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List of the North American Species of Bombus and Aporthus

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Description of a new species of *MASARIS*, from the Rocky Mountains.

BY E. T. CRESSON.

Masaris vespoides n. sp.

Male. (Plate 4, fig. 1.) Length $9\frac{1}{2}$ lines; expanse of wings 15 lines. Head coarsely punctured, sparsely clothed with pale hairs; face above the antennæ flat; eyes large, with a deep, narrow sinus above the insertion of the antennæ; ocelli placed in an equi-lateral triangle on the vertex; clypeus convex, subquadrate, deeply emarginate at the apex with the angles rounded; labrum rounded at tip, hairy; mandibles somewhat obtuse, with two small indentations on the inner edge near the apex; antennæ smooth, a little longer than the head and thorax together, first joint short and thick, second very small, third to sixth joints somewhat flat and about equal in length, each joint being about twice as long as the first and second together, seventh joint two-thirds as long as the sixth, rather flat and broader than the preceding joints, the five apical joints formed into a broad oval knob slightly convex above and concave beneath, these five joints are apparently soldered together with the sutures very indistinct above but more distinct beneath. Prothorax prominent, closely punctured, hairy. Mesothorax oval and convex in front, sparsely hairy, closely and confluent punctured; somewhat flat before the scutellum where it is sparsely punctured, shining and with the posterior margin truncate. Scutellum semicircular, convex, sparsely punctured and shining. Wing-scale elongate and reniform. Metathorax somewhat flat, densely punctured, hairy, the posterior angles terminating on each side with an acute spine. Legs hairy, rather short, the posterior pair longest; anterior femora clavate, broadest near the base, and curved inward; tibiæ shorter than the femora, somewhat excavated on the inner edge towards the base; anterior tarsi ciliated beneath, and all, except the posterior pair, have the first joint as long as the remaining joints taken together; intermediate femora short, thick, not clavate, sinuate beneath; inner edge of the tibiæ deeply excavated from the middle to the base and sulcate, broadly dilated in the middle and somewhat suddenly constricted towards the apex; posterior femora somewhat clavate; tibiæ longer than the

femora and constricted at the base, with the tip armed with two unequal spurs, one of which is rather short, simple and curved, the other nearly twice as long, stout and deeply bifid; first joint of the tarsi as long as the tibiæ, narrow, cylindrical and curved inwards; tarsal claws simple. Superior wings rather long and narrow, with one marginal and two submarginal cells, the first submarginal somewhat longer than the marginal, the second submarginal about two-thirds as wide as the first submarginal and much narrowed towards the marginal; the third discoidal cell elongate and bent about its middle towards the second submarginal, which receives the second recurrent nervure in the middle. Abdomen with seven segments, elongate, convex above, gradually narrowed posteriorly, retractile, curved under; segments minutely punctured, shining, somewhat transversely sulcate on their disk and with their sides rounded from the base; first segment short, flat on its anterior face; apical segment narrow, subquadrate, sinuate on the sides, and deeply and widely emarginate at the apex, disk with two longitudinal carinæ each bearing a small obtuse tubercle on the posterior third of the segment. Abdomen beneath flat, smooth and shining, with a bifid projection on the anterior part of the second and third segments, that on the third segment being much more prominent and armed posteriorly with an acute spine; apical segment deeply bifid.

Head black; clypeus, apex of the labrum, middle of the mandibles, a transverse line, dilated in the middle, between the antennæ, and the outer and inner orbit of the eyes above the antennæ, yellow; antennæ above with the base of the first and the second joints black, the apex of the first, inner-side of the second and the four following joints yellow, the apical joints yellowish varied with fuscous, beneath blackish, margined on the inner side with yellowish, except the sixth joint which is tinged with fuscous. Prothorax black; its anterior margin above, and an oblong spot beneath the wings, yellow. Mesothorax black, a small, obsolete, yellowish spot on each side near the wing-scale. Scutellum black, a yellowish bilobed spot on the apex. Metathorax black, posterior angles yellow. Wing-scale yellow, except the anterior inner corner which is black. Wings stained with yellowish, nervures honey-yellow about the base, blackish towards the apex. Legs yellow, the coxæ and trochanters, except their tips, and the base of the femora black; tarsi, except the first joint, reddish-yellow. Abdomen black;

each segment above with a more or less broad yellow transverse band, almost confluent with the posterior margin; the anterior margin of the yellow band on first segment is angulated on each side, widens outwardly, narrow on the disk and slightly indented in the middle; the yellow bands of the second, third and fourth segments are deeply and somewhat squarely indented on each side with black, and slightly so on the disk, the yellow band on the second segment is divided into three parts by the indentation on each side becoming confluent with the black of the posterior margin; on the fifth and sixth segments the yellow band is broad, covering two-thirds of the segment, very slightly indented on the middle of the anterior margin; apical segment narrowly margined with black on the sides and tip, anterior part more broadly margined with black and produced posteriorly into a triangle, truncate at its apex with its sides somewhat rounded; the small tubercles on the disk are blackish. Abdomen beneath black, a spot on each side of the second and third segments, and a broad transverse band on each of the fourth, fifth and sixth segments, yellow.

Female. Length 8 lines; expanse of wings $14\frac{1}{2}$ lines.

In structure, it differs from the male as follows:—General form more short and stout. Eyes smaller and wider apart; a transverse carina between the antennæ; clypeus transversely rugose anteriorly, deeply and triangularly indented at the apex; antennæ short, not much longer than the head, rounded, first joint short and thick, second very small, third about as long as the three following joints together, fourth, fifth, sixth and seventh joints about equal in length, but gradually broader towards the apex, the five apical joints formed into an elongate-oval knob, as long as the four preceding joints together. Prothorax with the sides wider and somewhat flattened. Mesothorax more flat, with a distinct longitudinal dorsal carina, and another, rather indistinct, on each side of the disk between the wings. Metathorax with the posterior angles not so strongly produced. Legs shorter and simple, anterior tarsi not ciliated beneath. Abdomen with six segments, shorter, scarcely curved under and very slightly attenuated posteriorly; upper surface more distinctly punctured, semi-opaque and scarcely sulcate; apical segment broadly rounded at tip, without carinæ or tubercles on the disk; abdomen beneath slightly convex, without projections on the 2nd and 3rd segments, apical segment long and broadly rounded at tip.

In color, it differs as follows:—Head entirely black except the outer and inner orbit of the eyes above the antennæ, a transverse spot on the anterior margin of the clypeus, and the sides of labrum at base, which are yellow; antennæ above blackish with the third, fourth and fifth joints yellowish, beneath reddish-yellow with the base and apex black. Prothorax not so broadly margined anteriorly with yellow, but separated in front of mesothorax by a black line; no yellow spot beneath the base of the wings. Mesothorax and scutellum entirely black. Metathorax with the posterior angles slightly tipped with yellow. Legs yellow with the femora entirely black except the extreme tips. Wings rather darker. Abdomen not so broadly banded above with yellow; the bands of the first four segments resemble those of the male, that on the basal segment being interrupted in the middle; the band on the fifth segment is deeply indented on its anterior margin, and with a small transverse black spot on each side; apical segment with a large yellow spot on each side, confluent with the lateral margin of the segment; abdomen beneath with two small yellow spots on the disk of the second segment, and a narrow yellow band, more or less interrupted in the middle, on the third and fourth segments, and a small yellow spot on each side of the fifth segment.

Variety. (Plate 4, fig. 2.) Differs from the female above described as follows:—Sides of clypeus and labrum margined with yellow; the transverse yellow spot on the anterior margin of the clypeus larger; a yellowish spot on the mandibles near the base. Prothorax with the anterior margin entire, but the yellow is produced posteriorly into a point on each side of the mesothorax in front; the yellow spot beneath the base of the wings is present, as in the male. Mesothorax profoundly impressed on each side between the wings; the yellow spot on each side near the wing-scale is present, but much larger than in the male. Scutellum with a yellowish bilobed spot posteriorly. Metathorax with the posterior angles strongly produced and yellow. Legs colored as in the male. Wings stained with fuscous towards the apex. Abdomen: the second, third and fourth segments have the yellow bands with the anterior margin more or less indented in the middle, but on each side, instead of being squarely indented, the yellow band encloses a transverse black spot, which is largest and nearest to the disk on the second segment; the band on the fifth segment is very broad, deeply and some-

what squarely indented in the middle and with a very small black dot on each side; abdomen beneath with a dot on each side and a transverse spot in the middle of the second segment, and an uneven transverse band on the third, fourth and fifth segments, yellow, that on the fifth segment is narrower, divided in the middle with black, and with the yellow extending posteriorly on each side of the segment.

Hab. Pike's Peak. Collected by Mr. Winslow J. Howard.

One male and two female specimens in the collection of the Entomological Society of Philadelphia.

The male of this species differs remarkably in several points of structure from the type of the genus, *M. vespiformis*, as delineated by Messrs. Saussure and Schaum. It differs as follows:—The knob of the antennæ is much broader, and more of an oval. The neuration of the superior wings is different from that given by Dr. Schaum.* The marginal cell is not so long, the first submarginal more elongate, the second submarginal without any projection towards the marginal, the second discoidal cell much longer, the third discoidal not so square, but more elongate and bent towards the second submarginal. The figure given by M. Saussure† represents the neuration of the wing of our species much better, although the third discoidal cell is also too square. The singular structure of the anterior and in particular the intermediate tibiæ, and the posterior tarsi; the bifid styloid spine at the tip of the posterior tibiæ, and the simple tarsal claws‡ are characters not noticed in *M. vespiformis*. The tip of the apical segment of the abdomen above, instead of being bifid, as seems to be the case in *M. vespiformis*, is deeply and broadly emarginate, and the carinæ and tubercles on its disk are very conspicuous. The projections on the second and third ventral segments are also differently constructed from those of *M. vespiformis*, that on the second segment being less developed and bifid, while that on the third segment is strongly developed, bifid, and bearing an acute spine posteriorly.

* Ann. Soc. Ent. Fr. 3 sér. 1, pl. 20.

† Monog. des Masariens, pl. 5, f. 4.

‡ I am satisfied that the tarsal claws in this species are simple, and that the styloid spine at the tip of the middle tibiæ is deeply bifid, as I have examined them repeatedly with a strong magnifying power, and am quite convinced that it is the effect of no optical error, as suggested by M. Saussure (l. c. p. 17).

The antennæ of the female also differs somewhat from the figure given by M. Saussure (l. c. pl. iv. fig. 3c.) and Dr. Schaun (l. c. pl. 20, f. 7). The basal joint is scarcely half as long, and the knob (or the 5 apical joints), is much broader, and more of an oval.

