

NOTES ON THE FAMILY HYDROMETRIDAE
||
WITH DESCRIPTIONS OF NEW SPECIES

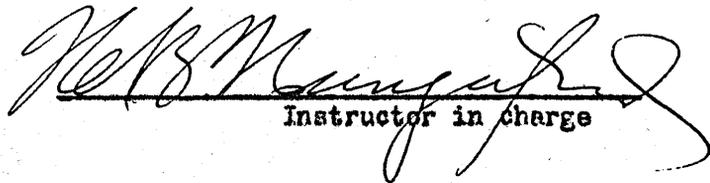
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PREFACE

The writer wishes to express his sincere appreciation of the kindly interest and helpful suggestions of Dr. H. B. Hungerford, under whose direction this paper has been prepared; special thanks are given to the following workers who have loaned or given to Dr. Hungerford the material studied: Dr. F. X. Williams, Doctors Bouvier and Seguy of the Paris Museum, Dr. G. Horvath of the Hungarian National Museum at Budapest, Mr. W. E. China of the British Museum, and to Messrs. J. M. Aldrich and W. L. McAtee of the Smithsonian Institution.

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PRESENT DIVISIONS OF THE FAMILY HYDROMETRIDAE.

In 1927 Esaki (2) proposed a new division of the family Hydrometridae into two subfamilies which he characterized as follows:

1. Hydrometrinae.

"Antennae four-jointed, third segment longest, first shortest, body slender, more than six times as long as broad; head setae in three pairs set in pits, two pairs on the anterior swollen part, one pair near the base; rostrum not passing the anterior margin of prothorax, omphalium absent, tarsal claws apical.

"Two genera: Hydrometra Lamarck, 1801, with 36 known species universally distributed; and Bacillometra Esaki, 1927, with a single known species from South America."

2. Limnobotodinae.

"Antennae five-jointed, fifth segment longest, second and fourth shortest, body less slender, not more than six times as long as broad; head setae set in non-pigmented areas, in two pairs, one pair on the anterior swollen part and one pair near the anterior margin of pronotum; rostrum reaching mesosternum, omphalium present, tarsal claws subapical, inserted dorsally.

"A single genus and species, Limnobotodes paradoxus Hussey, is known from Honduras, Central America."

KEY TO GENERA OF HYDROMETRIDAE.

A. Antennae four-segmented.

B. Pronotum longer than twice the breadth; mesosternum not
sulcated along the median longitudinal line.

-----Hydrometra Lamarck

BB. Pronotum only a little longer than broad; mesosternum
sulcated along the median longitudinal line; metasternum
with two distinct longitudinal sutures which extend and
vanish into the ventral abdominal segments.

-----Bacillometra Esaki

AA. Antennae five segmented; pronotum scarcely longer than wide.

-----Limnobotodes Hussey

LIST OF SPECIES OF HYDROMETRA LAMARCK AND
THE LOCALITIES IN WHICH THEY HAVE BEEN COLLECTED.

WESTERN HEMISPHERE

- | | |
|--|---|
| <u>H. agenor</u> Kirkaldy
Ecuador | <u>H. hungerfordi</u> Bueno
United States: Kansas |
| <u>H. argentina</u> Berg
Argentine | <u>H. husseyi</u> Bueno
Paraguay and Argentine |
| <u>H. australis</u> Say
United States: Georgia,
Florida, and Louisiana | <u>H. kirkaldyana</u> Bueno
Brazil and Argentine |
| <u>H. barei</u> Hungerford
United States: Florida | <u>H. lentipes</u> Champion
Guatemala and Costa Rica |
| <u>H. caraiba</u> Guerin
Cuba, West Indies | <u>H. lillianis</u> Bueno
United States: California |
| <u>H. championiana</u> Bueno
Guatemala, Costa Rica,
Colombia, Cuba, and Brazil | <u>H. martini</u> Kirkaldy
Eastern United States
and Canada |
| <u>H. chilensis</u> Reed
Chile, S. A. | <u>H. mensor</u> F. B. White
Brazil |
| <u>H. comata</u> Bueno
Trinidad, West Indies | <u>H. metator</u> F. B. White
Brazil |
| <u>H. consimilis</u> Barber
Cuba and Porto Rico | <u>H. mulfordi</u> Hungerford
Bolivia, S. A. |
| <u>H. cordubense</u> Bueno
Mexico (Gulf Coast), Lower
California, Costa Rica | <u>H. myrae</u> Bueno
United States: Georgia,
Louisiana, Florida;
Cuba and Haiti |
| <u>H. cyprina</u> Bueno
Mexico (Gulf Coast) | <u>H. naiades</u> Kirkaldy
Guatemala, C. A. |
| <u>H. exilis</u> Bueno
Honduras, C. A. | <u>H. priscillae</u> Bueno
Guatemala, C. A. |
| <u>H. fruhstorferi</u> n. sp.
Brazil | <u>H. sztolcmani</u> Jaczewski
Brazil |
| <u>H. gibara</u> Bueno
Cuba, West Indies | <u>H. wileyi</u> Hungerford
United States: Texas |
| <u>H. guianae</u> n. sp.
British Guiana, S. A. | <u>H. williamsi</u> n. sp.
Ecuador, S. A. |

EASTERN HEMISPHERE

- | | |
|--|--|
| <u>H. aculeata</u> Montrousier
New Caledonia | <u>H. horvathi</u> n. sp.
New Guinea |
| <u>H. albolineata</u> Scott
Japan | <u>H. juliena</u> n. sp.
Cochin-China |
| <u>H. albolineolata</u> Reuter
Africa | <u>H. lineata</u> Eschscholtz
China and Japan |
| <u>H. ambulator</u> Stal
Africa | <u>H. longicapitis</u> Bueno
Sumatra |
| <u>H. bifurcata</u> n. sp.
Madagascar | <u>H. madagascarensis</u> n. sp.
Madagascar |
| <u>H. eremobia</u> Kiritshenko
Transcaspia | <u>H. papuana</u> Kirkaldy
New Guinea |
| <u>H. fanjshira</u> n. sp.
Madagascar | <u>H. procera</u> Horvath
Japan |
| <u>H. feta</u> Hale
Australia | <u>H. stagnorum</u> Linneus
Europe |
| <u>H. gracilenta</u> Horvath
Hungary | <u>H. strigosa</u> Skuse
Australia |
| <u>H. greeni</u> Kirkaldy
India and Ceylon | <u>H. transvaali</u> n. sp.
Transvaal |
| <u>H. hoplogastra</u> Hale
Australia and New Guinea | <u>H. vittata</u> Stal
Philippine Islands |

OTHER GENERA AND SPECIES OF
THE FAMILY HYDROMETRIDAE.

Bacillometra ventralis Esaki
French Guiana, South America

Limnobotodes paradoxus Hussey
Honduras, Central America

LIST OF NEW (?) SPECIES OF HYDROMETRA LAMARCK

WHOSE AUTHENTICITY IS IN QUESTION.

- H. chabanaudi n. sp. (?)
French Guiana, S. A.
- H. aegypti n. sp. (?)
Egypt
- H. annami n. sp. (?)
Annam, Formoso, Nhatrang
- H. butleri n. sp. (?)
India
- H. isaka n. sp. (?)
Madagascar
- H. maindrona n. sp. (?)
Mascate
- H. smithi n. sp. (?)
Africa
- H. swensoni n. sp. (?)
China

CHARACTERS USED IN DESCRIBING THE HYDROMETRIDAE.

Torre-Bueno (15) lists the following primary characters used in describing and making keys for the family Hydrometridae:

1. Proportion of the antecular part of the head to the postocular.
2. Length of the rostrum as compared to the head, which is expressed in terms of its extension to or beyond the eyes.
3. Proportions of the antennal segments, particularly between I and II and between II and IV.
4. Thoracic and acetabular pittings, their absence or presence and their character.
5. Form of clypeus.
6. Proportional distances of the coxae inter se.
7. Extension of the anterior and posterior femora as compared to the apex of the head and the tip of the abdomen respectively.
8. Comparative length of the head and antennal segment II.
9. Male ventral processes of the sixth or seventh segments of the abdomen.
10. Terminal segment of the male abdomen.
11. Length.

The antecular part of the head is considered as extending from the very tip of the clypeus to the anterior margin of the eyes, while the postocular part is measured from the posterior margin of the eyes to the anterior margin of the pronotum. The head of the specimen must

be in its natural position if the measurements are to be accurate. The rostrum appears to be quite flexible and sometimes is quite difficult to measure accurately due to its curvature. Antennal segments I and II are stiff and straight and are easily measured. The third segment, however, is very frequently curved or sinuate and is frequently missing. The presence or absence of pits on the pronotum and acetabula and their arrangement seem to be characteristic. The distance between the coxae is more properly the distance from the anterior margin of each acetabulum to the anterior margin of the acetabulum immediately behind. The presence or absence, the position and structure, of the male abdominal processes are very good characters.

Considering that the proportions of the antennal segments inter se are being used in taxonomic work, it was thought worthwhile to measure as accurately as possible the lengths of the antennal segments of a series of specimens in order to see how much variation there was present. Accordingly the antennal segments of fifty males and fifty females of Hydrometra martini Kirkaldy were measured. These specimens had been collected in October from their hibernating quarters near a very small pool. The measurements were made with the aid of an eyepiece micrometer with fifty divisions to the millimeter.

It was found that the ratio of segment II to segment I varied from 2.05 to 2.33 in the males, with a mean ratio of 2.20; in the females the variation of segment II to segment I was from 1.94 to 2.23, the mean ratio being 2.06. The ratio of segment II to segment IV varied from 0.65 to 0.81 in the males, the mean ratio being 0.725; for the females the variation was from 0.64 to 0.81, the mean being 0.743.

The lengths of the antennal segments of six males and six females of Hydrometra myrae Bueno from Calcasieu Parish, Louisiana, were also measured. In the males of this species the ratio of the segment II to segment I varied from 2.50 to 2.80, the mean ratio being 2.65; in the females the variation was from 2.34 to 2.61, the mean ratio being 2.42. The mean ratio of segment II to segment IV was 0.91 for the males and 0.94 for the females.

In the following descriptions of new species a unit of measurement is equal in length to 0.0325 millimeters. The measurements of the antennal segments were made with the eyepiece micrometer having 50 divisions to the millimeter.

The drawings are dorsal and lateral views of the last segments of the abdomen. The drawings are all made to the same scale so that comparisons could be more easily made.

DESCRIPTIONS OF NEW SPECIES OF HYDROMETRA LAMARCK.

Hydrometra williamsi n. sp.

(Plate I)

Size and Color.

Length, 15.6 mm. (male holotype). The general color of the body is light brown in the dorsal view; in the ventral view the color is brownish black to black with the ventral side of the head and thorax darker than the abdomen; the pronotum has a very narrow, median, longitudinal, white stripe; a much broader stripe extends along the sides of the body from the anterior margin of the thorax to about the middle of the seventh abdominal segment where it fades away.

Structural Characteristics.

Head: Length, 155 units; the ratio of the antecular part of the head to the postocular part is such that the formula expressing the relationship is $AO:PO::105:39$; the dorsal interocular groove is short, not longer than the diameter of an eye, and very shallow; the ventral interocular groove is somewhat shorter than the diameter of an eye, and is much broader and deeper than the dorsal groove; clypeus nearly as broad as long, sharply pointed, and polished; the rostrum does not extend quite to the anterior margin of the eyes; the antennae are missing from the specimen.

Pronotum: Length, 72 units; an encircling row of pits parallel to the anterior margin and close to it; near the margin of each of the propleura is a row of five or six small pits; the pits on the posterior lobe are numerous but they are inconspicuous, small, shallow, and scattered.

Metanotum: Length, 60 units; the wings on the male are very small, narrow, and straplike, only 27 units in length.

