New records of *Pseudomasaris* Ashmead (Hymenoptera : Vespoidea, Masaridae), with notes on *P. phaceliae* Rohwer and *P. cazieri* R. M. Bohart

By O. W. Richards

Imperial College of Science and Technology, London, S.W.7

Synopsis

New records are given of nine species of *Pseudomasaris*, and a revised key to species is included. The hitherto unknown female of *P. cazieri*, and the characters separating *P. texanus* and *P. phaceliae*, are described.

In the last few months three lots of *Pseudomasaris* from the collection of the University of California, Berkeley, have been available for study through the kindness of Dr. P. D. Hurd, Jr. These lots are: first, general accessions made since I studied the collection in 1961 (Richards, 1963); second, a large collection nearly all made by Dr. Hurd and his associates in South California, in a locality of some interest because certain species were first described from a place nearby; thirdly, three specimens bred from a nest. Finally, a number of specimens were obtained by Dr. R. M. Bohart and myself in New Mexico, during a visit to obtain more specimens of *P. phaceliae* Rohwer, of which only one male and four females had previously been examined. Dr. Bohart has also sent me the unknown female of *P. cazieri* Bohart and a number of records of other species. This new material amounts in all to 247 males and 268 females, together with Dr. Bohart's records of 38 males and 171 females. Of the commoner species, only new county records, flower records, or unusual altitudes are noted. Some of the flower records are unusual, but they seem to be quite reliable. My own experience of the smaller species of *Pseudomasaris* that are associated with *Phacelia* is that they are never found except when a substantial growth of the plant is present, but when the wasps are common most of those caught are hovering in front of or settled near the plants rather than actually on the flowers. A few errors have been found in the 1963 key, and a few additional characters are noted and the whole incorporated in a new key. The species are dealt with in the same order as in 1963.

1. *Pseudomasaris cazieri* R. M. Bohart *in* Richards, 1963

Female

Black; mandibles, palpi, labrum, clypeus, antennae (except dorsal side of club and a small apical patch beneath it), outer and inner orbits (latter to just before emargination of eye) and spot just behind posterior ocelli, dorsal aspect of pronotum, squarish discal patch at posterior margin of mesoscutum, scutellum, tegula, legs except coxae (femora, especially hind ones, somewhat darkened beneath), some suffusion of gaster, especially of tergites 1–3 distally, and of yellow sternal marks, especially disk of sternite 6, dark orange. Much of inner orbits, propodeal spines and a small streak below them, transverse bands occupying one half to two-thirds of gastral tergites 1–3 and all or nearly all of 4–6, lateral, more or less triangular spot on gastral sternites 2–6, yellow. Wings dark fuscous with slight metallic reflections, costa to end of pterostigma dark orange. Dorsal side of head with long yellowish pubescence. Dorsal aspect of pronotum and mesoscutum with rather less long yellowish pubescence, mostly directed towards mid-line. Length, 19·0; length of fore wing, 12·5 mm.

Frons confluently but not very coarsely punctured. Clypeus coarsely and very closely punctured, interstices linear, but without any tendency to coalesce transversely. Antennal segment 3 as long as 4 + 5 + 6, club long, oval, about as long as 1 + 2 + 3. Pronotum very closely and relatively finely punctured, humeri rounded. Mesoscutum very closely and not very strongly punctured at front and sides, interstices of punctures and large posterior unpunctured discal area dull, densely microreticulate. Mesopleuron dull, with rather close, somewhat shallow punctures, interstices reticulate. Gastral tergites absolutely dull, densely microreticulate or granulate with a small number of rather fine punctures at the sides; sternites with rather more punctures and with less distinct reticulation.

MEXICO: Chihuahua, 23 miles S. of Minaca, 23.viii.5. (*R. F. Smith*) (University of California, Davis). Dr. R. M. Bohart tells me that there is a male in the collection of the American Museum of Natural History with the same data as this female; the species is now recorded from the Mexican states of Durango and Chihuahua.

