

VI. *A Monograph of British Braconidæ.* Part III.

By the Rev. T. A. MARSHALL, M.A., F.E.S.

[Read December 5th, 1888.]

PLATES X. & XI.

XVI. CALYPTIDES.

Abdomen sessile. Fore wings with 2 cubital areolets, the 1st separated from the prædiscoïdal; recurrent nervure rejected; radial areolet lanceolate, not reaching the apex of the wing; prædiscoïdal areolet petiolated; axillary areolet closed by an oblique transverse nervure. Terebra elongate.

The two genera here brought together by authors are so different in appearance that their association seems hardly natural; the structure of their abdomen varies in some important respects. They agree, however, in the combination of a sessile abdomen with 2 cubital areolets, characters not found united in any other subfamily except the *Blacides* and *Liophronides*. These two have the axillary areolet of the fore wing open; in the *Calyptides* the same areolet is closed. On the other hand, the *Calyptides* have the podiscoïdal areolet of the fore wing closed, while it is half open in the *Blacides* and *Liophronides*.

Abdomen showing 8 segments above; the 1st much longer than broad i. EUBADIZON.
Abdomen seldom showing more than 3 or 4 segments above, the rest more or less retracted; the 1st not or hardly longer than its apical breadth ii. CALYPTUS.

i. EUBADIZON, *Nees*.

Eubazus, *Nees*, Act. Ac. L. C., 1819, p. 307.

Eubadizon, Sectio I., *Nees*, Mon., i., 233; Hal., Ent. Mag., iii., 131; *Wesm.*, Nouv. Mém. Ac. Brux., 1835, p. 164; S. v. Voll., Schets., ii., Braconiden, tab. iv.

Charmon, Hal., Ent. Mag., i., 262.

TRANS. ENT. SOC. LOND. 1889.—PART II. (JUNE.) M

Elongate, slender. Labial palpi tri- or subquadriarticulate. Abdomen linear, with 8 visible segments; suturiform articulation obsolete in the middle; 1st segment striolated, much longer than broad, slightly attenuated at the base; tubercles situated before the middle. Legs long and slender. Terebra elongate.

Head transverse, broader than the thorax; clypeus separated from the face by a curved impression, deeper at the sides, with 2 basal foveæ; mandibles bidentate; antennæ slender, setaceous, elongate, or, if shorter, subincrassated towards the apex; maxillary palpi 6-jointed. Abdomen with segments 1—3 elongate, the others very short; 1st segment, and sometimes the base of the 2d, striolated, the rest smooth; sutures visible (except the middle of the suturiform articulation); belly of the ♀ compressed, carinated.

The species are few in number, and only the first is of common occurrence; Nees von Esenbeck described 5, in two sections, the latter of which comprised only *E. trigonus*, with 3 cubital areolets, now transferred to the genus *Microtypus*, Ratz.; his first species, *E. macrocephalus*, belongs apparently to the next genus. Wesmael and Haliday each added a new species, and another, *E. rufipes*, is figured by Herrich-Schäffer in Panz. F. G., 154, 24.

These insects, so far as known, are parasites of Lepidoptera.

TABLE OF SPECIES.

- (4) 1. Second abdominal segment smooth.
- (3) 2. Scutellum and pectus more or less rufous; antennæ ♀ longer than the body, slender, setaceous, more than 40-jointed 1. *extensor*, L.
- (2) 3. Scutellum and pectus black; antennæ ♀ shorter than the body, incrassated towards the apex, 22-jointed 3. *flavipes*, Hal.
- (1) 4. Second abdominal segment rimulose 2. *pallidipes*, Nees.

1. *Eubadizon extensor*, L.

Ichneumon extensor, L., Fn. Suec., 1613; S. N., 935;

Pimpla extensor, Fab., Piez., 115, ♀.

Eubadizon pectoralis, Nees, Mon., i., 236; Hal., Ent. Mag., iii., 132, ♀; Wesm., Nouv. Mém. Ac. Brux., 1835, p. 165, ♂ ♀; Ratz., Ichn. d. Forst., ii., pl. ii., f. 30.

Black; palpi and legs flavo-testaceous; mandibles, pectus, pleuræ, scutellum, often the prothorax, disk of the mesothorax

partly, and sides of the metathorax, rufo-testaceous. Wings hyaline; squamulæ, costa, and stigma yellow; nervures pale fuscous. First abdominal segment rimulose. Terebra as long as the body, or hardly shorter. ♂ ♀. Length, $2\frac{1}{4}$ —3; wings, $4\frac{1}{2}$ —6 lin.

Var. 1, ♀. Scutellum black. Wesmael.

Var. 2. Thorax mostly rufous; antennæ rufous at the base. Haliday.

Antennæ ♀ longer than the body, very slender, setaceous, 42—46-jointed, testaceo-fuscous, the 1st joint and apex of the 2d paler; those of the ♂ one-half longer than the body (broken in my specimen); mandibles rufous, sometimes blackish, acutely bidentate; maxillary palpi very long, joints 1, 2, short, 4 longest. Thorax attenuated at both ends; mesothoracic sutures impunctate; metathorax shining, with a medial oblong punctulate fovea, having raised edges. Stigma ovate-lanceolate; radial areolet acuminate, not quite reaching the apex of the wing; radius sinuated; recurrent nervure far rejected; pabrachial areolet of the hind wings $\frac{2}{3}$ of the length of the præbrachial; axillary transverse nervure distinct. Abdomen longer than the head and thorax, and narrower than the latter; 1st segment less than $\frac{1}{3}$ of its entire length, linear, rimulose or sublævigated, with prominent tubercles near the base; the other segments smooth and shining; suturiform articulation indistinct; segments 2—3 together as long as all the following. Terebra rufous, with black pilose valves. ♂ similar, but the antennæ and posterior abdominal segments are longer.

The Linnean *Ichneumon extensor* was supposed by Gravenhorst to be *Pimpla roborator*, Fab., but the type-specimen having now been verified by Fitch, the name is restored to the present insect. Described from 1 male, 7 females taken in Darenth Wood, and Devonshire; found by Bignell at Ivybridge; in Ireland, not uncommonly, by Haliday; and generally distributed in northern and central Europe. First taken, according to Nees, in the Sudetsch mountains of Bohemia; Ratzeburg's specimens were reared by Nördlinger at Grand Jouan in the beginning of June from *Sericoris Nördlingeriana*, Ratz., and *Coccyx? Mulsantiana*, Ratz.; by Brischke and others from *Tortrix rosana* and *viridana*, L.; *cratægana* and *diversana*, Hüb.; *Phlæodes immundana*, Fisch.; and in England by Colquhoun out of *Depressaria nervosa*, Haw.

2. *Eubadizon pallidipes*, Nees.

Eubazus pallipes, Nees, Mag. Ges. Berl., 1814, p. 215,
♀.

Eubadizon pallipes, Nees, Mon., i., 235, ♂ ♀; Wesm.,
Nouv. Mém. Ac. Brux., 1835, p. 167, ♀.

E. coxalis, Nees, Mon., i., 235, ♂.

E. semistriatus, Hal., Ent. Mag., iii., 131, ♂ ♀.

Black; mouth, palpi, antennæ at the base, and legs, testaceous; hind tibiæ margined at the apex with fuscous, their tarsi almost entirely fuscous. Wings hyaline; squamulæ rufous; stigma and nervures fuscous. First and second abdominal segments rimulose. Terebra one-half longer than the body. ♂ ♀. Length, $1\frac{3}{4}$ —2 lin.

Antennæ ♀ (broken); 1st joint beneath and apex of the 2d testaceous. Mandibles testaceous in the middle. Metathorax rugose, carinated at the base, with prominent posterior angles. Wings less ample than those of *extensor*, and distinguished by the dark stigma. Legs shorter and stouter. First abdominal segment rimulose, dull, deeply excavated near the base, and with prominent tubercles; from the middle to the apex faintly canaliculated; 2d segment also rimulose and dull, the following segments smooth and shining. Wesmael.

♂. Antennæ slender, not much longer than the body, 28-jointed, joints 1—2 testaceous beneath; mandibles small, nearly concealed, flavo-testaceous. Mesothoracic sutures punctulate. Metathorax thickly punctate. Radial areolet acuminate; po-brachial areolet of the hind wings $\frac{2}{3}$ the length of the præbrachial. Abdomen hardly narrower than the thorax, linear, depressed; 1st segment occupying $\frac{1}{4}$ of its length, $\frac{1}{2}$ longer than broad; tubercles situated before the middle; 2d segment shorter, rimulose, the lateral margins narrowly lævigated; the following segments successively decreasing in length, smooth, with inconspicuous sutures; segments 2—3 together somewhat longer than all the following; anal forceps protruded, large, conchiform. Haliday.

Described by Haliday from a specimen in the collection of Curtis; he had not seen the ♀, nor Wesmael the ♂; I have never met with the species.

3. *Eubadizon flavipes*, Hal.

Eubadizon flavipes, Hal., Ent. Mag., iii., 132, ♂ ♀.

Black, shining; legs flavo-testaceous; 1st abdominal segment

bicarinated, the rest very smooth. Terebra longer than the body. ♂ ♀. Length, $1\frac{1}{3}$ — $1\frac{2}{3}$; wings, $2\frac{1}{2}$ —3 lin.

Formed like *extensor*, but the antennæ, legs, and abdomen are shorter. ♀. Antennæ shorter than the body, filiform, 21-jointed, the last joint enlarged, oblong. Palpi much shorter than those of *extensor*. Mesothoracic sutures impunctate. Metathorax areated, vaguely punctulate. Wings hyaline; stigma fuscous; radix and squamulæ pale ferruginous; pabrachial areolet of the hind wings hardly as long as $\frac{2}{3}$ of the præbrachial. Hind tibiæ at the apex, and their tarsi almost entirely, fuscous. Abdomen narrower and scarcely longer than the thorax; 1st segment occupying more than $\frac{1}{3}$ of its entire length; tubercles minute, situated between the base and the middle; on the disk are two acutely elevated carinæ, approximated posteriorly, the interstices hardly striolated; the remaining segments very smooth; 2d and 3d hardly discrete, together as long as the 1st; the following segments very short; belly carinated, pale, pellucid. Terebra slender, less than half as long again as the body. ♂. Antennæ 24—25-jointed, somewhat longer than the body.

Inhabits north Ireland, but rarely. Haliday. An English ♀ specimen is in Fitch's collection, having the antennæ 22-jointed, and somewhat incrassated towards the tips; it presents some other characters not noticed by Haliday; 1st abdominal segment piceous, its extreme base testaceous; hind coxæ above, and a line on the 4 posterior femora, piceous; hind tibiæ broadly fuscous at the apex; nervures, especially of the hind wings, decolorous and hard to be seen. I cannot consider it anything more than a variety of *flavipes*.

Obs. There is an obscure reference in Ratzeburg (Ichn. d. Forst., ii., 65) to a parasite bred by Reissig from *Cryptorrhynchus lapathi*, L., and which was never properly examined. It resembled a *Macrocentrus*, but had only 2 cubital areolets—the neurulation of a *Brachistes*. This is immediately suggestive of *Eubadizon flavipes*, and of nothing else. "A hint," says Ratzeburg, "for future breeders."

ii. CALYPTUS, Haliday.

Hal., Ent. Mag., iii., 128 (1835); S. v. Voll., Schets., ii., Braconiden, tab. iv. (wing).

Brachistes, Wesm., Nouv. Mém. Ac. Brux., 1835, p. 109.

Shorter and stouter than *Eubadizon*. Labial palpi triarticulate. Abdomen oblong or ovate, not longer than the thorax; usually only 3 segments visible above in the ♀, the rest retracted or very short; suturiform articulation obsolete, so that segments 2—3 appear as one elongate segment; in the ♂ the 4th and following are less completely concealed; 1st segment broad, conical, truncate, not or hardly longer than its apical breadth; tubercles medial. Legs shorter than in *Eubadizon*, the hind pair incrassated. Terebra exerted.

Head broader than the thorax, not much narrowed behind the eyes; vertex transverse; occiput distinctly margined; maxillary palpi 6-jointed, the 4th joint longest; labial palpi consisting of 3 equal joints. Mesothorax elevated, gibbous, its sutures distinct. Abdomen, ♀, appearing biarticulate; segment 1 rimulose; 2—3 connate, and concealing the rest, not margined, smoothly reflexed, so as to cover the sides and unite in a carina in the middle of the belly; the truncate extremity of the 3d leaves a large posterior cavity within which the remaining segments are withdrawn; from the centre of this cavity proceeds the terebra of the ♀, and the apex of the sexual organ of the ♂; in the latter the posterior segments are visible above in the form of 2 or 3 narrow rings beyond the edge of the 3d segment; rarely this is also the case in the ♀. Only the 1st segment of the ♀ is margined at the sides beneath; in the ♂ sometimes the base of the 2d is also margined. For the distinction between this genus and *Sigalphus*, see Trans. Ent. Soc. Lond., 1885, p. 104.

Of the Braconids described by Nees v. Esenbeck, only *Sigalphus fasciatus* (Mon., i., 269) and perhaps *Eubadizon macrocephalus* (Mon., i., 234) belong to this genus. Haliday first established *Calyptus* with 3 species, including *Sigalphus fasciatus*. In the same year appeared Wesmael's *Brachistes* with 4 species, one of which is identical with a species of Haliday; a 5th species was added in 1838 by Wesmael in his Supplement. Ratzeburg, in the Ichn. d. Forst. (1844—52), increased the number of species to 14, one of which is identical with a species of Haliday, and another, *Brachistes fagi*, Ratz., belongs to the genus *Sigalphus*. Reinhard informs us that Ruthe almost completed a MS. monograph of these insects; it has never been published *in extenso*, but a synoptical table by Reinhard, with diagnoses of some new species, appeared in the Berl. ent. Zeit., 1867, pp. 369—374.

TABLE OF SPECIES.

- (6) 1. Hind tibiæ black or blackish, except at the base.
 (5) 2. Abdomen with only 3 segments visible above.
 (4) 3. First abdominal segment not longer than its apical breadth; tubercles obsolete (♀ unknown) 1. *puber*, Hal.
 (3) 4. First segment $\frac{1}{2}$ longer than its apical breadth; tubercles conspicuous (♂ ♀) 2. *tibialis*, Hal.
 (2) 5. Abdomen with 6—7 segments visible above (♀ unknown) 3. *segmentatus*, n. s.
 (1) 6. Hind tibiæ rufous or testaceous.
 (8) 7. All the coxæ black or fuscous, except sometimes on the under side 4. *fasciatus*, Nees.
 (7) 8. All the coxæ testaceous 5. *sigalphoides*, n. s.

1. *Calyptus puber*, Hal.

Calyptus puber, Hal., Ent. Mag., iii., 130, ♂.

Black; legs ferruginous, coxæ blackish at the base; hind tibiæ and tarsi fuscous, the former ferruginous at the base; 1st segment short, stout, punctato-rugulose. Body shining, covered with a close whitish pubescence; mandibles black at the base. Antennæ 31-jointed, longer than the body. Wings dull hyaline, stigma and nervures fuscous, squamulæ piceous with a rufescent margin. Metathorax punctate, marked with elevated lines forming areæ, of which the middle one is pentagonal. First abdominal segment not longer than its apical width, which is twice that of the base; basal angles obtusely carinated; tubercles obsolete; the remaining segments irregularly punctulate, with whitish hairs; 2d segment about twice as long as the 1st; 3d segment rugulose at the extremity. Hind coxæ nigro-fuscous above; hind tibiæ fuscous, broadly ferruginous at the base, their tarsi almost entirely fuscous; the 4 anterior tarsi at the tips only. Female unknown. Length, $1\frac{3}{4}$; wings, 4 lin. Haliday.

Taken sparingly by Haliday in woods on the banks of the Shannon. Otherwise unknown, and not to be identified with any of the continental species. The synonym *Brachistes nigricoxis*, Wesm., given in my catalogue, seems now too doubtful to be maintained; so also Reinhard's conjecture as to the identity of *B. uncigenis*, Wesm. However, the form of the 1st segment seems to be the only difference between this and the following species, and it is quite possible that they may be the same.

2. *Calyptus tibialis*, Hal.

Calyptus tibialis, Hal., Ent. Mag., iii., 130, ♂ ♀.

Brachistes uncigenis, Wesm., Nouv. Mém. Ac. Brux., 1835, p. 113, ♂ ♀; Ratz., Ichn. d. Forst., iii., 27, pl. ii., f. 38 (abdomen).

Black, shining; thinly pubescent with short whitish hairs; mandibles rufous except at the base; palpi and legs rufo-testaceous, hind coxæ black above, fuscous beneath; hind tibiæ and tarsi blackish, the former testaceous at the base. Antennæ ♀ as long as the body, with 30 cylindrical joints diminishing in length towards the extremity; 2d joint usually dull testaceous: antennæ ♂ one-fourth longer, 32-jointed. Face punctate, dull, with a deep fovea on each side above the clypeus, and a shallow central depression; clypeus transverse, rounded in front, punctate; under each eye is a short, shallow groove; cheeks emarginate close to the base of the mandibles, forming on each side a dentiform process flattened against the surface and not easily seen. Pronotum rugulose. Mesothoracic sutures strongly incised, punctate. Scutellum small; ante-scutellar fovea large, punctate, bisected by a carina. Metathorax as in the last species. Wings slightly infumated, stigma and nervures fuscous, squamulæ testaceous. Abdomen as long and as broad as the thorax, flattened above, shining, with parallel sides, truncated at the end of the 3d segment, beneath which, in the ♀, the remaining segments are concealed; in the ♂ they project slightly. First segment rather longer than its apical width, which is about 3 times that of the base, rugulose; tubercles obtusely prominent; two lateral carinæ extend from the base nearly to the middle; 2d segment marked with shallow punctures, often very indistinct. Terebra straight, as long as the body. Size variable. ♂ ♀. Length, $1\frac{1}{3}$ —2; wings, $2\frac{2}{3}$ —4 lin.

Described from 5 females and 19 males. Taken by Haliday in the woods of northern Ireland; locally common in England, and especially in a wood close to my house at Nunton, Wilts; I have also specimens from Leicestershire and Herts. Wesmael possessed a series taken on old palings and windows at Brussels; he suspected them to be parasites of *Anobium*.

3. *Calyptus segmentatus*, n. s.

