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[SEVENTH SERIES.]

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XIX.—*A Synopsis of the Suborders and Families of Teleostean Fishes.* By G. A. BOULENGER, F.R.S.

FOR several years I have been endeavouring to improve the classification of Teleostean Fishes, chiefly through a study of their skeletons, of which a large series has been prepared in the British Museum; and Dr. A. Smith Woodward has recently published his views on the arrangement of the fossil types of this order. The time has come to gather together the information thus obtained. The synopsis here offered was prepared two years ago for the fish-volume of the 'Cambridge Natural History,' but owing to circumstances over which I have had no control its publication in that work is still further delayed. Several important changes to my original scheme have been made during this lapse of time, owing to the work carried on in America by Drs. Gill, Jordan, and Starks, and in this country by my young colleague Mr. C. Tate Regan, whose criticisms on many points I gratefully acknowledge.

I need hardly say that I regard this new arrangement of an enormous and most difficult group, including close upon 12,000 species, as merely provisional, and I am fully aware that not a few groupings are nothing but card castles, which future investigations are likely to upset. But my aim has been to build up on phylogenetic lines, and as such I sincerely trust my attempt will be found a considerable improvement on the previous systems and serve as a basis for criticism.

XXIII.—*Descriptions of new Species of Aculeate and Parasitic Hymenoptera from Northern India.* By P. CAMERON.

Apidæ.

Nomia pilosella, sp. n.

Black; the head, thorax, base of abdomen, and legs densely covered with longish white pubescence; the second, third, fourth, and fifth segments with emerald-coloured smooth bands; postscutellum with two stout longish black spines; metanotal area stoutly closely striated. Wings hyaline, the apex infuscated; tegulæ black, pale round the outer border. Face and clypeus not very strongly keeled down the middle. Hind femora roundly dilated above, the basal slope longer and not so long as the apical; the hind tibiæ become gradually wider towards the apex and rounded on the outer side; on the inner side the basal two thirds is straight, only slightly roundly dilated; the apex is broadly bluntly roundly dilated, somewhat as in *N. Westwoodi*, but the femora are much thicker, more dilated in the centre above, the basal and apical slopes are straight, oblique, whereas in *Westwoodi* the femora above have a gradually rounded curve from the base to the apex; in the present species they are shaped more as in *N. Elliotii* as figured by Smith (Trans. Ent. Soc. 1875, pl. i. fig. 7), but not by Bingham ('Fauna of Brit. India,' i. p. 449). The pubescence on the present species is much longer and denser than in *Elliotii*, which has the base of the metanotum "finely punctured," and there is a green band on the first abdominal segment; the present species has no band on it and the base of the metanotum is stoutly reticulated; also it is much more densely pilose.

Hab. Khasia Hills. Coll. Rothney.

Habropoda fulvipes, sp. n.

Black; the basal two segments of the abdomen rufo-fulvous, the lower inner orbits, a dagger-shaped mark (the "handle" above) on the centre of the face and clypeus, apex of clypeus, labrum, and basal half of mandibles pale yellow; the hair on the front of the head darker, behind paler coloured than it is on the thorax; antennæ dark brownish; legs

fulvous, with paler hair. Wings hyaline, slightly tinged with fulvous; the nervures and stigma black. ♀.

Length 14 mm.

Hab. Khasia Hills. Coll. Rothney.

Clypeus punctured; in its centre a stout keel which reaches near to the apex; the face tuberculate in the middle, its apex and that of the labrum margined; on the centre of the face at the apex is a broadly triangular yellow-fulvous mark; on either side of the top of the labrum is a brownish mark, with two projections, the inner of which is raised. There is a dark brownish plate on the outer side of the base of the hind tibiæ, which is longer than broad, shield-shaped, roundly narrowed towards the apex, and with the outer edges raised. Basal four abdominal segments fringed with pale fulvous hair, the apical with longer black hair all over; the pygidium bare, with the sides broadly depressed on the apical half. Vertex smooth and shining, the front punctured, with a narrow keel down the centre.

What I suppose is the male has the head black, except the clypeus, which is pale yellowish testaceous; the lower part of the front and the sides of the clypeus thickly covered with depressed fulvous pubescence, as is also the greater part of the thorax; the abdomen above is black except the base and apices of the basal two segments broadly, and the ventral surface, which are honey-coloured; the legs are similarly coloured, except that the coxæ, trochanters, femora, and hind tibiæ are black above; the hind femora become gradually roundly dilated from the base to the apex; the hind tibiæ curved, not swollen. Clypeus margined laterally, not very convex, its apex transverse, margined narrowly on the inner edge. Antennæ entirely black. The wings are more clear hyaline than in the female, and the nervures and stigma are lighter coloured.

Compared with Bingham's figure of *H. Magrettii* the male of the present species has the thorax only very slightly haired and the hind femora are not at all so strongly dilated; its abdomen, too, is longer and narrower. It (the male) appears to be much more slenderly built than any species of *Habropoda* I have seen, is much less hairy, and has a much longer malar space, the eyes being widely distant from the base of the mandibles. The third joint of the antennæ is swollen, not narrowed at the base, and is hardly so long as the fourth, whereas in what I take to be the male of *H. Radoszkowskii* it is clearly longer and distinctly narrowed at the base. In neither the female nor the male of my species is the second recurrent nervure interstitial. The Indian species

of *Habropoda* can hardly be looked upon as typical of the genus. Possibly my male represents a distinct species. It certainly appears to be too slender for the female, comparing it with the males of other species of the genus and their females.

Caelioxys cariniscutis, sp. n.

This species is very similar to *C. khasiana*, with which it agrees in size, form, and coloration, including the fulvous pubescence on the underside of the tarsi, but it differs in the clypeus being keeled down the centre, in the sides of the scutellum being deeply furrowed, with the outer edge raised; the lateral teeth are stouter, depressed in the centre, become narrowed gradually to the apex, which is rounded and not depressed; the pronotum at the base projects into a large plate, which becomes gradually narrowed outwardly, forming a triangle of which the upper side is longer than the lower. There are eight teeth on the apical segment, two basal and six apical; the upper central pair are the shorter; the space behind them is depressed, the base of the depression with an oblique slope and shallower than it is at the apex; the apical lower pair of teeth are much longer and stouter than the others; the apices of the third, fourth, and fifth segments are less closely punctured than the rest; there is an oblique furrow on the sides of the second near the base and an oblique depression on the sides of the fifth near the base; the ocellar region has some smooth spaces at the sides and behind the ocelli; the lateral teeth of the scutellum are not bent downwards as in *khasiana* and *basalis*; the wings are fuscous violaceous to the transverse basal nervure. ♂.