As noted by Dr. Bohart for the male, the species is closely related to *P. occidentalis* (Cresson) and less closely to *P. wheeleri* J. Bequaert. It differs from both of them in the dark wings and black mesopleuron and sides of propodeum. Gastral tergites 1–3 are more black marked than in *P. occidentalis* but less than in *P. wheeleri*. The clypeus is more coarsely punctured than in *P. occidentalis* and very much more than in *P. wheeleri*; there is a comparable difference in the sculpture of the frons. The mesoscutum is duller than in *P. occidentalis* but not duller than in *P. wheeleri*; both these species, however, have it punctured throughout. The propodeal spine is shorter and wider, especially compared with *P. occidentalis*. The gastral tergites are dull, granulate or microgranulate, punctured only at the sides; in the other two species, though very closely and finely punctured, the tergites are not so dull.

2. *Pseudomasaris wheeleri* J. Bequaert

The species is still known only from Baja California and California. New county records in the latter state are from Madera, Mono and Tuolumne counties. Nineteen specimens (both sexes) are recorded from 8500 feet in Mono and Inyo counties, higher than previous records. New flower records: Compositae, *Peucephyllum schottii* Gray, 6 ♀; Hydrophyllaceae, *Eriodictyon crassifolium* Benth., 2 ♂, *E. trichocalyx* Hel. var. *lanatum* Jepson, 1 ♂, 1 ♀; Labiatae, *Hyptis emoryi* Torr., 3 ♂; Scrophulariaceae, *Penstemon* sp., 3 ♂, 8 ♀; Zygophyllaceae, *Larrea glutinosa* Jepson, 1 ♀.

3. *Pseudomasaris zonalis* (Cresson)

Although 15 males and 40 females were examined, they provided no essentially new records.

4. *Pseudomasaris coquilletti* Rohwer

Amongst 5 males and 3 females, there is one new county record from California: Kern Co.

A new flower record is: Papaveraceae, *Escholtzia* sp., 1 ♂.

As before, all specimens are recorded from below 3600 feet and the dates are in April and May, with 1 male in March.

5. *Pseudomasaris edwardsii* (Cresson)

In 7 males and 34 females, there are two new county records for California: Imperial Co., San Luis Obispo Co. There are the following additional flower records: Boraginaceae, *Cryptantha intermedia* Greene, 1 ♀, *C. muricata* (Hook & Arn.) Nels. & MacBr., 1 ♀; Hydrophyllaceae, *Phacelia crenulata* Torr., 1 ♀; *P. distans* Benth., 2 ♂, 11 ♀; *Eriodictyon trichocalyx* Hel., var. *lanatum* Jepson, 1 ♀; Labiatae, *Salvia columbariae* Benth., 1 ♀; Onagraceae, *Oenothera clavaeformis* Torr. var. *aurantiaca* Wats., 1 ♂.

6. *Pseudomasaris texanus* (Cresson)

Although no new material of this species has been available, some of the specimens recorded in 1963 have been re-examined. There were four records from Arizona:

Bradley (1922 : 45): Maricopa Co., Phoenix, 1 ♂ (*J. Bequaert*). Bequaert (1940 : 38): Gila Co., Globe, 1 ♀ (*D. K. Duncan*); Maricopa Co., Tempe, 1 ♂ (*D. K. Duncan*). In spite of the kind help of Dr. Jos. Bequaert and Dr. H. E. Evans, these three specimens cannot now be traced, but Dr. Bequaert in a letter agrees with me that they were probably *P. phaceliae*.

Richards (1963 : 296): Navajo Co., Snowflake, 26.vii.52, 1 ♂ (*Cazier* and *Schrammel*). This specimen has been re-examined by Dr. R. M. Bohart and is really *P. phaceliae*. There is now no evidence that *P. texanus* occurs anywhere but in the western half of Texas; moreover, *P. phaceliae* occurs at least in the more western quarter of Texas as well as in Arizona and New Mexico.

