MISCELLANEOUS NOTES ON JAPANESE PLECOPTERA.*

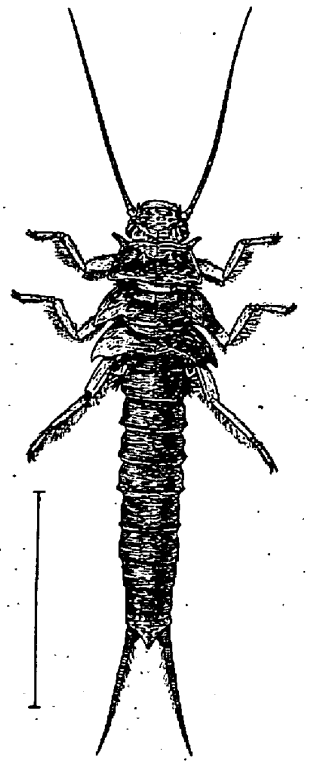
By Masuzo Uéno.

Ôtsu Hydrobiological Station.

1. *Pteronarcys*-nymph from corea

Body elongated, cylindrical, smooth, with a prominent pronotum (fig. 1). General color dark brown, venter somewhat lighter than dorsum; legs yellowish brown; antennæ and cerci light brown.

Head with three ocelli, lateral ocelli about on a line with anterior margin of compound eyes; three round spots ranging lengthwise on each side of head between lateral ocellus and base of antenna; antennæ about half as long as body, composed of about 70 joints. Mouth-parts as illustrated in fig. 2~6. Labium with glossæ extending nearly the same distance as the paraglossæ; palpifer well-developed; labial palpi extending beyond apex of paraglossæ, three-jointed, last joint longest; submentum small. Maxillæ well-developed; lacinia with two slender teeth at apex, beneath which on inner side is a row of stiff hairs; galea slightly shorter than lacinia; palpifer appears as basal joint of palpus; maxillary palpi five-jointed, basal joint very short, second a little shorter than third, which is subequal to fourth, fifth longer than fourth and slender. Mandibles rather well-developed; with several broad teeth directed inward, mola not well-developed.

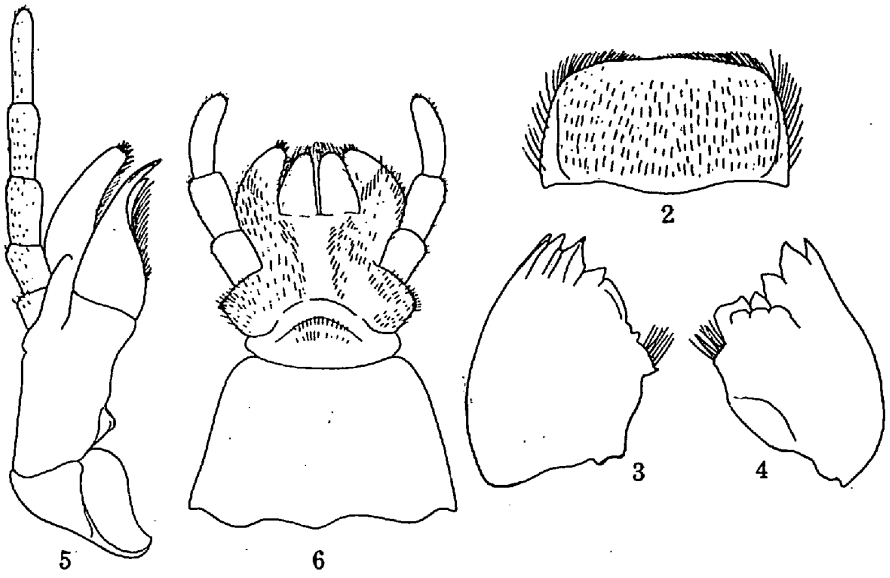


1

Fig. 1.
Nymph of *Pteronarcys* sp. from Tyosen (Corea).
(Uéno del.)

Pronotum much wider than head, flaring, much broader than long, widened behind, front and hind margins convex, each anterior angle

* Contribution from the Ôtsu Hydrobiological Station of the Kyôto Imperial University.



