

## ***Halearcturus*, a new genus of Antarcturidae Poore, 2001 (Crustacea: Isopoda: Valvifera) with a key to genera of the family**

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### **Abstract**

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A new genus *Halearcturus* is erected for a single species, *Arcturus serrulatus* Whitelegge, 1904. It differs from all other antarcturid genera in the combination of having an antennal flagellum of one major article plus a short curved tapering article (all other genera have either three or four articles, or about nine, plus a terminal one) and is unusual in lacking a uropodal exopod. *Halearcturus* has unique complex ornamentation; it lacks both a strong medial posterior spine and a pair of prominent sublateral spines on the pleotelson, typical of other antarcturids. The genus has a single species from south-eastern Australia. A key to genera of Antarcturidae is presented.

### **Keywords**

Crustacea; Isopoda; Valvifera; Antarcturidae; *Halearcturus*; new genus; key

### **Introduction**

The family Antarcturidae Poore, 2001 includes over 120 species, many presently or formerly included in the genus *Antarcturus* zur Strassen, 1902 (Schotte et al., 2008 onwards). Brandt (1990) revised *Antarcturus*, erecting five similar new genera. The number of genera in Antarcturidae has grown since then to eighteen. Nevertheless, generic differentiation remains problematic. No phylogeny exists, the characters used to differentiate genera remain unclear, several species are difficult to place, several species are undescribed (especially in southern Australia), and nomenclatural issues remain.

Compounding the problems are 41 species that have been described or included later in the genus '*Microarcturus* Nordenstam, 1933'. This name is a nomen nudum (Poore, 2001). Poore (2003) allocated most of these to other genera in Antarcturidae Poore, 2001, Austrarcturellidae Poore and Bardsley, 1992, Holidoteidae Wägele, 1989, or Pseudidotheidae Ohlin, 1901 but two were said to belong to new genera. This contribution deals with one of these by erecting a new monotypic genus.

*Arcturus serrulatus* Whitelegge, 1904 is an easily recognised southern Australian species on account of its unique decoration of prominent plate-like projections. It was included in *Antarcturus* by Stebbing (1908) and placed in *Microarcturus* by Nordenstam (1933). The species was redescribed and illustrated more fully by Hale (1946) but remains in taxonomic limbo. This opportunity is taken to present an interim key to genera currently included in

Antarcturidae. The most recent key dealt with only few Antarctic genera in the context of the arcturid subfamily Arcturinae (Wägele, 1991).

Material is deposited in the Australian Museum, Sydney (AM) and Museum Victoria, Melbourne (NMV).

### **Key to genera of Antarcturidae Poore, 2001**

1. Pereopods 2–4 bearing few well spaced straight stiff setae along flexor margins of carpus to propodus; body and limbs covered with fine short setae ..... 2
  - Pereopods 2–4 bearing numerous closely and regularly spaced fine 'filter setae' along flexor margins of at least merus to propodus; body and limbs smooth ..... 3
2. Pereonal and pleonal segments each with pair of dorsolateral spines of similar lengths; eyes unpigmented ..  
..... *Thermoarcturus* Paul & Menzies, 1971
  - Pleotelson with 1 pair of dorsolateral spines much longer than others; eyes pigmented .....  
..... *Spinarcturus* Kensley, 1978
3. Antenna flagellum of 9 or more short articles ..... 4
  - Antenna flagellum of 4 or fewer short articles ..... 9
4. Pleonite 1 free from remaining segments of pleotelson ..... 5
  - Pleonite 1 fused to remaining segments of pleotelson ..... 7

