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Ex. 10000 no. 10

~~BEATT~~ HINCKSWOOD

of the male genital armature. With these adjustments the subfamilies recognised in this revision number eight, namely, Anataeliinae, Blandicinae, Diplatyinae, Echinomatinae, Esphalmeninae, Karschiellinae, Pygidicraninae, and Pyragrinae.

In speculating on phylogeny in the Dermaptera we are at a serious disadvantage because of the lack of fossil evidence. Such information as is available suggests that the ancestors of the present earwigs had 5-segmented tarsi, carinulate femora, segmentate cerci in both adult and nymph, and probably the anterior wings had venation. Four subfamilies of the Pygidicranidae have retained the carinulate femora, two of which have segmentate cerci in the nymphal stage, otherwise the ancestral characters have disappeared.

The eight modern subfamilies of the present family show such a diverse admixture of primitive and specialised characters that it is impossible to formulate any satisfactory classification. They are monophyletic in origin and can be derived from a hypothetical ancestral line but cannot be satisfactorily derived from each other. They represent, so to speak, the terminal twigs of an evolutionary tree, the branches of which have disappeared.

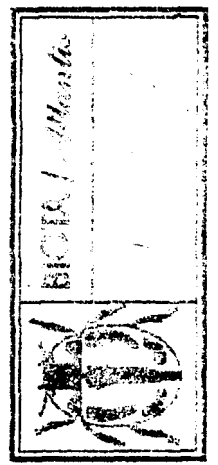
If we consider the Pygidicraninae as representing the main evolutionary line towards the Labiduridae the Diplatyinae must have branched off early, retaining the primitive segmentate cerci in the nymph, as well as carinulate femora and female gonapophyses, but developing specialisations in the form of the head and antennae, and in the genital armature. Only two Anataeliines are known so that little can be said about them except that they probably represent another, unsuccessful, branch from the same primitive line. The Blandicinae represent an African offshoot of the Pygidicranine line in which the femoral carinulae have become obsolete and the antennae have lost their more primitive form. The Karschiellinae are also African, and have retained the carinulate femora, gonapophyses, segmentate nymphal cerci, and primitive form of antennae but have developed specialisation of the head, perhaps in connection with carnivory, and have lost the function of one distal lobe, a development towards the Forficuloid line. In the New World the Pyragrinidae presumably developed from Pygidicranine stock by the loss of most of the primitive characters, including the gonapophyses, and in acquiring genitalic specialisation in the development of double virginal orifices. The Old World Echinomatinae have retained such primitive characters as simple forceps, primitive antennal form, and gonapophyses but have lost the femoral carinulae. Lastly the Esphalmeninae which occur in both Old and New Worlds have retained the simple form of head and gonapophyses, but have lost the segmentate cerci and femoral carinulae and have developed genitalic specialisation.

KEY TO SUBFAMILIES OF THE PYGIDICRANIDAE

- 1 (3) Femora compressed and longitudinally carinulate. *Pygidicraninae*, p. 21.
- 2 (5) Antennal segments 4 to 6 transverse or at least short.
- 3 (4) Antennae slenderer, segments 4 to 6 short but scarcely transverse. Medium to rather large insects; forceps rarely asymmetrical. Both distal lobes equally developed. Nymphal cerci not segmentate. Circumtropical.
- 4 (3) Antennae stout, segments 4 to 6 transverse. Large, powerfully built insects; forceps usually asymmetrical. One distal lobe aborted, vestigial. Nymphal cerci segmentate. African only. *Karschiellinae*, p. 100.

