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NOTES ON *NANORCHESTES*
II. Four species from Victoria Land, Antarctica (Acari: Nanorchestidae)[1]

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Abstract. *Nanorchestes antarcticus, N. bellus,* and *N. lalae,* n. sp., are widespread, abundant, and sympatric throughout their range in Victoria Land. A 4th species, *N. brekkeristae,* is less common and in Victoria Land has been recorded only at latitude 84°S.

Strandtmann, in Womersley & Strandtmann (1963), described *Nanorchestes antarcticus* from specimens collected on Observation Hill, Ross I, in South Victoria Land, Antarctica. Subsequently, Strandtmann (1967: 472) stated that specimens of *Nanorchestes* found on Palmer Peninsula are probably also *N. antarcticus,* in spite of some differences that were noted.

Since then, new taxonomic characters have been found (Strandtmann 1981) making it possible to more sharply define the species. A restudy of old and new material from Palmer Peninsula, Victoria Land, and other areas of Antarctica, utilizing the new characters, shows that the Palmer Peninsula material represents 2 undescribed species (to be described in a subsequent paper) and that in Victoria Land there are not 1, but 4 species. These latter are the subject of this paper.

K. L. Lindsay (1972), in her fine paper on a taxonomic description of the instars of *Nanorchestes antarcticus,* mentions on page 500 (ibid) that a flap of cuticle between setal bases *nf* is convex but in mounted specimens frequently ruptures and appears as 2 winglike structures, 1 over each *na/nf* base. This is the so-called naso and it is either entire or cleft. If entire it may be convex, truncate, or emarginate, but whatever its outline, it rarely, if ever, splits on mounting. It seems obvious that Lindsay had at least 2 species for her study, 1 with a split naso and 1 with the naso entire.

The holotype of *N. antarcticus* (which has a divided naso) has 10 setae on tarsus III and 2 on femur II. Hence, the leg chaetotaxy Lindsay (1972) shows (p. 596, 597, 598) is correct for *N. antarcticus,* but the larva figured (p. 601) shows a convex naso and is *N. bellus.*

A study of the Bishop Museum collection (BISHOP) of approximately 200 specimens from various parts of Victoria Land indicates that at least 3 species of *Nanorchestes* are sympatric in the region, as follows: *Nanorchestes antarcticus* Strandtmann, with a divided naso, cheliceral seta with 2 essentially equal branches, tarsus III with 10 setae,

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femur II with 2 setae, femur IV with 3 setae; *Nanorchestes bellus* Strandtmann & Sømme with entire, convex naso, cheliceral seta with 1 branch much longer than the other, tarsus III with 8, femur II with 3 and femur IV with 2 setae; and *Nanorchestes lalae,* n. sp., with naso entire and emarginate, cheliceral seta as in *bellus* but cheliceral shears much longer, palpal claw borne on a very prominent tubercle, tarsus III with 8, femur II with 3, and femur IV with 3 setae.

A 4th species, *N. brekkeristae* Strandtmann & Sømme, is apparently much more restricted in distribution, having been collected in Victoria Land south of latitude 84°S. It differs from the above 3 by having much coarser body striations and the cheliceral seta unbranched.

The following symbols are used in the descriptions and illustrations: *acs,* anterior cheliceral seta; *cs,* cheliceral seta; *lab,* labrum; *pcs* 2, palp coxal seta 2; *epi,* epistome; *naso,* naso; *na, nb, ne, nm, nr,* setae and sensillae of the dorsal sensory quadrat; *o,* ocellus; *op,* ocular plate; *ia,* inner adoral seta; *oa,* outer adoral seta; *rut,* rutellum.

DESCRIPTIONS OF SPECIES

Nanorchestes antarcticus Strandtmann, 1963 Fig. 1–4

Diagnosis. Naso deeply cleft. Setae *nm* and *nr* about equally long and thick. Cheliceral seta bifurcate, branches subequal. Tarsus III with 10 setae, femur II with 2, and femur IV with 3 setae.

All measurements in micrometres. Average length 240. ♂ 230, ♀ 250, tritonymph 220–230. *Dorsum.* Naso deeply cleft. Seta *na* 42 with short, close cilia over most of its length. Sensillum *nb* 38, slender, seldom angulate, with ciliation longer but more sparse than on *na.* A small, striated, cuticular flap at base of *nb.* Setae *nm* and *nr* of equal length and thickness, ca. 20. Seta *ne* 10, slender, on a tubercle. Distance between bases of setae *na* greater than between *na* and *nb,* about 20 and 13, respectively. Body setae numerous, branched, 6–8. *Gnathosoma.* Cheliceral seta bifurcate, anterior arm 20, posterior 15; ciliation on both arms similar, moderately long. Basal palp coxal seta (*pcs*2) furcate. *Legs.* Tarsus I and II each with a small, thornlike, middorsal famulus. Tarsus I with 3 serpentine lines of which the anterior is longest and curves anteriorly. Middorsal line short, extending from base of segment to famulus. Tarsus II with 1 line, middorsal, and slightly swollen apically. Leg chaetotaxy: I, 18-6-5-4+2; II, 11-5-4-2; III, 10-3-3-3; IV, 11-3-3-2+1.

