Notes on the Larvae of Two Interesting Gomphidae (Odon.) from the Malay Peninsula

(Plates II—IV: two text-figures)

By M. A. LIEFTINCK

(*Mus. Buitenzorg*)

In April, 1928, the writer received from Dr. E. TITSCHACK, of the Hamburg Museum, a fine collection of Asiatic Dragonfly-larvæ for identification and description. The insects are of very great interest, because the collection contains numerous new forms from different sources, among them a good deal of hitherto unknown Gomphid larvæ, mostly from China but also from the Malay Peninsula and the Great Sunda Islands. One of these larvæ, a splendid example of *Sieboldius japponicus* SELYS, from Malacca, took the writer's special attention because of its singular appearance and its huge size, and it was thought desirable not to delay publication but to give a full description and some illustrations of it, it was intended also to give some remarks on the supposed habits and life-history of this larva, as submitted to him by Dr. LAIDLAW who kindly sent a second highly interesting larva, belonging to the *Gomphidae*, viz. a freshly emerged example of *Heliogomphus kelantanensis* (LAIDLAW), with its exuviæ, taken in the same country and forming part of the F. M. S. Museums collection at Kuala Lumpur.

However, owing to the writer's departure to Java, the publication of the results of these investigations was much delayed, only a few notes on the *Sieboldius* larva being embodied in a Dutch periodical.

As only very little is still known about the early stages of this family, a careful description of these larvæ, accompanied by some figures of their external structures, is now given, the publication of which will, it is hoped, found to be justified.

Unless otherwise stated the figures are original. For the fine photographs of the *Sieboldius* larva I am indebted to Mr. F. STACHHOUWER, of the Geological Laboratory, in Amsterdam.

Sieboldius japponicus

SELYS 1854. (Text fig. 1 and pl. II fig. 1–3, III fig. 1–3).

LIEFTINCK, Tijdschr. Ent., 72, March 1929, Verslag pp. XLV—XLVII. (Notes on larva, in Dutch).

Material studied:—One male larva, ult. labelled: Camp Jor, Wasserscheide zwischen Perak und Pahang (Malakka-Gebiet), ALB. GRUBAUER leg., vend. 30-xii-1902 (printed), in Mus. Hamburg.

A very large and robust species, with exceedingly flattened angular abdomen, much dilated antennæ and almost ribbon-like, flattened legs. *Coloration* dark brown. Pattern indistinct, as is shown on pl. II fig. 1-2.

Head transverse, broader than long, much flattened above from posterior margin of compound eye to the front, narrower behind, oblong, with distinct rather elevated and rounded postocular lobes, and with two small knob-like tubercles on dorsal surface at each side of the median line. Frons much protruding between the antennæ, emarginate anteriorly, inserted in which a rounded tubercle. Eyes widely distant, moderately large, though much projecting laterally, situated at middle of head. Antennæ very peculiar in shape: the two basal joints short and small, cylindrical; third joint enormously enlarged, plate-shaped and with inner and outer edges cut straight; margin somewhat elevated and covered with minute scale-like hairs. Last joint of antennæ wholly absent. Ocelli indicated as light spots. (pl. III fig. 1).

Labium very short and robust, much broader than long, considerably protruding in front, reaching beyond frontal tubercle; its posterior border extending between the fore legs; ventral surface with the sides bent up. Mentum contracted in its basal one-fifth. Median lobe with its anterior border nearly straight, its free margin very slightly projecting, evenly rounded, bearing a dense fringe of short, tubular, golden-brown hairs, the margin itself provided with 16–17 very low, shining, dark brown teeth, which are seen with some difficulty. Lateral lobes with the outer margins very convex and with about 25 thickened knobs of the same colour along inner margin. Moveable hook short and strong (pl. III fig. 2 and text fig. 1).

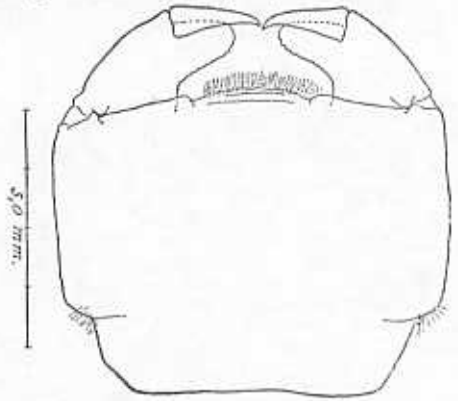

Fig. 1.—*Sieboldius japponicus* Selys.
Interior view of labium, in ultimate larval instar.

Prothorax divided into dorsal and ventral parts; the dorsal portion less broad than the head, much hollowed, somewhat saddle-shaped, with its margins well raised. Thorax robust, though smaller than in the supposed larva of *albardae*, much enlarged behind, sharply pinched in the median line. Wing-pads rather long, reaching middle of fifth segment. Neuration indistinct.

Legs rather robust and much flattened. Fore and middle pair much shorter than the hindermost, the fore legs shortest. Femora almost bare, tibiæ pubescent exteriorly. Fore tibiæ longer than femora, middle tibiæ of about same length, hind tibiæ slightly shorter than femora. Tarsi very short. Number of separate joints 2, 2, 3.

Abdomen extraordinary broad and flattened, gradually increasing in width from base to the end of segment 8, thence suddenly narrowed to almost a point, with segment 7—8 widest. Dorsum somewhat elevated. Segments of nearly equal length, excepting first, which is very short, and tenth which is exceedingly small and rather inserted in the ninth. The lateral apical edges of segments 2—6 are much incised and produced into large trapezoidal leaves, their free margins being triangularly pointed behind. Edges of 7 acute, of 8 almost straight. Dorsal hooks prominent on segments 2—4, pointed, that on 3 longest, flattened laterally and bent caudad though not overlapping the posterior margin of the same segment; that on 5 longer, compressed laterally but largely rounded in profile. Dorsal hooks on remaining segments replaced by very low, rounded, longitudinal rails. Seen from below, the abdomen is divided into five longitudinal strips, the median one being narrow and flat. Outline of the true body-cavity clearly indicated, regularly ovate and slightly concave. Side-strips larger from before backwards, giving the abdomen its highly characteristic shape.

