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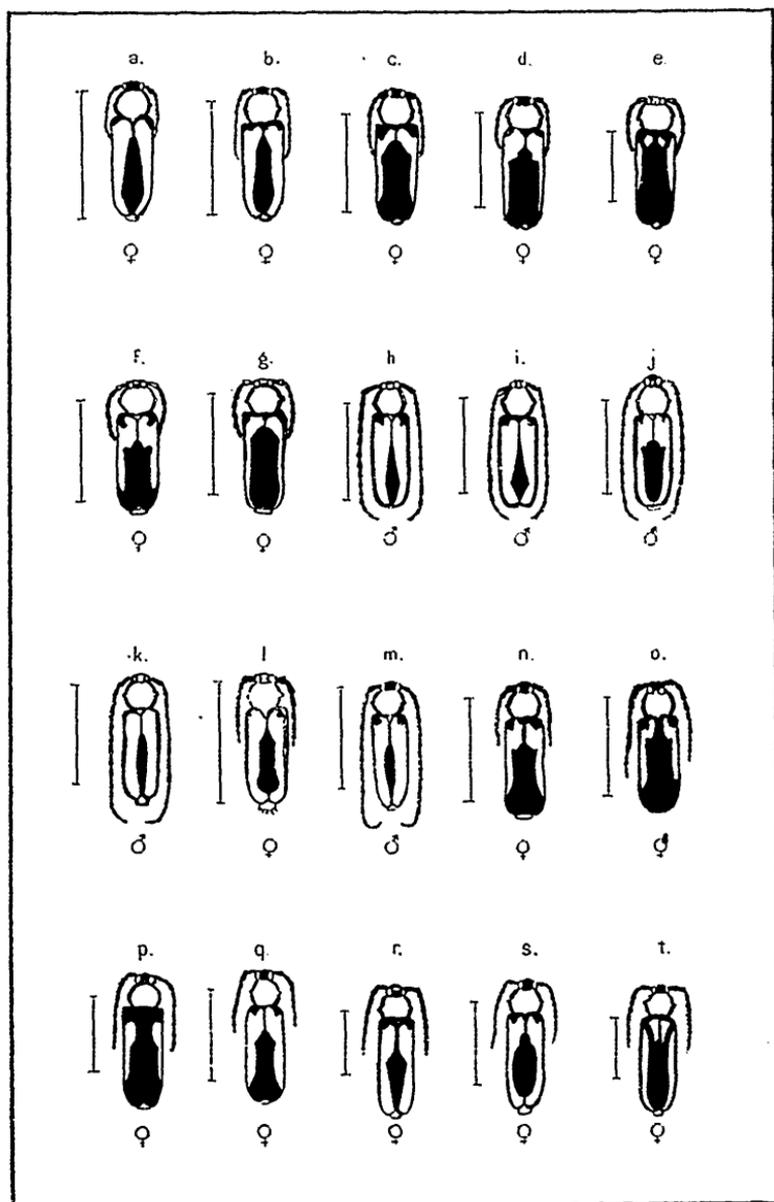
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## SOME INTERESTING COLOUR-VARIETIES IN THE GENUS CROSSIDIUS.

BY H. F. WICKHAM, IOWA CITY, IOWA.

While engaged in the re-arrangement of some boxes of Cerambycidae recently, the peculiar modifications of the ordinarily very simple pattern of coloration in the genus *Crossidius* brought about the desire to see to what extent and under what circumstances certain of these modifications were carried on or existent. The results of the studies ensuing thereupon are presented in the present paper.

The pattern which may be regarded as the typical one, and upon which all the others are built, either by simple addition or subtraction, is as follows:—Head black, thorax black with yellow side margins, elytra yellow with the humeri and a large elongate common sutural spot black. I do not wish it understood, however, that this is to be regarded as the original pattern from which the others have been evolved through the processes of natural or sexual selection—only as a common plan of coloration, and one which forms a convenient standard of comparison.

In habit the beetles are diurnal, frequenting flowers of golden-rod and other yellow-flowered Compositae, more especially in the arid regions of the United States and southward. In our faunal limits the genus is found from Montana and Oregon to Texas and Southern California, spreading over a vast extent of territory, and one of great differences in climatic and atmospheric, as well as of geologic characters. Under these circumstances we might well expect to find the genus composed of either many more or less closely allied species, or one or few very variable ones. My own experience goes to show that, in this group, those species of wide distribution offer many interesting variations, and to bring some of these before the reader I have prepared the accompanying plate, wherein the body and antennae of the insects are represented in a conventional manner, and all accuracy of delineation confined to the points under discussion—the clytral pattern.

That the yellow ground colour of most of the species is of protective value, and that the black markings aid in this object by breaking the continuity of outline, I think no one will contradict who has seen these insects in their natural homes, whether he be a believer in any of the theories advanced to account for this phenomenon or not. That the variation within specific limits is also very great will not be denied by one who has seen cabinet series from various parts of the country; but the meaning of this variation and its co-relations, if such there be, with the multitudinous incidents of food, size, habitat, altitude, temperature and moisture, are not to be made out at a sitting, but will take years of thought and labour to demonstrate. The few facts, for the bringing forward of which the present paper was written, may none the less serve a useful purpose in aiding those whose investigations are of a parallel nature to keep a sort of check on their own investigations, or to find that the work of others may help to bear out the conclusions arrived at in their own.