Figs. 2–6. Mouth-parts of *Pteronarcys*-nymph from Tyosen.
2, Labrum; 3 & 4, mandibles; 5, maxilla; 6, labium.

produced conspicuously and laterally in a long, up-curved process (fig. 1); dorsal surface with a transverse depression. Mesonotum and metanotum with wing-pads produced laterally and backwards; with a transverse depression on each notum.

Legs fringed with long hairs on femur, tibia and tarsus; first and second tarsal joints subequal in length, third joint much longer than basal two joints combined.

Abdomen cylindrical, not markedly tapered toward apex; tenth tergite conspicuously prolonged behind in a sharp, triangular process, directed upward at tip (fig. 1). Cerci in all the specimens were broken off, leaving only several basal joints, but they may be probably shorter than half the body length.

Gills arranged in pairs present on venter; on prosternum five pairs, two posterior to legs, three anterior to legs arranged in an obliquely transverse row; on mesosternum and metasternum two pairs each, anterior and posterior to legs; one pair on first two abdominal sternite respectively; no coxal and anal gills.

Length of body 30 mm, length of antenna 15 mm.

Locality: Zenkyori,[1] north-eastern Tyôsen (Corea); a small mountain stream, under stones, 3 nymphs (probably females), coll. by Prof. T. KAWAMURA, June 27, 1936.

Remarks: The nymph described above apparently belongs to the genus *Pteronarcys* NEWMAN. Its prominent pronotum and the presence of paired

1) 咸鏡北道茂山郡全巨里

gills on the first two abdominal segments are peculiar to the genus. With respect to the latter characteristic, it is obvious that the present nymph does not belong to *Pteronarcella* BANKS, another genus of Pteronarcidae, because the nymph of the latter genus has one more pair of gills on the third abdominal segment (vide SMITH 1917). The mouth-parts of the present nymph have characteristics peculiar to the nymphs of *Pteronarcys* (vide CLAASSEN 1931, FRISON 1935).

Pteronarcidae has its main area of distribution in North America, consisting of the above two genera, *Pteronarcys* and *Pteronarcella*. Only two species of the former genus are known to occur in Eastern Asia, *Pteronarcys sachalina* KLAPÁLEK (1908) in Saghalien (2 ♀♀) and Manchuria, and *P. excavata* WU and CLAASSEN (1934) from Wei-Hu-Ling at Kirin in Manchoukuo (1 ♀) (vide WU 1936). Although the nymph described above has not yet been satisfactorily determined to species, this is the first record of the occurrence of the genus in Japan excluding Saghalien.

2. Capniidae of Japan

Allocapnia nivalis (UÉNO)

Capnia nivalis UÉNO, 1929, p. 143, fig. 23, Pl. 24, fig. 4.

Locality: Sugadaira, Nagano Pref. (Prov. of Sinano), 1 ♂ and 5 ♀♀, coll. by S. MIYAMOTO, Feb. 1937.