Anal appendages forming together an elongated pyramid of about the same length as segments 9+10. Cerci longest, with their exterior sides slightly concave and with their tips rounded, strongly channelled interiorly to envelop the appendix dorsalis. This very broad at base, channelled at sides, strongly narrowed at its middle and finally tapering with rounded tip. Cercoids very short, less than one-third as long as cerci, pointed. Genital valves at base of segment 9 exceedingly small, closely approximated, triangular (pl. III fig. 3).

Total length of body (incl. apps.)	..	42.0 mm.
Greatest width of head, across the eyes	..	8.6 ,,
Length of abdomen ..	..	27.0 ,,
Greatest width of abdomen ..	..	22.5 ,,
Length of hind femur (excl. troch.)	..	15.5 ,,

The striking genus *Sieboldius* is confined to South East Asia and comprises five species, one of which occurs in the Malay Archipelago. They may be enumerated as under:—

S. albardae SELYS	China, Japan
S. gigas (MARTIN)	Tonkin
S. herculeus NEEDHAM	Fukien
S. japponicus SELYS	Burma, Siam, Malaya, Sumatra, Borneo.
S. nigricolor FRASER	South Shan States.

Its very close ralationship to the nearctic genus *Hagenius* has been pointed out by WILLIAMSON (14, p. 273).

The larva of *Hagenius brevistylus* SELYS was first described by CABOT in 1872 (1), from material collected in several localities in the United States, and who has also given a fine drawing of the full grown larva (*loc. cit.*, pl. 3 fig. 4). Afterwards HAGEN (4) published a very ample description of it, and to NEEDHAM we owe interesting life-history notes and a photograph of the cast-skin of the *brevistylus* larva (7, pl. 18 fig. 7).

CABOT was also the first author who became acquainted with the larva of *Sieboldius*, and in the cited paper he discussed a single young larva—probably in the penultimate or ante-penult instar—found by him among material from Kanagawa in Japan. A portrait of this remarkable specimen is given on pl. 3 fig. 5 and is reproduced on pl. III fig. 4 of the present paper.

As only one species of *Sieboldius* is known from Japan, viz. *albardae* SEL., CABOT'S supposition of his larva being representative of the incomplete insect in all probability is correct. The specimen figures under the name '*japponicus*' but it may be remembered that in the original description of that species the habitat was wrongly given as Japan, hence the unfortunate application of names.

A further note on the larva of the Japanese species was published by UCHIDA in 1907 (12). As noticed already before, a short account on the larva of the true Malaysian *S. japponicus*, with remarks on its possible manner of living drawn up from the same specimen as that discussed more fully in this paper, was given by the present author in 1929 (*loc. cit.*).

Finally, NEEDHAM in his recent "Manual of the Dragonflies of China" (10), described a new *Sieboldius* from Fukien,

including some notes on a big larva that was found by Prof. NEEDHAM himself "in a ditch of slowly running water by a roadside near Zakow, Chekiang", and "at the edge of a rice field". These larvæ were identified as *Sieboldius* spec., without further comments.

The discovery of this curious insect is of great importance and interest; firstly, because a brief indicatory remark is given on the environmental conditions under which it was found, and secondly, because of its very striking resemblance to the specimen recorded herewith from the Malay Peninsula.

Leaving the matter undecided whether NEEDHAM'S example has to be referred to *herculeus* from Fukien, or to yet another, possibly undescribed, species, any possibility of its belonging to the best known Chino-Japanese species, viz. *albardae* can safely be eliminated, since CABOT described a quite different type of larva from Japan which very likely belongs to that species (*huj. op.*, pl. I fig. 4-5).

Fortunately the very characteristic shape of the body of NEEDHAM'S larva is well demonstrated by the outline figure as reproduced on pl. IV fig. 3 of the said work, allowing us to undertake a direct comparison between the two animals. Although strikingly similar in general aspect, some obvious differences are to be found, for the better understanding of which it was thought advisable to add a reduced copy of NEEDHAM'S drawing, rendered on pl. III fig. 4 of this paper.

These differences may be tabulated as follows:—

S. japponicus (Malaya).	*S. species* (Chekiang).
1. Total length of body 42, of abdomen 27, width of head 8.6, of abdomen 22.5 mm.	1. Total length of body 38, of abdomen 24; width of head 9, of abdomen 22 mm.
2. Fourth antennal joint absent. Marginal mental teeth of labium 16-17, number of teeth along interior margin of lateral lobes about 25.	2. Fourth antennal joint vestigial. Marginal mental teeth of labium 10-12, those along margin of lateral lobes about 18.
3. Leaf-like expansions of segment 2-9 of abdomen more strongly projecting laterad, especially that of segment 7, the outer edge of 8 being more transversely placed and almost rectangular.	3. Leaf-like expansions of segments 2-9 of abdomen less projecting laterad, the outer edges of segments 7 and 8 decidedly more rounded.
4. Relative lengths on mid-dorsal line of segments 7-10 and appendages as 10: 10: 10: 3: 13.	4. Relative lengths on mid-dorsal line of segments 7-10 and appendages as 10: 10: 10: 5: 9.