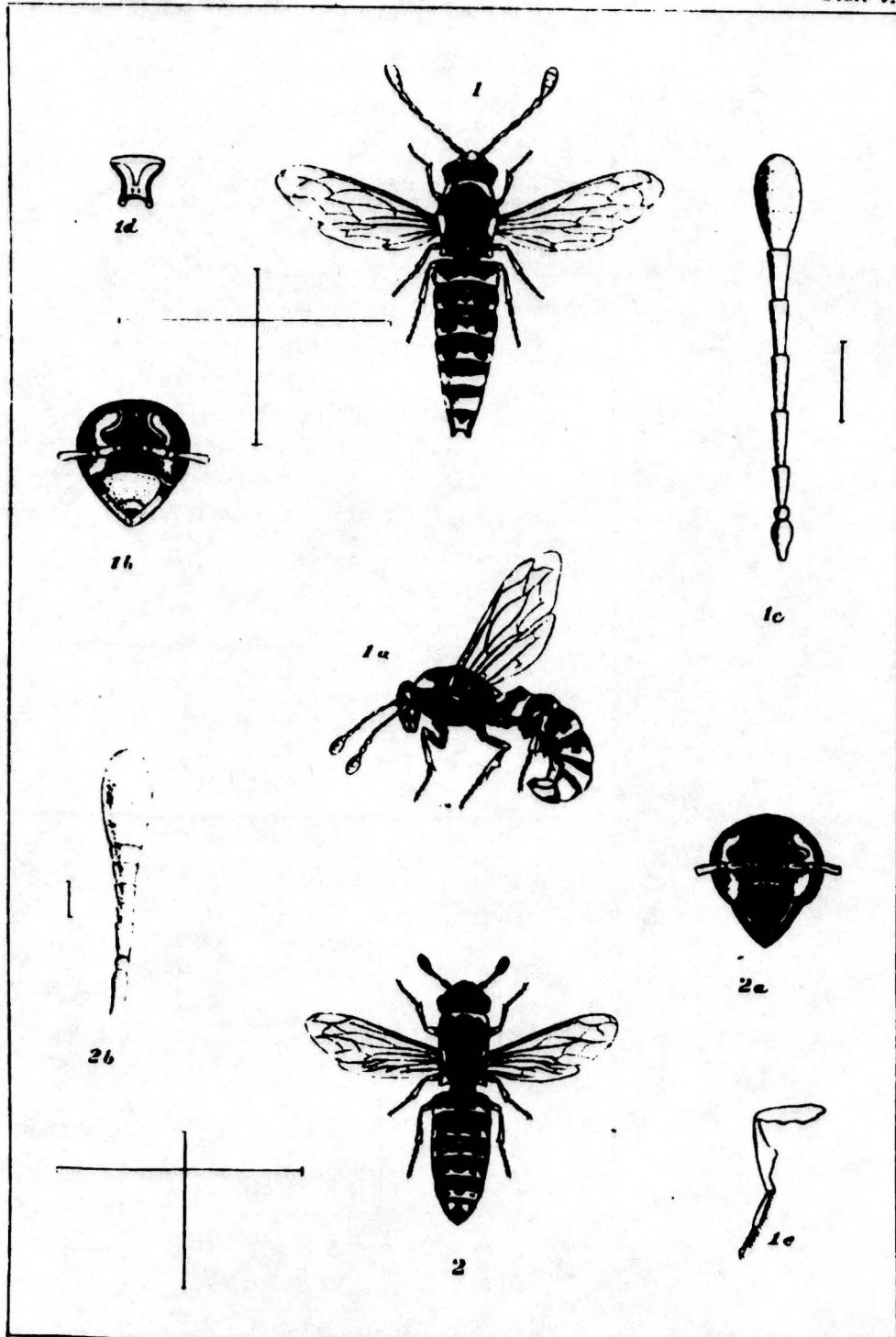
Taking all these differences of structure into consideration, it remains, therefore, a question, whether they are sufficient wherewith to establish a separate genus.

I must say here, that the rough plate accompanying this paper should not be taken as being correct in every particular, but will enable any one to recognize the species which it represents. Unfortunately it was printed off before several corrections were made, which I will mention here, so that no one may be misled. The neuration of the wings are not sufficiently correct, particularly in fig. 2. In fig. 1, the antennæ are rather too long in proportion to the insect, and also in fig. 1*a*, the first joint of the posterior tarsi should be as long as the tibiæ, and curved inward. The antennæ of the female (fig. 2*b*) should have the third joint much longer and the basal joint a little shorter.

EXPLANATION OF PLATE 4.

(All the figures are enlarged.)

Fig. 1.	Masaris vespoides, ♂.	
" 1 <i>a</i> .	ib.	profile.
" 1 <i>b</i> .	ib.	face.
" 1 <i>c</i> .	ib.	antennæ.
" 1 <i>d</i> .	ib.	apex of abdomen.
" 1 <i>e</i> .	ib.	middle leg.
" 2.	Masaris vespoides, ♀, variety.	
" 2 <i>a</i> .	ib.	face.
" 2 <i>b</i> .	ib.	antennæ.



Nasaris vespoides.

STATED MEETING, JULY 13.

President BLAND in the Chair.

REPORTS OF COMMITTEES.

The Committees on the papers of Messrs. Edwards and Cresson, read June 8th, reported in favor of their publication in the Proceedings of the Society.

DONATIONS TO CABINET.

A large and very fine collection of determined European LEPIDOPTERA, from Wm. H. Edwards, of Newburgh, N. Y.

50 COLEOPTERA (*Cychrus niagarensis*, *Panagæus crucigerus*, *Chlænius niger*, *Bolbocerus Lazarus*, *Ludius attenuatus*, *Atimia confusa*, *Arhopalus speciosus*, *Saperda candida*, *Physocnemum brevilineum*, *P. ligneum*, *Eudocinus Mannerheimii*), 12 LEPIDOPTERA (*Eudryas grata*, *Plusia simplex*, *Hadena xylinoides*, *H. miseloides*, *Agrotis suffusa*, *Placodes cinereola*, *Erastria carnicola*), from Harvey J. Rich, of Brooklyn, N. Y.

35 HYMENOPTERA (*Diastrophus nebulosus*, and galls, *D. cuscuteformis*, *Aulax pirata*, *A. sylvestris*, *Rhodites verna*, *R. radicum*, and gall, *R. rosæ*, *R. bicolor*, *R. ignota*, *R. dichlocerus*, and gall, *Callimome magnifica*, *C. brevis*, *C. dichlocerus*, *C. advena*), from Baron R. Osten Sacken.

20 COLEOPTERA (*Hippodamia Lecontei*, *Chrysomela philadelphica*, *Agriotes muncus*, *Corymbites pulcher*, *C. tarsalis*, *Acmæops proteus*, *Carabus Lapaluyi*, *Phellopsis obcordatus*, *Aphodius fossor*, *Emmesa connectens*), from Wm. Cowper, of Quebec, Canada.

1 LEPIDOPTERA (*Smerinthus modestus* ♀), from Aug. R. Grote, of Buffalo, N. Y.

1 COLEOPTERA (*Goes tessellatus*), from C. F. Parker.

DONATIONS TO LIBRARY.

Silliman's American Journal of Science and Arts, for July, 1863,
from Dr. T. B. Wilson.

*Descriptions of some species of Lepidoptera, from the Northern
shores of Lake Superior, by Dr. T. W. Harris, from J. W. Wiedemeyer.*

*The Insect Hunter's Companion, by Rev. Jos. Greene, M. A., from
Dr. Samuel Lewis.*

Prairie Farmer, (Chicago, Ill.) Vol. 11, Nos. 11 to 26.

The following works were deposited by Dr. T. B. Wilson:—

*Gronland geographisch und statistisch beschrieben. Aus dänischen
Duellschriften von Anton von Etzel. 1 Vol. 8vo.*

The Journal of Entomology, Nos. 5—8. London. 8vo.

Tijdschrift voor Entomologie. Deel 6, Stuk. 3 & 4.

The Zoologist, for April und May, 1863. 8vo.

Wiener Entomologische Monatschrift. Bd. 7, Nr. 3 & 4. 8vo.

The Entomologist, by E. Newman. 1 Vol. (Complete.) 8vo.

*Revue et Magasin de Zoologie, par M. F. E. Guérin-Ménéville.
1863, No. 2 & 3. 8vo.*

*Proceedings of the Linnean Society of London, Zoology. Vols. 1—
6. 8vo.*

*Annales de la Société Entomologique de France. 4^e série, Tome 2.
Trim. 4. 8vo.*

Annales de la Société Entomologique Belge. Tome 6. Royal 8vo.

Exotic Butterflies. By W. C. Hewitson. Part 46. 8vo.

*Naturgeschichte du Insecten Deutschlands. Von Dr. W. F. Erich-
son. Coleoptera. Bd. 1—3, and 4 Lief. 1—3. 8vo.*

*Genera des Coléoptères d'Europe. Par Jacquelin Du Val. 2 Vols.
Royal 8vo.*

WRITTEN COMMUNICATIONS.

The following papers were presented for publication in the Proceed-
ings:—

" American Micro-Lepidoptera, by Brackenridge Clemens, M. D."

" Observations on American Tineina, by H. T. Stainton."

And were referred to Committees.

The following Communication was read from Baron R. Osten Sacken :

" Mr. Walsh just communicates me that he bred *Lasioptera solidaginis* O. S., described by me in these Proceedings (Vol. I, p. 368) in great numbers, from the *lepidopterous* gall on *Solidago*, and not from the gall of *Trypeta solidaginis*. He also bred the same *Lasioptera* from exactly similar galls on *Vernonia fasciculata*.

" Thus the doubts which I entertained when the above quoted paper was written, are now solved.

" I may mention here that *Trypeta asteris* Harris is nothing but a synonym of *T. solidaginis* Fitch, as I have ascertained in Mr. Harris's collection in Boston. Whether this fly really also produces galls on *Aster*, remains to be decided by observation. In Mr. Harris's manuscript catalogue of his collection, which is still preserved, he had written originally, opposite the number, designating this fly: '*produces galls on Solidago*.' Later, however, he struck out the word *Solidago* and put *Aster*, in pencil, in its stead. Although the name *T. asteris* is older, I think that the name of *T. solidaginis*, as the more appropriate one, should be preserved, the more so, as there exists another *T. asteris* of Haliday."

NEW BUSINESS.

On motion, the thanks of the Society were unanimously tendered to Wm. H. Edwards, Esq., of Newburgh, N. Y., for the large and beautiful collection of European Moths, presented by him this evening.

ELECTIONS.

On ballot, Mr. Tryon Reakirt, of Philadelphia, was elected a *Resident Member*, and the following persons were elected *Corresponding Members* of the Society:—

F. W. Tepper, of Brooklyn, N. Y.

R. W. Kennicott, of the Grove, Cook Co., Ill.

Edward Tatnall, Jr., of Wilmington, Del.

Henry S. Sprague, of Buffalo, N. Y.

Description of certain species of DIURNAL LEPIDOPTERA found within the limits of the United States and British America. No. 2.

BY WM. H. EDWARDS, NEWBURGH, NEW YORK.

- | | |
|--|--|
| 1. <i>Parnassius Sayii</i> , nov. sp. | 4. <i>Lycæna Amica</i> , nov. sp. |
| 2. <i>Colias Christina</i> , nov. sp. | 5. <i>Melitæa Texana</i> , nov. sp. |
| 3. <i>Colias Helena</i> , nov. sp. | 6. <i>Anthocaris Ausonoides</i> , Boisd. |
| 7. <i>Chionobas Chryxus</i> , Doubleday. | |

PARNASSIUS SAYII, nov. sp.

Female, 2½ inches. Upper side: primaries white, with a broad semi-transparent margin which encloses a transverse row of white, lunular spots; base black: a large rounded spot in the cell, another nearly same size on the arc, and a patch on the inner margin: between the cell and the sub-marginal row are three white spots running from the costa, each surrounded with black; no red spot; fringe of both wings white with black points at the tips of the nervures.

Secondaries white, with a narrow semi-transparent margin, and a sub-marginal row of black lunules; base and abdominal margin to the end of the body deep black, sending out a hook which passes around the extremity of the cell; a large pink spot on the costa, another on the disk, both edged with black: on the abdominal margin, below the black space, are two small connected black spots, placed transversely, each enclosing a pink spot

Under side: primaries as above; on secondaries are four black spots across the base, each marked with a few pink scales; the black spots on the abdominal margin re-appear as three separated spots, the middle one largest and triangular, each showing a few pink scales.

Body black above, below covered with yellow hairs; at the extremity of the abdomen a horny pouch shaped as in *Nomion*: palpi yellow: antennæ yellowish with fine black rings: club black.

From the Society's collection. Taken at Pike's Peak.

I am not certain whether this species may not be the one taken for *Nomion*, which is a Siberian species, said in the British Museum Catalogue to be found in the Rocky Mountains and California. I have examined several specimens of the true *Nomion*, and it is described

and figured by Boisduval in his *Species Général*, vol. 1. Although there are some points of resemblance between the two, the differences are decided. They are much alike in the general color, in the shape of the black abdominal border, and of the horny pouch of the abdomen; but the present species is much smaller in size, with no red spots on primaries, or at the base of secondaries above; the fringe is not alternate black and white, as in *Nomion*, and there are several other points of difference. *Nomion* is a conspicuous species, from its large size and the number and brilliancy of the red spots on both wings.

COLIAS CHRISTINA, nov. sp.