The figures *a* to *j* of the accompanying plate represent some of the forms shown by *Crossidius pulchellus* from southern localities. It will be noticed that the lightest forms, *h* and *i*, are both males, while the darkest, *c*, *d* and *e*, are females; the male shown at *j* is, however, darker than the females shown at *a* and *b*, the pattern resembling more closely that of *g*, though the males with fusiform sutural blotch, *h* and *i*, are lighter than the correspondingly marked females *a* and *b*; this is true also of the male with shield-shaped spot (*j*), and its corresponding females, *c*, *d*, *e*, *f* and *g*. The females, among themselves, show an increase in comparative size of the dark spot with decrease in actual size of the insect, as will be seen by comparisons of the hair-lines indicating the length of each specimen figured. The inference to be drawn here is that the female tends to the possession of increase of black markings over those of the male, and that the smaller specimens are likely to be darker than the larger.

Figures *q*, *r*, *s* and *t* are of specimens which have been referred to *C. hirtipes*, but which I am inclined to consider simply a small form of *C. pulchellus*, since they do not agree with the description of the former species. These are all females, and do not bear out well the conclusion which would seemingly be justified by the preceding series that the small specimens are darkest, since *r* is a lighter form than the larger *s*. At *t* is shown a curiously marked specimen in which the humeral spot is prolonged backward, connecting with the sutural mark at what is, in most specimens, its antero-lateral angle. This may be compared with fig. *e*

where a somewhat similar conjunction is brought about, not so much by the prolongation of the humeral spot as by the extension forward of the sutural patch.

Figure *k* represents a form of coloration sometimes seen in the male of *C. longipennis*, Casey, of which species a series of fifty specimens, all from Albuquerque, New Mexico, lies before me. Of these only two of the males are so heavily marked with black as the figure, while all but two of the females are darker, the majority tending towards *a* (but lacking the humeral spot), while one is almost as dark as *g*. In this species, as in *pulchellus*, the females are the more heavily marked with black, but the size of my specimens is so constant that no correlation can be traced between size and colour. It may be worthy of remark, however, that the specific pattern of coloration involves much less black than that of *C. pulchellus*, while the actual size of the insect averages much greater—an indication of a tendency in large species in this genus to become light-coloured as well as large individuals of some of the species.

At *l* is shown a specimen of *C. intermedius*, which will illustrate the pattern of coloration of the only specimen I possess. It differs from most of its congeners in having pale legs and antennæ, and inhabits the drier portions of the southern plains in the same localities, and with the same habits, as *C. pulchellus*, though the range is probably much less extended.

*C. nitidicollis*, Casey, is represented by figures *m* and *n*, and is found in the neighborhood of Tucson, Arizona, and on the foothills of the mountains near by. It will be noticed that the male shows very little black, while the female is quite dark, almost exactly resembling fig. *f* of *C. pulchellus*. Here we find the female, as usual, darker than the male.

In the figures *o* and *p*, which show the markings of *C. discoideus*, a red and black species, is noticed an extension anteriorly of the sutural mark, which here reaches the base of the wing covers, with, in one case, a corresponding increase of the humeral spots which have been spread over the whole base of the elytra, and become confluent with the sutural blotch. Both specimens are females, so no sexual comparisons can be made, though the small specimen is the darker. My specimens are from the high mountains of Colorado (Cockerell) and from Williams, Arizona, the latter place at an altitude of between 6,000 and 7,000 feet.

The results of some researches regarding melanism in insects have lately been published by Mr. J. W. Tutt, of London, England. He believes that moisture is the chief excitant cause of melanism, and has

offered proof to show that among the British lepidoptera the darkest forms are commonest in the more humid parts of England. Given an excitant cause, he shows that as moisture in the atmosphere tends to darken the soil, trees and other natural objects, natural selection would, if not interfered with by opposing forces, tend to perpetuate the melanic forms. This line of thought has suggested to me the desirability of making some inquiries regarding the climatic conditions of the different regions from which my own specimens come. A request for figures stating average annual precipitation has at once been acceded to by Prof. Mark. W. Harrington, Chief of the U. S. Weather Bureau, who has kindly sent me the appended statistics:—

Annual precipitation at Albuquerque, New Mex.,	7.19 in.	May to Oct ,	5.42 in.
“ “ Helena, Montana,	13.22 in.	“ “	7.90 in.
“ “ Flagstaff, Arizona,	25.95 in.	“ “	9.12 in.
“ “ Prescott, Arizona,	17.06 in.	“ “	8.50 in.

In most of these cases the observations have extended over a number of years, but the record for Flagstaff, Ariz, has been kept for only seventeen months, and Prof. Harrington writes me that it may be too high an average. My object in getting the figures for the months of May to October (inclusive) is this: If the action of moisture on the colours of insects be purely physiological, it would act chiefly, no doubt, while the insect was growing,—that is, through the active part of the larval stage, extending through the warmer months of the year; if, on the other hand, it acts indirectly by bringing the tints of the insect, through the work of natural selection, more closely in harmony with the darker colours with which this wet weather would surround it, it must nevertheless act during these same months.

While my paper does not deal exclusively with any one species, those treated of are closely allied, and on this ground it may prove profitable to make a few comparisons.

Fifty specimens of *C. longipennis* from the driest of these points—Albuquerque, New Mexico—show thirty-two males, none of which have more than a very slender line of black along the suture, and eighteen females, most of them coloured like *h*, several as light as *h*, and only one as dark as *b*. *C. testaceus*, from the dry regions of Southern California, is also notable from its lack of black markings. I found *C. longipennis* abundant upon golden-rods (*Solidago*), which had a very solid head of

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bloom, without the reliefs of light and shade thrown by the more open inflorescence of the yellow-flowered plants on which my other species were chiefly taken. Dr. Leconte records *C. testaceus* from *Baccharis* without specifying more definitely.

