

Two New Species of *Gulcamptus* (Crustacea : Copepoda : Harpacticoida) from North America

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Abstract

Two new North American taxa of the canthocamptid harpacticoid copepod genus *Gulcamptus* are defined. Alaskan populations originally ascribed to *G. uenoi* MIURA are now considered a distinct taxon for which the name *G. alaskaensis*, new species, is proposed. The female of *Gulcamptus huronensis*, new species, is described from Lake Huron and Alaska; the male is unknown.

The genus *Neomaraenobiotus* FLÖSSNER is considered a synonym of *Gulcamptus* MIURA, and *N. laurentiacus* FLÖSSNER, from Canada, is transferred to *Gulcamptus*. The diagnosis of *Gulcamptus* is emended.

Species of *Gulcamptus* have now been found in Korea, Japan (Hokkaido), Canada (Yukon and North West Territories) and the United States (Alaska and Lake Huron).

Key words : Faunistics, Copepoda, North America

1. Introduction

The canthocamptid harpacticoid copepod genus *Gulcamptus* was proposed by MIURA (1969) for *G. uenoi*, discovered in a cave in Korea. In addition to *G. uenoi*, *G. jesoanus* ISHIDA and KIKUCHI, 1994 and *G. yoichiensis* ISHIDA, 1995, both from Hokkaido, Japan, are presently included in the genus.

Recent information on variability in species of this genus (ISHIDA, 1995, ISHIDA and KIKUCHI, 1994) led to our judgment that Alaskan specimens formerly attributed by ISHIDA (1992) to *G. uenoi* instead represent a distinct taxon. Additional specimens of this taxon were discovered in uncatalogued Alaskan material from the Mildred S. WILSON Collection in the U. S. National Museum of Natural History.

Collections of benthic copepods from the Laurentian Great Lakes confided by Patrick L. HUDSON to J. W. REID for identification included a single specimen of a previously unknown species of *Gulcamptus*. A specimen ascribable to this species was also found by T. ISHIDA in a collection of Alaskan copepods made by Anne ROBERTSON and S. MILNER. Each of these new species is authored by one of us.

We consider that *Neomaraenobiotus* FLÖSSNER, 1992 is a synonym of *Gulcamptus*. The inclusion of *N. laurentiacus* FLÖSSNER in the genus *Gulcamptus* brings the total number of known species to six. We propose an emended diagnosis for *Gulcamptus*.

2. Materials and methods

Specimens were originally fixed in formalin and transferred to 70% ethanol for long-term storage. For taxonomic examination, they were transferred to glycerine, then to lactic acid, and finally dissected and mounted in polyvinyl lactophenol with a little chlorazol black E added, or in gum-chloral medium. Specimens are deposited in the collections of the United States National Museum of Natural History (USNM), or in the personal collection of T. ISHIDA.

3. Taxonomic account

Family Canthocamptidae G. O. SARS, 1906 ;
MONARD, 1928 ; LANG, 1948

Genus *Gulcamptus* MIURA, 1969

Synonymy :

Gulcamptus MIURA, 1969 : 242, 250. —ISHIDA

1992 : 251. —ISHIDA and KIKUCHI 1994 : 12, 16. — ISHIDA 1995 : 40, 44.

Neomaraenobiotus FLÖSSNER, 1992 : 7, 11-13. New Synonymy.

FLÖSSNER (1992) proposed a new genus *Neomaraenobiotus* for the new species *N. laurentiacus*, collected from wet mosses at Mackenzie Bay, Yukon Territory and near Inuvik, North West Territories, Canada. Apparently FLÖSSNER did not take the attributes of the genus *Gulcamptus* into consideration in proposing his new genus. *Neomaraenobiotus laurentiacus*, as noted by ISHIDA and KIKUCHI (1994) resembles species of *Gulcamptus*, specifically in the ornamentation of the urosome (as far as this was described by FLÖSSNER), the proportions and ornamentation of the caudal rami, and the segmentation, proportions and general pattern of the armament of legs 1-5. Other, possibly genus-level features described include the 1-segmented antenna exopodite and mandibular palp. FLÖSSNER (in litt. to J. REID, October 1994) stated that the antenna exopodite of *N. laurentiacus* is actually 2-segmented. We therefore propose that *Neomaraenobiotus* be considered a synonym of *Gulcamptus*.

The diagnosis is emended to include the characters of *G. laurentiacus* as well as those of recently discovered taxa. *Gulcamptus* is similar to *Moraria* T. and A. SCOTT, 1893, except that in *Gulcamptus* the antenna exopodite is composed of 2 articles and in *Moraria*, of 1 article; the medial terminal seta on legs 2-4 exopodite article 3 is reduced in *Gulcamptus*, normal in *Moraria*; and leg 3 exopodite article 3 has 2 medial setae in *Gulcamptus*, but only 1 seta in *Moraria*. *Gulcamptus* also bears some similarities to *Maraenobiotus* MRÁZEK, 1894, but the exopodite of leg 1 is triarticulate in species of *Gulcamptus*, and biarticulate in *Maraenobiotus*. Because neither the type specimens nor other material of *G. uenoi* can be located in the MIURA Collection (Y. KIKUCHI, pers. comm. to T. ISHIDA, February 1995), the diagnosis includes the characteristics of *G. uenoi* as originally described.