Niger, nitidus, abdomine nonnunquam picescente; pedes cum coxis pallide testacei; tibiæ posticæ cum tarsis præter basin fusæ;

tarsi 4 anteriores apice fusi. Maris antennæ corpore longiores, totæ nigræ, 27-articulatæ; palpi pallidi. Prothorax punctulatus, nitidus. Mesothoracis sulculi impunctati. Metathorax a basi inde declivis, postice haud truncatus, indistincte areatus, nitidus. Alæ hyalinæ stigmatе fusco, nervis pallidioribus, ultra stigma fere deletis; areola radialis subcultriformis, radio vix nisi recto. Abdomen depressum, thorace brevius, ovatum, lateribus rotundatis; segmentum 1um latitudine sua apicali paulo longius, apice quam basi sesquialtius aciculatum, carinis 2 longitudinalibus ante marginem posticum obsoletis, basi ipsa testaceum, tuberculis fere inconspicuis; cætera lævia, nitida; segmentum 2um 1o haud brevius, postice latius; 3um quadruplo brevius; sequentia exserta, 3o non breviora sed latitudine sensim decrescentia; 7um subito angustatum. Femina latet.

Black, shining, abdomen sometimes inclining to piceous; legs pale testaceous, including the coxæ; hind tibiæ and tarsi dusky, except the base of the former; 4 anterior tarsi dusky at the tips. Antennæ ♂ longer than the body, entirely black, 27-jointed. Palpi pale. Prothorax punctulate, shining. Mesothoracic sutures impunctate. Metathorax inclined from the base, not truncate behind, indistinctly areated, shining. Wings hyaline, stigma fuscous, nervures paler, nearly effaced beyond the stigma; radial areolet subcultriform, radius almost straight. Abdomen shorter than the thorax, depressed, ovate, with rounded sides; 1st segment rather longer than its apical width, which is only one-half greater than that of the base, aciculated, with 2 longitudinal carinæ, effaced before the hind margin; the extreme base testaceous; tubercles indistinctly prominent; the remaining segments smooth and shining; 2d segment as long as the 1st, widest behind; 3d only a quarter as long; 4th—7th exserted, as long as the 3d and successively diminishing in width; 7th abruptly narrower. Female unknown. Length, $1\frac{1}{2}$; wings, $2\frac{1}{2}$ lin.

Described from 3 males in Fitch's collection, which are there named *claviventris*, Ruthe; that author, however, describes only the ♀, and says nothing about the exsertion of the posterior segments, unusual in the genus, and which may or may not be a characteristic of the ♂ in this species. *C. exsertor*, Ruthe, has the posterior segments conspicuous in both sexes, but the present insects cannot be referred to that species, the 1st segment of which is shorter than its apical width.

4. *Calyptus fasciatus*, Nees.

Sigalphus fasciatus, Nees, Mag. Ges. Berl., 1816, p. 250; Mon., i., 269 (♀ only); *C. fasciatus*, Hal., Ent. Mag., iii., 129, ♀.

Black, shining, minutely pubescent; abdomen often piceous; legs piceo-rufous, with black coxæ, short and stout. Palpi and mandibles testaceous. Clypeus irregularly impressed. Antennæ ♀ black, filiform, submoniliform towards the apex, as long as the body, 20-jointed, the joints shorter than in the rest of the species; those of the only ♂ at hand are mutilated. Prothorax smooth. Mesothorax very gibbous, concave in front, and projecting over the prothorax; sutures distinct, scarcely punctate. Metathorax very short, truncate, punctulate, somewhat shining, areated in 3 narrow compartments beneath the scutellum, the medial compartment rounded behind. Wings brownish hyaline, with an indistinct transparent streak under the stigma, which, with the nervures, is fuscous; radial areolet short, ovate, acuminate. Abdomen somewhat shorter and narrower than the thorax, flattened above, with subparallel sides, truncated at the end of the 3d segment, which, in the ♀, conceals the rest; in the ♂ the posterior segments are slightly exserted; 1st segment rugulose, dull, deplanate, rather shorter than its apical width, which is twice that of the base; 1st suture deeply incised; at the base are two short carinæ; tubercles not prominent; 2d and 3d segments smooth and very shining, deplanate; 2d segment shorter than the 1st and longer than the 3d. Terebra stout, somewhat decurved, a little shorter than the abdomen. ♂ similar in all respects. Length, 1; wings, $2\frac{1}{2}$ lin.

The ♂ described by Nees von Esenbeck, having the 1st segment smooth, the hind legs elongate, &c., clearly belongs to some other species; the true ♂, which I have taken, resembles the other sex. Nees and Haliday possessed each a single ♀, and the species is not noticed by other writers. I have taken 5 females and 1 male on *Umbelliferae* at Barnstaple, St. Albans, and Nunton, Wilts.

5. *Calyptus sigalphoides*, n. s.

Præcedente minor et gracilior. Piceus, capite nigro, palpis pallidis, genis infra oculos longius descendentes. Antennæ ♀ graciles, corpore longiores, basi obscure testaceæ apicem versus nigricantes, 23-articulatæ; articuli 10 priores lineares, sensim longitudine decrescentes, cæteri submoniliformes. Thorax compressus, capite angustior. Prothorax pallide piceus, punctulatus,

obscurus; mesothorax gibbosus, suturis lævibus; metathorax sensim declivis, haud truncatus, areatus, lateribus bidentatus; areæ superiores læves, nitidæ, inferiores obscuræ. Alæ hyalinæ stigmatē magno piceo, nervis pallidioribus ultra stigma pæne obsoletis; areola radialis ovato-acuminata. Abdomen ovatum, depressum, thorace brevius; segmentum 1um transversum, aciculatum, marginatum, rufescens, apice quam basi duplo fere latius, disci carinis duabus longitudinalibus ante marginem posticum deletis; sutura 1ma profundissima; segmentum 2um 1mo æquale, 3tio paulo longius, aciculatum, deplanatum; 3tium lateribus parallelis, marginibus basin versus aciculatis; cætera lævia, nitida; segmentum 3tium medio obtuse carinatum, postice truncatum; 4tum subexsertum, testaceum. Terebra abdominis trientem longitudine æquans, nonnihil decurva. Mas incognitus.

Smaller and more slender than the preceding. Piceous, the head black; palpi pale; cheeks descending considerably below the eyes. Antennæ ♀ slender, longer than the body, obscurely testaceous at the base, blackish towards the extremity, 23-jointed; the first 10 joints linear, gradually decreasing in length, the rest submoniliform. Thorax compressed, narrower than the head. Prothorax pale piceous, punctulate, dull; mesothorax gibbous, its sutures impunctate; metathorax not truncated behind, but sloping gradually, areated, the superior compartments smooth and shining, the rest dull; bidenticulate at the sides. Wings hyaline, stigma large, piceous nervures paler, nearly effaced beyond the stigma; radial areolet ovate, acuminate. Abdomen ovate, depressed, shorter than the thorax; 1st segment transverse, aciculated, margined, rufescent, almost twice as wide at the extremity as at the base, with 2 longitudinal carinæ on the disk effaced before the hind margin; 1st suture deeply incised; 2d segment as long as the 1st and rather longer than the 3rd, aciculated, deplanate; 3d segment with parallel sides, aciculated laterally at the base only; the rest of the abdomen smooth and shining; segment 3 obtusely carinated down the middle, truncate behind; segment 4 subexserted, testaceous. Terebra as long as $\frac{1}{2}$ of the abdomen, somewhat decurved. Male unknown. ♀. Length, 1; wings, $2\frac{1}{3}$ lin.

The only specimen was taken in a meadow in Northamptonshire.

Obs. The above may seem a meagre account of this genus, of which 20 species are indicated by Reinhard; but I have seen no more than 5 of British origin, though others in all probability exist. Some specimens $2\frac{1}{4}$ lines long have long stood in my collection for *atri-*

cornis, Ratz. They were taken in Mar Forest, Scotland; and to them have been added more recently others found by Mr. G. C. Champion in the Highlands. A closer examination than they had previously received now shows them to be *Allodorus semirugosus*, Nees, belonging to the *Sigalphides*, respecting which see Trans. Ent. Soc. Lond., 1885, p. 103. I can only regret that they were not recognised in time to be inserted in their proper place. This and other discoveries I hope to be able to bring forward hereafter as a supplement at the end of these papers.

XVII. BLACIDES.

Maxillary palpi 5—6-, labial 3—4-jointed. Abdomen sessile or subsessile, with 8 visible segments above; suturiform articulation obsolete. Fore wings with 2 cubital areolets, the 1st separated from the prædiscoidal; radial areolet cultriform, extending nearly to the apex of the wing; radius straight; axillary areolet not divided by a transverse nervure; recurrent nervure everted or interstitial; cubital nervure more or less obsolete; podiscoidal areolet not closed. Terebra of variable length, deflexed or straight.

The *Blacides* are nearly allied to the *Liophronides*, with which Haliday associated the first genus, *Pygostolus*. The most obvious distinctions are to be found in the structure of the abdomen of the females, and in the wings of both sexes. In the *Blacides* the radius is straight, and its 1st abscissa distinct, being equal in length to the thickness of the stigma, or nearly so; the abdomen of the ♀ is never decurved at the extremity, and the terebra is directed, as usual, backwards. In the *Liophronides* the radius is curved, and its 1st abscissa much shorter; the abdomen of the ♀ is decurved at the apex, so that the terebra points forwards.

Nees von Esenbeck published in 1834 (Mon., i., 189) a genus *Blacus* with two sections, but so indistinctly conceived as to include in the 2d section three of the *Aphidiides*; while in the same work his genus *Bracon* begins with two more *Blacides*, associated with two of the *Liophronides*. The *Blacus* of Wesmael (1835) is correctly defined, and coextensive with the present subfamily. Haliday, in the same year, characterised the genus *Blacus*, making two subgenera, *Blacus* and *Ganychorus*, and removed two aberrant species, the *Ichneumon*

sticticus, Fab., and *Leiophron falcatus*, Nees (which Wesmael had regarded as *Blaci*) to another subgenus *Pygostolus*, arranged under *Leiophron*. The step is to a great extent justified by the transitional characters of the two species, though they are unquestionably better placed in the present group. Ruthe's paper on *Blacus* contained in the Berl. ent. Zeit. for 1861, confirms Wesmael's views as to the affinities of *Pygostolus*. Haliday's *Ganychorus* must be abandoned, for reasons which will shortly appear; so also *Goniocormus*, Först.; there remain, then, the two following genera, easily distinguished:—

- Prædiscoidal areolet petiolated, not touching the parastigma; 1st joint of the flagellum shorter than the 2d i. PYGOSTOLUS.
 Prædiscoidal areolet not petiolated, touching the parastigma; 1st joint of the flagellum almost always longer than the 2d ii. BLACUS.

i. PYGOSTOLUS, Hal.

Hal., Ent. Mag., ii., 459; Ruthe, Berl. ent. Zeit., 1861, p. 157.

Head transverse; face subquadrate; clypeus gibbous; mandibles projecting, armed with 2 unequal teeth; maxillary palpi 5-, labial 4-jointed (at first sight 3-jointed, the penultimate joint being very minute). Occiput margined on its lower edge only. Mesothorax trilobate, with distinct sutures. Metathorax well-developed, regularly convex, not areated. Recurrent nervure interstitial, or nearly so; cubital nervure springing from the præbrachial transverse.

Of this very natural genus there are 3 known European species, but only 2 have been found in the British Isles. Their ground colour is testaceous, with a few blackish portions, which are variable, but usually include the metathorax; there exists also a dusky variety of *P. falcatus*. Head somewhat narrower than the thorax; antennæ longer than the body, setaceous rather than filiform, 1st joint of the flagellum always a trifle shorter than the 2d; lower tooth of the mandibles shorter than the upper one, and more inclined inwards. Mesothorax gibbous, its lobes separated by deep sutures. Furrow of the mesopleuræ wide, shallow, faintly rugose or crenate, and somewhat curved. Ante-scutellar fovea wide and deep, geminated by a carina. Metathorax elongate, not much depressed below the mesothorax, regularly convex, without the horizontal and vertical portions seen in *Blacus*. Wings ample,

reaching in repose much beyond the extremity of the abdomen; nervures pale, with some dark portions (as in *Ophion* and other testaceous insects); radius straight, originating usually beyond (seldom from) the middle of the stigma; pabrachial areolet longer than the præbrachial. Legs stout, proportionally shorter than those of *Blacus*; the hind tarsi, especially, are much shorter than their tibiæ. The British species may be recognised at a glance, even by their size.

Antennæ 33—34-jointed; terebra scarcely half as long as the abdomen, straight; length, $2\frac{1}{2}$ lines .. 1. *sticticus*, Fab.
 Antennæ 29—30-jointed; terebra as long as $\frac{2}{3}$ of the abdomen, falcate; length, $1\frac{1}{2}$ —2 lines 2. *falcatus*, Nees.

1. *Pygostolus sticticus*, Fab.

Ichneumon sticticus, Fab., E. S., Suppl., 229; *Cryptus sticticus*, Fab., Piez., 89, ♀; *P. sticticus*, Hal., Ent. Mag., ii., 459; Ruthe, Berl. ent. Zeit., 1861, p. 162, ♀.

Bassus testaceus, Fall., Spec. Hym. (not of Fab.), ♀.
Blacus gigas, Wesm., Nouv. Mém. Ac. Brux., 1835, p. 99, ♀.

Rufo-testaceous, smooth and shining; eyes, stemmaticum, occiput, variable portions of the mesothorax and pleuræ, the pectus and sometimes the scutellum, also the metathorax, and base of the 1st abdominal segment, fuscous. Palpi whitish. Antennæ dull ferruginous, darker towards the tips, each joint of the flagellum annulated with fuscous at the extremity. Metathorax punctatoprugose, without raised lines or areæ. Wings hyaline, stigma yellow; costa, radius, anal nervure and part of the præbrachial, fuscous, the other nervures ferruginous; cubital nervure obsolete for a great portion of its length. Abdomen shorter than the thorax, and at its widest part not narrower, oblong-ovate above; if viewed laterally, obliquely truncate behind; the sides of the 1st segment diverge as far as the obtusely prominent tubercles, which are placed before the middle; thence to the apex the sides are nearly straight and parallel; 1st segment minutely aciculated, the rest smooth; suturiform articulation faintly visible at the sides. Valves of the terebra lanceolate, stout, black, pilose. Male unknown. Length, $2\frac{1}{2}$; wings, 6 lin.

Not common; a solitary parasite of *Tenthredinidæ*, and sometimes of *Lepidoptera*. It has been bred from *Nematus ribesii*, Scop., and *Macrophya ribis*, Schr. In Scott's collection I saw one reared from *Pterostoma*

palpina, L., and another from *Depressaria angelicella*, Hüb. I obtained two specimens by beating an alder-tree near Abergavenny, and a third by sweeping in a marsh near Cornworthy in S. Devon. Cameron's collection contains two, one taken at Kenmuir in Scotland; the other he reared from a reddish-grey cocoon, rough, dull, and felted, attached to the stalk of a plant on the shores of Loch Awe. This cocoon differs in colour and size from that of *P. multistriatus*, Ratz., of which I possess an example, together with the perfect insect, from Switzerland, presented to me by the kindness of Mr. Bignell. The latter cocoon is white, and nearly 5 lines long; those observed by Ratzeburg were brownish grey. *P. multistriatus*, Ratz., is likely to be found in England; it is 2—4 lines long, formed like *sticticus* and *falcatus*; antennæ 34—36-jointed; the colour of my specimen and Ruthe's is rufo-testaceous without any mixture of fuscous; but others apparently vary like their congeners. Ratzeburg's three specimens were hatched out of cocoons attached to the needles of fir-trees; that author has figured the ♂, which seems to be smaller than the ♀. The individual referred to by Wesmael (Nouv. Mém. Ac. Brux., 1838, p. 144) under *B. falcatus*, and which was sent from Liège by M. Carlier, belongs undoubtedly to this species; it is preserved in the Brussels collection.

2. *Pygostolus falcatus*, Nees.

Leiophron falcatus, Nees, Mon., i., 44; *Blacus falcatus*, Wesm., Nouv. Mém. Ac. Brux., 1835, p. 101, ♀; Tappes, Ann. Soc. Fr., 1869, pl. i., f. 16, ♂; *P. falcatus*, Hal., Ent. Mag., iii., 20, ♀; Ruthe, Berl. ent. Zeit., 1861, p. 158, ♂ ♀.

Similar to the preceding, but much smaller. Rufo-testaceous, unicolorous or varied with fuscous, *viz.*, on the stemmaticum, occiput, metathorax, and posterior portion of the pectus, together with the base and apex of the abdomen. Antennæ longer than the body, filiform, 29—30-jointed (in 20 examples). Wings as in *sticticus*, but the yellow stigma is often more or less infuscated, and the recurrent nervure somewhat rejected, seldom interstitial. Metathorax punctato-rugulose, sometimes with vestiges of 2 medial and 2 lateral carinæ. First abdominal segment faintly aciculated or nearly smooth, especially at the apex. Terebra decurved, with

stout black valves, pilose beneath. ♂ similar; abdomen rounded at the extremity, instead of being vertically truncate. Length, $1\frac{1}{2}$ —2; wings, $3\frac{3}{4}$ — $4\frac{1}{4}$ lin.

Var. 1. Fuscous, palpi and legs testaceous; base of the antennæ, orbits of the eyes, face, anterior pleuræ and basal half of the belly, rufous. Ruthe. I have taken an English specimen of this variety.

Var. 2. Entirely rufo-testaceous; cubital nervure obsolete to its base, so that the 1st cubital areolet is no longer separated from the prædiscoidal. Ruthe.

Commoner than *sticticus*, but I can find no record of its having been bred except that of Tappes (*l.c.*), who obtained the ♂ out of *Cryptocephalus bipunctatus*, L.

ii. BLACUS, Nees.

Blacus, Nees, Act. Ac. L. C., 1819, p. 306 [this reference shows nothing except the origin of the name]; Hal., Ent. Mag., iii., 39; Wesm., Nouv. Mém. Ac. Brux., 1835, p. 91 [including *Pygostolus*]; Ruthe, Berl. ent. Zeit., 1861, p. 132.

Head small, subglobose; occiput margined above and below; maxillary palpi 6-, labial 3-jointed. Antennæ ♀ 17—24-jointed (usually 17—20); those of the ♂ 19—26-jointed (usually 19—21—22); 1st joint of the flagellum generally longer than the 2d. Thorax compressed; mesothorax trilobed, its sutures distinct; metathorax not gibbous as in *Pygostolus*, but inclined posteriorly almost from the base, partially areated by cariniform lines. Wings sometimes abbreviated in the ♀; recurrent nervure entering the 1st cubital areolet near its apex. Abdomen not shorter than the thorax, and much narrower at the base, gradually widened behind in the ♂, or compressed in the ♀; subsessile or almost petiolated; 1st segment oblong, tubercles ante-medial; anus truncated in the ♀, rounded in the ♂. Legs more elongate and slender than in *Pygostolus*, stouter in the ♀; hind tarsi as long as their tibiæ, or nearly so. Terebra variously exerted; anal forceps of the ♂ protruded.