Turning now to the biology of the genera *Hagenius* and *Sieboldius*, we must assume that very little is known with certainty about the habits of the peculiar *Sieboldius* larvæ. It has often been stated that, as a matter of course, conspicuously flattened aquatic insect larvæ have adapted themselves to a mode of living in swiftly flowing waters, attached to smoothest, current-swept stones or clinging to rocks along the banks of the stream. Of course, many instances are known of insect larvæ, belonging to various orders, having such specializations but among the *Gomphidae* which generally are burrowers in mud or sand along the edges of streams and ponds, we meet with adaptations to a mode of living under quite different circumstances but resulting in similar modifications of the shape of their body and even of its separate parts, such as the antennæ, the legs, etc.

Several oriental Ephemerid larvæ, such as *Thalerosphyrus determinatus* WALK., and *Compsoneuria spectabilis* EAT., are conspicuously flattened rock-dwellers, found attached to the underside of stones in rapidly running water. However, according to NEEDHAM (8), in the nearctic may-fly larva of *Ephemerella hecuba* for instance, the edges of the abdominal segments are spread out in great, flat, lateral spines shaped like the teeth of a circular saw. It is the flattest may-fly nymph known but it lives on the silt-covered boulders in slack water at the edges of the stream.

Among the oriental *Odonata*, the flat larvæ of *Ictinus*, with their disk-like ventral surface, are mud-dwellers clinging to smooth stones edging quiet lakes and ponds, and do not live, as LAIDLAW surmises, under boulders and rocks in rapidly running water (LAIDLAW, 5, p. 368).

FRASER described and figured the much flattened larva of *Onychogomphus biforceps nilgiriensis*, which has the third antennal joint enormously widened and quite similar in shape to our examples of *Sieboldius* and *Heliogomphus*. These larvæ were found "in the pool of a mountain stream, amongst debris consisting mainly of rotting leaves, twigs, etc. above Gudalur ...." (3, p. 426). This suggests a mode of living in similar situations as those described by FRASER.

Hagenius brevistylus. The larva of this nearctic species "frequents trashy shores, preferable in running water. Several

different sizes of nymphs are usually found together, indicating that a number of years are probably required for development" (NEEDHAM, in 9, p. 67) and ".... In other localities I have observed that the nymphs are likely to be found about the deep holes in the creek bed, under lodged driftwood. etc. "NEEDHAM, in 7, p. 441).

The author's remark on the developmental period of more than one year is, of course, of but little comparative value, since *Sieboldius* is mainly tropical in distribution.

Sieboldius ? species from China. The statement on the habits of this larva points to a dwelling in similar places.

Sieboldius japponicus. For many years Dr. LAIDLAW collected in Perak himself and visited quite similar spots as that which furnished our insect. His remarks on the subject, as contained in a letter, dated February 14, 1929, may be quoted *verbatim*.

"As to the larva, I think this must as you surmise, belong to *Sieboldius*. The size must be taken into account, the great length of the hinder femora and tibiæ, and I think I can make out with a lens the characteristic shape of the triangle, followed by what looks like a supplementary sector. But apart from these distinguishing characters, to which should be added the parallel wing cases, it is quite the most curious larva I have seen. I caught a single male *S. japponicus* in Perak (about 100 miles from where your larva came from) in dense forest. I believe the insect breeds in small muddy puddles in the forest, which are only a few inches deep, and depend on the copious rain, which in that part of the world may fall at any time of the year. These puddles often dry up, but none the less whenever rain falls frogs and all sorts of creatures resort to them as nurseries. The extraordinary flattened form of this larva may be an adaptation to living in very shallow muddy pools. A depression such as is made, say by an elephant's foot mark, when filled with rain water will often in a day or two be filled with tadpoles, etc., which are left to perish if the rain does not fall for a few days. A flat beast like this larva could live in the mud at the bottom of a small depression where other creatures would probably dessicate ....."

It is my hope that future researches in the Malay Peninsula or Sumatra may clear up the dark points in the life-history of this interesting species.

Heliogomphus kelantanensis

LAIDLAW 1902 (Text fig. 2 and pl. II fig. 6, IV fig. 1-4).

LAIDLAW, Proc. Zool. Soc. London, I-II, 6 & 25, 1902, p. 80, 385, pl. 5 fig. 5 (male insect).—Hab. Kuala Aring.

Material studied:—One female exuviæ, with freshly emerged imago, Malay Peninsula, Kedah, near Jitra, Catchment Area, 9-iv-1928, H. M. PENDLEBURY (coll. F. M. S. Museums).

A small species with much flattened hairless body, enormously enlarged plate-shaped third joint of antennæ, and rather robust legs.

Coloration sandy-yellow, originally covered with a thin coat of sand or loam; dorsum of abdominal segments 2-9 with a distinct pattern consisting of groups of more or less confluent, lightly coloured, spots.

Head of moderate size, much flattened above, broadest across the eyes which are rather large, slightly projecting; occipital lobes sloping and somewhat convex behind the eyes, well rounded behind. Head much projecting in front, frontal lobe very broad, almost horizontal, its anterior margin distinctly convex and provided with minute scale-like hairs. Antennæ very peculiar, each about 2 mm. long. First two joints small, cylindrical. Third joint enormously enlarged, plate-shaped, with its inner (mesal) margin nearly straight, the outer edges rounded; margin hardly elevated, framed, with numerous minute, scale-like and much swollen stetæ. Fourth joint wholly absent. Ocelli, like a few other spots between median ocellus and compound eye, indicated as light spots.

Labium very flat, not protruding in front, reaching as far back as end of coxæ of first pair of legs. Below, the mesal longitudinal margins of the compound eye are elevated to form strongly raised rims bearing two rounded protuberances, one after another, the posterior border of the prosternum being saddle-shaped and provided with a downwardly directed cone, on each side close against the coxæ, thus firmly pressing the labium against ventral side of head and prosternum. Median lobe about as long as wide, contracted in its basal one-fourth, bearing interiorly and laterally a group of 5-6 short setæ; anterior border evenly rounded with its free margin distinctly convex, carrying a very dense fringe of tubercular golden-yellow hairs, the margin itself provided with microscopical, rather irregular and bluntly rounded teeth. Lateral lobes broadest at base, then slender and bent somewhat inward, with their apices rounded and with about

12 equidistant teeth along the inner margin, the interstices carrying one soft hair. Movable hook stout.