Emended diagnosis: Canthocamptidae with

cylindrical vermiform habitus. Hyaline membranes of somites smooth or finely serrate. Anal operculum either with protuberances at lateral corners (*G. uenoi*), or with several marginal denticles (all other species). Caudal ramus about 1.5-2 times as long as wide, with indistinct or no dorsal keel. Antennule of 8 articles; geniculate in male. Exopodite of antenna biarticulate; exopodite of mandible also biarticulate (this requires confirmation in *G. laurentiacus*). Legs 1-4, exopodites of 3 articles, articles 1 and 2 with lateral spine but lacking medial seta (medial surface of exopodite article 2 of legs 2-4 with 1-2 tiny hairlike spines in some species); article 3 usually with 4,5,6,5 setae and spines, medial terminal seta short and extremely slender, this seta apparently lacking in *G. uenoi*. In female, legs 1-3 endopodites of 2 articles, leg 4 endopodite of 1-2 articles; proximal articles (if present) lacking seta, distal articles with 2-3, 3-4, 2-3 setae respectively. In male (where known), legs 1 and 4 similar to those of female; legs 2-3 endopodites modified, leg 2 article 1 with or without medial seta, article 2 with 3-4 setae and distolateral notch; leg 3 article 1 with or without medial seta, article 2 with apophysis, article 3 with 2 modified terminal setae. Leg 5 with basipodite distinct in female, fused in male; basipodite with 2-3 setae in female, 2 setae in male; exopodite with 2-4 setae in female, 4 setae in male.

Type species: *Gulcamptus uenoi* MIURA, 1969 (by monotypy).

Gulcamptus alaskaensis ISHIDA, new species

Figs. 1, 2

Synonymy :

Gulcamptus uenoi MIURA, 1969. —ISHIDA 1992 : 249, 251-252, figs. 9-14.

Material : Holotype ♀, dissected and mounted on slide, USNM 264007; allotype ♂, dissected and mounted on slide, USNM 264008; paratypes : 3 ♀♀, 1 ♂ dissected and mounted on 4 slides, and 2 ♀♀ and 1 ♂ mounted whole together on slide, USNM 264009; 30 ♀♀ and 3

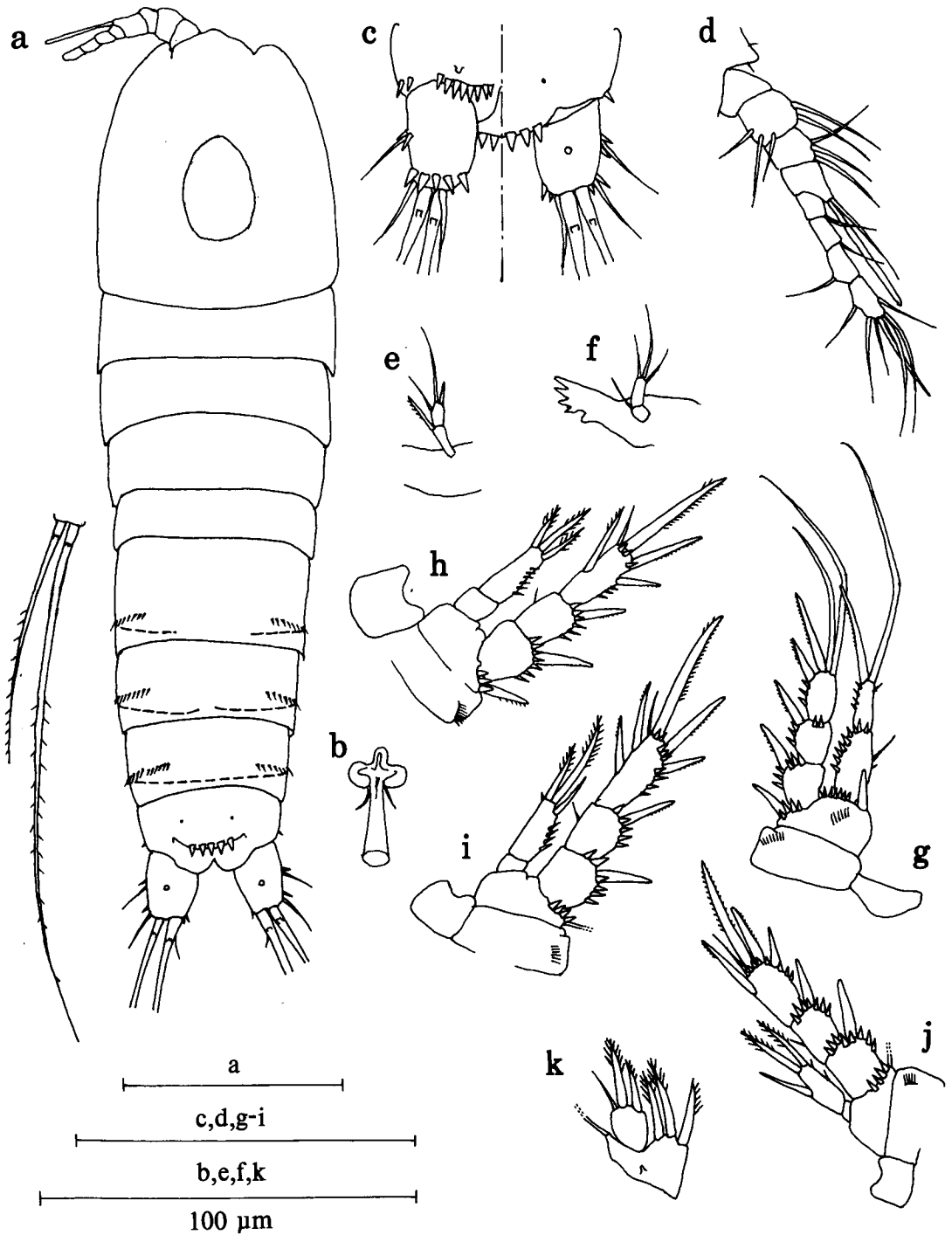


Fig. 1. *Gulcamptus alaskaensis*, new species, holotype female (USNM 264007): a, Habitus, dorsal; b, Receptaculum seminis; c, Anal somite and caudal ramus, dorsal and ventral; d, Antennule; e, Exopodite of antenna; f, Mandible; g, Leg 1 and coupler, anterior; h, Leg 2 and coupler, anterior; i, Leg 3 and coupler, anterior; j, Leg 4 and coupler, anterior; k, Leg 5, anterior.

