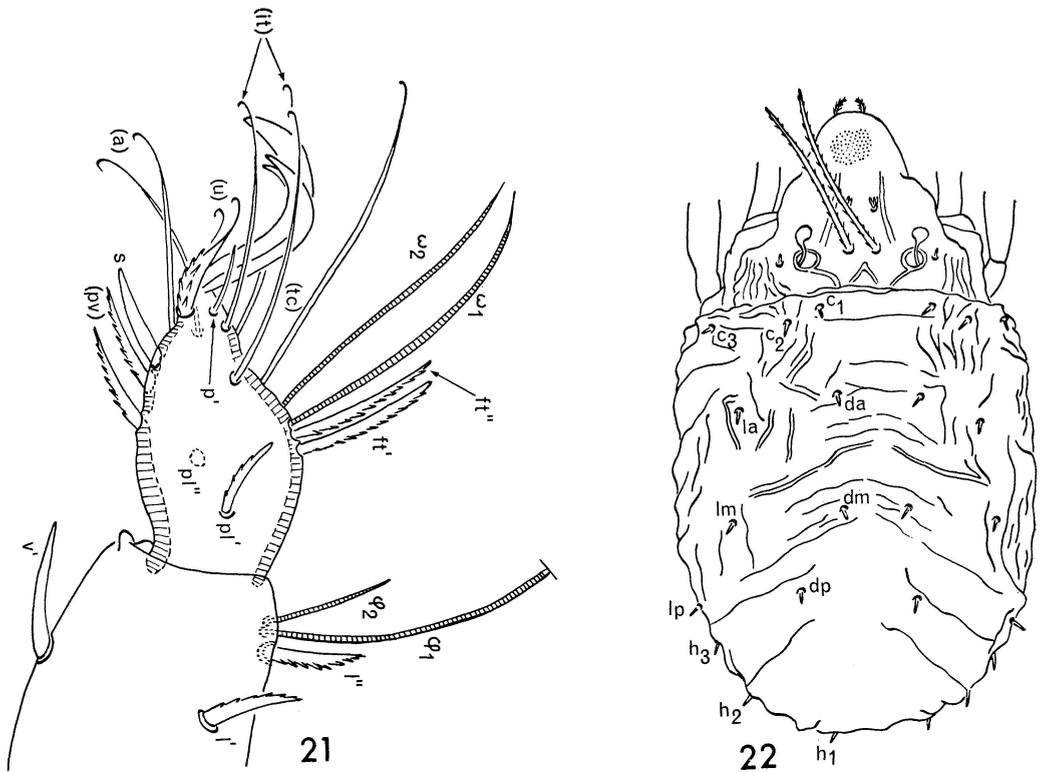


Fig. 21-22. *Antarcticicola georgiae* n. sp. 21, tarsus I, paraxial; 22, deutonymph, dorsal. Notations for tarsal setae follow Grandjean's scheme; remainder as in Fig. 12-13.

**MATERIAL EXAMINED:** 20 adults (14 ♂♂, 6 ♀♀), several nymphs.

**Measurements of adults:** ♂, Average length of body: 661.2  $\mu\text{m}$  (range: 609.0-696.0); average width: 319.0  $\mu\text{m}$  (range: 278.4-348.0). ♀ Average length of body: 667.0  $\mu\text{m}$  (range: 638.0-696.0); average width: 319.0  $\mu\text{m}$  (range: 290.0-348.0).