5. Pleonites 5 and 6 with middorsal spines .....  
 ..... *Marmachus* Poore, 2012
- Pleonites without middorsal spines ..... 6
6. Head without pair of spines between eyes, pereon and pleon without submedian, sublateral and supracoxal spines; pleotelson without prominent medial posterior spine dorsal to margin .....  
 ..... *Furcarcturus* Baltzer, Held and Wägele, 2000
- Head with pair of spines between eyes, pereon and pleon with pairs of submedian, sublateral and supracoxal spines; pleotelson with prominent medial posterior spine dorsal to margin ..... *Oxyarcturus* Brandt, 1990
7. Pleotelson with paired submedian spines or tubercles, with marginal lateral spines .....  
 ..... *Antarcturus* zur Strassen, 1902
- Pleotelson without paired submedian spines or tubercles, without marginal lateral spines ..... 8
8. Head without pair of submedian spines between eyes; pereonites without middorsal, sublateral or supracoxal spines (tubercles at most) ..... *Litarcturus* Brandt, 1990
- Head with pair of submedian spines between eyes; pereonites with sublateral and supracoxal mushroom-like tubercles; pereonites 1–4 with middorsal tubercles on posterior margins ..... *Tuberarcturus* Brandt, 1990
9. Pleonites without middorsal spines ..... 10
- One or more pleonites with middorsal spines or tubercles ..... 17
10. Head with pair of submedian spines ..... 11
- Head without pair of submedian spines ..... 15
11. Eyes absent ..... 12
- Eyes present, pigmented ..... 13
12. Pereonites with paired submedian and sublateral tubercles; pereopods 2–4 with regular rows of long setae along flexor margins of merus–propodus, unguis setiform .....  
 ..... *Abyssarcturus* Kussakin and Vasina, 1995
- Pereonites without paired submedian and sublateral spines; pereopods 2–4 with regular rows of long setae along flexor margins of merus–dactylus, unguis short, curved ..... *Glaberarcturus* Kussakin and Vasina 1998
13. Pleotelson with paired submedian and lateral spines, with prominent paired posterior sublateral spines .....  
 ..... *Fissarcturus* Brandt, 1990
- Pleotelson with prominent medial posterior spine dorsal to margin or apex prominently produced ..... 14
14. Pereopods 2–4 with regular rows of long setae along flexor margins of merus–propodus .....  
 ..... *Acantharcturus* Schultz, 1981
- Pereopods 2–4 with regular rows of long setae along flexor margins of merus–dactylus .....  
 ..... *Chaetarcturus* Brandt, 1990
15. Pleotelson without pairs of sublateral spines ..... 16
- Pleotelson with prominent pair of sublateral spines near midpoint ..... *Caecarcturus* Schultz, 1981
16. Eyes pigmented; pleotelson dorsal surface convex, not differentiated from lateral margin, with medial spine prominently posteriorly produced .....  
 ..... *Cylindarcturus* Schultz, 1981
- Eyes absent; pleotelson dorsal surface bulbous, differentiated from lateral margin by longitudinal groove, without prominent medial posterior spine .....  
 ..... *Globarcturus* Kussakin and Vasina, 1994
17. Pleotelson with 2 middorsal tubercles near apex, with paired submedian and sublateral spines .....  
 ..... *Hlearcturus* gen. nov.
- Pleonites 2 and 3 with middorsal spine; pleotelson without pairs of submedian and sublateral spines ..... 18
18. All pereonites with paired sublateral tubercles and supracoxal spines; pleotelson with prominent paired posterior sublateral spines; pereopods 2–4 with unguis short, curved ..... *Mixarcturus* Brandt, 1990
- Pereonites without paired sublateral spines or supracoxal spines; pleotelson without prominent paired posterior sublateral spines more dominant than other spines; pereopods 2–4 unguis setiform .....  
 ..... *Pleuropriion* zur Strassen, 1903

#### ***Hlearcturus* gen. nov.**

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*Type species.* *Arcturus serrulatus* Whitelegge, 1904, by monotypy and original designation (masculine).

*Diagnosis.* Body weakly geniculate between pereonites 4 and 5, anterior pereon slightly elevated. Head with pair of submedian spines between eyes; pereonites with supracoxal spines on all pereonites, with paired sublateral tubercles, without paired submedian spines, without middorsal spines; pleonite 1 fused to remaining pleotelson; pleotelson with 2 middorsal tubercles near apex, without paired submedian spines, with pairs of sublateral tubercles, with marginal lateral projections, without prominent paired posterior sublateral spines more dominant than other spines, without prominent medial posterior spine dorsal to margin. Antennal flagellum of 2 articles, first about third as long as peduncle article 5, second quarter length of first. Pereopods 2–4 with regular row of long setae along flexor margins of merus–propodus, second row on mesial face. Pereopods 2–4 unguis short, curved. Pleopod 1 of male exopod groove opening distolaterally on margin, scarcely produced at opening. Pleopod 2 of male, appendix masculina acute, at least 1.5 times as long as endopod. Uropod without exopod.

Oostegites 2–4 supported by ventral coxal processes, largest on pereonite 4; oostegite 5 absent, without ventral coxal processes.

*Etymology.* For Herbert Mathew Hale (1895–1963) whose contributions significantly expanded knowledge of marine isopods in southern Australia, combined with *Arcturus*, a commonly used genus stem.

*Composition.* Type species only.