Length 11–12 mm.

Hab. Khasia Hills. Coll. Rothney.

Caelioxys khasiana, sp. n.

Black; clypeus, face, lower part of the vertex broadly on the sides, pleuræ, metanotum, and the apices of the abdominal segments narrowly covered with white pubescence, the rest of the head and thorax with short white pubescence; wings bright dark fuscous violaceous, highly iridescent, the nervures and stigma black. ♀.

Length 11–12 mm.

Hab. Khasia Hills. Coll. Rothney.

Vertex covered with large, deep, round punctures, which are much more widely separated at the sides of the ocelli; the raised central part of the front more coarsely punctured,

almost reticulated; its sides more closely and less coarsely punctured; face and clypeus closely irregularly punctured; the hair fringing the apex of the clypeus has a fulvous tinge. Mandibles to near the apex coarsely punctured, the punctures longish. Pro- and mesothorax closely covered with large deep punctures, which are small on the base of the mesonotum. Apex of scutellum broadly rounded; the lateral teeth large, almost smooth, curved down slightly at the apex. Median segment and apex of mesopleuræ smooth. Abdomen sparsely but distinctly punctured; the apex of the last segment closely rugosely punctured, the centre raised, smooth, the sides obliquely depressed; the apex becomes gradually narrowed to a point; the apical ventral segment becomes gradually narrowed and projects largely beyond the upper. Legs covered with white pubescence; the tarsi below with longish stiff fulvous hair.

Comes near to *C. basalis*, Sm.

Nomia Rothneyi, sp. n.

Black; an interrupted band of white pubescence on the apex of the first abdominal segment; a broad smooth white band on the apices of the second, third, and fourth segments; flagellum of antennæ brownish beneath; wings hyaline, the stigma testaceous, the nervures darker coloured. ♀.

Length 7 mm.

Hab. Mussoorie (*Rothney*).

Face broadly roundly raised in the middle; clypeus opaque, with clearly separated scattered punctures, its apex transverse; front and vertex closely punctured; an impressed line on the centre of the upper three fourths of the front; the sides of face, of the front, and the outer orbits thickly covered with white pubescence. Thorax closely punctured; the sides and apex of the mesonotum and the postscutellum thickly covered with grey pubescence. Basal area of metanotum large, clearly defined, strongly transversely striated; the striæ distinctly separated; the narrowed basal inner edges obliquely striated. Pleuræ, sternum, and legs densely covered with long cinereous pubescence. Abdomen smooth and shining; there is a transverse, curved, impressed line behind the white band on the third and fourth segments; the apical two segments are brown.

This species cannot well be confounded with any of the described white-banded species of *Paranomia*.

Nomia interrupta, sp. n.

Black ; a narrow line of pale green on either side of the apex of the second abdominal segment, the tibiæ rufous ; the pleuræ densely covered with long fulvous pubescence, the mesonotum more sparsely with shorter black, the cheeks with pale fulvous, the face and clypeus with fulvous pubescence. Flagellum of antennæ for the greater part rufotestaceous. Wings hyaline, slightly tinged with fulvous. Face and clypeus stoutly keeled down the centre. ♀.

Length 13 mm.

Hab. Khasia Hills. Coll. Rothney.

Face distinctly projecting in the middle, the projection with an oblique slope, almost smooth ; the clypeus distinctly sparsely punctured ; the central keel on the two is continuous. Clypeus roundly convex, its apex broadly roundly. Front and vertex sparsely indistinctly punctured. Mesonotum closely and distinctly punctured, the scutellum as closely but not so strongly. Basal area of metanotum closely, strongly, irregularly transversely striated. Tegulæ rufotestaceous. Back of abdomen minutely punctured, except at the apex of the segments ; the scopa bright rufous. Hair on legs long, fulvous, glistening on the tibiæ and tarsi.

A distinct species, easily known by the single, interrupted, smooth, greenish band on the second abdominal segment, strongly keeled face and clypeus, and the four rufous front tibiæ.

Nomia tuberculata, sp. n.

Black ; the pubescence on the head, thorax, and underside of the abdomen pale fulvous ; the base of the first abdominal segment thickly covered with fulvous pubescence, the rest of the pubescence on the back short, sparse ; the apices of the basal three segments broadly smooth and shining. Face roundly dilated in the centre, almost smooth ; the clypeus broadly depressed in the middle, the sides roundly dilated, smooth and shining, bearing some large punctures ; the top in the centre keeled, the apex is transverse, clearly separated. Wings hyaline, the apex with a fuscous cloud ; stigma and nervures testaceous. ♀.

Length 13 mm.

Hab. Khasia Hills. Coll. Rothney.

Face, front, and vertex sparsely punctured, the face in the centre smooth. Postscutellum thickly covered with fulvous pubescence. Median segment smooth and shining, its basal

area not defined, its sides with a few keels. Tegulae testaceous. The hair on the legs is long, dense, and fulvous, the spurs dark rufous.

Characteristic of this species is the fact that the raised centre of the face and the sides of the clypeus form three large tubercles. In Bingham's arrangement ('Fauna of Brit. India,' Hym. i. p. 459) it comes near *N. terminata*, Sm.

Megachile khasiana, sp. n.

The pubescence on the head, thorax, and base of abdomen dense, fulvous, on the rest of the back of abdomen and on the apex of ventral surface black; on the base the ventral scopa black; legs covered with cinereous pubescence; the pubescence on the underside of the base of four front tarsi rufous, on the hinder black; wings fuscous violaceous, the base more hyaline, paler. ♀.

Length 13 mm.

Hab. Khasia Hills. Coll. Rothney.