Certain records for *P. texanus* are the following: Texas, probably Bosque Co. Clifton (type locality); also probably 5 ♂, 4 ♀ Texas, 1873 (British Museum (Nat. Hist.)) (perhaps received by F. Smith from Cresson); Bexar Co., 29.iv.40, 1 ♂ (*Orchard* and *Struck*) (University of California, Berkeley); Llano Co., 24.iv.63, 1 ♀ (*C. Rael*); Sutton Co., Sonora, 4.v.54, 2 ♀ (*L. D. Beamer*); Val Verde Co. or (less probably) Edwards Co., 36 miles S. Sonora, 10.iv.50, 1 ♂, 7 ♀ (*Michener, Rozen, Beamer, Stephen*) (U.C.D.).

The records (Richards, 1963: 296) from Atascosa, Brewster, Comal, Reaves, Tom Green, Travis and Uvalde counties, though probably correct, ought to be verified.

The characters separating *P. texanus* from *P. phaceliae* are noted below under the latter species.

7. *Pseudomasaris phaceliae* Rohwer

In Richards (1963 : 296), the status of *P. phaceliae* was left somewhat undecided. Only 1 male and 3 females (U.S. National Museum) and 1 female (B.M. (N.H.)) were examined, and its area of distribution in New Mexico seemed to be enclosed by that of *P. texanus*, which was recorded from Arizona and Texas. Moreover, it is now clear that the distinctions between the two species were blurred because a few specimens of *P. phaceliae* were misidentified as *P. texanus*.

In April 1965, I joined Dr. R. M. Bohart and Mr. F. D. Parker of the University of California, Davis, at Las Cruces, New Mexico (the type locality of *P. phaceliae*), to search for *Pseudomasaris*. Before I arrived Dr. Bohart had already found a site, twelve miles north of Las Cruces, where the genus occurred. As a result of joint collecting we obtained a long series of both sexes of *P. phaceliae* and also of *P. maculifrons* (Fox) (*see below*). This has enabled Dr. Bohart and myself to determine the more important differences between *P. texanus* and *P. phaceliae*.

P. phaceliae

Male and female.—Apex of fore femur and bases of dorsal side of mid and hind tibiae with a yellow spot.

Male.—Eyes separated at the narrowest by two and a half to three times posterior ocellar diameters. Antennae with segments 3–7 pale lemon-yellow, 4–7 with a sharply defined apical black band beneath and 6–7 also above; segment 7 wider at apex, club much more convex anteriorly in dorsal view and ventrally hardly more than one-third white. Process of third gastral sternite wider anteriorly. Process of gastral tergite 7 narrower, with its prongs less widely diverging.

Female.—Pronotum and gaster more extensively yellow. Punctures less close and even, especially to the sides of the ocelli, in front of the scutellum and on the disk of the gastral tergites.

P. texanus

Male and female.—Apex of fore femur and bases of mid and hind tibiae without yellow spots.

Male.—Eyes separated at the narrowest by about one posterior ocellar diameter. Antennae with segments 3–4 brown, 5–7 orange to brown with not very well-defined dark apical bands above (beneath not very different from *P. phaceliae*); segment 7 narrower at apex, club in dorsal view less convex anteriorly, and ventrally at least two-thirds white. Process of third gastral sternite narrower anteriorly. Process of gastral tergite 7 wider, with its prongs more widely diverging.

Female.—Pronotum and gaster with large reddish or black areas. Punctures much closer and more even, especially to the sides of the ocelli, in front of scutellum and on the disk of the gastral tergites.

In males of both species, most of the ventral surface of the club and of antennal segments 6–7 have very short, dense, pale hairs.