About 19 European species are described, 9 of which are British, and I have added one remarkable new form. The insects are mostly slender and gnat-like, black or piceous (rarely with some rufous portions), and with testaceous legs. *Blacus* is here understood in the sense of Ruthe's monograph above quoted, not that of Wesmael,

whose description includes *Pygostolus*. Haliday divided the genus into two subgenera, as follows:—

Antennæ of the ♂ 19-, of the ♀ 17-jointed; claws simple	<i>Blacus</i> .
Antennæ ♂ ♀ with a greater number of joints; claws pectinated	<i>Ganychorus</i> .

In the Synopsis at the end of Westwood's 'Introduction,' he abandoned the character derived from the antennæ, for the reason that, from this point of view, one species, *hastatus*, belongs to *Blacus* in the ♀ sex, while its ♂ is a *Ganychorus*. There remains then only the pectination of the claws to distinguish *Ganychorus*; this by itself is no foundation for a genus, and it seems better to adopt the method of Ruthe and Reinhard, who recognise only the genus *Blacus*. *Goniocormus*, Först., is another artificial genus with which we may well dispense.

The species of *Blacus* frequent damp shady places in woods, where some of the commonest occur in great numbers, associated like winged ants at the time of swarming; the males dance in the air like gnats; the females are less active, and creep amongst moss and herbage; these latter may sometimes be found hibernating. Their parasitism is rather conjectured than known, but the few indications we have connect them with small Coleoptera and Diptera. Some of the species are most difficult to distinguish, especially in the ♂ sex, and I can scarcely hope that the following table will always be found to apply satisfactorily. Haliday's divisions were made without uniform reference to the ♂ sex; and Ruthe's tabular sections, though in appearance complete, will be found deficient in the same respect, since in many cases he possessed only females. *B. longipennis*, Nees, will be omitted here, although it was inserted in my catalogue on the authority of Curtis's 'Guide'; it was not in his collection, and was unknown to Haliday, and other writers since Nees; the only mention of it is in a list of Russian insects by Kawall; it is perhaps a synonym of *paganus*, Hal.

TABLE OF SPECIES.

- (16) 1. Wings ♂ ♀ fully developed.
 (3) 2. Antennæ 24—26-jointed 1. *tuberculatus*, Wesm.
 (2) 3. Antennæ with fewer than 24 joints.

- (7) 4. Posterior angles of the metathorax not produced or dentiform.
- (6) 5. Legs flavo-testaceous; hind femora not infuscated 2. *ruficornis*, Nees.
- (5) 6. Legs rufo-testaceous; hind femora infuscated before the apex 3. *maculipes*, Wesm.
- (4) 7. Posterior angles of the metathorax more or less produced and dentiform.
- (9) 8. Antennæ ♀ 19-jointed; ♂ 22-jointed 4. *tripudians*, Hal.
- (8) 9. Antennæ ♀ 17-jointed; ♂ 19—20- (rarely 21-) jointed.
- (11) 10. Length, 1 line or less; the smallest species 5. *humilis*, Nees.
- (10) 11. Length, $1\frac{1}{4}$ — $1\frac{1}{2}$ lines, which is the usual size.
- (13) 12. Radial areolet about twice as long as its greatest breadth; terebra ♀ $\frac{1}{2}$ longer than the abdomen 6. *hastatus*, Hal.
- (12) 13. Radial areolet about three times as long as its greatest breadth; terebra ♀ much shorter than the abdomen.
- (15) 14. ♂. Anterior angle of the prædiscoidal areolet complete, not being cut off by the parastigma. ♀ antennæ not longer than the head and thorax, and not incrassated at the apex .. 7. *paganus*, Hal.
- (14) 15. ♂. Anterior angle of the prædiscoidal areolet cut off by the enlarged parastigma. ♀ antennæ rather longer than the head and thorax, incrassated towards the apex 8. *trivialis*, Hal.
- (1) 16. Wings abbreviated; females only.
- (18) 17. Antennæ 18-jointed 9. *aptenodytes*, n. s.
- (17) 18. Antennæ 20-jointed.
- (20) 19. Hind femora annulated with fuscous before the apex; terebra as long as the abdomen 10. *ambulans*, Hal.
- (19) 20. Hind femora unicolorous; terebra shorter than $\frac{1}{3}$ of the abdomen .. 2. *ruficornis*, var.

1. *Blacus tuberculatus*, Wesm.

Blacus tuberculatus, Wesm., Nouv. Mém. Ac. Brux., 1835, p. 98; Ruthe, Berl. ent. Zeit., 1861, p. 132, ♂ ♀.

Ganychorus pallipes, Hal., Ent. Mag., iii., 41, ♂ ♀.

Bracon barynoti and *otiorhynchi*, Boudier, Ann. Soc. Fr., 1834, pp. 333, 334, pl. xi.

? *Blacus Florus*, Goureau, Ann. Soc. Fr., 1851, p. 137, ♀.

Black, abdomen sometimes piceous in the middle; palpi and legs pale ochraceous; oral parts dull rufous. Antennæ ♀ 24-jointed (rarely 25), as long as the body, ferruginous; scape, extreme base of the following joints, and 5--6 apical joints entirely, fuscous. Prothorax produced, forming a sort of neck, rugulose; mesothorax shining, with deep converging sutures; mesopleuræ also smooth and shining, with a shallow punctate furrow; scutellum subacutely elevated at the apex, slightly rugulose, distinctly margined; metathorax short, carinated longitudinally, finely rugulose, almost reticulated; 2 dorsal areæ faintly defined posteriorly and at the sides, behind them are two less distinct areæ. Wings hyaline, as long as the whole body, nervures and stigma yellow. Legs longer and more slender than in other species; claws, and extreme base of the hind coxæ, fuscous. Abdomen ♀ subclavate; 1st segment forming scarcely $\frac{1}{3}$ of its length, linear, slightly dilated behind, rugose; tubercles prominent, placed before the middle; the other segments smooth and shining. Terebra as long as $\frac{1}{4}$ of the abdomen. ♂ similar; antennæ longer, 25—26-jointed, fuscous, base of the flagellum usually ferruginous; parastigma and apex of the stigma fuscous; legs longer, last joint of the tarsi fuscous; abdomen linear, not subclavate. Length, 2; wings, $4\frac{1}{2}$ lin.

Described from 14 specimens. Found not uncommonly in woods throughout the kingdom. It is the largest species, and distinguished by the greatest number of joints in the antennæ. Bred by Boudier from larvæ of *Otiorrhynchus ligneus*, Ol., and *Barynotus mærens*, Fab., at Montmorency. The evidence of the identity of Boudier's parasites with the present species, though much of it is of a negative character, seems tolerably conclusive, and is borne out by the figures. With *Blacus Florus*, Goureau, the case is different; but if this belongs to the genus *Blacus* at all, it must be *tuberculatus*, Wesm., for the description is applicable to no other species. Goureau records it as a parasite of *Agromyza nana*, Meig., which mines the leaves of *Iris pseudacorus*; but the small size of the fly compared with that of the parasite renders this incredible, as indeed Goureau himself acknowledged.

2. *Blacus ruficornis*, Nees.

Bracon ruficornis, Nees, Mon., i., 49, ♂ ♀ (not his var. β).

Blacus ruficornis, Wesm., Nouv. Mém. Ac. Brux., 1835, p. 92; Ratz., Ichn. d. Forst., ii., 61; Ruthe, Berl. ent. Zeit., 1861, p. 134, and Stett. Zeit., 1857, p. 160 (ein Bracon-Zwitter), ♂ ♀.

Ganychorus ruficornis, Hal., Ent. Mag., iii., 42, ♂ ♀.

Dark fuscous, slender, abdomen sometimes piceous or testaceous in the middle; mandibles and clypeus rufescent; palpi and legs testaceous. Antennæ ♀ stout, somewhat shorter than the body, filiform, rufo-testaceous, 20—21-jointed (the 2 apical joints often appearing to be united); scape and apical joints of the flagellum usually fuscous, the others annulated with fuscous at the extremity; subapical joints longer than broad. Prothorax punctato-rugulose, smooth at the sides above; scutellum less elevated than in the last species; metathorax short, finely rugulose and reticulated, almost vertical posteriorly, divided into 4 areæ, and longitudinally carinated. Wings broader than in most species, subhyaline; stigma brown, more or less pale, or with pale spots; cubital and some other nervures fuscous, the rest pale brown; parastigma yellowish, smallest in the ♀, so that the angle of the prædiscoidal areolet is not cut off. Last joint of the tarsi infuscated. Abdomen subclavate; 1st segment narrow, hardly dilated posteriorly, more or less distinctly rimulose, faintly margined, not canaliculated; the following segments smooth, having each a transverse row of faint punctures before the hind margin. Terebra about $\frac{1}{3}$ of the abdomen. ♂. Antennæ setiform, black, narrowly testaceous at the base, as long as the body, 21—22-jointed; wings somewhat whitish, elongate; stigma stramineous; parastigma enlarged, cutting off the angle of the prædiscoidal areolet; abdomen slender, hardly subclavate; 1st segment canaliculated. Length, $1\frac{1}{2}$; wings, $3\frac{1}{3}$ lin.

Var. ♂ ♀. Rufo-castaneous; head, apex of the abdomen, and sometimes the 1st segment and metathorax, fuscous.

Obs. I have a ♀ with abbreviated wings, probably belonging to this species. Antennæ 20-jointed; hind femora not infuscated before the apex (*cf.* sp. 3); wings very narrow, not reaching the apex of the abdomen; stigma placed near the extremity; radial areolet contracted, not longer than the stigma; radius curved; 1st cubital areolet not separated from the prædiscoidal; metathorax vertical behind, not bidenticulate. Terebra less than $\frac{1}{3}$ of the abdomen. Length, 1; wings, $\frac{3}{4}$ line.

Ruthe has described a hermaphrodite, either of this species or the following, in which the antennæ, wings, &c., do not correspond, being of opposite sexes.

An abundant species throughout Europe, and found gregariously on bushes in shady places; some of the females live more than one season in this country, and may be found in winter among dead leaves or moss, especially at the roots of trees. Ratzeburg records the breeding of a specimen by Dahlbom, at Lund, on Sept. 7th, from a pupa of *Cionus fraxini*, DeGeer.

3. *Blacus maculipes*, Wesm.

Blacus maculipes, Wesm., Nouv. Mém. Ac. Brux., 1835, p. 94; Ruthe, Berl. ent. Zeit., 1861, p. 139, ♂ ♀.

Bracon ruficornis, var. β , Nees, Mon., i., 49.

Ganychorus diversicornis, Hal., Ent. Mag., iii., 43, ♂ ♀ (not of Nees).

Uniformly black, or with the 2d abdominal segment piceous; mouth and legs rufo-testaceous, hind femora infuscated before the apex. ♀ antennæ shorter and stouter than in *ruficornis*, hardly equalling $\frac{3}{4}$ of the body, submoniliform, 20-jointed, rufo-testaceous, the 1st and last joints, and sometimes more of the subapical ones, blackish. Sides of prothorax finely rugulose, smooth above; mesopleuræ smooth, or hardly striated in the middle; scutellum smooth; metathorax short, gibbous, subvertical behind, finely and irregularly rugulose, with 4 areæ, of which the 2 dorsal are nearly smooth. Wings somewhat infumated, shorter and narrower than those of the ♂; stigma and most of the nervures brownish. Legs stouter and shorter than in the ♂; 1st abdominal segment stouter, wider behind; tubercles inconspicuous. Terebra somewhat longer than $\frac{1}{3}$ of the abdomen. ♂. antennæ 21-jointed, longer than the body, the 1st or 1st and 2d joints testaceous. Wings ample, as long as the body, subhyaline, nervures stramineous, stigma more or less brownish; parastigma pale, with a brown longitudinal streak; the stigma is darkest when the antennæ are most broadly pale at the base. Legs elongate, yellowish, with hardly a rufous tinge; hind pair visibly granulated; tarsi infuscated towards the apex; so also the hind femora, and sometimes their tibiæ, with the base of their coxæ. Tubercles of the 1st segment salient. Length, $1\frac{1}{4}$; wings, 3 lin.

I have not met with this species, and the description is taken from the authorities cited, with the synonymy given by Reinhard. Taken formerly by Haliday in Ireland, less commonly than *ruficornis*.

4. *Blacus tripudians*, Hal.

Ganychorus tripudians, Hal., Ent. Mag., iii., 41, ♂ ♀.

Blacus rufescens, Ruthe, Berl. ent. Zeit., 1861, p. 141, ♂.

♀. Nigro-piceous, 2d abdominal segment paler; legs pale ochreous; mouth and clypeus rufescent. Antennæ 19-jointed, ferruginous, scape and apex fuscous. Thorax as in *B. tuberculatus*, but the hind angles of the metathorax are dentiform. Wings hyaline, stigma, radix, and squamulæ pale ochreous, most of the nervures decolorous, the rest pale fuscous. Legs slender; last joint of tarsi (at least of the 4 anterior), and claws, fuscous. Terebra hardly as long as $\frac{1}{3}$ of the abdomen. ♂ variable, fuscous, or rufo-castaneous, with the head and posterior segments of the abdomen fuscous. Palpi pale, fuscous at the base. Antennæ a little longer than the body, 22-jointed, fuscous, ferruginous at the base; 2 first joints of the flagellum almost equal in length. Prothorax rufo-testaceous, punctato-rugulose; mesothorax more or less brown or rufous; pectus often rufescent; scutellum not very prominent, obtuse; mesopleuræ punctato-rugulose, with a shining medial space; metathorax not gibbous, almost straight from the base to the apex, punctate, almost reticulato-rugose, tricarinated, ferruginous; the 2 lateral carinæ end in dentiform processes. Wings broad, greyish hyaline, nervures and stigma brown, radix and squamulæ more rufous; 1st and 2d abscissa of the radius straight, forming a right angle; 1st abscissa originating behind the middle of the stigma, and longer than the intercubital nervure; anterior angle of the prædiscoïdal areolet not truncated by the parastigma. Legs elongate; hind tibiæ and tarsi somewhat infuscated, the latter hardly as long as the former. Abdomen not quite so long as the head and thorax, fuscous; the 1st segment often rufous, impressed at the base, not much dilated posteriorly, and there only striated. Length, $1\frac{1}{2}$; wings, $3\frac{1}{3}$ lin.

Not so common as *ruficornis*; according to Haliday gregarious, frequenting willows (*Salix caprea*) in large numbers; the males sport together in airy dances on warm, sunny afternoons, like the gnats of the genus *Chironomus*. I have observed a similar habit in another species—probably *ruficornis*—but of *tripudians* I have only taken a few isolated examples. Ruthe conjectured that his *Blacus mamillanus* might be the ♀ of this species, but this is sufficiently disproved by the descriptions.

5. *Blacus humilis*, Nees.

Blacus humilis, Nees, Mon., i., 191; Hal., Ent. Mag., iii., 121, ♂ ♀; Wesm., Nouv. Mém. Ac. Brux., 1835, p. 95, partly; Ruthe, Berl. ent. Zeit., 1861, p. 148, ♀.

B. exilis, Nees, l. c.

Dacnusa cerealis, Curt., Farm. Ins., 294.

♀. Black or piceous: mouth paler, mandibles ferruginous; palpi fuscous. Antennæ 17-jointed, $\frac{1}{3}$ shorter than the body, incrassated towards the tips, blackish, paler at the base. Mesopleuræ almost smooth, with a punctate longitudinal furrow; metathorax subtruncate behind, obtusely prominent, very finely rugulose, almost smooth in the middle; posterior angles minutely dentiform. Wings narrow, subhyaline, stigma and nervures pale piceous, costa and squamulæ darker; anterior angle of the prædiscoidal areolet complete in both sexes. Legs slender, piceous-brown or ochraceous; tibiæ and tarsi paler, except at the tips; 4 posterior coxæ infuscated. Abdomen compressed, hardly longer than the thorax; 1st segment linear, oblong, convex, rugulosely punctate, finely margined; the other segments smooth. Terebra as long as $\frac{1}{3}$ or $\frac{2}{3}$ of the abdomen, somewhat decurved. ♂ similar; antennæ 19—20-jointed, filiform, longer than the body; abdomen narrower, linear; legs more slender, but hardly longer. Length, 1; wings, 2 lin.

The smallest species, much resembling *trivialis*, Hal., but, besides the inferior size, it differs in the antennæ of the ♀, which are longer, and incrassated towards the apex; the medial joints of the flagellum are also more elongate; the subapical joints ovate, decreasing gradually in length. The dentiform processes of the metathorax are very small, and only 2 in number, instead of 4, as in *paganus*, Hal.

Var. 1. Only $\frac{3}{4}$ of a line long; wings narrower; legs more slender; metathorax hardly bidenticulate. The antennæ of the specimen here referred to were not a pair, the joints of either side differing in length and form. Ruthe.

Var. 2. Length, $1\frac{1}{4}$; wings, $2\frac{1}{2}$ lines. ♀. Abdomen hardly compressed, subclavate; nervures of the wings stouter. Haliday.

Var. 3. Antennæ not longer than the head and thorax, incrassated at the apex. Haliday.

This species is evidently a parasite of some insect feeding upon ears of corn: it may be obtained by sweeping in wheat-fields.

6. *Blacus hastatus*, Hal.*Blacus hastatus*, Hal., Ent. Mag., iii., 121, ♀.*B. terebrator*, Ruthe, Berl. ent. Zeit., 1861, p. 142, ♂ ♀.

Black, mouth and legs rufo-testaceous, hind tibiæ and tarsi somewhat darker. ♀ antennæ shorter than the body, rather stout, filiform, 17-jointed, brown, darker towards the apex; 1st joint of the flagellum half as long again as the 2d. Cheeks partly testaceous; palpi brownish. Prothorax punctato-rugose, the sides smooth above; scutellum obtuse, more or less rugulose; mesopleuræ with a punctate furrow; metathorax short, truncate posteriorly and bidentate, the posterior face much shorter than the dorsal; rugulose, tricarinated, the 2 lateral carinæ ending in an obtuse angle. Wings infumated, narrow; radix, squamulæ, and nervures fuscous; stigma somewhat paler; 1st abscissa of the radius originating a little beyond its middle, much shorter than the intercubital nervure; anterior angle of the prædiscoidal areolet complete; radius curved at the base. Legs darker than those of the ♂. Abdomen shorter and narrower than the thorax, lanceolate above, compressed towards the apex, and, viewed laterally, clavate; 1st segment about 3 times longer than broad, scarcely widened behind, minutely striated, margined, bicarinated at the base. Terebra subarcuate, one-half longer than the abdomen. ♂ similar; antennæ as long as the body, or somewhat longer, setaceous, 20—21-jointed, the basal joints rufous beneath; legs paler; abdomen narrower. Length, $1\frac{1}{4}$; wings, $2\frac{1}{2}$ lin.