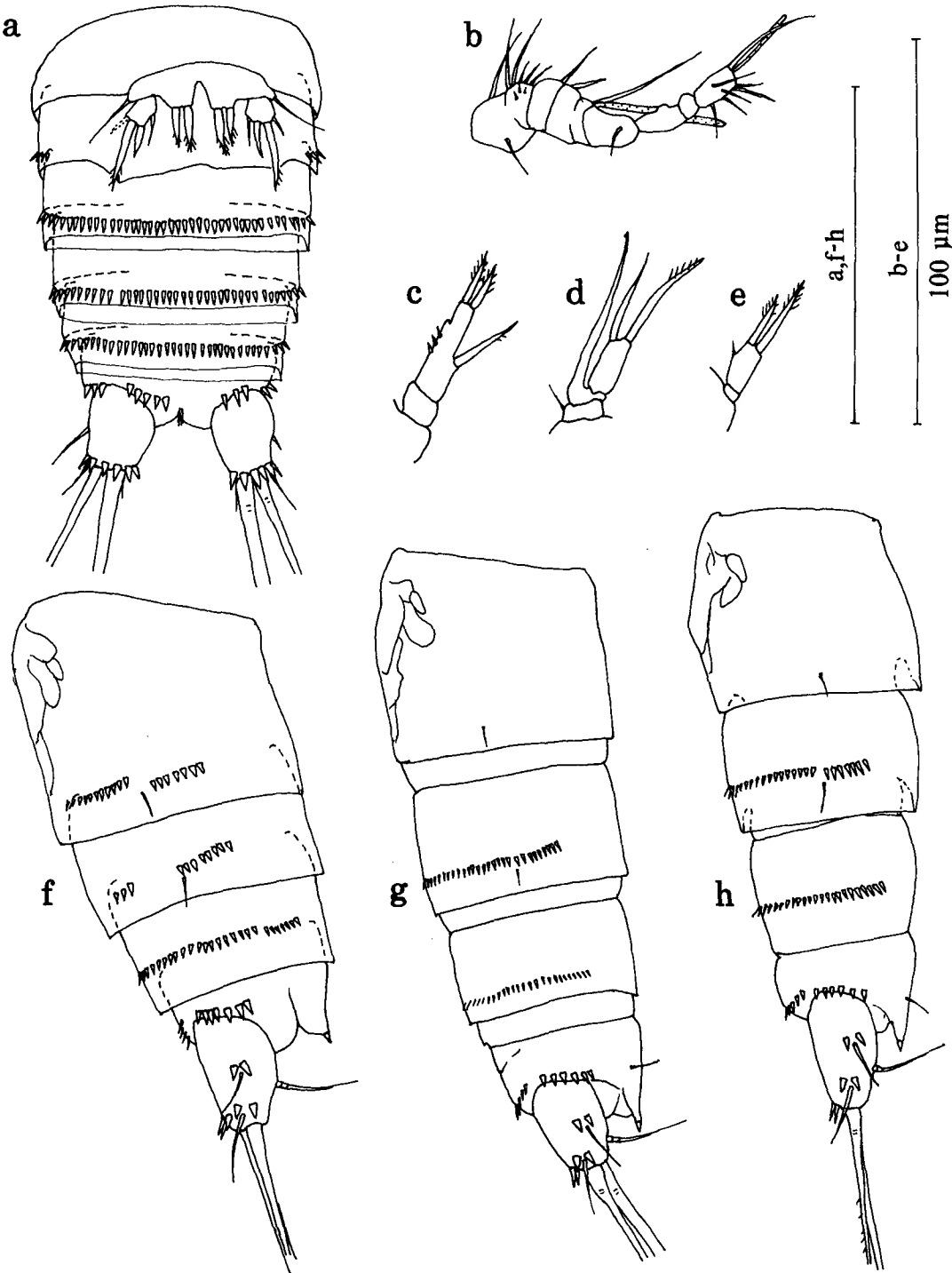


Fig. 2. *Gulcamptus alaskaensis*, new species, a-d, allotype male (USNM 264008), e, paratype male (USNM 264009); f, paratype female from Portage, south central Alaska (USNM 264009); g, paratype female from Montana River, southeastern Alaska (USNM 251164); h, female of *Gulcamptus yoichiensis*, collection of T. ISHIDA: a, Prosomite 5 and urosome, ventral; c, Left leg 2 endopodite; d, Right leg 3 endopodite; e, Left leg 4 endopodite; b, Antennule; f-h, Urosome, left lateral.

♂♂, USNM 251971, all from a puddle near Begich Boggs Visitor Center, Portage, south central Alaska, USA, 27 July 1992, coll. T. ISHIDA. 2 ♀♀, each on slide, USNM 264010, 1 ♀ on slide, USNM 250674, and 2 ♀♀, each partly dissected on 1 slide and 3 ♀♀, mounted whole together on 1 slide, USNM 251164, all from marsh by the Montana River, Juneau, southeastern Alaska, USA, (58°29'N, 134°37'W), 15 October 1994, coll. M. SANEYOSHI, prep. T. ISHIDA. Non-paratypes: 33 ♀♀, 9 ♂♂ and 3 copepodids, USNM 278016, from moss washings in a heavily forested area near a stream at about Mile Post 73, Seward Highway, Chugach Mountains, Kenai Peninsula, south central Alaska, USA, about 60°48'N, 149°6'W, 23 July 1955, coll. M. S. WILSON (information combined from collection notebook and uncompleted manuscript in M. S. WILSON Collection). Mounted specimens in gum-chloral medium, unmounted specimens in 70% ethanol.

