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## FIFTY GYNANDROMORPHOUS ANTS TAKEN IN A SINGLE COLONY OF *MYRMICA SABULETI* MEINERT IN IRELAND.

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(Plate I.)

DURING the first week in August Mr. Desmond P. Walls visited the small island called Ireland's Eye, near Dublin, and having found there a colony of the ant *Myrmica sabuleti* Meinert, by digging into the nest he obtained 12 gynandromorphs. He twice revisited the nest, and by August 17, having dug it all up, he had collected 50 gynandromorphs in all. These he kindly sent me, and they are briefly described below. Workers, and some normal males and winged females, were present.

The island is just a bare rock, with a shallow covering of dark earth which stains the hands much as coal would. It slopes much more gently on the western side than on the cliff-bound northern and eastern aspects. The nest was situated on the western side, only about 100 ft. above sea-level, and lay in the dark, comparatively dry earth. The underlying rock formed a tiny cliff a few feet behind it; and would shelter it from cold east winds. Several sharp broken-off pieces of rock occurred throughout the soil of the nest.

All the specimens are mixed gynandromorphs, or female-male mosaics. They are all more or less winged, mostly with 12-jointed antennae, the legs being chiefly male. All of them, even the most female-like specimens, possess a more or less complete male genital armature, and a certain number also possess stings; but no two specimens are alike.

Some 67 gynandromorphous ants have been described to date, and in all these not more than 2, or 3 at the outside, have been found in the same colony. Now we have 50 taken in a single colony, bringing the total up to 117. This, however, is entirely put in the shade by an occurrence recorded by the late Professor W. M. Wheeler in 1937. He mentions that Dr. Neal A. Weber collected an entire large colony of *Cephalotes atratus quadridens* De Geer, and that there were "more than 4000 gynandromorphs or female-male mosaics which will be described in a future publication." The work in question was published after Wheeler's death; and, as far as I am aware, these gynandromorphs have not yet been described.

Various theories have been proposed to account for the occurrence of these abnormal forms; but as Wheeler said in 1903, "we

can have no real understanding of gynandromorphism until it can be produced experimentally." This appears to have been done, as recorded by Poulton in 1927. In his Presidential Address to the Royal Entomological Society of London, on certain effects of shock upon insect development, he shows that van Sommeren actually produced gynandromorphs in Lepidoptera. Sudden vibration was caused to the boxes containing the lepidopterous larvae by knocking several times on the side of the box with the knuckles, or a mallet of medium weight. Having mentioned this to Mr. Walls, he told me that there is a powerful oscillator at the Baily Lighthouse. In bad weather when this signal is sent out, the ground even across the Bay has been felt to vibrate.

Mr. Walls has taken 3 or 4 other gynandromorphs belonging to other species of ants, besides the present 50, and all these gynandromorphs occurred within two miles or so of the lighthouse.

No. 1.—Colour chiefly dark, with yellow patches on head and body; legs infuscate; wings ♂.

*Head* intermediate in shape and sculpture; *antennae* 12-jointed, chiefly ♀; *scapes* shorter than in normal ♀; left partly ♂, clavate beneath at apex, with lateral tooth only slightly developed, right with lateral tooth more developed. *Thorax* chiefly ♂; *mayrian furrows* present; *epinotum* with a spine on left side, but shorter than in normal ♀; right side spine short, but considerably more developed than normal ♂ tubercle. *Petiole* and *post-petiole* chiefly ♂; *gaster* intermediate. *Genitalia* very slightly exerted. Dissected out:—*annular lamina* only enclosing left side of genitalia; left *stipes* and  *volsella* fully developed, right *stipes* abbreviated; right *volsella* wanting, right *sagitta* only apparent; *sting* present.

No. 2 (Pl. I, fig. 2).—Colour chiefly dark, with a few yellow patches; legs ♂; wings ♂.

*Head* intermediate, the right side partly excavated from frontal carina to temple; right *eye* situated in cavity; *antennae* 12-jointed, chiefly ♀; left *scape* clavate at apex beneath with a blunt tooth, and lateral tooth slightly developed; right *scape* with a more developed lateral tooth. *Thorax* chiefly ♂; *mayrian furrows* present but left slightly abbreviated where a yellow patch extends from pronotum to mesonotum; *epinotum* with ♂ tubercle on left, spine on right, shorter than normal ♀ spine. *Petiole*, *post-petiole* and *gaster* chiefly ♂. *Genitalia* not exerted.