The certain records of *P. phaceliae* are now as follows: Arizona, Navajo Co., Snowflake, 26.vii.52, 1 ♂ (*Cazier* and *Schrammel*) (U.C.D.). New Mexico, Bernalillo Co., Albuquerque, 13.v.10, 1 ♂ (type) (U.S.N.M.); Dona Ana Co., Filmore Can. (= ? Fillmore Canyon), 1 ♀ paratype (U.S.N.M.), Mesilla, 29.v., 1 ♀ paratype (*Cockerell*) (U.S.N.M.), Las Cruces, 2 ♀ (U.S.N.M., B.M. (N.H.)), 12 m. N. of Las Cruces, levee of the Rio Grande, 9.iv.65, 3 ♂ (one reared from nests under stones), 7 ♀ (three reared) (*R. M. Bohart & F. D. Parker*), 11.iv.65, 1 ♂, 1 ♀ (*O. W. Richards*), 25.iv.65, 1 ♂, 10 ♀ (*O. W. Richards*), all on or amongst *Phacelia congesta* Hook. var. *rupestris* (Greene) MacBride; Otero Co., 5 m. N. of Alamogordo, on *Phacelia popei* T. & G. var. *similis* (Woot. & Standl.) Voss., 24.iv.65, 1 ♀ (*O. W. Richards*). Texas, Reeves Co., 23 miles W. of Pecus, 16.iv.54, 1 ♂ (*R. H.* and *L. D. Beamer*) (U.C.D.). Specimens of *Phacelia* were kindly determined by Mr. Wayne Savage through the intermediacy of Dr. Helen Sharsmith of the Berkeley Herbarium.

8. *Pseudomasaris maculifrons* (Fox)

This is one of the less common species, and in the 1963 paper only 38 males and 81 females were recorded. Now a further 164 males and 81 females have been examined, and Dr. Bohart has sent records of 16 males and 114 females. A long series was obtained by Dr. Hurd from a locality 3 miles S. of Palo Verde, Imperial Co., California, which is only 34 miles from Quartzite, Arizona, the type locality for *P. rohweri* Bradley, a synonym of the present species. The previous records from New Mexico were only the types of *P. albifrons* Rohwer and *P. zonalis neomexicanus* Rohwer; now we have many more specimens, which show that the species is common there and confirm my synonymy of Rohwer's two names. The nest of this species was not previously recorded; I have, however, seen specimens bred from nests in Arizona by Dr. Mont A. Cazier, and Mr. F. D. Parker found a number of nests near Las Cruces, which he will describe elsewhere.

New records:–California, Imperial Co., 3 miles S. of Palo Verde, on *Phacelia crenulata* Torr., 8.iv.63, 138 ♂, 31 ♀, 9.iv.63, 23 ♂, 14 ♀ (*P. D. Hurd, jr.*); Riverside Co., Joshua Tree National Monument, 1 mile W. Cottonwood Springs, 9.iv.52, 1 ♀ (*R. F. Smith*), 11.iv.63, 1 ♂, 1 ♀ (*C. A. Toschi, D. E. Bright*), Boyd Desert Research Centre, 4 miles S. of Palm Desert, 6.iv., 2 ♀, 12.iv., 1 ♀, 13.iv.63, 1 ♀ (*P. D. Hurd, jr.*). Arizona, Mohave Co., 2·8 miles E. of Parker, nest 7–14.ii.64, emerged 10.iv.64, 1 ♂, 2 ♀ (*Cazier* and *Mortenson*). New Mexico, Dona Ana Co., 12 miles N. Las Cruces, levee of Rio Grande, on or around *Phacelia congesta* Hook. var. *rupestris* (Greene) MacBride (det. Wayne Savage) and nesting under stones 9–11.iv.65, 5 ♂, 38 ♀ (*Bohart, Parker* and *Richards*).

Some of the characters of this species are referred to under the next.

9. *Pseudomasaris basirufus* Rohwer

The new material of this species is as follows: California, Imperial Co., 3 miles S. of Palo Verde, on *Phacelia crenulata* Torr., 8.iv.63, 5 ♂, 6 ♀, 9.iv.63, 2 ♂, 1 ♀ (*P. D. Hurd, jr.*); Salton Sea, 5.iv.59, ♀ (*C. A. Toschi*).

The locality in Imperial Co. is about 34 miles from Quartzite, the type locality for *P. bariscipus* Bradley, which I synonymised with this species in 1963.

This new material makes it possible to note certain new characters and some of the variations in this and the previous species.

One of the new females of *P. basirufus* has only a very small white spot on the mandibles. The central ventral process of gastral tergite 7 in the males is perhaps not best described as "subconical". It is narrower than in *P. maculifrons* and the sides are more convergent, but the end is always narrowly truncate with two small teeth on each side. The area above this process, between it and the two dorsal

processes, seems to be nearly always white in *P. basirufus* and always black in *P. maculifrons*.