Female: Length of holotype, excluding caudal setae, 420 μm ; range of length of paratypes 388–450 μm . Cephalosome with oval dorsal integumental window. Additional, narrow transverse integumental window visible on all but anal somite, and round lateral window visible on genital and succeeding somite in some specimens of Kenai Peninsula population (resembling pattern in *G. huronensis*, Fig. 3a, c). Hyaline frills of all somites smooth. Genital field (Fig. 1b) clover-shaped. Urosomal somites except anal somite each with row of spines near posterior margin laterally to ventrally, spine row on genital and 3rd urosomal somite discontinuous ventrally (Fig. 1a). Anal somite (Fig. 1c) with about 8 spines anterior to each caudal ramus on ventral surface, and with spine row on each posterolateral margin. Anal operculum convex, with 6 (3–8 in paratypes) triangular denticles (Fig. 1a, c). Caudal ramus (Fig. 1a, c) oblong, slightly divergent, 1.5 times longer than broad, each with 5 spines at ventral posterior margin; lateral surface of ramus with 2 groups composed of seta and 2 spines inserted at midlength and distolateral corner; dorsal surface of ramus lacking keel. Outer and middle terminal caudal setae about 3.5 times and 7.5

times length of ramus, respectively; inner terminal seta shorter than length of ramus.

Antennule of 8 articles, article 4 with aesthetasc reaching end of article 8, article 8 with shorter slender aesthetasc. Exopodite of antenna (Fig. 1e) and mandibular palp (Fig. 1f) each biarticulate, proximal and distal articles with 1 and 3 setae respectively.

Legs 1–4 (Figs. 1g–j) each with biarticulate endopodite, exopodite of leg 1 biarticulate, those of legs 2–4 each triarticulate. Formula for major armament as follows (exp = exopodite, enp = endopodite):

| | basis | exp | enp |
|-------|-------|-----------------|------------|
| Leg 1 | 1-1 | 0-1; 0-1; 0,2,2 | 1-0; 1,2,0 |
| Leg 2 | 0-1 | 0-1; 0-1; 1,2,2 | 0-0; 0,2,1 |
| Leg 3 | 0-1 | 0-1; 0-1; 2,2,2 | 0-0; 0,2,1 |
| Leg 4 | 0-1 | 0-1; 0-1; 1,2,2 | 0-0; 1,2,0 |

Legs 2–4 exopodite article 2 each with tiny hairlike unsocketed spine on medial margin. Outer distal setae of legs 2–4 exopodite article 3 stout, almost spiniform, but inner distal setae rudimentary, hairlike. Couplers of all legs bare.

Leg 5 (Fig. 1k), medial expansion of basoendopodite reaching midlength of exopodite. Basoendopodite with 3 short thick setae. Exopodite with 2 short thick setae and 1 thin outer seta.

Male: Length of allotype 320 μm , of paratypes 300 and 315 μm . Body form similar to female. Posterior margin of first urosomite with 1 row of spines laterally; posterior margins of second and following two urosomites each with 1 row of spines ventrally and laterally; ornamentation of anal somite and caudal rami as in female (Fig. 2a). Anal operculum with 5 denticles. Outer and middle terminal caudal setae about 4 times and 8 times length of ramus, respectively. Antennule (Fig. 2b), fifth article with aesthetasc reaching to middle of terminal article.

Leg 1 and legs 2–4 exopodites as in female; leg 2 endopodite (Fig. 2c) article 2 with 1 inner and 2 terminal short thick setae; leg 3 endopodite as in Fig. 2d; distal article of leg 4 endopodite (Fig. 2e) differing from that of female in having bare inner margin; leg 5 (Fig. 2a), basal expansion with 2 short thick setae,

exopodite with 1 slender inner seta, 2 apical setae of which inner seta is shorter than outer, and 1 slender outer seta.

Variation : As ISHIDA (1992) reported, female specimens from the Montana River, southeastern Alaska were equipped with 2 or 3 setae on the distal article of the leg 4 endopodite. The same variation was seen in the specimens from Portage ; but all 10 females examined from the Kenai Peninsula had 3 setae at this location. There was also a clear difference in the ornamentation of the genital double somite : the Portage specimens and 9 of 10 Kenai Peninsula specimens examined were equipped with a row of spinules with a gap on each side, while the Montana River specimens and 1 Kenai Peninsula specimen were bare (Figs. 2f, g). The only other variation seen within or between the three populations was the number of denticles on the margin of the anal operculum, which varied from 3-8 (usually 6) in females and from 3-5 (usually 5) in males.

Etymology : Named for Alaska, referring to the type locality.

Comparisons : this species is discussed together with *G. huronensis*.

***Gulcamptus huronensis* REID, new species**

Fig. 3-5

Material : Holotype ♀, dissected on slide in PVL, USNM 259907, from Lake Huron, Adams Point region, 4 miles east of Rogers City, Michigan, USA, 45°25.10N, 83°41.70W, sand bottom, 15 m, ponor grab, bottom temperature 13°C, 19 June 1991, coll. P. L. HUDSON. Paratype ♀, preserved in 70% ethanol, USNM 264011, Nunatak Creek, Alaska, USA, 13 June 1994, coll. A. ROBERTSON and S. MILNER.

Female : Length of holotype in glycerine, excluding caudal setae 490 μm (habitus drawn from specimen slightly expanded in lactic acid) ; length of paratype 448 μm . Habitus (Fig. 3a-d) vermiform cylindrical. No dorsal integumental window (nuchal organ) visible on cephalosome of holotype ; round dorsal integumental window seen on paratype. Holotype additionally with indistinct round integumental

windows present on each side of pediger 5, genital double somite and succeeding urosomite ; additional narrow ovoid dorsal transverse integumental windows visible on pedigers 4 and 5, genital double somite, and succeeding 3 urosomites. Paratype with narrow transverse dorsal integumental windows visible on all except anal somite, no lateral windows visible except indistinctly on genital double somite. Hyaline frills of all somites smooth. Genital field (Fig. 3d), anterior part clover-shaped, sclerotized. Genital double somite (Fig. 3d) with 2 rows of tiny denticles lateral to leg 6 and 2 pairs of tiny papillae posterolateral to genital field ; next urosomite with lateral rows of tiny denticles and ventral paired rows of papillae and tiny spines ; next urosomite with lateral rows of tiny denticles and ventral row of tiny spines, middle spines smallest. Spines slightly larger and spine rows similarly arranged, but slightly longer in paratype specimen. Anal somite with 6-7 large spines along ventral part of posterior margin and 3-4 large spines along lateral part. Anal operculum (Fig. 3a, c) crescentic, produced slightly past posterior end of anal somite, with 3 large denticles on posterior margin, denticles arranged asymmetrically in holotype, symmetrically in paratype.