Six specimens of *C. pulchellus* from Williams, Ariz., are of a rather dark form, such as shown by *g* and *d*, with the exception of two males which are somewhat lighter, as *h*, and one darker female, like *e*. Four males from Peach Springs and Seligman are a very little lighter than *h*, while two females from the same localities are darker than the males, but not quite as dark as the Williams female. Three examples from Albuquerque are about the same as the Peach Springs specimens. A series of nineteen specimens from Helena Mon., averaging much smaller than those of other localities, are of a type very nearly the same as the Williams specimens, so far as regards the extent of black markings.

Summing up the evidence, then, we find :

1. Light specimens (*C. longipennis*) at Albuquerque, where the precipitation is 7.19 inches.
2. Darker ones (*C. pulchellus*) at Peach Springs and Seligman, where it is about 17. inches.
3. Still darker ones at Williams, where it is about 25.95 inches.
4. Specimens about the same as these last from Helena, Montana, where it is about 13.22 inches.

Now we have to reconcile with it, if we are to accept Mr. Tutt's theory at all, the phenomenon of specimens from Helena, with a precipitation of 13.22, presenting a phase of coloration as dark as those from Williams, with an annual precipitation of 25.95 inches. This, however, is not a great difficulty, since I have before mentioned the fact that the Helena beetles average much less in size than the more southern ones, and here I think it quite possible that we have the keynote to the whole thing. Mr. Tutt has already\* adduced proof that some forms of disease produce melanism, and it has occurred to me that this species (*C. pulchellus*) having its metropolis in the south, where comparatively mild winters prevail, may find it a hard struggle to exist on the plains of Montana, where

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\*Melanism and Melanochroism, p 44 *et seq.*

the winters are of exceptional severity. The consequent weakening of the individuals by this undue exposure may produce a stunted and debilitated race, and the effects of this debility be shown in the lack of the bright yellow pigmentation so characteristic of the forms from the dry, warm regions of the South.

I am far from thinking that all has been written upon the subject of the variation in *Crossidius* that the occasion offers, but space has its limits and the material is too scanty to more than indicate in what direction we may look for the explanation of some of the phenomena presented. The data regarding precipitation in the different localities even cannot entirely be relied upon, as I have had to apply the average taken at Flagstaff to Williams, which is but few miles distant, and at very nearly the same elevation. In the same way it has been necessary to take that given at Prescott as approximately correct for Peach Springs and Seligman. However, I hope the article may attract the attention of more of our American students of entomology to a fascinating branch of the science, and that we may soon see in this country a number of workers who will follow out the lines of investigation suggested by our English brothers, and for the furtherance of which they have established a new magazine† especially devoted to the discussion of variation and its manifold causes. Most of my own work in this article has been suggested by the writings of Mr. Tutt, and to his works I would refer those who care to follow up the subject and learn, in a reasonable compass and without the mass of irrelevant matter which encumbers some other recent works dealing with the speculative side of entomology, what new fields of investigation may be opened up to those who like to know the histories of their insects as well as their names.

#### EXPLANATION OF PLATE.

- Figs. *a* to *j*, *Crossidius pulchellus*, southern forms.  
 Fig. *k*, “ *longipennis*, Casey.  
 Fig. *l*, “ *intermedius*, Ulke.  
 Figs. *m* and *n*, “ *nitidicollis*, Casey.  
 Figs. *o* and *p*, “ *discoideus*, Say.  
 Figs. *q* to *t*, “ *pulchellus*, Lec., northern forms.

†The Entomologist's Record and Journal of Variation.

NOTES ON TWO SPECIES OF TENTHREDINIDÆ, FROM  
YOSEMITE, CAL.

BY HARRISON G. DYAR, ROXBURY, MASS.

*Schizocerus tristis*, Cress.var. *FUMIPENNIS*, n. var.

Eight examples bred from larvæ in the Yosemite Valley differ from Mr. Cresson's description in having both wings uniform smoky blackish, about as dark as the hind wings of *Hylotoma scapularis*, Klug. In the ♀, the pale parts of the legs are not white, but of an obscure sordid whitish, tinged with brown, and not contrasting with the black body parts; the abdomen is obscurely banded with brown between the segments.

Length of ♀, 6 mm.; ♂, 5 mm.; expanse of wings, ♀, 13.5 mm.; ♂, 11 mm.

*Larva*.—Head rounded, wider than high, the mouth parts pointed; clear green, shaded with black across the middle; ocelli black, mouth brownish; width, 1 mm. Thoracic feet large, the abdominal ones small, present on joints 5-10 and 13 (10 pairs in all). A slight subventral ridge; body transversely creased and covered with round, smooth, concolorous, wart-like elevations, uniform green, the dorsal vessel showing darker by transparency; a stigmatal row of black dots. The anal plate terminates in four short pointed projections tipped with black, and there are two others below the anus. Thoracic feet dusky. Length of larva, about 10 mm.

*Cocoon*.—Formed on the back of a leaf: oblong, rounded, symmetrical, composed of coarse yellowish silk of loose and irregular texture, not compact enough to be opaque.

*Pupa*.—Eyes prominent, cases free, the wing cases small; abdomen cylindrical, slightly tapering; colour clear green, the legs colourless, eyes black and two blackish shades on the thorax, as well as at bases of wing cases.

Food plant—*Hosackia grandiflora*, Benth.

*LABIDA OPIMUS*, Cress.

A ♀ example differs considerably from Mr. Cresson's description:—  
var. *BIGEMINA*, n. var.