Specimens examined. About 110 specimens, as follows: ANTARCTICA: VICTORIA LAND (in order of degrees, beginning with the northernmost record). Balleny Is: Sabrina I: 66°53′S–163°19′E, 1♂, 2♀, 2N, 9.III.1964, E. Schofield; 1♀, 3.II.1965, J. Schoup. Riddly Beach at Cape Adare, 71°17′S–174°14′E, 1 specimen, 25.I.1964, Shoup. Red Castle Ridge, 72°26′S–169°57′E, 1♂, 460 m, 13.XI.1964, K.A.J. Wise. Felsite I, 72°26′S–169°49′E, 1♀, 1963–64 season, J.L. Gressitt. Lizard's Foot, 77°13′S–162°58′E, 1♂, 3♀, 1N, 28.I.1964, Wise. Ross I: Caughley Beach, 77°14′S–166°25′E, 1♀, 26.I.1964, A.V. Spain. Ross I: Rocky Point, 77°14′S–163°26′E, 3♂, 2♀, 26.I.1964, Wise. Spike Cape, 77°18′S–163°43′E, 1♂, 12.II.1964, Wise. Marble Point, 77°26′S–163°50′E, 1 specimen, 14.XII.1963, Wise. King Pin (a nunatak), 77°27′S–163°12′E, 1♂, 1N, 28.I.1964, Spain. Mt Coleman, 77°32′S–162°23′E, 1♂, 1♀, 914 m, 28.I.1964, Wise. Ross I: Cape Royds, 77°33′S–166°09′E, 1♂, 4♀, 1N, 20.I.1964, Wise & Spain; 2♂, 3♀, 1TN, 27.XII.1977, R.W. Strandtmann. Ross I: Turk's Head, 77°40′S–166°46′E, 4♂, 4♀, 2TN, 152 m, 26.I.1964, Spain. Ross I: Cape MacKay, 77°42′S–168°30′E, 1♂, 4♀, 24.I.1964, Wise & Spain. The Strand Moraines, 77°45′S–164°31′E, 1♂, 3♀, 29.I.1964, Wise & Spain. Ross I: Crater Hill, 77°50′S–166°43′E, 4♂, 3♀, 3N, 18–27.I.1964, Wise