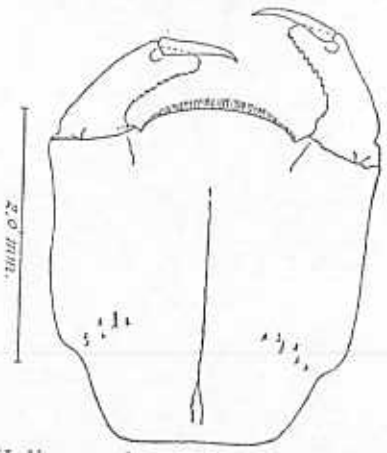

Fig. 2.—*Heliogomphus kelantanensis* (Laidlaw).
Interior view of labium, in the exuviæ.

Prothorax rectangular, divided into upper and ventral parts, the dorsal portion being raised, forming two crescent-shaped ridges, opened towards the front; ventral portion slightly narrower than head. Meso- and metathorax much broader and flattened above. Sterna plate-like, with sharply pronounced lateral margins. Mesosternum with a distinct redressed cone close against the coxæ, those on metasternum being much larger. Close behind each of these cones, including those on prosternum, there is a small pit-like impression, there being six in all. Wing-pads strongly divergent (possibly lying parallel on the back in the living larva!), reaching end of segment 4 or somewhat beyond.

Legs widely distant, placed at lateral edges of thorax, rather short and flattened dorso-ventrally. Fore tibiæ decidedly longer than femora, mid tibiæ only slightly longer and hind tibiæ much shorter than femora, Hind femora reaching to end of segment 5. Femora a little curved and hairless, tibiæ with very short hairs exteriorly. Tarsi much shorter than tibiæ. Number of separate joints 2, 2, 3.

Abdomen much wider than head, very flat, almost parallel-sided from base to end of segment 7, thence gradually narrowed towards the end, with general outline roughly ovate. Segments of nearly equal length, excepting first which is reduced, and tenth which is very narrow and annular. Lateral edges of segments very sharp; strong, much projecting spines on segments 6-9, that on 8 largest and acute. Side-margin of 9 finely

denticulate. Dorsal hooks very prominent, much flattened laterally, absent on segments 1-3. Ninth abdominal segment, when seen from side, very high, the tenth and anal appendages being abruptly lowered, much sloping apically. No lateral spines and no dorsal hooks on segment 10.

Anal appendages very small, the cerci longest; cercoids with their exterior sides concave, and with sharply pointed tips, of equal length as the appendix dorsalis, which is triangular and bluntly pointed.

Total length of body (incl. apps.)	..	18.0 mm.
Greatest width of head across the eyes	..	5.0 ,,
Length of abdomen ..	..	10.5 ,,
Greatest width of abdomen ..	..	6.4 ,,
Length of hind femur (excl. troch.)	..	5.0 ,,

This very interesting larva is the first *Heliogomphus* coming to our knowledge.

As many difficulties have arisen at the time when making a phylogenetic grouping of the more heterogeneous groups among the *Gomphidae* without having any satisfactory data on the larval characters, sole descriptions of larvæ whose correct identification is beyond doubt, seem urgently needed. A few remarks on that which has already been made known on the subject would not seem to be out of place.

The series *Epigomphus*, as defined by WILLIAMSON (15) and LAIDLAW (5) has the following Asiatic representatives:—

Macrogomphus
Leptogomphus
Heliogomphus
Microgomphus,

both *Perissogomphus* and *Acrogomphus* having been removed from it, the former being now placed in the *Gomphus* alliance by LAIDLAW, and the latter near *Onychogomphus* in the alliance of that name, created by the same author.

The genus *Cyclogomphus* is not sharply separated from the Epigomphine group and *verticalis* SELYS although its larva is said to be almost identical to that of *heterostylus*, yet is now thought by FRASER to be a *Microgomphus*. The larvæ of both *verticalis* and *heterostylus* were described and figured by FRASER, and judging from his notes these two species are so widely different from our *Heliogomphus*, described above, that in my opinion there remains a little doubt as to the correct identification of *verticalis*. Either the Indian larva does not belong together with the imago, or, as a quite likely possibility,

verticalis is neither a member of *Microgomphus*, nor even belongs to *Cyclogomphus* (FRASER, 2).

Among the above mentioned true Epigomphines the larval stages of one, *Leptogomphus*, are still unknown. According to FRASER (2) the grown larva of *Macrogomphus annulatus* is a most remarkable insect, very different from the more typical representatives of their group, viz. *Microgomphus* and *Heliogomphus*. Of these, we owe an important note on the larva of *Microgomphus torquatus* to FRASER, who published a description and useful figures of structural details, drawn from a specimen "lying buried in the mud near the border of a running stream", and taken near Poona, India (2). It was originally considered as belonging to *Cyclogomphus minusculus* SELYS.

To this larva our specimen of *Heliogomphus* bears a striking similarity, not only in its outward appearance, having an unusual broad and much flattened body, but also in the shape of the mask, the total absence of distinct localized fringes of hair on the femora, and by the very small,annular and strongly contracted tenth abdominal segment[1].

So far as our present knowledge goes, we are now able to recognize the three known Epigomphine genera by distinctive features as are briefly summarized in the table below.