Head black; clypeus, labrum, mandibles (except at tip), palpi, lower half of cheeks, and elongate oval spot resting on the insertion of

each antenna and tip of basal joint of antenna outwardly, greenish yellow. Thorax black, the prothorax, tegulæ, two wedge-shaped bands along the parapsidal grooves, scutellum, centre of metathorax above, and a large angular spot on pleura, also yellow. Legs yellow, except the bases of coxæ, the tips of hind femora, tips of all the tibiæ outwardly and the tarsal joints, especially toward their tips, which are black. Wings smoky brownish-hyaline, iridescent, nervures black, the basal part of stigma and costa adjoining stigma yellowish. Abdomen greenish-yellow above and below, except the basal half of basal plates, a triangular spot on basal part of each dorsal abdominal segment, except the last, and ovipositor sheaths, which are black. Length, ♀, 11 mm.; expanse, 22 mm. The pair of spots between the eyes and second pair on the front part of mesothorax are conspicuous.

#### FITCH'S TYPES OF N. A. MEMBRACIDÆ.

BY F. W. GODING, M. D., PH. D., RUTLAND, ILLINOIS.

(Continued from page 172.)

No 3123 is *Ophiderma flava*, Godg.

No. 4416 is the type of *Thelia cratægi*, Fh.

No. 1875 is the type of *Ceresa brevicornis*, Fh. The brief description given by Fitch is correct, but not sufficiently complete. Good characters are present for separating it from its congeners.

The species labelled *Thelia Robinæ* is *T. turriculata*, Fh., and that labeled *Smilia betule* is *S. camelus*, Fabr. Fitch's manuscript name *Zuela* is what is now known as *Stictocephala*, Stal. The descriptions of the species of this family, published in Emmons's N. Y. Report, were written by Dr. Fitch, as is stated by Emmons in a foot note, and there is no valid reason for crediting such species to Emmons. Fitch described the species and preserved the types which are now in the collection of the National Museum; consequently, his name should be attached to all such species whenever reference is made to them. While Fitch depended largely on the distribution of colours and shape of the crest of the prothorax, yet he gave some reliable characters which are of use in identifying his species. The crest immediately after the last moult is very soft and easily mutilated, and many species might be made from the eggs of a single female were this character depended upon. It should be used only with other and less variable characters.

## SYNOPSIS OF THE DIPTEROUS GENUS THEREVA.

BY D. W. COQUILLET, LOS ANGELES, CAL.

The following table contains all the species of *Thereva* known to me as occurring in this country north of Mexico. *Thereva torgissa*, Say. (*corusca*, Weid.), and *T. crassicornis*, Will (*non Bellardi*), belong to *Psilocephala*. *Thereva nigra*, Say., is a true *Thereva*. *T. albiceps*, Loew., is evidently the same as *albifrons*, Say; and *gilvipes*, Loew., is the other sex of *flavincta*, Loew., as that author suspected at the time of describing these two forms. Walker's and Macquart's species have not been identified, nor could this be done with any degree of certainty except by an examination of the type specimens.

The table is as follows :—

- |   |                           |
|---|---------------------------|
| 1.—Antennæ black . . . . .  | 3                         |
| Antennæ yellow; California species . . . . .  | 2                         |
| 2.—Pile and bristles of head and thorax wholly whitish, knob of halteres yellow, front of female wholly opaque. . . . .         | <i>semitaria</i> , n. sp. |
| Pile and bristles of head and thorax largely black, knob of halteres black, front of female with a shining black spot . . . . . | <i>fucata</i> , Loew.     |
| 3.—Femora largely or wholly black . . . . .   | 5                         |
| Femora yellow, knob of halteres black, front of female with one or two shining black spots . . . . .                            | 4                         |
| 4.—Front of female with two shining black spots, front of male destitute of black pile . . . . .                                | <i>duplicis</i> , n. sp.  |
| Front of female with only one shining black spot, front of male with many black pile . . . . .                                  | <i>flavincta</i> , Loew.  |
| 5.—Knob of halteres black . . . . .   | 8                         |
| Knob of halteres yellow or white, front of female destitute of shining black spots . . . . .                                    | 6                         |
| 6.—Front of female with two large, velvet-black spots, apices of femora black . . . . .   | 7                         |
| Front of female destitute of such spots, apices of femora broadly yellow, cross-veins of wings not bordered with brown. . . . . | <i>candidata</i> , Loew.  |
| 7.—Stigma dark brown, cross-veins bordered with brown . . . . .   | <i>otiosa</i> , n. sp.    |
| Stigma pale yellow, cross-veins not bordered . . . . .  | <i>vialis</i> , O. S.     |

- 8.—Front of female partly shining black..... 9  
 Front in both sexes wholly opaque and covered with pollen..... 11
- 9.—Abdomen of female opaque on the first six segments, front with two shining black spots..... *Johnsonii*, n. sp.  
 Abdomen of female largely shining..... 10
- 10.—Front of female with a shining black spot reaching the lower ocellus; pollen on sides of front extending less than half way from each eye to lower ocellus..... *strigipes*, Loew.  
 Front of female having the lower half shining, the upper half covered with pollen..... *hirticeps*, Loew.  
 Front of female wholly shining black, except each lower corner..... *nigra*, Say.  
 Front of female with only one shining black spot; pollen on sides of front nearly or quite reaching the lower ocellus. *frontalis*, Say.
- 11.—Pile of front largely black..... 13  
 Pile of front wholly white, front of female destitute of large, velvet-black spots..... 12
- 12.—Bristles of occiput black, eighth abdominal segment in the female shining black, stigma dark brown..... *albifrons*, Say.  
 Bristles of occiput whitish, eighth segment in the female covered with pollen, stigma pale yellow..... *novella*, n. sp.
- 13.—Wings hyaline, the cross-veins not broadly bordered with brown. . 14  
 Wings brownish, the cross-veins broadly bordered with darker brown..... *comata*, Loew.
- 14.—Third joint of antennæ unusually short, inverted pyriform, the first joint very robust..... *melanophleba*, Loew  
 Third joint of antennæ not unusually short..... *melanoncura*, Loew.