**Cerotegument:** Conspicuous on body but not on legs; microsculpture consists of rounded black or brown granules, of varying diameters to a maximum of 10  $\mu\text{m}$ . Ornamentation on venter finer and granules smaller than on dorsum. **Prodorsum:** Anterior margin of rostrum broadly rounded; rostral setae short, thickened, conspicuously barbed and strongly incurved (Fig. 16 & 19). Lamellar setae very short spines, usually smooth, occasionally with terminal barbs; inserted just posterior to a curved, transverse prodorsal ridge. Interlamellar setae long, strongly thickened and barbed, dark brown in color, with insertions very close together; each interlamellar insertion surrounded by a chitinised thickening which may extend laterad as a curved ridge, joining the lamellar ridge at anterior limit of pseudostigma. Lamellar ridges well developed, slightly convergent, extending anteriorly to level of lamellar setae. Pseudostigma large, cup-shaped, its rim confluent with lamellar ridge. Sensillus with slender stem and strongly fusiform head. A short, smooth exopseudostigmatic seta inserted lateral to each pseudostigma. **Notogaster:** Main features of the dorsal surface are shown in Fig. 16. This region is broadly oval in shape, anterior margin narrowing markedly to a mid-dorsal peak which is "open" in most cases. Posterior notogastral contour developed as a rectangular bosse. Typically 10 pairs of short notogastral setae; variations in this pattern of chaetotaxy were as follows: 1, Anterior setae ( $c_2$ ) sometimes difficult to see or may be lacking. 2, Additional anterior seta ( $c_1$ ) present on one side in a ♂ specimen. 3, An additional centro-dorsal seta ( $dm$ ) present on one side in a ♂ specimen. Form of notogastral setae variable, being smooth or barb-

ed, blunt or pointed; 2 of the common forms shown in Fig. 17 & 18. All dorsal setae brown in color. *Venter*: Appearance and chaetotaxy of ventral surface shown in Fig. 20. Coxisternal region normal, setal formula: (3-1-2-3). Anterior to genital field is a pregenital thickening represented, either as a curved ridge following the contour of the genital field, or as an angular arrangement of thickenings which may, or may not be continuous, as illustrated. Genital aperture of ♂ appreciably smaller than that of ♀; each genital plate with 6 short, pointed setae. Aggenital neotrichy present in ♂; typically 3 pairs of aggenital setae usually inserted in a curvilinear row paralleling the posterior border of genital field. Variations observed in this pattern as follows: 1, 2 setae on one side, 3 on the other (i.e. a total of 5 aggenital setae), frequency 3/20 or 15%. 2, 1 seta on one side 3 on the other (i.e. a total of 4), frequency 1/20 or 5%. 3, 2 pairs of aggenital setae. Frequency 1/20 or 5%. Aggenital neotrichy lacking in the ♀♀ examined. Anal setae (2 pr) and adanals (3 pr) short spines, smooth or terminally barbed; anal setae slightly more strongly developed than adanals; occasionally 1 of adanal setae lacking. Adanal fissure a conspicuous slit aligned transversely on anterolateral margin of anal field. *Lateral region of podosoma*: Pedotecta I and II present but not strongly developed. A discoidal projection located between insertions of legs III and IV carries coxisternal seta 4c on its posterior face. *Legs*: Pattern of tarsal chaetotaxy very similar to that of *Podacarus auberti*, the formula for legs I-IV being: (18-15-15-12), excluding claws. On tarsus I (Fig. 21), both primilateral setae (*pl*) present; famulus reduced to a small point, visible only in anti-axial view; insertion of seta *ft''* coupled with that of solenidion  $\omega_1$ ; setae (*p*) short and eupathidial; setae (*tc*), (*it*), (*u*) and (*a*) looped apically. Setae (*u*) are thickened and strongly barbed basally.

Chaetotaxy of tarsus II differs from that of tarsus I in that setae (*pl*) are lacking, as is the famulus; setae (*p*) are strongly developed and not eupathidial and are looped apically; insertion of seta *ft'* is coupled with that of solenidion  $\omega_1$ , and likewise that of seta *ft''* is coupled with  $\omega_2$ . Setae *ft'* and (*it*) are lacking on tarsus IV. All tarsi bear 3 claws, brown in color, the 2 laterals being more slender than the median; there is a subsidiary tooth on each of the lateral claws.