Male. Expands $2\frac{1}{10}$ inch. Upper side: primaries bright yellow, with a large, deep-orange patch on the disk, which reaches neither the costa nor the base, and occupies about one-half the space inside the border; the border is broad, black, crossed by the yellow nervures nearly or quite to the margin, and resembles *C. Eurytheme* in the outline of its inner edge; discal spot small and black; edge of costa rose-red.

Secondaries lemon yellow with a paler orange patch which is confined to the outer limb, reaching neither the costa nor abdominal margin; the border narrow, with a very even inner edge, also crossed by the yellow nervures; discal spot large, deep-orange; fringe of both wing long, rose-red.

Under side: primaries same yellow, the basal half pale-orange; costal margin sprinkled with fine black scales; between the nervules three or four sub-marginal brown points or clusters of scales; discal spot as above.

Secondaries more greenish, covered uniformly with fine black scales; an obsolete sub-marginal row of brown points; discal spot small, round, silver-white, in a reddish brown circlet about which are a few scales of same color; a few rosy scales at the base; fringe and costal edge of each wing rose-red; palpi pale yellow; legs and antennæ rosy; club blackish.

In three specimens out of four there were no traces of the sub-marginal points.

Female. Expands $2\frac{5}{10}$ inches. Upper side wholly pale yellow, without a border; discal spots as in the male, that of secondaries being more yellowish; fringes rose-red.

Under side paler and immaculate, excepting the discal spots; the basal half of primaries brownish yellow instead of orange; otherwise like the male.

Taken at the portage of Slave River, by Mrs. Bernard C. Ross, late of Fort Simpson, for whom I have the honor to name this fine species.

COLIAS HELENA, nov. sp.

Male. Expands $1\frac{5}{16}$ inch. Upper side greenish yellow, deepest colored on secondaries, sprinkled with black on the costa of primaries and at the base of the wings; border of primaries broad, black, much advanced on the costa, not crossed by yellow nervures; that of secondaries of medium width, short, terminating midway on the margin; both borders erose on inner edge; primaries have a slender, black, discal mark; secondaries only an indistinct pale point, fringes rose-red.

Under side: primaries in color much as above, with a similar discal mark; secondaries dark greenish yellow, covered with fine black scales; discal spot small, round, silver-white, with no border; at the base a few rosy scales; body black above, yellow beneath; collar rosy; palpi yellow with rosy hairs at extremity; legs and antennæ rosy; club brown.

Female. Expands $1\frac{7}{16}$ inch. Upper side soiled white with a slight green tinge; primaries have brownish-black border, very broad at the apex, terminating in a point at the inner angle, the inner edge on the inferior nervules emarginated; secondaries have a narrow border at outer angle only; discal spots as in the male; fringes rose-red.

Under side: primaries same white as above, the apex and costal margin washed with yellow; secondaries as in the male.

From Mackenzie's River, taken by Mrs. Ross.

LYCÆNA AMICA, nov. sp.

Male. Expands $1\frac{1}{16}$ inch. Upper side silvery-blue, brownish along the margins, with a narrow, straight discal mark on primaries; fringe white. Under side glossy greyish white; primaries have a narrow discal mark and a curved row of six minute black spots across the disk; secondaries have a nearly straight row of five minute spots, besides two on the costa, one of which is in the middle, the other near the base, all

edged with white; there is also a sub-marginal row of points and small brown lunules, sometimes obsolete.

From Mackenzie's River, by Mrs. Ross.

MELITÆA TEXANA, nov. sp.

Male. Expands $1\frac{5}{16}$ inch. Upper side blackish brown, mottled with fulvous at the base of the wings, and sprinkled with small white spots; these form, on primaries, an interrupted sub-marginal line, and an abbreviated line of three spots from the costa, besides five or six others irregularly placed; on secondaries, a bent line across the disk and a sub-marginal row of faint crescents; fringe blackish, except in the emarginations, where it is white.

Under side: primaries ochrey-yellow next the base, and beyond, dark brown; the apex and hind margin paler brown; a sub-marginal row of crescents; the white spots re-appear of larger size.

Secondaries buff next the base, reticulated with reddish-brown lines; a white band crosses the disk corresponding to the spots on upper side; beyond to margin clouded with brown, with a row of crescents, the third from the anal angle largest and whitish, all surmounted by blackish spots.

Texas.

ANTHOCARIS AUSONOIDES, Boisduval: mentioned in description of *A. Sara*. Ann. Soc. Ent., X. p. 286. 2d Ser.

Male. Expands $1\frac{6}{10}$ inch. Upper side white; primaries have the apex blackish, enclosing a white patch on the costa and two or three white rays along the ends of the nervules; costa slightly sprinkled with black; a black, narrow, sinuous spot on the arc; fringe alternate white and black.

Secondaries have a mottled appearance from their transparency; fringe white with black points at the ends of the nervules.

Under side: primaries as above, except that the apex is faintly clouded with dull green; secondaries mottled with dull green disposed in three jagged, transverse bands and a demi-band on the inner side between the marginal and central; the marginal band deeply scalloped; the bands more or less connected.

Female. A little larger, resembles the male.

California, from Dr. H. Behr. Youcon River, from Mr. R. W. Kennicott. Pike's Peak, in the Society's collection.

The resemblance to *Ausoniu* is very close, but not more so than to *Tagis* or to *Simploniu*, two other European species.

CHIONOBAS CHRYSUS, Doubleday: figured in Genera of Diurnal Lepidoptera, but not described.

Male. Expands 2 inches. Upper side: primaries brown, with a broad, ochrey yellow band across the nervules, not reaching the costa; within this band are two round, black spots, the upper one largest and between the discoidal nervules; the other minute, between the second and third median nervules.

Secondaries ochrey yellow, bordered with brown at the outer angle; a minute black spot near the anal angle; fringe of both wings alternate black and whitish.

Under side: primaries paler, the upper spot reproduced, and having a white pupil; the whole wing, except the band, marked by fine, dark brown streaks, at the apex and on the costa interspersed with white.

Secondaries mottled with brown and white, the latter color predominating next the base; a broad, sinuous band crosses the disk, darkest on the edges; the minute spot reproduced.

Female. A little larger, of an uniform dull ochrey yellow; primaries have three spots, the two outer ones with white pupils.

Taken near Pike's Peak; from the Society's Collection.

The female of this species much resembles the female of *C. Taygete*, from Labrador.

List of the North American species of **BOMBUS** and **APATHUS**.

BY E. T. CRESSON.

The great difficulty that has attended the discrimination of the European Bombi, on account of the many variations, will doubtless be experienced with our own species, until a correct knowledge of them is obtained. A mere examination or comparison of the specimens will not surmount this difficulty,—their haunts must be examined, and the only way in which the species and their varieties can be correctly separated, is either by capturing or breeding the individuals from their nests. As yet no such information has been obtained of our species, and to make a beginning, we must do the best we can in separating them by examining and comparing specimens, until we obtain by experience such knowledge as will enable us to produce a correct division of these insects. It is my purpose, therefore, in this paper, to give a list of our species with their characters, together with a few notes which may be of service to future monographists of this group.

Gen. **BOMBUS** Latr.

Bombus Latr. Hist. Nat. Ins. xiv, 63. (1802).

Bremus Jurine, Hym p. 259. (1807).

The latest, best and most detailed description of the characters of this widely distributed genus, is thus given by Mr. Smith, in his *Catalogue of the Bees of Great Britain*, (p. 207):—

“*Body* oblong and densely pubescent. *Head* subtriangular. *Antennæ* geniculated, filiform, longer than the head. *Ocelli* placed in a slight curve in a transverse impression on the vertex. *Labrum* transverse, its anterior margin ciliated. *Mandibles* stout, grooved exteriorly towards their apex, which is rounded. *Labial palpi* four-jointed; the first joint elongate, longer than the mentum, the second joint about one-fourth as long as the first, ciliated at the sides; the third and fourth joints minute, placed outside and near the apex of the second joint. *Paraglossæ* short, broad, and rounded at their apex. *Labium* linear, very pubescent, and about one-third longer than the labial palpi. *Maxillary palpi* two-jointed. *Superior wings* with one marginal and three submarginal cells, the second submarginal cell much narrowed towards the marginal, receiving the first recurrent nervure about the middle; the third submarginal narrowed towards the marginal, receiving the second recurrent nervure near

its apex. *Posterior legs* in the *females* have on the upper and under margins of the tibiæ externally, a dense fringe of stiff hairs, forming a corbicula or pollen-basket; the exterior surface of the tibiæ smooth, shining, and broadly dilated; the basal joint of the tarsi elongate, broad, flattened, and slightly concave exteriorly, deeply notched at the base, forming a stout tooth; the exterior margins ciliated with short stiff hairs; the claws bifid. In the *males* the tongue is more elongate and slender; the mandibles have a dense fringe of curled hair on their inferior margins; the antennæ are more slender, and longer; the posterior tibiæ are not furnished with a corbicula, and are slightly thickened; the basal joint of the posterior tarsi not notched at the base; the abdomen has an additional segment, and the antennæ an additional joint."

The difference in the shape of the posterior tibiæ and first joint of the posterior tarsi of the males, will more easily distinguish it from the female sex, as it is often troublesome to count the joints of the antennæ and the segments of the abdomen; but a very conspicuous character with which to distinguish the sex, and for which, apparently original, observation, I am indebted to Benj. D. Walsh, Esq., of Rock Island, Ill., is the difference in the shape of the tarsal claws:—in the male the inner tooth of the claw is almost as long as the outer, while in the female and worker the inner tooth is very short. This character, as far as I have observed, is constant.

Between the *female* and the *worker*, there seems to be no external characters, excepting size, by which to distinguish them, the worker being the smallest, and yet in a large series of some of our common species, the size gradually diminishes from the largest female to the smallest worker, making it quite impossible to divide them without more explicit characters. However, as there seems to be some confusion of opinion amongst authors, regarding the difference in size between the females and the workers, and in the absence of any satisfactory solution of the matter, it may be interesting to cite here a few passages on this subject. Reaumur (*Ins.* vi.) says:—"The nests seldom contain more than 50 or 60 inhabitants; these are of different sizes: the females, of which there is more than one in a nest, are the largest, and probably alone survive the winter; the males are of the middle size, as is also one description of working-bees, or neuters; the other neuters are the smallest, no bigger than the hive bee. These two sorts of neuters, it is most likely, are appropriated to different kinds of work; the largest being the strongest, and the others the most lively, active and expert." Huber (*Trans. Linn. Soc. Lond.* 1802, vi, p. 218) says:

“The males of *Bombi* are always smaller than their females; the difference is greater or less according to the species; in some, the females are at least double the size of the males, in others they are only a few lines longer. The size of the males and the females scarcely varies in each species, but the workers have not so fixed and uniform a size; some are so small that they would not be taken for *Bombi*; others are so large that one would be tempted to take them rather for females than for workers; nevertheless their size is never equal to that of the mothers, and a glance of the eye is sufficient to compare them, and to put each one in the place which it ought to occupy.” Again, on p. 284, he says:—“The form of the maxillæ of the female is entirely like that of the worker; its legs are equally capable of being charged with pollen, the colors of both are generally distributed in the same manner upon all parts of the body; it appears, that if to so many relations, we add that of fecundity, we shall make of the workers as many small females; for the difference of size is the only exterior character by which they can be distinguished.” And again, on p. 290, he says:—“Among the workers there were assuredly small females, which I should have recognized, if I had been able to find in them any distinctive character.” St. Fargeau (*Hym. i, 448*) says:—“When the birth of a certain number of workers has made the work more easy, and the arrival of provisions more active, comes the period when the Mother Humble-Bee lays eggs of males and at the same time eggs of females. These females, at least some of them, acquire a size much above that of the mother, founder of the nest. They are in this respect intermediate between the latter, and the small barren workers, which first came into the world. Like the workers they share in the common labors, and, like their mother, they become fecundated by connection with the males born at the same period as themselves. These males are also smaller than the males which will be born at the end of the summer. * * * * Then the population increases in proportion to the number of these young females, of medium size, which have just been hatched; the number of males especially appears to increase rapidly, which would lead me to believe that they gave birth to males only. The female founder continues nevertheless her laying, and, towards the end of August, there are raised, in each nest, several females of the largest size (from three to eight, as far as I have been able to see). It is these

which will pass the winter, benumbed by the cold, and which are destined to the subsequent propagation of the species in the following year."