Face and clypeus strongly but not closely punctured, the pubescence on them paler and sparser than on the front. Mandibles widely furrowed along the outer edge; the apical part bordered by a narrow curved furrow, the central with some irregular furrows, of which the apical is the wider and deeper; the apical tooth is long and stout, rounded at the apex, the second is broader and shorter and becomes gradually narrowed to the apex, which is rounded; the rest is broadly bluntly rounded and toothless. Abdomen opaque, closely punctured; the basal three segments have transverse furrows near the middle, the apex of the third is more widely depressed. Calcaria testaceous; metatarsus nearly as wide as the tibiae; apex of clypeus transverse.

Of the Indian species this comes nearest to *M. umbripennis*, Sm., recorded by Smith from Borneo and Nepaul and by Bingham from Sikhim and Tenasserim. The number of mandibular teeth is not given by Bingham, but Smith states (Cat. Hym. Brit. Mus. i. p. 175) that they have four stout teeth, so his species is readily separated from *M. khasiana*.

FOSSORES.

Trypoxylon placidum, sp. n.

Black; the antennal scape, face, and clypeus thickly covered with silvery pubescence, the pleurae, sternum, and median segment with longish white hair, the pro- and

mesonotum thickly with long fuscous hair, the legs sparsely with white pubescence. Wings hyaline, the apex smoky, nervures and stigma black. Apical joint of antennæ thickened, nearly twice the length of the preceding two joints united. Front alutaceous, indistinctly furrowed in the centre; vertex opaque, finely, not very distinctly punctured. Clypeus not carinate in the middle, its apex broadly rounded, raised, smooth. Palpi pallid testaceous, black at the base. The apex of metanotum has an oblique slope; the basal furrow extends from the base to the apex, becomes gradually wider, is shallow and finely transversely striated; the furrow on apical slope wide, deep on the basal half, V-shaped; the apical third of the segment is somewhat coarsely transversely striated. Abdominal petiole narrow, with only the apex dilated; it is as long as the succeeding three segments united, its apex distinctly clavate. ♀ ♂.

Length 13 mm.

Hab. Khasia Hills. Coll. Rothney.

Trypoxylon fulvocollare, sp. n.

Black; the basal five or six joints of the antennæ fulvous, the scape thickly covered with white hair, the flagellum with shorter blackish pubescence; clypeus and mandibles rufous, palpi pale testaceous; the apex of pronotum and tubercles fulvous; the base and sides of the first abdominal segment and the base of the second and third segments broadly rufo-testaceous. Apex of fore coxæ, trochanters, femora, tibiæ, and tarsi fulvous, the femora of a deeper hue, the apex of the middle femora, the middle tibiæ and base of tarsi, and the base of the hinder tibiæ pale testaceous. Wings hyaline, with a slight fulvous tinge, the costa and stigma fulvous, the latter lighter in tint; the radius and cubitus testaceous. Face, eye-incision, outer orbits and the base, sides and apex of mesonotum thickly covered with golden pubescence; the scutellum with short fuscous, the postscutellum with longer fulvous hair; the pleuræ and sternum with short pale fulvous pubescence. Front and vertex sparsely punctured, the former above with a wide and shallow furrow; the lower half triangularly keeled. On the apex of the basal half of the median segment is an elongated fovea; the apical half deeply furrowed in the middle. The apical third of the petiole dilated.

Comes nearest to *T. coloratum*, Sm.; that species has only a small tubercle above the base of the antennæ, while in the present species there is not a tubercle, but a long stout

keel. There is no lateral furrow on the base of the median segment. ♀.

Length 17-18 mm.

Hab. Khasia Hills. Coll. Rothney.

Trypoxylon khasia, sp. n.

One of the larger species. In size comes near to *T. coloratum*, which differs in having the pubescence golden. In Bingham's table ('Fauna of Brit. India,' Hym. i. p. 224) it comes into B, except as regards the size and b^3 . "Abdomen red, basal segment only black."

Black; apex of clypeus testaceous; mandibles yellow, their teeth black; palpi yellow; scape and base of flagellum of antennæ pale yellow, the rest black, brownish beneath; the base and sides of mesonotum with a distinct fulvous-yellow band; tubercles yellow, except at the base, and fringed with silvery hair; abdomen rufo-testaceous, the petiole black, except at the apex, the black there being triangularly incised in the middle. Four front legs yellowish, the femora of a more testaceous hue, the base of all the coxæ black; the hind femora black, running into testaceous towards the middle; the hinder tibiæ yellowish beneath, flavo-testaceous above, blackish towards the apex, the tarsi blackish, the apices of all the joints testaceous. Wings hyaline, the stigma testaceous. The clypeus, orbits, and eye-incision densely covered with silvery pubescence; the front obscurely punctured; a narrow furrow runs from the ocelli. Thorax densely pilose, the pile fuscous on the mesonotum, longer and more silvery on the sides; the sides and apex of median segment thickly covered with pale hair; at its base in the middle is an elongated somewhat pear-shaped depression; the apex is deeply and widely furrowed and densely covered with long white hair. The greater part of the pleuræ covered with silvery pubescence.

Length 20 mm.

Hab. Khasia Hills. Coll. Rothney.

Trypoxylon orientale, sp. n.

Antennæ black, distinctly thickened towards the apex, the scape thickly covered with long white hair; flagellum bare. Face, lower part of eye-incision, and clypeus thickly covered with silvery pubescence; front and vertex opaque, covered with long fuscous hair. Palpi pale testaceous. Thorax thickly covered with pale hair. Median segment short, its apex with an oblique slope; on the base is a striated depres-

sion, which becomes gradually wider towards the apex and is moderately deep; there is a smooth, narrower, oblique furrow on the sides. Legs black, pilose, the hair on the femora longer. Wings clear hyaline, the sides of the dilated apex of the petiole and the base and sides of the second segment rufous; the petiole long and slender, as long as the following three segments united. ♀.

Length 22 mm.

Hab. Khasia Hills. Coll. Rothney.

Psen rufo-balteata, sp. n.

Black; the apex of the second abdominal segment and the whole of the third rufous; the fifth and following joints of the antennæ testaceous beneath. Legs thickly covered with white hair; the spurs pale rufous. Wings clear hyaline; the first cubital cellule in front is half the length of the second, the first recurrent nervure is received very near the first transverse cubital, the second at twice the distance from the second transverse cubital. ♀.

Length 5 mm.

Hab. Khasia Hills. Coll. Rothney.