The ventral process on gastral sternite 3 in *P. basirufus* is narrower anteriorly and ends in two small approximated teeth; posteriorly it is normally produced into a high knife-like edge of some length, but in one male this part is hardly raised. In *P. maculifrons*, the process is triangular, with its ventral surface more or less concave and surrounded by raised margins; it varies much in size and in shape from narrowly to broadly triangular, but is always much broader than in *P. basirufus*. In *P. maculifrons* it may be black or red or particoloured, and in a few specimens there are two white spots on the posterior face. The antennae of the male of *P. basirufus* may have segments 3 and 4 reddish, with black apices, but in the majority of specimens the red is largely, or occasionally entirely, replaced by white. In *P. maculifrons* antennal segments 3 and 4 are reddish with black apices or entirely black; segment 3, in particular, is usually black with a very narrow red ring where it joins 4.

The males of the two species differ constantly in the separation of the eyes on the vertex, by nearly three ocellar diameters in *P. basirufus* and by a little more than one ocellar diameter in *P. maculifrons*. A new character by which these and some of the allied species may be separated is found in the antennae. In *P. basirufus* and *P. macswaini* Bohart the antennae, including the club, are quite bare beneath. In *P. maculifrons*, the distal third of segment 7 beneath and the white part of the club bear dense short white hairs. In *P. micheneri* Bohart, the distal half of segment 6 and the whole of 7 beneath bear short dense white hairs, like those on the white part of the club.

10. *Pseudomasaris macswaini* R. Bohart *in* Richards

Four more females have been seen of this species, which was described from 6 males and 12 females: California, Kern Co., Short Canyon, 6 miles W. of Inyokern, 11.iv.62, 3 ♀ (*J. W. MacSwain*), Last Chance Canyon, 9 miles N. of Ricardo, 10.iv.60, 1 ♀ (*C. A. Toschi*). Dr. Bohart has seen 17 males and 39 females; San Diego Co., Borrego Valley, 11.iv.62, 7.iv.64 (*Bohart & Parker*); Inyo Co., Sand Canyon, 14.iv.62 (*R. M. Bohart*).

11. *Pseudomasaris vespoides* (Cresson)

Amongst 17 males and 50 females of this species is one new county record, from Butte Co., California. Additional flower records are: Labiatae, *Salvia carduacea* Benth., ♀; Scrophulariaceae, *Penstemon laetus* Gray, 3 ♀, *P.* sp., 1 ♀.

Six of the males and ten of the females were captured at altitudes above 9000 feet.

Errors have been noted in couplets 11, 18, 23 and 24 of the earlier key (Richards, 1963 : 285) and some new characters can now be added, together with the female of *P. cazieri* R. M. Bohart.

Revised key to the species of Pseudomasaris

1 Females 2
– Males 16
2 A sharp transverse ridge just above antennal sockets; clypeus strongly transversely rugose; fore basitarsus as long as mid-basitarsus
vespoides (Cresson)
– No ridge above antennal sockets; clypeus shagreened or punctate, sometimes very coarsely, but rugosities not transverse; fore basitarsus clearly shorter than mid-basitarsus 3
3 Mid-femur flattened beneath and with a more or less distinct anteroventral ridge, femur distinctly wider at base than at apex (least so in *P. edwardsi*); colour black and sulphur-yellow (or in some forms of *P. zonalis* whitish), frons with a pale spot above clypeus (except in some *P. zonalis*); angles of propodeum distinctly dentate 4

– Mid-femur rounded beneath with no anteroventral ridge; femur scarcely wider at base than at apex except in *P. wheeleri*, which is much larger . 6

4 Mid-tibia almost always with a distinct anterior prominence near middle; humeri with an obtuse anterior ridge; yellow of upper orbits not produced towards the ocelli; propodeal spines longer than in *P. zonalis* and yellow markings more extensive; metapleuron usually with a small yellow spot; size intermediate . . . . . ***edwardsii*** (Cresson)