Coxae: The distance between the first and second coxae is to that between the second and third coxae as 47:76; all the acetabula are pitted; the anterior acetabulum on the right side has four pits anterior to the cleft and one pit posterior to the cleft; the middle acetabulum has two pits anterior to the cleft and four posterior to it; the posterior acetabulum has ten small scattered pits. On the left side of the body the anterior acetabulum has three pits anterior to the cleft and two posterior to it; the middle acetabulum has three pits anterior and four pits posterior to the cleft; the posterior acetabulum has thirteen small scattered pits.

Femora: The anterior femora extend slightly beyond the apex of the head; the posterior femora surpass the tip of the abdomen by about one-fifth of their own length.

Abdomen: Length, 194 units; on the ventral side of the sixth abdominal segment of the male, on each side of the median longitudinal line, is a very large oval depression fringed with hairs which are longer and stiffer on the anterior margin; in dorsal view the sides of the seventh segment are parallel; the tergites of the first five abdominal segments are glabrous but on the posterior three-fourths of the sixth and on the seventh segment there are fine hairs; interspersed among the hairs are many, minute, black, spicule-like structures; the terminal dorsal spine is short, stout, and sharp.

Described from one male specimen collected at Napo, Ecuador, Feb. 14, 1923, by Dr. F. X. Williams. Type deposited in the Snow Entomological Collection, University of Kansas, Lawrence.

Notes.

This species differs from all other known species of Hydrometridae in the possession of the large oval depressions on the ventral side of the sixth abdominal segment.

Hydrometra fruhstorferi n. sp.

(Plate I)

Size and Color.

Length, 12.6 mm. (male holotype), 13.5 mm. (female allotype). The general color of the body is a very dark brown; a frosted band extends along the sides of the thorax; on the abdomen the band is much less distinct than on the thorax; the female is a somewhat lighter brown in color, the connexiva being a brownish yellow; on both the male and the female the frosted band along the sides of the body is very indistinct in the lateral view.

Structural Characteristics.

Head: Length, 114 units (male), 122 units (female); the ratio of the anteocular part of the head to the postocular part is expressed by the formulas AO:PO::72:34 (male), 76:36 (female); the interocular grooves are absent on the male; on the female the dorsal interocular groove is equal in length to the diameter of an eye and is very shallow; the ventral interocular groove is absent; the clypeus is nearly as broad as long, obtusely pointed (nearly rounded), and polished; the rostrum surpasses the eyes by about one-half the postocular distance on both the male and female; the antennae, with the exception of the basal segments, are missing from the male; on the female the lengths of the

antennal segments have the following ratio beginning with the basal one: 35:59:178:97.

Pronotum: Length, 62 units (male), 66 units (female); an encircling row of large pits parallel to the anterior margin and about four units from it; near the margin of each of the propleura are seven or eight pits arranged in two rows; a median row of pits on the posterior lobe and numerous other large pits present more or less in rows.

Metanotum: Length, 45 units (male), 47 units (female); the wings are very small, narrow, and straplike, only 19 units in length on the male and 21 units on the female.

Coxae: The distance between the first and second coxae is to that between the second and third coxae as 38:60 (male), and 42:63 (female); all the acetabula are pitted; on the male the anterior acetabulum on the right side has five pits anterior to the cleft and six pits posterior to it; the middle one has four pits anterior and two pits posterior to the cleft; the third acetabulum has seven scattered pits. On the left side of the body the anterior acetabulum has the pits arranged two anterior to the cleft and eight posterior to it; the middle acetabulum has three pits anterior and eight pits posterior to the cleft; the third acetabulum has ten scattered pits.

Femora: On both the male and female the anterior femora slightly surpass the apex of the head and the posterior femora slightly exceed the tip of the abdomen.

Abdomen: Length, 166 units (male), 180 units (female); the male processes on the ventral side of the sixth segment are mammilose, widely separated, placed slightly posterior to the middle of the segment, and joined by a broad, transverse ridge; on the ventral anterior

half of the seventh segment, on each side of the median longitudinal line, is a large depression fringed with hairs on the lateral and posterior margins. The first five abdominal tergites are smooth and polished; the sixth one presents a fine, transversely-wrinkled appearance; the male has a small dorsal terminal tubercle; the female has a very short terminal dorsal spine.

Described from two specimens, a male and a female, collected in Espirito-Santo, Brazil, in 1898, by Fruhstorfer. Types in the Paris Museum.

Notes.

In general appearance this species might be confused with H. wileyi Hungerford. However, in Hungerford's species the male processes are mammilose, widely separated and placed near the anterior margin of the segment; in the species just described the processes are mammilose but are placed slightly posterior to the middle of the segment and are joined by a broad transverse ridge.

Hydrometra guianae n. sp.

(Plate I)

Size and Color.

Length, 15.9 mm. (male holotype), 17.2 mm. (female allotype), 16.0 mm. (male paratype). The general color of the body is a dark brown, the head and abdomen being somewhat darker than the other parts; a broad, light-colored, frosted stripe extends along the sides of the body from the anterior margin of the pronotum to the anterior margin

of the sixth abdominal segment where it fades away into the darker color; on the female the stripe along the sides of the abdomen is broad, yellow, and very distinct; the posterior three-fourths of the pronotum has a narrow, longitudinal, median, light-colored stripe bordered on each side by a broader dark-brown stripe.

Structural Characteristics.

Head: Length, 163 units (holotype), 164 units (allotype), 160 units, (paratype); the ratio of the antecular part of the head to the post-ocular is given by the formulas AO:PO::111:41 (holotype), 112:40 (allotype), 108:40 (paratype); on the male holotype the dorsal interocular groove is short, not longer than the diameter of an eye, shallow, and narrow; the ventral interocular groove of the holotype is the same length as the dorsal groove but is deep and very broad; the dorsal interocular groove is somewhat broader in the female allotype than in the male; the clypeus is nearly as broad as long, pointed, and polished; on the holotype the rostrum extends nearly to the anterior margin of the eyes; on the allotype the rostrum reaches to the middle of the eyes; beginning with the basal one the lengths of the antennal segments are in the following ratio: 39:88:306:X (male holotype); the last segment is missing from the antennae of the holotype and all segments except the first are missing from the antennae of the allotype.

Pronotum: Length, 73 units (holotype), 85 units (allotype), 76 units (paratype); an encircling row of pits parallel to the anterior margin and about four units from it on the male holotype; posterior lobe with median longitudinal row of pits and other pits more or less in rows; seven or eight pits in two rows near the margin of each of the propleura.

Metanotum: Length, 64 units (holotype), 66 units (allotype); the wings of the holotype are small, narrow, and straplike, only 78 units in length; on the allotype and paratype the wings are large and long, extending slightly beyond the posterior margin of the fourth abdominal segment.

Coxae: The distance between the first and second coxae is to that between the second and third coxae as 44:82 (holotype), 55:85 (allotype); all the acetabula are pitted; on the male holotype the anterior acetabulum on the left side of the body has eight pits anterior to the cleft and nine pits posterior to it; the middle acetabulum has six pits anterior and twelve pits posterior to the cleft; the third acetabulum has nine scattered pits; on the right side of the body the anterior acetabulum has six pits anterior to the cleft and nine pits posterior to it; the middle acetabulum has seven pits anterior and ten pits posterior to the cleft; the posterior acetabulum has ten scattered pits.

Femora: The anterior femora attain the apex of the head on both the male and female; the posterior femora extend beyond the tip of the abdomen by about one-fourth of their own length on both the male and the female.

Abdomen: Length, 190 units (holotype), 216 units (allotype), 195 units (paratype); the male processes, located on the ventral side of the posterior half of the sixth abdominal segment, are hairy U-shaped ridges opening posteriorly; the seventh segment of the male is somewhat compressed ventro-laterally to form a broad, median, ventral, longitudinal keel, on each side of which is a large depression; the seventh segment also has a small lateral protuberance on each side,

located about the center of the segment as seen in the lateral view; the male has a short, sharp, terminal dorsal spine; the spine of the female is somewhat longer than that of the male; the tergites of the first five abdominal segments of the male are smooth but those of the sixth and seventh segments are roughened by very numerous, small, black, spicule-like processes.

Described from two males and one female collected near New Amsterdam, British Guiana, South America, on July 30, 1923, by Dr. F. X. Williams. Types deposited in the Snow Entomological Collection, University of Kansas, Lawrence.

Notes.

This species appears to be more closely allied to H. championiana Bueno than to any other known species. The most important differential characters lie in the shape and position of the male abdominal processes. In Bueno's species these processes are crescentic thickenings converging anteriorly, the ends equidistant from the respective anterior and posterior margins of the segment. In the species described above the processes, which are U-shaped hairy ridges opening posteriorly, are located on the posterior half of the segment.

Hydrometra madagascarensis n. sp.

(Plate II)

Size and Color.

Length, 14.6 mm. (male holotype), 16.6 mm. (female allotype); the general color of the body of both the male and female is a light yellowish brown except the connexiva which are a very dark brown.

Structural Characteristics.

Head: Length, 154 units (male), 178 units (female); the ratio of the antecular part of the head to the postocular part is given by the formulas A0:PO::106:42 (male), 127:45 (female). The dorsal interocular groove of both the male and female is shallow, not longer than the diameter of an eye; the ventral interocular groove of both the male and female is much broader than the dorsal groove, shallow, and about equal in length to the diameter of an eye; the clypeus is small and bluntly conical; the rostrum surpasses the eyes by about one-eighth the postocular distance on the male and extends to the anterior margin of the eyes on the female; the antennae are missing from both specimens.

Pronotum: Length, 43 units (male), 47 units (female); an encircling row of pits parallel to the anterior margin and about three units from it; entire pronotum pitted; the pits on the posterior lobe are much larger and deeper than those of the anterior part.

Metanotum: Length, 45 units (male), 50 units (female); the wings are absent on both the male and female.

Coxae: The distance between the first and second coxae is to that between the second and third coxae as 26:48 (male) and 30:55 (female); all the acetabula are pitted, the anterior and middle acetabula with two or three small pits on each side of the cleft and the posterior acetabulum with several small shallow depressions.

Femora: The anterior femora extend to the antennal tubercles on the male but do not extend quite as far on the female; the posterior femora of the male slightly exceed the tip of the abdomen.

Abdomen: Length, 208 units (male), 236 units (female); the male

processes, located on the ventral side of the sixth abdominal segment near its anterior margin, are four pointed chitinized tubercles; the two larger ones are located close together near the median longitudinal line of the segment; each of the smaller ones is located a trifle more posteriorly than the median ones and midway between the median line and the lateral margin of the segment; the terminal dorsal process of the male is very short and blunt; the terminal dorsal process of the female is considerably longer, being about one-third as long as the seventh segment.

Described from one male and one female collected in Forêt Tanala, Reg. de Ranomafana, Andranomafana, Madagascar, March 1901, by Ch. Alluaud. Types in the Paris Museum.

Notes.

This species appears to be more closely allied to H. longicapitis Bueno than to any other known species. The most important difference lies in the nature of the male processes. In Bueno's species there are two mammilose processes close to the anterior ventral margin of the sixth abdominal segment while in the species just described there are the four chitinized tubercles.

Hydrometra fanjahira n. sp.

(Plate II)

Size and Color.

Length, 12.8 mm. (male holotype); the general color of the body is a reddish brown; a longitudinal, median, narrow, white stripe extends from the anterior margin of the eyes to the base of the pronotum; the

anterior third of the pronotum and the lateral margins dark reddish brown in color; the remaining part of the pronotum brownish yellow; a narrow white band extends along the lateral margins of the thorax; ventral parts of the entire body with frosted appearance; white patches of frosting on the sides of the abdomen near the anterior margin of each segment; a broad, white, longitudinal stripe on the wing.

Structural Characteristics.

Head: Length, 113 units; the ratio of the antecular part of the head to the postocular part is given in the formula $AO:PO::72:31$; the dorsal interocular groove is slightly shorter than the diameter of an eye, fine, and shallow; the ventral interocular groove is equal in length to the diameter of an eye, broader and much deeper than the dorsal groove; clypeus about half again as broad as long, slightly concave on the anterior margin; the rostrum surpasses the eyes by about one-half the postocular distance; only the first two segments of the antennae are present and they are in the ratio of 29:65.