Caudal rami (Fig. 3a-f) divergent, 1.8 times longer than broad. Each ramus with low dorsal keel extending along anterior 2/3, basally articulate dorsal seta inserted near posterior end of keel. Anterior lateral seta inserted at about anterior 2/5 of ramus, posterior lateral seta inserted at about distal 4/5 of ramus. Three terminal setae present, length of middle seta about 4.1 times length of ramus, length of outer seta about 2 times length of ramus, length of inner seta about 0.6 times length of ramus. Inner seta with expanded base, inserted partly ventrally to middle seta, distal part of seta extremely fine. Ornamentation of ramus consisting of row of 3-5 large spines along postero-medial border anterior to terminal setae, and two large spines anterior to each lateral seta.

Rostrum (Fig. 3a, 4a) short, broadly triangular, with 2 sensilla. Antennule (Fig. 4b) of 8

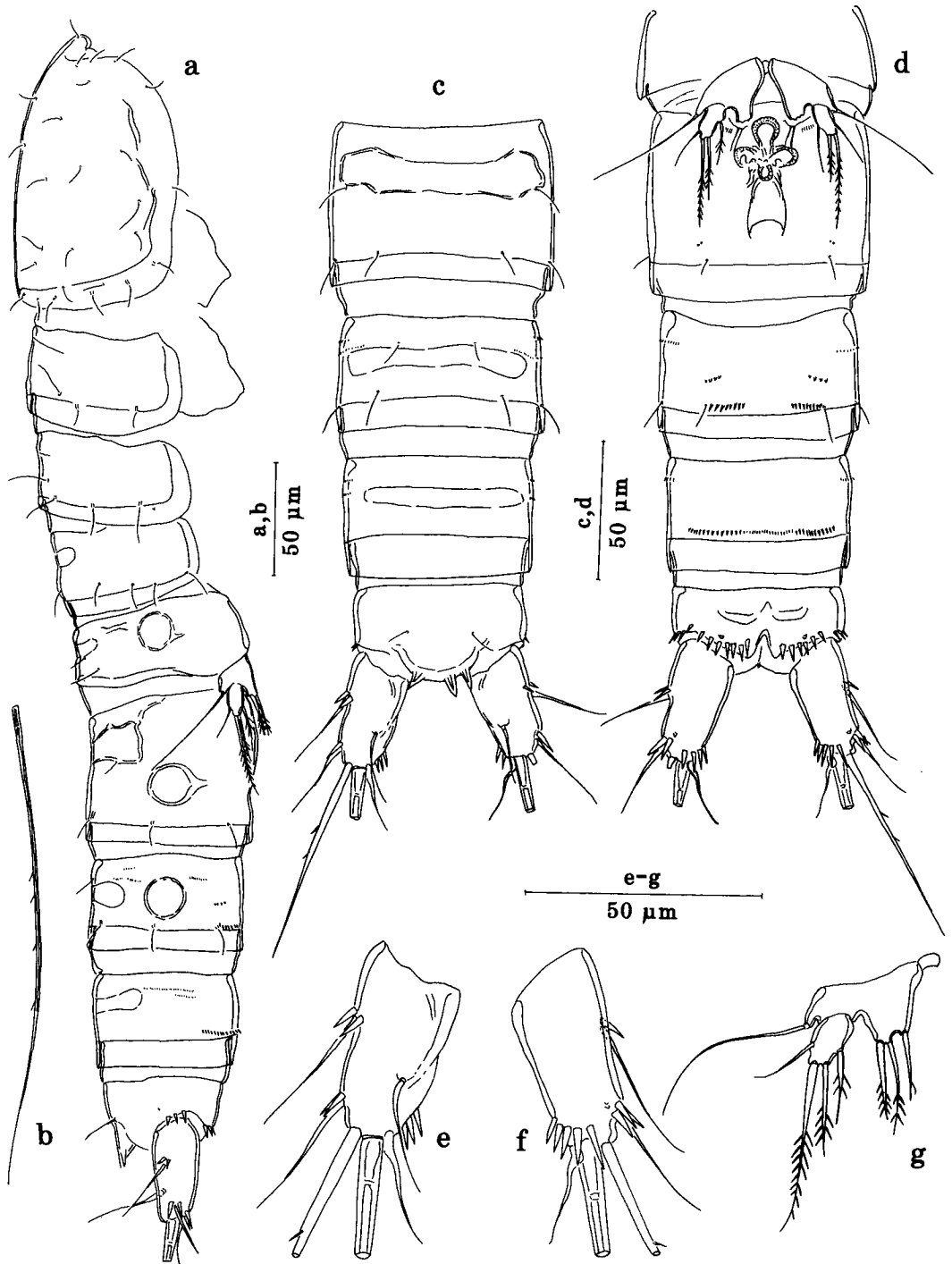


Fig. 3. *Gulcamptus huronensis*, new species, holotype female (USNM 259907): a, Habitus, right lateral; b, Middle terminal caudal seta; c, Urosome and caudal rami, dorsal; d, Urosome and caudal rami, ventral; e, Caudal ramus, dorsal; f, Caudal ramus, ventral; g, Leg 5.

articles, article 4 with broad esthetasc reaching near midlength of article 8, article 8 with slender esthetasc. Antenna exopodite (Fig. 4b, c) and mandibular palp (Fig. 4d) each biarticulate, article 1 with 1, article 2 with 3 terminal and subterminal setae. Maxillule broken in dissection, not illustrated. Maxilla (Fig. 4e) with 2

endites; claw of basis with comb of fine spinules. Maxilliped (Fig. 4f, g) prehensile, with basally articulate seta on basis.