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- 5 (2) Antennal segments 4 to 6 longer, never transverse. Small to medium insects.
- 6 (7) Completely apterous; caudal margin of metasternum truncate; eyes small, similar in both sexes; virga simple; nymphal cerci not segmentate. Canaries, China and Korea. *Anataeliinae*, p. 17.
- 7 (6) Rarely completely apterous; caudal margin of metasternum concave; eyes usually large, especially in male; virga usually with two orifices; nymphal cerci segmentate. Circumtropical. *Diplatyinae*\*.
- 8 (1) Femora not or only indistinctly carinulate.
- 9 (10) Antennal segments 4 to 6 short, subquadrate. Stout, chaetulose insects with simple forceps. Distal portion of parameres simple, without teeth or processes (except at base); virga long, simple. Tropics of Old World. *Echinosomatinae*, p. 117.
- 10 (9) Antennal segments 4 to 6 longer, at least 5 and 6 clearly longer than broad.
- 11 (1+) Claws with a large arolium.
- 12 (13) Female gonapophyses present. Prosternum rounded in front. Virga simple. South Africa. *Blandicinae*, p. 176.
- 13 (12) Female gonapophyses absent. Prosternum acute in front. Virga with two orifices. Neotropical. *Pyragrinae*, p. 181.
- 14 (11) Claws without an arolium. Pronotum transverse or quadrate. Antennal segments 4 to 6 relatively short: 4th only slightly longer than broad. Male ultimate tergite often transverse. Gonapophyses present in female. Virga with two orifices. Neotropical region and South Africa. *Esphalmeninae*, p. 196.

#### Subfamily ANATAELIINAE

*Anataeliinae* Burr, 1909, *Dtsch. ent. Z.* 1909 321, 322; 1911, *Genera Insectorum* 122, 10, 11; rgrj. *J.R. micr. Soc.* 1915: 424, 425—Bey-Bienko, 1936, *Fn. U.R.S.S., Ins. Dermapteres*: 82, 216—Hincks, 1937, *Notes ent. Chinoise* 4: 52.

*Anataelidae* Brues, Melander & Carpenter, 1954, *Bull. Mus. Comp. Zool., Harvard* 108: 115.

Head elongate, its caudal margin concave; post-ocular carinae present; eyes small, scarcely as long as first antennal segment and clearly shorter than genae. Antennae 16-segmented, all segments, except 2nd and 4th long and slender. Pronotum elongate, about as wide as head; much narrower than meso- and metanotum. Abdomen slender, cylindrical or somewhat depressed. Forceps subcontiguous, at least at base. Pro- and metasternum truncate caudad. Manubrium of penultimate sternite short. Legs slender; femora distinctly compressed and longitudinally carinate; claws simple. Parameres of male armature slender, terminating in one or two inner mucronate processes; virga simple, with single orifices. Opisthomeres as Pygidicraninae. Female gonapophyses long, slender and setaceous. Nymphal cerci unisegmentate.

This interesting subfamily includes only two genera, each containing a single species. Its discontinuous distribution, in the Canaries, Korea and North East China, suggests that it is a relict, relatively primitive group, which is supported by several morphological characteristics such as the well developed female gonapophyses, elongate head and small eyes, and strongly carinate femora. The Blandicinae, from South Africa, presents some similarities to the Anataeliines but differs in the proportionately longer third antennal segment, almost obsolete femoral carinae and non-tuberculate ultimate tergite. It is perhaps most closely allied to the Pygidicraninae from which it differs notably in the form of the antennae.

\* See first part of this series (Hincks, 1955)

HINCKS, W.D. 1959  
Desgleichen II. Pygidiumida excluding Diplatyinae.  
Ibid 1-XI + 1-218

KEY TO GENERA OF ANATAELIINAE

- 1 (2) mesonotum ecanate; abdomen slightly depressed in both sexes; tubercles of ultimate tergite small and not obscuring caudal margin; arolium absent; virga convoluted; abdominal puncturation fine. Canary Islands.  
*Anataelia* Bolivar, p. 18.
- 2 (1) Mesonotum carinate; abdomen cylindrical; tubercles of ultimate tergite very large, obscuring caudal margin; arolium present; virga not convoluted; abdominal puncturation very coarse. Korea, N.E. China.  
*Challia* Burr, p. 20.

