advocating the decimal system of book numbering which might be modified from Mr. Dewey's classification. He gave in illustration a decimal classification for a natural history library.

GENERAL MEETING, MARCH 3, 1886.

The President, Mr. S. H. Scudder in the chair.

Messrs. Henry Brooks, C. W. Jenks, Samuel H. Russell and Rev. R. C. Winslow were elected Associate Members.

Dr. Thomas Dwight read a paper on the significance of the internal structure of bone which will appear in the Memoirs, vol. IV, no. 1.

A life-size portrait of Mr. Alexander Agassiz, the gift of Mr. Francis Parkman was shown, for which the thanks of the Society were voted.

GENERAL MEETING, MARCH 17, 1886.

Vice President, Mr. F. W. Putnam in the chair.

The following papers were read:

MONOGRAPH OF THE HEMEROBIDAE. PART II.

BY DR. H. A. HAGEN.

THE materials for a monograph of this family were prepared long ago. After the revision of the literature published in the Stettin Entomologische Zeitung, 1851, I collected the described species in my Hemerobidarum synopsis synonymica (Stett. Ent. Zeit., 1866). Both papers antedate the time of their publication; the first was concluded about three years earlier, the second about two years. Some shorter papers followed the first: on Osmylus published in 1852; on the Hemerobidae in amber, 1856 (written in 1850); synopsis of the British Planipennes, 1858; the Ceylon Hemerobidae, 1858–59; the North American Hemerobidae 1861; on Coniopteryx, 1859; on Dilar, 1866. In my Synop. Hemer., p. 370, I stated, that a description of the genital parts would give better and more reliable characters for many species. Ram-

bur's description of the appendages of the male of M. lutescens is the only one anterior to my synopsis. Mr. M'Lachlan, 1868, described and figured the appendages of ten species. I have figured in the meantime as many as I could, but other duties prevented their publication. The study of the previous stages so splendidly advanced by Prof. Fr. Brauer, I tried to follow in my papers on the larvae of Hemerobina (1872), Myrmeleon and Ascalaphus (1873). The study of Asa Fitch's types, of those of Brauer, Schneider and some of Zetterstedt, Erichson and others, together with my notes of types contained in other collections has induced me to publish what I know about this interesting family.

Micromus Ramb., Neur., p. 416.

Front wings with the costal space strongly narrowed at base, the transversals not furcated nor recurrent. This character is indeed the only prominent one to separate Micromus from Hemerobius; the last joint of the palpi is flat and pointed. The genitals of the male are sometimes difficult to be made out, even in alcoholic specimens. The last dorsal segment is split from below, perhaps sometimes entirely; in the cavity behind this split two superior appendages are to be seen; they are straight with the tip more or less curvate, and may reach out of the split; the last ventral segment forms a spoonshaped or elongated valve, which covers the last abdominal segment; between both segments are deeply inserted the two inferior appendages, long, spine-like and more or less curved; between these originates the long dagger-like penis, split more or less on its lower side, at least at the tip. It is very rare that all these five parts are easily visible. The females have the abdomen sloping at the apex, cut straight, with an oval opening at the end, without a visible ovipositor. The last joint of the tarsi (Ceylon species) with a large round membranous planula; as it cannot be seen in dry specimens, it may be present also in other species.

There is nothing known about the early stages of Micromus. I have not tabulated the species, as the number of the sectors of the front wing give them a very easy clew. There are seven sectors in two species, six in two, five in three, four in seven, three in one. The first four species have oblique bands cut by longitudinal ones on the front wings. The relative length of the wings and of the antennae are good characters.

There are five species known from Europe, six from North America including one from Cuba, two from Africa, four from Ceylon, two from the Pacific; of course this is probably only a small part of the actually existing species. The American species are M. montanus, M. angulatus, M. variolosus, M. insipidus, M. Cubanus, M. angustus (probably M. subanticus Walk.) all easily recognized. Only one, M. angulatus, is also found in Europe, and M. montanus much resembles European species. None of the American species seems to be common except the widely-spread M. insipidus.

1. Micromus paganus Linn.

Hemerobius paganus L. S. N., Ed. XII, 912, no. 11.—Villers, III, 49, no. 7.

Hemerobius marginalis (Samou.) Steph. Ill., VI, 110, no. 15.

Hemerobius elegans Goeszy, Sitzb. Wien Akad., 1852, p. 345.

Micromus lineosus Ramb., p. 416, no. 1.