Not common; Curtis appears to have taken one ♀, which Haliday described; Ruthe possessed two pairs, found near Berlin; and in my collection are 3 females, 1 male, taken in Northants, Leicestershire, and Wiltshire.

7. *Blacus paganus*, Hal.*Blacus paganus*, Hal., Ent. Mag., iii., 122, ♀.*B. brevicornis*, Ruthe, Berl. ent. Zeit., 1861, p. 146, ♀.? *B. humilis*, Wesm., Nouv. Mém. Ac. Brux., 1835, p. 95 (partly), not of Nees.

♀. Black or piceous; legs rufo-piceous; mandibles rufous; palpi piceous, the 2 last joints of the maxillary pale. Antennæ stout, moniliform, not longer than the head and thorax, not incrassated towards the apex, 17-jointed (the last joint consisting really of two united). Thorax irregularly punctulate, pubescent; pleuræ rugulose, more finely beneath the wings and in the shallow furrow;

scutellum punctulate; metathorax short, inclined from the base to the apex, rugulose, tricarinate, quadridenticulate at the sides. Wings whitish hyaline, stigma and nervures fuscous, or ochreous, and in that case the costa and parastigma are darker; squamulæ piceous; parastigma somewhat enlarged, cutting off the angle of the prædiscoidal areolet. Legs short and stout, obscure, the fore pair palest; hind femora in the middle, their tibiæ at the apex, usually infuscated; coxæ fuscous. Abdomen as long as the thorax, compressed posteriorly, oblong above, triangular when viewed laterally; 1st segment subrectangular, twice as long as broad, somewhat constricted at the base, margined, punctate-striate, with 2 faint medial carinæ; tubercles somewhat salient before the middle; suturiform articulation visible; segments 2—3 together longer than the 1st; segment 3 faintly punctulate. Terebra decurved, the valves stout at the base, about as long as $\frac{1}{3}$ of the abdomen.

♂. Similar; antennæ slender, filiform, longer than the body, 19—20-jointed. Parastigma smaller, not cutting off the angle of the prædiscoidal areolet. Second abdominal segment sometimes testaceous; abdomen more slender; legs much longer. Length, $1\frac{1}{2}$; wings, 3 lin.

Not common; I possess a ♂ from Lastingham, Yorkshire, and a ♀ from St. Albans. They are much larger than *B. humilis*, Nees, and quite distinct; the want of specimens seems to have caused a difficulty to Ruthe, who had only one ♀. Wesmael's *humilis* is probably made up of the present species and *humilis*, Nees; but the description of the latter is so concise that there hardly remains anything to trust to except size.

8. *Blacus trivialis*, Hal.

Blacus trivialis, Hal., Ent. Mag., iii., 122, ♂ ♀.

B. instabilis, Ruthe, Berl. ent. Zeit., 1861, p. 149, ♂ ♀.

Black; mandibles rufescent; palpi pale fuscous. ♀ antennæ stout, subfiliform, about $\frac{2}{3}$ as long as the body, incrassated towards the apex, 17-jointed, the 4 ante-apical joints globose. Metathorax punctato-rugose, tricarinate, more or less obtusely bidenticulate. Wings ample, hyaline; stigma and nervures stramineous; costa, radix, and squamulæ fuscous; radius slightly curved in the middle, making the radial areolet subovate; anterior angle of the prædiscoidal areolet truncated by the enlarged parastigma. Legs slender, rufo-testaceous; hind coxæ black, their femora usually infuscated; tarsi fuscous at the apex. Abdomen longer than the

thorax; 1st segment twice longer than broad, hardly widened posteriorly, finely margined, punctato-rugose; tubercles inconspicuous. Terebra straight, half as long as the abdomen, or somewhat less. ♂ antennæ hardly shorter than the body, subsetaceous, fuscous, 19-jointed, the basal joint rufous at the apex. Prædiscoidal areolet as in the ♀. First abdominal segment linear; anal forceps somewhat extruded. Length, $1\frac{1}{4}$; wings, $2\frac{1}{2}$ lin.

Very like *humilis*, Nees, but larger and stouter, with longer antennæ; the dentiform angles of the metathorax, though short, are never quite obsolete; the radius is not quite straight, and its areolet shorter in proportion. It is, however, extremely difficult to distinguish otherwise than by the size. Gregarious, and abundant throughout the country in shady woods.

9. *Blacus aptenodytes*, n. s.

♀. Niger, prothoracis lateribus, mesonoto, scutello, rufis; abdominis segmento 3tio pedibusque cum coxis testaceis; unguiculis fuscis. Antennæ corpore paulo breviores, 18-articulatæ, rufo-testaceæ, scapo et articulo ultimo obscurioribus; flagelli articulus 1us 2o duplo longior; ultimus oblongus, acuminatus, e duobus conflatus, præcedente duplo longior. Corpus subtiliter albido pubescens; caput, mesothorax, scutellum, sicut in *B. ruficorni* formata; metathorax deplanatus, rugulosus, medio carinatus, areis dorsalibus duabus distinctis; postice fere in perpendiculum declivis, angulis fortiter productis, obtuse dentiformibus. Alæ angustissimæ (latitudine vix nisi longitudinis sextantem æquante), abbreviatæ, ciliatæ, metathoracis apicem non excedentes; stigma lineare, alæ apici propinquum, et cum nervis fusco-testaceum. Femora postica cum tibiis suis solito crassiora, subclavata. Abdomen deplanatum, apice compressum; segmentum 1um elongatum, lineare, apicis latitudine circiter triplo longius, bicarinatum, rugulosum; cætera lævissima. Terebra breviuscula, segmenti 1mi longitudinem dimidiam haud superans. Mas latet.

♀. Black; prothorax at the sides, disk of the mesothorax, and scutellum, rufous; 3d abdominal segment, and legs together with the coxæ, testaceous; claws fuscous. Antennæ rather shorter than the body, 18-jointed, rufo-testaceous, with the scape and the last joint darker; 1st joint of the flagellum twice as long as the 2d; last joint oblong, acuminate, consisting of 2 joints united, twice as long as the preceding. Body minutely and sparsely pubescent with whitish hairs; head, mesothorax, and scutellum formed as in *B. ruficornis*; metathorax deplanate, rugulose,

carinated in the middle, with two distinct dorsal areae; almost vertical behind, the apical angles strongly produced, obtuse, denticiform. Wings very narrow, their breadth scarcely equalling $\frac{1}{3}$ of their length, abbreviated, ciliated, not reaching beyond the metathorax; stigma linear, placed near the apex of the wing, fusco-testaceous, together with the nervures. Hind femora and tibiae incrassated, subclavate. Abdomen deplanate, compressed at the apex; 1st segment elongate, linear, about 3 times longer than its apical breadth, bicarinated, rugulose; the other segments very smooth. Terebra short, not longer than $\frac{1}{2}$ of the 1st segment. Male unknown. Length, $1\frac{1}{4}$; wings, 1 lin.

A specimen was taken at Peckham by Billups, and two more by Capron at Shiere, near Guildford.

10. *Blacus ambulans*, Hal.

Ganychorus ambulans, Hal., Ent. Mag., iii., 43, ♀.

♀. Pitchy black; 2d abdominal segment rufescent; mouth and clypeus dull ferruginous. Antennæ 20-jointed, ferruginous, fuscous at the apex, the subapical joints somewhat shorter, and the last joint larger than in *B. ruficornis*; yet the antennæ resemble those of that species rather than of *maculipes*, and are similarly coloured. Head rotundo-cubic, less oblate than in other species. Metathorax sub-cubic, truncate behind, thickly granulated. Wings abbreviated, narrow, tinted with brown; stigma and nervures fuscous; radix and squamulae stramineous. Legs shorter than in *ruficornis*, of a duller rufous; hind femora annulated with fuscous before the apex; last joint of all the tarsi and base of the hind coxæ fuscous. Abdomen shorter and more compressed; 1st segment hardly forming $\frac{1}{3}$ of its length, stouter, and with less conspicuous tubercles. Terebra as long as the abdomen. Male unknown. Length, $1\frac{1}{4}$; wings, $1\frac{3}{4}$ lin.

Var. Mesonotum and scutellum rufo-piceous.

The description is that of Haliday. Specimens were formerly in Curtis's collection, but nothing more is known of them. They are not, I think, the *Dacnusa cerealis* of Curtis, as stated in my catalogue, for some reason now forgotten; that synonym rather applies to *Blacus humilis*, Nees.

XVIII. LIOPHRONIDES.

Maxillary palpi 5-, labial 3-jointed. Mesothoracic sutures distinct or obsolete. Abdomen subsessile, oval, convex; suturiform

articulation obsolete, the other sutures distinct; apical segments of the ♀ curved under the abdomen, so that the short terebra points forwards. Wings nearly as in the last subfamily, but the radius is curved, and its 1st abscissa much shorter than the thickness of the stigma.

The genus *Liophron* of Nees v. Esenbeck, established in 1819, indicates species with 2 cubital areolets, and the abdomen of the ♀ decurved. In his monograph (i., 43) he describes 3, which now belong to as many different genera; *L. falcatus* is a *Pygostolus*, and is referred to the *Blacides*; *L. clavipes*, from Italy, has the abdomen margined, and belongs to some different tribe; *L. ater* belongs to the present group. Wesmael described 4 species of *Liophron*, taking what he supposed to be the *L. ater*, Nees, for his type; the *ater*, Wesm., however, is not identical with *ater*, Nees, but with *Bracon lucidator*, Nees. The species known to Wesmael belong to two genera which Haliday named *Ancylus* and *Centistes*, but for *Ancylus* he afterwards restored the original name *Liophron*. A notice of *Liophron* and *Centistes* by Reinhard, accompanied by diagnoses of the species, is to be found in the Berl. ent. Zeit. for 1862. Förster, in his Synopsis, created some confusion by substituting the name *Liophron* for Haliday's *Centistes*, and quoting as a type *L. ater*, Nees, which is *Ancylus excrucians*, Hal.; the type should have been *L. ater*, Wesm. As for Haliday's *Liophron*, or *Ancylus*, it is divided by Förster into two new genera, *Ancylocentrus*, containing (for the second time) *Ancylus excrucians*, Hal., with the claws bifid; and *Allurus*, containing *Ancylus muricatus*, Hal., with the claws simple. The character taken from the claws is here reversed in the two genera; it is also a merely sexual distinction. Another genus of Förster's, *Syrrhizus*, remains undescribed. With the *Liophronides* terminates the series of Polymorphous groups characterised by 2 cubital areolets in conjunction with a sessile or subsessile abdomen. The perfect insects frequent fungi, but their habits in the larval state are entirely unknown.

Mesothoracic sutures distinct	i. LIOPHRON.
Mesothoracic sutures obliterated	ii. CENTISTES.

i. LIOPHRON, Nees.

Leiothron, Nees, Act. Ac. L. C., 1819, p. 303; Mon., i., 45; Wesm., Nouv. Mém. Ac. Brux., 1835, p. 103.

Ancylus, Hal., Ent. Mag., i., 459 and 460.

Mesothoracic sutures distinct, only in one species vanishing posteriorly. Abdomen subsessile, convex; terebra short, curved, with broad cultrate valves, pointing forwards. Wings with 2 cubital areolets; podiscoidal areolet narrowly open at the apex.

Joints of the antennæ cylindric, and closely conjoined. Abdomen above ellipsoid; 1st segment short, tubercles placed near the base; segments 2—3 together much longer than the 1st, smooth and shining; the following segments short, but not concealed; anus of the ♀ compressed, decurved. Stigma ovate, lanceolate; prædiscoidal areolet not quite touching the parastigma; 1st cubital areolet separated from the prædiscoidal; recurrent nervure interstitial; cubital nervure faintly traced. The antennæ and legs offer no sexual peculiarities as in the *Blacides*. The species are of rare occurrence, black and very shining, with hard integuments; the 2d abdominal segment is sometimes more or less red. We have four species:—

- | | |
|--|----------------------------|
| (6) 1. First abdominal segment subquadrate, not narrowed at the base; claws of the ♀ bifid, of the ♂ simple. | |
| (5) 2. Abdomen partly red. | |
| (4) 3. Hind coxæ produced into a strong tooth; ventral segments bidenticulate on their hinder edge; 2d abdominal segment entirely, 3d at the sides and beneath, red .. | 1. <i>muricatus</i> , Hal. |
| (3) 4. Hind coxæ only subdentate; ventral segments hardly bidenticulate; abdomen wholly black above, dull red at the sides .. | 2. <i>lituratus</i> , Hal. |
| (2) 5. Abdomen entirely black | <i>muricatus</i> , var. |
| (1) 6. First abdominal segment longer than broad, narrowed at the base; claws simple, ♂ ♀. | |
| (8) 7. Tubercles of 1st segment not salient: coxæ red, or at most with a fuscous basal spot above | 3. <i>ater</i> , Nees. |
| (7) 8. Tubercles salient; coxæ black | 4. <i>edentatus</i> , Hal. |

1. *Liophron muricatus*, Hal.

Ancylus muricatus, Hal., Ent. Mag., ii., 460; Reinh., Berl. ent. Zeit., 1862, p. 335, ♀.

Leiothron armatus, Wesm., Nouv. Mém. Ac. Brux., 1835, p. 105, ♀ (not var. 1).

♀. Black, shining; legs and 2d abdominal segment rufous. Body pubescent, on the under side rather thickly. Mandibles, and sometimes clypeus, rufescent. Antennæ more or less rufous at the base, somewhat longer than the body, 30—31-jointed. Metathorax convex, finely rugulose, dull, with an indeterminate smooth space on each side of the base. Wings hyaline, stigma fuscous, nervures paler, radix and squamulæ dull stramineous. Legs elongate, stout; base of hind coxæ, hind tibiæ at the tips, and their tarsi, infuscated; hind coxæ armed underneath with a vertical and somewhat obtuse tooth; hind tarsi the longest; claws bifid. First abdominal segment subquadrate or hardly longer than broad, with a transverse impression on each side before the middle, dilated at the base where the salient tubercles are situated, longitudinally rugulose, especially towards the sides, the extremity smooth in the middle; 2d segment rufous, with or without a medial fuscous spot on the disk; 3d segment black, rufous at the sides and underneath, its ventral hind margin bidenticulate; the same denticulation is repeated more and more faintly on the following ventral segments. Terebra very short; valves ferruginous, pilose, rounded, squamiform. Male unknown. Length, $1-1\frac{2}{3}$; wings, $1\frac{1}{2}-3$ lin.

Var. Abdomen entirely black. Wesmael.

This species only differs from the following in the more pronounced denticulation of the coxæ and ventral segments, and in the distribution of the rufescence of the abdomen; it is therefore not unlikely that they belong to the same species, as Wesmael supposed, and that the species is moderately variable. Found rarely, in woods; I possess 2 females, one taken in the Forest Hills, Leicestershire, the other in Brittany, near Lokmariaker.

2. *Liophron lituratus*, Hal.

Ancylus lituratus, Hal., Ent. Mag., ii., 461, ♀.

Leiophron lituratus, Reinh., Berl. ent. Zeit., 1862, p. 335, ♂ ♀.

L. armatus, var. 1, Wesm., Nouv. Mém. Ac. Brux., 1835, p. 105, ♀.

Only distinguished from the preceding as follows:—In general larger, the red portions of a duller hue; antennæ 31—33-jointed; abdomen longer and more slender; 2d segment black or piceous above; sides of all the segments, and the entire belly, rufous; denticulation of the ventral segments and hind coxæ less distinct. The ♂ (which I have not seen) differs, according to Reinhard, in

having the claws simple; antennæ 33-jointed; abdomen not decurved at the extremity. Length, 2; wings, $3\frac{3}{4}$ lin.

I have 3 old ♀ specimens taken at Milford Haven, of larger size, with 33-jointed antennæ; and one from Nunton, Wilts, which is rather smaller; antennæ 31-jointed. This last closely resembles *muricatus*.

3. *Liophron ater*, Nees.

Leiophron ater, Nees, Mon., i., 45; Reinh., Berl. ent. Zeit., 1862, p. 335, ♂ ♀ (not of Wesm.)

Ancylus ater, Hal., Ent. Mag., iii., 21, ♂ ♀.

A. excrucians, Hal., Ent. Mag., ii., 461, ♀.

♀. Smaller than the two foregoing species; abdomen entirely black. Antennæ 24—25-jointed, scarcely longer than the body, more or less rufous beneath at the base. Mouth rufo-testaceous; palpi paler. Wings as in *muricatus*. Legs rufo-testaceous; hind coxæ edentate, more or less fuscous above; claws fuscous, not bifid. First abdominal segment longer than broad, gradually widened from the base, which is little more than half as broad as the apex; finely aciculated; the other segments smooth and shining; tubercles inconspicuous; ventral segments denticulate. Terebra very short, curved, its valves testaceous. ♂ similar; abdomen narrower; antennæ longer, according to Nees 25- (*i.e.*, 24-) jointed. Length, $1\frac{1}{2}$; wings, 3 lin.

Haliday himself (Ent. Mag., iii., 21) established the above synonymy, and he is followed by Reinhard. I shall not venture to disturb this; yet I have a difficulty in explaining the fact that Nees, in describing the thorax of his *ater*, calls it “*æqualis*,” which is his usual mode of indicating the absence of the mesothoracic sutures. This is a character of *Centistes*, and of *Bracon lucidator*, Nees, the *L. ater* of Wesmael, who seems to have taken note of the word “*æqualis*.” It is possible then that *Bracon lucidator*, Nees = *L. ater*, Nees and Wesmael, = *Centistes*; and in this case the name of the species above described should be *L. excrucians*, Hal.

Found among fungi in woods, but not common; I possess 4 females, one taken near St. Albans, and three at Nunton, Wilts. Nees captured the ♂ ♀ *in copulâ*, in a garden at Sickershausen, in Franconia.

4. *Liophron edentatus*, Hal.

Ancylus edentatus, Hal., Ent. Mag., ii., 461, ♀; *Leio-
phron edentatus*, Reinh., Berl. ent. Zeit., 1862,
p. 335, ♀.