Antennæ stout, thickened towards the apex; the scape beneath sparsely covered with long black hair. Face and clypeus thickly covered with silvery pubescence; the front and vertex almost bare, sparsely punctured; the eyes almost parallel; the ocelli in pits; the front with a shallow central furrow; antennal tubercle large, the apex triangular, its sides distinctly margined, the middle depressed; below this is a larger broader one, roundly incised at the apex, the sides rounded. Pro- and mesothorax shining, sparsely covered with white hair; the mesonotum distinctly but not closely punctured; the scutellums with a few fine punctures. Area on the base of metanotum narrow, elongate, and marked with stout striæ; the central furrow is wide and deep, becoming slightly wider towards the apex, and marked with a few stout striæ; on either side of it at the apex is a large leaf-like expansion, its apex transverse, on the outer side covered with long hair; at its base is a small rounded projection. Pro- and mesopleuræ finely and sparsely punctured; below the mesopleural tubercles is a wide, deep, slightly oblique furrow, marked with some transverse keels; there is a smooth furrow near the base of the metapleuræ; the apex of the latter is rugose and is marked with some transverse keels.

Comes near to *P. rufiventris*, but is quite distinct therefrom.

Ichneumonidæ.

Suvalta annulipes, sp. n.

Agrees with *S. levifrons* in having the front and vertex smooth, but is smaller, has two yellow marks on the mesonotum, the scutellum yellow from base to apex, not yellow on the basal half only; the mark on the mesopleuræ is smaller, and there is none on the metapleuræ; the black on hind femora broader, reaching to the middle; the hind coxæ are yellow at the base, not broadly in the middle, and the hind trochanters yellow, not black.

The ninth to twenty-second joints of antennæ yellowish white below; the flagellum thickly covered with black short hair; scape shining, sparsely pilose. Face, clypeus (except at apex), labrum, mandibles, palpi, apical two thirds of scutellum, a large somewhat triangular mark on the sides of the first abdominal segment at the apex, the other segments broadly at the sides, and the apical almost entirely, yellow. Four front legs fulvous, yellow at the base, the end joint of tarsi black; hind coxæ black, with a large yellow band on the base above; the trochanters and basal half of femora fulvous, the apical half of femora and of the tibiæ black, the basal half of the tibiæ and of the tarsi yellowish. ♀.

Length 12 mm.

Hab. Khasia Hills. Coll. Rothney.

Face strongly punctured above, in the middle transversely striated; apex of clypeus smooth, the base punctured; mandibles punctured at the base. Front and vertex smooth and shining, sparsely covered with long black hair; the space between the hind ocelli with large deep punctures. Mesonotum rugosely punctured, reticulated in parts. Scutellum covered with long fuscous hair, its yellow mark is rounded before and behind, its sides coarsely punctured, the depressions stoutly striated behind. In the centre of the metanotum at the base is an area wider than long and having inside a few stout oblique keels; the rest of the basal region reticulated, the reticulations wider on the inner side; the rest is strongly closely reticulated; the teeth large, broad, rounded at the top, looked at from behind. Propleuræ sharply margined at the base above, above strongly punctured; the rest stoutly striated. Mesopleuræ stoutly longitudinally striated, except in the middle behind; immediately under the tubercles the striæ are vertical or oblique; near the base under the tubercles is a keel. Metapleuræ coarsely rugosely punctured, the punctures running into reticulations.

Areolet almost square, the recurrent nervure received near the apical third. Abdomen short; petiole shining, strongly punctured; between the apex and the middle are scattered punctures; the second and third segments are closely punctured, the others smooth; gastrocœli smooth, hardly depressed in the middle.

Suvalta pallidinerva, sp. n.

Agrees closely in coloration with *S. annulipes*, but may be known from it by the longer, more slender petiole, which is not so much dilated at the apex nor so strongly punctured; the head is wider compared with the mesothorax, and the pronotum is much more dilated at the base, it being there distinctly tuberculate.

Length to apex of petiole 7 mm.

Hab. Khasia Hills. Coll. Rotlney.

Black; clypeus (except at apex), palpi, the inner orbits to near the end of the vertex, the outer more broadly from near the top, edge of pronotum (broadly in front, more narrowly behind), scutellum broadly in the middle, a broad line on the sides of median segment from shortly above the spines, a large mark on the base of propleuræ (broad above, gradually narrowed towards the apex), the tubercles, a large mark on the lower side of the base of mesopleuræ (curved and narrowed above), the base and lower side straight, a mark under the hind wings, the greater part of the lateral scutellar keels, and the sides of the abdominal segments broadly, yellow. Four front legs fulvous, their coxæ and trochanters pallid yellow; the fore femora lined with black above; the hinder legs are of a deeper fulvous tint; the coxæ, trochanters, slightly more than the apical third of the femora, apical fourth of tibiæ, the spurs, and base of metatarsus black; the tarsi are of a more yellowish tint than the tibiæ. Wings hyaline, the nervures, stigma, and costa pale testaceous; the areolet is of equal width throughout, a little longer than broad, the recurrent nervure is received in its apical third.

Mesonotum rugosely punctured, the punctures running into striations in the middle. Scutellum covered with long fuscous hair, smooth; postscutellum very smooth and shining. The depression in the middle of median segment is smooth, at its sides it is finely punctured, the outer part coarsely punctured. The segment outside the keel is coarsely rugosely punctured; the teeth broadly rounded at the top, oblique at the sides; behind them are some curved keels. The upper-side of the pronotum is roundly incised in the centre, the

sides of the propleuræ above are strongly punctured, the middle strongly obliquely striated. Mesopleuræ longitudinally striated (except on the lower side at the base, which is punctured, and a small smooth space in the middle behind); the tubercles are punctured. Metapleuræ closely rugosely punctured, above more closely punctured. Mesosternum punctured, its furrow triangularly widened at the apex. Petiole shining; before its apex is a punctured band, surrounding a smooth space; the second and third segments are closely punctured; gastrocœli shallow, coarsely aciculated, the part behind them is raised on the outer side and is very smooth and shining.

The antennæ and the apical abdominal segments are broken off.

Algathia rufopetiolata, sp. n.