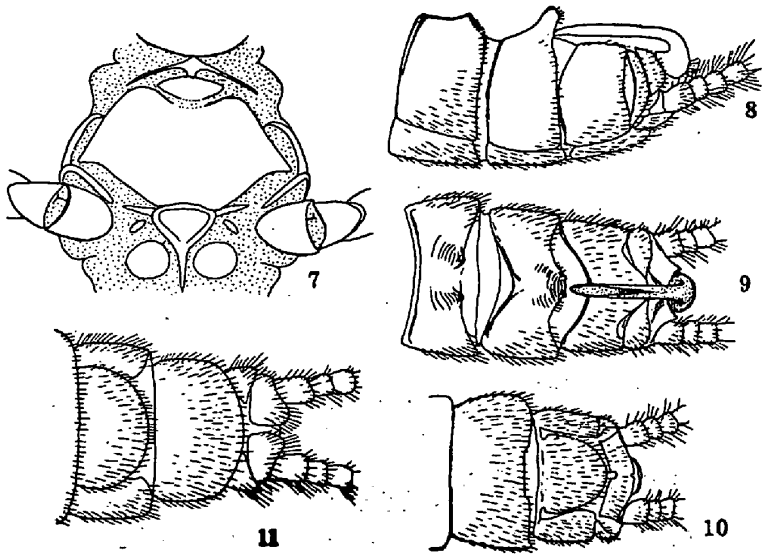
The specimens from the above locality agree closely with the type, but are somewhat smaller. Length of body: 6.5 mm in ♂, 5~8 mm in ♀. (holotype ♂ 9.5 mm, allotype ♀ 10 mm). On the dorsum of the abdomen of ♀ a longitudinal membraneous stripe extends from the second to the hind margin of the eighth abdominal segment, the ninth and tenth tergites being entirely chinitized. The wings are entirely absent in ♂, ♀ is also unsual in its lack of wings, but a few large specimens up to 8 mm in length have very short wing rudiments. FRISON (1929, p. 329) noticed that the females of *Allocapnia vivipara* (CLAASSEN), though usually wingless, often have wings of various lengths. He also states that the short-winged or brachypterous forms of the above species occur chiefly in northern Illinois while the long-winged or macropterous forms are found in the southern part of the state. Such a distribution of the females with various wing lengths may also be found in our country. In this connection the validity of the genus *Apteroperla* which MATSUMURA (1931) established for a wingless species of Capniidae (Apteroperlidae MATSUMURA auct.) is very doubtful.

Allocapnia tikumana n. sp.

Holotype ♂, allotype ♀, paratypes 5♂♂ and 2♀♀; all in the Ōtsu Hydrobiological Station of the Kyôto Imperial University.

Male. Small blackish brown stonefly resembling closely *Allocapnia nivalis* (UÉNO), but slenderer. Entire lack of wings in both sexes.

Head a little broader than prothorax; antennæ nearly as long as half of body length, composed of 32 joints, basal joint nearly as wide as second, following joints moniliform, gradually decreasing width toward apex. Prothorax quadrate, slightly broader in hind margin, angles rounded, dorsal surface slightly rugose. Mesosternum with posterior margin of large chitinized median area strongly extended backwards (fig. 7). Legs rather long; of



Figs. 7–11. *Allocapnia tikumana* n. sp.

7, male mesosternum; 8–10, male terminal abdominal segments: 8, lateral; 9, dorsal, and 10, ventral views; 11, female terminal abdominal segments, ventral view.

three tarsal joints, second shortest, first and third of subequal length. Abdomen cylindrical, broadest at fifth segment; cerci about half of body length, composed of 17 joints, several basal joints moniliform, succeeding joints becoming long and slender.

Seventh tergite with a pair of raised, chitinized, knob-like structures at the posterior margin (fig. 8, 9); eighth tergite at posterior margin raised to a median knob, the back of which is for the reception of the tip of recurved supra-anal process (fig. 8, 9); ninth sternite rounded behind (fig. 10). Upper part of recurved supra-anal process slender, forming a heavily chitinized shaft.

Length of body: 6 mm (paratypes 4~6 mm).

Female. Wingless as in ♂. Antennæ 32-jointed. A median dorsal longitudinal membraneous stripe extends from second to hind margin of eighth abdominal segments; two apical segments entirely chitinized; tenth tergite rounded behind; cerci 17-jointed, basal 4~5 joints moniliform, succeeding ones long and slender. Ventral plate of eighth abdominal segment broadly rounded (fig. 11).

Length of body: 5 mm (paratypes 5.5~6 mm).

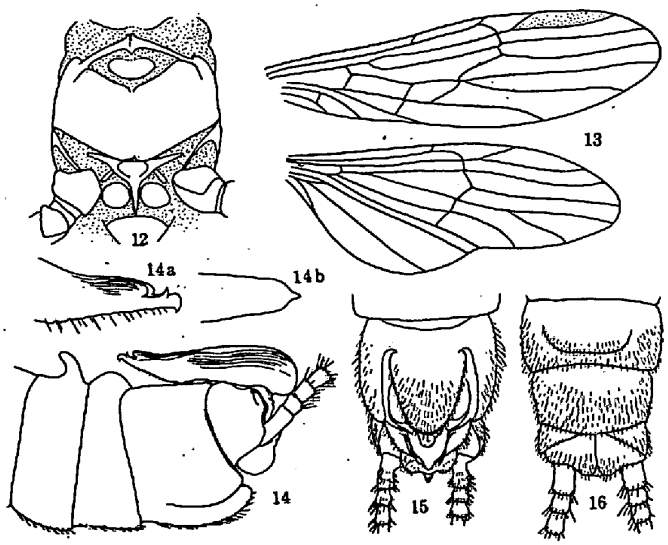
Locality: Sugadaira, Nagano Pref. (Prov. of Sinano), coll. by S. MIYAMOTO, Feb. 1937.