Legs 1-4 (Fig. 4h-j, 5a) each with triarticulate exopodite; endopodites of legs 1-3 biarticulate, endopodite of leg 4 uniaarticulate. Couplers of all legs bare. Formula for major armament:

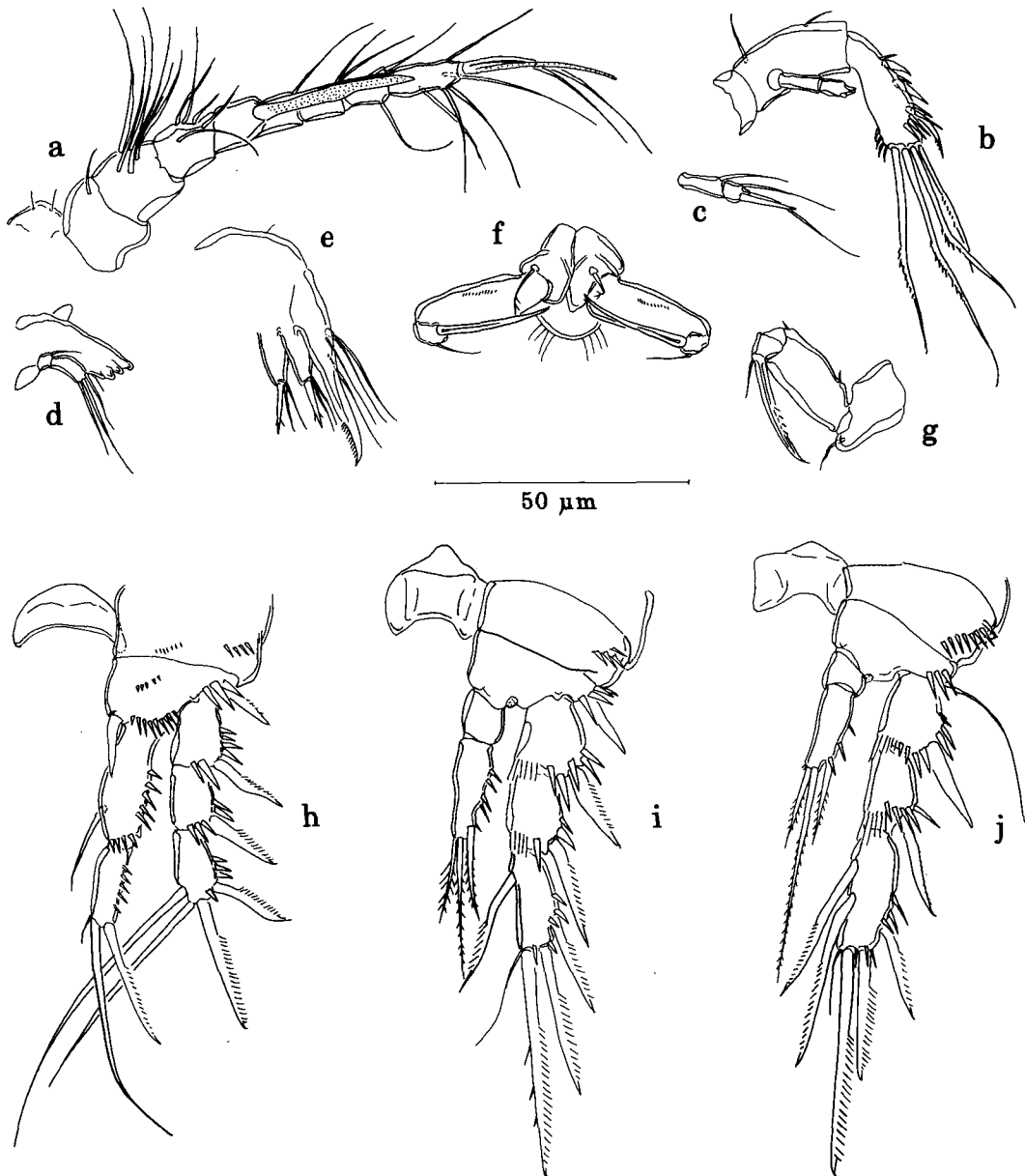


Fig. 4. *Gulcamptus huronensis*, new species, female, holotype (USNM 259907): a, Rostrum and antennule; b, Antenna; c, Exopodite of antenna; d, Mandible; e, Maxilla; f, Maxillipeds, ventral; g, Maxilliped, posterior; h, Leg 1 and coupler; i, Leg 2 and coupler; j, Leg 3 and coupler.

| | basis | exp | enp |
|-------|-------|-----------------|------------|
| Leg 1 | 1-1 | 0-1; 0-1; 0,2,2 | 1-0; 1,2,0 |
| Leg 2 | 0-1 | 0-1; 0-1; 1,2,2 | 0-0; 0,2,1 |
| Leg 3 | 0-1 | 0-1; 0-1; 2,2,2 | 0-0; 0,2,1 |
| Leg 4 | 0-1 | 0-1; 0-1; 1,2,2 | enp 0,2,0 |

Distolateral setae of legs 2-4 exopodites stout; distomedial setae extremely slender. Medial surfaces of legs 2-4 exopodites bare.

Leg 5 (Fig. 1d, g), medial expansion of basipodite reaching midlength of exopodite, with 3 setae; exopodite with 4 setae in holotype, 3 setae in paratype. Leg 6 (Fig. 1d) consisting of small, broadly triangular plate bearing 2

slender apical setae.

Male: Unknown.

Etymology: Named for the type locality in Lake Huron.