Pronotum: Length, 63 units; an encircling row of pits parallel to the anterior margin and about three units from it; the posterior two-thirds of the pronotum with a shallow, median, longitudinal groove, faintly pitted except near the posterior end where the pits are more distinct; an irregular row of about twenty pits near each lateral margin; five or six pits in an irregular row near each of the margins of the propleura.

Metanotum: The wings are large and long, extending nearly to the posterior margin of the fifth abdominal segment.

Coxae: The distance between the first and second coxae is to that between the second and third coxae as 37:68; all the acetabula are

pitted; on the left side of the body the anterior acetabulum has one pit anterior to the cleft and two pits posterior to it; the middle acetabulum has two pits anterior to the cleft and two pits posterior to it; the posterior acetabulum has two small pits; the pits on the right side of the body are similarly arranged except that the anterior acetabulum has two pits anterior to the cleft.

Femora: The anterior femora extend to the base of the antennae; the posterior femora slightly surpass the tip of the abdomen.

Abdomen: Two large elevations on the ventral side of the posterior half of the sixth abdominal segment; each elevation is about midway between the median, longitudinal line and the lateral margin; these elevations are about one-half as long as the segment and are capped with a longitudinal brush of long stiff hairs, inclined outward and backward; the seventh segment is slightly compressed ventro-laterally to form a ventral keel, on each side of which is a large depression which is very shallow; in dorsal view the sides of the seventh segment are nearly parallel; the tergites of the posterior two-thirds of the sixth segment and of the entire seventh segment present a fine, transversely-wrinkled appearance; the other abdominal tergites are polished; the tergite of the seventh segment is frosted; the terminal dorsal spine of the male is prominent, about one-fourth as long as the segment, and curved slightly downwards.

Described from one male bearing the following label: "Madagascar, Region du Sud-est, Vallee du Fanjahira, Isaka, Ch. Alluaud, 1901."
Type in the Paris Museum.

Notes.

This species seems to be more closely allied to H. juliena which

is described as new in this paper. They can be easily separated by the fact that H. fanjahira has the large elevations on the sixth abdominal segment, relatively shorter femora, and the shorter terminal spine.

Hydrometra juliena n. sp.

(Plate I)

Size and Color.

Length, 13 mm. (male holotype); the general color of the body is a brownish yellow.

Structural Characteristics.

Head: Length, 120 units; the ratio of the antecular part of the head to the postocular part is expressed by the formula $A0:P0::75:35$; both the dorsal and ventral interocular grooves are about as long as the diameter of an eye and are broad and shallow; clypeus truncate, about half again as broad as long; rostrum extends back one-third of the postocular distance; beginning with the basal one the ratio of the lengths of the antennal segments is expressed by the following: 40:80:210 (approx.):X; the third segment, due to its curvature, could not be measured accurately; the last segment of the antennae is missing from the specimen.

Pronotum: Length, 59 units; an encircling row of pits parallel to the anterior margin and about three units from it; the posterior lobe with a median longitudinal row of pits on the posterior two-thirds of the lobe; on each side of the median row and also near each lateral margin is an irregular row of pits; a row of six or seven pits near

the margin of each of the propleura.

Metanotum: Length, 53 units; the wings are large, extending slightly beyond the middle of the fifth abdominal segment.

Coxae: The distance between the first and second coxae is to that between the second and third coxae as 35:67; all the acetabula are pitted; the anterior acetabulum on the left side of the body has four pits, two anterior to the cleft and two posterior to it; the middle acetabulum has two pits anterior to the cleft and one posterior to it; the posterior acetabulum has one or two very faintly defined pits; on the right side of the body the pits are similarly arranged except on the middle acetabulum which has one pit anterior to the cleft and two pits posterior to it.

Femora: The anterior femora surpass the apex of the head by about one-seventh of their own length; the posterior femora extend beyond the tip of the abdomen by about one-sixth of their own length.

Abdomen: Length, 168 units; the two male processes are on the posterior half of the ventralside of the sixth abdominal segment; each process, which is about one-third the length of the segment, is about midway between the median, longitudinal, ventral line and the lateral margin and consists of a longitudinal brush of stiff hairs; the terminal dorsal spine is long and sharp, about one-half the length of the segment.

Described from one male bearing the label "Museum Paris, Cochinchine, Julien, 1875." Type in the Paris Museum.

Notes.

The position and nature of the male processes distinguish this

species from all other known species with the exception of H. fanjahira, which is described as new in this paper. H. julienna may be separated from H. fanjahira by the fact that the latter species has the two large elevations on the ventral side of the posterior half of the sixth abdominal segment, the femora are relatively shorter, and the terminal dorsal spine is shorter.

Hydrometra transvaali n. sp.

(Plate II)

Size and Color.

Length, 10.5 mm. (male holotype); the general color of the body is a dark brown; the dorsal part of the head and the ventral part of the thorax are lightly frosted; the ventral part of the abdomen is heavily frosted; the pronotum with a narrow, longitudinal, median, frosted line, bordered successively on each side by a narrow, dark purplish-brown band, a broader light yellowish-brown band, and a broad, dark purplish-brown band, the latter one lying on the margin of the pronotum; a narrow frosted stripe extends along the lateral margins of the thorax; a median, longitudinal white stripe on the wing.

Structural Characteristics.

Head: Length, 93 units; the ratio of the antecular part of the head to the postocular part is given by the formula AO:PO::58:27 (male); the dorsal interocular groove is about equal in length to the diameter of an eye and is shallow; the ventral interocular groove is about the same length as the dorsal groove but is somewhat deeper; the clypeus is truncate, about one and one-half times as broad as long;

the rostrum surpasses the eyes by about four-fifths of the postocular distance; beginning with the basal one the ratio of the lengths of the antennal segments is expressed by the formula 30:54:135 (approx.):78.

Fronotum: Length, 53 units; an encircling row of small pits parallel to the anterior margin and about three units from it; a shallow, median, pitted groove extends practically the entire length of the pronotum; the posterior lobe with scattered pits, those near the lateral margins being deeper and arranged more or less in rows.

Metanotum: The wings are large and long, extending to the posterior margin of the fifth abdominal segment.

Coxae: The distance between the first and second coxae is to that between the second and third coxae as 32:56; on the right side of the body the anterior acetabulum has one pit anterior to the cleft and two pits posterior to it; the middle acetabulum has two pits on each side of the cleft; the posterior acetabulum is unpitted.

Femora: The anterior femora attain the apex of the head and the posterior femora slightly surpass the tip of the abdomen.

Abdomen: The posterior half of the sixth abdominal segment is swollen; on the ventral side of the sixth segment, about midway between the median longitudinal line and the lateral margin, is a small brush of stiff hairs close to the posterior margin; the seventh segment is provided with a hairy, broad, ventral keel, extending the length of the segment; a large depression on each side of the keel; a heavy ledge above each depression with a tuft of long, spinelike hairs near the anterior margin and a similar tuft of much longer hairs near the posterior margin; at the posterior margin of the sixth segment is a fringe of short stiff hairs on the dorsal part of the segment; the

terminal dorsal spine is stout and sharp, about one-third the length of the segment.

Described from two males bearing the following label: "Transvaal, Makapan, E. Simon, Coll. Noualhier, 1898." Type in the Paris Museum.

Notes.

This species appears to be more closely allied to H. albolineolata Reuter than to any other known species. It may be distinguished from Reuter's species by the fact that his species lacks the broad, heavy keel and large depressions on the seventh segment; there is also considerable difference in the arrangement of the hair tufts on the two species, Reuter's species having two large lateral hair tufts visible from above on the last segment.

Hydrometra horvathi n. sp.

(Plate VII)

Size and Color.

Length, 14.5 mm. (male holotype); the general color of the body is a light brown; the head is darker in color especially the expanded area, the region about the eyes, and the ventral part; the pronotum with a narrow, median, longitudinal, frosted line bordered on each side by a dark purplish-brown band; this latter band bordered with a broad, yellowish-brown band which in turn is bordered with a broad, light-brown band near the lateral margin; a frosted stripe extends on the lateral margins of the body from near the anterior margin of the thorax to the posterior margin of the sixth abdominal segment with white patches near the anterior margin of each abdominal segment;

the abdominal tergites are dark brown but the connexiva and the ventral parts of the abdomen are light brown in color; the ventral parts of the postocular region of the head, the thorax, and the abdomen are lightly frosted.

Structural Characteristics.

Head: Length, 130 units; the ratio of the antecular part of the head to the postocular part is given in the formula $A0:PO::85:35$; the dorsal interocular groove is short, about equal in length to the diameter of an eye, shallow and narrow; the ventral interocular groove is about the same length as the dorsal groove but is much broader; the clypeus is truncate, about twice as broad as long; the rostrum surpasses the eyes by about one-third the postocular distance; the antennae are missing from the specimen.

Pronotum: Length, 73 units; an encircling row of pits parallel to the anterior margin and about three units from it; a median longitudinal groove extends nearly the full length of the pronotum; scattered pits on the posterior lobe, the pits more numerous and deeper near the lateral margins; the prothorax and mesothorax have a swollen appearance in comparison with the other parts of the body.

Metenotum: The wings are large, extending to the posterior margin of the fourth abdominal segment.

Coxae: The distance between the first and second coxae is to that between the second and third coxae as 35:65; the anterior and middle acetabula are pitted; on the right side of the body the anterior acetabulum has three pits, one anterior to the cleft and two posterior to it; the middle acetabulum has two pits anterior to the cleft and three

pits posterior to it; on the left side of the body the anterior acetabulum has one pit on each side of the cleft; the middle acetabulum has two pits on each side of the cleft; the posterior acetabulum on each side of the body is unpitted.

Femora: The anterior femora surpass the apex of the head by about one-eighth of their own length and the posterior femora extend beyond the tip of the abdomen by about the same distance.

Abdomen: The two male processes are located on the ventral side of the seventh segment slightly anterior to the middle and somewhat nearer to the median longitudinal line than to the lateral margin; each process appears to be a small sharp spine* ; the sixth and seventh segments are approximately the same length; the terminal dorsal spine is short and conical.

Described from one male specimen labelled "N. Guinea Biro 97, Stephansort Astrolabe B." Type in the Hungarian National Museum, Budapest.

Notes.

The presence of the male processes on the seventh segment distinguishes this species from any other known species.

* Each spine is probably a tuft of very stiff hairs but the high power of the binocular microscope does not reveal the exact nature of the processes.

Hydrometra bifurcata n. sp.

(Plate II)

Size and Color.

Length, 11.8 mm. (male holotype); 13.9 mm. (female allotype); the general color of the body is a very dark brown; the pronotum of the male holotype with a narrow, median, longitudinal, light-colored stripe, which is more distinctly defined on the posterior lobe; the median stripe is bordered successively on each side by a purplish-brown band, a broader band of brownish yellow, and on the extreme lateral margin by a band of purplish brown; a frosted stripe extends along the lateral margins of the thorax; the frosted stripe along the lateral margins of the abdomen is very faintly defined except near the margin of each segment where there is a large patch of frosting; ventral parts of the entire body with frosted appearance; the female allotype is similarly colored with the exception that the median stripes on the pronotum are narrow and much lighter in color and that the stripe along the lateral margin of the abdomen is clearly defined.

Structural Characteristics.

Head: Length, 112 units (holotype), 126 units (allotype); the ratio of the antecular part of the head to the postocular part is given by the formulas AO:PO::72:30 (holotype), 82:33 (allotype); on both the male and female the dorsal interocular groove is short, about as long as the diameter of an eye, shallow, and narrow; the ventral interocular groove on both the male and female is the same length as the dorsal groove but is somewhat deeper and broader; the clypeus is deeply and broadly incised, thus appearing bifurcated; the rostrum of

the male and female surpasses the eyes by about one-half the postocular distance; beginning with the basal one the lengths of the segments of the antennae are in the following ratio: 33:72:210:100 (male holotype), 37:80:213:93 (female allotype).