Micromus paganus Schneid., Arb. Schles. Ges., 1846, p. 101.—Hag., Stett., Ent. Zeit., XIX, 130—Entom. Ann., 1858, p. 26, no. 21—Brauer, Neur. Austr., p. 58.—M'Lachl., Monogr., p. 173, no. 3, pl. IX, f. 4.—Wallengr., Monogr., p. 48, no. 1.

Long. c. al. 11–13 mm.; exp. al. 20–26 mm.

Yellowish, villous; head pale brown, front shining; palpi pale yellow; antennae half as long as wings, pale yellow, first joint and base of second brownish; occiput triangularly elevated; prothorax brown, with two transverse impressions, the first one stronger; thorax yellow; legs pale yellowish; hind tibiae very long; tip of all tarsi dark brown. Front wings large, more than twice as long as broad, tip slightly parabolic; hyaline, with a very light yellowish tinge; five sectors; gradate veins oblique, parallel; external series 9, internal 5 to 6 veins; costal space narrow at base, costals bifurcated near the costa, and the first of the costals representing almost a recurrent vein; two brown oblique bands along the graduate veins; the internal not reaching the mediana, dilated triangularly near the hind margin and sending back a crescent brown band to the base; the external interrupted before the hind margin; both bands intersected by three longitudinal ones, more or less interrupted, running to the margin behind the tip; venation white, villous, sparingly interrupted with brown; hind wings hyaline, venation white, one specimen with the external gradate brownish.

Abdomen grayish brown, whitish at its apex, with a faint me-

dian black dorsal line on the last segments; male genitals with a lower, very large and very concave lobe, seen from below oblong (in one ovoid) and very pilose; two parallel yellowish hooks originating before the base of the lobe are similar to a curved and pointed knife; the base is broader, short with a very marked dorsal knee, followed by a straight part, which ends in a strongly incurved and sharply pointed apex; abdomen of female similar, apex compressed, last segment very short, blunt.

Hab. I have before me 3 ♂ and 7 ♀; from Umeå, Lapland, locality not recorded before; from Eastern Prussia, Insterburg; from Pommerania; from Silesia, type of Schneider; Glatz; from Meseritz, Zeller, Sept. 11; from Austria, from Ischl; from Upper Karinthia, Zeller July 6. Wallengren quotes localities from southern Sweden up to Jämtland; very common in forests June to August; in England common throughout the summer, M'Lachlan; at Lyon, France, rare, Villers and Rambur; Russia, St. Petersburg, O. Sacken; Utto, Zurich, Switzerland, 2100 feet on beeches only once found, H. semireticulatus Bremi.

Though the type of Linnaeus no longer exists, and his description is very short, it has unanimously been accepted to belong to this species, first by Villers and later by Schneider. The bands on the wings variable, sometimes nearly disappearing. The specimen from St. Petersburg is the largest and most variegated seen by me.

2. Micromus montanus new spec.

Long. c. al., 11–12. mm.; exp. al. 21–23 mm.

I have for a long time been uncertain, if M. montanus is only a race of M. paganus; nevertheless the different shape of the genitals of the male and some additional characters have decided me to consider M. montanus as a different species.

Shape, size, color and pattern as in M. paganus. The hooks of the male are longer and much thinner, cylindrical, sharp spines, triangularly dilated at base, without the basal knee of M. paganus, but more curved before tip; the lower concave lobe more square. The occiput is not elevated; wings similar, but the internal oblique band reaching always the front margin; the gradate veins mostly darker, blackish.

Hab. Natick, Mass.; White Mts., N. H., July, 1875, Morrison. I have 2 ♂ and 5 ♀ before me.

3. Micromus angulàtus.

Hemerobius angulatus Steph., Ill., vi, 106, no. 2.
Hemerobius villosus Zetterst., Ins. Lapp. p. 1050, nota (Micr.); villosus Brau., Ins. Austr., p. 58.
Hemerobius intricatus Wesm., Bull. Brux., viii, 214, 2.—Hag., Stett. Ent. Zeit. xx, 412.
Micromus intricatus Schneid., Stett. Ent. Zeit., vi, 343, no. 27.—Arbeit. Schles., Ges., 1846, p. 1.—Hag., Entom. Ann. 1858, p. 26, no. 20.—Stett. Ent. Zeit., xix, 130.
Micromus tendinosus Ramb., Neur., p. 417, no. 3.
Hemerobius lineatus Göszy, Sitzb. Wien Akad., 1852, p. 346.
Micromus aphidivorus Hag., Entom. Mon. Mag., ii, 59, no. 1.—M'Lachl., Mongr. p. 172, f. 2.—Wallengr. Monogr., p. 49, no. 2.
Long. c. al. 6–7 mm.; exp. 12–16 mm.