– Mid-tibia with no anterior prominence 5

5 Larger; humeri rounded; yellow of upper orbits produced towards ocelli; metapleuron usually with a large yellow dorsal spot . . . ***coquilletti*** Rohwer

– Smaller; humeri with an obtuse anterior ridge; propodeal spines usually shorter than in the other two species; yellow of upper orbits not produced towards ocelli; metapleuron often with no or with a minute yellow spot; pale markings sometimes whitish in northeastern part of its range . . . . . ***zonalis*** (Cresson)

6 Clypeus closely and coarsely or rugosely punctured; propodeum strongly dentate; large species 7

– Clypeus finely and rather indistinctly punctured or shagreened; smaller species 9

7 Wings blackish. Clypeus much more strongly and rugosely punctured, interstices linear. Posterior disk of mesoscutum not punctured but with dense microsculpture, dull. Disk of third gastral tergite absolutely dull, with dense minute granulate sculpture. *Northern Mexico* ***cazieri*** Bohart *in* Richards

– Wings subhyaline. Clypeus much less strongly punctured or at least (*P. occidentalis*) interstices much more distinct. Posterior disk of mesoscutum closely and finely punctured, dull or slightly shining. Disk of third gastral tergite with extremely close fine punctures but not absolutely dull 8

8 Colour rather orange-yellow, bands of gastral tergites 2–5 feebly emarginate in front or covering whole segment; mesoscutum less closely punctured posteriorly. *Kansas, New Mexico, Texas* ***occidentalis*** (Cresson)

– Colour black and sulphur-yellow, bands of gastral tergites 2–5 deeply triemarginate or black-spotted in front; mesoscutum more closely punctured and duller posteriorly. *California* . . . . ***wheeleri*** J. Bequaert

9 Propodeum lamellate rather than dentate; if dentate, tooth very short; thorax with long dense hairs; not red-marked 10

– Propodeum with angles strongly dentate; thorax less densely pubescent; except in *P. macswaini*, nearly always with some reddish markings, at least on gastral segments 1–2 11

10 Markings whitish-yellow; clypeus, scape, mesopleuron, scutellum and gaster ventrally, black. *Region of Rocky Mountains northward* ***marginalis*** (Cresson)

– Markings sulphur-yellow; clypeus, scape, mesopleuron, scutellum, and gaster ventrally with yellow markings. *California, Sierra Nevada; Utah* ***macneilli*** R. M. Bohart *in* Richards

11 Smaller species with whitish markings; frons dull; mesoscutum closely punctured 12

– Species with yellow marking 14

12 Smaller; frons with no central white mark; mandibles with a white spot; punctures of frons, especially between eye and ocelli, fewer and smaller; punctures of mesepisternum smaller and denser. *California (Imperial and Inyo Cos.); Arizona (Yuma Co.), at low or moderate elevations* . . . . . ***basirufus*** Rohwer

– Slightly larger; mandibles brown; punctures of frons larger and more numerous, of mesepisternum larger and less dense 13

13 Antennal club relatively longer; antennal segment 6 about 1·5 times as broad as long, broader than length of segment 4; frons occasionally with no central white spot. *California, Inyo Mts. above* 5000 *feet* ***micheneri*** R. M. Bohart *in* Richards

– Antennal club relatively shorter; antennal segment 6 about 1·3 times as broad as long or less, not broader than length of segment 4; frons with a central white spot. *California and Utah to New Mexico; northern Mexico at lower elevations* . . . . . ***maculifrons*** (Fox)

14 Smaller, black and yellow species, without red; frons duller, mesoscutum more closely punctured; mandibles largely yellow. *Southern California* ***macswaini*** R. M. Bohart *in* Richards

– Larger, black and yellow species, pronotum partly red; frons, pronotum and mesoscutum more shining; mandibles brown 15

15 Apex of fore femur and dorsal bases of mid and hind tibiae yellow. Pronotum and gaster more extensively yellow. Punctures less close and even on frons, posterior disk of mesoscutum, and disk of gastral tergites. *Arizona to western Texas* . . . . . ***phaceliae*** Rohwer