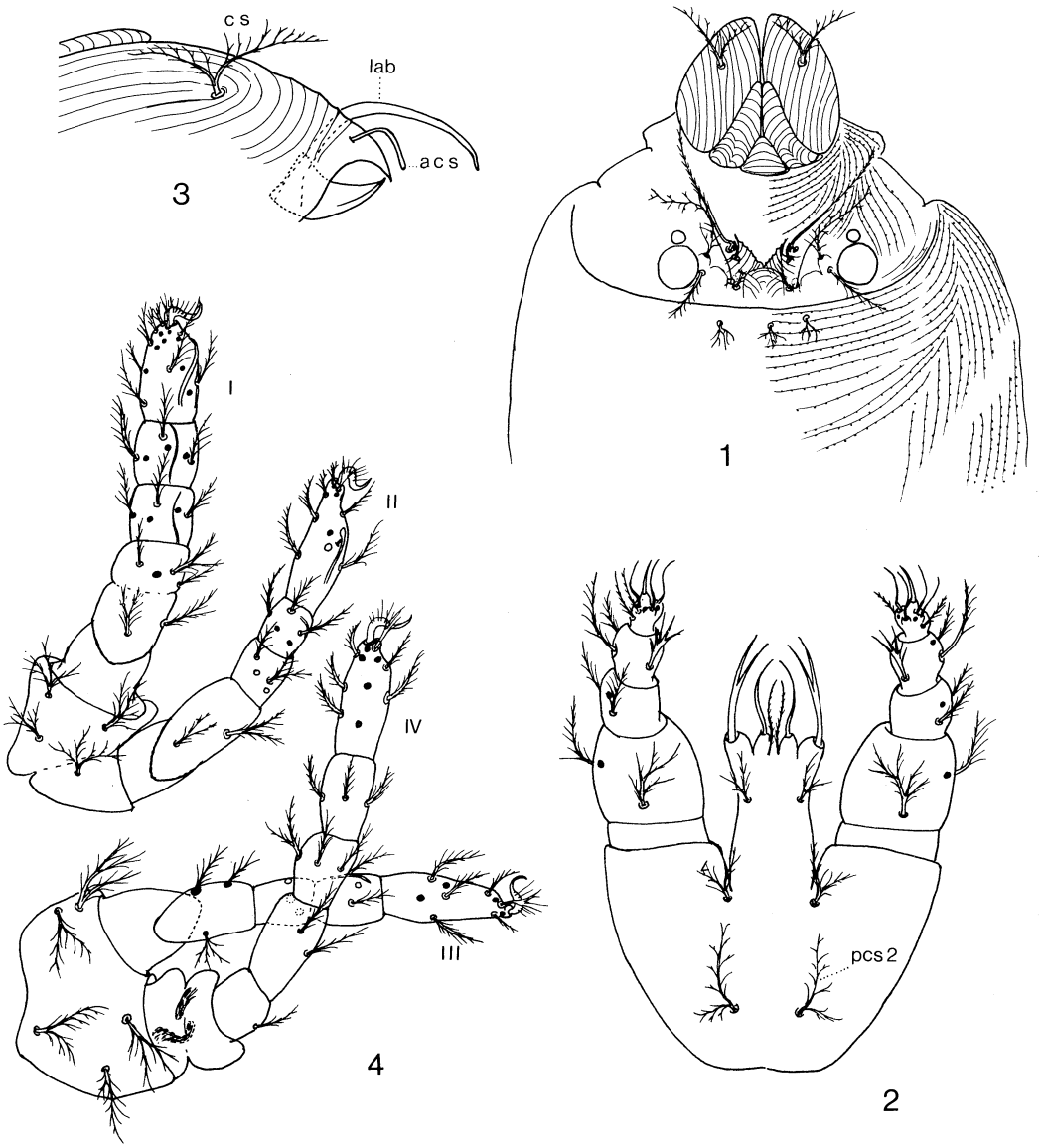

FIG. 1–4. *Nanorchestes antarcticus:* **1,** prodorsum; **2,** ventral view of gnathosoma; **3,** side view of chelicera; **4,** legs I–IV, ventral aspect.

& Spain. Blue Glacier, 77°51′S–164°10′E, 1♂, 2♀, 1TN, 18.XII.1963, Gressitt; 2♂, 1♀, 29.I.1964, Wise. Ross I: Observation Hill, 77°51′S–166°41′E, 1♂, 5♀ (including the holotype ♀, Bishop Museum 3427), 1N, 20.XII.1963, Gressitt; 1♂, 1♀, 1TN, 25.XII.1977, Strandtmann. Lake Péwé, 77°57′S–164°17′E, 2♂, 7.II.1964, Wise.

Specimens examined from outside of Victoria Land. About 17 specimens. QUEEN MAUD LAND (ca. 30°W–30°E) (not to be confused with Queen Maud Mts). Brekkerista, 72°14′S–0°18′W, 1♂, 1♀, 1150 m,

in lichens, 24.I.1971, J. Ansgard (reported in Strandtmann & Sømme 1977: 145). Tvora, 72°10′S–0°05′W, 1♀, 1200 m, 2.I.1971, Ansgard (ibid). Tverrnipa, 72°15′S–1°19′E, 1♀, 1700 m, 4.I.1971, Ansgard (ibid). Dvergen Hill, 72°13′S–0°47′E, 2♂, 1500 m, 11.I.1971, Ansgard (ibid). WILKES LAND (ca. 60°E–150°E). Mawson Escarpment, 72°30′S–68°43′E, 2♀, 1DN, I.1972, J. Manning. Vestfold Hills, Davis Station, 66°43′S–77°83′E, as reported by Rounsevell (1977). Mirnyy Base, ca. 66°S–93°E, 5♂, 22–25.XII.1962, M. Pryor. Casey Station, 66°17′S–110°33′E, 2♂, 1♀, 1DN, 28.XII.1975, D.E. Rounsevell.

Comments. As can be seen from the foregoing distribution, *N. antarcticus* is widespread in eastern Antarctica. It may occur also in western Antarctica, but thus far I have no records from there. Those specimens from the Antarctic Peninsula that I had previously assigned to *N. antarcticus* (Strandtmann 1967) actually are an undescribed species, which will be described in a future paper. The species from Marie Byrd Land, *N. wilbanksi* Strandtmann (1981), is quite similar to *N. antarcticus,* being the only other species to have 10 setae on tarsus III, but the 2 forms differ consistently in the number of setae on femur II; *N. antarcticus* has 2 and *N. wilbanksi* 3.