Stress may be laid on the fact that in the larvæ of Gomphid genera a good deal of apparently fundamental morphological characters are often variable within the limits of each genus. and sometimes are exhibited as if each of these has developed along quite different lines of development, giving a very intricate commixture of characters, and making it very hard to define the total amount of known larvæ belonging to a certain genus against others of rather remote affinity but of similar appearance. Examples of this kind are met with in many genera. The larva of *Macrogomphus* for instance, appears to me to be rather similar in some important characters to certain species of the nearctic *stylurus* group of *Gomphus*.

On the other hand WALKER has shown, while discussing the very different types found in the larvæ of the group just mentioned, that equal difficulties may arise in opposite measure, giving a very instructive objection against the naming of previously defined 'groups', the nymphal characters of which "merge

1. In the outline sketch of the body of *M. torquatus* the tenth segment of abdomen is not even shown. The three last segments are said in the text to be spined laterally; it is obvious however, that FRASER has overlooked the very small tenth segment and accordingly must have meant the segments 7-9 being spined laterally (2, p. 463 and pl. 23 fig. 2).

into one another to such an extent that it seems unnatural to attempt their separation." (WALKER, 13, p. 79).

Cyclogomphus, Macrogomphus	*Microgomphus, Heliogomphus*
1. Body elongate, shaped much as in *Gomphus* and allied genera;	Body ovate, much flattened dorso-ventrally;
2. Legs short and robust, the femora with a long fringe of hairs on exterior surface;	Legs rather longer, the femora without distinct fringe of hairs, naked or with scattered hairs only;
3. Median lobe of labium with its anterior border straight, not projecting in front;	Median lobe of labium with its anterior border convex, projecting in front;
4. Distal end of lateral lobe of labium long and much pointed at tip, rather kukri-shaped.	Distal end of lateral lobe of labium short and much rounded.

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Papers marked with an asterisk have not been consulted by the writer.

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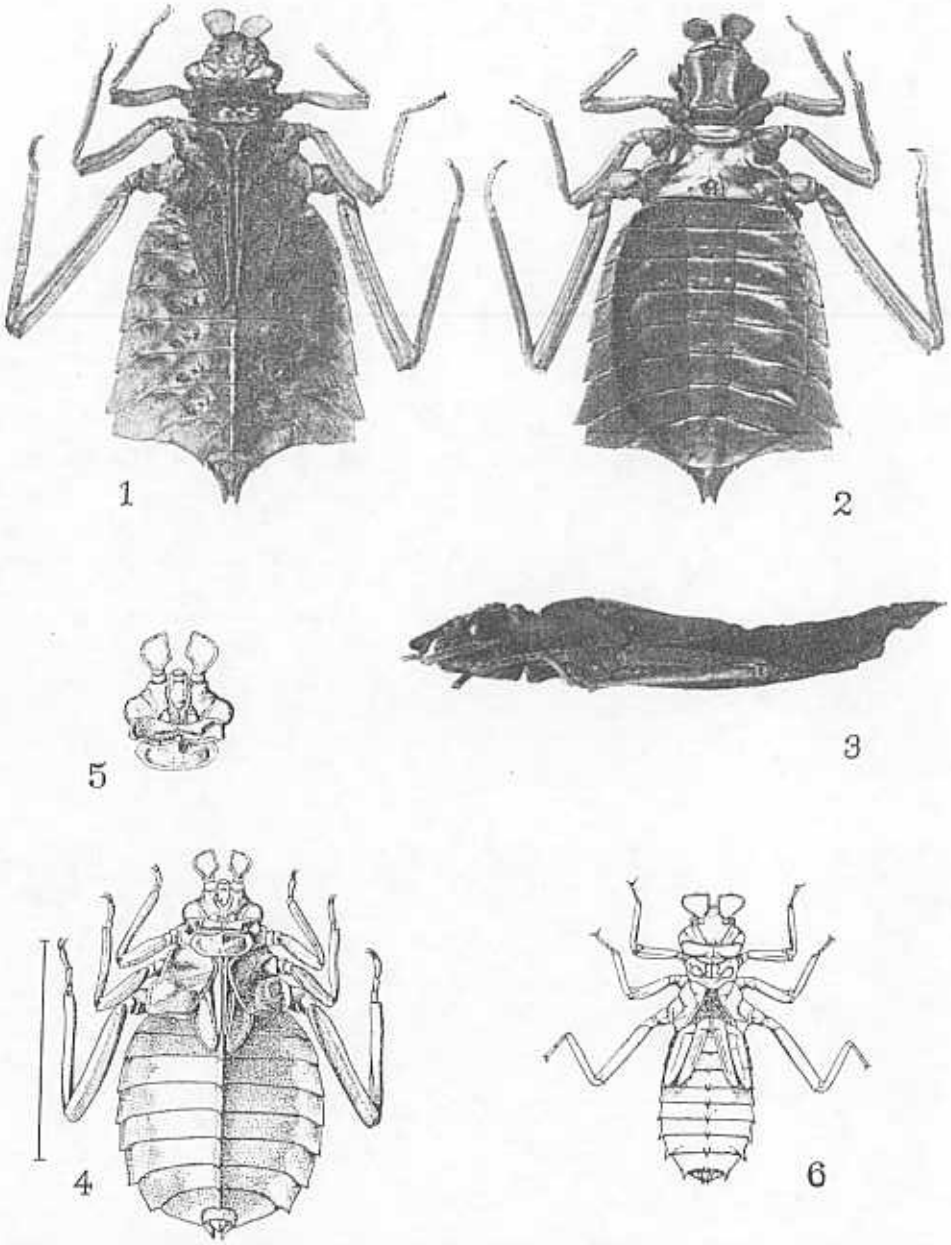
EXPLANATION OF PLATE II