Thus it seems that Reaumur and Huber consider all workers, except the largest females, while St. Fargeau seems to think that all are females except the smallest, which he calls the workers.

The opinion of St. Fargeau is probably the most correct, although there is no doubt that the workers vary in size as well as the females. An examination of the sexual organs, however, may show some differences of structure between the two sexes.

Our species of *Bombus* are quite numerous, and many of them very handsome.

The following table may facilitate the determination of the species:—

* *Thorax above entirely yellowish.*

§ Abdomen yellowish and black.

† *Apex black.*

1st segment yellow.....	Sp. 1—2.
2d segment yellow.....	Sp. 3.
1st and 2d segments yellow.....	Sp. 4.
1st, 2d and 3d segments yellow.....	Sp. 5.
Mixed with black and yellow.....	Sp. 6.

†† *Apex yellowish or whitish.*

First 3 segments yellow.....	Sp. 7.
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§§ Abdomen entirely yellowish-white in certain lights.....Sp. 8.

** *Thorax above yellowish, banded with black.*

§ Abdomen whitish or yellowish and black.

† *Apex black.*

First 5 segments yellow.....	Sp. 9.
“ 4 “ “	Sp. 10—11.
“ 3 “ “	Sp. 12—13.
“ 2 “ “	Sp. 14—16.
Third segment yellowish.....	Sp. 17.
Fourth “ “	Sp. 18—19.

†† *Apex white or yellowish-white.*

First 3 segments black, remainder white.....	Sp. 20.
1st, 2d and 4th segments black.....	Sp. 21.
1st, 3d and 4th “ “	Sp. 22.
1st, 4th and 5th “ “	Sp. 23.
1st and 4th “ “	Sp. 24.

§§ Abdomen yellow, reddish or fulvous and black.

† *Apex yellowish or fulvous.*

3d, 4th or 5th segments black.....Sp. 25—29.

†† *Apex black.*

1st and 2d segments yellow and reddish; rest black.....Sp. 30.

1st segment yellow, 2d, 3rd and part of 4th reddish.....Sp. 31.

1st and part of 4th segments yellow, 2d and 3rd reddish.....Sp. 32.

“ “ “ “ 2d, 3d & part of 4th reddish.....Sp. 33.

1st and 4th segments yellow, 2d and 3rd reddish.....Sp. 34.

1st and 2d segments yellow, 3rd and 4th reddish.....Sp. 35.

§§§ Abdomen entirely yellowish or reddish, or both.

Anterior half yellow, posterior reddish.....Sp. 36.

2d and 3rd segments reddish.....Sp. 37.

3d and 4th “ “Sp. 38.

All yellowish except anus.....Sp. 39.

*** *Thorax above black.*

Abdomen with the first 3 segments more or less yellow or red Sp. 40—42.

“ reddish, except the 1st and last segments.....Sp. 43.

“ all black.....Sp. 44.

1. *B. Virginicus.*

Apis Virginicus Oliv. Encycl. Méth. Ins. iv, p. 66. (1789).

? *Apis griseo-collis* De Geer, Mém. Ins. iii, p. 576, pl. 28, fig. 13—14. (1773);

Oliv. Encycl. Méth. Ins. iv, p. 64. (1789).

Bombus Virginicus Fabr. Syst. Piez. p. 346. (1804); St. Farg. Hym. i, p. 470.

(1836); Kirby, Faun. Bor. Am. iv, p. 274. (1837); Smith, Brit. Mus. Cat.

Hym. ii, p. 398. (1854); Greene, Ann. Lyc. Nat. Hist. N. Y. vii, p. 170.

(1860).

Female. Head black, clothed more or less with yellowish hairs above the antennæ. Thorax above and on the sides pale yellow, more sparse on the disk. Wings vary from sub-hyaline to violaceous. Legs black, except the base of the femora beneath which is sometimes clothed with yellowish hairs; tarsi brown, basal joint rufous on the inner side. Abdomen with the first segment above pale yellow, remaining segments black; sometimes the anterior margin of the second segment in the middle, is sparsely clothed with short yellowish hairs. Beneath black. Length 9—12 lines.

Worker. Differs from the female only in size, and undergoes the same variations in color. Length 5—7 lines.

Male. Head clothed above and below the antennæ with yellowish, intermixed with a few black hairs; eyes very large and prominent.

Thorax above and on the sides tawny-yellow. Wings subhyaline, more or less embrowned. Legs black; femora beneath clothed with long yellowish hairs. Abdomen with the first segment above yellowish; anterior part of the second segment in the middle yellowish or yellowish-brown; remaining segments black. Beneath black, more or less mixed with yellow. Length 7—9 lines.

A very common species. Fifty (18 ♀, 24 ♂, 8 ♂) specimens examined. Can., Conn., N. Y., Del., Pa., D. C., Ill., Mo., Miss., Tex. (Coll. Ent. Soc. Phila., and Mr. E. Norton.)

I have with some doubts placed De Geer's *Apis griseo-collis* as a synonym of this species. De Geer says:—"The Bees of this species, which are of a medium size and very hairy, although less upon the abdomen than elsewhere, have been found in Pennsylvania by M. Acrelius, where they make their nests in the ground. I have only the workers and the males. Their color is black, but the thorax and a part of the anterior portion of the abdomen are entirely covered with hairs of a yellowish-gray, or olive color. The wings are brown and shining, and the eyes of a dusky brown. The male is large, with large eyes which cover almost the whole of the head, as is usual in all the male Bees. The upper lip is yellow, and the black color of the abdomen and of the legs is shining, and approaches somewhat a deep blue. The working Bee, which is of the usual form of the Humble-Bees, is much smaller than the male; its upper lip is black like the rest of the head, and the black color of the abdomen and of the legs has no blue shade." The figure given by De Geer, of his species, represents the abdomen as being entirely black. Olivier seems to have seen De Geer's species, and thinks it distinct from his *Apis Virginica*, previously described. Therefore, if *griseo-collis* and *Virginicus* should prove to be the same species, which is quite probable, then the former name must, according to priority, take precedence.

In defence of the synonymy of *B. Virginicus*, given above, I have to say, that the briefness of the Linnean and Fabrician descriptions of *Apis Virginica* are such, that it is impossible to say, with any degree of certainty, whether they refer to our common *Bombus Virginicus* or *Xylocopa Virginica*, both species having the thorax and basal segment of the abdomen yellowish. In 1770, Drury described and figured (Illust. Ins. 1, p. 96, pl. 43, fig. 1) a species, without name, which, according

to the description and figure, is certainly our common *Xylocopa* or carpenter-bee. During the next year, Linnæus, in his "Mantissa Plantarum," gives Drury's species the name of *Apis Virginica*, and describes it thus:—"hirsuta pallida, abdomine, excepto primo segmento, atro." Fabricius, in his Syst. Ent., and Ent. Syst., and Gmelin, in ed. Linn. Syst. Nat., give the same description of *Apis Virginica*, quoting Drury's description and figure, and as if they had not seen the insect, they give no additional characters, and we are, therefore, obliged to give these quotations as referring to *Xylocopa Virginica*. Olivier, in Encycl. Méth. (1789), although he quotes all former descriptions of *Apis Virginica*, gives us in a very few words, the first indication of the existence of *Bombus Virginicus*, having, no doubt, had that species before him when he wrote his description, because he says that *the head is black, with a few yellow hairs in front*, which is the case with the *Bombus*, but not with the *Xylocopa Virginica*. In 1804, Fabricius in his Syst. Piez. creates the genus *Bombus* and places Drury's species in that genus; he also describes under the genus *Centris*, a species which he calls *Carolina*, and which is nothing more or less than the same species as described by Drury. We are then to suppose that his *Bombus Virginicus* is the *Apis Virginica* of Olivier, and not of Drury and Linnæus, whom he quotes. Mr. Say, in Bost. Journ. (1837), doubting the accuracy of Fabricius in placing his *Carolina* in the genus *Centris*, made an examination of the generic characters and found it to be a *Xylocopa*, a genus created by Fabricius in the same volume in which he describes his *Centris Carolina*. Mr. Say gives a description of both sexes of this species, but allows it to retain the name of *Carolina*, and quotes Drury's *Virginica* (which was described over 30 years before) as a synonym. Mr. Westwood, in his new edition of Drury's work (1837), transfers the *Apis Virginica* of Drury to the genus *Xylocopa*, and quotes Fabricius' *Bombus Virginicus*, Syst. Piez., as the same thing. Finally, Mr. Smith, in his British Museum Catalogue of Hymenoptera, ii, p. 362 (1854), quotes both Drury's and Fabricius' species as distinct; to the former he gives the same references as he gives to *Bombus Virginicus* on p. 398, and indicates that both *Xylocopa Virginica* (Drury), and *Xylocopa Carolina* (Fabr.), as distinct species, are in the Collection of the British Museum. Amid all this confusion, our only course is to fall back on what little proof we

have, and transfer all references of *Apis Virginica*, previous to that of Olivier, to *Xylocopa*, and place the discovery of *Bombus Virginicus* to the credit of Olivier, who gave the first indication with which we are able to separate it from the *Apis Virginica* of Drury, Linnæus and Fabricius. Therefore, I offer the following as, probably, a more correct view of the synonymy of the latter species.

XYLOCOPA VIRGINICA.

- Apis Virginica* Drury, *Illust. Exot. Ins.* i, p. 96, pl. 43, f. 1 (1770); *Linn. Mant. Plant.* p. 540. (1771); Gmelin, ed. *Linn. Syst. Nat.* p. 2784; *Fabr. Syst. Ent.* p. 380. (1775); *Ent. Syst.* ii, p. 318. (1793).
Centris Carolina Fabr., *Syst. Piez.* p. 357. (1804).
Xylocopa Carolina Say, *Bost. Jour.* i, p. 412. (1837); *St. Farg., Hym.* ii, p. 207. (1841); *Smith, Brit. Mus. Cat., Hym.* ii, p. 363. (1854).
Xylocopa Virginica Westw., edit. Drury, *Illust. Exot. Ins.* i, pl. 43. fig. 1. (1837); *Smith, Brit. Mus. Cat., Hym.* ii, p. 362. (1854).

2. *B. impatiens.*

Bombus impatiens Harris, *Cat. Ins. Mass.* 2d edit.

Male. Head black, with a mixture of yellowish hairs below the antennæ and on the cheeks and vertex. Thorax pale yellowish. Wings hyaline. Legs black, with pale hairs at base of the femora beneath. Abdomen with the first segment above pale yellow; remaining segments black. Beneath sparsely clothed with yellowish hairs. Length 7 lines.

Female and *worker* not seen.

Seven specimens, Can., Conn., Pa., Ill., Mo. (Coll. Ent. Soc. Phil., and E. Norton.)

The coloration of this species is so much like that of *B. Virginicus*, that, at first, I supposed it to belong to that species, but the males above described are so different from what I have taken for the males of *B. Virginicus* that they can scarcely be of the same species. A specimen in the collection of Mr. Norton, labelled *B. impatiens*, was compared with specimens so named in the Harris collection, and the above description made from it. It may be that this species and the males of *B. Virginicus* are mixed up, but until we have more conclusive evidence of their identity, it is probably best to keep them separated.

3. *B. Marylandicus.*

Apis Marylandica Fabr. *Ent. Syst. Suppl.* p. 273.

Bombus Marylandicus Fabr. *Syst. Piez.* p. 346.

"Large. Head black, labium ferruginous. Antennæ black, first

article ferruginous. Thorax hairy, ferruginous. Abdomen hairy, black, second segment yellow. Posterior legs very hairy. Wings blackish-violaceous. *Hab. America.*"

Unknown to me. Is it a *Bombus*?

4. *B. vagans*.

Bombus vagans Smith, Brit. Mus. Cat. Hym. ii, p. 399.