Black; the scape of antennæ rufous below, the base of flagellum brownish, joints 11-14 white below; a triangular yellowish mark in the centre of the face above; apex of mandibles testaceous; palpi pale yellow; scutellums, the sides of the apex of median segment, the apices of the second, third, fifth, and the whole of the apical abdominal segments pale yellow; the petiole rufous, its apex yellow. Legs red; the four front coxæ and trochanters pale yellow; the femora and tibiæ fulvous, the tibiæ paler, the fore tarsi fuscous except at the base, the middle blackish; the hinder coxæ, trochanters, and femora rufous; a large mark on the coxæ below at the apex, the apex of femora, and tibiæ (except a small dull rufous band at the base) black; the calcaria pale; tarsi black, with rufous spines. Wings hyaline, with a slight fuscous tinge, the nervures and stigma black; areolet narrowed in front; transverse median nervure received shortly in front of the transverse basal. ♂.

Length 8-9 mm.

Hab. Khasia Hills. Coll. Rothney.

Face sparsely punctured laterally, more thickly in the centre; clypeus punctured, more sparsely below; labrum fringed with long fulvous hair; the face thickly covered with fuscous pubescence. Front sparsely punctured, the inner orbits above sharply margined. Mesonotum closely punctured, the apex in the middle broadly longitudinally striated, almost reticulated; middle lobe raised at the base. Scutellum roundly raised, smooth, covered with long pale hair. Postscutellum bifoveate at the base. Metanotum at the base with large deep punctures; the areola longer than

broad, rounded at the base, gradually narrowed to the apex; the rounded basal part has a stout central keel and a less distinct one at the apex; the lateral areae stoutly obliquely striated; the posterior median strongly, closely, transversely striated, the sides more sparsely and strongly. Base of propleuræ aciculated, the upper half strongly punctured, the lower with some stout striations; meso- and metapleuræ closely and strongly punctured, the latter more strongly and rugosely above the keel. The postpetiole has a depression in the middle, which is wide at the apex, narrowed towards the base; the second and third segments closely punctured, the base of the second closely and strongly longitudinally striated, the striae going on to the gastrocœli, which are shallow, brownish, and aciculated at the apex.

Alyathia tibialis, sp. n.

Black; a mark in the middle of the face above and the base of the mandibles rufous; palpi lemon-yellow, the apical lateral areae of the mesonotum except at the base yellow; first abdominal segment blood-coloured, the sides in the middle blackish, the apex yellow, the apex of the second, the sides of the third broadly at the apex, and the sixth and seventh entirely, pale yellow; the basal three joints of the antennæ rufous beneath, the tenth to sixteenth white, fuscous above; four front legs rufo-fulvous, the coxæ and trochanters yellow; the middle tarsi fuscous; the hind legs rufous, the apex of the femora, tibiæ (except at the base), and the tarsi black. Wings hyaline, with a slight fulvous tinge, the stigma fuscous. ♀.

Length 8-9 mm.

Hab. Khasia Hills. Coll. Rothney.

Face closely punctured, thickly covered with fuscous hair, the clypeus more strongly and sparsely punctured, the front and vertex shining, sparsely punctured, the former indistinctly keeled. Mesonotum strongly punctured, longitudinally striated in the middle towards the apex. Scutellum shining, thickly covered with long fuscous hair. Areola obliquely narrowed towards the base and to a less extent towards the apex, which is transverse; its base has a central and a less distinct and more irregular longitudinal keel on the sides, the middle irregularly transversely striated; the posterior median area is (except at the base) transversely striated; the outer basal area coarsely punctured, smooth at the base; the apical stoutly transversely striated, more stoutly on the apical than on the basal half; spiracular

area finely rugose at the base, more coarsely transversely rugose before the spiracles, the middle with some stout curved keels, the apex much more closely but not quite so sharply obliquely striated. Mesopleuræ closely punctured, strongly irregularly striated under the tubercles; the metapleuræ uniformly, somewhat strongly punctured and deeply depressed at the base above. Postpetiole obscurely punctured laterally and furrowed in the middle. Scutellum thickly covered with long fuscous hair; postpetiole striated at the base.

Agrees closely in coloration with *A. rufopetiolata*, including the rufous petiole; may be known from it by the narrower areola, which receives the keel in the middle, while in *rufopetiolata* it is received clearly above the middle.

Algathia latibalteata, sp. n.

Agrees closely in coloration with *A. zonata*; may be known from it by the black hind coxæ, by the base of metanotum being rugosely punctured, by the areola being rounded at the base and stoutly transversely striated, &c.

Black; a small mark on the face below the antennæ (broad at base, gradually narrowed to the apex, as long as it is wide at the base), palpi, tegulæ, scutellums (except the scutellum at the base), the apex of the first abdominal segment, of the second and third more broadly, the apical two thirds of the penultimate, and the whole of the last, pale yellow. Mandibles black, the apical third rufous. Palpi pale yellow. Four front legs fulvous, the tarsi infuscated, the coxæ and trochanters pale yellow; the hind coxæ black, the top and more or less of the inner side rufous; basal joint of trochanters rufous, apical yellowish; the femora with the apex broadly black, the black more extended above; tibiæ and tarsi black, the former broadly rufous at the base; calcaria pale. Wings hyaline, with a fulvous tinge; nervures fuscous, darker at the base; areolet much narrowed in front; the second transverse cubital nervure faint.

Length 11 mm.

Hab. Khasia Hills. Coll. Rothney.

Scope of antennæ testaceous in the middle below; the flagellum at the base obscure brownish, thickly covered with black hair. Face and clypeus with widely separated punctures and covered with long fuscous hair. Front and vertex shining, sparsely haired and punctured; the front ocellus surrounded by a furrow. Mesonotum shining, punctured in the middle, at the base of the basal lobe almost striated.

The basal lateral area of metanotum strongly punctured and with a curved furrow on the inner side; areola twice longer than wide, bulging out obliquely in the middle and with the apex wider than the base and transverse; its basal half is furrowed deeply down the middle, the sides irregularly transversely striated; the base of the posterior median area with a stout longitudinal keel in the middle, the rest transversely irregularly striated, the striae weaker and closer towards the apex; the outer area strongly punctured, the punctures large and deep, the spiracular area irregularly reticulated at the base, the rest strongly transversely striated. Propleuræ above with large deep punctures, the depressed middle stoutly, obliquely, irregularly striated. Mesopleuræ strongly punctured, rugosely near the tubercles; the metapleuræ between the keels strongly and uniformly punctured. The first abdominal segment smooth, the sides of postpetiole depressed and punctured; the middle with a large deep depression; the second and third segments closely punctured, the base of the second closely longitudinally striated; the gastrocoeli shallow, closely striated (except at the apex); the apical segments thickly covered with white hair.