Rufous-brown; front shining; palpi brownish; vertex slightly carinated; antennae yellowish, the two basal joints darker brownish, the other sometimes darker annulated; thorax brown; legs yellow, the four anterior tibiae with two indistinct blackish bands, extreme tip of tarsi darker; front wings about half as broad as long; apex elliptical; slightly pubescent, luteous-hyaline, faintly mottled with brown spots; crossed with three oblique about equidistant very narrow brown fasciae, which are intersected by three similar longitudinal fasciae; the venation is luteous, interrupted with fuscous; along the margin are dark fuscous forks and spots; four to five sectors; seven veins in the apical gradate series; six in the inner one; hind wings pale, more hyaline, some darker blackish veins along the front and apical margin. Abdomen dark brown; male with a yellow spoon-shaped ventral valve; the last dorsal segment paler, truncate, split from below two-thirds of its length: out of the split two processes reach more or less, viewed from the side straight, from above with the apex bent inside; this apex is black, sharp, the convex part cut horizontally; both processes together represent a kind of forceps, in which the bent-up apex of the penis is placed; the penis is long and narrow, gradually enlarged to base, tip split below (or bifid?) two longer divergent straight spines above the lower valve, originating near the base of penis. Female with the end of abdomen blunt, pale.

Hab. There are sixteen specimens before me; one ♂ from the

White Mts., Morrison; two from Canada, J. Jack; another from Europe; ♂ ♀ from Sweden, Mus. Lund. types of H. villosus, Zett.; ♂ ♀ from St. Petersburg, August, O. Sacken; from Koenigsberg, E. Prussia, July; from Silesia, May 6, type of H. intricatus Schneid.; from Pommerania; from Hambourg; from Zurich, Switzerland, very common in pine forests, sent by Bremi as H. aphidivorus Schrk.; one ♂ from Syracuse, Sicily, April 1844, Zeller, the type described by Schneider; I have seen a large number, the types of Wesmael, Rambur, and from Madeira, Wollaston.

Stett., Ent. Zeit. XIX, 130, no. 2. I have quoted specimens from S. Russia and Irkutzk, Siberia. Both are no longer in my collection; but I have reason to doubt the determination of the specimen from Irkutzk; after Zetterstedt and Wallengren, M. angulatus is widely distributed in Sweden, but always rare, July to September. In England, M'Lachlan, very rare, but widely distributed in summer. In France, Rambur, common everywhere; also in Sardinia; in Belgium near Bruxelles; in Austria, Brauer, near Vienna, rare.

After a careful examination of Schrank's description Fn. Austr. p. 313, no. 627, and the more detailed in Fuesly N. Mag. I, 283, I am convinced that his H. aphidivorus is not this species but probably H. marginatus. I have adopted in my synopsis on Bremi's authority and only in the Madeira Neur. Schrank's name. Brauer and Schneider have never adopted it, but M'Lachlan and Wallengren, perhaps on my authority. In my manuscript notes on Stephens' species, I had H. angulatus determined as H. aphidivorus and as M'Lachlan gives the same determination, the name of Stephens has to be restored.

The North American specimens are doubtless identical with the European species. M. angulatus, though much smaller, imitates M. paganus in the bands of the front wings.

4. **Micromus meridionalis** Costa.

Mucropalpus meridionalis Costa, Nnov. studii Ent. Calabr. ult. p. 31, pl. III, f. 6 (not compared by me).

Costa Fauna Nap. Neurot. Supl. 2, pl. XIII, f. 2.

Costa has in both papers referred his species to Mucropalpus, but the narrow base of the costal space unites it to Micromus. The circumstance that it was collected in the valley of Aspromonte,

the most southern part of Calabria, combined with the fact that Zeller collected M. angulatus in Syracuse, Sicily, is in favor of the identity of Costa's species. The figure is too yellow, but it contradicts not the supposition, and the description contains nothing which would not apply to M. angulatus. The intersecting longitudinal bands of the front wings are not mentioned, but they are often very faint. Costa's specimen and Schneider's have only four sectors. Till the contrary is proved, the identity can be accepted. Brauer, Neur. Europ., p. 29, also refers Costa's species to Micromus.