Female. Head black, often more or less yellow on the vertex. Thorax above and on the sides yellow, sometimes slightly intermixed with black between the wings. Wings fusco-hyaline. Legs black; in some specimens the base of the femora below have a few yellowish hairs; tarsi brown. Abdomen with the first two segments above yellowish, remaining segments black, except in two specimens which have the apical segment slightly mixed with yellow. Beneath black. Length 8—12 lines.

Worker. Colored as the female. Length 6—7 lines.

Male. Head yellowish, slightly mixed with black, with a thick tuft of bright yellow in front below the antennæ. Thorax above and on the sides pale yellow. Wings subhyaline, faintly clouded on the apical margins. Legs black; femora clothed beneath with yellowish hairs. Abdomen with the first two segments above pale yellow; remaining segments black, except the apical one, which is sometimes mixed with yellowish. Beneath clothed with yellowish hairs. Length 6—8 lines.

Forty-two (14 ♀, 19 ♂, 9 ♂) specimens examined, from various localities:—Can., Me., Conn., Pa., N. J., Del., D. C., Va., Ill. (Coll. Ent. Soc. Phil. and E. Norton.)

5. *B. perplexus* n. sp.

Male. Head black, with a tuft of pale hairs in front below the antennæ; vertex yellowish. Thorax bright honey-yellow. Wings hyaline, apical margins faintly clouded. Legs black; base of femora beneath yellowish. Abdomen with the three basal segments bright honey-yellow, the third segment having a slight admixture of black; remaining segments black. Beneath black, slightly mixed with yellowish. Length 8 lines.

Female and *worker* not seen.

One specimen. Connecticut. (Coll. Mr. E. Norton.)

This species closely resembles *B. Hudsonicus*, but the form of the

body is more elongate and not so compact as that of the latter species, and the color is much brighter.

6. *B. bimaculatus* n. sp.

Male. Head black, mixed with yellowish on the face and vertex. Thorax honey-yellow. Wings sub-hyaline, slightly stained with yellowish. Legs black, clothed with yellowish hair, especially on the femora beneath. Abdomen with the whole of the first segment above, and the second, except a few black hairs on the middle and a round black spot on each side, pale honey-yellow; the fourth segment mixed with black and yellow; the third and apical segments black. Beneath yellowish hairy. Length $7\frac{1}{2}$ lines.

Female and *worker* unknown to me.

One specimen. Connecticut (Coll. Mr. E. Norton.)

7. *B. Hudsonicus*, n. sp.

Male. Head with a tuft of yellow hairs in front and on the vertex. Thorax above and beneath yellowish. Wings subhyaline. Legs black, femora beneath clothed with yellowish hairs. Abdomen with the first three segments yellowish above; the remaining segments black, the two apical segments having a mixture of pale hairs. Beneath sparsely clothed with yellowish hairs. Length 7 lines.

Female and *worker* not seen.

Two specimens. Hudson's Bay Territory. (Coll. E. Norton.)

8. *B. pallidus* n. sp.

Female. Head black, with fuscous hairs at the insertion of the antennæ and on the vertex. Thorax above and beneath pale ochraceous, shading into pale fuscous posteriorly. Wings dark fuscous, tinged with violaceous. Legs black, thickly clothed with short pale hairs; tarsi pale, inner side of basal joint golden in certain lights. Abdomen above pale ochraceous, base of the first, and the three apical segments shaded into pale fuscous. Beneath black, sparsely clothed with short pale hairs. Length 11 lines.

Worker and *male* not seen.

One specimen. St. Louis, Mo. (Coll. E. Norton.)

In taking a dorsal view of this singular species, with the head turned from us, the upper surface of the thorax behind the insertion of the wings, the base of the first, and the three apical segments of the ab-

domen are pale fuscous. If we turn it around, with the head towards us, this color disappears, and the whole surface seems to be pale ochraceous with a silky gloss. In examining this specimen, it occurred to me that it might be a very faded specimen of our common *B. Pennsylvanicus*, for if we convert the pale fuscous into black, and the pale ochraceous into yellow, we will have the exact coloration, superiorly, of that species; but the hairs of the legs being pale ochraceous, and with the sericeous appearance of the insect, would be sufficient, in my estimation, to render it distinct, and it would scarcely be possible for the colors to change so greatly, particularly so, as the specimen, apparently, has never been in spirits.

9. *B. borealis*.

Bombus borealis, Kirby, Faun. Bor. Amer. 4. p. 272.

“Body clothed underneath with black, above with tawny hairs. Face and vertex with a tuft of yellowish ones; thorax, between the wings, with a black hairy band; wings somewhat embrowned, with black nervures; legs black; abdomen above with a thick coat of tawny hairs palest at the base; anus black. Length of body 8 lines. Taken with *B. sylvicola*.”

In the collection of the Entomological Society there is a single female specimen from Canada (kindness of Mr. Saunders), which answers to the above description, except that the abdomen beneath is sparsely clothed with yellowish hairs, and the length of the body is 9 lines. I do not feel justified in separating them.

10. *B. fervidus*.

Apis fervida Fabr. Ent. Syst. Suppl. p. 274.

Bombus fervidus Fabr. Syst. Piez. p. 352; St. Farg. Hym. 1, p. 470.

Female. Head black. Thorax anteriorly and pleura yellow; a black band between the wings. Scutellum yellow. Wings fusco-hyaline, slightly tinged with violaceous. Legs black. Abdomen above yellow, excepting the two apical segments which are black. Beneath black. Length 10 lines.

Variety. The yellow color deeper, the black band between the wings is broader, and the face and vertex is clothed with pale yellow hairs.

Worker. Colored same as the female. Length 6—7 lines.

Male. Head yellow in front and on the vertex. Thorax above tawny-

yellow, mixed with black on the pleura; a broad black band between the wings. Wings subhyaline. Legs black, slightly mixed with yellowish on the femora beneath. Abdomen with the first four and the posterior margin of the fifth segments above tawny-yellow, the remaining segments black. Beneath yellowish. Length 7 lines.

Twenty-seven (14 ♀, 10 ♂, 3 ♂) specimens examined. Can., Conn., N. Y., Penn., Del., Va., Ks., and Utah. (Coll. Ent. Soc. Phil., and E. Norton.)

I have seen no specimens so large as mentioned by St. Fargeau.—13 lines.

11. *B. Pennsylvanicus.*

Apis Pennsylvanica De Geer, Mém. iii. p. 575, pl. 28, f. 12. (1773).

Apis Americanorum Fabr. Syst. Ent. p. 380. (1775); Ent. Syst. ii, p. 319. (1793); Oliv. Encycl. Méth. iv, p. 66. (1789).

Bombus Americanorum Fabr. Syst. Piez. p. 346. (1804); St. Farg. Hym. i, p. 472. (1836).

Female. Head black, often more or less yellow on the vertex. Thorax with its anterior portion above yellow; between the wings black. Scutellum black, generally mixed with yellow. Wings blackish-viaceous. Legs black; tarsi brown, basal joint rufous on the inner side. Abdomen with the first segment above generally more or less yellow, sometimes almost all black; second and third segments yellow, remaining segments black. Length 9—12 lines.

Worker. Differs in no respect from the female, except in size; in color it undergoes the same variations. Length 6—8 lines.

Male. Head black, intermixed with obscure yellowish on the face and vertex; eyes very large and prominent, almost contiguous on the vertex. Thorax above and on the sides tawny-yellow, with a blackish band between the wings; in some specimens the thorax is entirely yellowish. Wings fusco-hyaline, darkest along the costa and towards the base. Legs black; hairs of the basal joint of the posterior tarsi pale; tarsi brown. Abdomen with the first three segments tawny-yellow, slightly mixed with blackish on the base of the first segment; remaining segments black. Beneath black, sparsely clothed with pale hairs. Length 10 lines.

Eighty specimens examined from Conn., N. Y., N. J., Penn., Del., Md., Va., Ill., Mo., Ks., Fla., Tex. (Coll. Ent. Soc. Phila., E. Norton.)

This is our most common species, and has generally been known

and cited by authors as the *Americanorum* of Fabricius, but De Geer described it two years previously under the name of *Pensylvanica*, as having the scutellum and the first segment of the abdomen all yellow, while that of Fabricius had those parts apparently all black. However, the series of specimens which I have examined show that they are one species, and that the color of the scutellum and the first segment of the abdomen vary very much in the mixture of black and yellow. The most abundant variety is intermediate between that of the De Geer and Fabricius, it having the scutellum and the first segment of the abdomen more or less mixed with yellow. Olivier was the only one who suggested that De Geer's species was a variety of *Americanorum*, and yet, for some unknown reason, he allowed the latter name to remain. No one since Olivier seems to have taken any notice whatever of De Geer's species, nor of Olivier in placing it as a synonym of *Americanorum*.

Two fine ♀ specimens from Florida vary in having the first segment of the abdomen above jet-black, with a small patch of yellowish in the middle of the posterior margin of the segment.

12. *B. sonorus*.

Bombus sonorus Say, Bost. Journ. Nat. Hist. i, p. 413.

"Body yellow; head black; thorax with a broad black band in the middle; wings violaceous-black; tergum with the first, second and third segments yellow, with others black; beneath black. Length ♀ four-fifths of an inch. Inhabits Mexico."

"Resembles the *fervidus* Fabr., so closely that it may readily be mistaken for it, but that species has only two segments of the tergum clothed with yellow hair; that of the second one, however, is so much elongated as to conceal a considerable portion of the next segment. The color is a much deeper yellow than that of *fervidus*."

Unknown to me. Say is certainly mistaken in stating that *fervidus* has only two segments of the abdomen yellow; it has the first four segments yellow.

13. *B. Arcticus*.

Bombus Arcticus Kirby, Suppl. Parry's 1st Voy. p. cexvi. Curtis. Ross' 2nd Voy. Append. p. lxiv. (1824.)

? *Apis alpina* O. Fabr. Fn. Grønland, p. 199. (1780.)

"Female. Body covered with long black hairs, but those that clothe

the base and apex of the thorax, and the anterior half of the upper side of the abdomen, are of a pale yellow. Some black hairs are visible at the base of the last yellow segment of this part of the body. The antennæ are as long as the head. The wings are a little tinged with brown, and their nervures are black. The tarsi are covered with short reddish hairs. Length 11 lines.

"*Male*. Much smaller than the female. The hairs of the whole trunk or intermediate segment of the body, are pale yellow intermixed with some black ones. The legs, also, particularly the anterior pair, are clothed with long yellowish hairs. Length 7 lines."

Arctic America. Unknown to me.

Mr. Kirby gives his reasons, at some length, for considering this species identical with that of O. Fabr., who mistook his for the *Apis alpina* of Linné (See l. c. p. ccxvii), and which species Mr. Smith (Bees of Great Britain, p. 222) quotes as a synonym of *B. nivalis* Dahlb., a species with the apical segments of the abdomen yellow, and consequently quite different from *B. Arcticus*.

14. *B. pleuralis*.

Bombus pleuralis Nyl. Notis. ur Sällsk. pro Faun. et Flor. Fenn. Förh. 1. 231.

"♀. Black, thorax anteriorly and pleura yellow; scutellum and two first segments of the abdomen yellow. Length 20 millim.

"♂. Same as ♀ except that the hairs of the face are yellow; those of the belly mixed with yellowish, and those of the scutellum almost all black. Length 14 millim. Sitka."

Not seen.

15. *B. scutellaris* n. sp.

Female. Head black. Thorax with its anterior portion above and on the sides yellow; a broad black band between the wings. Scutellum yellow. Wings blackish-violaceous, darkest toward the base. Legs black. Abdomen with the two basal segments above yellow; remaining segments black. Beneath black. Length 13 lines.

Worker. Excepting size, there is no difference between this and the female. Length 9 lines.

Male. Not seen.

Four (2 ♀, 2 ♂,) Fla., Tex., (Coll. Ent. Soc. Phil., E. Norton, and Smith. Inst.)

This is a handsome species. It agrees with the description of *B. pleuralis* from Sitka, but besides its larger size, the difference of locality is so great that I have considered it safe to separate them.

16. *B. Grønlandicus*.

Bombus Grønlandicus Smith, Brit. Mus. Cat. Hym. ii, p. 393. 23.