*Thereva semitaria*, n. sp. ♂ black, the antennæ, palpi, knob of the halteres, posterior margins of the second and third abdominal segments, hypopygium, femora, tibiæ, except the tips, and base of tarsi, yellow, the femora sometimes brown. Head and entire body whitish pollinose, the entire pile white, the bristles, except those of the legs, yellowish-white. Third antennal joint as long as the first and nearly twice as broad, being three fourths as broad as long; style one-third as long as the third joint. Thorax not distinctly vittate. Wings grayish-hyaline, the costal margin usually a darker gray, veins largely yellow, very narrowly bordered with brown, stigma dark brown, fourth posterior cell closed and short petiolate.

♀ same as the ♂, except that the pollen on the upper part of the front is more yellow, and the eighth and ninth abdominal segments are shining yellow, posterior margins of the other segments also more or less yellow.

Length, 8 to 11 mm. Southern California. Eleven males and four females, in April and May.

*Thereva duplicis*, n. sp. ♂ black, the femora, tibiæ, tarsi, except at apex, and the hypopygium, yellow. Head gray pollinose, the pile wholly yellowish-white, that of the vertex, bristles in upper part of the occiput and on the antennæ, black; third antennal joint as long as the first and only slightly wider, style one-fourth as long as the third joint. Pile of thorax mixed black and yellowish-white, the bristles black; pile of pleura white, that on the scutellum more yellowish, the four bristles black. Pile of abdomen yellowish-white, that of the venter white, of the femora mixed black and white, of the tibiæ and tarsi black; bristles of legs also black. Wings grayish-hyaline, the veins largely brown and indistinctly bordered with brown, stigma dark brown, fourth posterior cell closed and short petiolate.

♀ same as the ♂, with these exceptions: Pile of front largely black, its pollen yellow; in middle of front are two transverse shining black spots separated from the eyes by a pollinose interval nearly equalling the length of the second antennal joint. Posterior margin of each abdominal segment, except the first, yellow, including the greater portion of the last three segments; base of the third, fourth, fifth and sixth segments, and the whole of the following ones, shining; pile of the fourth and following segments both dorsally and ventrally erect and black.

Length, 9 to 13 mm. South Dakota (Aldrich), Montana (Morrison). One male and two females.

*Thereva otiosa*, n. sp. ♂ black, the knob of the halteres, and posterior margins of the second and third abdominal segments, white, tibiæ, except at apex, and base of tarsi, yellow. Head white pollinose; that on upper part of front narrowly black, on the vertex grayish-black; pile of entire head, except the black pile of the vertex, white; bristles of upper part of occiput and on the antennæ black. Third joint of antennæ five-sixths as long as the first and slightly narrower, style one-fourth as long as the third joint. Thorax grayish-black pollinose and marked with two narrow whitish pollinose vittæ, the lateral margin also whitish pollinose; pile of thorax mixed black and white or yellowish, the bristles

black; pile of pleura and scutellum white, the four bristles of the latter black. Abdomen whitish pollinose, that at the base of the second, third and fourth segments blackish-gray; pile of abdomen, venter and femora white; a few on the hypopygium black; short pile of tibiæ and tarsi, like all the bristles of the legs, black. Wings, including the space between costa and auxiliary vein, grayish-hyaline, veins black, narrowly bordered with brown; stigma dark brown, fourth posterior cell narrowly open, or closed and short petiolate.

♀ same as the ♂, with these exceptions: Front dark-brown pollinose on the upper part, and near the middle marked with two large rounded velvet-black spots contiguous to the eyes; eighth and ninth abdominal segments shining, their pile largely black.

Length, 7 to 11 mm. Los Angeles County, California. Nine males and seven females, March to May.

*Thereva novella*, n. sp. ♂ same as *otiosa*, with these exceptions: Style of antennæ two-fifths as long as the third joint; pile and bristles of vertex and bristles of occiput yellowish-white; thorax destitute of black pile; knob of halteres brown, margined with yellow; veins of wings largely yellow, stigma also yellow and indistinct.

♀ differs from the ♀ of *otiosa*, besides in the particulars above mentioned, in that the front is destitute of the two round velvet-black spots, having instead a narrow, interrupted, dark-brown cross-band; eighth abdominal segment opaque pollinose, its pile largely yellow.

Length, 8 to 11 mm. Los Angeles County, California. Five males and one female.

*Thereva johnsoni*, n. sp. ♀ black, base of third antennal joint, tibiæ, and base of tarsi, reddish. Head yellowish-gray pollinose, front with two transversely oval shining-black spots on its middle; pile of head pale yellow, that of the front mixed with black, bristles of occiput and of the antennæ black. First joint of antennæ slender, scarcely wider than the second, third joint lanceolate, one and a half times as wide as the second, three-fourths as long as the first joint; style one-fifth as long as the third joint. Thorax yellowish pollinose, marked with two light gray vittæ, the sides a purer gray; pile of thorax and scutellum pale yellow, less than half as long as the black bristles, a few black pile on the thorax; pleura gray pollinose and yellowish-white pilose. Knob of halteres brown. Abdominal segments one to six uniformly yellowish-gray pollinose and short yellow pilose, the seventh and following segments shin-

ing brown ; pile of abdomen erect and largely black. Front and middle femora destitute of bristles. Wings yellowish gray, a hyaline streak in base of marginal cell, a darker gray cloud in apex of first submarginal and along front edge of the second submarginal cell ; stigma and a small spot at base of the second submarginal and of each posterior cell, dark brown ; fourth posterior cell closed and short petiolate.

