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BEES FROM MOROCCO

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The bees recorded below were obtained on the Cockerell-Mackie Expedition of 1930.¹ The holotypes are all in The American Museum of Natural History.

Halictus albomaculatus Lucas

The species which I recorded from Morocco as *H. major* Nylander, female, is evidently *H. albomaculatus*, as Blüthgen has suggested. It is extraordinarily like *H. major*, but may be distinguished by the broad bands of white tomentum at bases of tergites, the difference from *H. major* being especially noticeable on the fourth. Blüthgen further suggests that my *H. phanerodontus* is really the male of this species. I compared it with a male of *H. separandus* Frey-Gessner, which is considered a synonym of *H. albomaculatus*, and found it to be distinct. *H. separandus* is the European form, and it may be that it is after all separable. Lucas describes the male of his *H. albocinctus*, which is considered to be a synonym of *H. albomaculatus*, but the description is so brief and general that it is impossible to reach any decision from it. The much less distinct abdominal bands (as compared with the female) do not seem characteristic. It is possible that there is a series of species of this group, as of *Monilapis*, but if so, the fact awaits adequate demonstration. I find I have a second male of *H. phanerodontus*, from Ifrane, August (W. P. Cockerell). The face is appreciably narrower than in the type, and the supraclypeal area is largely hidden by hair, not exposed and shining as in the type. The clypeus is somewhat ridged in the middle, and the hind basitarsi are largely darkened. The venter of the abdomen does not differ. The Ifrane locality is in the Middle Atlas, and it is possible that a different race is represented.

Halictus ifranicola, new species

FEMALE.—Length about 10 mm., anterior wing 7.7 mm.; very robust, with broad-oval abdomen; black, including mandibles and antennae (flagellum very obscurely brown beneath), but all the tarsi dusky red, the knees narrowly red, the

¹ For particulars, see "Natural History," XXXI (1931), pp. 309-317. (On p. 315, second column, for August 7 read September 7, and on p. 317 read Mr. Joseph Nurra.)

tibiae obscurely red at apex; hair of head and thorax rather scanty, dull pale fulvous. Head broad, approximately circular, the clypeus not produced; clypeus convex, shining, coarsely punctured; supraclypeal area shining; sides of face and front very densely punctured but glistening, no smooth line next to orbits; sides of vertex dull and excessively densely and finely punctured, but a little smooth space next to each lateral ocellus. Mesonotum closely and finely punctured, but shining on disc, median sulcus distinct; scutellum densely and coarsely punctured in middle, but at each side with a polished area; mesopleura strongly punctured, and with much long hair; area of metathorax crescentic, poorly defined, the surface with a weak reticulate sculpture, with some short plicae at base; posterior truncation dull, not sharply defined above; tegulae pale brown, clouded with darker, and with hyaline margins. Wings very strongly reddened; stigma clear red, nervures reddish; second cubital cell higher than broad, parallel sided, receiving recurrent nervure a considerable distance from end; third cubital broad. Legs with fulvescent hair, dense on hind tibiae; hind spur with four short brown teeth. Abdomen very broad, dull (including first tergite), and excessively densely and finely punctured; hair-bands on apices of tergites pale fulvescent, on first reduced to a transverse mark at each side, on second rather broadly interrupted, on third and fourth entire, but weak in middle; apex with fulvescent hair; ventral segments narrowly pallid on margins, and with much outstanding hair.

Morocco: Ifrane, Aug., 1930 (Alice Mackie).

In Blüthgen's table in Konowia, 1923, this runs to *H. patellatus* Morawitz, which differs by the distinctly shining abdomen, the middle of scutellum flat and shining, and the dark tegulae. From *H. fumatipennis* Blüthgen it differs by the dark antennae and more red on legs; in Blüthgen's table of Spanish species it would run best to *H. patellatus* but, disregarding the color of the legs, it runs to *H. fumatipennis*, differing by the light red or reddish stigma and nervures, and smaller size. It is also near *H. tetrazoniellus* Strand, from Cyprus.