Algathia rufipes, sp. n.

Black; the tenth to fifteenth joints of antennæ white below; face, clypeus, inner orbits and the outer from near the top, mandibles at the base, palpi, edge of pronotum (except at the base) narrowly, an irregular squarish mark behind the middle of the mesonotum, scutellums, sides of metanotum broadly, the lower edge of propleuræ, tubercles, an irregular mark (narrowed in the middle) on the lower part of mesopleuræ, a short line below the hind wings, a small mark over the hind coxæ, the centre and apex of scutellum, the apices of the first, second, third, and fourth abdominal segments, of the sixth, and the whole of the apical segment, yellow. Legs rufous, the four front coxæ and trochanters yellow; the hind coxæ and base of trochanters black; the hind tarsi white, the basal and apical joints black. Wings hyaline, the stigma testaceous, the nervures blackish; areolet narrowed above, the nervures almost touching there; transverse median postfurcal. ♀.

Length 10, terebra 1 mm.

Hab. Khasia Hills. Coll. Rothney.

Face closely punctured and covered with silvery pubescence; there is an irregular diamond-shaped mark in its centre and a less distinct black line above the clypeal foveæ.

Clypeus punctured, but not strongly or closely, its apex slightly bent inwardly. Scutellum opaque, closely and uniformly punctured, more strongly than the mesonotum. Metanotum closely punctured (except in the centre at the base); areola longer than broad and of nearly equal width; the teeth broad, large, rounded, and narrowed at the apex. Propleuræ have a plumbeous hue and are irregularly striated at the apex; the meso- closely, the metapleuræ if anything still more closely, punctured, the punctuation running into striæ at the apex. The second to fifth abdominal segments are closely punctured; the gastrocœli striated at the base; the petiole is aciculated in the middle towards the apex.

Algathia erythropoda, sp. n.

Black; the face, clypeus in the centre above, the mark rounded at the apex, the basal half of the mandibles, palpi, the inner orbits, the line dilated in front of the ocelli, a line on the pronotum (broad at the base, gradually narrowed to the apex), basal half of tegulæ, tubercles, scutellum (except at the base), postscutellum, the fifth abdominal segment (narrowly in the middle), the apical two thirds of the sixth and seventh entirely, yellow. Scape of antennæ yellow below, thickly covered with white hair; the joints of flagellum dilated below (especially near the apex) and brownish. Legs rufous, the front coxæ and trochanters yellow, the middle coxæ yellow, broadly black at the base behind; the hinder black, with the apical half yellow above; the basal joint of the trochanters, apex of hinder tibiæ, and the hind tarsi black; the spurs pale fulvous. Wings not very clear hyaline, the stigma and nervures black; areolet narrowed in front, being there less in length than the space bounded by the recurrent and second transverse cubital nervures. ♂.

Length 11 mm.

Hab. Khasia Hills. Coll. Rothney.

Face coarsely punctured, thickly covered with short white hair; the clypeus less strongly punctured, almost smooth at the apex; the vertex strongly punctured, the front smooth. Mesonotum closely strongly punctured. Scutellum shining, covered with long fuscous hair. Areola broader than long, the sides at the base obliquely truncated, the apex slightly bent inwardly, the sides distinctly depressed, with two or three keels at the apex; the centre raised, rugosely punctured; the posterior median area widened at the base, closely, strongly, transversely striated; the lateral basal area coarsely aciculated on the inner side, the rest strongly irregularly

striated; the spiracular area behind strongly aciculated, the rest coarsely transversely striated; the other basal area strongly but not closely punctured; the apical area smooth at the base, the rest with stout, clearly separated, transverse keels. Upper part of propleuræ strongly punctured, the base aciculated, the middle below stoutly striated; mesopleuræ strongly punctured, the base above and the apex below striated; metapleuræ punctured strongly all over. Postpetiole strongly and closely punctured, raised in the middle and obliquely narrowed at the apex; the second and third abdominal segments closely punctured, the apical thickly covered with fulvous hair; the gastroceli large, the base on the inner side with a stout keel, the outer with two keels.

Comes near to *A. parvimaculata*; it is larger, wants the white bands on the postpetiole, the hinder trochanters are yellow, not black; the black mark on the face and clypeus is much smaller and the middle coxæ are yellow.

Algathia varipes, sp. n.

Black; the face, clypeus, labrum, the inner orbits from the middle of the ocelli to the white face, an oblique somewhat triangular mark near the eyes opposite the hinder ocelli, the lower three fourths of the outer orbits (the mark narrow above, broader below), palpi, mandibles (except their teeth), a line on the pronotum (curved at the base), scutellums, the posterior intermedian, the apex of spiracular end of the tooth-bearing area of median segment, a mark above the hind coxæ, the apices of the first and second abdominal segments broadly (the lines dilated in the middle), the sixth slightly in the middle, and the whole of the last segment pale yellow; the four front legs fulvous, the coxæ and trochanters pale yellow; the hinder coxæ black, broadly yellow in the middle above; the basal joint of the trochanters yellow, the apical joint and the base of femora rufous, the rest of the femora, almost the apical half of the tibiæ, and the base of metatarsus black; the rest of tarsi white, the hinder spurs dark rufous. Wings hyaline, the costa, stigma, and nervures black. ♂.

Length 9 mm.

Hab. Khasia Hills. Coll. Rothney.

Antennal scape beneath and the fourteenth to twenty-fifth joints white; scape thickly covered with long fuscous hair, the flagellum with short black pubescence. Face, clypeus, and vertex closely and strongly punctured, thickly covered with short fuscous hair. Mesonotum closely punctured,

opaque; scutellums shining, smooth, sparsely covered with short fuscous hair; the basal scutellar keel stout, sharp, white at the apex, and extending to the middle. Base of median segment depressed at the base, the furrow smooth, slightly curved, petiolar area open at the base, areola longer than broad, rounded at the base, rounded inwardly at the apex; posterior median area slightly widened at the base, almost smooth, only obscurely transversely striated; the supra-external area has some scattered punctures, the tooth-bearing coarsely punctured, the spiracular finely punctured at the base, the rest obliquely striated; the posterior intermedian coarsely obliquely striated; the teeth indistinct. Propleuræ punctured above, below smooth, the apex in the middle with some stout punctures; mesopleuræ closely punctured, the metapleuræ more strongly, with the punctures somewhat more widely separated.