Discussion and Comparisons: Table 1 compares species of *Gulcamptus* with respect to the setation of legs 2-5 and ornamentation of the anal operculum. *Gulcamptus alaskaensis* is closest to *G. uenoi* and *G. yoichiensis*, with only a few differences in detail. It resembles *G. uenoi* in the proportions of the female leg 5, but differs in the thickness of the leg 5 setae, the

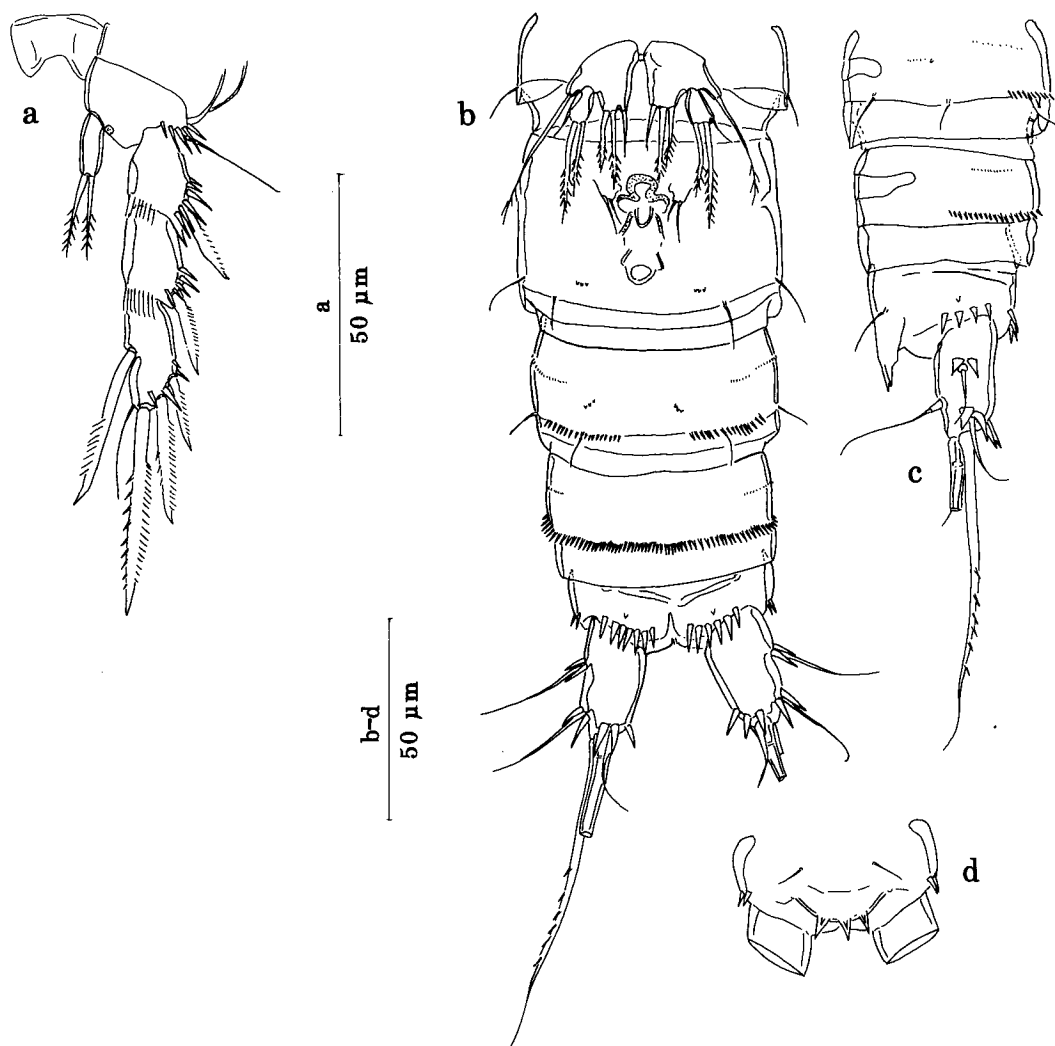


Fig. 5. *Gulcamptus huronensis*, new species, female; a, holotype (USNM 259907), b-d, paratype (USNM 264011): a, Leg 4 and coupler; b, Urosome and caudal ramus, ventral; c, Urosomites 3-5 and caudal ramus, right lateral; d, Anal operculum, dorsal.

number of setae on the leg 5 basoendopodite, the number of denticles of the anal operculum, the length/width ratio of the caudal ramus, and the shape of the leg 2 endopodite of the male. Also, MIURA (1969, Fig. 46) indicated the urosomite spine rows as ventrally continuous, the leg 5 basipodite less produced, and most leg 5 setae more spiniform than in *G. alaskaensis*. *Gulcamptus alaskaensis* differs from *G. yoichiensis* only in having longer, thinner setae of leg 5 of the female and shorter, thicker setae of the endopodites of legs 2-4 of the male, in having more spinules on the posteroventral margin of the caudal ramus, and in having the posterolateral caudal seta inserted nearly at the distal edge of the ramus (compare Fig. 2h for *G. yoichiensis*). *Gulcamptus alaskaensis* and *G. yoichiensis* are apparently the only congeners with tiny hairs on the medial surface of the exopodite article 2 of legs 2-4.

Gulcamptus huronensis differs from all its congeners in having the leg 4 endopodite composed of 1 rather than 2 articles. The ornamentation on the urosomites most resembles the specimens of *G. alaskaensis* from the Montana River and one of the individuals from the Kenai Peninsula, and *G. yoichiensis* in lacking spine rows on the genital double somite

of the female. The spines composing the urosomite spine rows are smaller than in other congeners.

The slender medioterminal setae on legs 2-4 exopodites are short in *G. alaskaensis*, and longer in *G. laurentiacus* and in *G. huronensis*. Corresponding setae are apparently present, but are very short in at least legs 2 and 4 in *G. uenoi*, as seen in MIURA'S (1969) Figs. 38 and 39 (according to MIURA'S text; the figure numbers for legs 2 and 3 appear to have been exchanged); MIURA drew no corresponding seta for leg 3 (his Fig. 37). These setae are lacking in *G. jesoanus* (= *Gulcamptus* sp. S of ISHIDA, 1987) (ISHIDA and KIKUCHI, 1994).