No. 3 (Pl. I, fig. 3).—Colour chiefly pale yellow; some black patches on thorax; legs with right femora slightly infuscate. Deälated, except right hind wing, which is present in the form of a short wing pad.

*Head* and *antennae* ♀; *ocelli* scarcely developed. *Thorax*: *pronotum* ♀; *mesonotum* partly ♂; *mayrian furrow* partly developed on left, less so on right; *epinotum* ♀, with spine on right shorter than that on left. *Petiole* and *post-petiole* ♀; *gaster* ♂. *Genitalia* not exerted.

No. 4.—Yellow and black in patches; legs partly infusate; wings intermediate.

*Head* intermediate in shape, sculpture chiefly ♂; *antennae* 12-jointed; *scapes* ♂; last with lateral tooth somewhat developed on right scape; left *eye* larger than right *eye*. *Thorax* intermediate; only right *mayrian furrow* well developed. *Epinotum* ♀; right spine shorter than left spine. *Petiole* and *post-petiole* ♀; *gaster* partly ♂ in shape. *Genitalia* partly exerted.

No. 5.—Yellow and black in patches and spots; legs infusate; wings ♀.

*Head* chiefly ♀, sculpture ♂; left *mandible* only developed; *antennae* 12-jointed; *scapes* ♂, but with lateral teeth slightly developed; left *frontal carina* abbreviated; right side of head excavated from border of eye to posterior border; *eye* situated in cavity. *Thorax* ♂; *epinotum* with tubercle on right side sharper than left one. *Petiole* ♂, black; *post-petiole* ♀, yellow; *gaster* chiefly ♂. *Genitalia* partly exerted, when dissected, ♂; genital armature more or less completely developed, but part of *sting* present.

No. 6.—Yellow and black in patches; fore wings only developed, ♂; cells and veins only present at base; legs partly infusate.

*Head* intermediate; *antennae* 12-jointed; *scapes* ♂ but with lateral teeth slightly developed. *Thorax* intermediate; *pronotum* ♀; right *mayrian furrow* partly developed; *epinotum* ♀ armed with sharp spines. *Petiole* intermediate; *post-petiole* ♀; *gaster* intermediate. *Genitalia* partly exerted.

No. 7.—Colour chiefly yellow; some faint dark patches on head and body; legs slightly infusate; wings deàlated, except right hind wing present as a small narrow thread.

*Head* chiefly ♀, the right side excavated from cheek to posterior angle; *eye* in cavity beneath; left lateral *ocellus* not fully developed; *antennae* ♀. *Thorax* intermediate; right *mayrian furrow* partly developed, left less so; *epinotum* ♀, armed with sharp spines. *Petiole* and *post-petiole* chiefly ♀. *Genitalia* partly exerted.

No. 8.—Yellow with darker patches; legs partly infusate; wings ♀.

*Head* and *antennae* ♀; left lateral *ocellus* not developed. *Thorax* chiefly ♀; *epinotum* with right side armed with strong spine, left with a short sharp projection. *Petiole* and *post-petiole* ♀; *gaster* chiefly ♀. *Genitalia* partly exerted.

No. 9.—Yellow and black in patches; legs infusate; wings ♂.

*Head* chiefly ♂; *antennae* yellow, 12-jointed; *scapes* ♂, but thicker and clavate at apex. *Thorax* chiefly ♂; *mayrian furrows* not completely developed; *epinotum* with a short sharp projection on each side. *Petiole*, *post-petiole* and *gaster* chiefly ♂. *Genitalia* partly exerted on left side; ♂. When dissected, the left *stipes* longer than the right; left  *volsella* fully developed, right less so; right *sagitta* present; *sting* on left.

No. 10.—Chiefly yellow with black patches; legs infusate; wings ♀.

*Head* intermediate; *antennae* 12-jointed; *scapes* chiefly ♂, but broader with lateral tooth fairly developed on left; less so on right, which is clavate at apex. *Thorax* chiefly ♀; right *mayrian furrows* only slightly indicated; *epinotum* armed with two sharp spines. *Petiole* chiefly ♂; *post-petiole* chiefly ♀; *gaster* intermediate. *Genitalia* considerably exerted.