Ecology. D. E. Rounsevell (1977) worked on the biology and ecology of *N. antarcticus* at Davis Station (66°34′S–77°83′E) in the Vestfold Hills, Wilkes Land, Antarctica. His findings indicate that, at least in that area, 1) *N. antarcticus* was abundant, with no other species of Arthropoda occupying the study site; 2) it was active from October to March, when the ground temperature exceeded 0 °C; 3) from April to September it was immobile in lower layers of sand, which contained less than 0.5% water; 4) eggs were laid as early as November in sand up to 4 cm deep; 5) no predators, competitors, parasites, or diseases occurred at the study site, and the major cause of mortality apparently was dehydration.

Fitzsimmons (1971), using specimens collected at Marble Point, found *N. antarcticus* could survive temperatures from −23 °C to +31 °C, but temperatures below −41 °C and above +37.2 °C were lethal.

Nanorchestes bellus Strandtmann & Sømme, 1977 Fig. 5–11

Diagnosis. Naso entire, narrow, convex. Distance between setae *na* less than between *na* and *nb.* Cheliceral seta with 2 unequal branches.

All measurements in micrometres. Average length of ♂ 260; ♀ 250; tritonymph 220. *Dorsum.* Naso entire, with convex anterior margin. Setae *na* relatively short, from 32 to 38, with short, close cilia on apical ½. Sensillae *nb* from 30 to 35, straight, nearly as thick as *na* with fairly long, fairly dense, branched cilia. Setae *nm* 12–18; *nr* 15–18; *ne* 7–10. Distance between bases of setae *na* averages 10, between base of *na* and base of *nb* averages 15. Body setae about 7, branched treelike from base. *Gnathosoma.* Chelicerae relatively short, ca. 35 long. Cheliceral seta with 2 unequal arms, the longer ca. 15, the shorter 6–8. Both arms with moderately long, branched cilia. Basal palp coxal seta bifurcate and loosely plumose. *Legs.* Moderately long and moderately slender. Tarsus III has 8 setae, femur IV 2 setae. Empodial claws with 5–6 rays each side. Chaetotaxy: I, 18?-6-5-4+2; II, 11-5-4-3; III, 8-3-3-3; IV, 11-3-3-1+1.

Specimens examined. About 38 specimens, as follows: ANTARCTICA: VICTORIA LAND (in order of degrees north to south). Felsite I, 72°26′S–169°49′E, 15 specimens, 400 m, 1963–64 season, J.L. Gressitt. Granite Harbor, The Flatiron, 77°01′S–162°23′E, 1♀, 13.II.1964, bare soil, K.A.J. Wise. Marble Point,