"*Female*. Length 9—10 lines. Black; the pubescence on the face black, that on the vertex is also black; the face elongate. Thorax, above, anteriorly and posteriorly having a long loose yellow pubescence, between the wings a broad band of black; wings subhyaline, stained with fuscous towards their base; the legs have a black pubescence. Abdomen, the two basal segments covered with long yellow pubescence, the apical ones with black. *Hab.* Greenland."

Not identified.

17. *B. medius* n. sp.

Worker? Head black. Thorax anteriorly pale yellowish, with a broad black band between the wings. Scutellum pale yellowish. Wings blackish-violaceous. Legs black. Abdomen black, with the third segment above pale yellowish. Beneath black. Length 7 lines.

One specimen. Utah. Dr. Suckley. (Coll. Smith. Inst.)

18. *B. Californicus*.

Bombus Californicus Smith, Brit. Mus. Catal. Hym. ii, 400. 57.

Female. "Black; the pubescence on the head black, that on the thorax before the wings fulvo-ochraceous, posteriorly and beneath black; the legs black; wings fuscous. Abdomen, the pubescence black, except that on the fourth segment, which is yellow. Length 10 lines."

Worker. Same as female, except that the hairs on the head are yellow. Length 6 lines.

Male. "The pubescence as in the female, differing only in having that on the face yellow. Length 5—6 lines."

Hab. California. (♀, Coll. Ent. Soc. Philad.) *Female* and *male* not seen. In the worker the hairs are rather long, and those of the third segment of the abdomen above cover the anterior part of the yellow of the fourth segment, giving the band of yellow on that segment the appearance of being very narrow.

19. *B. dubius* n. sp.

Worker? Head black. Thorax anteriorly pale yellowish; between

the wings black. Scutellum yellowish, mixed with black. Wings fuscous. Legs black. Abdomen above black, with the fourth segment yellowish-white. Beneath black. Length 7 lines.

One specimen. Western Kansas. (Coll. E. Norton.)

Closely allied to *B. Californicus*, but differs by the more elongate head, the yellowish scutellum, and in the scape of the antennæ being much shorter.

20. *B. occidentalis*. var.

Bombus occidentalis Greene, Ann. Lyc. Nat. Hist. N. Y., 7, p. 11 & 170.

Female. Head black, with a tuft of yellowish hairs below the antennæ. Thorax yellow anteriorly and laterally, with a broad black band between the wings. Scutellum yellowish, intermixed with black. Wings fusco-hyaline, nervures black. Legs black; tarsi brown; corbicula golden-yellow. Abdomen above with the first three segments black, the apical segments white. Beneath black, with the posterior margin of the fifth and sixth segments fringed with whitish hairs. Length 10 lines.

Worker. Colored same as the female. Length 7 lines.

Male. Colored same as the female, except that the hairs on the clypeus and vertex are mixed with yellowish, and those of the body beneath more or less pale. Length 7—8 lines.

Forty-two (2 ♀, 36 ♂, 4 ♂) specimens examined. California, Puget's Sound, Ft. Vancouver, (Coll. Ent. Soc. Phila., E. Norton, and Smith. Inst.)

A very pretty species, and seems to be the most common of our Western ones. The hairs of the body are rather long, and those on the third abdominal segment above cover the anterior half of the fourth segment.

21. *B. proximus*, n. sp. var.

Worker? Head black. Thorax anteriorly pale yellowish, posteriorly black mixed with yellowish. Wings subhyaline. Legs black; corbicula pale. Abdomen above black, with the third segment yellowish-white, and the two apical segments white. Beneath black, slightly mixed with pale hairs. Length 7 lines.

One specimen. Utah. Dr. Suckley. (Coll. Smith. Inst.)

Resembles *B. medius*, but the head is shorter, the body more compact, the wings clear, and the apical segments of the abdomen are white.

22. *B. modestus*, n. sp. - ♀.

Female. Head black, slightly mixed with pale hairs on the vertex. Thorax before the wings yellowish-white; remainder black. Wings hyaline, faintly clouded on the apical margins. Legs black; inner side of the basal joint of posterior tarsi golden in certain lights. Abdomen above with the first, third and fourth (except the posterior margin) segments black; second yellowish-white; posterior margin of the fourth, and the remaining segments white. Beneath black. Length 7 lines.

One specimen. Youcon River, Arctic America. Mr. R. Kennicott. (Coll. Smith. Inst.)

23. *B. terricola*. -

Bombus terricola Kirby, Faun. Bor. Am. iv, p. 273, Pl. 6 f. 4 ♀.

Female. Head black. Thorax with its anterior portion above bright yellow, remainder of the thorax black, except a slight admixture of yellow on the scutellum. Wings fusco-hyaline. Legs black; hairs of the posterior tibiae and the tarsi pale brown. Abdomen with the first, fourth and fifth segments above black; second and third bright yellow; anus yellowish-white. Beneath black. Length $9\frac{1}{2}$ lines.

Worker. Same as the female, except that the scutellum is altogether black, and the smaller size. Length 7 lines.

Male. Unknown to me.

Two specimens; Canada West, ♀ (Coll. Ent. Soc. Phila.), Hudson's Bay Territory, ♂ (Coll. Mr. E. Norton).

For the beautiful female specimen, the Society is indebted to Mr. William Saunders, of London, C. W.

24. *B. Howardii*, n. sp. - ♀.

Male. Head black, mixed with yellow on the face and vertex. Thorax lemon-yellow above and beneath, with an indistinct blackish band between the wings. Wings hyaline, slightly stained with yellowish; nervures brown. Legs black, slightly yellowish on the base of the femora beneath; hairs of the tibiae and tarsi pale brown. Abdomen with the first, anterior portion of the second, and the fourth segments above black; the posterior margin of the second and the whole of the third segments above lemon-yellow; the three apical segments very

pale yellow or a dirty white. Beneath black, sparsely clothed with pale hairs. Length $8\frac{1}{2}$ lines.

Female and worker not seen.

One specimen. Pike's Peak. (Coll. Ent. Soc. Phila.) Collected by Mr. Winslow J. Howard, after whom it is named, and who has already discovered in that locality some new and very interesting species of Hymenoptera.

25. *B. frigidus*.

Bombus frigidus Smith, Brit. Mus. Cat. Hym. ii, p. 399. (1854).

Bombus Carriei Greene, Ann. Lyc. Nat. Hist. N. Y. vii, p. 170. (1860).

Female. Head black, mixed with yellowish on the vertex. Thorax yellow, with a black band between the wings. Wings fusco-hyaline. Legs black; base of femora beneath clothed with yellowish hairs; corbicula fulvous; tarsi brown, inner side of basal joint rufous. Abdomen above with the two basal segments yellow; the third black, and the remaining segments fulvous or yellowish-fulvous. Beneath black, mixed with a few pale hairs. Length 7—8 lines.

Worker. Colored same as the female. Length 5—6 lines.

Male. Colored same as the female, except that the hairs on the head and legs are all yellow. Length $6\frac{1}{2}$ lines.

Variety. The black band on the third segment of the abdomen above is very indistinct.

Twenty (13 ♀, 4 ♂, 3 ♂) specimens examined. Great Slave Lake; Youcon River, Arctic America. Mr. Kennicott, (Coll. Smith. Inst.) Puget's Sound, (Coll. E. Norton).

The antennæ of the male of this species, unlike any other known to me, have the flagellum somewhat suddenly thickened at the base, and gradually narrows to the tip.

In some specimens the hairs of the third dorsal segment of the abdomen cover the anterior part of the fourth segment, giving the abdomen the appearance of having two black bands.

The variety of the male has the abdominal segments very much contracted, and the black band on the third segment is so indistinct that it would seem to belong to another species, but I think it is merely a variation.

The description of *B. Carriei* Greene, answers so well to that of *B. frigidus*, that I have no doubts of their identity.

26. *B. Kirbiellus*.

Bombus Kirbiellus Curtis, Ross' 2nd Voyage, Append. p. lxii.

"*Female*. Pl. A, fig. 2.—Black, a broad margin in front of the thorax, hinder margin of scutellum, and the abdomen, excepting the third segment and the apex, clothed with long yellow-ochreous hairs; wings yellowish, excepting the posterior margin, the nervures piceous; inside the tarsi with the pile bright ferruginous; tips of spurs, apical joint of tarsi, and base of claws sub-castaneous. Length 10 lines.

"*Neuter*. Similar to the female but much smaller, the hairs beyond the black on the abdomen are generally orange, and the whole of the tarsi, excepting the basal joint, is sub-castaneous. Length 7 lines.

"*Male*. Black, antennæ as long as the thorax, compressed at the apex; face and crown of head clothed with long yellow and black hairs; thorax yellow with hairs, having a transverse black band between the wings; basal half of abdomen yellow, the remainder orange, with a narrow black band across the middle; wings slightly yellow at the costa, the posterior margin slightly stained with brown, nervures piceous; basal joint of tarsi clothed inside with bright ferruginous hairs; spurs, base of claws, and apex of tarsi ochreous. Length 7½ lines."

Arctic America. Unknown to me.

27. *B. polaris*.

Bombus polaris Curtis, Ross' 2nd Voyage, Append. p. lxiii.

"*Female*. Black; a broad band across the anterior portion of the thorax, the scutellum, and abdomen clothed with long yellow hairs, whitish towards the apex of the abdomen, with a few black hairs on the sides of the third segment, a band of the same color on the fourth, and a very slight one on the fifth segment; tarsi clothed with black pile internally, the outside of the basal joints brownish, the edges ferruginous. Length 10 lines.

"*Male*. Black, clothed with yellow hairs; head black, with a patch of yellow hairs on the face, and another on the back of the head, a blackish band across the centre of the thorax, and an indistinct narrow one on the third and fourth segments of the abdomen, the apex orange; inside of tarsi clothed with yellowish pile. Length 6 lines.

"*Remarks*. A pair only of this species was preserved; in size and many respects it resembles *B. Kirbiellus*, but the indistinct and some-

what double band of black hairs across the abdomen will distinguish it, and the yellow pile inside of the tarsi in the male and the black in the female, are sufficient characters, I think, to justify its being separated from the former species."

Arctic America. Unknown to me. Probably a variety of the preceding species.

I have before me two male specimens from Methy Portage, Arctic America, (Coll. Smith. Inst.) which answer very well to the description above given. They are nearly 6 lines long, and in coloration they closely resemble the workers of *frigidus*, but differ very much from the males of that species.

28. *B. strenuus*, n. sp.

Female. Head black, mixed with dark fuscous on the vertex. Thorax anteriorly and laterally yellowish; a broad black band between the wings. Scutellum yellowish, somewhat mixed with black. Wings fusco-hyaline, darkest along the costa and towards the base. Legs black. Abdomen with the three basal segments yellowish; the fourth black, and the two apical segments more or less fulvous or yellowish-fulvous, mixed with black. Beneath black. Length 10—12 lines.

Worker. Not seen.

Male. Colored same as the female, except that the head has a mixture of yellowish below the antennæ and on the vertex; the legs have the hairs yellowish, particularly on the posterior pair; the fifth segment of the abdomen is nearly all black, and the two apical segments entirely fulvous. Length 7 lines.

Five (4 ♀, 1 ♂) specimens examined. Youcon River, Arctic America, and Hudson's Bay Territory. Mr. Kennicott. (Coll. Smith. Inst.)

A very fine species. Two of the female specimens have the two apical segments almost entirely black, and therefore this species may, although improbably, prove to be a variety of *B. Arcticus*.

29. *B. Sitkensis*.

Bombus Sitkensis Nyl. Notis. ur Sällsk. pro Faun. et Flor. Fenn. Förh. 1. p. 235. 19.

"Hairy, yellow; on the third and fourth segments of the abdomen blackish, with the hairs on the head and back of thorax mixed with blackish; corbicula either fuscous or inclining to fulvous. In the ♂,

the hairs are of a more pure yellow, with three, more or less distinct, narrow bands of the abdomen, and the hairs in the middle of the back of the thorax mixed with black.