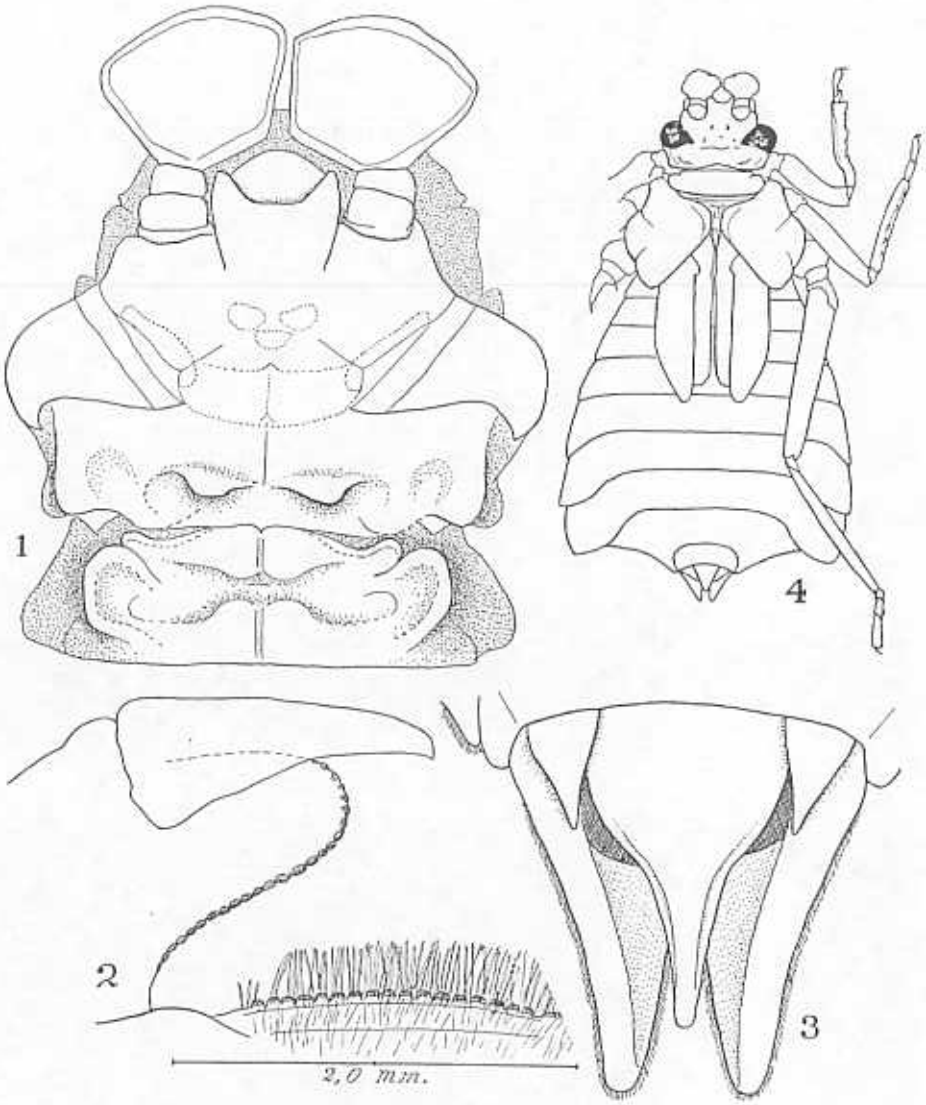
Fig. 1. *Sieboldius japponicus* SELYS, Malay Peninsula, ultimate larval instar, dorsal view. Length of body 42 mm.

Fig. 2. *Idem,* ventral view.

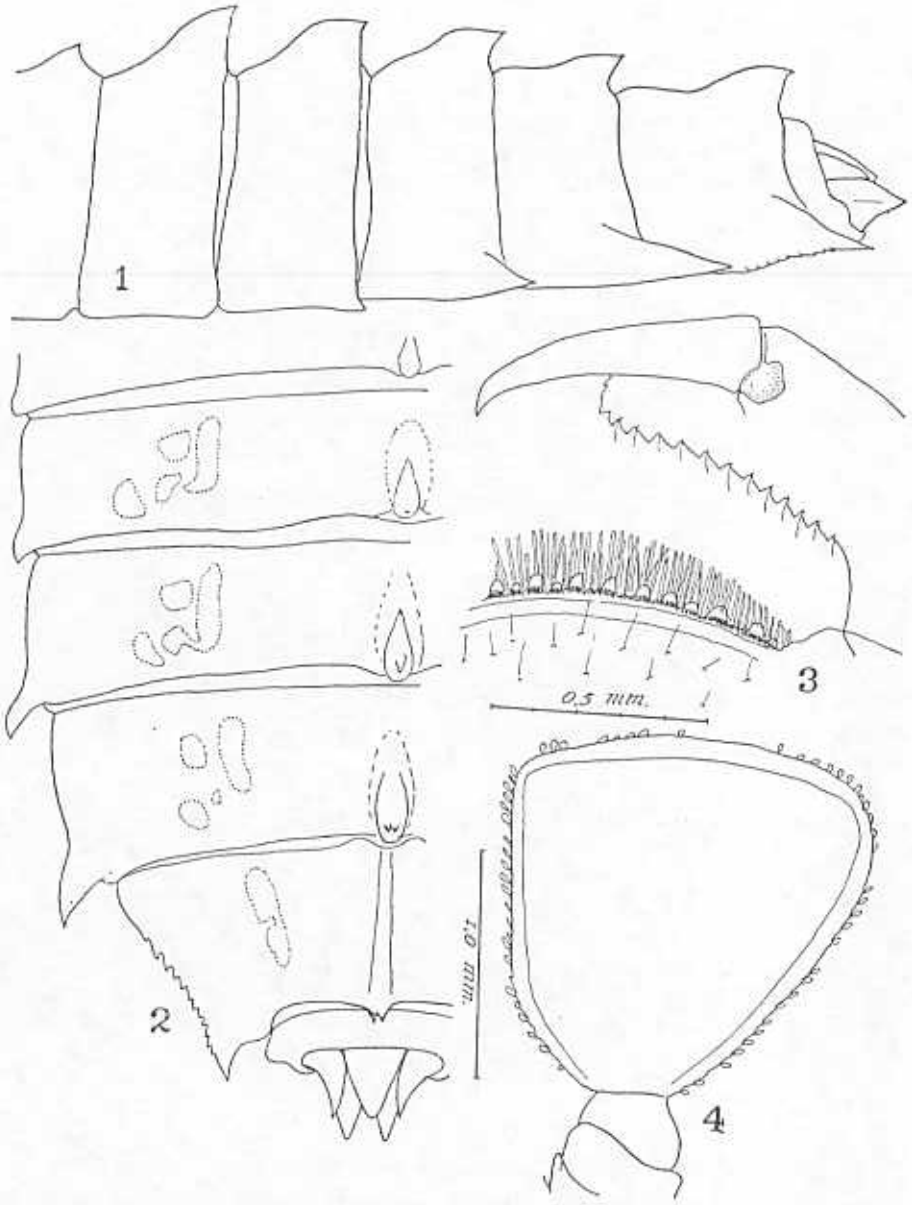
Fig. 3. *Idem,* side view.