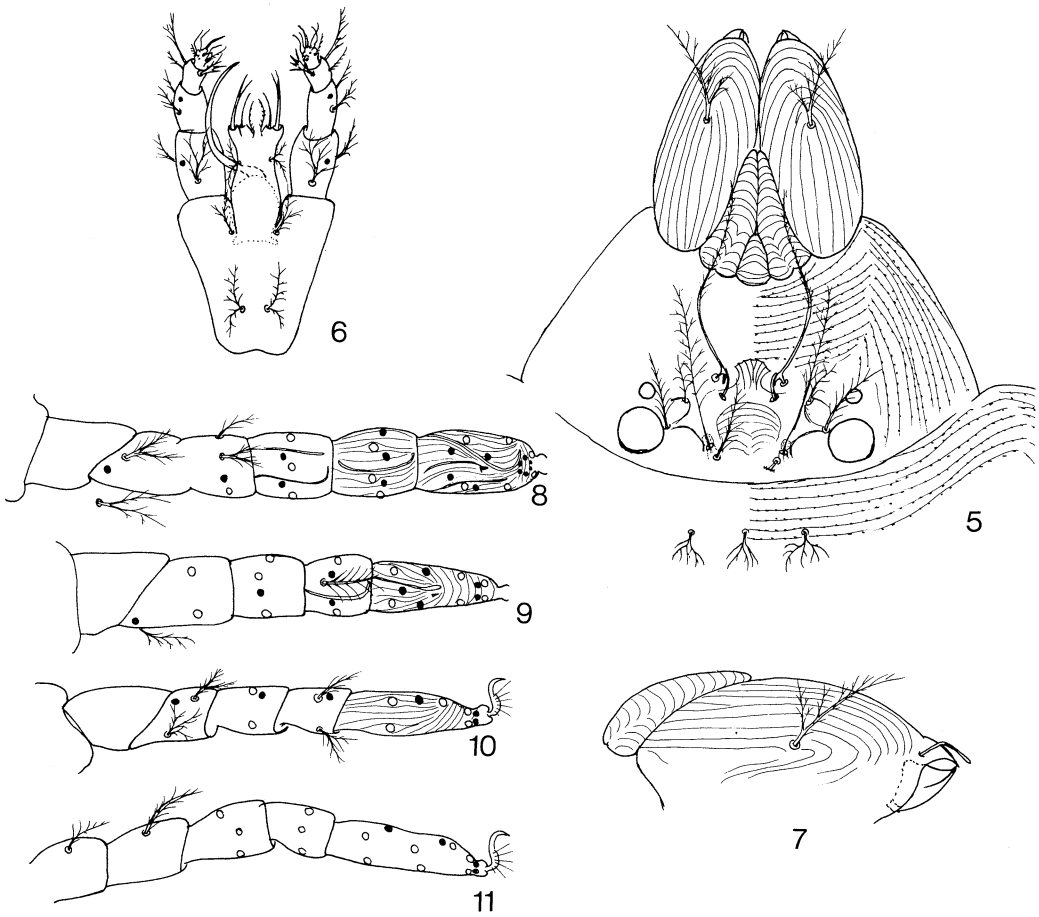

FIG. 5–11. *Nanorchestes bellus:* **5,** prodorsum; **6,** ventral view of gnathosoma; **7,** side view of chelicera; **8,** leg I, dorsal view; **9,** leg II, dorsal view; **10,** leg III, side view; **11,** leg IV, side view.

77°26′S–163°50′E, 1♂, 27.I.1964, A. Spain. Ross I: Cape Royds, 77°33′S–166°09′E, 3♂, 1♀, 1TN, 27.XII.1977, R.W. Strandtmann. Ross I: Dreadnought Cone (position not given), 1♂, 1♀, under stones, 55 m, 21.I.1964, Wise. Butter Point, 77°39′S–164°13′E, 1♂, 1TN, 366 m, 28.I.1964, Wise. Ross I: Hut Point Peninsula, 77°43′S–166°53′E, 1♂, 100 m, 26.I.1964, Spain. Ross I: Crater Hill, 77°50′S–166°43′E, 1♀, 320 m, 18.I.1964, Wise. Ross I: Observation Hill, 77°51′S–166°41′E, 2♀, 1TN, 25.XII.1977, Strandtmann. Lake Péwé, 77°57′S–164°17′E, 1♀, 7.II.1964, Wise. Brown Peninsula, 78°05′S–165°33′E, 1♂, 2♀, 6.XII.1964, Gressitt. Miers Valley, 78°07′S–164°10′E, 1N, 220 m, 3.XII.1964, Gressitt. Lake Penny, 78°16′S–163°12′E, 2♀, 26.XII.1963, Fearon & Gressitt (Note. These 2 specimens had been designated as paratypes of *N. antarcticus*; they are in the Bishop Museum collection).

Specimens examined from outside of Victoria Land. 19 specimens. QUEEN MAUD LAND: Tvora, Sverdrupfjella, 72°10′S–0°05′W, 1♂ (paratype), 25.XII.1971. ENDERBY LAND: Cape Bruce, 67°25′S–60°47′E, 1♀, 2.II.1975, D.E. Rounsevell. WILKES LAND: Davis Station, 68°35′S–77°58′E, 8♂, 7♀, 2.I.1974, Rounsevell. SUBANTARCTIC IS: Macquarie, 54°30′S–158°57′E, 1♀, 11.III.1975; 1♀, 6.I.1976, Rounsevell.

Comments. Although not as abundant as *N. antarcticus, N. bellus* Strandtmann & Sømme has essentially the same range as the former. It has not been found as far south, but it extends much farther north, having been found on Macquarie at latitude 54°S.

Nanorchestes bellus was originally described from 2 specimens (1 ♂, 1 ♀) from Queen Maud Land: Sverdrupfjella, Tvora, 72°10′S–0°05′W.

Nanorchestes lalae Strandtmann, **new species** Fig. 12–21

Nanorchestes antarcticus Strandtmann, 1967, in part (variant No. 2, p. 77, fig. 14d, e).

Diagnosis. Tubercle of palp tarsus prominent, as long as segment; cheliceral shears ca. 18 μm long. Empodial claw with 8–10 rays each side.