Pronotum: Length, 52 units (holotype), 67 units (allotype); an encircling row of pits parallel to the anterior margin and about three units from it; the posterior lobe has a median longitudinal row of pits and other pits arranged in rows; a row of three or four faint pits near the margin of each of the propleura of the holotype; on the female allotype the pits on the propleura are more numerous.

Metanotum: Length, 45 units (holotype); the wings of the male holotype are narrow and straplike, extending slightly beyond the middle of the second abdominal segment; on the female allotype the wings are large and long, extending to the middle of the fifth abdominal segment.

Coxae: The distance between the first and second coxae is to that between the second and third coxae as 30:58 (holotype), 40:70 (allotype); on the right side of the body of the male holotype the anterior acetabulum has two pits anterior to the cleft and two pits posterior to it; the middle acetabulum has four faint pits similarly arranged; the posterior acetabulum is unpitted.

Femora: The anterior femora of the male holotype do not extend quite to the apex of the head while on the female allotype the anterior femora reach slightly beyond the apex; the posterior femora slightly surpass the tip of the abdomen on both the holotype and the allotype.

Abdomen: Length, 154 units (holotype); the two male processes, located on the ventral side of the sixth abdominal segment, are

placed so that each one is about midway between the anterior and posterior ends of the segment and the median longitudinal line and the lateral margin; the processes are small tufts of very stiff hairs; posterior to each of the processes and located on the margin of the segment, is a brush of long stiff hairs; the posterior margin of the sixth segment has a fringe of short stiff hairs on the dorsal and lateral sides; the seventh segment of the male holotype is somewhat compressed ventro-laterally to form a broad, median, ventral, longitudinal keel, which is broadly expanded distally; on each side of the keel is a large depression; the terminal dorsal spine of the holotype is long and stout, about one-third the length of the segment; the terminal dorsal spine of the allotype is long and sharp, about one-half the length of the segment.

Described from three males and four females collected in Madagascar by Ch. Alluaud. The male holotype and two paratypes (one male and one female) were collected in the Region du Sud-est in 1901; the female allotype and two paratypes (one male and one female) were collected in Diego-Suarez in 1893; the other female paratype was taken in the Region du Sud in 1901. Types in the Paris Museum.

Notes.

The bifurcated condition of the clypeus and the nature and position of the male processes distinguish this species from all other known species.

DESCRIPTIONS OF NEW (?) SPECIES OF HYDROMETRA

WHOSE AUTHENTICITY IS IN QUESTION.

Hydrometra isaka n. sp. (?)

(Plate III)

Size and Color.

Length, 11.4 mm. (male holotype), 11.9 mm. (female allotype); the general color of the body is a dark reddish brown; pronotum with a narrow, longitudinal, median, white stripe; faint white stripe extending along the sides of the body from the anterior margin of the thorax to the posterior margin of the sixth abdominal segment; ventral side of the entire body with slightly-frosted appearance.

Structural Characteristics.

Head: Length, 103 units (male), 99 units (female); the ratio of the anteocular part of the head to the postocular part is given by the formulas AO:PO::67:28 (male), 64:28 (female); on both the male and female the dorsal interocular groove is slightly shorter than the diameter of an eye, narrow, and moderately deep; the ventral interocular groove of the male is long, extending from about the base of the expanded part of the head to almost the pronotum, the postocular part of the groove being much broader and deeper than the anteocular part; on the female the postocular part of the ventral groove is similar to that of the male but the anteocular part of the groove is very faintly defined; clypeus large, bluntly pointed, and polished; the rostrum of the male surpasses the eyes by about one-third the postocular distance, while the rostrum of the female

extends to about three-fifths of the postocular distance; the antennae of the male, with the exception of the basal segments, are missing; the first two antennal segments of the female are present and in the ratio of 27:56.

Pronotum: Length, 50 units (male), 51 units (female); an encircling row of pits parallel to the anterior margin and about three units from it; posterior lobe with median longitudinal row of pits; other pits present and arranged more or less in rows; each of the propleura with a marginal row of three or four pits.

Metanotum: Length, 45 units (male), 42 units (female); wings short, narrow, and straplike, extending to the middle of the first abdominal segment of the male, slightly shorter on the female.

Coxae: The distance between the first and second coxae is to that between the second and third coxae as 32:56 (male), 33:52 (female); all the acetabula pitted; on the male the anterior acetabulum on the right side of the body has two pits anterior to the cleft and one pit posterior to it; the middle acetabulum has one pit anterior to the cleft and two pits posterior to it; the third acetabulum has one pit; on the female the anterior acetabulum on the right side of the body has one pit on each side of the cleft; the middle acetabulum has two pits on each side of the cleft; the posterior acetabulum has two pits.

Femora: The anterior femora of the male extend to the apex of the head and the posterior femora attain the tip of the abdomen; the anterior femora of the female do not extend quite to the apex of the head while the posterior femora extend slightly beyond the posterior margin of the fifth abdominal segment.

Abdomen: Length, 154 units (male), 176 units (female); the ventral

side of the sixth abdominal segment of the male is transversely depressed, the depression being about two-thirds as wide as the length of the segment and rather hairy; the dorsal posterior margin of the sixth segment of the male is fringed with short stiff hairs; in dorsal view the sides of the seventh segment of the male are nearly parallel and the segment presents a very blunt appearance; the terminal dorsal spine of the male is prominent, about one-third as long as the segment; the terminal spine of the female is almost one-half as long as the segment; the tergites of the first six abdominal segments present a finely-wrinkled appearance transversely.

Described from one male and two females. The male holotype and the female allotype bear the following label: "Madagascar, Region du Sud-est, Vallee du Fanjahira, Isaka, Ch. Alluaud, 1901." The female paratype bears the label "Madagascar, Tamatave, Mathiaux, 1898." Types in the Paris Museum.

Hydrometra smithi n. sp. (?)

(Plate IV)

Size and Color.

Length, 9.9 mm. (male holotype), 11.8 mm. (female allotype), 10.8 mm. (male paratype); the general color of the body of the male holotype is a yellowish brown; a narrow, median, frosted stripe extends from the anterior margin of the eyes to the posterior margin of the pronotum; ventral part of head darker brown; ventral parts of thorax

and abdomen with frosted appearance; median frosted stripe on pronotum bordered successively on each side by a narrow purplish-brown band, a broad yellowish-brown band, and on each margin of the pronotum by a reddish-brown band; the general body color of the female is darker than that of the male; a narrow white stripe extends from the apex of the head to the end of the pronotum on the allotype and paratype; a white band extends along the margins of the prothorax and abdomen on the female; the under side of the body with frosted appearance; wings with longitudinal white stripe.

Structural Characteristics.

Head: Length, 90 units (holotype), 108 units (allotype), 98 units (paratype); the ratio of the antecular part of the head to the postocular part is given by the formulas $A0:P0::55:26$ (holotype), $66:32$ (allotype), $61:28$ (paratype); on the male holotype the dorsal interocular groove is obsolete; the ventral interocular groove is about as long as the diameter of an eye, broad, and deep; the clypeus is large and truncate, about one-half again as broad as long; the rostrum surpasses the eyes by about three-fourths of the postocular distance on both the male and female; the first three segments of the antennae of the holotype and paratype are present and they are in the following ratios: $25:43:126:X$ (holotype), $27:51:134:X$ (paratype); the antennae are missing from the allotype.

Pronotum: Length, 48 units (holotype), 55 units (allotype), 51 units (paratype); an encircling row of faint pits parallel to the anterior margin and close to it, the pits very faintly defined on the dorsal

side but somewhat more prominent on the ventral side; posterior lobe with median longitudinal row of very faint pits bordered by an irregular row of pits on each side; each of the propleura with a marginal row of five or six small pits.

Metenotum: The wings are large and long, extending nearly to the posterior margin of the fifth abdominal segment on the holotype and to the end of the fourth abdominal segment on the allotype.

Coxae: The distance between the first and second coxae is to that between the second and third coxae as 28:50 (holotype), 33:56 (allotype); the acetabula are pitted approximately the same on both the male and female; on the left side of the body of the male holotype the anterior and middle acetabula have two pits on each side of the cleft; the posterior acetabulum has one or two faint pits; the pitting is the same on the right side of the body.

Femora: The anterior femora of the holotype extend to the middle of the expanded part of the head while the posterior femora extend almost to the tip of the abdomen; the anterior femora of the allotype extend to the base of the antennae and posterior femora extend nearly to the tip of the abdomen.

Abdomen: No abdominal processes on the sixth segment of the male; in dorsal view the general appearance of the seventh segment of the male is quite pointed, the sides of the segment being somewhat concave; on the ventral side of the seventh abdominal segment of the male, on each side of the median longitudinal line, is a hairy elevation near the posterior margin; the terminal dorsal spine of the male is long, stout, and sharp, about one-fourth as long as the segment; the terminal spine of the female is very sharp and prominent, about one-half

as long as the segment.

Described from two males and one female; the male holotype bears the following label: "Kortwright, Sierra Leone, W. Africa, 1100 ft., 20, II, 1904, Major F. Smith, R. A. M. C." The female allotype bears the label "Cote d'Afrique or. angl., Tiwi, Alluand et Jeannel, Nov. 1911." The male paratype bears the following label: "Dar-banda Merid, Krebedje (Fort Sibut), Mission Chari-Tchad, Dr. J. Decorse, 1904."

Holotype in the British Museum; allotype and paratype in the Paris Museum.

Hydrometra greeni Kirkaldy (?)

(Plate III)

Size and Color.

Length, 11.7 mm. (male holotype), 10.8 mm. (male paratype); the general color of the body of the holotype is a brownish yellow, the underside of the abdomen darker in color with frosted appearance; a narrow white stripe extends along the median line of the body from the posterior margin of the eyes to the posterior margin of the pronotum; a frosted band along the sides of the body from the anterior margin of the pronotum to the posterior margin of the sixth abdominal segment.

Structural Characteristics.

Head: Length, 100 units (holotype), 95 units (paratype); the ratio of the anteocular part of the head to the postocular part is given in the formulas AO:PO::67:26 (holotype), 64:24 (paratype); the dorsal interocular groove of both holotype and paratype is about equal in

length to the diameter of an eye; the ventral interocular groove is long, extending from about the middle of the anteocular part of the head nearly to the pronotum; the postocular part of the groove is broader and deeper; clypeus bluntly conical and polished; the rostrum surpasses the eyes by about one-half the postocular distance; the antennae are missing from the holotype; on the paratype the first two segments are present and in the ratio of 28:57.

Pronotum: Length, 55 units (holotype); an encircling row of pits parallel to the anterior margin and close to it; the posterior lobe with a median longitudinal row of pits with numerous other pits arranged more or less in rows; each of the propleura with a marginal row of four or five pits.

Metanotum: The wings are large and long, extending to the posterior margin of the fourth abdominal segment on the holotype and slightly farther on the paratype.

Coxae: The distance between the first and second coxae is to that between the second and third coxae as 35:60 (holotype); all the acetabula are pitted; on the holotype the anterior acetabulum on the left side of the body has three pits anterior to the cleft and three pits posterior to it; the middle acetabulum has two pits anterior to the cleft and four pits posterior to it; the third acetabulum has two pits; on the right side of the body the anterior acetabulum has the pits arranged three anterior to the cleft and three posterior to it; the middle acetabulum has three pits anterior to the cleft and four posterior to it; the third acetabulum has two pits.

Abdomen: In dorsal view the sides of the seventh segment of the abdomen of the male holotype are almost parallel; ventral side of sixth

abdominal segment is transversely depressed, the depression being about one-half as wide as the length of the segment and rather hairy as is the posterior half of the fifth segment; the posterior dorsal margin of the sixth segment is fringed with short stiff hairs; the terminal dorsal spine is sharp and about one-third as long as the segment.

Femora: The anterior femora of the holotype attain the apex of the head and the posterior femora extend to the tip of the abdomen.