*Anataelia* Bolivar

*Anataelia* Bolivar, 1899, *Act. Soc. esp. Hist. nat.* 1899: 98 (type: *A. canariensis* Bolivar, 1899)—Burr, 1911, *Genera Insectorum* 122: 11—Hincks, 1937, *Notes ent. Chinoise* 4: 52.

*Head* with sutures moderately distinct; coronal suture long; post-ocular carinae weak; no evident frontal bristles present. *Pronotum* slightly widened caudad. Mesonotum ecarinate. *Abdomen* slightly depressed in both sexes. Ultimate tergite quadrate to transverse; caudal margin truncate mesad and strongly sinuate laterad in both sexes (figs. 11, 12); tubercles small and not obscuring caudal margin (figs. 11, 12). *Forceps* subcontiguous proximad in both sexes, straight in female (fig. 12) and in males of minor development (fig. 11), curved, with the inner margin cinate in well developed males (fig. 10). Pubescence of body moderate, decumbent; puncturation fine. Arolium absent. *Genitalia* with long convolute, simple virga; parameres terminating in two inner processes.

Restricted to the Canaries.

*Anataelia canariensis* Bolivar (figs. 10-13)

*Anataelia canariensis* Bolivar, 1899, *Act. Soc. esp. Hist. nat.* 1899: 98, figs. (♂). Canary Is.: Tenerife)—Burr, 1911, *Genera Insectorum* 122: 12, pl. 1, f. 11a, b, c; 1915, *J.R. micr. Soc.* 1915: 425, f. 57.

*Male*.—*Colour* fulvous; disc of head, anterior portion of prozona and metazona, sides and caudal margins of meso- and metanotum, proximal abdominal tergites vaguely, and the femora longitudinally, infuscated with fuscous. Foreparts of body dull; caudal abdominal segments and forceps moderately shining. *Head* deplanate above; genae long and slightly curved. *Pronotum* slightly shorter than head and shorter than the combined mesal length of meso- and metanotum. Latter broader than head or pronotum; sides more or less rounded; caudal margin of mesonotum almost truncate, of metanotum concave. *Abdomen* moderately strongly widened caudad in well developed males, less so in less developed individuals. Ultimate tergite deplanate, ecarinate laterad, with well marked median longitudinal sulcus, terminating in a low, rounded tumidity before caudal margin. *Forceps* dimorphic (figs. 10, 11). *Penultimate sternite* with caudal margin truncate mesad, oblique laterad. *Genitalia* (fig. 13). *Length* 15-16mm.

*Female* as male; abdomen slightly contracted caudad; ultimate tergite quadrate with three low tubercles mesad above caudal margin (fig. 12); forceps (fig. 12) slenderer than in males of minor development; penultimate sternite with distal portion subtriangular, rounded. *Length* 15-16mm.