5. Micromus navigatorum.

Micromus navigatorum Brauer, Wien. Z. B. Ges. XVII, 508.

Long. corp., 5 mm.; exp. al., 15 mm.; long. al. ant., 7 mm.; al. post., 5 mm.

Unknown to me; description of Dr. Brauer:—grayish ochreous; antennae same color, with paler villosity; prothorax with two pairs of dark spots; legs pale; wings hyaline; front wings ochreous with transverse nebulous fasciae; gradate veins blackish-brown, fumose around. Both series very oblique, parallel with eight external and six internal veins; other veins pale ochreous, alternately brown; seven sectors; a small brown spot in the basal third; five to six fumose spots on the hind margin; hind wings hyaline, veins ochreous; seven external black gradate veins, four internals; five sectors.

Hab. Ovalau, Viti, and Upolu, Samoa, coll. Dr. Graefe. This species somewhat resembles M. angulatus (Brauer), but seems so near M. timidus, that a more detailed description is needed to separate the two species.

6. Micromus variegatus.

Hemerobius variegatus F., Ent. Syst., II, 85, no. 18.—Steph., Illustr., VI, 113, no. 25.—Burm., Hdb., II, 974, no. 2.—Wesm., Bull. Brux., III, 214, no. 1.

Micromus variegatus Ramb., Neur. p. 417, no. 2.—Schneider, Arb., Schles. Ges. 1846, p. 100.—Brau., Neur. Austr., 58.—Costa, Fn. Nap. Neur. Hemer., p. 4, pl. 10, f. 2.—Hagen, Stett. Ent. Zeit., XXI, 54, no. 1.—Entom. Ann. 1858, p. 26, no. 19.—M'Lachlan,

Monogr., 172, no. 1, pl. IX, f. 4.—Wallengren, Monogr., 50, no. 3.

Long. c. al. 6–8 mm.; exp. al. 12–16 mm.

Body black; villosity white; front, shining coal black, on the occiput three longitudinal marks; palpi grayish; antennae yellow, long, more than three-fourths of the front wing, basal joint blackish, the other faintly annulated with a darker hue; thorax, dull, with some brown marks; legs yellowish white, whitish villous, tibia with a blackish ring near the knee and another on the apex; last tarsal joint, dark brown; claws pale; front wings narrow, long, three times longer than broad, apex rounded, hyaline, veins white and brown, whitish villous; the wings are somewhat irregularly spotted with brown bands sometimes along the gradate veins, a regular series of spots along the margin, the forks on apex of wing, the gradate veins; three sectors; the two gradate series not parallel, the external one somewhat irregular; five veins in each series; hind wings with three irregular fumose blotches, on the apex of the wing and on both margins before the apex, where also the veins are blackish; abdomen black, last segment pale whitish; a spoonshaped ventral valve; two yellow, sharp, subulate appendages; last dorsal segment flat, split from below for three-fourths of its length; female with a compressed, triangular apex.

Hab. Europe, 20 specimens, half males, before me: Silesia, the types of Dr. Schneider; Vienna, Austria, Mayr; Hamburg, Winthem; Stuttgart, Zenneck; Regensburg, Herrich Schaeffer; Switzerland, Zurich, Bremi and Imhoff; Bex, Dr. Hensche; England F. Walker.

Wallengren, Sweden, June and July in southern and middle provinces, rare; England, M'Lachlan, frequent in summer and generally distributed; Italy and Sardinia, A. Costa; Sardinia, Rambur; Corsica, Hagen.

The females are commonly larger; the appendages of the male are not easily seen; the spoonshaped lower valve and the two subulate spines are certain; also the flattened dorsal segment split from below (not two oval valves above), but I have not been able to see upper appendages, and only doubtfully distinguish a straight penis.

Wallengren is surely right in stating that H. variegatus Zett.

belongs to another species. My specimen from England ♂ is very small face pale brown, only two sectors.

Mr. E. Newman, Proc. Ent. Soc., May 5, 1856 (repr. Zoologist, p. 5152) states that Mr. Dorville found in a pupa shell of Abraxes grossularia a white silken cocoon, out of which emerged H. variegatus. This is the only fact known of the previous stages of Micromus. When I saw Stephens' collection, a specimen of H. variegatus with the label fimbriatus was near the type of H. hirtus, but other types of H. variegatus were in the right place and no. 26 H. fimbriatus in the Illustr. with a ?, was wanting.