Algathia Rothneyi, sp. n.

Agrees closely in coloration with *A. varipes*, except that it has a yellow mark on the mesopleura; otherwise differing in having the base of the metanotum opaque and aciculated, the keels bordering the petiolar area are longer, the areola is not smooth, the teeth are more distinct, the hinder femora have only the apical third black, and the scutellar keels reach to the apex.

Black; the head below the antennæ, mandibles (except the teeth), palpi, the inner orbits above, the line narrowed below, the apical three fourths of outer orbits, edge of pronotum (the basal half of the line dilated and acute at the base), the tubercles, a mark on the hinder edge of mesopleuræ (longer than wide and obliquely truncated at the apex), scutellums, the sides of the median segment (broadly at the apex), a narrow band on the first abdominal segment (roundly dilated in the middle), the apex of second broadly, and the apical two entirely, pale yellow. Four front legs rufous, their coxæ and trochanters pallid yellow; hinder legs of a deeper red; coxæ black, yellow above and within, the basal joint of trochanters yellow; the apical third of femora and of the tibiæ and the basal two thirds of metatarsus black; the rest of the tarsi pale yellow, except the apex of the last joint. Wings clear hyaline, the stigma testaceous, nervures fuscous. ♀.

Length 8 mm.

Hab. Khasia Hills. Coll. Rothney.

Scape below and joints 9-16 of antennæ white, the

flagellum at base and apex brownish beneath. Face closely, the clypeus more sparsely punctured; palpi pale yellow; labrum fringed with long fuscous hair. Vertex below the ocelli closely transversely punctured; front smooth and shining. Mesonotum closely punctured. Scutellum not distinctly depressed at base and apex, its keels sharp and extending to the base of the apical third and depressed on the inner side; scutellum bifoveate at the base. Basal area of metanotum large, aciculated, obliquely narrowed towards the apex; areola nearly as long as wide, the sides at the base obliquely narrowed, its apex slightly roundly turned inwardly; posterior median area smooth, of uniform width and rounded at the base; the other areas closely punctured, opaque; the spiracular and the tooth-bearing areas more strongly, irregularly, and not so closely striated. Propleuræ above closely punctured, the apex broadly, in the middle longitudinally striated; the base with a broad yellow band, broader than the upper one on the pronotum; mesopleuræ closely punctured, the middle-behind coarsely aciculated, the metapleuræ at the base aciculated, the rest closely obliquely aciculated. Gastrocœli shallow, striated; the base rufous, striated.

Alyathia robusta, sp. n.

Is very similar in form and coloration to *A. maculiceps*; may be known from it by the yellow scutellum, by the strongly striated front and vertex, by the areola being distinctly defined and the posterior median area not at all, and by the apex of the hind tibiæ and the metatarsus being black.

Black; face (except a small black mark above), clypeus, mandibles, palpi, the inner orbits to beyond the hinder ocelli, the lower outer orbits (narrowly above, broadly below), palpi, a narrow line on the pronotum (not reaching to the base), tegulæ, a line on the base of the propleuræ, the line dilated at the base, two short marks in the centre of the mesonotum, scutellums, two broad lines on the sides of median segment, the tubercles, lower part of mesopleuræ (the yellow dilated upwards at the base), the base of mesosternum, the apices of the first to fourth abdominal segments, and the apical entirely, yellow. Four front legs fulvous, tinged with yellow, the apices of the tarsi black; hinder coxæ and basal joint of trochanters, apex of femora, of the tibiæ and the metatarsus, black; on the apex of the hind coxæ behind is a large yellow mark, narrowed behind. Wings hyaline, the nervures and stigma pale testaceous; the

areolet slightly oblique, narrowed in front, the nervures almost uniting there. ♂.

Length 11 mm.

Hab. Khasia Hills. Coll. Rothney.

Face closely and strongly punctured, its middle above almost transversely striated; clypeus less strongly punctured, its apex smooth; it is thickly covered with short white, the labrum fringed with long fulvous, hair. Vertex near the eyes punctured, the centre with three keels, running from the hinder ocelli, which turn outwardly to the central furrow, the front finely transversely striated. Mesonotum closely and strongly punctured. Scutellum at base rugosely punctured, the rounded apex closely longitudinally striated; the keels large, black, and reaching to the apical third. Middle of metanotum at base with an oblique slope, the sides margined, very smooth and shining; areola somewhat wider than long, the base rounded, apex transverse, it is irregularly longitudinally rugose, the middle keeled; the lateral areæ rugose, in the centre almost reticulated; teeth large, wide. Propleuræ obscurely punctured above; the mesopleuræ strongly punctured, the middle slightly, the apex more strongly longitudinally striated; the metapleuræ with the spiracular area closely obliquely striated. Postpetiole closely, finely, irregularly striated, the other abdominal segments closely punctured; gastrocœli deep, finely striated at the base; apex aciculated.

Algathia flavo-balteata, sp. n.

Agrees in size and colour with *A. robusta*; may easily be separated from it by the form of the scutellum, which has a much sharper oblique slope, by the postscutellum being only obscurely, not strongly striated at the base, by the base of metanotum being aciculated, by the areola being longer compared with its breadth, by the black on the hind femora and tibiæ being less extended, by the hind coxæ being almost entirely yellow above, and by the less distinct curve on the apex of clypeus.

Joints 9-15 of antennæ below, the face and clypeus (except for a small oval mark below the antennæ), mandibles, palpi, inner eye-orbits, the outer from near the top more broadly, white. A narrow line on the pronotum, tegulæ, a large mark near the apex of mesonotum, scutellums, two broad curved lines on the sides of median segment at the apex, a broad line on the lower side of the propleuræ, a broader one (curved upwards at the base on the lower side of the mesopleuræ), a

narrower one on the hinder edge, a mark below the hind wings, the basal four abdominal segments at the apex, and the apical two entirely, whitish yellow. Four front legs fulvous; the coxæ and trochanters yellow; the hind coxæ black, the middle above broadly yellow, and there is an elongated mark on the side at the base; the hind femora and tibiæ rufous, as are also the trochanters; the hinder knees, apex of tibiæ, and metatarsus black, the rest of the tarsi white. Wings hyaline, with a slight fuscous tint; stigma testaceous. ♀.