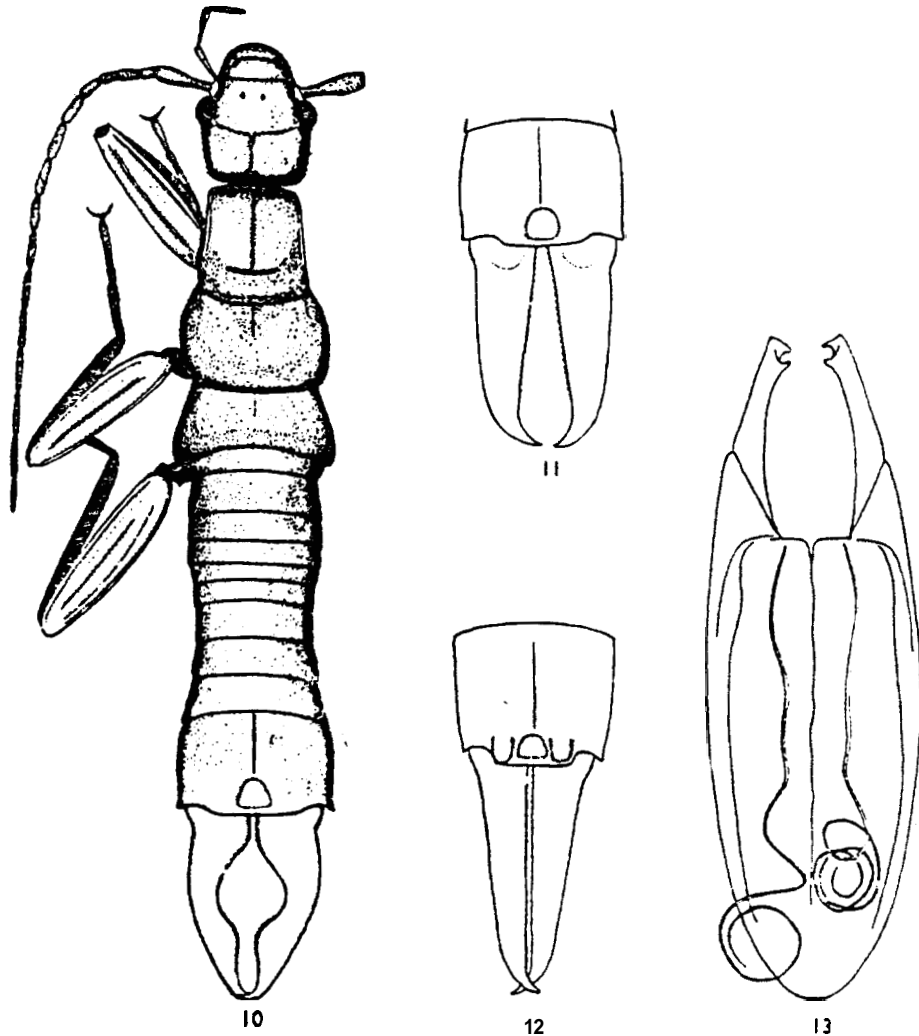
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Figs. 10-13.—*Anataelia canariensis* Bolivar; 10, male; 11, forceps of male of minor development; 12, forceps of female; 13, male genitalia.

*Nymphs* closely resemble the female. One specimen examined was 12 mm. in total length and had 15-segmented antennae; it is probably in the penultimate instar. Another, probably representing the preceding instar had 14-segmented antennae and a total length of 10 mm.

*Types* presumably in the Madrid Museum; supposed "cotypes" in the British Museum (N.H.).

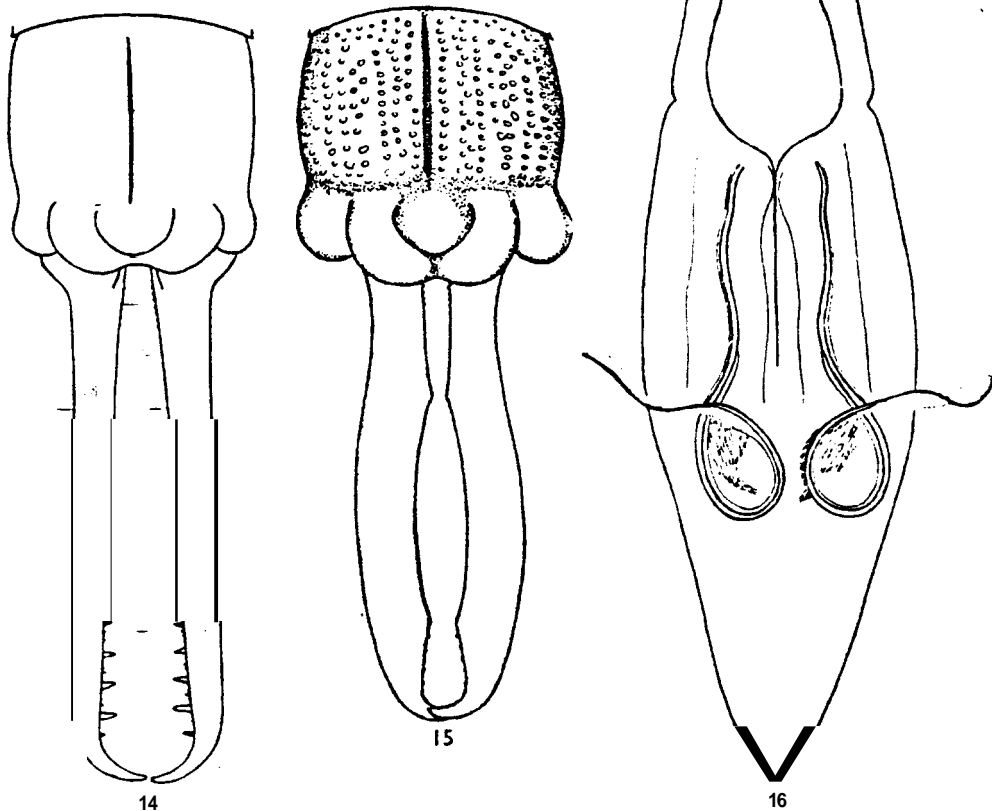
*Material examined*.—BRITISH MUSEUM (N.H.). CANARIES: Teneriffe, Bajamar, 20.9.1898, 2 ♂, 1 ♀ (*A. Cabrera*) (said to be cotypes); 10.9.1911, 2 ♂, 1 ♀, 1 nymph (*A. Cabrera*); Teneriffe, 1905, 1 ♀ (all *ex coll.* Burr). HINGES COLL. CANARIES: Teneriffe, Bajamar, 60 m., 11.1921, 4 ♂, 2 ♀, 1 nymph (*M. Escalera*).