No. 11.—Yellow and black in patches; legs somewhat infusate; wings ♂.

*Head* intermediate; *antennae* 12-jointed; *scapes* ♀, but shorter, and lateral teeth not so strongly developed. *Thorax* intermediate; *mayrian furrows* fairly well developed; *epinotum* armed with a sharp, but shorter than normal ♀ spine on left; ♂ tubercle on right, but more pointed. *Petiole*, *post-petiole* and *gaster* intermediate. *Genitalia* exerted; when dissected, ♂ genital armature practically complete.

No. 12 (Pl. I, fig. 12).—Yellow and black in patches; legs infusate; wings intermediate.

*Head* intermediate; *antennae* 12-jointed; right *scape* ♀, but shorter; left ♂, but clavate at apex and lateral tooth slightly developed; right *frontal carina* longer than left. *Thorax* intermediate; *pronotum* ♀; right *mayrian furrow* developed; *epinotum* armed on right with sharp spine, on left with a much shorter spine or tooth. *Petiole*, *post-petiole* and *gaster* chiefly ♂. *Genitalia* exerted; when dissected ♂ genital armature practically complete.

No. 13.—Chiefly black with yellow patches; legs dark; wings ♂.

*Head* chiefly ♂; *antennae* 12-jointed; left *scape* stout, clavate at apex, lateral tooth somewhat developed; right *scape* longer, but shorter and stouter than in normal ♂; left *frontal carina* longer, yellow, ♀; right shorter, black, ♂. *Thorax* chiefly ♂; *pronotum* ♀; *mayrian furrows* developed; *epinotum* armed with tubercles which are sharper than in normal ♂. *Petiole*, *post-petiole* and *gaster* chiefly ♂. *Genitalia* not exerted.

No. 14 (Pl. I, fig. 14).—Yellow, black in patches; legs infusate; fore wings very narrow, scarcely broader than hind wings; cells and veins only developed at base.

*Head* intermediate; *antennae* 12-jointed; left *scape* ♀, but shorter; right *scape* ♂, but somewhat stouter; left *frontal carina* longer than right. *Thorax* intermediate; *pronotum* ♀; left *mayrian furrow* partly developed; *epinotum* armed with long sharp spine on left, much shorter spine on right. *Petiole* ♂; *post-petiole* chiefly ♀; *gaster* intermediate. *Genitalia* somewhat exerted; when dissected left *stipes*, *volsella* and *sagitta* present; right *stipes* and *volsella* shorter; right *sagitta* wanting; *sting* present on right.

No. 15.—Yellow and black in patches; legs infusate; wings ♀.

*Head* intermediate; *antennae* 12-jointed; left *scape* ♀, but slightly shorter; right chiefly ♂, but clavate at apex, and with lateral tooth developed; left *frontal carina* longer than right. *Thorax* intermediate; *pronotum* chiefly ♀; *mesonotum* ♂ with *mayrian furrows* fully developed; *epinotum* armed with two short spines. *Petiole*

♂; *post-petiole* chiefly ♀; *gaster* intermediate. *Genitalia* exerted; when dissected ♂ genital armature practically complete.

No. 16 (Pl. I, fig. 16).—Yellow and black in patches; legs infuscate; left fore wing ♀, right fore wing as narrow as hind wing; cells and veins only developed at base.

*Head* intermediate; *antennae* 12-jointed, left *scape* chiefly ♂, but stouter at apex, and with lateral tooth moderately developed at base; right *scape* ♀ but shorter; right *frontal carina* somewhat longer than left. *Thorax* intermediate; *pronotum* ♀; *mesonotum* ♂; *mayrian furrows* developed; *epinotum* armed with a sharp spine on right, but shorter than normal ♀; spine on left shorter. *Petiole* chiefly ♂; *post-petiole* and *gaster* chiefly ♀. *Genitalia* not exerted.

No. 17 (Pl. I, fig. 17).—Black with some yellow patches; legs mostly dark; wings ♀.