Described from two males; the holotype was collected in Coimbatore, British India, by L. V. Newton, S. J.; the paratype was taken in Pasumalai, South India, by J. Lawson. Types in the Snow Entomological Collection, University of Kansas, Lawrence.

Hydrometra butleri n. sp. (?)

(Plate III)

Size and Color.

Length, 11.25 mm. (male holotype), 11.0 mm. (male paratype); the general color of the body is a brownish yellow; the wing has a longitudinal white stripe.

Structural Characteristics.

Head: Length, 103 units (holotype), 97 units (paratype); the ratio of the anteocular part of the head to the postocular part is given by the formulas $A0:P0::67:28$ (holotype), $63:27$ (paratype); the dorsal interocular groove of the holotype is equal in length to the diameter of an eye, fine, and shallow; the ventral interocular groove

is longer, surpassing the eyes by about one-half the postocular distance; clypeus bluntly conical and polished; the rostrum of the holotype surpasses the eyes by about two-fifths of the postocular distance; the lengths of the antennal segments of the holotype, beginning with the basal one, are in the ratio 27:64:X:65; the lengths of the antennal segments of the paratype are in the ratio 28:61:X:x; the third segment could not be measured accurately due to its curvature; the fourth segment of the antennae of the paratype was missing.

Pronotum: Length, 54 units (holotype and paratype); an encircling row of pits parallel to the anterior margin and close to it; the posterior lobe with a median longitudinal row of pits and other pits arranged more or less in rows; each of the propleura with a marginal row of five or six pits.

Metanotum: On both the holotype and paratype the wings are large and long, extending to the middle of the fifth abdominal segment.

Coxae: The distance between the first and second coxae is to that between the second and third coxae as 33:58 (holotype); all the acetabula are pitted; on the left side of the body of the holotype the anterior acetabulum has one pit anterior to the cleft and two pits posterior to it; the middle acetabulum has two pits anterior to the cleft and three pits posterior to it; the third acetabulum has a large pit at the top.

Femora: The anterior femora of the holotype extend to the apex of the head and the posterior femora slightly surpass the tip of the abdomen.

Abdomen: The sixth segment of the male is considerably swollen; on the ventral side of the sixth abdominal segment, on each side

of the median longitudinal line, is a small brush of stiff hairs; on the paratype the brush is much more pronounced and extends to the posterior margin of the segment, the posterior end being nearer the dorsal margin of the segment than the anterior end; near the base of the terminal dorsal spine, on each side of the median longitudinal line, is a small protuberance; the dorsal posterior margin of the sixth segment is fringed with stiff hairs; the terminal dorsal spine is sharp and long, about one-half as long as the segment.

Described from two males; the holotype was collected in Kodai Kanal, S. India, by Campbell; the paratype bears the label "Inde Mere, Trichinopoly, Tos. Dubreuil." Holotype in the Snow Entomological Collection, University of Kansas, Lawrence; paratype in the Hungarian National Museum, Budapest.

Hydrometra chabanaudi n. sp. (?)

(Plate III)

Size and Color.

Length, 11.9 mm. (male holotype); the general color of the body is a dark brown with the ventral parts heavily frosted; a narrow median frosted line extends from the posterior margin of the eyes to the posterior margin of the pronotum; a white band along the sides of the body from the anterior margin of the pronotum to the posterior margin of the sixth abdominal segment; wing with a longitudinal white stripe.

Structural Characteristics.

Head: Length, 104 units; the ratio of the anteocular part of the

head to the postocular part is given by the formula $AO:PO::68:28$; the dorsal interocular groove is narrow and equal in length to the diameter of an eye; the ventral interocular groove is very broad and deep, extending from the anterior margin of the eyes nearly to the pronotum; clypeus bluntly conical and polished; the rostrum surpasses the eyes by about one-fourth the postocular distance; the first two antennal segments are present and in the ratio of 30:69.

Pronotum: Length, 56 units; an encircling row of pits parallel to the anterior margin and close to it; a median longitudinal row of small pits on the posterior lobe and numerous larger scattered pits present; each of the propleura with a marginal row of four or five small pits.

Metanotum: The wings are large and long, extending slightly beyond the posterior margin of the fourth abdominal segment.

Coxae: The distance between the first and second coxae is to that between the second and third coxae as 35:61; all the acetabula are faintly pitted; on the left side of the body the anterior acetabulum has one pit anterior to the cleft and two small pits posterior to it; the middle acetabulum has one pit on each side of the cleft; the third acetabulum has two or three small pits.

Femora: The anterior femora extend to the apex of the head and the posterior femora attain the tip of the abdomen.

Abdomen: In dorsal view the sides of the seventh segment of the male are nearly parallel; the ventral side of the sixth segment with a shallow transverse depression which is about one-half as wide as the length of the segment; ventral side of the fifth and sixth segments hairy; dorsal posterior margin of the sixth segment with a

fringe of short stiff hairs; terminal dorsal spine sharp and prominent, about one-half as long as the segment.

Described from one male bearing the label "Guinee Francaise, Dixine Foulah, Pres Konakry, P. Chabanaud, 1919." Type in the Paris Museum.

Hydrometra aegypti n. sp. (?)

(Plate III)

Size and Color.

Length, 10.6 mm. (male holotype); general color of the body is a yellowish brown; the anterior part of the pronotum reddish brown; pronotum with narrow median longitudinal frosted line, bordered successively by bands of reddish brown, yellowish brown, and on each lateral margin by a band of reddish brown; ventral parts of abdomen frosted; a faint frosted stripe extends along the sides of the body from the anterior margin of the pronotum to the posterior margin of the sixth abdominal segment; a longitudinal white stripe on the wing.

Structural Characteristics.

Head: Length, 89 units; the ratio of the antecular part of the head to the postocular part is given by the formula $A0:P0::56:26$; the dorsal interocular groove is narrow and about equal in length to the diameter of an eye; the ventral interocular groove is broad and long, extending from a point slightly anterior to the eyes to almost the pronotum; clypeus bluntly conical and polished; the rostrum surpasses the eyes by slightly more than one-half the postocular

distance; the antennae are missing from the specimen.

Pronotum: Length, 52 units; an encircling row of small pits parallel to the anterior margin and close to it; the posterior lobe with a median longitudinal row of faint pits and other larger scattered pits present; each of the propleura with a marginal row of four or five faint pits.

Metanotum: The wings are large and long, extending slightly beyond the posterior margin of the fourth abdominal segment.

Coxae: The distance between the first and second coxae is to that between the second and third coxae as 33:52; all the acetabula are faintly pitted; the anterior acetabulum on the left side has one pit anterior to the cleft and one pit posterior to it; the middle acetabulum has two pits on each side of the cleft; the third acetabulum has one or two very faint pits.

Femora: The anterior femora do not extend quite to the antennal tubercles; the posterior femora extend to the posterior margin of the sixth abdominal segment.

Abdomen: In dorsal view the sides of the seventh segment are nearly parallel; the ventral side of the fifth and sixth segments is hairy; the ventral side of the sixth segment with a shallow transverse depression about one-half as wide as the length of the segment; the terminal dorsal spine is blunt and prominent, about one-third as long as the segment.

Described from one male bearing the following label: "Aegypten, Pyramiden X, H. Rolle, S. W. 11." Type in the Hungarian National Museum, Budapest.

Hydrometra maindrona n. sp. (?)

(Plate III)

Size and Color.

Length, 11.1 mm. (male holotype), 11.7 mm. (female allotype); the general color of the body is a dark brown; on the male there is a narrow median longitudinal white stripe on the pronotum; a faint white stripe extends along the sides of the body from the anterior margin of the pronotum to the posterior margin of the sixth abdominal segment; the ventral parts of the body with frosted appearance; the female similarly colored except that the ventral part of the body is lighter brown in color and is not frosted.

Structural Characteristics.

Head: Length, 99 units (male), 104 units (female); the ratio of the anteocular part of the head to the postocular part is given by the formulas AO:PO::64:28 (male), 68:29 (female); on both the male and female the dorsal interocular groove is short, about equal in length to the diameter of an eye; the ventral interocular groove of both the male and female is broad and long, extending from the anterior margin of the eyes to about two-thirds of the postocular distance; the clypeus is small and conical; the rostrum extends to the posterior margin of the eyes on the male and slightly farther on the female; the first two antennal segments of the male are in the ratio of 25:59; the last two segments are missing from the male and all segments except the basal ones are missing from the female.

Pronotum: Length, 49 units (male), 52 units (female); an encircling row of pits parallel to the anterior margin and close to it; posterior

lobe with median longitudinal row of pits which is bordered on each side with a row of six or seven pits; each of the propleura with a marginal row of five or six pits.

Metenotum: Length, 38 units (male), 40 units (female); the wings are narrow and straplike, 52 units in length on the male and 55 units in length on the female.

Coxae: The distance between the first and second coxae is to that between the second and third coxae as 32:54 (male), 35:55 (female); all the acetabula are pitted; on the left side of the body of the male the anterior acetabulum has two pits on each side of the cleft; the middle acetabulum also has two pits on each side of the cleft; the third acetabulum has two or three small pits; the pitting on the female is similarly arranged.

Femora: The anterior femora of both the male and female extend to the base of the antennae; the posterior femora of the male are missing from the specimen; the posterior femora of the female extend to the posterior margin of the fifth abdominal segment.

Abdomen: Length, 154 units (male), 166 units (female); the ventral side of the sixth segment of the male with a transverse hairy depression about as wide as one-half the length of the segment; the tergites of the abdominal segments are finely-wrinkled transversely; the seventh segment of the female is very short compared to the other abdominal segments; the terminal dorsal spine of both the male and female is short and blunt.

Described from two specimens, a male and a female, bearing the following label: "Mascate, (Sept. Oct.), Maindron 133-96." Types in the Paris Museum.

Hydrometra annami n. sp. (?)

(Plate IV)

Size and Color.

Length, 12.7 mm. (male holotype), 13.9 mm. (female allotype), 11.9-12.6 mm. (male paratypes), 13.4-14.1 (female paratypes); the general color of the body of the holotype is a yellowish brown; a median longitudinal line on pronotum and lateral margins of pronotum reddish brown; ventral part of head somewhat darker and frosted in appearance; frosted stripe along the sides of the body from the anterior margin of pronotum to the end of the abdomen; the female allotype is similar in coloration except that the body is more yellowish than brown; a median longitudinal white stripe on pronotum bordered on each side by a reddish-brown band on the posterior lobe; white longitudinal line on wing.

Structural Characteristics.

Head: Length, 110 units (holotype), 115 units (allotype); the ratio of the antecular part of the head to the postocular part is given by the formulas AO:PO::74:28 (holotype), 77:29 (allotype); on the holotype the dorsal interocular groove is short and deep; the ventral interocular groove is about the same length as the dorsal groove but is broader; on the male paratype the lower groove is long, extending from about the middle of the antecular part of the head nearly to the pronotum, the postocular portion being deeper and broader than the antecular portion; the dorsal interocular groove of the allotype is the same as the holotype and paratype and the ventral groove is similar to that of the paratype except that the antecular portion is relatively longer, as it begins near the base of the expanded part of the

head; clypeus large, bluntly conical and polished; the rostrum surpasses the eyes by about one-half the postocular distance on the holotype but does not extend quite so far on the allotype; the first two antennal segments of the male holotype are present and their lengths are in the ratio of 31:73; the ratio of the lengths of the antennal segments of the allotype is 30:69:X:65; the third antennal segment could not be measured accurately due to its curvature.

Pronotum: Length, 58 units (holotype), 64 units (allotype); an encircling row of pits parallel to the anterior margin and close to it; posterior lobe with median longitudinal row of pits which has a row of pits on each side and also on each lateral margin; each of the propleura with an irregular row of four or five pits; the pits on the allotype are more irregularly placed and more numerous than on the holotype.

Metanotum: The wings are large and long, extending nearly to the posterior margin of the fourth abdominal segment on the holotype and nearly to the middle of the fourth abdominal segment on the allotype.