– Apex of fore femur and bases of mid and hind tibiae concolorous, orange-brown. Pronotum and gaster with large reddish or black areas. Punctures much closer and more even on frons, posterior disk of mesoscutum and disks of gastral tergites. *Texas* . . . ***texanus*** (Cresson)

16 Anterior basitarsus with a long posterior fringe; posterior basitarsus curved, distally lobed; antennal club concave beneath and longer than segment 3; a more or less marked keel above antennal sockets; gastral tergite 7 nearly always with a pair of small dorsal tubercles as well as the two pairs of more ventral ones . . . . . ***vespoides*** (Cresson)

– Anterior basitarsus with or without a short fringe; posterior basitarsus usually nearly straight, not lobed; antennal club convex beneath, or else much shorter; no keel above antennal sockets; the extra pair of tubercles on gastral tergite 7 absent or, in *P. macswaini*, very weak . . 17

17 Antennal segments 6–7 wider than the short club, which is concave beneath; eyes widely separated and not reaching hind margin of vertex; fore basitarsus without posterior fringe . . . . . ***edwardsii*** (Cresson)

– Antennal segments 6–7 less widened, narrower than the club . . . 18

18 Eyes reaching posterior margin of head, approximated on vertex so that they closely approach posterior ocelli and are not themselves separated by more than three times the diameter of latter; fore basitarsus with a short but distinct posterior fringe 19

– Eyes not reaching posterior margin of head, not so approximated and only in *P. wheeleri* approaching the posterior ocelli; process of gastral sternite 3 hook-like behind 24

19 Gastral tergite 7 ending in a narrowly truncate process; process of gastral sternite 3 narrow, ventral surface nearly linear, anteriorly with two teeth, posteriorly in profile forming a hook; antennal segments 3–4 white (3 rarely reddish) with black apices, 4 distinctly widened at apex, penultimate segments and club bare beneath; eyes separated by rather less than three times diameter of posterior ocellus; pale markings white, red restricted to gaster and often not well developed. *California*; *Arizona.* ***basirufus*** Rohwer

– Gastral tergite 7 ending in a broader, truncate process, usually with minute teeth on each side; process of gastral tergite 3 triangular in ventral view, not toothed in front; antennal segment 4 not widened at apex . 20

20 Smaller species; process of gastral sternite 3 normally widely triangular; antennal club a little shorter, segments 6–7 usually little widened, flagellum not conspicuously annulated beneath, antennal segments 3–4 reddish-brown and black or (*macswaini*) lemon-yellow and black . . 21

– Larger species; gaster yellow with some red markings; gastral tergite 7 with no minute dorsal tubercles; process of gastral tergite 3 narrowly triangular; antennal club a little longer, segments 6–7 distinctly widened, flagellum annulated beneath 23

21 Markings whitish, gaster nearly always with some red suffusion; eyes separated by about 1·5 times the diameter of posterior ocelli or less, head and thorax more shining; gastral tergite 7 without minute dorsal tubercles 22

– Markings yellow, gaster without red; eyes separated by two to three times diameter of posterior ocelli; head and thorax duller; gastral tergite 7 with a pair of minute dorsal tubercles . . . ***macswaini*** Bohart *in* Richards

22 Antennal segment 6 only slightly widened at apex, just wider than segment 3, segment 7 not more than half as broad as long; eyes separated by about an ocellar diameter . . . . . ***maculifrons*** (Fox)

– Antennal segment 6 distinctly widened at apex, twice as wide as segment 3, segment 7 two-thirds as broad as long; eyes separated by 1·5 times an ocellar diameter . . . . . ***micheneri*** Bohart *in* Richards

23 Eyes separated by about one ocellar diameter; process of gastral sternite 3 narrower; antennal segments (dorsally) 3–4 brown, 5–7 orange to brown with ill-defined black apices, club less convex anteriorly, two-thirds white beneath; gastral tergite 7 narrower at apex, prongs less separated . . . . . ***texanus*** (Cresson)