*Remarks.* Several characters set this genus and its only species apart from other antarcturids. *Halearcturus serrulatus* is unique in the family in having an antennal flagellum of one major article plus a short curved tapering second article; all other genera have either three or four articles, or about nine of similar lengths, plus a terminal one. The genus is unusual in lacking a uropodal exopod but may not be unique in this regard. The exopod is absent also in '*Microarcturus*' *digitatus* Nordenstam, 1933, now accepted as *Mixarcturus digitatus* (Nordenstam, 1933) (Poore, 2003), but not in *M. abnormis* (Kussakin, 1967), type species of the genus. The exopod was said to be absent in *Antarcturus usitatus* Schultz, 1978 although it is present in all other species of the genus.

*Halearcturus* has unique complex ornamentation of plate-like tubercles and lacks both a strong medial posterior spine and a pair of prominent sublateral spines on the pleotelson. *Abyssarcturus* Kussakin & Vasina, 1995, *Globalarcturus* Kussakin & Vasina, 1994 and *Tuberarcturus* Brandt, 1990 (and some members of the loosely defined *Fissarcturus* Brandt, 1990) share this pleotelsonic spination but all three have very different patterns of body ornamentation. *Abyssarcturus* and *Globalarcturus* lack pigmented eyes and have a 4-articled antennal flagellum. *Abyssarcturus* has a setiform unguis on pereopods 2–4. *Tuberarcturus* has middorsal tubercles on the posterior margins of pereonites 1–4 and a 9-articled antennal flagellum. *Spinarcturus* Kensley, 1978 and *Thermoarcturus* Paul & Menzies, 1971 have simple pleotelsonic sculpture but both genera (one species each) are covered with a mat of fine setae and lack the pairs of long 'filter-setae' on pereopods 2–4 (Wägele, 1987) which are usual in Antarcturidae.

### *Halearcturus serrulatus* (Whitelegge, 1904)

Fig. 1

*Arcturus serrulatus* Whitelegge, 1904: 414–416, figs 118a–c.

*Antarcturus serrulatus*.—Stebbing, 1908: 53.

*Microarcturus serrulatus*.—Nordenstam, 1933:128.—Nierstrasz, 1941: 261.—Hale, 1946: 200–202, figs 23, 24.

*Type locality.* Australia, NSW, off Wattamolla [as Wata Mooli], 99–108 m (HMCS *Thetis* stn 57) (type material lost).

*Figured specimens.* Bass Strait, 70 km SW of Cape Otway, 39°26.60'S, 143°6.8'E, 115 m, NMV J8593 (male, 6.7 mm). 8 km S of South East Point, Wilsons Promontory, 39°13.80'S, 146°27.3'E, 65 m, NMV J62821 (ovigerous female, 10.0 mm).

*Other material examined.* NSW, off mouth of Manning River, 31°55'S, 152°52' E, AM P.11752. 25–28 km NE of South Head, Port Jackson, 33°44' S, 151°38'E, AM P.11671. Jervis Bay, 35°3'S, 150°44' E, AM G.940. 22.4 km off Batemans Bay, 35°45'S, 150°30' E, AM P.10715.

Bass Strait, Western Port and E of Tasmania: 43 specimens from Museum Victoria collections (see <http://museumvictoria.com.au/collections-research/our-collections/>).

*Redescription.* Ovigerous female, 10.0 mm. Head front, concave; with pair of anteriorly-directed curved blade-like projection between eyes; pair of tuberculate submedian bosses and pairs of small dorsolateral and lateral lobes on maxillipedal segment. Pereonites 1–4 each with pair of prominent submedian anteriorly-curved, hook-like projections, pair of smaller conical projections near posterior margin, pair of lateral anteriorly-directed projections each with small conical boss on anterior margin (lateral projection small on pereonite 1). Pereonites 5–7 each with pair of lateral flat-topped projections and much smaller cone near posterior margin. Pleonite 1 with pair of lateral posteriorly-directed. Pleonite 2 with pair of strong dorsolateral conical projections and smaller lateral posteriorly-directed cones. Pleonite 3 with low median boss, pair of smaller dorsolateral cones, pair of lateral wings directed posteriorly. Pleonites 4–6 and telson with 4 pairs of submedian conical tubercles, fourth largest, 3 sublateral conical tubercles, second largest, 3 pairs of lateral triangular tubercles, 1 median tubercles in front of apex, and apex with 1 dorsal median tubercle.

Coxa 1 fused to pereonite, with 3 triangular flat lobes. Coxae 2–4 free, each with 2 anterior and 2 posterior triangular flat lobes, the most posterior on pereopod 4 elongated as oostegite support. Coxae 5–7 fused, with lateral flat-topped tubercles and anterior and posterior triangular lobes.