All measurements in micrometres. Length of adult about 275 (250–310); tritonymph 240, deutonymph 200. *Dorsum.* Naso entire, emarginate, about 10 wide. Seta *na* 40, with short, close cilia on apical ½. Sensillum *nb* about 40, slender, with moderately long, branched cilia. Seta *nm* 12, *nr* 18, *ne* 9. Seta *ne* loosely plumose. Body setae branched from base, about 10 long. *Gnathosoma.* Cheliceral seta unequally bifurcate, longer arm from 20 to 30, shorter from 10 to 13. Both arms with branched cilia of moderate and rather uniform length. Basal palp coxal seta not furcate, about 12–15 long. Rutellum 15–20 long, forked at about middle, each tine bifurcate at tip. Palp tarsal claw on a prominent, cone-shaped tubercle, tubercle as long as palp tarsus. Cheliceral shears about 18 long, longer and more slender than in *antarcticus* and *bellus*. *Legs.* Tarsus III with 8 setae; femur IV, 3 setae. Chaetotaxy: I, 17(?)-6-5-4+2; II, 11-5-4-3; III, 8-3-3-3; IV, 11-3-3-2+1. Empodial claw with 9–10 rays each side.

Tritonymph. One femur IV, 3+1 setae, the other 2+1. Otherwise as adult.

Deutonymph. Femur IV, 2+1; femur II, 3 setae. No other setal counts were possible. Seta *na* 35; sensillum *nb* 35, *nm* 10, *nr* 15. Otherwise as adult.

Holotype ♂, ANTARCTICA: VICTORIA LAND: Granite Harbor, 76°53′S–162°44′E, 13.II.1964, by flotation from bare soil, K.A.J. Wise (BISHOP 11,911). Paratypes: VICTORIA LAND: 2♂, 2♀, 2TN, same data as holotype. Same locality as holotype, 2♂, under black rocks, 200 m, 16.XII.1963, J.L. Gressitt; 2♂, 1♀, under stones at The Flatiron, 15.I.1964, K.A.J. Wise.

Nontype specimens examined. About 30 specimens. VICTORIA LAND: Edisto Inlet, 72°20′S–170°05′E, 1 specimen, 19.II.1964, on feather bolus, Wise; Coulman, 73°27′S–169°40′E, 1♀, under black rock, 2050 m, Gressitt; Franklin, 76°05′S–168°11′E, 2♀, ex *Prassiola* nr running water, 13.I.1965; Mt Murray, Mawson Glacier, 76°10′S–161°50′E, 1♂, 30.I.1964, A.V. Spain; Marble Point, 77°26′S–163°50′E, 1♀, 1 sex undetermined, 12.II.1964, by flotation from under stone, Wise; Ross I: Cape Crozier, 77°31′S–169°23′E, 1♂, 2♀, S side of cape, 305 m, 25.I.1964, Wise; Mt Coleman, 77°32′S–162°23′E, 1♂, 914 m, 28.I.1964, Wise; Ross I: Hut Point Peninsula, 77°43′S–166°53′E, 1♀, top of Descent Cliffs, 100 m, 26.I.1964, Wise; Ross I: Castle Rock, 77°49′S–166°39′E, 1♂, under stones at Arrival Heights, 244 m, ?date, Wise; Ross I: Crater Hill, 77°50′S–166°43′E, 1♂, 1♀, 2 undetermined, 18 m and 270 m, 18.I.1964, Wise; Blue Glacier, 77°51′S–164°10′E, 1 specimen, ex soil and moss, 29.I.1964, Wise; Ross I: Observation Hill, 77°51′S–166°41′E, 2♂, 1♀, ex moss and soil on NE side, 100 m, 18.I.1964, Wise; Lake Péwé, 77°57′S–164°17′E, 1♀, 1N, 23.XII.1964, Shoup & Borchholder; White I, 78°08′S–167°20′E, 1♂, 1♀, 220 m, 3.XII.1964, Gressitt; Lake Penny, 78°16′S–163°12′E, 1♀, under stones with Collembola, 8.II.1964, Wise; Minna Bluff, 78°32′S–166°30′E, 1TN, 70 m, 3.XII.1964, Gressitt, Beatty; Massam Glacier, Shackleton Glacier area, 84°40′S–175°W, 1♀, 15.XII.1964, J. Shoup.

Specimens examined outside of Victoria Land. 3 specimens. ENDERBY LAND: Lake Lorna, 67°47′S–62°47′E, 1♂, 1TN, 1DN, 15.II.1975, D.E. Rounsevell.