– Eyes separated by two and a half to three ocellar diameters; process of gastral sternite 3 wider anteriorly; antennal segments (dorsally) 3–7 pale lemon-yellow, 6–7 with a sharply defined black apical band, club more convex anteriorly, one-third white beneath; gastral tergite 7 wider at apex, prongs more separated . . . . . ***phaceliae*** Rohwer

24 Mid-femur simple though thickened; antennal segment 7 twice as long as broad or rather longer, club convex beneath; large species . . . 25

– Mid-femur more or less emarginate beneath or with a tubercle near its apex posteriorly; fore basitarsus without posterior fringe; antennal segment 7 less than one and a half times as long as broad; process of gastral sternite 3 with ventral surface flat or slightly concave, without anterior teeth 27

25 Eyes approximated on vertex where separated by 3 times diameter of a posterior ocellus, which they almost touch; process of gastral sternite 3 with ventral surface slightly concave, without anterior teeth; more dorsal process of gastral tergite 7 longer and with a dorsal carina; fore basitarsus and mid-tibia as in *P. occidentalis* . . . . ***wheeleri*** J. Bequaert

– Eyes not approximated on vertex where separated by at least 5 times diameter of a posterior ocellus, which they do not nearly touch; process of gastral sternite 3 with ventral surface grooved and with two blunt anterior teeth; more dorsal process of gastral tergite 7 shorter and not keeled 26

26 Mid-tibia in front view strongly dilated at about middle; fore basitarsus with a short fringe of hairs; antennal club shorter and broader ***occidentalis*** (Cresson)

– Mid-tibia simple; fore basitarsus without a fringe; antennal club longer and narrower; species very largely orange-brown ***cazieri*** R. M. Bohart *in* Richards

27 Antennal segment 6 hardly more than twice as long as broad at apex, antennae conspicuously black annulated beneath only; mid-tibia simple, mid-femur with a slight tubercle behind at apex 28
– Antennal segment 6 at least three times as long as wide at apex; mid-femur emarginate beneath 29
28 Markings whitish-yellow, pleuron and scutellum black, venter of gaster mainly black; antennal club concave beneath; tubercle behind mid-femur larger . . . . . ***marginalis*** (Cresson)
– Markings sulphur-yellow, mesopleuron and scutellum with large yellow spots, venter of gaster mostly yellow; antennal club flattened beneath ***macneilli*** R. M. Bohart *in* Richards
29 Larger; antennal segments 6–7 gradually widening to the less well-defined club, which is hardly wider than segment 7; mid-tibia somewhat thickened, not emarginate . . . . . ***coquilletti*** Rohwer
– Smaller; antennal segments 6–7 less widened, club better defined, clearly wider than segment 7; mid-tibia anteriorly emarginate . ***zonalis*** (Cresson)

References

BEQUAERT, J., 1940, Notes on the distribution of *Pseudomasaris* and on the food plants of the Masaridinae and Gayellinae (Hymenoptera, Vespidae). *Bull. Brooklyn ent. Soc.* **35** : 37–45.
BRADLEY, J. C., 1922, The taxonomy of the Masarid wasps including a monograph on the North American species. *Univ. Calif. Publ. Tech. Bull.* **1** : 369–464, 15 pls.
RICHARDS, O. W., 1963, The species of *Pseudomasaris* Ashmead (Hymenoptera, Masaridae). *Univ. Calif. Publ. Ent.* **27** : 283–310, 3 pls, 26 figs.

Book Notices

The African genera of Acridoidea. By V. M. Dirsh. 8vo. Cambridge: University Press for the Anti-Locust Research Centre, 1965. Pp. xiii, 579, 452 text-figs. £10.

This work contains keys and short diagnoses for the families, subfamilies and genera of the African Acridoidea, and lists the African species of every genus. All African species up to and including those described in 1958 are included, together with a few later ones. The large selection of drawings is intended to supplement the diagnoses as an aid to identification. The distribution of each species is given, but synonymy and references to the literature have been omitted; such information was given in the companion work by H. B. Johnston, *Annotated Catalogue of African Grasshoppers*, published in 1956, which is being kept up to date with periodic supplements.

There is a useful section on terminology (pp. 3–14), and the volume concludes with a list of doubtful genera and species followed by an index.