Halictus leucozonius Schrank

We collected both sexes in some numbers at Ifrane and Asni, and I got one female at Fez, Sept. 6.

Halictus costulatus Kriechbaumer

Both sexes at Ifrane (W. P. Cockerell); a male at Asni, Aug. 11 (Cockerell).

Halictus callizonius Pérez

Males at Ifrane (A. Mackie) and Asni (Cockerell). Females from Tangier, July 31, collecting bright orange pollen (Cockerell) and Mogador, Aug. 20, collecting lemon-yellow pollen (W. P. Cockerell).

***Halictus (Monilapis) rejectus*, new species**

Halictus quadripartitus Blüthgen (err. det.), COCKERELL, 1931, Ann. Mag. Nat. Hist., June, p. 529. (Ifrane, Morocco. Male.)

Blüthgen (Jahrb. Nat. Ges. Graubündens, LXXI, p. 58) declares that my insect cannot be his *H. quadripartitus* and, on reviewing the subject, I must agree. He suggests, however, that it may be *H. maroccanus* Blüthgen, which he describes from Ifrane at the place cited. I was at first inclined to accept this solution, but a close study of the description brings out too many discrepancies. My bee is larger (length about 11.5 mm., anterior wing, 8 mm.), and the flagellum is black, with only a faint brownish tinge beneath (the third antennal joint has an orange spot, as in *H. maroccanus*). The first tergite (contrary to Blüthgen's description of *maroccanus*) is formed as in *H. simplex* Blüthgen (a specimen determined by Blüthgen compared), only the pure black apical margin is entirely dull, whereas in *simplex* it is shining. Blüthgen, comparing his insect especially with *H. simplex*, mentions no difference in the malar space; in *simplex* it is well developed and shining, in my insect shorter, dull in middle. The face is broader than in *simplex*, and the pure black eyes are longer; the antennae are very long, reaching end of thorax. The tergites are not brown at end, and the fifth tergite has an entire white band, lacking in *H. simplex* (this is true of *H. maroccanus*). The margin of the fourth sternite is evenly concave, as in *H. simplex*, and the margin of the fifth is similar. The wings are clear, a little dusky at apex, and the stigma is dark reddish brown (very pale, with a dark border, in *simplex*). The abundant hair of head and thorax is grayish white. The form of the fifth ventral segment distinguishes this from *H. quadripartitus*, and there are other differences. The mandibles not broadened at base at once separate it from *H. tomentosus* Eversmann, and the anterior basitarsi not broadened from *H. patellatus* Morawitz. The entirely black labrum and mandibles distinguish it from such species as *H. tetrazoniellus* Strand.

***Halictus (Evyllaesus) lucidellus*, new species**

FEMALE.—Length about 5 mm., anterior wing 3.5 mm.; rather slender, black, including mandibles and legs, but the flagellum dusky red beneath, the tegulae (which are not punctured) so dark brown as to be practically black. Head oblong, longer than broad, with the clypeus produced; clypeus, supraclypeal area and sides of face shining; front somewhat shining under a lens, but the microscope shows dense punctures which extend almost to the anterior ocellus, leaving only a little crescentic, smooth space in front of it (in *H. lucidulus* the front has dense punctures on a striatulate surface, but there is a smooth area in front of anterior ocellus, nearly as large as the ocellus). Mesothorax small, it and the scutellum appearing highly polished under a lens, the mesothorax with very minute, widely separated punctures, and the anterior