♀. Black; more robust than the preceding. Antennæ 26-jointed, dull ferruginous at the base beneath. Mandibles flavo-rufous, fuscous at the tips; palpi paler. Wings dull hyaline, stigma and nervures fuscous, radix stramineous, squamulæ piceous; radial areolet very little widened at the base, attenuated at the apex, making a distant approach to the semicordate form of *Sigalphus*. Legs flavo-rufous; coxæ black, unarmed; tarsi fuscous, except at the base. Abdomen subdepressed: 1st segment aciculated, stouter than in *L. ater*, Nees, attenuated at the base, but its width across the large and prominent tubercles is nearly equal to that of the apex; belly flattened, its segments edentate. Haliday. ♂ similar; antennæ not longer than the body, in my specimen 25-jointed. Mesothoracic sutures shallow, posteriorly effaced. Metathorax short, subrugulose, somewhat shining. Four posterior femora with a fuscous line above; hind tibiæ somewhat infuscated at the apex. Radial areolet as in the ♀. An intermediate form, leading to *Centistes*. Length, $1\frac{1}{2}$; wings, 3 lin.

The ♀ seems not to have occurred since the time of Haliday, who drew up his diagnosis from 2 old and bad specimens; he remarks that their depressed abdomen might be the result of rough handling. The ♂ I captured at Nunton, and refer it to this species with some confidence, owing to the form of the radial areolet.

ii. CENTISTES, Hal.

Centistes, Hal., Ent. Mag., ii., 462; Reinh., Berl. ent. Zeit., 1862, p. 336.

Characters of *Liophron*, but the mesothorax is quite smooth, with no trace of sutures. Antennæ having the same number of joints in both sexes. Abdomen obovate, convex in the ♀, decurved at the apex, and with the belly compressed; subdepressed in the ♂; 1st segment longer than broad, narrowed at the base; tubercles inconspicuous. Terebra short, subulate, pointing forwards.

Only two species are known in Europe:—

Legs flavo-rufous; antennæ 24-jointed, as long as the	
body, or longer	1. <i>lucidator</i> , Nees.
Legs brown; antennæ 19-jointed, shorter than the	
body	2. <i>fuscipes</i> , Nees.

1. *Centistes lucidator*, Nees.

Bracon lucidator, Nees, Mon., i., 50, ♂.

Centistes cuspidatus, Hal., Ent. Mag., ii., 462, ♂ ♀.

Leiophron ater, Wesm., Nouv. Mém. Ac. Brux., 1835, p. 104, ♂ ♀ (not of Nees).

♀. Black, brilliant; mandibles and sometimes the clypeus testaceous; palpi paler. Two or three basal joints of the antennæ testaceous beneath. Face carinated in the middle. Mesonotum smooth and brilliant, gibbous. Metathorax slightly rugulose, with a shining space on each side at the base, and another at the apex. Wings hyaline, stigma and nervures reddish fuscous, radix and squamulæ dull stramineous. Legs testaceous; hind tibiæ towards the apex, and their tarsi, fuscous. First abdominal segment aciculated, with 2 lateral carinæ, and a third in the middle which reaches neither extremity; the following segments very smooth and shining. Terebra as long as the 1st segment, but concealed in repose; its valves black, acute, lanceolate. The ♂ differs only in having longer antennæ, and the abdomen not decurved at the extremity. Length, 1—1½; wings, 2—2½ lin.

The ♂ is common everywhere, and especially amongst fungi in woods; the ♀ is seldom met with.

2. *Centistes fuscipes*, Nees.

Bracon fuscipes, Nees, Mon., i., 50; *Leiophron fuscipes*, Wesm., Nouv. Mém. Ac. Brux., 1835, p. 107, ♀; *C. fuscipes*, Reinh., Berl. ent. Zeit., 1862, p. 336, ♂ ♀.

Shorter and stouter than the preceding. Black, shining; mandibles rufous; palpi piceous. Antennæ ♀ entirely fuscous, stout, filiform, about half as long as the body. Mesonotum smooth, gibbous. Metathorax slightly rugulose, transversely bisected by a carina more or less distinct. Wings shorter than in *lucidator*, somewhat infuscated, nervures and stigma fuscous or rufescent, the latter short, broad, triangular. Legs stout, brownish, fore femora and tibiæ sometimes rufescent, the 4 posterior always dark coloured; knees somewhat paler; joints of the tarsi short. Abdomen oblong-ovate; 1st segment broader than in *lucidator*, rimulose, the apex smoother in the middle; belly of the ♀ compressed. Terebra as long as ¼ of the abdomen, but concealed in repose; valves black, subcylindric, rounded at the end. The ♂ is similar, with the usual sexual differences. Length, 1; wings, 2 lin.

Not common; I captured several of both sexes once in Leicestershire, and a single specimen at Nunton.

XIX. ICHNEUTIDES.

Maxillary palpi 5-, labial 4-jointed. Mesothoracic sutures distinct. Abdomen sessile, depressed, subclavate or spathuliform, showing 7—8 segments above. Fore wings with 3 cubital areolets, the 1st receiving the recurrent nervure; 2d small, trapeziform, about the size of the stigma (*Ichneutes*), or smaller (*Proterops*); radial areolet very short, subtriangular, metacarpus not longer than the stigma; pabrachial areolet of the hind wings half as long as the præbrachial. Terebra concealed, or nearly so.

The group is of very small extent, and completely isolated; the shape of the radial areolet at once distinguishes the insects; it resembles in some degree that of *Chelonus*, but there the likeness stops. Wesmael also compares his genus *Acampsis* (a section of *Sphæropyx*), but the similarity extends no further than the head and thorax. Nees v. Esenbeck was acquainted with a single species, for which he established the genus *Ichneutes*; Wesmael added two more, one of which he afterwards suppressed, and made known a second genus *Proterops*, with one species, perhaps described by Fabricius as a *Bracon*, but subsequently neglected or misunderstood. The insects are sluggish, and attack the exposed larvæ of *Tenthredinidæ*, for which purpose they do not require a long terebra.

First abscissa of the radius much shorter than the 2d;
2d cubital areolet broader than long, its upper side
much longer than the 2d transverso-cubical nervure;
radius of the hind wings obsolete; front of
the usual length, so that the foremost ocellus is
remote from the base of the antennæ i. ICHNEUTES.

First abscissa of the radius longer than the 2d; 2d
cubital areolet longer than broad, its upper side
shorter than the 2d transverso-cubical nervure;
radius of the hind wings distinct; front so abbreviated
that the foremost ocellus is situated between
the antennæ ii. PROTEROPS.

i. ICHNEUTES, *Nees*.

Nees, Mag. Ges. Berl., 1816, p. 275; Mon., i., 156;
Wesm., Nouv. Mém. Ac. Brux., 1835, p. 195.

Head transverse, as wide as the thorax; occiput not margined;
face quadrate; clypeus rounded behind, straight on the front edge,

deplanate; mandibles broad, bidentate. Antennæ setiform, those of the ♂ hardly longer. Thorax short; mesonotum elevated. Wings ample, hyaline; podiscoidal areolet almost as large as the prædiscoidal; the short triangular radial areolet remote from the apex of the wing; in the hind wings the radial and cubital areolets are not separated. Legs short, stout; hind tibiæ subclavate, armed with very short spurs. Terebra not projecting beyond the last segment; anus of the ♂ obtuse, segment 6 much longer than 5, rounded behind, smooth and concave above; the ♂ is also smaller and narrower than the ♀, but not otherwise distinguishable. Of the two known species *I. levis* has not yet been noticed in this country.

1. *Ichneutes reunitor*, Nees.

Ichneutes reunitor, Nees, Mag. Ges. Berl., 1816, p. 276, pl. vii., f. 3; Mon., i., 158; Wesm., Nouv. Mém. Ac. Brux., 1835, p. 196, ♂ ♀; S. v. Voll. Schets., tab. v.

I. brevis, Wesm., lib. cit., p. 198, ♂ ♀; cf. Suppl., p. 156; Ratz., Ichn. d. Forst., ii., 70, pl. ii., f. 35.

Black, abdomen sometimes piceous in the middle. Body somewhat villose. Face rugulose, beset with greyish pubescence, and with a short indistinct carina above. Cheeks, vertex, and front granulated, dull; palpi and middle of mandibles testaceous. Antennæ ♂ ♀ as long as the body, 31-jointed. Thorax pubescent; pleuræ granulated; metathorax subrugulose, with an oblong medial area enclosed between two carinæ which reach from the base to the apex. Stigma and nervures fuscous; radius slightly curved; 2d intercubital nervure very short, subobsolete; hind wings sinuated near the base of their anterior margin; their pobrachial areolet remote from the posterior margin. Legs pale rufo-testaceous; coxæ black. Abdomen pubescent; 1st segment rugose, dull, with 2 carinæ, separated at the base and converging to the apex; 2d segment rugose; 3d and following sparingly punctulate, shining. Valves of the terebra conical. Length, $1\frac{1}{2}$ — $2\frac{1}{2}$; wings, 3—5 lin.

Var. 1. Antennæ, abdomen in the middle, and coxæ, testaceous; or antennæ with a fuscous line above, and hind coxæ partly fuscous.

Var. 2. Smaller; facial carina more distinct; metathorax with no medial area; radius straight; pleuræ almost smooth; palpi dusky; hind femora piceous on the outer side. *I. brevis*, Wesm.

Not common, but widely distributed, from the Arctic

regions to the Mediterranean; the Rev. A. E. Eaton brought a specimen from Spitzbergen, and others were sent to me from Italy by Dr. Magretti. According to Ratzeburg both sexes were bred in April from galls of *Nematus viminalis*, L., on willows, by Hartig; also by Brischke from (probably) *Nematus septentrionalis*, L.; it is also mentioned as a parasite of *Nematus frigidus*, Boh., and *Nematus salicis*, L. I have several times taken it in England on umbellate flowers, and at Nunton a specimen occurred belonging to var. 1.

ii. PROTEROPS, *Wesm.*

Wesm., *Nouv. Mém. Ac. Brux.*, 1835, p. 201.

Characters of *Ichneutes*; but the anterior ocellus is placed between the antennæ, the front thus almost disappearing; the 2d cubital areolet is much smaller, contracted above; the radius of the hind wings distinct, &c., as already pointed out. The insect is much larger, with blackish wings and orange-coloured abdomen, like a *Bracon*, for one of which genus it was formerly mistaken.

1. *Proterops nigripennis*, *Wesm.*

Bracon denigrator, *Cur.*, *B. E.*, pl. lxi., ♂ (exclusive of dissections and text); not of *Fab.*

Proterops nigripennis, *Wesm.*, *Nouv. Mém. Ac. Brux.*, 1835, p. 202, ♂ ♀; also *Suite I.*, 1837, pl. f. P; *S. v. Voll. Schets.*, tab. v.

Black, shining, pubescent; wings dark brown; abdomen bright orange. Face impressed with a deep fovea on each side of the clypeus; palpi and mandibles black. Antennæ $\frac{1}{4}$ longer than the body, stout, slightly incrassated towards the apex, 34-jointed in one ♂ (I have no ♀). Mesothoracic sutures deeply incised, impunctate. Metathorax short, rugulose, dull. Wings iridescent, with a whitish streak below the stigma, which is black, as well as the nervures; hind wings sinuated near the base. Legs entirely black, pubescent, longer than those of *Ichneutes*, and the spurs of the hind tibiæ longer. Abdomen smooth, shining, punctulate, pubescent with reddish hairs; showing 8 segments above in the ♂, 7 in the ♀; 1st segment widened from the base to the apex, where its breadth is doubled; posterior margin deeply sinuated; disk convex, with raised margins separated from the medial ridge by a channel on each side; tubercles basal, salient; suturiform articulation uncommonly deep, impunctate; abdomen widened to the

end of the 4th segment; 5th and 6th narrower; 7th in the ♀ protruding only as a blunt point; 7th segment of the ♂ rounded, and followed by the exerted apex of the 8th. Terebra concealed. ♂ ♀. Length, $2\frac{3}{4}$; wings, 6 lin.

Very rare in this country; a parasite of *Hylotoma enodis*, L. Wesmael possessed 4 specimens taken near Brussels; Magretti has found it in Italy, at Canonica d'Adda; Curtis records a ♂ captured in Birch Wood, Kent, and a ♀ taken by Kirby, now in the Stephensian collection; Cameron has obtained more than one in Scotland, and the ♂ I possess is due to his liberality.

XX. HELCONTIDES.

Maxillary palpi 6-, labial 4-jointed. Front excavated, usually armed with an erect tooth; head large, subconic, transverse. Abdomen sessile or subsessile, articulated to the posterior face of the metathorax near its upper edge, and much above the hind coxæ; 1st segment usually elongate, forming even as much as half the abdomen; but not so in *Cenocælius*. Fore wings with 3 cubital areolets; recurrent nervure rejected or interstitial; 2d cubital areolet trapeziform; radial areolet lanceolate, acute, ending before the apex of the wing; metacarpus longer than the stigma; prædiscoidal areolet contiguous or petiolated. Hind femora incrassated, in *Helcon* often toothed beneath. Terebra elongate.

The species are parasites of Coleoptera.

The two genera to be here noticed are only distantly related; yet it is better perhaps to keep them together for the present.

Abdomen sublinear, elongate; 1st segment forming nearly half of its length; anterior margin of the clypeus unarmed; recurrent nervure considerably rejected i. HELCON.

Abdomen elliptic, short; 1st segment scarcely forming a third of its length; anterior margin of the clypeus dentate; recurrent nervure interstitial, or nearly so ii. CENOCELIUS.

i. HELCON, Nees.

Nees, Act. Ac. L. C., 1819, p. 307; Mon., i., 224.

Occiput margined. Mesothoracic sutures distinct, rugose. Prædiscoidal areolet almost touching the parastigma. Abdomen as

long as the thorax, linear, sometimes incrassated and rounded posteriorly, sessile.

Head large, subcubic, as wide as the thorax; face convex, varicose; clypeus short, discrete, its front edge straight, 2 basal foveæ distinct; eyes small, protuberant; cheeks not dilated. Antennæ placed at the edge of the large frontal depression, in both sexes as long as the body, or longer. Prothorax produced, variolously punctate, its lateral margins elevated. Mesothoracic lobes very convex, the medial one produced towards the head. Metathorax truncated posteriorly, areated by 4—6 carinæ. Wings rather small; stigma narrow, lanceolate; 1st cubital areolet receiving the recurrent nervure a little behind the middle; 2d small, hardly longer than broad; pobrachial areolet somewhat longer than the præbrachial, sometimes emitting a spurious nervure from its extremity to the hind margin (but not in *H. annulicornis*); podiscoidal areolet completely closed; radial areolet of the hind wings contiguous or petiolated; anal nervure distinct. Legs elongate, especially the hind pair; coxæ and hind femora incrassated, the latter often dentate beneath; tibiæ stout, but with small spurs; tarsi elongate. Abdomen narrower than the thorax, deplanate; 1st segment very long, bicarinated; 2d and 3d together a little shorter; the others transverse.

The large black species of *Helcon* are found in the forests of Central Europe, usually on the trunks of trees, or felled timber, where the females crawl slowly in search of the burrows of longicorn beetles. Kawall, in Courland, bred *H. ruspator*, L., from a larva of *Strangalia quadrifasciata*, L. It is almost certain that Great Britain possesses no indigenous species, and that the occurrence of the following in some numbers on one occasion was the result of their accidental introduction.

1. *Helcon annulicornis*, Nees.

Nees, Mon., i., 231; Ste., Ill. M., vii., Suppl. 4, pl. xxxvii., f. 3 ♂, f. 4 ♀; Hal., Ent. Mag., iii., 144, ♂ ♀.

Deep black, very shining; legs red; 4 anterior coxæ and trochanters, hind tibiæ and tarsi, black; antennæ of the ♀, and 4 posterior tarsi in both sexes, annulated with white; hind femora armed beneath with a stout subapical tooth. Face rugose; vertex deplanate, transverse, smooth. Antennæ ♀ 29-jointed, black; joints 13—15 white. Mandibles and palpi fuscous. Thorax punctate, with blackish pubescence. Metathorax reticulated, with

4 longitudinal carinæ, of which the two medial form an elongate area, narrowest at the base; the lateral carinæ are twice intersected by transverse carinæ. Wings fumato-hyaline; stigma and nervures fuscous. Hind coxæ rufous; fore femora and 4 anterior tibiæ fuscous at the base; fore tarsi rufous, fuscous at the tips; the other tarsi white, with the base of the 1st joint and the last joint entirely, fuscous. First abdominal segment longer than the 2d and 3d together, scarcely widened posteriorly, with raised lateral margins and 2 parallel dorsal carinæ, the space between which is punctulate and rugose; the 2 exterior channels smooth, as likewise is the rest of the abdomen. Terebra as long as the abdomen and metathorax. ♂ much smaller; antennæ without a white ring; abdomen narrower. Length ♀ 5; wings, 9 lines; ♂ 4; wings, $7\frac{1}{2}$ lines.

Taken in Germany by Gravenhorst, in France by Villers, near Lyon. The pair excellently figured in the work of Stephens are from several found, as that author believed, in South Wales; more were in the collection of the Entomological Club, supposed to have been taken by E. Newman near Leominster. A ♀, the gift of F. Walker, is in my collection, and I presume it was one of the same casual visitors. They might have been imported in the larval state to Bristol or Cardiff in foreign timber containing Coleoptera; it is certain that no more specimens have since appeared in this country. I possess also *H. (Gymnoscelis) tardator*, Nees, from Walker's collection, but its British origin is altogether doubtful.

ii. CENOCELIVS, Hal.

Cenocælius, Hal., in Westw. Int., ii., Gen. Syn., 62; Brullé in St. Farg. Hym., iv., 481; Westw., Tijdschr., 1881—82, p. 33; Smith, Nom. Brit. Hym., pt. xiii., p. 27, and Proc. Lin. Soc., Zool., vi., p. 66; S. v. Voll. Schets., tab. vi., f. 24 (wings by Haliday).

Capitonius, Brullé in St. Farg. Hym., iv., 544.

Aulacodus, Cresson, Proc. Ent. Soc. Philadelph., 1865, p. 8.

Laccophrys, Först., Verh. d. pr. Rheinl., 1862, p. 257; Reinh., Berl. ent. Zeit., 1865, p. 265.

Occiput margined. Mesothoracic sutures distinct, punctate. Prædiscoidal areolet petiolated, not touching the parastigma.

Abdomen not longer than the head and thorax, subsessile. Terebra exerted.

Head very large, transverse, broader than the thorax; face convex; clypeus angulated in front, imperfectly discrete, with 2 indistinct basal foveæ; eyes small; cheeks somewhat dilated; antennæ inserted in a large shallow depression of the front; between them is a compressed dentiform elevation; those of the ♂ as long as the body, of the ♀ hardly longer than the head and thorax. Mesopleuræ punctulate, shining, with a crenate furrow. Metathorax depressed, vertical behind. Second cubital areolet, when measured along the cubital nervure, twice as wide as when measured on the radial; its inner angle incomplete. Legs short, stout; hind femora edentate. First abdominal segment subtriangular, striated, the rest smooth; 2d and 3d segments of equal length; suturiform articulation visible.