Coxae: The distance between the first and second coxae is to that between the second and third coxae as 36:60 (holotype), 40:64 (allotype); all the acetabula are pitted; on the holotype the anterior acetabulum on the left side of the body has two pits anterior to the cleft and three pits posterior to it; the middle acetabulum has two pits anterior to the cleft and four pits posterior to it; the third acetabulum has one large pit at the top; the pits are similarly arranged on the right side of the body; the anterior acetabulum on the left side of the allotype has two pits on each side of the cleft; the middle acetabulum has three pits on each side of the cleft; the

third acetabulum has two pits; the pits on the right side of the body are similarly arranged except that the middle acetabulum has four pits posterior to the cleft instead of three.

Femora: On the holotype the anterior femora slightly surpass the apex of the head and the posterior femora do not extend quite to the tip of the abdomen; the anterior femora of the allotype do not extend quite to the apex of the head and the posterior femora extend slightly beyond the posterior margin of the fifth abdominal segment.

Abdomen: The two male processes are located on the ventral side of the sixth abdominal segment, one on each side of the median longitudinal line; each process is about midway between the anterior and posterior margins of the segment and consists of a small elevation capped with short stiff hairs; the terminal dorsal spine of the holotype is sharp and about one-fourth the length of the segment; the posterior dorsal margin of the sixth segment of the holotype has a fringe of short stiff hairs; in dorsal view the sides of the seventh segment are nearly parallel and the segment presents a very blunt appearance; the terminal dorsal spine of the female is sharp and prominent, about two-fifths of the segment in length.

Described from three males and six females; the holotype, allotype, and three female paratypes were collected in Annam Laos; two paratypes, one male and one female, bear the following label: "Formosa Sauter, Takao, 1907." All of these specimens are from the Hungarian National Museum, Budapest. Two paratypes, a male and a female, from the Paris Museum were collected in Nhatrang by A. Krempf in 1913.

Hydrometra swensoni n. sp. (♂)

(Plate IV)

Size and Color.

Length, 12.7 mm. (male holotype), 14.1 mm. (female allotype); the general color of the body of the male holotype is a yellowish brown; the ventral side of the head and the dorsal side of the abdomen darker brown; anterior part of the pronotum and the dorsal part of the head reddish brown; pronotum with median longitudinal white stripe bordered successively on each side on the posterior lobe by a narrow reddish-brown stripe, a broad brownish-yellow band and on each lateral margin by a reddish-brown band; frosted stripe extends along the sides of the body from the anterior margin of the pronotum to the posterior margin of the sixth abdominal segment; the general color of the female is a light yellowish brown; the markings on the thorax are similar to those on the male except that they are somewhat lighter in color; wing with broad longitudinal white stripe.

Structural Characteristics.

Head: Length, 110 units (holotype), 112 units (allotype); the ratio of the antecular part of the head to the postocular part is given by the formulas A0:P0::74:28 (holotype), 75:29 (allotype); on both the holotype and allotype the dorsal interocular groove is narrow and deep, about equal in length to the diameter of an eye; the ventral interocular groove of both the holotype and allotype extends from about the middle of the antecular part of the head to about four-fifths of the postocular distance, the postocular portion being broader and deeper; clypeus large, bluntly pointed and polished;

the rostrum surpasses the eyes by about one-half the postocular distance; the lengths of the antennal segments are in the following ratio: 32:60:115(approx.):57 (holotype), 32:62:K:57 (allotype); the third segment of the antennae of the allotype could not be measured accurately due to its curvature.

Pronotum: Length, 62 units (holotype), 66 units (allotype); an encircling row of pits parallel to the anterior margin and close to it; posterior lobe with median longitudinal row of pits which is bordered on each side by a row of larger pits; two or three irregular rows of large pits on each lateral margin; each of the propleura with eight or ten small pits in two irregular marginal rows.

Metanotum: The wings of both the holotype and allotype are large and long, extending to the posterior margin of the fourth abdominal segment on the male holotype and slightly beyond the anterior margin of the third abdominal segment on the female allotype.

Coxae: The distance between the first and second coxae is to that between the second and third coxae as 40:63 (holotype), 42:65 (allotype); on the holotype the anterior acetabulum on the left side of the body has two pits anterior to the cleft and three pits posterior to it; the middle acetabulum has three pits anterior to the cleft and four pits posterior to it; the third acetabulum has one pit; on the allotype the anterior acetabulum on the left side of the body has three pits on each side of the cleft; the middle acetabulum has two pits anterior to the cleft and five pits posterior to it; the third acetabulum has two pits.

Femora: The anterior femora of the holotype and allotype extend

nearly to the base of the antennae; the posterior femora of the holotype extend to the base of the terminal dorsal spine; the posterior femora of the allotype extend nearly to the posterior margin of the fifth abdominal segment.

Abdomen: No male processes; the ventral side of the fifth and sixth abdominal segments clothed with long fine hairs; a slight median longitudinal keel on the ventral side of the seventh segment; in dorsal view the sides of the seventh segment are nearly parallel and the segment presents a very blunt appearance; a fringe of short stiff hairs on the dorsal posterior margin of the sixth segment; the terminal dorsal spine of the male is sharp and prominent, nearly one-half as long as the segment; the spine of the female is also sharp and prominent, about two-fifths as long as the segment.

Described from a series of over sixty specimens collected in China; the holotype and allotype were taken in Soochow, China, April 23, 1923, by E. Swenson. Types in the Snow Entomological Collection, University of Kansas, Lawrence.

NOTES ON OTHER SPECIES OF HYDROMETRIDAE.

Hydrometra aculeata Montrousier

(Plate VII)

In the original description of this species Montrousier (12) states that there are two recurved hooks towards the extremity of the fifth segment of the abdomen. On the specimens in the Snow Entomological Collection at the University of Kansas, which were collected in New Caledonia by Prof. Lamberton, there are two prominent recurved hooks near the anterior ventral margin of the sixth abdominal segment.

Hydrometra cordubense Bueno

(Plate VI)

The specimens in the Snow Entomological Collection were collected in Lower California by W. M. Mann. They differ from the original description of the species by Bueno (15) especially in the ratio of the intercoxal distances. In Bueno's specimens the ratio of the distance between the first and second coxae to that between the second and third coxae was given as 15:18 for all specimens. The males from Lower California have the intercoxal distances in the ratio of 25:42 and the females average 31:45, which is considerable variation from the type specimens.

Hydrometra vittata Stal

Distant (1) gives the following interesting notes concerning the

synonyms of Hydrometra vittata Stal:

"In these pages (Ann. Nat. Hist. vol. x, page 173, 1902) I drew attention to some synonymy appertaining to a species of Hydrometra found in Japan, Bombay, and Ceylon, which left the name H. albolineata Scott, the oldest and therefore legitimate name to be used. Since then Dr. Sjostedt has kindly let me see a cotype of Stal's Philippine species, H. vittata, which proves to be conspecific and therefore again necessitates further synonymic revision, as follows:

HYDROMETRA VITTATA:

Hydrometra vittata Stal, Oefv. Vet.-Ald. Forh. 1870, p. 705.

Limnobates albolineatus Scott, Ann. and Mag. Nat. Hist. (4),
XIV, page 447, (1874).

Hydrometra greeni, Kirk., Entomologist, 1898, page 2.

Hydrometra hoplogastra Hale

(Plate V)

The specimens of this species, which were collected in New Guinea, differ in some respects from Hale's specimens (3).

The size varies from 15.1 mm. (male) to 18 mm. (female); the ratio of the antecular part of the head to the postocular part is expressed in the following formulas: AO:PO::103:32 (male), 113:34 (female); the lengths of the antennal segments are in the following ratio : 43:100:X:102 (male), 45:112:X:106 (female), 50:114:317:103 (female); on the two specimens two of the third antennal segments could not be measured due to their curvature. The distance between the first and

second coxae is to that between the second and third coxae as 40:75 (male) and 46:78 (female); the acetabula are not pitted. The regions of the body bear the following relation to each other: head:pronotum; metanotum:abdomen:: 144:61:64:197 (male) and 157:73:69:255 (female).

KEY TO NEW WORLD SPECIES OF HYDROMETRA.

- A. AO about twice PO.
- B. No thoracic pits.
- C. Clypeus narrow and pointed; male abdominal processes small, sharp, black spines, close to the anterior margin of the segment; length, 11.0 mm.-----kirkaldyana Bueno
- CC. Clypeus broad, excavate anteriorly; male abdominal processes stout, blunt, mammilose, close to the anterior margin of the segment; length, 11.2 mm.-----comata Bueno
- BB. Thoracic pits present.
- C. Male abdominal processes acuminate, blunt, or sharp.
- D. Clypeus large, broad, and truncate; rostrum extending at least $\frac{1}{2}$ PO.
- E. Male processes spinose, curved backward; dorsal interocular groove obsolete, ventral interocular groove obvious, short; length, 11 mm.-----cyprina Bueno
- EE. Male processes mammilose, blunt, widely separated.
- F. Dorsal interocular groove strongly marked, as long as eye; ventral interocular groove wide and longer, extending to three-fourths of PO; length, 9 mm. (male), 11.3-11.8 mm. (females).
-----lillianis Bueno
- FF. Dorsal interocular groove shallow and broad, on a slight elevation; length, 13.5 mm. (male), 15 mm. (female).-----wileyi Hungerford

DD. Clypeus nearly as broad as long, parallel sided, very obtusely pointed (nearly rounded); male abdominal processes mammilose, joined by a wide transverse ridge; numerous pits on the acetabula; length, 12.6 mm. (male), 13.5 mm. (female).-----fruhstorferi n. sp.

DDD. Clypeus small, narrow, and conical.

E. A few evanescent pits on the anterior and middle acetabula; male abdominal processes spinose, moderately long, stout, sharp, curved backward, placed near the anterior margin of the segment; length, 11.4 mm. (male); a long row of median pits starting about two-fifths of the length of the pronotum from anterior margin.-----gibara Bueno

EE. Two pits on each side of cleft of anterior and middle acetabula; male processes black, conical, glabrous, minute, close together near the anterior margin of the segment; no pits on posterior lobe of pronotum; length, 9 mm. (male), 10.8 mm. (female).-----hungerfordi Bueno

EEE. One pit on each side of cleft of anterior and middle acetabula; male processes spinose, sharp, near the anterior margin of the segment; length, 10.1 mm. (male), 11.7-12.3 mm. (females).

-----husseyi Bueno

CC. Male abdominal processes linear.

D. Two pits present on each side of cleft of anterior and

middle acetabula; length, 8.0-9.5 mm.-----consimilis Barber

DD. One pit present on each side of cleft of anterior end
middle acetabula.

E. Male processes linear, oblique, located near the anterior margin of the segment, the distance between the processes more than twice the length of either process; length, 7.5-8.0 mm. (males), 9.3 mm. (female).

-----barei Hungerford

EE. Male processes linear, transverse, located near the anterior margin of the segment, the distance between the processes not more than twice the length of either process.

F. Antennal segment II two and one-half times as long as segment I and subequal to segment IV; length, 8.7-9.7 mm. (males), 10.5-11.2 mm. (females).

-----myrae Bueno

FF. Antennal segment II twice as long as segment I and from two-thirds to four-fifths as long as segment IV; length, 8.5-9.8 mm. (males), 9.2-11.8 mm. (females).-----martini Kirkaldy

CCC. Male processes represented by two large elevated elliptical areas covered with stout, black hairs; two strong lateral outgrowths, curved downwards and forwards, on sides of seventh segment; length, 10.5 mm. (males), 11.5 mm. (females).-----sztolcmani Jaczewski

CCCC. Male abdominal processes absent.

D. Clypeus nearly as broad as long, very bluntly pointed

(nearly rounded); length, 9.1-9.3 mm. (males), 10.2-11.0

mm. (females).-----cordubense Bueno

DD. Clypeus narrow, acuminate; length, 10.0-10.2 mm. (males),

11.3 mm. (female).-----lentipes Champion

CCCC. Male processes not known.

D. Length, 22 mm.-----caraiba Guerin

DD. Length much less than 22 mm.