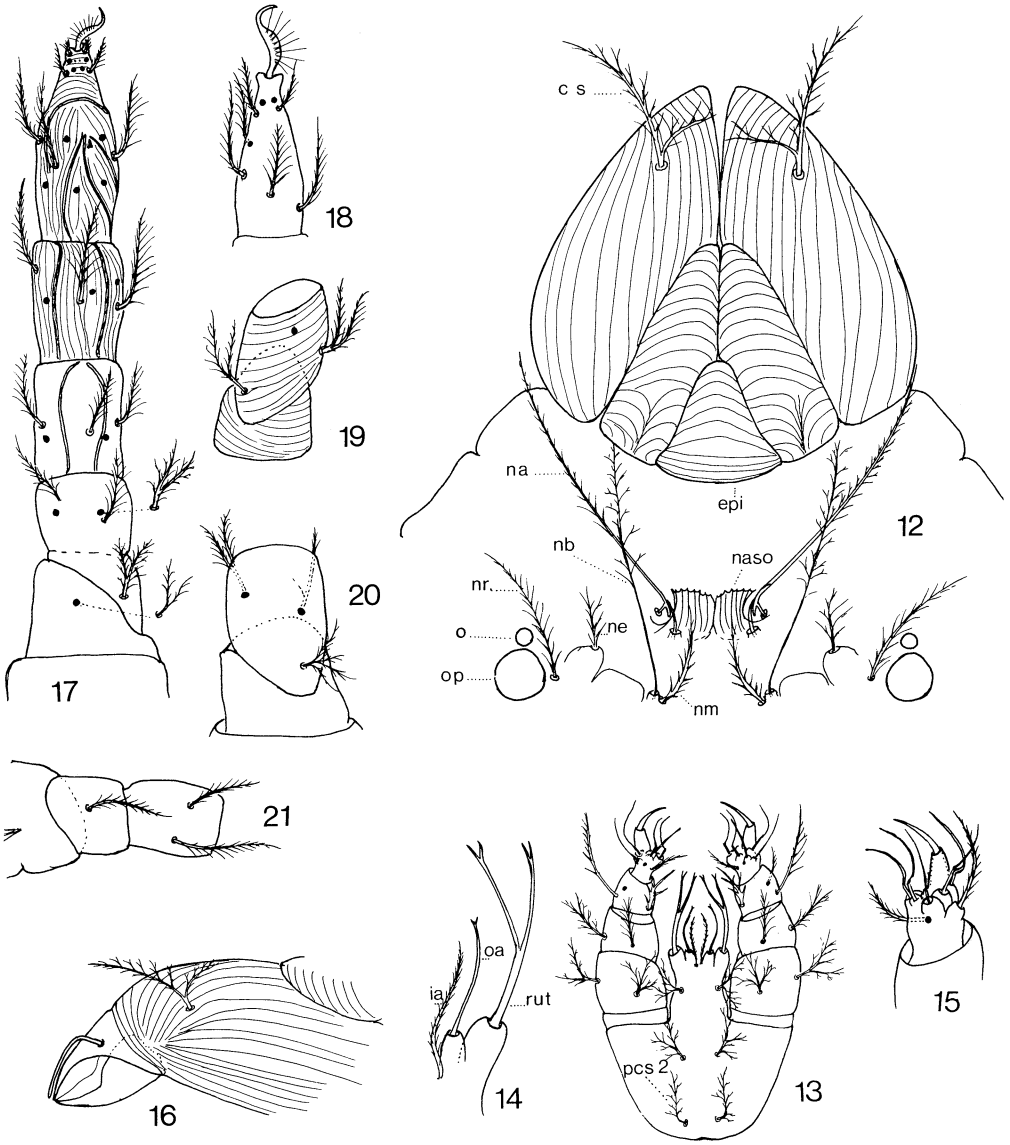

FIG. 12–21. *Nanorchestes lalae:* **12,** prodorsum, showing sensory area, epistome, and chelicerae; **13,** gnathosoma, ventral aspect; **14,** enlarged view of rutellum and inner and outer adoral setae; **15,** palp tarsus; **16,** chelicera; **17,** leg I, dorsal aspect; **18,** tarsus III; **19,** femur and trochanter II; **20,** femur and trochanter III; **21,** femur IV.

Disposition of types. The holotype and several paratypes are with the Bishop Museum, Honolulu, Hawaii. Paratypes are in the Institute of Acarology, Ohio State University, Columbus, Ohio and the U.S. Department of Agriculture, Systematic Entomology Lab, Beltsville, Maryland.