*Immatures*: A brief examination of the nymphal stages indicated several general similarities with those of the type species, *A. meyeri*, and Fig. 22 shows the appearance of the deutonymph from the dorsal aspect. The notogastral integument is strongly pleated and there are no porose hysterosomal sclerites. Nymphs are unidifferent, i.e. there are 15 pairs of notogastral setae present, of which 12 pairs are visible in dorsal view. These setae are much shorter than the corresponding setae in the type species.

*Locality data*: All the specimens examined came from a single collection taken at locality No. 7 (Holotype BISHOP 8848).

*Remarks*: As noted above, *Antarcticola* has been known only from eastern continental Antarctica up to this time, and its occurrence on South Georgia is of considerable zoogeographical interest. In addition, the generic diagnosis compiled previously (Wallwork 1967) now requires modification in the light of this new find. A comparison between *A. meyeri* and *A. georgiae* provides the following list of similarities which may be used as the basis for this re-definition: 1, Nymphs and larvae with pleated integument, lacking porose hysterosomal sclerites. 2, Interlamellar setae and sensillus well developed in all stages. 3, With 10 pairs of notogastral setae, as a general rule. Centrodorsal setae undergoing regression, although this regression is occasionally incomplete.

Adults of *A. meyeri* and *A. georgiae* can be distinguished easily by the following characters: 1, Aggenital neotrichy present in ♂ of *A. georgiae*, lacking in ♂ of *A. meyeri*. 2, Notogastral tectum and humeral lobes present in *A. meyeri*, lacking in *A. georgiae*. 3, Interlamellar setae inserted close together in *A. georgiae*, insertions remote from each other in *A. meyeri*. 4, Notogastral peak "closed" in *A. meyeri*, "open" in *A. georgiae*. 5, Pseudostigma covered by notogastral tectum in *A. meyeri*, exposed in *A. georgiae*. 6, Lamellar and notogastral setae very short spines in *A. georgiae*, longer and more conspicuous in *A. meyeri*. 7, The linear arrangement of genital setae in *A. meyeri* contrasts with the paired arrangement of these setae in *A. georgiae*. 8, On tarsus I, seta *pl'* is lacking in *A. meyeri*, present in *A. georgiae*. 9, On tarsus II, seta *ft''* associated basally with solenidion  $w_1$  in *A. meyeri*, whereas in *A. georgiae* seta *ft''* is associated basally with solenidion  $w_2$ , and seta *ft'* with  $w_1$ .