Length, 10 mm. Washington. Received from C. W. Johnson, and collected by Prof. O. B. Johnson, after whom the species is named.

### SOME NOTES ON MICHIGAN INSECTS, PRINCIPALLY COLEOPTERA, AFFECTING FOREST TREES.

BY C. H. TYLER TOWNSEND.

The following notes were presented to the Entomological Society of Washington, May 1, 1890, under the title of "Some insects affecting certain forest trees." They are herewith somewhat revised and sifted for publication, since the matter which follows is of some value.

The paper furnishes a record of certain insects mostly coleopterous, which I found many years ago in Michigan affecting either the trunks or foliage of forest trees and shrubs and which I have since been able to identify in connection with my notes. All are southern Michigan records, and belong to the vicinity of Constantine. Many coleoptera found under dead bark, but which feed merely on decaying vegetable tissue, have been omitted. Such are *Prionochaeta*, *Scaphidium*, *Ditoma*, *Bactridium*, *Melanotus*, *Cis*, *Tenebrioides*, *Melandrya*, *Utioma*, *Platydemia*, *Penthe*, *Cratoparis*, and many others.

#### COLEOPTERA.

*Brontes dubius*, F.—Under bark of linden (fall) ; elm and butternut logs (May).

*Paromalus acqualis*, Say.—Under bark of decaying butternut and linden logs (May).

*Hister lecontei*, Mars.—In burrows under decaying bark of butternut, elm, and linden.

*Adelocera aurorata*, Lec.—One under bark of old oak log (Jan.)

*Alans oculatus*, L.—Boring stumps and dead trunks of oak, hickory, poplar and linden.

- Cardiophorus gagates*, Er.—On oak leaves (May).
- Elater manipularis*, Cand.—Under decaying linden bark (Nov.)
- Elater nigricollis*, Hbst.—In hickory stump (Oct.) ; and poplar stump (Dec.)
- Elater linteus*, Say.—In decaying poplar stump (fall).
- Elater apicatus*, Say.—In decaying poplar stump (Dec)
- Agriotes oblongicollis*, Melsh.—On leaves of hazel (May) ; and beech (May, June).
- Limonius auripilis*, Say.—On beech foliage (May, June).
- Limonius basillaris*, Say.—On new oak and beech growth (May, June).
- Acmæodera culta*, Web.—On cut oak wood (July).
- Agrius ruficollis*, F., *otiosus*, Say, *bilineatus*, Web.—On cut oak wood and rails (July).
- Brachys ovata*, Web.—On foliage of beech and oak (May to July).
- Brachys acrota*, Melsh.—Eating oak and hazel leaves (May) ; leaves of beech, elm, ironwood (*Carpinus*), (May, June).
- Brachys aeruginosa*, Gory.—On leaves of beech, elm, ironwood (*Carpinus*), (May, June).
- Thanasimus dubius*, F.—In numbers on piles of oak wood (May). In coitu (May 20).
- Thaenoclerus sanguineus*, Say.—Under bark oak stumps (Oct.) ; under bark butternut log (May).
- Dichelonycha elongata*, Fab.—On leaves of oak (May).
- Lachnosterna prunina*, Lec.—On foliage of red oak (May, June).
- Lachnosterna crenulata*, Fröh.—On foliage of red oak (May).
- Lachnosterna tristis*, F.—Swarming in red oaks (May).
- Anomala undulata*, Melsh.—Swarming in red oaks (May).
- Strigoderma arboricola*, F.—On red oaks (May). The last five species occur mostly in the evening.
- Cotalpa lanigera*, L.—Eating leaves of dwarf willows (*Salix cordata*), (May, June).
- Parandra brunnea*, F.—Under bark of linden and butternut logs.
- Smodicum cucujiforme*, Say.—Many specimens found on a white oak fence post, beside small holes in post from which they had emerged (June, July).

*Dorcaschema nigrum*, Say.—On hickory foliage (May, June).

*Goes pulverulenta*, Hald.—Dead beetle found in a cell in cut hickory.

*Liopus alpha*, Say.—On oak rails, and on fence posts under red oak tree (June).

*Lepturges querci*, Fitch.—On oak posts of fence under red oak tree (June).

*Hyperplatys maculatus*, Hald.—Same as preceding.

*Saperda vestita*, Say.—In sapwood, also in bark of dead linden trunk in all stages (May).

*Saperda tridentata*, Oliv.—Beetles and pupæ under bark of elm logs (May).

*Donacia flavipes*, Kby.—Twenty-seven taken on leaves of new oak growth (May 23).

*Chlamys plicata*, F.—On witch hazel (June).

*Exema gibber*, Oliv.—On witch hazel (June).

*Cryptocephalus venustus*, F.—On oak and hickory foliage.

*Pachybrachys othonus*, Say, *carbonarius*, Hald., *infaustus*, Hald.—On oak foliage.

*Noda (Colaspis?) convexa*, Say.—On beech foliage.

*Chrysomela scalaris*, Lec.—On leaves of low sumac, hazel, linden.

*Chrysomela multipunctata*, Say. var. *bigsbiana*, Kby.—On leaves of low sumac (*Rhus*).

*Lina lapponica*, L.—In numbers eating leaves of dwarf willow (*S. cordata*), (May, June).

*Blepharida rhois*, Forst.—On low sumac.

*Haltica inervata*, Lec.—On foliage of ironwood (*Carpinus*), beech and elm (May, June).

*Odontota rubra*, Web.—On beech, elm and oak foliage (May, June).