Length 11 mm.

Hab. Khasia Hills. Coll. Rothney.

Face closely and strongly punctured; the clypeus sparsely punctured, its apex transverse; the black part of vertex strongly aciculated, the front strongly transversely striated and furrowed down the centre. Propleuræ with a plumbeous hue; the meso- closely, the metapleuræ if anything more strongly, punctured. Scutellum strongly but not closely punctured. Median segment closely punctured; the apex in the centre closely, at the sides much more strongly, transversely striated; the teeth large; areola longer than broad, rounded at the base, slightly narrowed at the apex, which is transverse. Postpetiole shagreened or finely striated in the middle; the gastrocæli large, wide, the base finely striated.

Algathia femorata, sp. n.

Black; a mark (elongated and rounded at the apex) in the centre of the face above, palpi, scutellum, the outer areæ on the apex of the median segment, the middle of the tubercles, the apex of the first and second abdominal segments, a large triangular mark on the sides of the third, the apex of the penultimate, and the whole of the last segment yellow. Scape of antennæ rufous beneath, the middle of flagellum broadly white. Four front legs fulvous, their coxæ and trochanters yellowish white; the middle tarsi and the hind legs black, except the trochanters, which are yellow, and the extreme apex of the femora, which is rufous; the calcaria white. Wings hyaline, the nervures and stigma black. ♀.

Length 10 mm.

Hab. Khasia Hills. Coll. Rothney.

Face strongly, clypeus sparsely punctured. Mesonotum closely and strongly punctured, thickly covered with short thick hair. Scutellum smooth, shining. Areola elongate, the base distinctly, the apex slightly narrowed; the lateral keels received in front of its middle; posterior median area

aciculated, shagreened towards the apex; the lateral areæ with some rough transverse keels, the spiracular closely punctured, the apex raised on the inner side, transversely striated; the outer two basal areæ are closely but not strongly punctured, the outer apical have three stout, curved, transverse keels on the apex. The apex of the median segment is thickly covered with long soft white hair. Propleuræ coarsely punctured more finely at the base, the middle below obscurely striated. Mesopleuræ coarsely punctured, below the tubercles obliquely striated; metapleuræ punctured like the mesopleuræ. First segment of abdomen smooth, the depressed sides of the apex punctured; the second and third segments closely punctured, the base of the second striated laterally; gastrocœli not depressed, rufous at the apex. The apical segments of the abdomen are thickly covered with soft white hair.

Algathia cariniscutis, sp. n.

Black; the scape of antennæ and joints 8-12 underneath, the face and clypeus (except for a line in the centre of the former, which gets gradually thicker until it reaches the clypeal foveæ, the clypeus being also black in the centre), and the labrum white; the inner orbits broadly to the end of the eyes, the outer more narrowly on the lower half, maxillary palpi, lower part of propleuræ, the edge of pronotum (except at the base), tegulæ, tubercles, scutellums, the apical half of median segment, a large oblique mark on the mesopleuræ above the coxæ, a smaller one behind the posterior coxæ, one under the hind wings, the apices of the first and second abdominal segments, a mark on either side of the third, and the apical two segments, yellow. Legs rufous, the four front coxæ and trochanters bright lemon-yellow, the apices of the tarsi fuscous; the hinder coxæ black, broadly yellow above and at the sides above on the inner side, their middle behind next to the black part rufous; the trochanters black, the basal joint for the greater part yellow above; the apex of the hind femora and the base of the tibiæ more narrowly black; the hinder tarsi paler, not so rufous in tint as the anterior, their apex black. Wings clear hyaline, the stigma and nervures black. ♀.

Length 8 mm.

Hab. Khasia Hills. Coll. Rothney.

Face and clypeus closely punctured, covered with short white down; the front and vertex almost impunctate. Mesonotum closely and uniformly punctured; scutellum smooth, covered with fuscous pubescence, its sides stoutly

keeled. Arcola slightly wider than long, rounded at the base, the apex bulging inwardly; the base of posterior median area smooth, the rest transversely striated; the outer apical arcæ are more strongly and widely striated. The upper half of propleuræ closely punctured, as are also the mesopleuræ; the metapleuræ are more closely and strongly punctured. First segment of abdomen aciculated, the post-petiole more strongly and raised in the middle; the second and third segments are closely punctured; the gastrocæli wide, striated, the oblique apex aciculated.

XXIV.—*Preliminary Note on certain Points in the Anatomy of Eryx and other Boidæ, partly indicative of their Basal Position among the Ophidia.* By FRANK E. BEDDARD, M.A., F.R.S.

IT is generally believed that the Boidæ occupy phylogenetically a place at or near the base of the Ophidian series; and this view is expressed by Boulenger in a tabular statement of the mutual affinities of the various families of the Order*. This opinion is largely based upon the persistence of considerable vestiges of the pelvic girdle and upon the paired lungs. In studying the anatomy of snakes I have been able to note a few other points to which little or, in some cases, no attention has been paid and which tend to the support of this conclusion. My observations bearing upon this subject were made upon *Python*, *Eryx*, and *Boa*.

The first point to which I would draw attention is the equal size of the right and left aortic arches, which join to form the dorsal aorta. In at least many other snakes (for example, *Zamenis flagelliformis*) the right aortic arch is so much the smaller that it appears almost as an inconspicuous branch of the left. It would appear, however, that in *Python bivittatus* this is not the case †, though Dr. Gadow's drawing ‡ of *Pelophilus madagascariensis* is in accordance with the facts which I have observed.

Secondly, the intercostal branches of the aorta are arranged in a fashion which appears to me to be distinctly archaic. In most snakes the intercostal arteries are very irregular in

* 'Catalogue of the Snakes in the British Museum (Natural History),' London, 1893, vol. i. p. 2.

† Bronn's 'Klassen und Ordnungen des Thierreichs,' Bd. vi. Abth. iii. pl. cxxxiv. fig. 2. This figure is copied from Fritsch.

‡ *Ibid.* pl. cxxv. fig. 1.