The genus *Cenocælius* was established by Haliday from a British insect which he named *flavifrons* but did not describe; he left, however, a sketch of the wings, reproduced in Van Vollenhoven's 'Schetsen.' Certain exotic insects were recognised by F. Smith and Professor Westwood as nearly allied, and the name *Cenocælius* was applied to them, while the British type of the genus remained unknown, or received new names from authors whenever it occurred. The first description of Haliday's insect is that by Nees v. Esenbeck, who placed it in the genus *Bracon*; in Ratzeburg's work it figures as an *Opius*, and is accompanied by a second congener; Förster created for them his genus *Laccophrys*, subsequently adopted by Reinhard, Van Vollenhoven, and others. The second species mentioned by Ratzeburg was known long ago to Linné, and is ticketed in the Linnean collection as *Ichneumon agricolator* and *secalis*. As there can be no doubt that the insect now to be described is Haliday's type of *Cenocælius*, I have restored the proper generic name, leaving the exotic forms to whatever fate may be in store for them; one or other of the names *Capitonius* or *Aulacodus* may perhaps be conveniently applied to them, and their differences from the British *Cenocælius* may be hereafter settled. There seems to be a natural group of some extent to which these insects belong; some are Asiatic and others American; they are sufficiently different from *Helcon*, and no doubt require generic division, though agreeing in the mode in which the abdomen is articulated to the

metathorax. This position of the abdomen tends to break down the distinction between the *Braconidæ* and *Evaniidæ*, and seems to have influenced the respective authors of *Capitonius* and *Aulacodus*, who have arranged those genera in the latter family. The wings and general appearance of *Cenocælius* are those of a Braconid, whatever difficulty may exist in determining its exact location; Förster referred *Laccophrys* to the *Diospilides*, and Reinhard to the *Helcontides*; the second arrangement is somewhat preferable, but in fact *Cenocælius* is isolated, and the connecting-links, if any, which might determine its position, must be looked for out of Europe. *Laccophrys Villæ-novæ* and *L. Medenbachii*, Voll., seem hardly to belong to this genus.

1. *Cenocælius analis*, Nees.

Bracon analis, Nees, Mon., i., 63, ♂ ♀.

Opius cephalotes, Ratz., Ichn. d. Forst., ii., 63, ♂ ♀
(not of Wesm.).

Laccophrys cephalotes, Reinh., Berl. ent. Zeit., 1865,
p. 267, pl. iii., f. 6, ♂ ♀.

Black; mouth, femora towards the apex, tibiæ, and tarsi rufous, as also the face, cheeks, and 4th and following abdominal segments of the ♀. Antennæ 25-jointed, blackish, the extreme base rufous. Palpi fuscous. Metathorax coarsely rugose, reticulated. Wings fusco-hyaline, stigma and nervures fuscous; beneath the former is an indistinct pale streak. Legs rufous; coxæ and basal half of the femora more or less black. First abdominal segment deeply striated, 3 times broader at the apex than at the base, with basal tubercles; 2 of the medial striæ elevated, cariniform; 2d segment striated at the base, but often smooth, like all the following segments. Terebra somewhat longer than the abdomen. ♂. Antennæ as long as the body, the 3 first joints rufous. Sometimes the posterior margin of the 2d segment, and all the following segments, are dull rufous, as in the ♀. Femora not always black at the base. Length, $1\frac{1}{2}$ — $1\frac{3}{4}$; wings, 3— $3\frac{1}{2}$ lin.

Reared at Hohenheim by Nördlinger from branches of apple-trees tenanted by xylophagous beetles; by Bouché from *Scolytus rugulosus*, Ratz., also on an apple-tree; the *Scolytus*, like its parasite, has the body red at the extremity. In my collection are 2 females, one from an unknown source, the other taken in the orchard of my house at Nunton.

The second known species, *C. rubriceps*, Ratz., is likely also to be found in England. It differs in being rather larger; antennæ 31—34-jointed; head of the ♀ rufous, with a black stemmaticum. Several times reared from *Magdalinus violaceus*, L., on pine-trees. This is the true

Ichneumon ^{*agricolator*}
secalis

as labelled in the Linnean collection, and not the *Perilitus secalis*, Hal.; see Trans. Ent. Soc. Lond., 1887, p. 79. The meaning of the double name is hard to understand; perhaps *agricolator* and *secalis* were afterwards found by Linné to be the same, for in Turton's translation of the 'Systema Naturæ' *agricolator* is thus mentioned:—"Black; head ferruginous; abdomen sessile. Inhabits Europe. Probably a variety of *Ichneumon secalis*." The habitat of *secalis*, in the 12th ed. of the 'Systema Naturæ,' is said to be "in larvis spicarum," in larvæ found on ears of corn, which is not unlikely, although different from the origin assigned to Ratzeburg's insect.

XXI. MACROCENTRIDES.

Form elongate, slender. Head very transverse; front not or hardly excavated; foremost ocellus not placed in a fovea; antennæ elongate; maxillary palpi 6-, labial 4-jointed. Mesothoracic sutures distinct. Metathorax deplanate. Fore wings with 3 cubital areolets, the 1st separated from the prædiscoidal; radial areolet elongate, cultrate; metacarpus longer than the stigma. Abdomen longer than the thorax, sessile, linear, or subsessile, and then attenuated at the base; the segments discrete; tubercles basal. Legs elongate, slender; hind femora not incrassated; spurs of the posterior tibiæ elongate. Terebra elongate.

The first attempt to discriminate these insects from *Bracon* is due to Curtis, who in 1832 proposed the genus *Zelee* (but in such terms as partially to include *Meteorius*, Hal.), and in the following year *Macrocentrus*. Nees v. Esenbeck, in 1834, included the same insects in the 1st section of his genus *Rhogas* (Mon., i., 200). Wesmael, in 1835, again separated the 2 forms united by Nees, giving to one of them (*Zelee*) the name *Phylax*, which is preoccupied in Coleoptera; and to the other (*Macrocentrus*) the name *Rhogas*, in a limited sense, the genuine *Rhogades* being called by him *Aleiodes*. The two forms

are well distinguished by nature; it remains only to eliminate their names from the confusion of synonymy, which is best effected by adopting the two genera *Macrocentrus* and *Zelee*. The former involves no difficulty, but *Zelee*, Curt., could not be accepted without its further interpretation by Haliday. Two more genera have been proposed by Förster, *Homolobus*, a dismemberment of *Zelee*, and *Amicroplus*, a dismemberment of *Macrocentrus*, but they are founded upon extremely trivial distinctions.

Occiput not margined; middle lobe of the mesonotum gibbous; abdomen linear above, 1st segment not or hardly longer than the 2d; terebra straight, at least as long as the abdomen, usually much longer i. MACROCENTRUS.

Occiput margined; middle lobe of the mesonotum not more elevated than the 2 lateral; abdomen subclavate above, 1st segment much the longest; terebra falcate, much shorter than the abdomen ii. ZEELE.

i. MACROCENTRUS, Curt.

Curt., Ent. Mag., i., 187 (1833); Hal., *lib. cit.*, iii., 136.

Rogas, Wesm., Nouv. Mém. Ac. Brux., 1835, p. 170.

Head three times as broad as long; vertex narrow, elevated into a transverse ridge. Radial nervure of the hind wings not sinuated; radial areolet never geminated by a transverse nervure. Spurs of hind tibiæ not half as long as the metatarsus. Second abdominal segment canaliculated along the lateral margins.

Head as broad as the thorax, very oblate; occiput emarginate above; vertex transversely compressed, with a raised stemmaticum on its hinder edge; front abruptly descending; face broad, flattened; clypeus discrete, transverse, with a fovea on each side of the base; mandibles acutely bidentate. Antennæ slender, setaceous, usually longer than the body, with 30—54 joints. Thorax oblong, somewhat compressed; mesothoracic lobes gibbous, especially the middle one; metathorax short, subtruncate. Stigma ovate, protuberant outside the costa; radial areolet lanceolate, ending not far from the apex of the wing; 1st cubital areolet receiving the recurrent nervure beyond the middle; 2d small, oblong, its hinder basal angle produced; radius of the hind wings with a short petiole; pabrachial areolet longer than half the præbrachial. Legs elongate; 2d joint of trochanters sometimes ending in a minute spine on the outer side. Abdomen longer and narrower than the thorax, linear, deplanate, compressed at the

apex in the ♀; 8 segments visible above; 1st linear, elongate, with basal tubercles; 2d and 3d a little shorter; the rest transverse; belly carinated; anus ♀ truncated; ventral valve produced, obtus-angular. Terebra longer than the body, seldom shorter.

The species are black, with or without rufous or testaceous markings; but *M. abdominalis* is often wholly testaceous. The general form much resembles that of *Lissonota* and *Glypta* among the Ichneumons. The *Macrocentri* are parasites of Lepidoptera, and often gregarious in large numbers; one species has been reared from *Anobium*. The habits of three species are noticed by Ratzeburg, and he has mentioned seven more supposed to be different; but their descriptions are incomplete, and some of them may be mere varieties. Brischke found the larvæ of *M. interstitialis*, Ratz, in small colonies between leaves of *Pyrus aria* (White Beam-tree). Some individuals retired from the rest, and made their cocoons separately. It is not stated what insect had been their victim. On the 22d of July these larvæ were $2\frac{1}{2}$ lines long, white, with a green intestinal canal; on the 8th of August the perfect insects appeared. The cocoons are narrow and elongate, brown, silky, and when agglomerated together they are covered with a whitish web common to the whole brood; but the solitary cocoons are not so protected.

TABLE OF SPECIES.

- | | | | |
|--------|---|----|---------------------------|
| (6) 1. | Antennæ 45—54-jointed; maxillary palpi elongate, 3d joint as long as the 1st of the flagellum, or longer. | | |
| (3) 2. | Third abdominal segment (like the 2 preceding) entirely rimulose | 1. | <i>abdominalis</i> , Fab. |
| (2) 3. | Third abdominal segment rimulose at the base only, or entirely smooth. | | |
| (5) 4. | Thorax black; stigma fuscous | 2. | <i>marginator</i> , Nees. |
| (4) 5. | Thorax rufous; stigma yellow | 3. | <i>thoracicus</i> , Nees. |
| (1) 6. | Antennæ 30—37-jointed; maxillary palpi short, 3d joint shorter than the 1st of the flagellum. | | |
| (8) 7. | Second abscissa of the radius as long as the 1st intercubital nervure; legs short, stout; mesonotum ♀ black; terebra longer than the body | 4. | <i>infirmus</i> , Nees. |
| (7) 8. | Second abscissa of the radius much shorter than the 1st intercubital nervure; legs elongate, slender; mesonotum ♀ rufous; terebra not longer than the abdomen | 5. | <i>collaris</i> , Spin. |

1. *Macrocentrus abdominalis*, Fab.

Ichneumon abdominalis, Fab., E. S., ii., 183; *Cryptus abdominalis*, Fab., Piez., 89; Grav., Ichn. Eur., iii., 1073, ♀.

Bracon linearis, Nees, Mag. Ges. Berl., 1811, p. 13, pl. i., f. 1; *Rogas linearis*, Nees, Mon., i., 200; Wesm., Nouv. Mém. Ac. Brux., 1835, p. 173, and 1838, p. 150; Ratz., Ichn. d. Forst., ii., 64, pl. ii., f. 33; *M. linearis*, Hal., Ent. Mag., iii., 137, ♂ ♀.

Rogas pallipes, Nees, Mon., i., 203; *M. pallipes*, Hal., Ent. Mag., iii., 137, note, ♀.

Elongate, slender, pubescent. Head, base of antennæ, prothorax, belly, and legs flavo-testaceous; stemmaticum fuscous; the rest variable; usually there is a dark transverse line below the scutellum, and a fuscous shade towards the extremity of the metathorax. Antennæ ♂ ♀ much longer than the body, about 45-jointed. Metathorax thickly punctulate. Wings hyaline; stigma yellow, often with a fuscous spot, or wholly fuscous; nervures fuscous; radix and squamulæ stramineous; 2d cubital areolet not much narrowed outwardly. Legs elongate, slender. Abdomen linear, not falcate; segments 1—3 delicately striolate, not shining; 1st segment canaliculated; 2d margined; 2—3 narrowly smooth at the apex. Terebra longer than the body. ♂ similar; antennæ almost twice as long as the body. Length, $1\frac{3}{4}$ — $2\frac{1}{2}$; wings, $3\frac{1}{4}$ — $4\frac{1}{2}$ lin.

Var. α. Piceous, head testaceous; antennæ fuscous, pale at the extreme base; prothorax and belly testaceous; pleuræ and mesonotum more or less varied with testaceous.

Var. β. Testaceous; metathorax partly, and base of abdomen, fuscous; or abdomen fuscous, the segments margined with testaceous; stigma with hardly a fuscous spot.

Var. γ. Entirely testaceous, except the stemmaticum; stigma yellow, immaculate.

Var. δ. Blackish; palpi, 1st joint of antennæ, legs, and base of the belly, testaceous; intermediate segments testaceous at the sides. *M. pallipes*, Nees. Van Vollenhoven bred this variety, mixed with typical specimens, from the same victim, thus proving their identity: and of 60 specimens sent to me by Bignell, about one-half were *pallipes*.

An abundant parasite of Lepidoptera, more or less gregarious, according to the size of the infested cater-

pillar. The elongate brown cocoons are usually agglomerated, and covered with a common web, of thin texture and paler colour. Frequently bred both here and on the Continent: first by Nees v. Esenbeck, June 28th, from *Calymnia trapezina*, L., in Franconia; by Bouché from *Hylophila prasinana*, L.; in Holland, according to Van Vollenhoven, from *Noctua ditrapezium*, Bork., *Tortrix podana*, Scop., and *T. corylana*, Fab.; in England by Dorville from *Nephopteryx spissicella*, Fab.; by Billups from *Epichnopteryx radiella*, Curt.; by Elisha from *Depressaria alstroemeriana*, Clerck; by Porritt from *Tortrix heparana*, Schiff., or *ribeana*, Hüb., and very numerous from *Hyponomeuta evonymellus*, L.; by Bignell from *Hydræcia petasitis*, Doubled., and *Tortrix viridana*, L.; and by Scott from *Vanessa Atalanta*, L.

2. *Macrocentrus marginator*, Nees.

Bracon marginator, Nees, Mag. Ges. Berl., 1811, p. 14;

Rogas marginator, Nees, Mon., i., 205; Wesm.,

Nouv. Mém. Ac. Brux., 1835, p. 176; Ratz.,

Ichn. d. Forst., ii., 65; *M. marginator*, Hal.,

Ent. Mag., iii., 138, ♂ ♀.

Rogas nidulator, Nees, Mon., i., 204, ♂ ♀.

R. obscurator, Ratz., Ichn. d. Forst., ii., 65, ♀.

Stouter than Sp. 1. Black, shining; palpi testaceous or dark, more or less; the maxillary elongate, pilose. Antennæ ♂ ♀ longer than the body, about 45-jointed. Thorax and scutellum faintly punctulate; metathorax rugose. Wings fusco-hyaline; stigma fuscous, paler at the base, ovate-lanceolate, narrower than in Sp. 1; nervures, radix, and squamulæ fusco-rufescent; 2d cubital areolet elongate, not attenuated exteriorly. Legs rufous; upper trochanters, 4 anterior coxæ, and apex of the hind pair, black; hind tibiæ and tarsi more or less dark, except at the base; in large specimens, black; all the tarsi dark. Abdomen shorter and broader than in other species; segments 1—2 rugulose, sometimes very faintly; 2d smooth at the apex, margined at the sides as far as the middle; 3d slightly rugulose at the base, or sometimes smooth; the rest smooth and shining. Terebra longer than the body. ♂ ♀. Length, $2\frac{1}{2}$ — $4\frac{1}{4}$; wings, 5— $8\frac{1}{2}$ lin.

Var. α. Palpi black; 2d segment smooth. *Rogas nidulator*, Nees. ♂ ♀.

Var. β. Antennæ rufous in the middle. ♀.

The variations are trifling, and depend chiefly upon size, and the degree of rugosity observable upon the first two abdominal segments.

Not so common as the preceding species. Bred by Billups from *Sesia culiciformis*, L.; a ♀ of var. *nidulator*, and of the largest size, from *S. spheciformis*, Fab., by Tugwell, at Greenwich; according to Van Vollenhoven, from *S. formiciformis*, Esp., and *tipuliformis*, Clerck. Also by Scott from *Depressaria angelicella*, Hüb. Hali-day found it in Ireland and the Hebrides, and remarks that he frequently saw the ♀ vaulting over and settling upon sand-hills inhabited by burrowing Hymenoptera. A ♂ sent to Ratzeburg by Bouché was reputed to have issued from a gall of *Dryophanta folii*, L.; but here some error seems probable.

3. *Macrocentrus thoracicus*, Nees.

Bracon thoracicus, Nees, Mag. Ges. Berl., 1811, p. 14;
Rogas thoracicus, Nees, Mon., i., 204; Wesm.,
 Nouv. Mém. Ac. Brux., 1835, p. 172, ♂; *M. tho-*
racicus, Hal., Ent. Mag., iii., 138; Ratz., Ichn. d.
 Forst., iii., 67, ♂ ♀.

Macrocentrus bicolor, Curt., Ent. Mag., i., 188, ♀.

Elongate, slender, black; thorax rufous, sometimes obscure above. Mouth and clypeus rufous. Maxillary palpi elongate, yellow. Head very transverse, 3 times broader than long. Antennæ ♂ ♀ much longer than the body, very slender, 49—54-jointed, fuscous, the 2 first joints testaceous. Prothorax black above; metathorax subrugulose, not shining, fuscous towards the base. Wings hyaline; stigma, costa, radix, and squamulæ yellow; nervures pale fuscous; pabrachial areolet much longer than the præbrachial, so that the podiscoidal becomes $\frac{1}{3}$ shorter than the prædiscoidal. Legs elongate, slender, flavo-testaceous. Abdomen linear, slender, pubescent, much longer than the head and thorax; segments 1—2, and base of 3, striated; 1st deeply canaliculated; 2d finely margined as far as the middle; 3d smooth at the apex; posterior segments of the ♀ compressed. Terebra longer than the body. ♂ similar; antennæ $2\frac{1}{2}$ times as long as the body. Length, 3—3½; wings, 6—7 lin.