**Challia Burr**

*Challia* Burr, 1904, *Trans. ent. Soc. Lond.* 1901: 286 (type: *C. fletcheri* Burr, 1904); 1911, *Annales Insectorum* 122: 11—Bey-Bienko, 1936, *Fn. U.R.S.S. Ins. Dermaptères*: 82, 216—Hincks, *Notes ent. Chinoise* 4: 52

*Head* with coronal suture long, deeply impressed: frontal sutures weak; post-ocular carinae well developed; evident frontal bristles present. *Pronotum* parallel-sided. *Mesonotum* with strong, entire, almost straight, lateral carinae. *Abdomen* cylindrical in both sexes, strongly punctured. Ultimate tergite elongate; caudal margin obscured by four very large swellings, two lateral, two median, of identical form and nearly equal size in both sexes. *Forceps* subcontiguous proximad in both sexes; straight in female, except at extreme apex, in male slightly bowed in distal three-quarters and more or less undulate in lateral view. Arolium present. *Genitalia* of male with virga long; parameres with a single inner process.

Restricted to South Korea and North-East China.



FIGS. 14-16.—*Challia fletcheri* Burr, ultimate tergite and forceps of: 14, female; 15, male; FIG. 16.—*Challia fletcheri* Burr, male genitalia.

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ate; eyes small,  
not segmentate.  
*Anatellinae*, p. 17.  
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two orifices;  
*Diplatyna*.\*  
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*latinae*, p. 117.  
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p. 181.

*Challia fletcheri* Burr (figs. 14-16)

*Challia fletcheri* Burr, 1904, *Trans. ent. Soc. Lond.* 1904: 286 (♂, Korea & China); 1911, *Genera Insectorum* 122: 11, pl. 1, f. 10a, b—Bey-Bienko, 1936, *Fu. U.R.S.S. Ins. Dermaptères*: 82, 216—Hincks, 1937, *Notes ent. Chinoise* 4: 53, f. 1-3.