Fig. 4. *Sieboldius ? albardae* SELYS, Japan, 3-ult. larval instar? Dorsal view. Length of body 28 mm. (After CABOT).





M. A. LIEFTINCK: *Dragonfly Larvae.*



M. A. LIEFTINCK: *Dragonfly Larvae.*

Fig. 5. Head of the same, more highly magnified, dorsal view. (After CABOT).

Fig. 6. *Heliogomphus kelantanensis* (LAIDLAW), Malay Peninsula, exuvia of larva. Length of body 18 mm.

EXPLANATION OF PLATE III

Fig. 1. *Sieboldius japponicus* (SELYS), Malay Peninsula, ultimate larval instar. Dorsal view of head.

Fig. 2. Left lateral portion of labium of the same, interior view.

Fig. 3. Anal appendages of the same, dorsal view.

Fig. 4. *Sieboldius ? species,* China, ultimate larval instar, dorsal view. Length of body 38 mm. (After NEEDHAM).

All figures highly magnified and not drawn to scale.

EXPLANATION OF PLATE IV

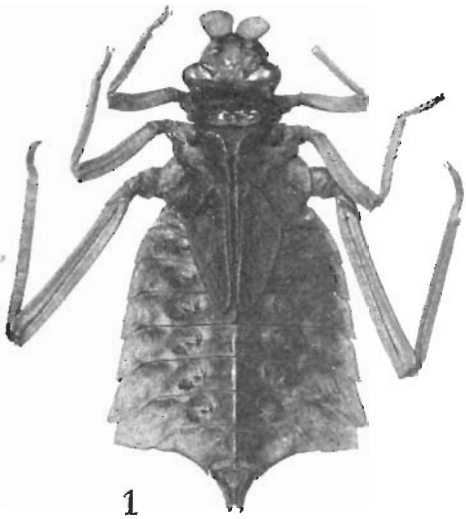
Fig. 1. *Heliogomphus kelantanensis* (LAIDLAW), Malay Peninsula, lateral view of abdomen in exuviæ.

Fig. 2. Left side of abdomen of the same, dorsal view.

Fig. 3. Right lateral portion of labium of the same, interior view.

Fig. 4. Right antenna of the same, dorsal view.

All figures highly magnified and not drawn to scale.



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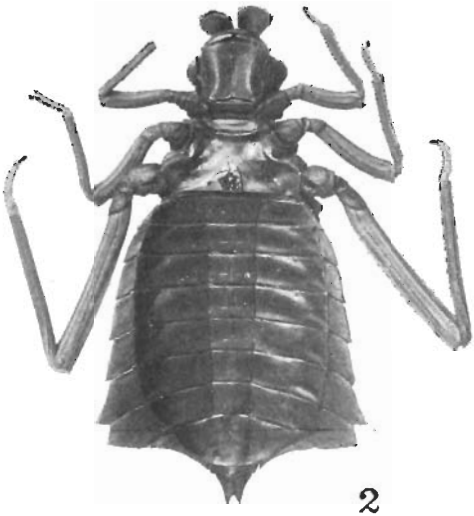

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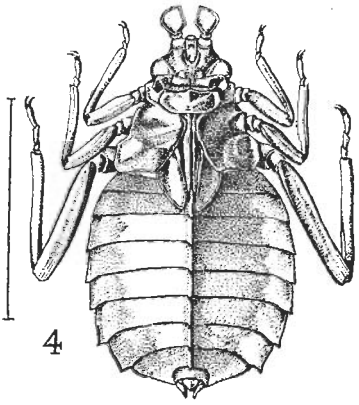

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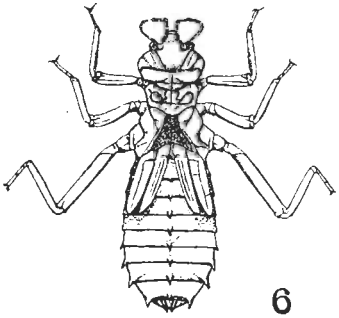