*Diaperis hydni*, F.—Twenty-five or thirty taken, Feb. 16, in groups in small passages in the inner wood of an old oak stump. Also found in same places later in the spring. When disturbed, they emit a yellowish

fluid which stains the skin, has a pungent odour, and turns alcohol to a crimson colour. The heads and legs of some worker termites dropped in the same alcohol became of a deep violet colour, but the heads of soldier termites, from their harder integument, remained unstained. These beetles exhibited considerable variation in the disposition of the black markings on their orange-red elytra. I could find no communication with their galleries from the outside. Their social hibernation is interesting.

*Synchroa punctata*, Newm.—Beetles and pupæ under bark of linden and elm logs (May).

*Attelabus analis*, Illig., *bipustulatus*, F., *rhois*, Boh.—On leaves of young hickory.

*Magdalis armicollis*, Say.—On elm foliage (June).

*Anthonomus crataegi*, Wlsh.—On beech foliage.

*Mononychus vulpcculus*, F.—On witch hazel (June).

*Cœliodes acephalus*, Say.—On witch hazel (June).

*Balaninus nasicus*, Say, *rectus*, Say.—Very numerous under an isolated red oak (Sept. 15 to 22 only).

*Eupsalis minuta*, Drury.—In dead oak and linden.

*Cossonus platalca*, Say.—Fifty-four taken under bark of an old butter-nut log (May).

Determinations of above coleoptera were made by Dr. Horn and Mr. Schwarz.

LEPIDOPTERA.—A scsiid (*Sammia*, sp.?) was bred from large knotty galls common on trunks of red oaks. These are rough excrescences of the bark and wood, frequently attaining a diameter of several feet. The moths are about the size of *S. aceris*.

DIPTERA.—The pine-cone gall of *Cecid. s-strobiloides*, O. S., occurs commonly on *Salix cordata* (June, July). It remains conspicuous through the winter, when these shrubs are otherwise bare.

THE PHALANGINÆ OF THE UNITED STATES.

BY NATHAN BANKS, SEA CLIFF, N. Y.

The family Phalangidæ is readily separable from the other families of Phalangida by having but one simple (not compound) claw at the end of each tarsus and having a claw at the end of palpus. The last (fifth) joint of palpus is nearly always longer than the next to last; an exception is the male of *Protolophus*. Our species have been described by Say (Complete Writings), Wood (Bull. Essex Inst., 1868), Weed (Bull. Ill. State Lab. Nat. Hist., 1889, and various articles in Am. Nat., 1887-1893), and Banks (Trans. Ent. Soc., Wash., 1891). The genera known to me may be separated by the following key:—

- 1 { Body with two rows of large tubercles, male with fifth palpal joint shorter than fourth, female with third palpal joint forked..... *Protolophus*.
- 1 { Body without large tubercles, fifth palpal joint always longer than the fourth..... 2
- 2 { A group of spines on the front margin of the cephalothorax, eye-tubercle with two rows of prominent spines..... 7
- 2 { Not with both of above characters..... 3
- 3 { Three large spines on the second joint of palpus, eyes exceedingly large..... *Caddo*.
- 3 { Without such spines, eyes normal..... 4
- 4 { Femur I., much shorter than body, in the females not as long as width of body..... 5
- 4 { Femur I., longer, or in some females but little shorter than body..... *Liobunum*.
- 5 { Metatarsus I., without false articulations, femora and tibiæ I. and III. much thickened..... 6
- 5 { At least one false articulation in metatarsus I., femora and tibiæ normal..... *Leptobunus*.
- 6 { Eye tubercle spinose..... *Globipes*.
- 6 { Eye tubercle smooth..... *Eurybunus*.
- 7 { Second joint of palpus with prominent spines..... 8
- 7 { Second joint of palpus without prominent spines..... 9
- 8 { No false articulation in metatarsus I., eye tubercle more remote from the anterior margin. .... *Lacinius*.
- 8 { At least one false articulation in metatarsus I., eye tubercle farther forward..... *Oligolophus*.
- 9 { Femora as narrow as, or narrower than eye-tubercle, fifth joint of palpus longer than the third and fourth together..... 10
- 9 { Femora wider than eye-tubercle, fifth joint of palpus not longer than the third and fourth together..... *Homolophus*

- 10 { Femur I. longer than width of body..... *Phalangium*  
 { Femur I. not longer than width of body..... *Mitopus*

Trachyrhinus, Weed [Am. Nat., 1892], is unknown to me; it appears to be near Homolophus, but with more slender legs, more spinose palpi, with a different patella, and larger eye-tubercle. Wood's description of *P. favosum*, however, reads much like *Mitopus biceps*, Thorell.

These genera I arrange in four tribes.

#### PROTOLOPHINI.

This embraces the single genus *Protolophus*, remarkable for the structure of the male palpi.

*Protolophus*, gen. nov.

In the male the second, third and fourth palpal joints are greatly enlarged, and the fifth joint is a little shorter than the fourth; the claw at the end of the fifth is, however, distinct. The female has the palpi more normal, the fifth joint longer than the fourth, the third joint is prolonged on the inner side, as in *Prosalpia*, and the fourth has a small projection at tip on the inner side. The eye-tubercle is low, with two rows of small spines. The legs are short, femur II. being shorter than the body; tibiæ without false articulations. The dorsal parts of the first five abdominal segments are more united than those beyond, each of these five segments having a median pair of large tubercles. Two species are known to me.

Abdominal tubercles unarmed..... *tuberculatus*.

Abdominal tubercles with a few apical spines..... *singularis*.

*Protolophus tuberculatus*, n. sp.

Length, 8 mm.; femur I., 2.3 mm.