Remarks: This species can be distinguished from *Allocapnia nivalis* by its slenderer body and the characteristics of the genitalia in both sexes.

Allocapnia sikokuensis n. sp.

Holotype ♂, allotype ♀, paratypes 8 ♂♂ and 3 ♀♀; all in the Ôtsu Hydrobiological Station.

Male. General color brown; head, antennæ and thorax dark brown. Head wider than prothorax; with three ocelli arranged in a triangle, hind ocelli about on a line with the center of compound eyes and almost twice as far apart as distance from one ocellus to compound eye. Antennæ 28-jointed, slightly moniliform, basal joint 1½ times as wide as second. Pro-



Figs. 12~16. *Allocapnia sikokuensis* n. sp.
12, Male mesosternum; 13, right wings, dorsal view; 14 & 15, male terminal abdominal segments; 14, lateral, and 15, ventral views; 14a, lateral view of terminal part of supra-anal process (enlarged); 14b, the same, dorsal view; 16, female terminal abdominalsegments, ventral view.

notum quadrate, a little wider than long, slightly wider behind, angles rounded, surface with black rugose. Legs slender; of three tarsal joints, second shortest, first and third subequal in length. Wings well-developed, hyaline, veins brown, venation as illustrated in fig. 13; Sc of fore-wing united with C before cord, anal field of hind-wing about 3/5 as long as front portion. Abdomen widest at fifth segment; each tergite black and chitinized at front margin; ninth and tenth tergite heavily chitinized; cerci 17-jointed, basal 4~5 joints moniliform, those following becoming long and slender.

Seventh abdominal tergite at hind margin with a large median tubercle directed forwards (fig. 14); eighth tergite somewhat raised; dorsum of ninth and tenth tergites with a median membraneous area; ninth sternite sharply rounded behind, apex bluntly pointed (fig. 15); sub-anal lobes terminated in an upcurved process. Supra-anal process prominent, heavily chitinized, recurved, its apex reaching to the middle of eighth tergite; upper part forming a shaft, apex curved downward (fig. 14, 14a, 14b).

Length of body: 5.5 mm; expanse of wings: 10 mm.

Female. Dorsum of abdomen with a median longitudinal stripe extending from the second to the hind margin of eighth tergite.

Length of body: 6.5 mm; expanse of wings: 13 mm.

Locality: Tokusima, Sikoku; Yosino river, about 4 km up from the estuary, 9 ♂♂ and 4 ♀♀ (in spiritus), coll. by SYUITI MORI, April (?), 1936.

Remarks: This species resembles closely *Capnia takahashii* OKAMOTO (1922, p. 6, Taf. 1, fig. 3), but differs from it in several characteristics. The present new species is larger than *C. takahashii* (in spiritus) whose length is only 4 mm in ♂ and 4.5 mm in ♀. In *C. takahashii* the antenna is a little shorter than the fore-wing, but in the present species it is much shorter, about 3/5 as long as the fore-wing. The cerci of *A. sikokuensis* are about half as long as the fore-wing, while those of *C. takahashii* only a little shorter. The wings are hyaline in the former, but infuscated in the latter. The male genital parts of the present species agree in most respects well with those of *C. takahashii*, but its recurved supra-anal process does not reach the dorsal tubercle on the seventh tergite as in *C. takahashii*.