E. Antennae as long as the body; length, 18 mm., width,

1 mm.-----metator White

EE. Antennae not as long as body.

F. No pits on the acetabula; ventral interocular groove

extending from anterior margin of eyes nearly to

the thorax; two distinct spines on posterior mar-

gin of the sixth abdominal segment of the female;

length, 12.5 mm. (female).-----mulfordi Hungerford

FF. One pit on each side of the cleft of the acetabula;

ventral interocular groove short, barely exceed-

the diameter of an eye; length, 9.5-11.2 mm.

-----naides Kirkaldy

FFF. ^{not?} Pitting known but probably with all three acet-

abula pitted; rostrum reaching to the eyes;

length, 13.5 mm.-----agenor Kirkaldy

AA. AO distinctly more than twice the PO.

B. Male abdominal processes acuminate, blunt, or sharp.

C. Pits absent on the pronotum; rostrum extending nearly to base of head; clypeus acute, nearly twice as long as wide; male processes spinose, sharp, directed backwards; length, 10.6 mm. (male).-----australis Say

CC. Pits large and deep on posterior lobe of pronotum, which has a longitudinal pitted groove; rostrum extending about $\frac{1}{2}$ PO; clypeus short, about as wide as long, acuminate; dorsal interocular groove shallow, short, not as long as diameter of an eye; ventral interocular groove extending from eyes nearly to pronotum; anterior groove deep, nearly as long as expanded part of head; male processes acute, long, black tipped, placed a little less than half the length of the segment from its anterior margin; length, 12.6-13.2 mm. (males), 14.1 (female).-----exilis Bueno

BB. Male abdominal processes linear.

C. Male abdominal processes crescentic thickenings converging anteriorly, the ends equidistant from the respective anterior and posterior margins of the segment, broad, black, and hairy; clypeus broad as long, obtusely pointed, sides parallel, polished; rostrum extending to the middle of the eyes; length, 14.5 mm. (male).-----championiana Bueno

CC. Male abdominal processes hairy, U-shaped ridges opening posteriorly, located on the posterior half of the sixth segment; length, 15.9 mm. (male), 17.2 mm. (female).

-----guianae n. sp.

BBB. Male processes reduced to lateral swellings on the sixth abdominal segment, with long fine hairs arising therefrom; male segment cylindrical, not compressed beneath into a longitudinal keel; a pitted groove runs the whole length of the pronotum; all three acetabula deeply coarsely pitted; length, 13.2-14.7 mm. (males), 16.0 mm. (female).

-----priscillae Bueno

BBBB. Male processes represented by large depressions fringed with hairs; clypeus nearly as broad as long, sharply pointed; all acetabula pitted; length, 15.6 mm. (male).

-----williamsi n. sp.

AAA. AO about one and one-half times the PO; length, 11.5-12.5 mm.

-----mentor White

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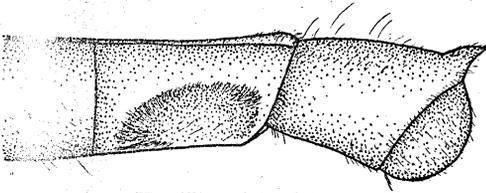
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EXPLANATION OF PLATES.

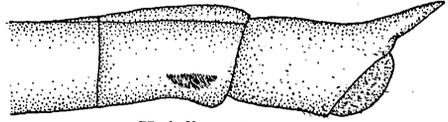
The drawings are lateral and dorsal views of the terminal segments of the abdomen. The only exceptions are the ventral view of the male abdomen of H. madagascarensis and the clypeus of H. bifurcata.

The figures are all drawn to the same scale and the magnification is approximately forty diameters (40x) on the photographic plate.

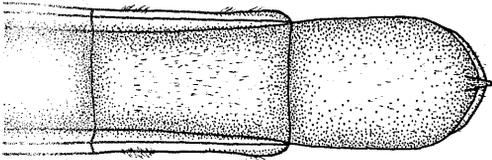
PLATE I



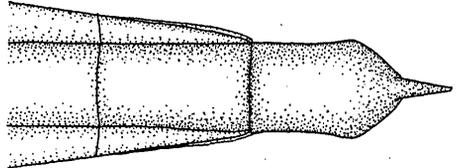
H. williamsi (male)



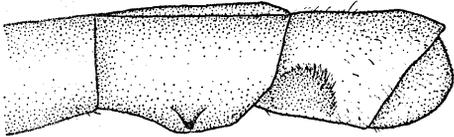
H. juliena (male)



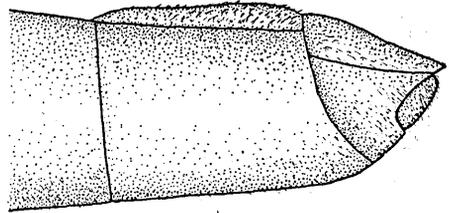
H. williamsi (male)



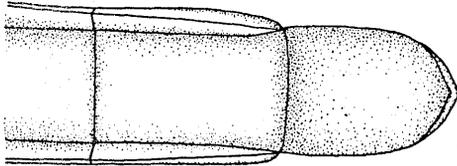
H. juliena (male)



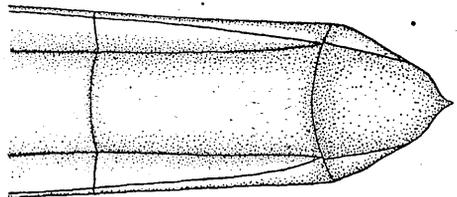
H. fruhstorferi (male)



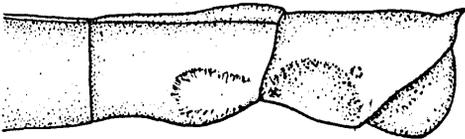
H. fruhstorferi (female)



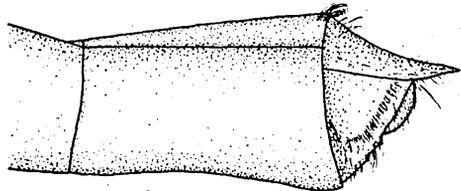
H. fruhstorferi (male)



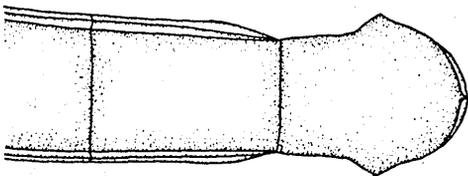
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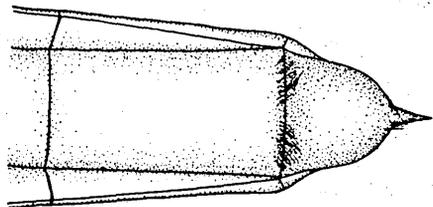
H. guianae (male)



H. guianae (female)

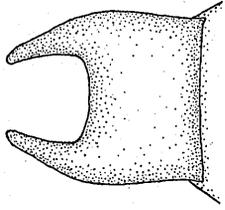


H. guianae (male)

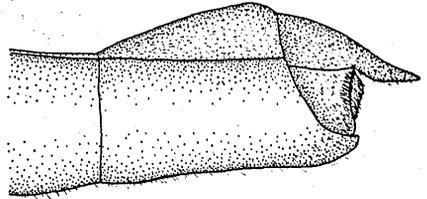


H. guianae (female)

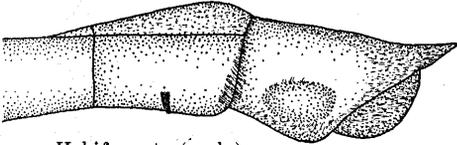
PLATE II



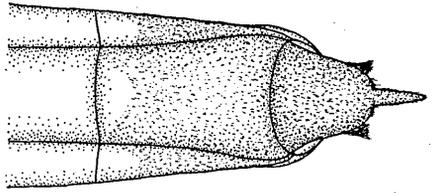
Clypeus of *H. bifurcata*



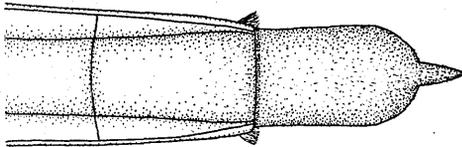
H. bifurcata (female)



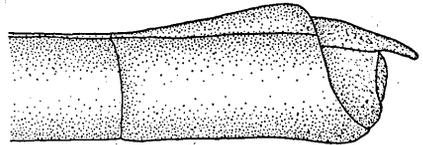
H. bifurcata (male)



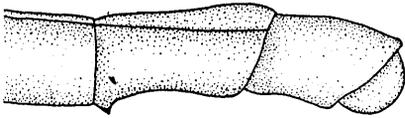
H. bifurcata (female)



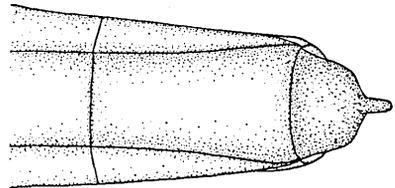
H. bifurcata (male)



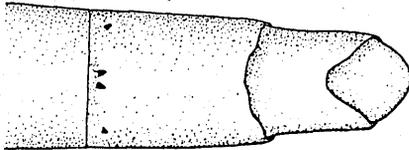
H. madagascarensis (female)



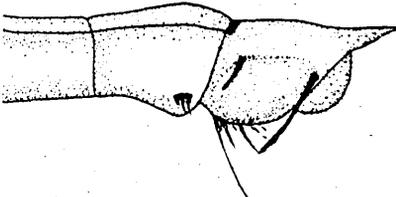
H. madagascarensis (male)



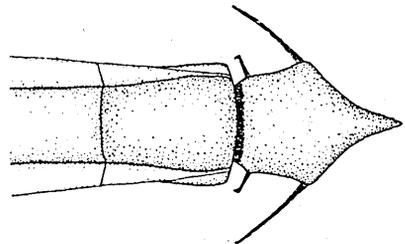
H. madagascarensis (female)



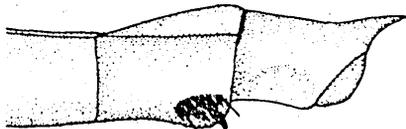
H. madagascarensis (male)



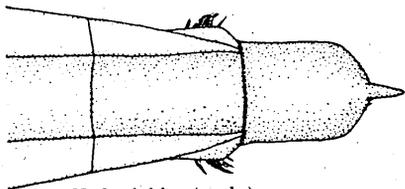
H. transvaali (male)



H. transvaali (male)

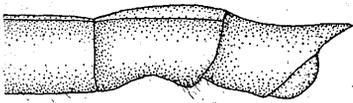


H. fanjahira (male)

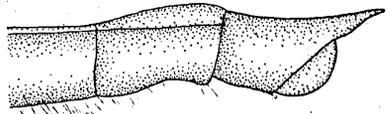


H. fanjahira (male)

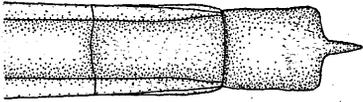
PLATE III



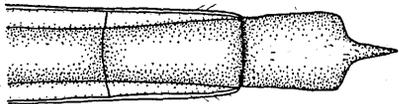
H. greeni (male)



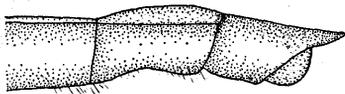
H. chabanaudi (male)



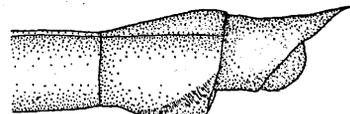
H. greeni (male)



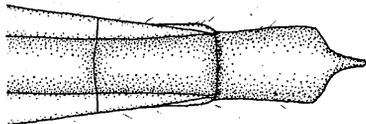
H. chabanaudi (male)



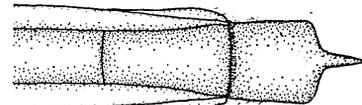
H. aegypti (male)