*Head* intermediate; *antennae* 13-jointed; left *scape* short, clavate at apex; lateral tooth somewhat developed at base; right *scape* ♂, but slightly stouter; left *eye* larger than right. *Thorax* chiefly ♂; *mayrian furrows* well developed; *epinotum* armed with ♂ tubercles, space between somewhat wider than normal. *Petiole*, *post-petiole* and *gaster* ♂. *Genitalia* exerted.

No. 18.—Black with yellow patches; legs dark; wings intermediate.

*Head* intermediate; *antennae* 12-jointed; *scapes* short, stout, with lateral teeth somewhat developed; right *frontal carina* longer than left. *Thorax* intermediate; *pronotum* chiefly ♀; *mayrian furrows* developed; *epinotum* armed with a short sharp spine on right; ♂ tubercle on left. *Petiole*, *post-petiole* and *gaster* intermediate. *Genitalia* exerted.

No. 19.—Black and yellow; legs infuscate; wings ♀.

*Head* intermediate; *antennae* 12-jointed, left *scape* chiefly ♂ but stouter and with lateral tooth somewhat developed; right ♀ but shorter and with lateral tooth not fully developed; left *frontal carina* ♂, right ♀. *Thorax* intermediate; *pronotum* ♀; rest of thorax chiefly ♂; *mayrian furrows* developed; *epinotum* armed with ♂ tubercle on left, a short sharp spine or tooth on right. *Petiole* and *post-petiole* chiefly ♂; *gaster* intermediate. *Genitalia* exerted.

No. 20.—Yellow and black in patches; legs infuscate; left wing ♀, right slightly narrower and with cells and veins only developed at base.

*Head* intermediate; *antennae* 12-jointed; right *scape* ♀; left shorter and stouter, lateral tooth not fully developed; right *frontal carina* longer than left. *Thorax* intermediate; *pronotum* ♀; right *mayrian furrow* developed, left only indicated; *epinotum* armed with two sharp spines, the left longer than the right. *Petiole* chiefly ♂; *post-petiole* half ♂, half ♀; *gaster* intermediate. *Genitalia* somewhat exerted.

No. 21.—Chiefly dark, yellow in patches; legs infuscate; wings ♀.

*Head* intermediate; right *antenna* 12-jointed, left 13-jointed; *scapes* chiefly ♂ though shorter and stouter, right with lateral tooth

somewhat developed; *frontal carinae* ♂. *Thorax* intermediate; *pronotum* chiefly ♀; *mayrian furrows* not fully developed; *epinotum* armed with a short sharp spine on right, ♂ tubercle on left. *Petiole* and *post-petiole* ♂; *gaster* intermediate. *Genitalia* slightly exserted.

No. 22.—Chiefly black with yellow patches; legs infusate; wings intermediate.

*Head* chiefly ♂; left *eye* slightly larger than right; *antennae* 13-jointed; right *scape* ♂, left slightly shorter and clavate at apex, *clubs* thicker than in normal ♂, left club with last two joints not completely separated. *Thorax* intermediate; left side of *pronotum* ♀, right ♂; right *mayrian furrow* fully developed, left only indicated; *epinotum* armed with ♂ tubercles, wider apart and slightly more prominent. *Petiole*, *post-petiole* and *gaster* chiefly ♂. *Genitalia* exserted: when dissected, ♂ genital armature nearly complete.

No. 23.—Chiefly black with yellow patches; legs infusate; wings ♀.

*Head* chiefly ♂; left *antenna* 13-jointed, right 12-jointed; left *scape* shorter, clavate at apex; lateral tooth somewhat developed at base, right longer with lateral tooth more developed; left *frontal carina* ♂; right longer, chiefly ♀. *Thorax* intermediate; left side of *pronotum* ♀, right ♂; *mayrian furrows* developed; *epinotum* armed with short sharp teeth. *Petiole*, *post-petiole* and *gaster* ♂. *Genitalia* partly exserted.

No. 24.—Yellow and black in patches; legs infusate; wings chiefly ♂.

*Head* intermediate; *antennae* 12-jointed; left *scape* ♀ but not quite so long and slender; right ♂ but slightly stouter in middle; left *eye* somewhat more prominent than right. *Thorax* intermediate; *pronotum* chiefly ♀ on right, ♂ on left; *mayrian furrow* developed on right, partly on left; *epinotum* armed with a sharp spine on left, a shorter, blunter spine or tooth on right. *Petiole*, *post-petiole* and *gaster* chiefly ♂. *Genitalia* exserted: when dissected *stipites*, left  *volsella* and *sagitta* present; *sting* on right.