middle microscopically striatulate (*H. lucidulus* is similar, but the punctures on disc are larger and somewhat closer, and the parapsidal grooves are very much coarser); median groove of mesothorax distinct; scutellum very large, flattened in middle, with sparse minute punctures; area of metathorax large, entirely dull and minutely sculptured, with very irregular, often imperfect, weak plicae on basal half (in *H. lucidulus* it is quite different, the basal half with strong dense rugae, the valleys between them shining); postscutellum with very inconspicuous tomentum on its anterior border (densely white-tomentose anteriorly in *H. lucidulus*). Wings dusky hyaline, brilliantly iridescent, the nervures pale brown, the large stigma reddish brown, second cubital cell receiving recurrent nervure well before end (at extreme corner in *H. lucidulus*, which has browner wings). Hair on inner side of hind basitarsi clear white, but the brush at end yellow; hind spur white, with four small short brown teeth. Abdomen shining black, the margins of the tergites not evidently pallid, though the depressions appear brownish under the microscope; a thin inconspicuous rounded spot of pale hair at lateral bases of second and third tergites; first tergite with excessively minute punctures; apical tergites with long hairs.

Morocco: Asni, Aug., 1930 (A. Mackie).

I had this labelled *H. lucidulus*, but it is evidently distinct. According to Blüthgen, *H. gracilis* Morawitz is a synonym of *H. lucidulus*, and it has indeed the same kind of metathoracic area. But it resembles the species just described in having the punctures of front nearly up to median ocellus, and the parapsidal grooves very delicate. The wings are distinctly brownish, and the second cubital cell receives the first recurrent nervure well before the end. The tegulae in *H. lucidulus* are dark as in *H. lucidellus*, but in *H. gracilis* they are red. The specimen of *H. gracilis* compared was determined by F. Morawitz, and is marked "Petrop.," which I take to be the modern Leningrad.

H. minutissimus Kirby is easily distinguished from *H. lucidulus* and *H. lucidellus* by the mesonotum, which is minutely tessellate and dull from front to back, while the scutellum has no polished spaces. The English (Isle of Wight) *H. minutissimus* compared has the first recurrent nervure meeting the intercubitus, whereas in the specimens from Morocco it joins the apical part of second cubital cell. Some of the Asni specimens, which I had placed as *H. minutissimus* variety, are to be referred to *H. lucidulus*, but my series assigned to that species is variable, and even after the removal of *H. lucidellus* (which differs from all by the shape of the head), may be composite. One form has the wings conspicuously reddened.

***Halictus malachurus* Kirby**

Morocco: Tangier, one female July 31, six males, July 30-Aug. 1 (Cockerell).

Blüthgen, in his work on Spanish *Halictus*, cites a good character for

H. malachurus in the depression or pit at the end of the large, finely sculptured area of metathorax. It is evident in females which my wife and I collected at St. Helens, Isle of Wight, which are certainly Kirby's species. Blüthgen places female *H. subhirtus* Lepeletier in the series of which it is said, "area central, en su extremo, no deprimada." But Lepeletier describes *H. subhirtus* from the vicinity of Paris, and expressly says, "metathorace subemarginato." Blüthgen remarks that from the description of Lepeletier it is impossible to be really sure (no se comprende bien) what species he had. Considering the locality and the description, it would seem that he had *H. malachurus*. I have a series of one female and three males, labelled *H. subhirtus*, with the locality "Bord." (I presume Bordeaux.) They were collected by Pérez. As seen under a lens, the female has the clypeus shining practically all over, and the broad white margins of the second and third tergites are very conspicuous and sharply defined. The males, however, are of two sorts. In one specimen the area of metathorax is large, with extremely fine sculpture, and the apical dimple: all as in *H. malachurus*. In the other two it is short, coarsely plicate, and without any median depression. The difference certainly seems to indicate two species. Now Blüthgen, in his table of males, separates *H. subhirtus* from *H. malachurus* on this very character. (Area central del metatórax con arrugas fuertes hasta el apice, el cual no está hundido en su centro.) I think there is no doubt that those specimens are *H. subhirtus* as understood by Blüthgen.¹ In the case of the female, the clypeus of *H. malachurus*, seen under a lens, has the upper part more or less distinctly opaque, although the microscope reveals no marked difference in sculpture. The conclusion would then seem to be that there are, in fact, two distinct species, as interpreted by Blüthgen, in France and Spain, but that probably the original *H. subhirtus* was *malachurus*. The species very common at Tangier, and obtained by various collectors, is *H. malachurus*, but Nadig got a male of *H. subhirtus*, as determined by Blüthgen, at Asni. In 1923 Blüthgen recorded *H. subhirtus* from Amismiz and Marrakech. There is, however, still another complication. I have before me a female and a male (the latter borrowed from the American Museum), labelled "Weissnfls.," determined by Friese as *H. malachurus*. The male has the *H. subhirtus* (as above defined) type of metathorax, but it differs from my *H. subhirtus* males by the more slender abdomen, with the first tergite evidently narrower. The female has the area of metathorax large and rough, with no apical dimple. The clypeus