Not very common; Nees v. Esenbeck captured a ♀ in Franconia, and Curtis another in England; Wesmæel possessed 4 males from Belgium, and I have a ♂ taken in Darenth Wood, and a ♀ from Pré Wood, St. Albans.

The species is recorded by Van Vollenhoven as a parasite of *Depressaria applana*, Fab., and *D. chærophylli*, Zell.; and, by Ratzeburg, of *D. nervosa*, Haw. Bred by Bignell out of *Noctua triangulum*, Hufn., and *Xylina ornithopus*, Rott. *Mesochorus fuscicornis*, Brischke, is its hyperparasite.

4. *Macrocentrus infirmus*, Nees.

Rogas infirmus, Nees, Mon., i., 203, ♀; Wesm., Nouv. Mém. Ac. Brux., 1835, p. 178, and 1838, p. 151; *M. infirmus*, Hal., Ent. Mag., iii., 139, ♂ ♀.

Black; palpi pale testaceous, the maxillary short, not longer than the head; mandibles testaceous. Head subdepressed; face short, very broad, transverse. Antennæ fuscous, with the base of the flagellum testaceous; shorter than in spp. 1—3; in the ♀ rather stout, shorter than the body, 30—33-jointed; in the ♂ 37-jointed, longer than the body. Mesothorax less gibbous than in the others, its sutures punctulate; metathorax not shining, granulated. Wings dull hyaline; stigma fuscous, pale at the base; nervures fuscous; radix and squamulæ dull stramineous; 2d abscissa of the radius as long as the 1st intercubital nervure. Legs shorter and stouter than in any other species; pale testaceous, femora and tibiæ generally infuscated towards the apex; hind coxæ sometimes fuscous at the base; femora subclavate. Abdomen linear, segments 1—2 and base of 3 very faintly and partially aciculated, hardly less shining than the rest; 1st segment oblong, not narrowed at the base, obsoletely canaliculated; tubercles obtuse; 2d margined laterally at the base; belly pale at the base. ♂ similar; antennæ longer, entirely black; palpi obscure; abdominal segments 1—3 almost smooth; 1st segment attenuated at the base; tubercles more acute; legs dull rufous, coxæ and femora at the apex more broadly infuscated. Sometimes the antennæ and legs are more slender, approaching the structure of the next species, but the wings remain distinct. Length, $1\frac{1}{2}$ — $2\frac{1}{4}$; wings, $2\frac{3}{4}$ —4 lin.

Common; a gregarious parasite. Bignell bred 2 females from *Eupæcilia curvistrigana*, Wilk.; and 172, all females, from a single caterpillar of *Hydræcia petasitis*, Doubled., on Sept. 9th; at the time when he communicated this fact to me all the parasites were not disclosed. I have frequently captured both sexes.

5. *Macrocentrus collaris*, Spin.

Bracon collaris, Spin., Ins. Lig., ii., 140; *Rogas collaris*, Nees, Mon., i., 204, ♀; Wesm., Nouv. Mém. Ac. Brux., 1835, p. 179; Ratz., Ichn. d. Forst., iii., 67, ♂ ♀; *M. collaris*, Hal., Ent. Mag., iii., 140, ♀.

Bracon ebeninus, Nees, Mon., i., 67, ♂.

Macrocentrus picipes, Hal., l. c., ♂.

More slender than *M. infirmus*, with longer legs and antennæ. ♀. Black; clypeus, palpi, mandibles, prothorax, mesonotum, and legs rufo-testaceous. ♂. Only the clypeus and mandibles rufo-testaceous; legs fuscous or blackish. Maxillary palpi short, not longer than the head. Antennæ ♀ as long as the body, 31-jointed; of the ♂ longer, 35-jointed. Metathorax punctulate. Wings hyaline; stigma fuscous with a pale spot, or flavo-testaceous with a fuscous spot; nervures, radix, and squamulæ fuscous; 2d abscissa of the radius much shorter than the 1st intercubital nervure. Legs elongate, slender; 2d joint of trochanters fuscous at the base in the ♀; femora not subclavate; hind tarsi much longer than those of *M. infirmus*. Abdominal segments 1—2 hardly rugulose; the rest quite smooth; 1st segment attenuated at the base; tubercles obtuse in the ♀, more salient in the ♂; 2d segment laterally margined at the base, sometimes piceous in the ♀.

Common; Wesmael captured 8 females and 6 males near Brussels on the flowers of the dwarf elder, *Sambucus ebulus*; it was a frequent species in Wiltshire, where I obtained a good series; found in Ireland on a sandy coast by Haliday. A parasite, according to Ratzeburg, of *Anobium pertinax*, L.

ii. ZELE, Curt.

Zele, Curt., B. E., 415 (1832); Hal., Ent. Mag. iii., 140.

Phylax, Wesm., Nouv. Mém. Ac. Brux., 1835, p. 159.

Head twice as broad as long; vertex convex, but not ridged transversely. Radial nervure of the hind wings sinuated; radial areolet sometimes geminated by a transverse nervure. Spurs of hind tibiæ as long as half the metatarsus, or longer. Second abdominal segment not canaliculated on each side.

Head as broad as the thorax; occiput margined, slightly concave; ocelli protuberant, contiguous; eyes large; face subquadrate, flattened; clypeus semicircular, discrete, with a fovea on each

side of the base; mandibles acutely bidentate; maxillary palpi elongate, 3d joint dilated on the inner side, 4th longest; 2d joint of the labial palpi strongly dilated, obliquely truncated. Antennæ setaceous, longer than the body, about 50-jointed. Mesothoracic lobes not gibbous; sutures distinct. Metathorax short, subtruncate posteriorly. Wings ample; stigma lanceolate; radial areolet oblong, lanceolate; radius subsinuated, reaching the apex of the wing; 1st cubital areolet receiving the recurrent nervure beyond the middle; 2d smaller, oblong, its lower interior angle produced, acute; podiscoidal areolet closed. Legs elongate, the hind pair scarcely stouter; spurs elongate. Abdomen longer than the thorax, subsessile, subclavate, falcate, compressed posteriorly in the ♀, and truncated at the extremity, with 8 segments visible; 1st linear, forming $\frac{1}{3}$ of the entire length of the abdomen, widened close to the base, where the tubercles are situated; the following segments shorter; 2d not margined laterally; posterior segments transverse; anal forceps of the ♂ subexserted, compressed, obtuse; terebra short, compressed, recurved.

The insects are solitary parasites of Lepidoptera. They are among the largest of European Braconids, and much resemble the *Panisci* among the Ichneumons, as well as some of the larger *Meteori*. This is owing to their testaceous colour; one, however, of our species is almost black. The likeness to *Meteorus* is enhanced by the similar neurulation; even the radial areolet of the hind wings is similarly coarctate, and in two species divided by an accessory nervure. The structure of the abdomen offers the readiest means of distinction; in *Meteorus* there is a real petiole, and the spiracles of the 1st segment are removed further from the base; in *Zele* the 1st segment, however slender, is not petiolated but subsessile, and the spiracles are quite close to the base.

TABLE OF SPECIES.

- | | | | | | |
|-----|----|--|---------|----|-------------------------------|
| (2) | 1. | Radial areolet of the hind wings not geminated by a transverse nervure | .. | 1. | <i>testaceator</i> , Curt. |
| (1) | 2. | Radial areolet of the hind wings geminated. | | | |
| (4) | 3. | Colour rufo-testaceous | | 2. | <i>chlorophthalma</i> , Nees. |
| (3) | 4. | Colour black | | 3. | <i>discolor</i> , Wesm. |

1. *Zele testaceator*, Curt.

Zele testaceator, Curt., B. E., 415; Hal., Ent. Mag., iii., 141, ♂ ♀.

Rogas annulicornis, Nees, Mon., i., 201, ♂; *Phylax annulicornis*, Wesm., Nouv. Mém. Ac. Brux., 1835, p. 160, and 1837, pl. f. N, 2 (spur of tibia).

Rufo-testaceous; tarsi whitish; 2d and following abdominal segments of the ♂ sometimes infuscated above. Palpi pale; mandibles dark at the tips; stemmaticum blackish; eyes green. Antennæ ♀ fuscescent towards the apex. Above the radix of the wings is a black dot. Metathorax obsoletely punctulate, indistinctly areated. Wings dull hyaline, with an indistinct transparent streak beneath the stigma, passing through the 2d cubital areolet; nervures fuscous; costa in the ♀ testaceous; stigma, radix, and squamulæ yellowish; radial areolet of the hind wings contiguous, coarctate owing to a sinus of the cubital nervure, but not geminated. Abdomen obsoletely punctulate at the base; 1st segment smooth anteriorly, longitudinally elevated in the middle. Terebra as long as the 1st abdominal segment. ♂. Antennæ stouter, more broadly fuscous, $\frac{1}{3}$ longer than the body, the articulations annulated with fuscous; abdomen often fuscous above. Length, 4—5; wings, 9—10½ lin.

Moderately common with us; more abundant, and widely distributed, on the Continent; numerous Belgian examples are in Wesmael's collection. Bred by Fransen at Rotterdam out of *Leucania obsoleta*, Hüb.

2. *Zele chlorophthalma*, Nees.

Rogas chlorophthalmus, Nees, Mon., i., 202 (excluding the synonym); *Z. chlorophthalmus*, Hal., Ent. Mag., iii., 142; *Phylax chlorophthalmus*, Wesm., Nouv. Mém. Ac. Brux., 1835, p. 162, ♂ ♀.

Rufo-testaceous; tarsi concolorous, as well as the abdomen of the ♂. Very like the preceding, but more slender; wings more ample, stigma and radial areolet broader; radial areolet of hind wings petiolated, coarctate, and geminated by a transverse nervure; legs more slender; abdomen shorter, clavate, less compressed. Terebra shorter, not surpassing the apex of the abdomen. Length, 3—3¾; wings, 7¼—9 lin.

This species and the next constitute Förster's genus *Homolobus*, having the radial areolet of the hind wings

divided, but not otherwise distinct. *Z. chlorophthalma* was supposed by Nees v. Esenbeck to be the *Bracon chlorophthalmus*, Spin.; but this cannot be proved, and the description applies equally to *Meteorus chrysophthalmus*, Nees.

Rare; taken near Turin, Vienna, and Friburg; Wesmael had a pair found near Brussels and Liége; Hali-day's specimen was from Scotland, and I beat one out of a nut-tree near Abergavenny.

3. *Zele discolor*, Wesm.

Phylax discolor, Wesm., Nouv. Mém. Ac. Brux., 1835, p. 162, ♀.

Similar in structure to the two preceding; black, or nigropiceous; mouth and legs testaceous; hind tibiæ fuscous, except at the base. Mandibles dull testaceous; palpi whitish. Antennæ much longer than the body. Pectus and pleuræ usually rufous posteriorly; metathorax sometimes rufous at the sides. Wings ample, dull hyaline; stigma and nervures fuscous, radix and squamulæ testaceous; radial areolet of the hind wings petiolated, coarctate, and geminated by a transverse nervure. Four anterior legs pale flavo-testaceous; hind legs somewhat darker, their tibiæ and tarsi blackish, the former pale at the base. Terebra shorter than the truncated extremity of the abdomen. Male unknown. Length, 3—3½; wings, 7—8 lin.

Rare; Wesmael first captured 3 specimens in June, near Brussels; Capron discovered the species to be British, by taking it at Shiere; Bignell has since bred several at Plymouth from *Cabera pusaria*, L., one of which he communicated to me, and I have since taken a specimen on the wing, in Wiltshire. It has also been bred by Fransen at Rotterdam from *Eugonia alniaria*, L. The cocoon is elongate, oval, white, and thin, with a medial zone of denser texture forming a whiter band.

XXII. DIOSPILIDES.

Occiput margined; head transverse; vertex not excavated; middle ocellus not placed in a fovea. Fore wings with 3 cubital areolets; radial areolet elongate, metacarpus longer than the stigma; axillary areolet with an incomplete transverse nervure. Hind femora simple. Abdomen sessile or subsessile, ovate or oblong, not longer than the thorax, or very little longer. Terebra elongate.

Maxillary palpi 5—6-, labial 3—4-jointed; mandibles bidentate; clypeus in front rounded, sinuated or acuminate. Mesothoracic sutures distinct. Metathorax sometimes areated. Second cubital areolet rhomboid, trapeziform, or triangular; recurrent nervure variously inserted; prædiscoidal areolet sometimes petiolated. Abdominal sutures indistinct, the 2d obsolete.

The genera *Aspidogonus*, Wesm., and *Microtypus*, Ratz., must be regarded for the present as belonging to this subfamily; they are exceptional in several respects; the former from the clavate antennæ of the ♂, the latter from the triangular 2d cubital areolet; but neither of them is yet known as British. Förster has also placed here his genus *Laccophrys*, otherwise *Cenocælius*, already discussed among the *Helcontides*. *Anostenus*, Först., differs from *Diospilus*, Hal., too slightly to be here adopted. My new genus *Dolops*, with 2 species, cannot enter into any other subfamily. Haliday's *Dyscoletes*, with the recurrent nervure everted, must also be provisionally included in the group.

The species are black, rarely piceous, of small or moderate size, and parasites of Coleoptera; only a few of the genus *Diospilus* have been reared in England; but a fine pair of *Aspidogonus diversicornis*, Wesm., lately sent to me from France, were bred from *Melandrya caraboides*, L.

TABLE OF GENERA.

- | | | | |
|-----|----|--|------------------|
| (2) | 1. | Prædiscoidal areolet touching the parastigma, not petiolated; head subcubic | i. DIOSPILUS. |
| (1) | 2. | Prædiscoidal areolet remote from the parastigma, petiolated; head contracted behind the eyes. | |
| (4) | 3. | Metathorax completely areated; 1st abdominal segment striated; pabrachial areolet of hind wings divided by a transverse nervure; their radial areolet contiguous | ii. DOLOPS. |
| (3) | 4. | Metathorax not areated (or very obsoletely); 1st abdominal segment smooth; pabrachial areolet of hind wings not divided; their radial areolet petiolated | iii. DYSCOLETES. |

i. DIOSPILUS, Hal.

Diospilus, Hal., Ent. Mag., i., 262, and iii., 133; Reinh., Berl. ent. Zeit., 1862, p. 329.

Taphæus, Wesm., Nouv. Mém. Ac. Brux., 1835, p. 189; Ratz., Ichn. d. Forst., ii., 56, and iii., 60 (fig.).

Maxillary palpi 6-, labial 3-jointed. Clypeus truncated or rounded in front, with 2 deep basal foveæ. Metathorax not areated. Second cubital areolet rhomboid or trapeziform; recurrent nervure much rejected; prædiscoidal areolet not petiolated; 1st abscissa of the radius very short; radial areolet lanceolate, ending before the apex of the wing. Legs short. Abdomen short, sessile, rounded at the sides. Terebra elongate.

Form short, stout, with large head and small abdomen; body black, shining; the deep impressions at the base of the clypeus, and the rhomboid or subquadrate form of the 2d cubital areolet, are marks which distinguish this genus among the *Polymorphi*; one species, *D. speculator*, Hal., is aberrant, having the 2d cubital areolet contracted on its upper side. To the genus *Diospilus* belong several Bracons of Nees v. Esenbeck (Sectio IV., Tribus i., Macrocephali, Mon., i., 60—67), viz., *melanoscelus*, *dispar*, *filator*, *capito*, and *ephippium*. Of the others there described, *nobilis* is a *Doryctes*; *analis* a *Cenocælius*; *flavicornis* an *Aspidogonus*; *ebeninus* a *Macrocentrus*; *dissimilis* and *gagates* remain still unknown. *Eubadizon trigonus*, Nees, is a *Microtypus*. This disposes of the list of difficulties given by Haliday in his description of *Diospilus* (Ent. Mag., iii., 134); he was acquainted with 3 species, but considered one of them, *capito*, Nees, a variety of the common *oleraceus*; Wesmael published 5 species, and Reinhard, in his paper on *Diospilus*, in the Berl. ent. Zeit., 1862, has raised the number to 11. Five British species will be noticed here, of which one is new; they are not easy to identify.

TABLE OF SPECIES.

- | | |
|---|-----------------------------|
| (4) 1. Palpi testaceous. | |
| (3) 2. Second cubital areolet subquadrate | 1. <i>oleraceus</i> , Hal. |
| (2) 3. Second cubital areolet much narrowed anteriorly | 5. <i>speculator</i> , Hal. |
| (1) 4. Palpi blackish. | |
| (8) 5. Radius ending nearer to the tip of the wing than to the stigma. | |
| (7) 6. Metathorax smooth; terebra longer than the abdomen | 2. <i>capito</i> , Nees. |
| (6) 7. Metathorax rugulose; terebra not longer than the abdomen | 3. <i>ovatus</i> , n. s. |
| (5) 8. Radius ending nearer to the stigma than to the tip of the wing | 4. <i>morosus</i> , Reinh. |

1. *Diospilus oleraceus*, Hal.

Diospilus oleraceus, Hal., Ent. Mag., iii., 134 (not the varieties); Reinh., Berl. ent. Zeit., 1862, p. 331, ♂ ♀, pl. i., f. 8 (wing).

Taphæus conformis, Wesm., Nouv. Mém. Ac. Brux., 1835, p. 191, ♂ ♀.

Black, shining; palpi pale; mandibles rufous. Face broad; 2 deep impressions above the clypeus, which is convex between them. Antennæ testaceous beneath at the base; those of the ♀ 24—25-jointed, filiform, hardly longer than the head and thorax; of the ♂ 26—29-jointed, subsetaceous, as long as the body. Mesothoracic sutures impunctate. Metathorax rugulose, with 2 smooth basal areæ. Wings broad, hyaline; squamulæ testaceous; stigma black, large, triangular; nervures fuscous, paler towards the base; 2d cubital areolet longer than broad, its angles right angles; prædiscoidal areolet touching the parastigma; cubital nervure of the hind wings straight. Legs testaceous; hind coxæ and tips of hind tibiæ often more or less blackish. Abdomen ovate, depressed, shorter and narrower than the thorax; 1st segment rugulose, rather longer than broad, narrowed at the base, striated in the middle; the other segments smooth; sutures subobsolete; lateral margins reflexed, embracing the ventral surface. Terebra as long as the body without the head. ♂ ♀. Length, $1\frac{1}{4}$ — $1\frac{1}{2}$; wings, $2\frac{2}{3}$ — $3\frac{1}{4}$ lin.

Var. ♀. Antennæ 23-jointed; length, 1 line.

Common in gardens; taken by Haliday on *Brassica rapa* and *Sinapis nigra*. Bred by Giraud out of galls on the roots of *Lepidium draba* formed by *Ceuthorrhynchus rapæ*, Gyl.; by Reinhard from similar galls of *C. assimilis*, Payk., on *Sinapis arvensis*; by Billups from the earthy cocoons of *C. sulcicollis*, Gyl., found at the roots of *Brassica oleracea*.