7. Micromus variolosus, n. spec.

Micromus variolosus Hag.

Long. c. al. 7. mm.; exp. al. 13 mm.

This species imitates M. variegatus.

Head and thorax brownish gray, with a little bluish tinge, with transverse rows of very small black tubercles; head in front and near the eyes, yellow, glossy; palpi blackish, shining; antennae shorter, half as long as the front wings, yellow, the two basal joints blackish, but the first yellow above; thorax with yellowish sutures. Front wings long, narrow, more than three times longer than broad, very little dilated in middle, apex elliptical; hyaline, milk-white, mottled with numerous blackish spots, very shortly fringed around and on the veins with white cilia; four sectors; series of gradate veins irregular, the external with six gradate, the internal with four; all cells between them very elongate and narrowed to the gradate veins; a maculose dark band somewhat longitudinal along the external gradate series, numerous other more or less definite spots; some darker, along the hind margin, some transverse near the base; veins brown regularly intersected with white; hind wings of similar shape, hyaline, with a few darker spots on the apical half of the front margin; veins on the basal half white, brown on the apical half with some white intersections; three sectors, four to five external brown gradate veins and five internals; cells very large. Legs yellowish white, whitish pilose; two black bands on tibia, one on femur, the last tarsal joint black, claws white. Abdomen blackish brown, the side membrane and the last segment luteous yellow; tubercles large; last ventral segment cut straight; the last segment compressed but split;

though no appendages are produced the specimen must be a male.

Hab. Only one specimen from Denver, Colorado.

It is a remarkable fact, that the three prominent species of Europe are represented in N. America; one of them M. angulatus is perfectly identical with the N. American species; the second, M. paganus, is so very near M. montanus, that only the appendages of the male show a sure structural difference; if a similar variation can be shown in European specimens, M. montanus would have to be considered as a race of M. paganus. The third, M. variegatus, differs somewhat more from the N. American species, of which only one specimen is known. One of the most striking characters of M. variegatus (in 19 specimens before me) the coal black glossy face is not mentioned by M'Lachlan and Wallengren, and Stephens, Ill., says also, deep fuscous, head very glossy in front. The only English specimen before me, though apparently young, has also the front brownish. It is desirable to know if the English and Swedish specimens never have a black face. But I believe that M. variolosus shows more differences. The antennae are shorter, the first joint yellow above; the small black tubercles on head and thorax are not to be found on twenty European specimens; the wings are narrower, and the venation shows more elongated cells. There are more American specimens needed and the knowledge of the male appendages to make this species beyond doubt. At all events it differs much more from M. variegatus than M. montanus does from its European relative.

8. Micromus insipidus.

Micromus insipidus ♀ Hag., Syn. N. Am. Neur., p. 199, no. 4.
Micromus sobrius ♂ Hag., ibid, 199, no. 5.

Long. c. al. 7 to 10 mm.; exp. al. 14 to 18 mm.

Head fuscous, with some pale villosity; front paler, luteous; palpi pale; antennae yellow, the two basal joints marked with fuscous; thorax and abdomen fuscous; legs pale, four anterior tibiae with two fuscous rings; tarsi yellowish; front wings slightly pilose, less than three times as long as broad, apex elliptical; hyaline, very little fumose, densely mottled with fuscous spots, forming in the apical half and along the hind border some waved, maculose, transverse bands; veins pilose, pale, with many fuscous interruptions; four sectors; series of dark, gradate veins, oblique, about parallel; six external gradate, of which the second

is nearer to the apex than the first; four internal gradate; hind wings hyaline, veins pale, with six and four gradate series, the external often blackish; last segment of male yellowish, above the spoon-shaped ventral valve two long, brownish, sharp, flat spines, excised largely externally on tip; a pale, small penis between them curved upwards and somewhat inflated just before the tip; dorsal segment split from below nearly to the top; two small darker appendages with the tip a little incurved are seen very near together in the interior of the dorsal segment; apex of the female abdomen blunt, pale.

Hab. I have 15 specimens (4 ♂) before me from Philadelphia; New York, West Point; Massachusetts, Cambridge, Beverly, Provincetown, July 21; Rock Island, J. W. Walsh; from Upper Wisconsin River, Kennicott; from Morganton, North Carolina, Morrison.