¹ M. L. Berland writes that the type of *H. subhirtus* cannot be found in the Paris Museum. It seems so nearly certain that it was *H. malachurus*, that I propose **H. malachurops**, n. n., for *H. subhirtus* as understood by Blüthgen and Pérez.

of the female does not appear to differ from that of English *H. malachurus*, but the tegulae differ, being shorter and reddened in middle. But the Morocco *H. malachurus* females (I have four, in addition to the one I took) have small reddish tegulae. They are also less robust than English specimens.

***Halictus malachurus sharificus*, new subspecies**

MALE.—Abdomen with the first three tergites pale red, or marked with red, varying as follows:

VAR. 1.—First tergite with the shoulders and a pair of transversely oval discal spots black; second tergite with similar spots, but much more widely separated, and elongated marks at extreme sides; third tergite with these marks united on each side, and a faint dusky shade across the disc. Flagellum bright ferruginous beneath. Tegulae hyaline, with a light yellow spot. Wings reddish. Marks on outer side of hind tibiae black. Tangier, July 31 (Cockerell).

VAR. 2.—Similar, but marks on each side of first tergite united to form a C, on second united to form a curved band, on third forming an entire transverse band, thickened in the middle. Tangier, Aug. 1 (Cockerell).

VAR. 3.—Similar in most respects, but first tergite black with a large quadrate median red patch, and red in middle before the depression; second tergite with an entire broad transverse black band; third mainly black, but a narrow red band before the depression. Hind tibiae with a large black mark. Tangier, Aug. 2 (Cockerell).

VAR. 4.—Similar to the last, but third tergite red at base except in middle. Marks on hind tibiae light red. Tangier, July 30 (Cockerell).

VAR. 5.—More robust, with very broad second cubital cell; tegulae pale testaceous with a light yellow spot. Patches of pale tomentum at sides of base of second and third tergites large and conspicuous; first tergite black with a square red mark on disc; second and third each with a transverse red mark, pointed at each end, that on third smallest; last sternite with apical half pale yellowish. Hind tibiae with a large red patch on inner side, and a smaller black one on outer. Anterior wings 6 mm. long. Asni, Aug. 8. (Alice Mackie).

These bees are easily known from *H. fratellus* Pérez (*frey-gessneri* Alfken) by the closely and distinctly, though minutely, punctured first tergite. Male *H. albipes* Fabricius, with red on the abdomen, differs in respect to the metathorax and the very long, comparatively dark antennae.

In 1933 (the paper was received Nov. 28, 1933), in his account of Nadig's *Halictus*, Blüthgen reported three males of the *sharificus* form from Tangier, but did not propose a special name for them. The holotype of *H. malachurus sharificus* is variety 1, above. This is the most extreme departure from typical *H. malachurus* but, if the name is used in a subspecific sense, it will presumably have to include all the Tangier *H. malachurus*.