"Small. ♀, 17 millim., anterior wings 14; ♂, 10—14, anterior wings 9—12; in this the black hairy band of the abdomen is often transversely divided by yellow hairs of the margin of the third segment; ♂, 12 millim., long, with the wings somewhat longer, hairs narrowly banded on the base of the third abdominal segment, on the fourth and fifth almost entirely black; anus fulvous-yellow. Feet black, hairy, in ♀ ♂, yellow hairy in ♂. Sitka."

Not seen.

30. *B. affinis* n. sp.

Female. Head black. Thorax in front and on the sides yellow; between the wings black. Scutellum yellow. Wings fusco-hyaline. Legs black. Abdomen with the whole of the first and the sides and posterior margin of the second segments above yellow; remainder of the second segment rufo-fulvous; remaining segments black. Beneath black. Length 8 lines.

Male. Colored same as the female, except a slight admixture of yellowish hairs on the vertex. Length 8 lines.

Hab. Canada, ♀, Mr. W. Saunders. (Coll. Ent. Soc. Phila.), and New York, ♂. (Coll. E. Norton).

31. *B. melanopyge*.

Bombus melanopyge Nyl. Notis. ur Sällsk. pro Faun. et Flor. Fenn. Förh. 1. p. 236.

"Hairy, yellow, with the hairs on the head and the back of the thorax, between the wings subfasciate, intermixed with blackish; on the second, third and base of the fourth segments of the abdomen fulvo-ruvous, on the following blackish; body beneath yellow hairy. Length of the body and anterior wings, 11 millim. Sitka."

Not seen.

32. *B. lacustris*, n. sp.

Female. Head black, mixed with yellowish in front and on the vertex. Thorax anteriorly and laterally yellowish, mixed with blackish; between the wings blackish. Scutellum yellowish. Wings subhyaline, apical margins clouded. Legs black; base of femora yellowish

beneath; corbicula fuscous; tarsi brownish, inner side of the basal joint bright rufous. Abdomen above with the basal segment and the posterior margin of the fourth segment yellowish; the second and third segments reddish; remaining segments black. Beneath black, mixed with yellowish hairs. Length 8 lines.

Worker. Colored same as the female, except that the yellowish fringe on the fourth abdominal segment is not so conspicuous. Length $6\frac{1}{2}$ —7 lines.

Male. Colored same as the female, except that the hairs of the head and the anterior part of the thorax are more yellowish, with a very slight mixture of black, and the black band between the wings much more distinct. Length $6\frac{1}{2}$ lines.

Six (3 ♀, 2 ♂, 1 ♂) specimens examined: Lake Athabasca, and Great Slave Lake. Mr. R. Kennicott. (Coll. E. Norton and Smith. Inst.)

This is closely allied to *B. ternarius* and *ornatus*, but differs from both species.

33. *B. ornatus*.

Bombus ornatus Smith, Brit. Mus. Cat. Hym. ii, p. 398. 52.

"*Female.* Length 7 lines.—Black; the pubescence on the head black, mixed with yellow hairs at the insertion of the antennæ; the thorax has a rich fulvo-ochraceous pubescence, and has a broad black band between the wings, the sides of the thorax anteriorly yellow; the legs have a black pubescence, with a few pale hairs at the base of the femora beneath; wings fusco-hyaline. Abdomen, the pubescence on the basal segment yellow, on the three following segments it is fulvous, having a narrow border of yellow, which divides it from the black pubescence which clothes the apex.

"The coloring of the male and the worker is the same, but less bright, and the pubescence is longer in the male than in the other sexes.

"*Hab.* North America; Hudson's Bay; Arctic America."

Unknown to me. Very closely allied to *B. ternarius*.

34. *B. ternarius*.

Bombus ternarius Say, Bost. Jour. Nat. Hist. 1, p. 414.

Bombus Huntii Greene, Ann. Lyc. Nat. Hist. N. Y. 7, p. 172.

Female. Head black, more or less yellow on the face and vertex. Thorax with its anterior portion, sides, and the scutellum lemon-yellow;

a broad black band between the wings. Wings subhyaline, apical margin stained with brown. Legs black; base of femora beneath clothed with yellow hairs; tarsi brown. Abdomen with the first and fourth segments above lemon-yellow; second and third segments bright fulvous; the two apical segments black. Beneath black, intermixed with yellowish. Length 10 lines.

Worker. Same as the female, except size, and the colors are not so bright. Length 5—6 lines.

Male. Colored same as the female. Length 7 lines.

Sixteen (5 ♀, 10 ♂, 1 ♂) specimens examined. Me., Conn., Penn., Kansas, Utah, Puget's Sound, and Arctic America. (Coll. Ent. Soc. Phil. and E. Norton).

This is a beautiful species when fresh; in alcoholic specimens the yellow is faded to a dirty white, and the fulvous color becomes more of a reddish hue. I see no reason why *B. Huntii* Greene, should be separated from this species, the colors are situated exactly the same, although faded by alcoholic immersion; and if the abdominal segments were not unnaturally distended, the entire length of the insect would not exceed 10 lines.

35. *B. flavifrons* n. sp.

Female. Head yellow in front and on the vertex. Thorax yellowish, mixed with blackish above, with a blackish band between the wings. Wings subhyaline, slightly stained with fuscous. Legs black, with pale hairs; femora beneath densely clothed with yellowish hairs; inner side of the basal joint of tarsi golden yellow in certain lights. Abdomen with the two basal segments above yellowish; the third and fourth fulvous; the remaining segments blackish. Beneath black, clothed with yellowish hairs. Length 8 lines.

Worker. Colored same as the female, except that the band between the wings is much more distinct, the color of the third and fourth segments of the abdomen above is more reddish, and the black color of the apical segments somewhat mixed with reddish. Length 5½ lines.

Male. Resembles the female, but the hairs are somewhat longer, and those on the face more dense; the color of the third and fourth segments of the abdomen above same as that of the worker; the legs and the abdomen beneath are thickly clothed with yellowish hairs. In

one specimen the base of the third segment of the abdomen above is mixed with black. Length 7 lines.

Eleven (3 ♀, 1 ♂, 7 ♂) specimens examined. Ft. Youcon, Arctic America; Hudson's Bay Territory, and Kansas. (Coll. Ent. Soc. Phil. E. Norton, and Smith. Inst.)

The black color on the apical segments of the abdomen of the worker, being mixed with red, would seem to connect it with *B. praticola* of Kirby, which I have not identified, but, for the present, it would probably be better to keep them separated.

36. *B. praticola*.

Bombus praticola Kirby, Faun. Bor. Am. 4, p. 274.

"*Female*. Body black, clothed above with yellowish hairs. Head with a tuft of yellowish hairs below the antennæ, and on the vertex; thorax black between the wings, which are embrowned; legs with yellow hairs at the base; anterior half of the abdomen yellow, posterior ferruginous. Length of the body 7 lines."

British America. Unknown to me.

37. *B. sylvicola*.

Bombus sylvicola Kirby, Faun. Bor. Amer. 4, p. 272.

Female. Head black; the vertex and a tuft of hairs below the insertion of the antennæ, yellowish. Thorax yellowish, with a broad black band between the wings. Wings subhyaline, varied with fuscous. Legs black; femora beneath with yellowish hairs. Abdomen above yellowish, with the second and third segments reddish. Beneath black, mixed with pale hairs. Length 8—9 lines.

Worker and male not seen.

Four specimens. Youcon River, Arctic America, and Great Slave Lake. Mr. R. Kennicott. (Coll. Smith. Inst.)

I take the specimens before me to be the same species as described by Mr. Kirby, under the above name, although he does not mention the position of the reddish bands on the abdomen. His description was taken from a single specimen (sex not mentioned) captured in Lat. 65°.

38. *B. rufo-cinctus* n. sp.

Male. Head black, hairs on the vertex and a tuft in front below the antennæ yellow. Thorax yellow, with an indistinct band between

the wings. Wings hyaline, slightly clouded on the apical margins. Legs black, femora clothed beneath with yellowish hairs. Abdomen with the third and fourth segments above reddish, remaining segments yellow. Beneath sparsely clothed with yellowish hairs. Length 7 lines.

Worker. Colored same as the male, except that the hairs of the face are black. Length 5 lines.

Female. Not seen.

Two specimens from Pike's Peak (Coll. Ent. Soc. Phila.), collected by Mr. W. J. Howard.

39. *B. nidulans.*

Apis nidulans Fabr. Ent. Syst. Suppl. 274.

Bombus nidulans Fabr. Syst. Piez. 349.

"Head and antennæ rather long. Thorax yellow, a black band between the wings. Abdomen yellow, anus slightly fulvous. Feet black. *Hab.* North America."

Unknown to me. Probably an *Apathus*, and may be a variety of *A. elatus*.

40. *B. Antiguensis.*

Apis Antiguensis Fab. Syst. Ent. p. 380; Ent. Syst. 2, p. 318; Oliv. Encycl. Méth. Ins. iv, p. 66.

Bombus Antiguensis Fabr. Syst. Piez. p. 346.

"Size of *A. violaceus*. Head black, immaculate. Thorax hairy, black. Abdomen black, anterior part yellow. Wings fuscous. Feet black. *Hab.* Antigua."

Unknown to me.

41. *B. ephippiatus.*

Bombus ephippiatus Say, Bost. Journ. Nat. Hist. 1. p. 414.

"Body black; pleura pale yellow; wings dusky, tinged with violaceous; tergum pale yellow towards the base; this color is gradually narrowed behind and terminately on the third segment, forming somewhat of a semi-oval, with its base to the thorax and confluent with the color of the pleura. Length less than half an inch.

"Inhabits Mexico."

Not seen.

42. *B. pulcher* n. sp.

Female. Head black. Thorax above black, lemon-yellow on the sides. Wings fusco-hyaline, slightly tinged with violaceous. Legs black. Abdomen with the first, part of the second, and centre of the third segments above bright lemon-yellow; balance of the second and third segments above bright rufous; remaining segments black. Beneath black. Length 11 lines.

Hab. Jalapa, Mexico. Mr. J. Akhurst. (Coll. E. Norton.)

This is the handsomest species of *Bombus* known to me, and were it not for the rufous color on the second and third segments of the abdomen, which is very conspicuous, I should have considered it as the *B. ephippiatus* of Say, but he mentions no such color in his description.

43. *B. Carolinus*.

Apis Carolina Linn. Syst. Nat. 2, p. 959; Fabr. Syst. Ent. p. 379; Ent. Syst. 2, p. 316; Oliv. Encyc. Méth. Ins. iv, 64.

Bombus Carolinus Fabr. Syst. Piez. p. 342.

“Hairy, black; abdomen above fulvous, the first and last segments black. *Hab.* North America.”

Unknown to me.

44. *B. violaceus*.

Bombus violaceus St. Farg. Hym. 1, p. 473.

“Black. Feet black; hairs of the under part of the tibiæ and tarsi rufous. Wings fuscous, with a violet reflection. *Female*. Length 13 lines. *Worker*, like the female. Length from 5 to 7 lines. North America.”

I have not seen this species, and doubt very much that it occurs in North America. The British Museum have specimens of it from South America.

In addition to the species above described, the following European species have been mentioned as found in North America:—

B. hortorum Linn. Smith, Entom. Annual, 1857, p. 30. Lake Winnepeg.

B. Derhamellus Kirby, Faun. Bor.-Amer. 4, p. 273. Arctic America.

B. hyperboreus Dahlb. Schödte, in Etzel's Grönland, p. 611. Greenland.

B. balteatus Dahlb. Schödte, “ “ “ “

In the collection of Mr. Norton, there is a single specimen, a worker, collected in New Jersey, by Mr. J. Akhurst, which answers so well to the description given by Mr. Smith of that sex of *B. pratorum*, a European species, that I do not feel justified in separating them.

ADDITIONS.

The preceding page had not been printed more than twelve hours before I received a copy of the June number of the "Journal of Entomology," for 1861, in which I find a paper by Mr. Frederick Smith, describing several North American species of *Bombus* and *Apathus*. This being the first opportunity that I have had of examining the above number of that valuable publication, the omissions, &c., are consequently unavoidable, and although unfortunate, yet I am glad of the opportunity of having the additions made, before the printing of my paper has been finished and copies distributed.

The three following species of *Bombus*, all of which are unknown to me, must be added to the foregoing list; those of *Apathus* will be found hereafter under that genus.