No. 25.—Chiefly dark, some yellow patches on head; legs dark; wings intermediate.

*Head* intermediate; *antennae* 13-jointed; right *scape* ♂; left stouter, clavate at apex, with small lateral tooth slightly developed at base. *Thorax*, *petiole*, *post-petiole* and *gaster* ♂. *Genitalia* very slightly exserted.

No. 26 (Pl. I, fig. 26).—Chiefly yellow with some black spots; legs chiefly yellow; wings ♀ but narrow and rather short; cells and veins only developed at base.

*Head* intermediate; *antennae* 12-jointed; right *scape* ♀; left shorter, ♂, clavate at apex and a slight ridge developed where lateral tooth is present in ♀; left *frontal carina* shorter than right. *Thorax* chiefly ♀; right *mayrian furrow* partly developed, left still less; *epinotum* armed with long sharp spines, the left slightly shorter than right. *Petiole* and *post-petiole* chiefly ♀; *gaster* ♀. *Genitalia* slightly exserted: when dissected *annular lamina*, *stipites* and right

*volsella* complete; left  *volsella* somewhat abbreviated,  *sagittae* incomplete;  *sting* present.

No. 27 (Pl. I, fig. 27).—Chiefly dark with some yellow spots; legs infuscate; wings intermediate.

*Head* intermediate;  *antennae* 13-jointed, but the last two joints of the clubs are only partly delimited; left  *scape* ♂; right  *scape* half ♂, half ♀; lateral tooth fairly well developed; left  *frontal carina* ♂, right ♀, longer.  *Thorax* chiefly ♂;  *mayrian furrows* well developed;  *epinotum* armed on right with a short sharp spine, or tooth, on left with ♂ tubercle.  *Petiole* and  *post-petiole* ♂;  *gaster* intermediate.  *Genitalia* scarcely exerted.

No. 28.—Mostly yellow with black patches; legs infuscate; wings ♀ but narrower, especially left fore wing, the veins and cells of which are only developed at base.

*Head* chiefly ♀;  *antennae* ♀;  *frontal carina* on left slightly more developed than the one on right.  *Thorax* intermediate;  *pronotum* ♀;  *mayrian furrows* well developed.  *Epinotum*,  *petiole*,  *post-petiole* and  *gaster* ♀.  *Genitalia* not exerted.

No. 29.—Black with yellow spots; legs infuscate; wings chiefly ♂.

*Head* chiefly ♂;  *antennae* 12-jointed; left  *scape* short, clavate at apex, with very small lateral tooth developed at base; right somewhat shorter, less clavate at apex, no lateral tooth at base.  *Thorax* chiefly ♂;  *pronotum* partly ♀;  *mayrian furrows* present;  *epinotum* armed with sharp ♂ tubercles.  *Petiole* chiefly ♂;  *post-petiole* chiefly ♀;  *gaster* intermediate.  *Genitalia* exerted.

No. 30.—Yellow and black in patches; legs infuscate; wings ♀.

*Head* intermediate;  *antennae* 12-jointed; right  *scape* short, stouter than normal ♂, with indications of a lateral tooth; left longer, bent, with well-developed small lateral tooth; right  *frontal carina* considerably more developed than left.  *Thorax* intermediate;  *pronotum* ♀; left  *mayrian furrow* slightly shorter than right;  *epinotum* armed with short sharp teeth.  *Petiole* and  *post-petiole* chiefly ♂;  *gaster* intermediate.  *Genitalia* not exerted.

No. 31.—Yellow and black in patches; legs infuscate; wings slightly shorter and narrower than in normal ♀; veins and cells very feebly indicated.

*Head* intermediate; left  *antenna* 13-jointed, but the last two joints of the club only partly delimited; right 12-jointed;  *scapes* short and stout, with indications of lateral teeth; left  *frontal carina* considerably more developed than right.  *Thorax* intermediate;  *pronotum* chiefly ♀; left  *mayrian furrow* partly developed, right wanting;  *epinotum* armed with a short sharp tooth on right, ♂ tubercle on left.  *Petiole* and  *post-petiole* ♂;  *gaster* intermediate.  *Genitalia* partly exerted.