Japanese species of Capniidae

Besides the three species described above, five species belonging to Capniidae have been found in Japan, namely, *Capnia takahashii* OKAMOTO, *C. conica* KLAPALEK, *C. japonica* OKAMOTO, *C. bituberculata* UÉNO, and *Capnella bulba* UÉNO. FRISON (1929) distinguishes *Capnia* PICTET from *Allocapnia* CLAASSEN (*Capnella* CLAASSEN auct., preocupied) by the form of the posterior margin of the large chitinized area of the mesosternum. In the latter genus, *Allocapnia*, the median area of mesobasisternite is markedly produced back-

wards. According to this designation, both *C. bituberculata* and *C. bulba*, together with *C. nivalis*, should be placed under the genus *Allocapnia*. It is, however, unknown as to which genus the other three species may belong. FRISON (l. c.) used also the relative length of the anal field of the hind-wing for separating these two genera. However, this combination of characters, the mesosternum and hind-wings, is not applicable to all Japanese capniids. The species such as *bituberculata* and *sikokuensis* have hind-wings with the anal field much smaller than the front portion as in *Capnia* defined by FRISON. Only *Allocapnia bulba* (=*Capnella bulba*) agrees with this combination of characters (vide UÉNO 1929, p. 147, fig. 25).

The nemourid (s. lat.) affinities of *Eucapnopsis* OKAMOTO (1922, p. 8), which was established as a member of Capniidae and consisted of two species, *stigmata* OKAMOTO and *4-segmentata* OKAMOTO, has been noticed by NEAVE (1934). FRISON (1935), however, considers that it should be transfered to the family Leuctridae, because "the short cerci of the adult are the strongest warranty for this placement."

3. *Rhopalopsole subnigra* OKAMOTO

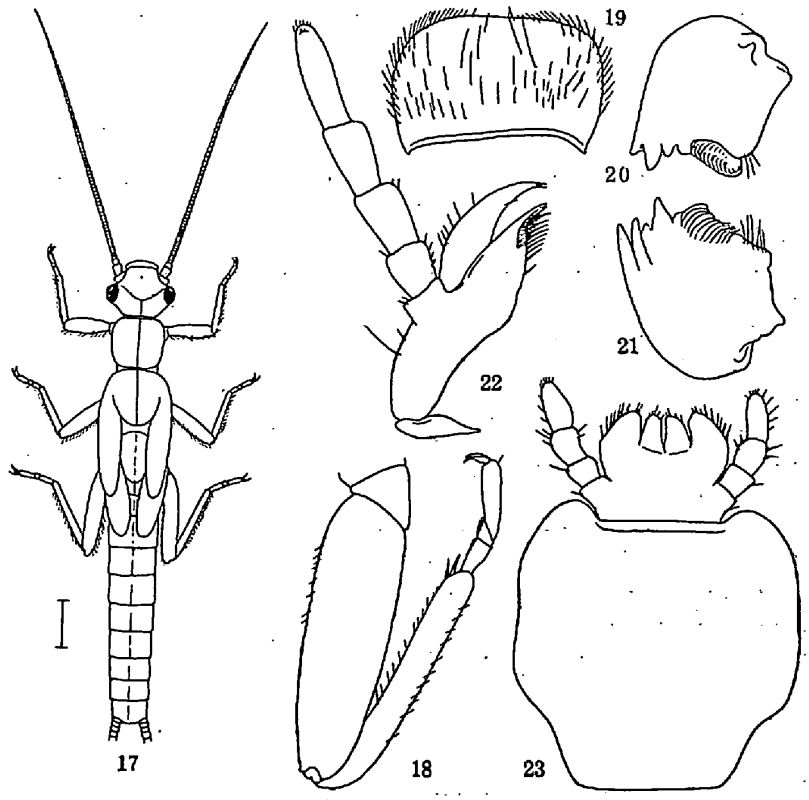
OKAMOTO, 1922, p. 42, Taf. 6, fig. 9 and 10.

7 ♂♂ and 8 ♀♀ were collected by Dr. YAICHIRO OKADA at Yunomine, Wakayama Pref. (Prov. of Kii) on March 24, 1937. These specimens agree well in most respects with OKAMOTO's original description. The type was collected at Minomo north of the city of Osaka in February, 1915. Length of body: 5~6.5 mm in ♂; 6.5~7 mm in ♀; expanse of wings 11.5~12.5 mm in ♂, 14.5~15 mm in ♀.