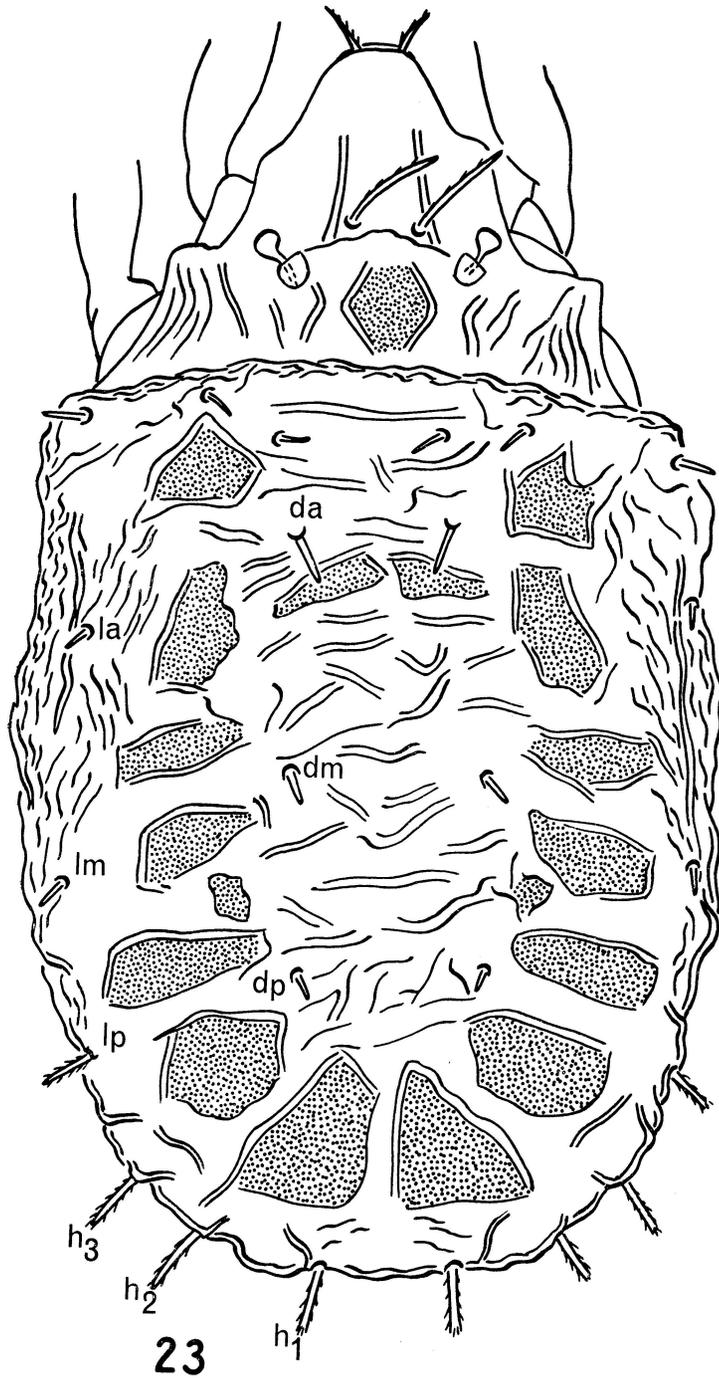


Fig. 23. *Podacarus auberti* Grandj. ssp. *occidentalis* Wallwork Tritonymph, dorsal. Notations as in Fig. 12-13.

In describing the type species, *A. meyeri*, attention was drawn to the absence of the looped condition of the tarsal setae (Wallwork 1967). This looped condition is present in *A. georgiae*, but this distinction is of doubtful significance since the terminal loops of these setae are easily broken off.

Nymphs of *A. georgiae* differ from those of *A. meyeri* in having much shorter rostral, lamellar and notogastral setae, and in having the interlamellar setae inserted close together, as in the adult (cf. Fig. 22 with Wallwork 1967, Fig. 8).

Mention must be made of 2 specimens (both ♂) collected from locality No. 22 which are very similar to *A. georgiae* in certain respects, but anomalous in others. In one case, the interlamellar setae are only about half the normal length and are not conspicuously barbed. In the 2nd specimen, notogastral setae  $c_1$ ,  $c_2$ ,  $c_3$ ,  $dm$  and  $dp$  are present, and the insertions of the interlamellar setae are remote from each other. Both specimens have 3 pairs of aggenital setae, although these are not arranged in a curvilinear manner. They may represent transitional forms, geographical variants or new subspecies, but this cannot be established with certainty until further collections are examined to determine the extent of morphological variability within the species *A. georgiae*.

**Podacarus auberti** Grndj. ssp. **occidentalis** Wallwork Fig. 23.

This form was described previously from South Georgia (Wallwork 1966) and differences between it and the nominate form were discussed. The nominate form, which has a rather wide distribution in the eastern subantarctic, has shorter interlamellar setae and weaker aggenital neotrichy than the subspecies *occidentalis*. In the Bishop Museum collections, the latter is represented by numerous specimens of all life stages in a sample taken from locality No. 23, and since a description of the immatures was not included in the previous account, a brief comparison with the corresponding stages of the nominate form is given. The form is also present in localities No. 7, 15, 16, 17, 22.