No. 32.—Chiefly dark with yellow spots; legs infuscate; right fore wing ♀; left shorter, very narrow; veins and cells only developed at base.

*Head* intermediate; right  *antenna* 12-jointed, left 13-jointed, but last two joints of club only partly delimited; left  *scape* ♂, but stouter

and with a very fine ridge at base; right ♀ but shorter and with lateral tooth less developed than in normal ♀; right *frontal carina* more developed than left. *Thorax* intermediate; *pronotum* ♀ on left, ♂ on right; *mayrian furrows* well developed; *epinotum* armed with ♂ tubercles, but wider apart, left slightly sharper. *Petiole* and *post-petiole* chiefly ♂; *gaster* intermediate. *Genitalia* not exerted.

No. 33.—Black with yellow patches; legs infusate; wings intermediate.

*Head* intermediate; *antennae* 12-jointed; left *scape* ♂, but stouter; right ♂, but clavate at apex; left *frontal carina* ♂, right partly ♀. *Thorax* intermediate; *pronotum* ♀ on right, ♂ on left; *mayrian furrows* only partly developed; *epinotum* armed with a long sharp spine on left, and a shorter sharp spine on right. *Petiole*, *post-petiole* and *gaster* intermediate. *Genitalia* exerted.

No. 34 (Pl. I, fig. 34).—Chiefly dark, with yellow spots; legs infusate; wings intermediate.

*Head* chiefly ♂; left *antenna* 13-jointed, right 12-jointed; right *scape* ♂, left shorter, somewhat clavate at apex, with a ridge or very small lateral tooth at base; right *eye* larger than left; *frontal carinae* ♂. *Thorax* intermediate; *pronotum* ♀ on left, ♂ on right; *mayrian furrows* only partly developed; *epinotum* armed with ♂ tubercles, slightly wider apart, and left slightly more prominent than right. *Petiole*, *post-petiole* and *gaster* chiefly ♂. *Genitalia* exerted.

No. 35.—Yellow and black in patches; legs infusate; right front wing ♀, but slightly narrower; veins and cells only distinct at base; right hind wing only present as a very small short stump; left fore and hind wings not present.

*Head* intermediate; *antennae* 12-jointed; left *scape* ♂, but slightly shorter and stouter; right chiefly ♂ with a narrow ridge at base; *frontal carinae* intermediate. *Thorax* chiefly ♂; *pronotum* ♀; *mayrian furrows* well developed; *epinotum* armed with two short sharp teeth, the left being slightly the longer. *Petiole* chiefly ♂; *post-petiole* chiefly ♀; *gaster* ♀. *Genitalia* not exerted.

No. 36 (Pl. I, fig. 36).—Yellow with black patches; legs chiefly yellow; right fore wing narrow, short, veins and cells very indistinct; right hind wing normal; left fore wing very short, narrow, veins very distinct, but no cells; left hind wing missing.

*Head* intermediate; *antennae* 12-jointed; right *scape* ♀, but slightly narrower and lateral tooth less well developed; left *scape* chiefly ♂ but stouter at apex and lateral tooth slightly developed at base. *Thorax* intermediate; *pronotum* ♀; *mayrian furrows* partly developed; *epinotum* armed with two long sharp spines, the one on the left slightly the longer. *Petiole* and *post-petiole* chiefly ♂; *gaster* ♀. *Genitalia* considerably, but unevenly, exerted.

No. 37.—Black with yellow patches; legs infusate; right fore wing slightly narrower than normal ♀; veins and cells rather indistinct; left fore wing missing, hind wings normal.

*Head* intermediate; *antennae* 12-jointed; *scapes* shorter and stouter than normal ♂, with lateral teeth developed; right *frontal*



*carina* ♀, left ♂. *Thorax* intermediate; *pronotum* chiefly ♀; only left *mayrian furrow* developed; *epinotum* armed with ♂ tubercles, but right slightly sharper. *Petiole* and *post-petiole* ♂; *gaster* intermediate. *Genitalia* not exerted.

No. 38.—Chiefly dark with yellow patches; legs somewhat infusate; wings chiefly ♂.