Mr. M'Lachlan suggests, Journ. Linn. Soc., IX, 274, that M. insipidus may be H. posticus Walker. Indeed, the description agrees, but it is placed among the species with three sectors, and besides I have compared in London my type of M. insipidus with Walker's species, and noted nothing about the identity. Of the two types from Georgia of H. posticus, one has four sectors and seven and five gradate veins; the other has three sectors and six and three gradate veins; I presumed the latter one to be H. posticus type.

M. insipidus is not among the types of A. Fitch.

Micromus sobrius Hag., Syn., p. 199, no. 5, should be better united with M. insipidus. When I described those species I had of M. sobrius, only two males, of M. insipidus, only two females, before me, which are still in the collection. Now I find no reliable difference between the two species. The appendages of the males are not well known except for the spines, and even those are not easy to be seen.

9. Micromus Cubanus n. sp.

Micromus Cubanus Hag.

Long. c. al. 8 mm.; exp. al. 14 mm.

Similar to the smaller specimens of M. insipidus. The tibiae have two black spots; the front wings are not mottled with brown on the membrane, but all veins are alternately yellow and dark brown; five sectors; external gradate veins seven; internal four.

M. insipidus has the external gradate longer, and always the second more remote to the apex of the wing. M. Cubanus has the second in the same line with one to four, which form a vertical line and not an oblique one as in M. insipidus; the external gradates are deep black; abdomen yellow; only the sharp inferior spines are to be seen, their tips longer than the valve; but I am not able to see that the spines are dilated before the apex as in M. insipidus; the upper valve is split from below.

Hab. Cuba; one ♂ from Gundlach, no. $\frac{2}{11}$ of his catalogue.

I would not have separated this species, but the lack of mottled brown on the front wings, the five sectors and the external gradates which are deep black, vertical in the beginning, the yellow abdomen and the not dilated spines seem to be characters sufficient for the separation.

10. Micromus angustus n. sp.

Micromus angustus Hag.

Long. c. al. 7 mm.; exp. al. 13 mm.

Head and prothorax yellowish with white villosity, with brownish spots above in older specimens; palpi pale, last joint blackish, somewhat dilated; antennae yellow, half as long as the wings; legs pale, whitish. Abdomen dark grayish brown; all specimens seem to be males; the genitals are not to be seen; a short, leaf-shaped ventral process is to be seen; in one specimen what seems to be the tip of the penis is a little prominent. Wings long, narrow, nearly four times as long as broad, apex elliptical; hyaline, a little fumose; veins alternately yellow and black, the gradate veins, the base of the sectors, some little spots around the margin and a more visible one in the middle of the wing nearer to the basis black; four sectors; five irregular gradate veins in the external series, four in the internal; hind wings similar in length and size, hyaline, veins yellowish, four external gradate cells larger.

Hab. Haulover, Florida, 2, March 2 and 4; Capron, Florida, 2, April 14 and 25, both from H. G. Hubbard; Morganton, North Carolina, 2 from Mr. Morrison.

This small, narrow species can not be confounded with other North American forms; the older ones are darker, also the veins in the hind wings. It is near M. linearis from Ceylon.

Perhaps this is the Hemerobius subanticus Walk., Neur. Br. Mus., p. 282, no. 13. The darker specimens do not disagree with the description, but H. subanticus is said to have only three sectors. The type in the British Museum of this species will decide the question; among my notes made in London I find H. subanticus is a Micromus with very narrow wings.

11. Micromus calidus.

Micromus calidus Hag., Wien. Z. B. Ges., IX, 207, no. 126.

Long c. al. 8 mm.; exp. al. 14 mm.

Brownish black with pale villosity; head above black, densely villous, occiput somewhat elevated; front glossy pale with transverse maculose brown bands; between the antennae black; the two basal joints of antennae black, the following brownish, the apical third blackish brown, shortly villous; palpi pale; prothorax black with two globular tubercles near the base; mesothorax black; legs whitish, pilose; four anterior on femur and tibia with three blackish rings, one basal, one apical and one in middle; last tarsal joint and claws dark; front wings short, nearly half as broad as long, apex elliptical; hyaline, grayish-fumose, part between the gradate series and at the base near the hind margin paler, whitish, faintly mottled with gray on the posterior half; veins blackish-brown, strongly interrupted with white, also on the front margin; six sectors black at base; three faint transversals on the tip of the subcostal space; external series with nine black gradate veins, the uppermost placed more internally; inner series with five black gradate; both series parallel except in the anterior third; at the base a short maculose black stripe; hind wings hyaline, grayish-fumose, veins pale, pterostigma part transversally blackish; external series with eight black gradate, also their forks dark; internal series with five gradate; abdomen dark brown, last segment luteous; two straight short spines above the lower valve of the male and a dagger-like spine between the superior valves, perhaps the penis.