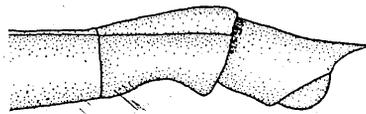
H. butleri (male)



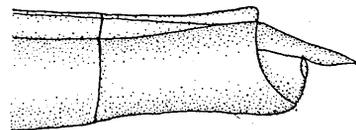
H. aegypti (male)



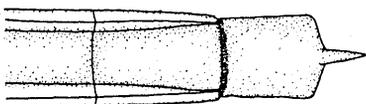
H. butleri (male)



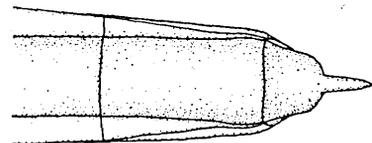
H. isaka (male)



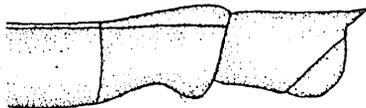
H. isaka (female)



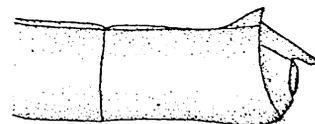
H. isaka (male)



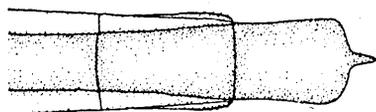
H. isaka (female)



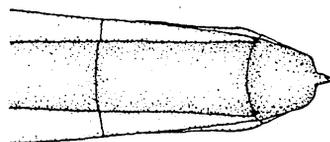
H. maindrona (male)



H. maindrona (female)

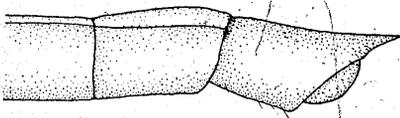


H. maindrona (male)

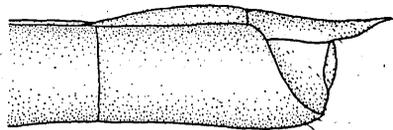


H. maindrona (female)

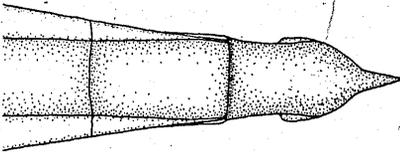
PLATE IV



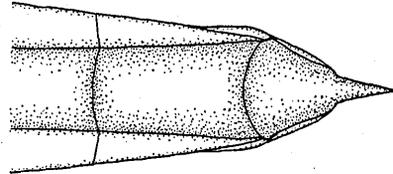
H. smithi (male)



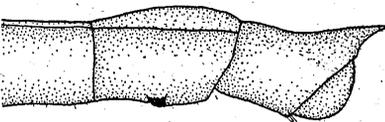
H. smithi (female)



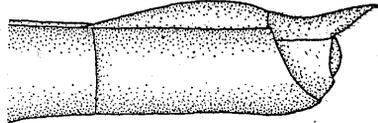
H. smithi (male)



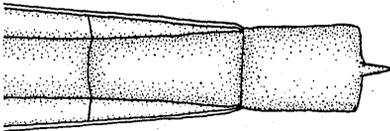
H. smithi (female)



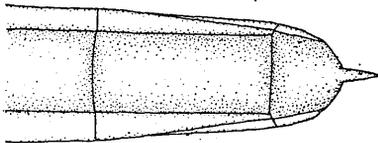
H. annami (male)



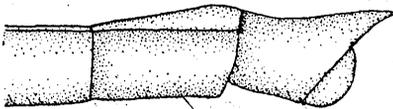
H. annami (female)



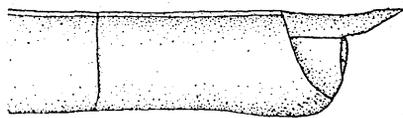
H. annami (male)



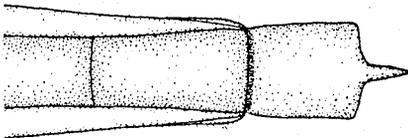
H. annami (female)



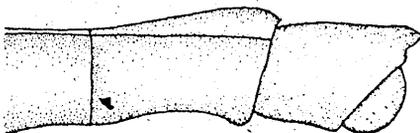
H. swensoni (male)



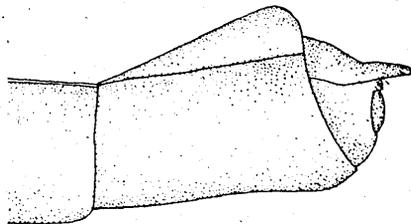
H. swensoni (female)



H. swensoni (male)

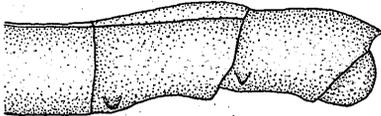


H. wileyi (male)

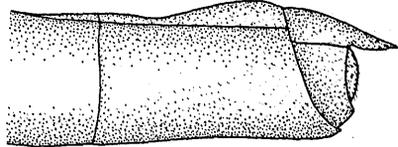


H. wileyi (female)

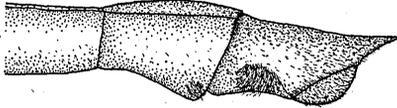
PLATE V



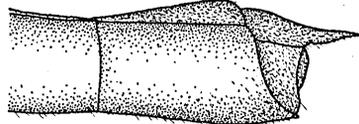
H. stagnorum (male)



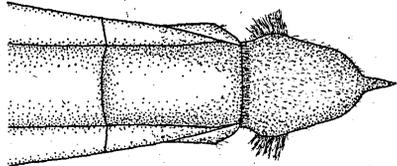
H. stagnorum (female)



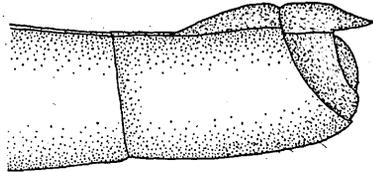
H. albolineolata (male)



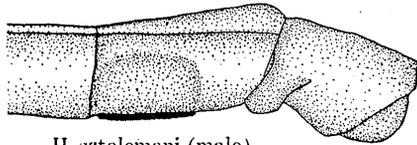
H. albolineolata (female)



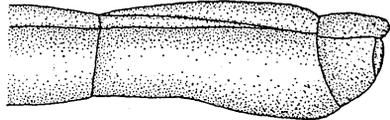
H. albolineolata (male)



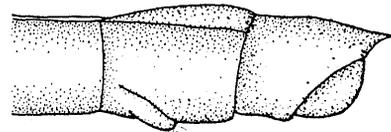
H. eremobia (female)



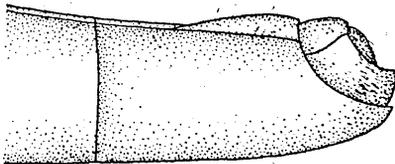
H. sztolemani (male)



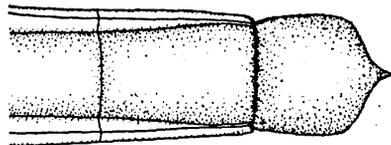
H. sztolemani (female)



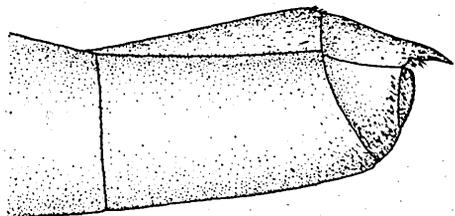
H. hoplogastra (male)



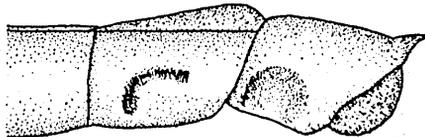
H. hoplogastra (female)



H. hoplogastra (male)

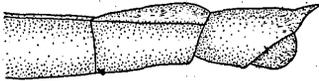


H. championiana (female)

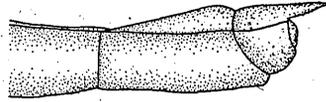


H. championiana (male)

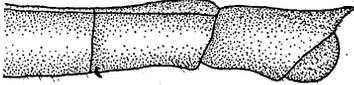
PLATE VI



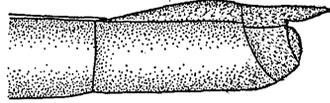
H. barei (male)



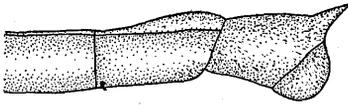
H. barei (female)



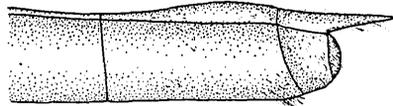
H. martini (male)



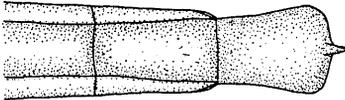
H. martini (female)



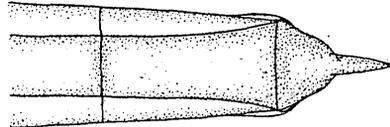
H. myrae (male)



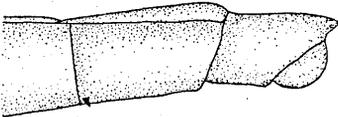
H. myrae (female)



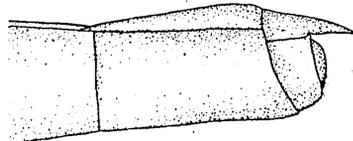
H. myrae (male)



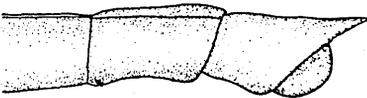
H. myrae (female)



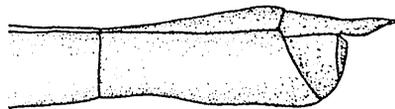
H. hungerfordi (male)



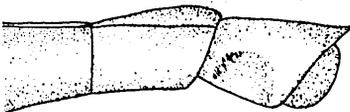
H. hungerfordi (female)



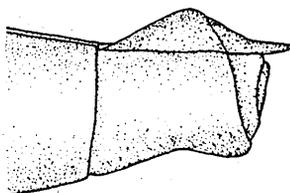
H. husseyi (male)



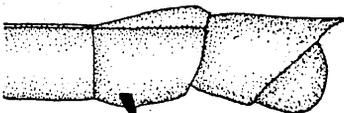
H. husseyi (female)



H. cordubense (male)

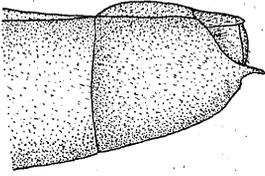


H. cordubense (female)

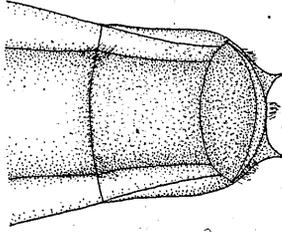


H. procera (male)

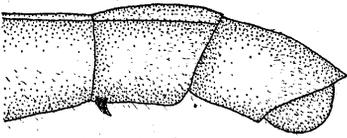
PLATE VII



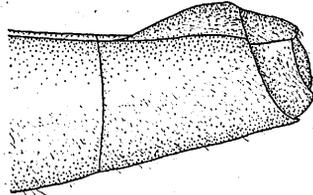
H. mulfordi (male)



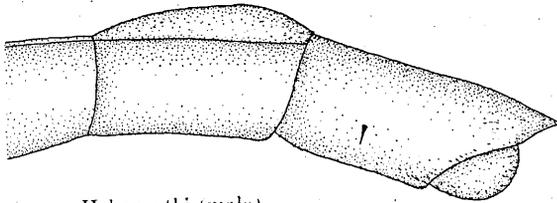
H. mulfordi (female)



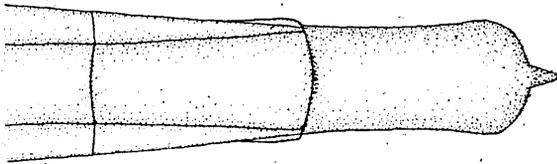
H. aculeata (male)



H. aculeata (female)



H. horvathi (male)



H. horvathi (female)