2. *Diospilus capito*, Nees.

Bracon capito, Nees, Mon., i., 64, ♀; *D. capito*, Reinh., Berl. ent. Zeit., 1862, p. 332, ♂ ♀.

Diospilus oleraceus, var. β , Hal., Ent. Mag., iii., 135.

Taphæus fuscipes, Wesm., Nouv. Mém. Ac. Brux., 1835, p. 192; Ratz., Ichn. d. Forst., iii., 60, fig.

Smaller than the preceding; palpi blackish. Antennæ 21—23-jointed; 2d joint often testaceous or piceous; 3d testaceous at the

base. Metathorax shining, smooth, or hardly rugulose, indistinctly areated. Wings as in *oleraceus*. Base and upper edge of femora, and tibiæ at the apex, fuscous; sometimes the legs are almost entirely black. First abdominal segment smooth in the middle, rimulose at the sides. Terebra as long as abdomen and metathorax. Otherwise like *oleraceus*. ♂ ♀. Length, $\frac{3}{4}$ —1; wings, 2—2 $\frac{1}{4}$ lin.

Obtained plentifully by Brischke on the wood of an old bathing-machine, and supposed to be a parasite of *Anobium* (Ratz., l. c.). I have taken it in Leicestershire and Yorkshire, and not uncommonly on *Umbelliferae* near Teignmouth; Billups has also found it at Peckham.

3. *Diospilus ovatus*, n. s.

Niger palpis concoloribus. Facies punctulata nitida; clypeus convexus; mandibulæ basi rufæ. Utriusque sexus antennæ 23-articulatæ, articulo 3tio basi anguste testaceo. Metathorax rugulosus, obsolete areatus. Areola radialis stigmatæ paulo longior et latior, inter stigma alæque apicem in medio desinens; radius curvatus; areola cubitalis 2da lateribus parallelis. Pedes testacei femorum latere externo tibiæque posticarum apice fuscis, tarsis fusciscentibus. Feminae abdomen rotundatum, maris ovatum, breve; segmentum 1um postice latiusculum, feminae transversum, maris latitudine apicali non longius; medio et apice lævigatum, lateribus rimulosus. Terebra abdomine non longior.

Black, with black palpi. Face punctulate, shining; clypeus convex; mandibles rufous at the base. Antennæ ♂ ♀ 23-jointed, 3d joint narrowly testaceous at the base. Metathorax rugulose, obsolete areated. Radial areolet rather longer and broader than the stigma, ending half-way between the stigma and the apex of the wing; radius curved; sides of the 2d cubital areolet parallel. Legs testaceous, outer edge of the femora and apex of the hind tibiæ fuscous; tarsi fusciscent. Abdomen ♀ rounded, ♂ ovate, short; 1st segment much widened behind, transverse in the ♀, in the ♂ not longer than its apical width; smooth in the middle and at the apex, rimulose at the sides. Terebra not longer than the abdomen. Length, 1 $\frac{1}{4}$; wings, 2 $\frac{2}{3}$ lin.

The ♀ differs from the two preceding and from *morosus* in the shortness of the terebra; the ♂ is distinct from *oleraceus* by the colour of the palpi and legs, the shorter, narrower radial areolet, and the number of joints of the antennæ; from *capito* by the radial areolet and the

greater size; from *morosus* by the greater size and 23-jointed antennæ. *D. robustus* and *inflexus*, described by Reinhard, have the terebra not longer than the abdomen, but in both of them the cubitus of the hind wings is angulated near the base, which is not the case with the present species.

Described from a ♂ and ♀ taken by Billups at Peckham, in September.

4. *Diospilus morosus*, Reinh.

Reinh., Berl. ent. Zeit., 1862, p. 332, ♂ ♀.

Black, with black palpi. Face punctulate, almost dull; clypeus rounded. Antennæ ♂ ♀ 21-jointed; 3d joint narrowly testaceous at the base. Distinguished from *oleraceus* and *capito* by the radial areolet, which is shorter and narrower, not longer or broader than the stigma, and ending a little nearer to the stigma than to the apex of the wing; 2d cubital areolet shorter, its inner angle somewhat produced, and hence the sides are not quite parallel. Fore femora at the apex, and tibiæ, rather pitchy-testaceous; tarsi and apex of hind tibiæ fuscous. Otherwise like *capito*. ♂ ♀. Length, 1; wings, $2\frac{1}{4}$ lin.

Billups has found this species at Peckham, and I have taken it at Niton in the Isle of Wight.

5. *Diospilus speculator*, Hal.

Diospilus speculator, Hal., Ent. Mag., iii., 135, ♀;

Reinh., Berl. ent. Zeit., 1862, p. 333, ♂ ♀.

Taphæus irregularis, Wesm., Nouv. Mém. Ac. Brux., 1835, p. 193, ♂ ♀.

Form more slender. Black; prothorax rarely, and abdominal segments 2—3 frequently, piceous or testaceous; mouth, clypeus, and base of antennæ broadly, testaceous. Face punctulate. Antennæ filiform, 27-jointed, those of the ♀ as long as the body, of the ♂ much longer. Metathorax finely rugulose, reticulated. Wings narrower than in other species, fumato-hyaline; stigma and nervures fuscous; radix and squamulæ rufous; 2d cubital areolet contracted above, forming a truncated triangle; radial areolet much longer than the stigma; radius straight. Legs testaceous; hind pair more obscure, generally with a fuscous spot or line on the upper edge of their femora near the apex; all the tarsi tipped with fuscous. Abdomen obovate, lanceolate, hardly longer than the thorax; 1st segment reticulato-rugulose, bicarinated at the

base, the apical angles smooth, depressed. Terebra as long as the body without the head. ♂ ♀. Length, $1\frac{3}{4}$; wings, $3\frac{1}{2}$ lin.

This species serves as a connecting-link between *Diospilus* and *Aspidogonus*; it forms the genus *Anostenus*, Först., characterised by the shape of the 2d cubital areolet.

Common in many places, especially in a wood near my house at Nunton, Wilts; taken once by Haliday in Ireland; also noticed in Belgium and Germany.

ii. DOLOPS, n. g.

Palpi maxillares 6-, labiales 4-articulati. Clypeus brevis, transversus, antice elevatus, bisinuatus, foveis 2 ordinariis prope basin distinctis. Metathorax regulariter areatus. Areola cubitalis 2da magna, trapeziformis; nervus recurrens interstitialis; areola prædiscoidalis petiolata; radii abscissa 1ma elongata, 2dæ fere æqualis; areola radialis lata, cultriformis, alæ apicem attingens. Pedes crassi, longiusculi. Abdomen oblongum, ovatum, sessile, lateribus rotundatis, reflexis. Terebra elongata.

Maxillary palpi 6-, labial 4-jointed. Clypeus short, transverse, bisinuated on the front edge, and elevated; with 2 basal foveæ. Metathorax regularly areated. Second cubital areolet large, trapeziform; recurrent nervure interstitial; prædiscoidal areolet petiolated; 1st abscissa of the radius almost as long as the 2d; radial areolet broad, cultrate, reaching the apex of the wing. Legs stout, of moderate length. Abdomen oblong-ovate, sessile, rounded at the sides. Terebra elongate.

Head somewhat transverse, not wider than the thorax, produced behind the eyes; occiput concave, margined. Mandibles retracted, a space being left between them and the clypeus, which is raised on the front edge, as in the case of certain *Opiides*. Front slightly excavated. Prothorax produced. Mesothoracic sutures distinct. Mesopleuræ smooth, shining, with a crenate fovea. Outer side of the 2d cubital areolet decolorous; pabrachial areolet longer than the præbrachial; anal nervure not interstitial. Radial areolet of the hind wings contiguous; pabrachial areolet bisected by a transverse nervure; pabrachial nervure obsolete. Abdomen elongate-ovate, not longer than the thorax; 1st segment broad, a little longer than its apical width, bicarinated, striolated; the other segments smooth and shining; segments 2—3 forming together half the length of the abdomen; suturiform articulation obsolete; apical segments very short. Terebra as long as the body, or longer. Sexes similar.

These insects differ from *Aspidogonus* in their neuration, and in the structure of the clypeus; I know nothing else with which they can be compared. *Bracon dissimilis*, Nees (Mon., i., 65) and *B. gagates*, Nees (Mon., i., 67) seem to be congeneric, but hardly identical with the species here described. Their habits are not known.

Antennæ ♀ 37-, ♂ 40-jointed; terebra as long as the body; hind legs not much longer than the middle pair 1. *hastifer*, n. s.

Antennæ ♀ 27—33-, ♂ 38-jointed; terebra longer than the body; hind legs elongate, much exceeding the middle pair 2. *aculeator*, n. s.

1. *Dolops hastifer*, n. s.

Niger, nitidus, ventre antice piceo, pedibus cum coxis rufis, tarsis obscurioribus; palpis rufis, maxillarium articulo 1mo fusco; antennarum scapo subtus et ore rufis; mandibulis apice nigris. Caput thoracis fere latitudine; vertex transversus; frons levissime excavata; occiput concavum, marginatum. ♀. Antennæ filiformes, corpore longiores, 37-articulatæ. Prothorax humilis, transverse striatus. Mesothorax antice fere in perpendiculum truncatus, lobi medii angulis porrectis, suturis crenulatis in spatium cancellatum ante scutellum conniventibus. Metathorax brevis, subrugulosus, postice subito declivis, carinis 4 longitudinalibus duabusque transversis in areas 7 partitus; area media cancellata. Alæ subfumato-hyalinæ, longius ciliatæ, squamulis rufis, stigmate, nervis, fuscis, areolæ cubitalis 2dæ latere externo decolori. Pedes cum coxis omnibus rufi, tarsis obscurioribus. Abdominis segmentum 1mum latitudine sua apicali vix longius, marginatum, bicarinatum, medio reticulato-rugulosum, utrinque fortius striatum, tuberculis parum conspicuis; segmenta cætera lævissima. Valvula ventralis anum non excedens. Terebra corpore non brevior. ♂. Paulo minor, antennis longioribus, 40-articulatis, segmento 1mo angustiore.

Black, shining, belly piceous at the base; mouth and under side of the scape rufous; mandibles black at the tips; 1st of joint of maxillary palpi fuscous, the rest rufous. Head almost as broad as the thorax; vertex transverse, front slightly excavated; occiput concave, margined. ♀. Antennæ filiform, longer than the body, 37-jointed. Prothorax situated low down, transversely and irregularly striated. Mesothorax elevated, almost vertical in front, angles of the middle lobe prominent; sutures crenulate, converging into a cancellated space before the scutellum; ante-scutellar fovea cancellated. Metathorax short, abruptly sloping

behind, subrugulose; 2 longitudinal carinæ spring from the middle of the base, and diverge to the declivity, from whence they are nearly parallel to the apex, the enclosed space is cancellated; 2 lateral carinæ, connected with the preceding by transverse branches, form a system of areation as complete as in most Ichneumons: hinder angles of the metathorax obtusely prominent. Wings subfumato-hyaline, ciliated; squamulæ rufous; stigma and nervures fuscous; outer side of the 2d cubital areolet decolorous. Legs rufous, including all the coxæ; tarsi somewhat obscure. First abdominal segment hardly longer than its apical breadth, margined, bicarinated, rugulose in the middle, more deeply striated at the sides, the extreme base smooth, excavated; posterior angles depressed; in the middle of the hind margin is a smooth tubercle, with a deep triangular fovea on each side, including the suture, and therefore common to segments 1—2; 2nd and following segments very smooth; 2—3 connate, and together much longer than 1; 4 short; 5—6 annuliform. Ventral valve not surpassing the anus. Terebra as long as the body. ♂ somewhat smaller; antennæ longer, 40-jointed; 1st segment narrower. ♂ ♀. Length, 2—2½; wings, 4—4¼ lin.

My specimen was taken in Leicestershire; Bignell found one in S. Devon, and several more, including the ♂, have been collected by Capron near Guildford.

2. *Dolops aculeator*, n. s.

Præcedenti proxime affinis, minor, gracilior. ♀. Ater, nitidissimus, ventre maximam partem pallide piceo, pedibus cum coxis rufis, coxis posticis nonnunquam basi fuscis; etiam femoribus 4 posterioribus supra vel apice, tibiisque posticis apice cum tarsis fuscescentibus. Antennæ feminae 27—33-articulatæ. Metathorax ut in præcedente, sed lævior, carinis mediis propius distantibus, area inclusa angustiore, profundius cancellata. Alæ præcedentis. Abdominis segmentum 1mum apicis latitudine nonnihil longius, utrinque marginatum, bicarinatum, ubique concinne striatum, tuberculis prominulis; cætera lævia, nitidissima. Terebra corpore paulo longior. ♂. Antennæ 38-articulatæ; tibiæ posticæ præter basin fuscescentes.

More slender, and smaller than the last species, with longer hind legs and terebra. ♀. Deep black, very shining, belly almost entirely pale piceous; legs rufous, together with the coxæ; hind coxæ sometimes fuscous at the base; 4 posterior femora more or less fuscescent above or at the apex; hind tibiæ at the apex, and tarsi, fuscescent. Antennæ ♀ 27—33-jointed. Wings and meta-

thorax as in the preceding, but the latter is smoother, its medial carinæ more approximated, including a narrower space more deeply cancellated. First segment rather longer than its apical breadth, margined, bicarinated, regularly striated; tubercles somewhat prominent; the other segments smooth, very shining. Terebra somewhat longer than the body. ♂. Antennæ 38-jointed; hind tibiæ fuscous, except at the base. ♂ ♀. Length, $1\frac{1}{4}$ — $1\frac{3}{4}$; wings, $2\frac{1}{2}$ — $3\frac{2}{3}$ lin.

Bracon gagates, Nees, must be very near the ♂ of this species; it seems to differ only in having black legs. One ♀ taken among nettles on a treeless down at the top of the cliffs near Teignmouth; and a pair at Cornworthy, S. Devon, the ♀ of which is of much smaller size.

iii. DYSCOLETES, Hal.

Dyscolus, Hal., Ent. Mag., iv., 39; S. v. Voll., Schets., II. Braconiden, tab. vi. (wings).

Dyscoletes, Hal., in Westw. Int., ii., Gen. Syn., 62.

Elongate, slender. Maxillary palpi 6-, labial 4-jointed. Clypeus straight on the front edge, above which is a semicircular elevation, projecting over the anterior margin. Metathorax not areated. Second cubital areolet narrow, trapeziform, very obliquely placed, the inner lower angle strongly produced; recurrent nervure evected; prædiscoidal areolet petiolated; 1st abscissa of the radius almost as long as the 2d; radial areolet narrow, cultrate, not quite reaching the apex of the wing. Legs elongate, slender. Abdomen linear, lanceolate, subsessile. Terebra elongate.

Head transverse, wider than the thorax, abruptly rounded behind the eyes. Occiput concave, margined. Clypeus touching the mandibles, and closing the mouth. Antennæ placed on a protuberance of the front; behind each is a shallow depression. Prothorax produced. Mesothoracic sutures visible. Mesopleuræ smooth, shining, with a crenate fovea. Second cubital areolet narrow, oblique, its inner angle much produced; the 1st intercubital nervure if completed would be 3 times as long as the 2d, but both are incomplete; pobrachial areolet longer than the præbrachial. Radial areolet of the hind wings petiolated; pobrachial areolet not divided. Abdomen as long as the thorax; 1st segment twice as long as its apical breadth, bicanaliculated, smooth, with a medial longitudinal ridge; suturiform articulation obsolete; segments 2—3 nearly reaching the apex of the abdomen; the following segments very short.

1. *Dyscoletes lancifer*, Hal., undescribed.

Piceus, palpis et thoracis disco saturatioribus; capite, antennis, abdominis dimidio apicali, terebræque valvis nigricantibus. Antennæ ♀ 28-articulatæ, corpore longiores, apicem versus subincrassatæ; flagelli articulus basalis sequentibus duobus simul sumptis longitudine æqualis. Prothorax rugulosus. Mesothorax punctis magnis distantibus impressus; punctorum intervalla subtilissime exarata. Metathorax subtilius at confertius punctulatus, elongatus, deplanatus; in uno tantum specimine, eoque minimo, arearum vestigia ægre discernenda. Alæ subfumato-hyalinæ, angustæ, elongatæ; stigma piceo-testaceum fusco circumditum; nervi pallidi, fusci. Pedes cum coxis piceo-testacei. Abdomen totum læve, nitidum. Terebra quam corpus quadrante longior. Mas latet.

Piceous; palpi and disk of thorax darker; head, antennæ, apical half of abdomen, and valves of terebra, blackish. Antennæ ♀ 28-jointed, longer than the body, somewhat incrassated towards the extremity; 1st joint of flagellum nearly as long as the two following together. Prothorax rugulose. Mesothorax beset with large distant punctures, between which are a few minute longitudinal scratches. Metathorax elongate, deplanate, punctulate, more thickly than the mesothorax, but with smaller punctures; the smallest specimen has some traces of areæ on the metathorax; not so the others. Wings subfumato-hyaline, narrow, elongate; stigma pitchy testaceous, with a fuscous circumscription; nervures pale fuscous. Legs, including the coxæ, pitchy testaceous. Abdomen wholly smooth and shining. Terebra $\frac{1}{4}$ longer than the body. Male unknown. Length, $1\frac{3}{4}$ —2; wings, 3— $3\frac{1}{2}$ lin.

This insect has remained unknown since the time of Haliday, who published no description of it, but made a sketch of the wings, reproduced in Van Vollenhoven's 'Schetsen.' From this source Dr. Capron and I succeeded in identifying four females in his collection taken at Shiere, near Guildford. I have since seen two more, taken near Brussels, among the unexamined specimens of Wesmael's collection.



Marshall, T. A. 1889. "VI. A Monograph of British Braconidae. Part III."
Transactions of the Entomological Society of London 37, 149–210.
<https://doi.org/10.1111/j.1365-2311.1889.tb02319.x>.

View This Item Online: <https://www.biodiversitylibrary.org/item/50992>

DOI: <https://doi.org/10.1111/j.1365-2311.1889.tb02319.x>

Permalink: <https://www.biodiversitylibrary.org/partpdf/4372>

Holding Institution

Smithsonian Libraries and Archives

Sponsored by

Smithsonian

Copyright & Reuse

Copyright Status: Public domain. The BHL considers that this work is no longer under copyright protection.

This document was created from content at the **Biodiversity Heritage Library**, the world's largest open access digital library for biodiversity literature and archives. Visit BHL at <https://www.biodiversitylibrary.org>.