21.—22. *B. modestus*.

Bombus modestus Smith, Journal of Entomology, i, p. 153.

"*Female*. Length 9 lines. Black, pubescent; the clypeus very smooth, shining, and delicately punctured. Thorax: the pubescence above before the wings yellow; the scutellum with a slight admixture of fulvous hairs; the wings subhyaline; the pubescence on the legs black, that on the basal joint of the posterior tarsi within ferruginous, the claw-joint of the tarsi obscurely ferruginous. Abdomen: the third and fourth segments clothed with yellow pubescence, the fifth with black, and fringed on its apical margin with yellow hairs, the apical segment has also a thin clothing of hair of the same color.

"*Worker*. Length 5½ lines. The pubescence similarly disposed to that of the female, but paler, that on the apical segments white.

"*Hab*. Oajaca, Mexico. In the Collection of the British Museum."

22. The name *modestus*, used for the new species of this number, on p. 99, being preoccupied by Mr. Smith, should be changed to *moderatus*.

42.—43. *B. laboriosus*.

Bombus laboriosus Smith, Journal of Entomology, i, p. 153.

"*Female*. Length 8 lines. Black, pubescent; the head entirely

black, with the clypeus very smooth and shining, and delicately punctured. The thorax with black pubescence above and beneath, that on the sides pale yellow; the pubescence on the legs entirely black; the wings fusco-hyaline, the nervures black. Abdomen: the three basal segments clothed with pubescence of a pale yellow, somewhat lemon-colored; that on the third segment not quite extending to the lateral margins; the apical segment thinly sprinkled with ferruginous hairs.

“*Worker*. Length 5 lines. Colored like the female.

“*Hab.* Oajaca, Mexico. In the Collection of the British Museum.”

43.—44. *B. diligens*.

Bombus diligens Smith, Journal of Entomology, i, p. 154.

“*Female*. Length 10 lines. Black, and clothed with black pubescence; wings dark brown, shining. The pubescence on the thorax short and dense, except on the disk above, which is smooth and shining; the three apical segments clothed with ferruginous pubescence, the apical segment smooth and shining in the middle.

“*Hab.* Oajaca, Mexico. In the Collection of the British Museum.”

Gen. **APATHUS** Newm.

Apathus Newm. Ent. Mag. ii, p. 404 (1834).

Psithyrus St. Farg. Ann. Soc. Ent. Fr. i, p. 366 (1832); Hym. ii, p. 424 (1841);
nec. Hubner.

This genus is parasitic on that of *Bombus*, and resembles it very much in general appearance. The characters with which to distinguish it from *Bombus*, are as follows:—The posterior tibiæ are destitute of corbiculæ, and are convex exteriorly; the basal joint of the posterior tarsi has no tooth at its base above. In the *female* the apex of the abdomen curves under, and the apical segment beneath has the lateral margins elevated. The mandibles have a single notch, while those of *Bombus* are distinctly toothed. This genus has no workers.

The males may be distinguished from those of *Bombus* by the posterior tibiæ being exteriorly convex and thickly coated with short hairs. The males of the latter genus have the exterior surface of the posterior tibiæ concave in the centre, with a few scattered hairs, and are fringed at the exterior margins.

Nothing is yet known of the economy of our species, and so far only a few have turned up. An examination of the nests of *Bombus* will doubtless bring more species to light. The following are all the species that have been identified.

1. *A. laboriosus*.

Bombus laboriosus Fabr. Syst. Piez. p. 352.

Female. Head black, pale yellowish on the vertex. Thorax above and on the sides pale greyish-yellow. Wings subhyaline, stained with yellowish. Legs black. Abdomen shining black; sparsely hairy on the disk; sides of the third segment slightly mixed with yellowish. Beneath black. Length 10 lines.

Male. Not seen.

Two specimens. Canada (Coll. Ent. Soc. Phila.) and Connecticut. (Coll. E. Norton.)

There is no doubt that this is the same species as described by Fabricius under the above name, although he does not mention the mixture of yellowish hairs on the sides of the third abdominal segment, which is quite plain in the two specimens before me.

2. *A. intrudens*.

Apathus intrudens Smith, Journal of Entomology, i, p. 154.

"*Female*. Black: a tuft on the vertex and another in front of the anterior stemma pale yellow; the thorax clothed above with pale pubescence, which is continued down the sides in front of the tegulæ; the thorax smooth and shining behind the scutellum; the legs with very short black pubescence; the wings fusco-hyaline. Abdomen nearly naked, shining, incurved and very acute at the apex, the margins of the segments thinly fringed with black pubescence.

"*Hab*. Oajaca, Mexico. In the British Museum Collection."

Unknown to me.

3. *A. fraternus*.

Apathus fraternus Smith, Brit. Mus. Cat. Hym. ii, 385.

"*Male*. Length 10 lines.—Black; the face below the insertion of the antennæ densely covered with dark fuscous pubescence; the flagellum very slender, the joints subarcuate; on the vertex the pubescence is mixed with fulvous. Thorax clothed with short fulvo-ochraceous

pubescence, on the middle of the disk it is black; the wings fuscous. darkest towards their base; the legs clothed with short dark fuscous pubescence. Abdomen elongate, narrowed towards the apex; the two basal segments clothed with short fulvo-ochraceous, and the apical segments with short black pubescence."

Female. Not seen.

One specimen. New Wied, Texas. (Coll. Smith. Inst.)

4. *A. contiguus* n. sp.

Male. Head black, yellowish on the vertex. Thorax lemon-yellow, more or less black between the wings. Wings fusco-hyaline. Legs black, tarsi pale, inner side of the basal joint rufous. Abdomen with the first two segments above lemon-yellow; rest black. Beneath black. Length 7—8 lines.

Variety. The anterior portion of the second abdominal segment above mixed with black, especially on the sides.

Female. Not seen.

Four specimens. Conn., Penn., Del. (Coll. E. Norton, and Ent. Soc. Philad.)

This species closely resembles *Bombus vagans* Smith, and probably parasitic on that species.

5. *A. citrinus*.

Apathus citrinus Smith, Brit. Mus. Cat. Hym. ii. 385.

Male. Head black, slightly mixed with yellowish on the vertex. Thorax pale lemon or greyish-yellow above and on the sides, more or less mixed with black between the wings. Wings subhyaline, stained with fuscous along the nervures. Legs black, tarsi pale, inner side of the basal joint golden in certain lights. Abdomen with the first three segments above pale lemon or greyish-yellow; remaining segments black. Beneath black. Length about 7 lines.

Variety? The yellowish hairs of the body much deeper in color, the wings darker, the fourth segment of the abdomen above mixed with yellowish and the hairs of the tarsi reddish. Length 6 lines.

Female. Not seen.

Six specimens. Mass., Conn., N. Y., Ill. (Coll. E. Norton, and Ent. Soc. Phila.)

The *variety* may be a distinct species, but there being only a single

specimen, I do not care to make a new species of it, until more have been accumulated.

6. *A. insularis*.

Bombus interruptus Greene. Ann. Lyc. Nat. Hist. N. Y., vii. p. 11 & 173, ♀.
(nec *Psithyrus* St. Farg.)

Bombus Suckleyi Greene. " " " 168. ♂.

Apathus insularis Smith, Journal of Entomology, i, p. 155, ♀.

Female. Head black, with the hairs at the insertion of the antennæ and on the vertex, yellow. Thorax yellow above and on the sides; black between the wings. Wings fusco-hyaline. Legs black; femora tinged with dark red; tarsi pale. Abdomen above shining black, with the sides of the third, fourth and fifth segments yellow. Beneath black. Length about 10 lines.

Male. Head black, mixed with yellow on the vertex. Thorax above and on the sides yellow; black between the wings. Wings subhyaline. Legs black; tarsi pale. Abdomen above with the second, third (or its anterior part), and the middle of the three apical segments black; rest yellowish. Beneath black, mixed with pale hairs. Length 7—8 lines.

Var. a. Having the second and third abdominal segments mixed with yellow on the disk; anus black. Length 8 lines.—*B. Suckleyi* Greene.

Var. b. Having the first three and sides of the fourth and fifth abdominal segments yellow; rest black. Length 6½ lines.

Var. c. Having a distinct black band between the wings; the second abdominal segment mixed with yellow on the disk; the fifth segment entirely black, and the apical segment mixed with pale fulvous. Length 6½ lines.

Fifteen (4 ♀, 11 ♂) specimens examined. Methy Portage, Arctic America; Puget's Sound; Ft. Steilacoom, W. T.; Vancouver's Island. (Coll. E. Norton and Smith. Inst.)

The female of this species so much resembles that of *A. campestris* of Europe, that, at first, I thought they were the same species, and am still doubtful whether the differences are sufficient to separate them; but until a more critical examination and comparison of the two species can be made, they had better be kept separated. The name *interruptus* having been used by St. Fargeau for a species of this genus, the name proposed by Mr. Smith should take its place.

The female specimens from which Mr. Greene made his description of this species, have the hairs on the dorsal surface of the abdomen rubbed off, although, generally, the hairs on that part of the abdomen are much scattered and sparse.

The only differences that I can see between the females of this species, and *campestris*, are that the former species has the hairs of the head yellowish, while those on the head of the latter species are entirely black; the black band in the middle of the thorax of *campestris* is broader and more distinct.

The males above described, and which I think belong to this species, present no characters by which they could easily be separated from those of *campestris*, and they vary just as much in the coloration.

The specimen, before me, of *B. Suckleyi* Greene, which seems to be the typical specimen (as it has the word "Type" attached to the pin), is a ♂, and not a ♀, as indicated in Mr. G's description, and the apical segment is apparently altogether black, and not yellowish. However, in considering the many variations which occur in the males of *A. campestris*, I am inclined to believe that this is the male of *A. insularis*, as well as the other two varieties described above.

Var. c., of the male, answers in many particulars to the description given of the male of *B. Sitkensis*, but as it seems more related as a variety of *A. insularis*, it would probably be best to allow it to remain here, until more specimens have been accumulated. It is certainly an *Apathus*.

7. *A. elatus*.

Apis alata Fabr. Ent. Syst. Suppl. p. 274.

Bombus elatus Fabr. Syst. Piez. p. 352.

Male. Head black, sometimes mixed with whitish on the clypeus. Thorax lemon-yellow with a black band between the wings. Wings fusco-hyaline. Legs black, more or less whitish on the femora; inner side of the posterior tibiæ and basal joint of tarsi golden-rufous in certain lights. Abdomen bright-lemon yellow, except the two apical segments, which are tufted with black. Beneath black, mixed with yellowish on the sides. Length 7—10 lines.

Var. a. Having the hairs on the fifth abdominal segment mixed with black, and the tufts on the anus tinged with fulvous.

Var. b. Having all the abdominal segments yellowish, except the anus, which is black.

Var. c. Having the whole of the thorax black, except the anterior portion above, and a few hairs on the scutellum which are yellowish.

Var. d. Having the whole of the thorax yellowish, except a slight admixture of blackish between the wings.

Female. Not seen.

Twenty-two specimens examined. Mass., Conn., N. Y., N. J., Penn., Del., Md., Ill. (Coll. E. Norton, and Ent. Soc. Phila.)

Although Fabricius described this species as having the thorax entirely yellow, it will be seen above that it varies from almost all yellow to almost all black. The most common variety, however, has a black band between the wings. The yellowish color of this species, as is generally the case with most of the bees, often fades to a dirty white; the color when fresh is doubtless a bright lemon-yellow.

It may be possible that *B. nidulans* of Fab., is only a variety of this species, as some of the specimens before me have the anus tinged with fulvous.

This species resembles *Bombus fervidus* very much in coloration, and may possibly be parasitic on that species.

In concluding this paper I would state that I have done the best I could in separating the species of this group, and it may be that I have made too many new species, but when we consider the great difficulty experienced by authors in bringing about a correct division of the European species, it will perhaps be a sufficient excuse for any such errors that I have made in this paper.

I desire, here, to express my thanks to Mr. Edward Norton, Dr. Thos. B. Wilson, and the Smithsonian Institution, for the loan of specimens, and for much valuable assistance.

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