Intra- and interpopulation morphological variations are known to be extensive in some species of canthocamptids, therefore prudence should be exercised in proposing new taxa based on few and seemingly slight differences. It will be apparent from Table 1 that major setation of legs 1-5 differs little among species of *Gulcamptus*. However, little intrapopulation variation has been observed in species of this genus. MIURA (1969) and FLÖSSNER (1992) noted no variation in *G. uenoi* and *G. laurentiacus* respectively. ISHIDA and KIKUCHI (1994) found that intraspecific variation in their

Table 1. Total number of setae and spines on the distalmost segments of legs 2-4 and on the leg 5 exopodite and endopodite; and the most common number (followed by range) of anal opercular denticles of species of *Gulcamptus* (the male of *G. huronensis* is unknown). Abbreviations: exp = exopodite, enp = endopodite, bsp = basoendopodite.

| | Leg 2 | | Leg 3 | | Leg 4 | | Leg 5 | | no. opercular denticles |
|---------------------|-------|-----|-------|-----|-------|-----|-------|-----|-------------------------|
| | exp | enp | exp | enp | exp | enp | exp | bsp | |
| females : | | | | | | | | | |
| <i>huronensis</i> | 5 | 3 | 6 | 3 | 5 | 2 | 3-4 | 3 | 3 |
| <i>alaskaensis</i> | 5 | 3 | 6 | 3 | 5 | 2-3 | 3 | 3 | 6(3-8) |
| <i>yoichiensis</i> | 5 | 3 | 6 | 3 | 5 | 2 | 3 | 3 | 3(2-3) |
| <i>uenoi</i> | 5 | 3 | 5? | 3 | 5 | 2 | 3 | 2 | 2 ^a |
| <i>laurentiacus</i> | 5 | 2 | 6 | 4 | 5 | 3 | 3 | 3 | 3-6 |
| <i>jesoanus</i> | 4 | 3 | 5 | 4 | 4 | 3 | 3 | 3 | 6(6-8) |
| males : | | | | | | | | | |
| <i>yoichiensis</i> | 5 | 3 | 6 | 3 | 5 | 2 | 4 | 2 | 2 |
| <i>laurentiacus</i> | 5 | 3 | 6 | 2 | 5 | 2 | 4 | 2 | 3-5 |
| <i>alaskaensis</i> | 5 | 3 | 6 | 2 | 5 | 2 | 4 | 2 | 5(3-5) |
| <i>uenoi</i> | 4 | 4 | 5 | 2 | 5 | 2 | 4 | 2 | 2 ^a |
| <i>jesoanus</i> | 4 | 4 | 5 | 2 | 4 | 2 | 4 | 2 | 6(6-8) |

^a The anal operculum of *G. uenoi* is extended into a denticle at each lateral corner.

extensive collections of *G. jesoanus* was confined to the number of spines on the anal operculum. In *G. yoichiensis*, the occurrence of rudimentary terminal caudal setae was observed for the first time in this genus (ISHIDA, 1995). The only variation within or between the three Alaskan populations of *G. alaskaensis* was in the ornamentation of the genital double somite, the number of setae on the leg 4 endopodite article 2, and the number of denticles on the anal operculum (ISHIDA, 1992 and present observations). In view of this apparent morphological stability, it seems that the existence of several differences between populations of *Gulcamptus* species constitutes good grounds for regarding them as separate taxa. We have followed this principle in proposing that the southeastern Alaskan population formerly identified as *G. uenoi* should be regarded as a distinct taxon, *G. alaskaensis*, and further in proposing the separation of *G. huronensis*.

The integumental windows, sometimes termed "nuchal organs" (REID, 1994), are difficult to observe in these specimens, but some individuals clearly have both dorsal transverse windows on most somites, and lateral round windows on some (except for the anal somite); in addition to the dorsal window on the cephalosome which is probably present in all members of the family. The array in *G. huronensis*, which may also be present in *G. alaskaensis*, may be the most elaborate known in the Canthocamptidae. These structures are usually neglected in descriptions, so little comparative information is available. Most canthocamptids have dorsal integumental windows on the cephalosome, and some have additional lateral windows on one or more urosomites (LANG, 1948). Some species of *Antarctobiotus* possess dorsal transverse windows on pedigers 2 and 3 (CICCHINO and RINGUELET, 1977). However, to our knowledge no canthocamptid has yet been described with dorsal as well as lateral windows on a single somite.

Species of *Gulcamptus* have been found in Korea (*G. uenoi*), southeastern Alaska (*G. alaskaensis*), Hokkaido, Japan (*G. jesoanus*, *G.*

yoichiensis), Yukon and North West Territories, Canada (*G. laurentiacus*), and glaciated Alaska and Lake Huron, U.S.A. (*G. huronensis*). All except *G. uenoi* have been collected in epigeal habitats, including snowmelt waters, streams, marshes, wet mosses and a lakebed, *Gulcamptus uenoi* was collected from a cave.

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摘 要

北米産の *Gulcamptus* 属 (甲殻類：
カイアシ類：ソコムジンコ) 2 種について

北米から得られたソコムジンコ、カントカンブタス科、*Gulcamptus* 属の2新種を報告する。これまで *G. uenoi* MIURA とされていたアラスカの個体群は新種であることが判明したので、*G. alaskaensis* と命名した。ヒューロン湖とアラスカから得られた雌の *Gulcamptus huronensis*, n. sp. を記載した。雄は得られていない。*Neomaraenobiotus* FLÖSSNER は *Gulcamptus* MIURA の異名と考えられ、したがって *N. laurentiacus* FLÖSSNER は *Gulcamptus* 属に移される。*Gulcamptus* 属の記相を改める。*Gulcamptus* に属する種の分布は韓国、日本(北海道)、カナダ(ユーコンと North West Territories) および合衆国(アラスカとヒューロン湖) に及ぶことになる。

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