Hab. Ceylon, Rainbodde, Nietner.

In the last lot received from Rainbodde by Mr. Nietner were three specimens in alcohol. One female belongs to M. australis. Another female is doubtful, entirely yellow and the wings pale, yellow in the pterostigmatical part, veins yellow, the beginning of

the sectors, the gradate veins and some near the margins brown; one front wing with six sectors has the venation of M. calidus; the other wing has an abnormal reticulation. The yellow prothorax has a brown line on each side. I would have referred it to M. calidus, but the legs have no black rings and on the wings the much variegated pattern of M. calidus is also wanting. The male is smaller, body brown, antennae annulated with brown; wings pale with five sectors and seven gradate veins in the external series; abdomen dark brown, genital appendages not to be seen; legs without black rings. All tarsi have a large, thin orbicular plantula, exceeding the claws on both sides.

12. Micromus australis.

Micromus australis Hag., Wien, Z. B. Ges. VIII, 483, no. 76.

Long. c. al. 7 mm.; exp. al. 12½ to 15 mm.

Pale luteous, luteo-pilose; head, palpi, antennae, pale luteous; occiput transversely elevated; prothorax nearly smooth, on each side a large brownish ill-defined spot; legs pale. Front wings less than half as broad as long, hyaline with a yellowish tinge, margins and veins luteo-pilose; veins luteous except the gradate and the veins connected with them, which are dark brown; four sectors, nine gradate in the external series, five in the internal; the series not strictly parallel; hind wings similar in shape and color; external gradate eight; internal five, both brown. Abdomen luteous, very pilose; last segment of male paler; lower valve long, narrow; rounded tip a little larger with numerous very long, spine-like hairs; the valve split above; at the base of the valve the two lower appendages are flat, erected, at tip lancet-shaped, recurved, sharply pointed, serrated on both margins; superior valves separated, ovoid, convex, on the lower margin with a short strong hook and some short pyramidal spines; apex of the female truncated.

Hab. Ceylon, Rainbodde, by Nietner. Eight males and females before me.

13. Micromus linearis.

Micromus linearis Hag. Wien, Z. B. Ges. VIII, 483, no. 75.

Long. c. al. 8 mm.; exp. al. 14 mm.

Elongate, luteous, occiput, tuberculate; antennae luteous; palpi and legs pale; prothorax anteriorly with two impressions; wings long, narrow, about four times as long as broad, narrowed at base,

apex elliptical; hyaline with a yellowish tinge, or subfumose; veins pale, alternately blackish; two black marks on the pterostigma, several smaller ones on the hind margin; the base of sectors and of some forks blackish; four sectors; six external gradate, five internal, not strictly parallel, the externals somewhat irregular; margins pilose; hind wings similar, pale, a blackish tinge on the apex of the subcostal space. Abdomen, blackish; of the male genitals only the closed valves are to be seen.

Hab. Ceylon, Negombo and Rainbodde, by Nietner; 30 ♂, 1 ♀.

14. Micromus costulatus.

Micromus? costulatus Motsch., Bull. Moscou, xxxvi, 2, 10.

Micromus lincaris Hag., var? minor. Wein, Z. B. Ges. viii, 483, no. 75.

Long. corp. 5 mm.; exp. al. 8½ mm.

Only a fragment; thorax and legs pale; wings less than three times longer than broad, hyaline, veins pale, the gradate and some forks dark; four sectors, six and five gradate veins; hind wings similar. Motschulsky's description is as follows: Sordide albescens, transversim fusco variegatus, sparsim testaceo-ciliatus; occipite subelevato; thorace medio longitudinaliter subconvexo, utrinque infuscato; alis elongatis, venis crassiusculis, subelevatis, fere costatis, fusco annulatis, serie externa sex, interna quinque gradata, pedibus testaceis. Long. 1¾ lin.; exp. alar. 3½ lin.

Hab. My specimen Ceylon, Rainbodde, Nietner; Motschulsky's, Ceylon, Mt. Patannas, Nietner. The identity of both is very probable; but the dimensions of the latter are a little smaller.