*Head* intermediate; left *antenna* 13-jointed; right 12-jointed, but last joint of club partly delimited; left *scape* slightly shorter and stouter than normal ♂, and with a small distinct lateral tooth; right ♂ but slightly shorter and stouter; left *frontal carina* ♂, right ♀. *Thorax* intermediate; *pronotum* chiefly ♀; left *mayrian furrow* very short, right fully developed; *epinotum* armed on left with a moderately long sharp tooth, on right with ♂ tubercle but somewhat sharper. *Petiole*, *post-petiole* and *gaster* chiefly ♂. *Genitalia* partly exerted.

No. 39.—Chiefly yellow, some black markings; legs yellow; deälated, with exception of left hind wing stump.

*Head* chiefly ♀; *antennae* 12-jointed; right *scape* ♀; left chiefly ♂, but clavate at apex and small lateral tooth developed at base; *frontal carinae* ♀. *Thorax* chiefly ♀; *pronotum* ♀ on left, less developed on right; only left *mayrian furrow* indicated; *epinotum* armed with two long sharp spines. *Petiole* and *post-petiole* chiefly ♀; *gaster* ♀. *Genitalia* unevenly exerted; when dissected *stipites* well developed; left  *volsella* and right *sagitta* only developed; *sting* present on left.

No. 40.—Dark with yellow patches; legs infusate; wings chiefly ♂.

*Head* intermediate; *antennae* 12-jointed; *scapes* chiefly ♂; left slightly stouter and clavate towards apex; right shorter and stouter, clavate at apex, small lateral tooth developed at base; left *frontal carina* ♂, right partly ♀. *Thorax* intermediate; *pronotum* chiefly ♂; left *mayrian furrow* developed, right only indicated; *epinotum* armed with a moderately long sharp spine on left; ♂ tubercle on right, but somewhat more prominent. *Petiole* ♂; *post-petiole* and *gaster* intermediate. *Genitalia* partly exerted.

No. 41.—Chiefly black, with some yellow patches; legs infusate; wings chiefly ♂.

*Head* chiefly ♂; *antennae* 13-jointed, but last two joints of left club only partly delimited; *frontal carinae* ♂. *Thorax* chiefly ♂; *pronotum* chiefly ♂; only right *mayrian furrow* developed; *epinotum* armed with ♂ tubercles. *Petiole* ♂; *post-petiole* and *gaster* chiefly ♂. *Genitalia* not exerted.

No. 42.—Dark with yellow patches; legs infusate; wings intermediate.

*Head* intermediate; *antennae* 12-jointed; *scapes* chiefly ♀, left shorter and stouter; lateral tooth fairly well developed; right slightly shorter and stouter, lateral tooth less developed; left *frontal carina* longer than right. *Thorax* intermediate; *pronotum* ♂; right *mayrian furrow* better developed than left; *epinotum* armed with a short sharp spine on left, ♂ tubercle on right. *Petiole*, *post-petiole* and *gaster* chiefly ♂. *Genitalia* exerted.

No. 43.—Chiefly dark, a few small patches of yellow; legs infusate; wings chiefly ♂.

Head chiefly ♂; *antennae* 13-jointed, but last two joints of right club only slightly delimited, and not completely in left club; *frontal carinae* ♂. *Thorax* chiefly ♂; *pronotum* partly ♀ on left; *mayrian furrows* developed; *epinotum* armed with ♂ tubercles, but slightly sharper. *Petiole*, *post-petiole* and *gaster* chiefly ♂. *Genitalia* partly exerted.

No. 44.—Chiefly black with yellow patches; legs infusate; wings intermediate.

Head intermediate; *antennae* 12-jointed, but the last joint of clubs shows signs of delimitation; right *scape* ♂; left stouter, and with distinct lateral tooth; *frontal carinae* ♂, but left slightly longer and more developed anteriorly than right. *Thorax* intermediate; *mayrian furrow* nearly entire on right, only partly developed on left; *epinotum* armed with a long sharp spine on right, a shorter one on left. *Petiole*, *post-petiole* and *gaster* chiefly ♂. *Genitalia* not exerted.

No. 45.—Yellow and black; legs infusate; wings narrower and slightly shorter than normal ♀, veins and cells only developed at base.