**Male.**—*Colour.* Herid fulvous to fuscous; pronotum flavous with fuscous markings; metanotum fulvous mesad shading to fuscous laterad; or whole of foreparts fuscous except sides of pronotum; abdomen reddish brown; legs and base of forceps fulvous; femora with longitudinal darker markings; distal portions of forceps reddish brown. *Foreparts,* to tergite 4, dull, more or less granulate; remaining abdominal tergites polished, heavily punctured, with pubescence almost restricted to sides of tergites. *Head* with genae more or less parallel-sided except at caudal angles. *Pronotum* approximately of same width as head. Meso- and metanotum successively broader and shorter than pronotum. *Abdomen* contracted to tergite j, thence gradually expanded to ultimate tergite. Ultimate tergite (fig. 15) with very strongly impressed median longitudinal sulcus; median pair of swellings above caudal margin enveloping a median rounded tumidity; discal puncturation very heavy and almost seriate; caudal margin and pygidium completely hidden. *Forceps* (fig. 14) curved or undulate in lateral view, subcontiguous in proximal one-quarter, terminating in a tooth or tubercle on inner margin, thence slightly bowed and terminating in another tooth on inner margin at the end of the third quarter; distal quarter abruptly curved distad, with inner margins coarsely crenulate. *Penultimate sternite* subtriangular, strongly punctured; caudal margin weakly sinuate mesad. *Genitalia* (fig. 16). *Length* 19-21 mm.

**Female** as male; abdomen cylindrical; tergites from 4th polished and strongly punctured. *Forceps* (fig. 14) slender, straight, subcylindrical, finely crenulate proximad; distal quarter with inner margins bearing a series of strong teeth interspersed with smaller ones. *Penultimate sternite* similar to that of male but entire distad; *Length* 20-21 mm.

*Types.*—A series of cotypes in the British Museum (S.H.).

*Distribution.*—North Eastern and Eastern China, Southern Korea.

*Material examined.*—BRITISH MUSEUM (N.H.). CHINA: Wei-hai-Wei, Len-kung-tan, 9.1890, 1 ♀ (cotype) (*T. U. Fletcher*) (Burr coll.). Tamaon Islaid, 2 ♀ (cotypes) (*J. J. Walker*) (Burr coll.). Chung-yun, 1 ♀ (cotype) (*J. J. Walker*) (Burr coll.). Da-laen-suen, 1 ♂ (cotype) (*J. J. Walker*) (Burr coll.). HINCKS COLL. CHINA: Kiangsi, Ku-ling, 31.7.35, 1 ♀ (*O. Piel*) (Mus. Heude).

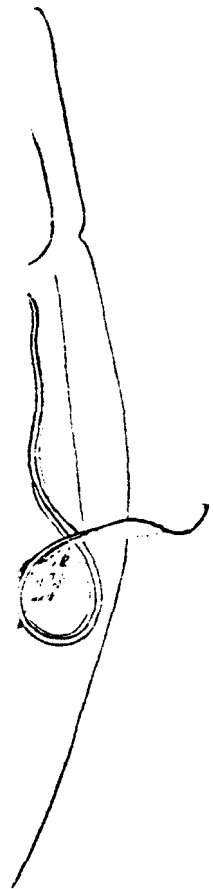
This very striking and interesting species is known from Burr's series of five cotypes (see above) from North-East China and Southern Korea, and from a series of 1 ♂, 2 ♀, and 1 nymph from Kiangsi Province in Eastern China, reported by Hincks (1937). The latter series has probably been destroyed except for the single female recorded above.

## Subfamily PYGIDICRANINAE

*Pygidicraninae* Burr, 1908, *Ann. Mag. nat. Hist.* (8) 2: 383; 1909, *Dtsch. ent. Z.* 1909: 322; 1910, *Fu. British India, Dermaptera*: 3ii; 1911, *Genera Insectorum* 122: 6; 1915, *J.R. micr. Sur.* 1915: 424, 430—Hincks, 1931, *Ann. Mus. Congo Belge (Sér. in 8<sup>e</sup>) Zool.* 8: 13, 31; 1937, *South African Animal Life* 4: 40.

*Pygidicranidae* Verhoeff, 1902, *Zool. Anz.* 25: 188, 202—Zacher, 1910, *Ent. Rdsch.* 27: 105; 1915, *Zool. Anz.* 45: 528—Brues, Melander & Carpenter, 1954, *Bull. Mus. Comp. Zool., Harvard* 108: 115.

*Pygidicranidae* Zacher, 1910, *Ent. Rdsch.* 27: 24, 25



male: 15. male.