Antennule flagellum blade-like, toothed; flagellum with 8 pairs of aesthetascs + 3 single subdistal aesthetascs. Antennal peduncle articles 2–4 laterally flattened, with teeth on upper margin.

Pereopod 2 basis with 2 teeth each on extensor and flexor margins; merus with small tooth at midpoint and large distal blade-like tooth on extensor margin; carpus with blade-like tooth at midpoint of extensor margin; propodus with 4 small teeth on extensor margin; dactylus with 2 small teeth on extensor margin, with short unguis. Pereopod 3 basis with 3 teeth on extensor and 6 on flexor margins; merus with distal blade-like tooth on extensor margin and small tooth on flexor margin; carpus with 2 blade-like teeth on extensor margin, small spine on flexor margin; propodus and dactylus as in pereopod 2. Pereopod 4 basis with 4 spines on extensor and 10 spines on flexor margin, irregularly arranged; ischium with spines on flexor margin; merus with distal blade-like tooth on extensor margin and small tooth on flexor margin; carpus with 2 blade-like teeth on extensor margin, small spine on flexor margin; propodus and dactylus as in pereopod 2.

Pereopod 5 with 4 tubercles on extensor margin, 3 on flexor margin; ischium irregularly tuberculate; merus and carpus each with 2 robust setae on conical projection on margin; propodus with 5 robust setae on conical projection on margin; dactylus curved. Pereopods 6 and 7 similar, less ornate, bases shorter.

Uropodal peduncle with 2 longitudinal-oblique rows of tubercles, 3 in row next to suture, 5 larger in midline; endopod triangular; exopod absent.

Sternite 8 simple flat, without oostegite.