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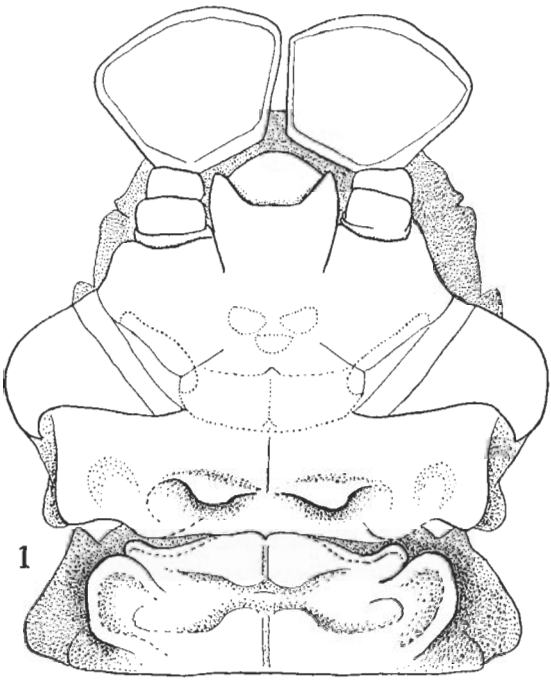
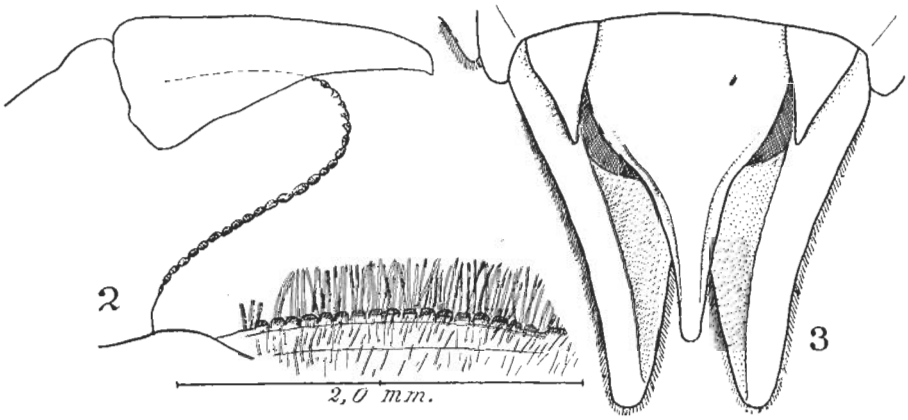
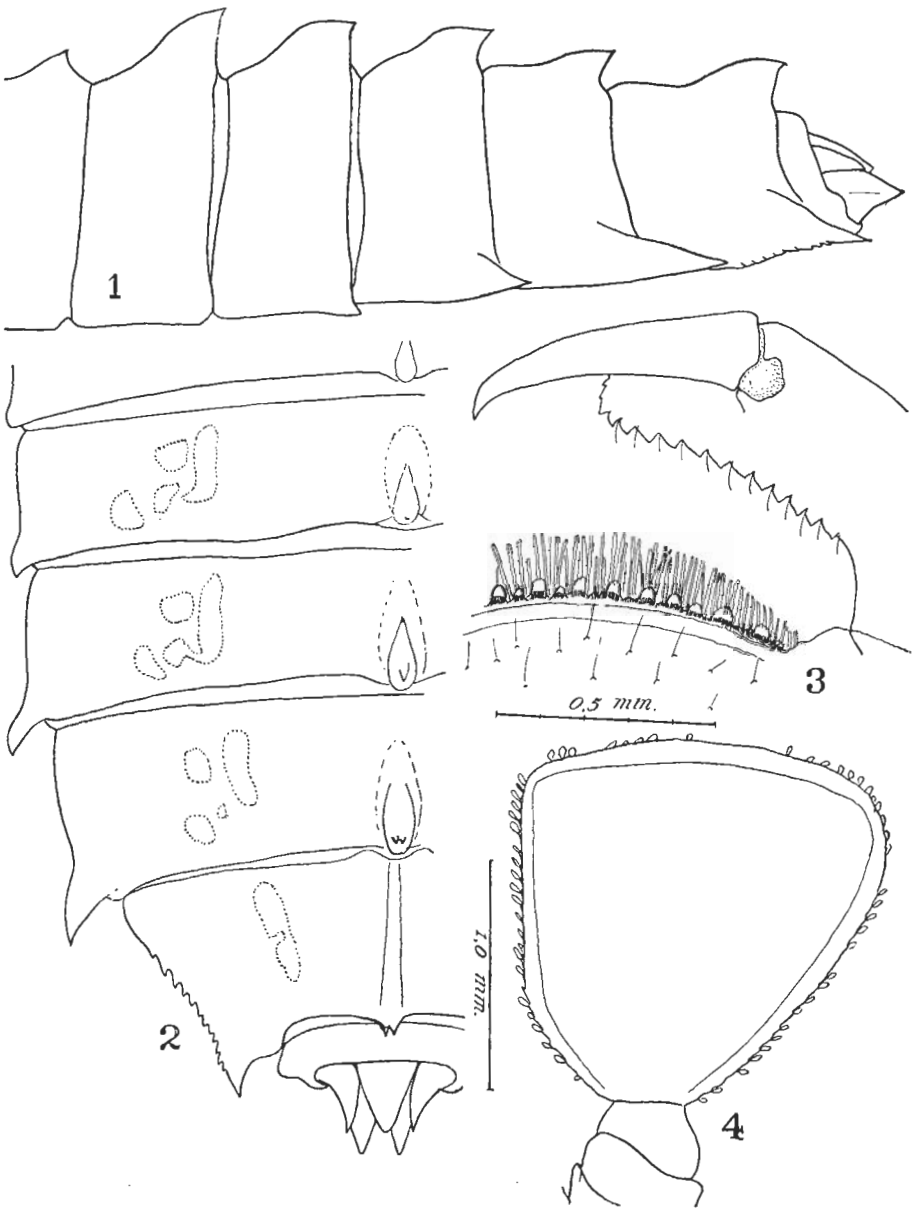
M. A. LIEFTINCK: *Dragonfly Larvae.*





M. A. LIEFTINCK: *Dragonfly Larvae.*



M. A. LIEFTINCK: *Dragonfly Larvae.*