Nymph: 10 nymphs were collected at the same place (St. XII, water temperature 28°C due to the inflowing of hot-springs),[2] where the imagos of *Rhopalopsole subnigra* were obtained. These nymphs (fig. 17) are fundamentally similar to the nymph of the genus *Leuctra*, and the close examination of their wing-pads made it obvious that they were of *R. subnigra*.

Length of body: 5.5~7 mm. General color brownish yellow; antennæ, legs and cerci yellow. Body elongated. Head wider than prothorax, widest at compound eyes, rounded behind, epicranial stem a little shorter than half of prothorax length; arrangement of ocelli as in the imago; antennæ long and slender, composed of more than 65 joints, first joint very large. Pronotum quadrate, slightly narrowed behind, angles rounded. Wing-pads nearly parallel with body axis, long and narrow; fore-wing-pads extending hind margin of metathorax and overlapping basal half of hind wing-pads. Legs rather short; femur a little longer than tibia, but much broader than latter; tibia with two long spines about $\frac{1}{3}$ length of first tarsal joint at apex

2) Y. OKADA and S. ITO 1937, Zool. Mag. (Japan), 49, 10: 353~361. (*In Japanese*).



Figs. 17~23. *Rhopalopsole subnigra* Okamoto (nymph).
17, Dorsal view; 18, hind-leg; 19~23, mouth-parts: 19, labrum, 20 & 21, mandibles, 22, maxilla, 23, labium.

on lower side; of three tarsal joints, second very short, third nearly twice as long as first, with two claws. Abdomen elongated, not markedly tapered toward apex; each segment with lateral margins straight, slightly broader than long; last segment rounded behind.

Mouth-parts (fig. 18~23) agree closely in most respects with those of *Leuctra*. Labium with glossæ and paraglossæ extending forward nearly the same distance, outer margins with rows of stiff setæ; paraglossæ slightly broader than glossæ; palpifer distinct; labial palpi extending far beyond apex of paraglossæ (in *Leuctra* not beyond apex of paraglossæ), three-jointed, basal joint shortest, second and third longer than first, third twice as long as first. Lacinia of maxilla ends in two slender, sharp teeth, beneath which are present a row of about nine stiff setæ on inner side and of fine setæ on outer side; galea extending slightly beyond tip of lacinia and ending in two sharp teeth; palpifer indistinct; palpi well-developed, thick, $2\frac{1}{2}$ times as long as labial palpi, second joint shortest, third and fourth subequal in length, fifth $1\frac{1}{2}$ times as long as fourth. Mandibles well-developed, heavily chitin-

ized; 3～4 teeth at apex, with a well-developed mola and a few stiff setæ.

Literature cited

Claassen, Peter W. (1931): Plecoptera Nymphs of America (north of Mexico). Thomas Say Foundation, Vol. 3, 1～199.

Frison, Theodore H. (1929): Fall and Winter Stoneflies, or Plecoptera, of Illinois. Illinois Nat. Hist. Surv. Bull. 13, 2: 345～409.

——— (1935): The stoneflies, or Plecoptera, of Illinois. Illinois Nat. Hist. Surv. Bull. 20, 4: 281～471.

Neave, F. (1934): Stoneflies from Purcell range, B. C. The Canad. Entom. 66: 1～6.

Okamoto, H. (1922): Zweiter Beitrag zur Kenntnis der japanischen Plecopteren. Bull. Agricult. Exp. Station, Government General of Chosen, No. 1: 1～46.

Smith, Lucy W. (1917): Studies of North American Plecoptera (Pteronarcinae and Perlodini.) Trans. Amer. Entom. Soc, 43: 473～489.

Uéno, Masuzo (1929): Studies on the stoneflies of Japan. Mem. Coll. Sci. Kyôto Imp. Univ. B, 4: 97～155.

Wu, Chenfu F. (1936): The Stoneflies of China (Order Plecoptera). Peking Nat. Hist. Bull. 11, 1: 49～82.