A female labelled *H. longulus* Smith (which has been proved to be conspecific with *H. malachurus*), collected in Egypt by Ehrenberg, received from the Berlin Museum, has the smaller, reddish tegulae, and the upper part of clypeus appearing dull. The wings are reddish, and the nervures are pale reddish. Typical *H. longulus* is British, but Smith reported it also from Italy. The Egyptian insect appears to go with the form found in Morocco.

***Halictus (Evylaeus) rufulocinctus*, new species**

MALE.—Length about 6.2 mm., anterior wing about 5.5 mm.; black, with a broad white triangular area on apical part of clypeus; labrum with a yellow band across upper part; mandibles pale yellowish in middle, red at end; knees, tibiae, and tarsi pale reddish, the tibiae mainly black in middle; margins of tergites rather narrowly but very distinctly red. Head oblong, rather broad, the clypeus not much produced; head and thorax with grayish-white hair, moderately abundant on face, but not hiding surface; clypeus and supraclypeal area shining; front dull, with a shining band along orbits; cheeks hardly as broad as eyes; antennae short for a male, not reaching scutellum, flagellum obscure brown beneath, the middle joints not much longer than broad. Mesothorax and scutellum very highly polished, with weak punctures; no strong median groove on mesothorax; postscutellum short, with thin hair; area of metathorax very large, dull and rugulose all over, the apical margin obtuse but shining, depressed in middle (the microscope shows the area to have fine rugae forming an irregular network, and the apical part with minute transverse striae); posterior truncation obtusely bounded at sides above; mesopleura shining; tegulae small, clear red. Wings long, hyaline, faintly dusky apically; stigma dark reddish brown, basal and marginal nervures dark, those in middle of wing very pale; second cubital cell broad, its outer side sloping, the recurrent nervure received near end. Hind tibiae very hairy. Abdomen long oval, highly polished, without hairbands or spots; the microscope shows rather dense but excessively minute and weak punctures on first tergite.

Morocco: Ifrane, Aug. 26 (A. Mackie).

This may be compared with *H. convexiusculus* Schenck, from which it is easily known by the much darker stigma, and with *H. ventralis* Pérez (*combinatus* Blüthgen), from which it is known by the highly polished mesonotum. It is much too large for *H. lucidulus* Schenck or *H. semilucens* Alfken.

***Halictus (Evylaeus) asnicus*, new species**

MALE.—Length about 4.5 mm., anterior wing 3 mm.; black, with rather broad, not at all cylindrical, abdomen, and scanty whitish hair, not forming bands or spots on abdomen, but long and abundant on postscutellum. Head broad-oval; clypeus produced, with a broad whitish margin; labrum with a pale band; no light spot on base of mandibles; clypeus polished, with distinct punctures; supraclypeal area

small and highly polished; front shining but closely punctured, no smooth band along orbits; scape short, intense black; flagellum very long, light yellow beneath, dusky brownish above. Mesothorax and scutellum highly polished, finely punctured; mesopleura shining but well punctured; area of metathorax short, dull, with a shining border behind; posterior truncation shining, not sharply bounded; a small yellow spot on tubercles; tegulae very small and pale. Wings clear hyaline, iridescent, with very pale stigma and nervures. Legs black, the tarsi yellowish white, darkened at end; hind tibiae pale at base. Abdomen shining, the hind margins of the tergites rather broadly pallid.

Microscopic characters: front well punctured all over, except an impunctate band running down from middle ocellus; mesothorax shining, with well separated distinct punctures, and no median sulcus; tegulae not punctured; area of metathorax short, with rather strong but irregular plicae on basal half, the apical half smooth and dull, with a well-defined curved margin; posterior truncation not sharply bordered at sides above, the broad surface punctate; second cubital cell narrow, receiving recurrent nervure a moderate distance from end; third cubital not produced apically; abdomen closely and well punctured on tergites 1, 2, and basal half of third, the rest of third, and the fourth dull and impunctate.

Morocco: Asni, Aug. 12 (A. Mackie).