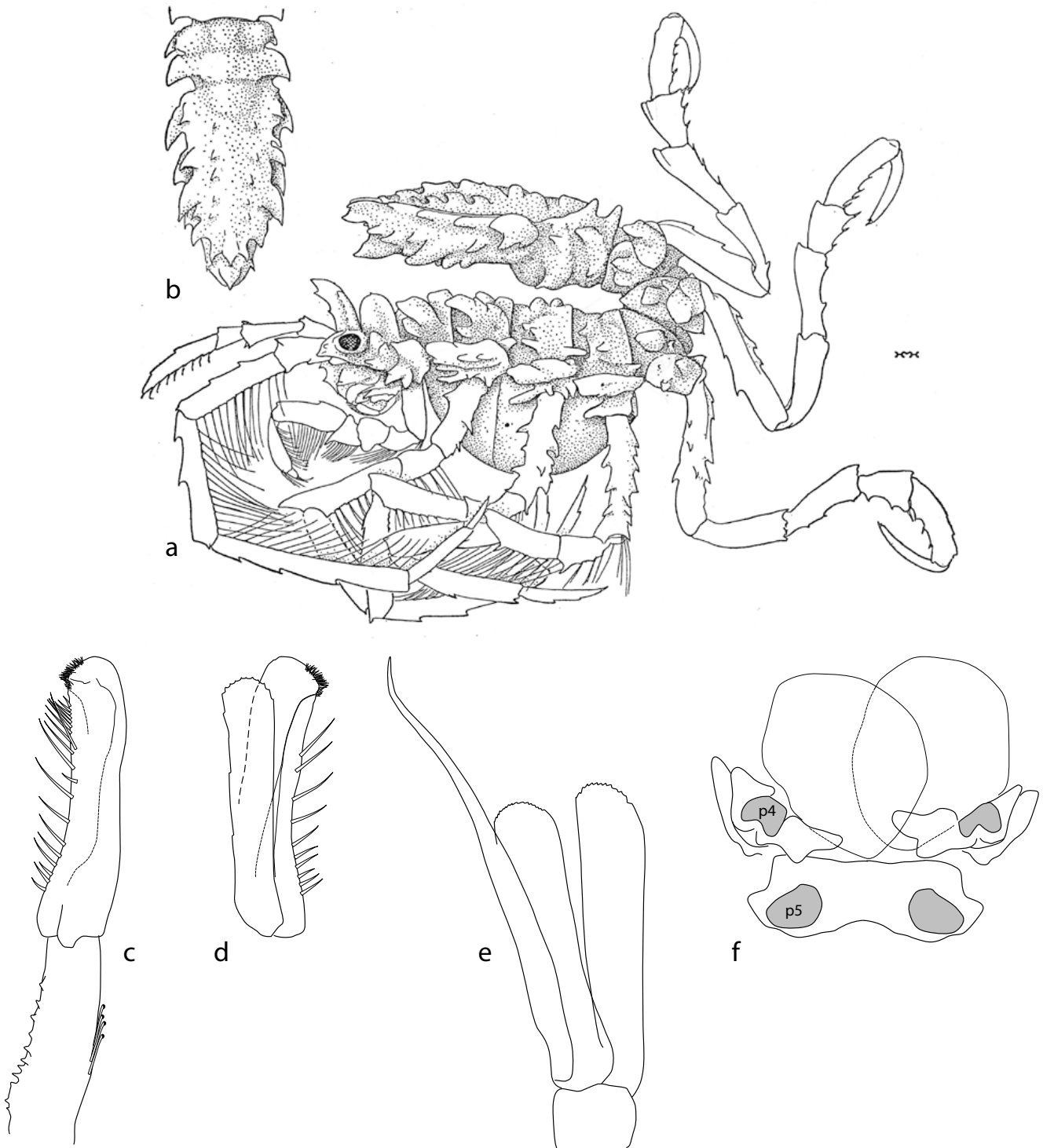


Figure 1. *Halearcturus serrulatus* (Whitelegge, 1904). a, female habitus; b, dorsal view of pleotelson. c, d, left male pleopod 1 in anterior and posterior views. e, left male pleopod 2 in posterior view. f, ventral view of coxae and oostegites of pereopods 4, sternum of pereonite 5 [a, b, reproduced from Hale (1946); c–e, NMV J8593; f, NMV J62821].

Male, 6.7 mm. Body more slender than ovigerous female, as typical of Antarcturidae. Head with pair of blade-like horns between eyes, each with acute tip and small acute point on anterior margin; pair of large submedian hemispherical bosses. Pereonites 2–4 each with pair of sublateral hook-like anteriorly-directed tubercles, pair of small tubercles near posterior lateral margin, pair of lateral marginal flat triangular lobes, directed anteriorly. Pereonites 5–7 each with pair of lateral conical tubercles. Pleonite 1 with pair of small lateral tubercles, with pair of sharp conical tubercles on sternum anterior to pleopods 1. Pleonite 2 with pair of large sublateral tubercles. Pleonite 3 with median boss. Remaining pleotelson with 2 pairs of obsolete submedian tubercles, 3 pairs of sublateral tubercles, second largest, 3 pairs of lateral wings, first largest, 1 median tubercles in front of apex, and apex with 1 dorsal median tubercle.

Coxae 1–4 unarmed. Coxae 5–7 each with obsolete anterior and posterior lateral tubercles.

Pereopod 2 merus with blade-like tooth on extensor margin; carpus with 2 blade-like teeth on extensor margin; propodus with 3 teeth on extensor margin; dactylus with 2 teeth on extensor margin. Pereopods 3 and 4 similar: basis with small marginal teeth; ischium with small tooth on flexor margin; merus with 1 blade-like tooth on extensor margin; carpus with 2 blade-like teeth on extensor margin, small spine on flexor margin; propodus and dactylus as in pereopod 2. Pereopods 5–7 similar: basis with irregular teeth; merus and carpus each with 2 robust setae on conical projection on margin; propodus with 4 robust setae on conical projection on margin; dactylus curved.

Pleopod 1 exopod with oblique groove opening laterally at about 90% of length, opening surrounded by dense setation, most distal part lamellar. Pleopod 2 endopod with tapering simple appendix masculina curving anteriorly, 1.6 times length of endopod.

Uropodal peduncle with 2 longitudinal-oblique rows of tubercles, 3 in row next to suture, 3 larger in midline.

*Colour.* Pale with small brown lateral spot on each segment of pereon and pleon and pereopodal coxa, 1 or 2 on each pereopodal basis, ischium, merus and carpus, 2 on uropod.

*Size (total length).* Largest male, 6.7 mm; largest ovigerous female, 10.0 mm.

*Distribution.* Southeastern coast of Australia and eastern Bass Strait, 32°S–43°S.

*Remarks.* The two syntypes are lost (Springthorpe and Lowry, 1994). Nevertheless, Whitelegge's (1904) description and his few drawings can be interpreted and reconciled with the abundant available material – the species is unmistakable and common in collections on the shelf of southeastern Australia. Sampling on the NSW shelf has been intensive, especially in the 1970s–1980s and no other antarcturid matches his description. Hale's (1946) description and more complete illustrations of material from Bass Strait are similarly unmistakable. His habitus drawing is reproduced here. The redescription above is limited to the body armature and to those features important in differentiation of antarcturid

genera: antenna, pereopodal dactyli, male pleopods 1 and 2, female sternite 8 and the uropod. Both Whitelegge and Hale illustrated and described ovigerous females. The diagnostic ornamentation can be discerned in a reduced form in specimens of all sizes.

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