Head chiefly ♀; *antennae* 12-jointed; *scapes* ♀, but left slightly shorter; left *frontal carina* ♂, right ♀. *Thorax* intermediate; *pronotum* ♀; left *mayrian furrow* developed, right indicated; *epinotum* armed with short sharp spines, the right being the longer. *Petiole* and *post-petiole* chiefly ♂; *gaster* intermediate. *Genitalia* partly exerted.

No. 46.—Yellow and black; legs infusate; wings narrower and shorter than in normal ♀; veins and cells only developed at base.

Head intermediate; *antennae* 12-jointed; right *scape* ♀; left chiefly ♂, but stouter at apex, and a very small lateral tooth developed at base. *Thorax* chiefly ♀; *mayrian furrows* absent; *epinotum* armed with two long sharp spines. *Petiole* chiefly ♀; *post-petiole* and *gaster* chiefly ♂. *Genitalia* considerably exerted.

No. 47.—Nearly all yellow, a few dark patches; legs mostly yellow; right fore wing very short and narrow, no cells; right hind wing normal; left fore and hind wings missing.

Head almost entirely ♀; *antennae* 12-jointed, ♀, but lateral tooth of left *scape* not nearly so well developed as right; right *frontal carina* considerably more developed than left. *Thorax* almost entirely ♀; right *mayrian furrow* slightly indicated; *epinotum* armed with two long sharp spines. *Petiole*, *post-petiole* and *gaster* chiefly ♀. *Genitalia* exerted; when dissected the ♂ genital armature more or less complete, but right appendages longer than left; *sting* present.

No. 48.—Black and yellow; legs infusate; wings intermediate.

Head intermediate; *antennae* 12-jointed; right *scape* ♀, but narrower, and lateral tooth not so well developed; left *scape* more ♂, but clavate at apex, with a small lateral tooth at base; *frontal carinae* chiefly ♂, right more sharply pointed at apex. *Thorax* intermediate; *pronotum* chiefly ♂; right *mayrian furrow* more strongly developed than left; *epinotum* armed with two short spines,

the right slightly longer and more sharply pointed. *Petiole*, *post-petiole* and *gaster* chiefly ♂. *Genitalia* not exerted.

No. 49.—Chiefly yellow, a few dark patches; legs chiefly yellow; right fore wing consisting of a long thin thread, no cells or veins, left fore wing being a short narrow wing, veins at base, no cells; hind wings slightly narrower than normal.

*Head* chiefly ♀; *antennae* 12-jointed; *scapes* ♀, but somewhat shorter and narrower. *Thorax* nearly entirely ♀, but right *mayrian* furrow indicated; *epinotum* armed with two long sharp spines. *Petiole* intermediate; *post-petiole* and *gaster* chiefly ♀. *Genitalia* unevenly exerted; when dissected ♂ genital armature incomplete; right *stipes* shorter and bifid; no *sting* present.

No. 50.—Chiefly dark with numerous yellow patches; legs infusate, wings intermediate.

*Head* intermediate; *antennae* 12-jointed; *scapes* chiefly ♀ but shorter and stouter; right *frontal carina* considerably more developed than left. *Thorax* intermediate; *pronotum* chiefly ♀; *mayrian* furrows developed; *epinotum* armed with a moderately short sharp spine on right, a considerably shorter sharp spine or tooth on left. *Petiole*, *post-petiole* and *gaster* intermediate. *Genitalia* unevenly exerted: when dissected ♂ genital armature incomplete, left *stipes* longer than right; right  *volsella* developed, left wanting; right *sagitta* longer than left; a well-developed *sting* present.

I have to thank Drs. Hinton and van Emden for kindly preparing slides from the dissections of the genitalia.

#### SOME LITERATURE CONSULTED.

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ACHERONTIA ATROPOS IN MALTA.—Though this moth is not often seen, its caterpillars are quite common, but do no real damage. Of the two colour forms of the caterpillar, the yellowish-green one is commoner than the brown. They feed on *Phaseolus vulgaris* and *Datura metel* as well as on potato. Farmers who turn up the pupae often regard them as a kind of date; and the moth is not welcomed when it flies indoors, for the superstition persists that it is a harbinger of evil, usually of death to a member of the family. *Macroglossum stellatarum*, on the other hand, is most welcome, for it is said to bring good tidings.—A. VALLETTA, F.R.E.S.; 214, Msida Street, Bkara, Malta.