There appear to be no obvious differences between the nominate form and this western subspecies, as far as the larval, protonymphal and deutonymphal stages are concerned. In the case of the tritonymph, the 2 forms are similar in the general pattern of body chaetotaxy and the development of hysterosomal porose sclerites (cf. Fig. 23 with Grandjean 1955, Fig. 7a). They differ in 2 respects, however, namely in that the interlamellar setae in *P. auberti occidentalis* are as long as their mutual distance, i.e. relatively longer than in the nominate form and, secondly, in the presence, in *P. auberti occidentalis*, of an additional pair of porose hysterosomal sclerites, located centrodorsally on the anterior 1/2 of the notogaster, immediately behind the insertions of setae *da* (Fig. 23). These sclerites are lacking or ill-defined in the nominate form.

#### Family CERATOZETIDAE

**Edwardzetes elongatus** Wallwork

This species, described originally from South Georgia (Wallwork 1966), is the most frequent cryptostigmatid in the Bishop collections examined, although it never occurs in great abundance. It has also been recorded from Candlemas I., Leskov I. and Bellingshausen I. in the South Sandwich group (Wallwork 1967).

LOCALITY DATA: The species is present in samples taken from localities No. 1, 4, 6, 7, 8, 9, 15, 16, 22 and 25.

**Magellozetes antarcticus** (Mich.)

This ceratozetid species, easily recognisable by its strongly developed lamellar cusps and lobate rostrum, occurs in samples taken from localities No. 1, 7, 10 and 16. The 3 adult specimens collected from locality No. 1 generally conform to the description of *M. antarcticus* given previously

(Wallwork 1965), although the turtoria are more strongly developed and projecting. One of the specimens exhibits an unusual feature in possessing an additional pair of prodorsal setae inserted on rostrum immediately posterolateral to median rostral lobe, on each side. These setae differ from the normal rostral setae, which are inserted behind them on the lateral margins of the prodorsum, in being shorter and smooth.

**Scotiazetes bidens** Wallwork

The genus *Scotiazetes*, with *S. bidens* as the type, was described from South Georgia (Wallwork 1966). The specimens examined in the present work come from 2 localities, No. 7 and 13, and do not differ in any significant respects from those described previously.

**Porozetes polygonalis** Hammer ssp. **quadrilobatus** Wallwork

This small sized ceratozetid (it is only slightly larger than *S. bidens*), a subspecific variant of a form originally described from Tierra del Fuego (Hammer 1962), was originally described from South Georgia (Wallwork 1966), and is easily distinguished from the other ceratozetids in this fauna by its strongly developed translamella. It occurs in samples from localities No. 4, 10 and 25 in the present study.

Family PARAKALUMMIDAE

**Sandenia georgiae** (Oudms.)

This is the only galumnoid mite present in the South Georgia fauna, according to all available records, and it is readily identified by the presence of large, hinged pteromorphs and flattened, blade-like prodorsal lamellae; a redescription has been given by Wallwork (1966). The species was encountered in only 1 sample examined in the present work, namely the composite No. 25 from "unknown sources".

DISCUSSION

It is proposed to postpone a detailed analysis of the zoogeographical significance of the South Georgia Cryptostigmata fauna until work on the collections, of which this report is only a part, has been completed. However, it is worth noting that, of the 4 new species described above, *Trimalaconothrus flagelliformis* and *Oppia scotiae* evidently have their strongest affinities with the South American fauna. *Halozetes littoralis* is an addition to the subantarctic podacarid element of the South Georgia fauna, and *Antarcticola georgiae* may provide a link with the impoverished fauna of continental Antarctica. The latter element has not been recorded in the South Georgia fauna previously. Further, the record of *Alaskozetes antarcticus*, represented by the subspecies which occurs on Bouvet I. and South Sandwich Is., but which differs from that occurring in the Peninsula region, suggests some degree of isolation of the subantarctic fauna from that of the Maritime Antarctic.

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