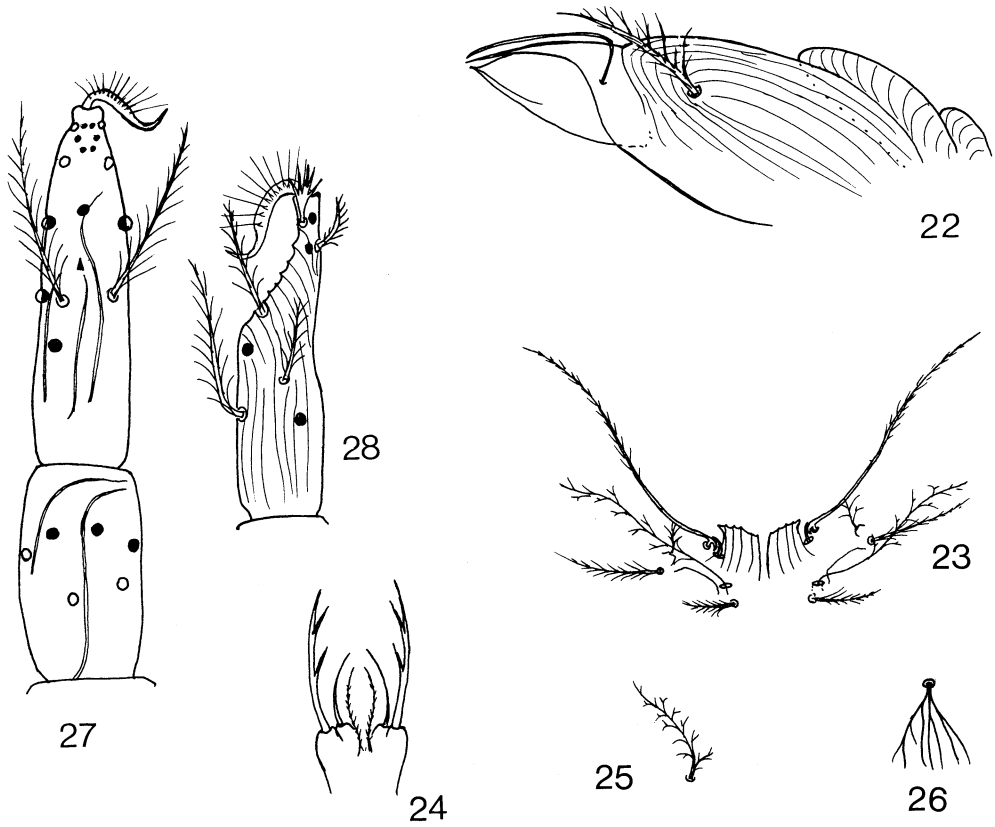

FIG. 22–28. *Nanorchestes brekkeristae:* **22,** side view of chelicera; **23,** naso and sensory setae; **24,** rutella and adoral setae; **25,** basal palp coxal seta; **26,** a dorsal body seta; **27,** tarsus and tibia I, dorsal aspect; **28,** tarsus III, side view.

Comments. Nanorchestes lalae is the variant No. 2 of *Nanorchestes antarcticus,* from Granite Harbor, mentioned in Strandtmann (1967:77, fig. 14 d, e). It is abundant in Victoria Land, where it is sympatric with *antarcticus* and *bellus,* but it seems not to be as common outside of Victoria Land as the last 2. The species is named for Graciela Hansen Strandtmann, of Kailua, Hawaii, in whom the spirit of Aloha is truly personified.

Nanorchestes brekkeristae Strandtmann & Sømme, 1977 Fig. 22–28

Diagnosis. Naso cleft, cheliceral seta unbranched, cheliceral shears very long (40–45 μm), empodial claw with 10–12 rays each side.

All measurements in micrometres. A large, coarsely striate species. Average length 300. *Dorsum.* Naso deeply cleft and coarsely striate. Seta *na* 75 long with short, close ciliation. Sensillum *nb* 55, with sparse, short, branched cilia. Body setae 10–15 long, branched. *Legs.* Coarsely striate. Empodial claws rather long, with 10–12 rays each side basally. The setae of

tarsus I are difficult to count, but there are apparently 18 rather than 16 as stated in the original description (ibid). Tarsus III with 8 or 9 setae. Leg chaetotaxy: I, 18?-6-5-4+2; II, 11-5-4-3; III, 8 or 9-3-3-3; IV, 11-3-3-2+1.

Specimens examined. 3 specimens. ANTARCTICA: VICTORIA LAND: 1♀, Beardmore Glacier, 84°00′S–171°00′E, 12.XII.1959, C.N. Tyndale-Biscoe; 1♂, Shackleton Glacier area, 84°35′S–173°50′W, ex moss and soil, 30.XII.1964, V. McGregor; 1♀, Massam Glacier area, 84°40′S–175°00′W, in soil, E side, 457 m, 15.XII.1964, Shoup. (All in the Bishop Museum collection.)

Comments. N. brekkeristae was originally described from specimens collected by J. Angar at Sverdrupfjella, Queen Maud Land, approximately 72°S–18°W, on the opposite side of the Pole from the Beardmore Glacier area in the Queen Maud Range.

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