15. Micromus pumilio.

Micromus pumilio Stein, Berl. Ent. Zeit., vii, 419, no. 40—Brau. Neur. Europ., p. 29.

Long. corp. 2½ mm.; exp. al. 9 mm.; long. al. ant. 4 mm.

Translation of Stein's description: Testaceus, palpis maxillaribus abdomineque fuscis.

Near H. dipterus. Head, antennae, thorax below and legs whitish yellow; the twelve basal joints of antennae, the first excepted, annulated with brown; maxillary palpi dark brown; eyes large and prominent, so that the prothorax looks very coarctated; it has brownish spots besides; wings grayish white, veins brownish,

some transversals brown, but all less strong than by H. dipterus; wings twice as long as abdomen; hind wings a little shorter; tibiae fusiform.

Hab. Greece from Krueper, now in the Museum of Berlin.

Dr. Fr. Stein, in 1863, had the kindness to send to me all his Neuroptera from Greece for determination. As Stein was at this time the only possessor of an excellent pair of H. dipterus, now in the Museum of Berlin, I asked him to compare the species from Greece with H. dipterus. He answered (Nov. 20, 1863) that Micromus pamilio is distinctly different, if both species are compared, in the colors of the head and antennae, and in the venation.

I have, therefore, no doubt that M. pumilio is a good species, Brauer, l. c., has quoted it with a ? under H. dipterus.

16. Micromus Tasmaniae.

Hemerobius Tasmaniae Walker, Trans. Ent. Soc. Lond., ser. 2, v, 186—M'Lachl., Ann. Mag. N. H., July, 1873, p. 39.

Long. corp. 5 mm.; exp. al. 14 mm.

(Walker's description.)

Mas. et fem.—Testaces, capite fulvo, fascia vitta punctisque duobus testaceis, thorace lituris fulvis, pedibus albidis, alis angustis subvitreis, venis albidis, alis anticis subpubescentibus, venis paucis fuscopunctatis.

Male and female. Testaceous; head tawny with a band, a stripe and two points testaceous; thorax with some tawny marks; legs whitish; wings narrow, almost vitreous; veins whitish; fore wings minutely pubescent; few veins, with brown points.

Hab. Tasmania; coll. W. W. Saunders, now in the Brit. Museum. I saw the species years ago in Mr. Saunders' collection, but have no specimen before me.

Mr. M'Lachlan, Ent. M. Mag. VI, 27, says: H. Tasmaniae Walker is a Micromus; I have seen it from several parts of New Holland, and possess two individuals from New Zealand, which differ only in the rather greater amount of spotting on the veins, and with these more strongly ciliated; a comparison of an extensive series from both quarters will be requisite to prove the identity or distinctness of the two forms.

17. Micromus timidus.

Micromus timidus Hag., Bericht., Akad. Berlin, 1853, p. 481.
Hag., Peter's Reise Mossamb., v, 91–92, pl. 5, fig. 2.

Long corp. 8 mm.; exp. al. 15 mm.

Brown, whitish pilose; face glossy; vertex elevate; palpi brownish; antennae reaching the middle of the wings, pale yellow, the two basal joints and the ten apicals brown; legs pale yellow; apical half of abdomen wanting; front wings hyaline, subcinereous, base and hind margin mottled with gray; veins and villosity pale yellowish; seven sectors; series of gradate veins parallel, external with eleven, internal with seven veins; sectors at the base and throughout spotted with brown; gradate veins and their connections dark brown; hind wings hyaline with nine external and six internal gradate veins; the internals and connections dark brown.

Hab. Mozambique, Peters; the type in the Berlin Museum.

As the venation was drawn by me with the camera, its correctness is without any doubt. In the older description eight sectors were stated, but I had then wrongly counted the basal branch, which does not belong to the sectors.

18. Micromus insularis, n. sp.

Micromus insularis Hag.

Long. c. al. 8 mm.; exp. al. 15 mm.

I had before united this species with M. timidus, even after comparing it with the type in the Berlin Museum, but the venation differs so much that I think they cannot belong together. Front wings with six sectors; series of gradate veins parallel, eight external veins, five internals. Otherwise the coloration is identical. The specimen is a male; lower appendages yellow, brown on tip, long, cylindrical, turned outside, a little curved at the base; a pointed penis in the split; the abdomen is brown, the last segment yellowish.

Hab. Madagascar, one specimen presented to me by C. A. Dohrn. More specimens of both species are needed to prove their position.