In Blüthgen's table of Spanish species it runs to 71, and it is a little doubtful whether the area of metathorax should be considered distinctly bounded or rounded behind. If the former alternative is chosen, it runs out on account of the dark base of mandibles combined with light band on labrum, and also on account of its small size. Choosing the latter alternative, it runs to 77, and has the head oval, and the second tergite well punctured as far as the short apical depression. It then goes on to 84, the second and third tergites being without depressions or incisions at base, and eventually it comes out with *H. griseolus* Morawitz. On comparison with *H. griseolus*, from Cyprus (Mavromoustakis), it is entirely different by the much longer antennae, and highly polished mesonotum. By the long antennae and shining mesonotum it resembles *H. politus* Schenck, but that differs at once by the dark antennae and stigma. It has the antennae and stigma much as in *H. semipunctulatus* Schenck, but that is considerably larger, with a long narrow abdomen. It agrees with no species reported from Morocco. I have not seen *H. musculus* Blüthgen, but that has the mandibles marked with yellow, and more yellow on legs. The under side of flagellum is ochre yellow. Pérez, in his paper on Barbary bees (1895) described *H. decolor*, *H. masculus*, and *H. mozabensis* from females, which in coloration more or less approached the condition normal for male *Halictus*. It is conceivable that the present insect is the male of one of these, but I think not likely. They all have considerable pubescence on the abdomen.

Halictus (Curtisapis) mogadoricus, new species

FEMALE.—Length about 6.5 mm., anterior wing 5 mm.; intense black, including the strongly curved mandibles, but the flagellum obscure brown beneath; pubescence on head and thorax dull white, rather scanty, finely plumose at sides of face. Head approximately circular, but clypeus distinctly produced; clypeus shining, coarsely punctured; supraclypeal area shining; front dull and densely punctured, with a shining band along orbits; vertex shining. Mesonotum dullish, moderately shining on disc, with very dense distinct punctures, readily visible under a lens; median sulcus distinct; much hair in region of tubercles; mesopleura coarsely sculptured; scutellum for the most part dull and very densely punctured, but bigibbous, the elevations shining; postscutellum anteriorly with dense white tomentum; area of metathorax subtriangular, sharply defined, with strong straight plicae extending to margin, the intervals shining; posterior truncation dullish, very coarsely sculptured, sharply bounded all round; tegulae small, very dark brown. Wings hyaline, faintly dusky, stigma and nervures dark brown; second cubital cell higher than broad, receiving recurrent nervure near end. Legs black, the tarsi somewhat reddened apically; hair on inner side of basitarsi white; hind tibiae with some almost black hair on outer side; hind spur serrulate, with about seven short obtuse brown teeth.¹ Abdomen with broad bands of pure white tomentum at bases of second to fourth tergites; hair bordering caudal furrow reddish; margins of tergites not discolored; first tergite rather narrow, brilliantly polished, but finely and closely punctured, the broad marginal depression duller and more finely punctured; the other tergites are dullish with a rather sericeous gloss, very finely and closely punctured.

Morocco: Mogador, at flowers of *Gaillardia*, Aug. 19 (W. P. Cockerell).

Related to *H. callizonius* and *H. leucozonius*, but smaller, with different metathorax. There is some resemblance to *H. pseudocaspicus* Blüthgen from Cyprus, but compared with that it is much less robust, with narrower face, and abdomen not so broad at base.

H. interruptus Panzer, taken at Ifrane, Aug. 26 (A. Mackie) is readily separated by the clypeus not being produced, the sides of the face not polished, and the tegulae red on outer side. Although Mogador and Marrakech are not far apart, they have entirely different climates. We left Marrakech in suffocating heat, but found Mogador, on the coast, windy and almost cold. This contrast is well known to every resident of Morocco, and travelers are warned to provide themselves with clothing adapted to the two extremes.

¹ The pollen collected is pale yellow.