Colour—Gray to brownish, the cephalothorax gray, the dorsum of abdomen darker, somewhat reddish-brown. Body with a broad, darker, median stripe, beginning at the anterior margin of the cephalothorax and extending to the sixth abdominal segment, narrower and darker on the abdomen than on the cephalothorax. Just below the front margin of the cephalothorax are two small median spines. The venter is pale grayish with a few brown spots near the sutures, the tips of the mandibles black, the coxæ brownish, the trochanters yellowish, the femora, patellæ and tibiæ reddish-brown, the metatarsi yellowish, the tarsi gradually becoming darker, the abdominal tubercles black. The legs are covered with small spines, on each side of the coxæ there are rows of small black plates.

The female is similar, but the dorsum is more reddish, the venter more

mottled than in the male, and there are some brown spots on the basal joint of the mandibles above.

Southern California. Not uncommon.

*Protolophus singularis*, n. sp.

Similar to *tuberculatus*, but the abdominal tubercles bear from two to four spines. The anterior margin of the cephalothorax is more spinose; and the second and fourth joints of the palpi are much more enlarged than in that species; the eye-tubercle is also more spinose. The legs are more slender, especially the second pair. The body and legs are more brownish, and the palpi are mottled, the second joint of the mandibles very dark.

Southern California. Collection of Dr. Geo. Marx. One male.

#### CADDINI.

This tribe embraces only *Caddo agilis*, remarkable for its large eyes. It shows its relation to certain genera of the next tribe in having spines on the second palpal joint. One young specimen has a white band above. I have it from N. Y. and D. C.

#### OLIGOLOPHINI.

The very spinose character of the members of this tribe distinguish them from all their allies.

*Oligolophus pictus*, Wood.

This occurs in the Eastern States.

*Lacinius ohioensis*, Weed.

Ohio, N. Y.

*Lacinius texanus*, Banks. Psyche, 1893.

Texas:

*Mitopus biceps*, Thorell.

Described by Thorell in 1876 from Colorado; I have received specimens from L. M. Cockerell.

*Phalangium cinereum*, Wood.

The northeastern parts of the United States and in Canada. [A. D. MacGillivray].

*Phalangium longipalpis*, Weed.

Arkansas. This would be called *Cerastoma* by some European authorities.

## HOMOLOPHUS, gen. nov.

Quite prominent spines upon the cephalothorax and eye-tubercle, and with transverse rows on the abdomen. Legs thicker than usual, the anterior femora being much thicker than the eye-tubercle is wide, almost as thick as the basal joint of the mandibles; femur I., is a little longer than the width of the body, tibiæ without false articulations. The fifth joint of palpus is not quite as long as the third and fourth together. This genus is related to *Phalangium*, but the last joint of palpus is shorter, and the legs are shorter and stouter.

*Homolophus arcticus*, n. sp.

Length, 6.4 mm. ; femur I., 4.2 mm.

Colour—Cephalothorax yellow-brown, black in the middle behind; dorsum of abdomen black; legs dark red-brown, yellow at extreme base of the femora and on the trochanters; venter brown. Eye-tubercle with two rows of a few spines; cephalothorax with scattered spines, arranged much as in *Phalangium cinereum*; abdomen with six transverse rows of similar spines; posterior angles of the cephalothorax projecting and rounded with a few prominent spines. Legs stout, very spiny, having a few more prominent spines at tips of femora, patellæ and tibiæ; second pair of legs lost.

Commander Island, Siberia. Collection of Dr. Geo. Marx.

## LIOBUNINI.

This tribe includes the more typical and common members of the sub-family.

## GLOBIPES, gen. nov.

The principal character of this genus is the enlarged femora and tibiæ of legs I. and III., the eye-tubercle is low and with a few spines, legs short, but femur II. is longer than the body and more than twice as long as femur I. Metatarsus I. without false articulations. The palpi are normal.

*Globipes spinulatus*, n. sp.

Length, 3.5 mm. ; femur I., 1 mm.

Colour, brown or reddish-brown, tip of abdomen more gray, dorsum somewhat mottled with brown, coxæ yellowish, trochanters and base of femora yellowish, remainder of femora, patellæ and tibiæ reddish, metatarsi yellowish, tarsi a little darker, palpi pale, tips of mandibles black. The female has two median white spots near the tip of the abdomen. The

palpi are very short, the patella and tibia somewhat enlarged, the fifth joint longer than the third and fourth together. The cephalothorax and abdomen are smooth; the legs have many small spines, most prominent on the enlarged parts of legs I. and III.; tibia II. has three false articulations. The legs of the female are longer and more slender than those of the male. The abdomen of the female is larger and pointed behind, while that of the male is somewhat truncate.

Southern California.

*EURYBUNUS*, gen. nov.

Eye-tubercle very low and smooth, cephalothorax with an elevation on the anterior margin bearing a few small spines. The segments of the dorsal shield of the abdomen are so closely united that their sutures are hardly discernible. The femora, patellæ and tibiæ of legs I. and III. are enlarged; femur II. barely twice as long as femur I., and a little longer than the body; metatarsus I. without false articulations.

*Eurybunus brunneus*, n. sp.

Length, 9 mm.; femur I., 4 mm.

Colour—Dorsum uniform brown, the margins of the abdomen a little white; venter grayish-white; coxæ, trochanters and part of the femora yellowish, a band near tip of femur brown, the extreme tip whitish; base of patella brown, the tip white; middle of tibia brown, the base and tip white; same with the metatarsus, except that the brown is not as dark; tarsi brownish; palpi and mandibles yellowish. Body very smooth, femora I. and III. with a few short scattered spines, similar spines on the under side of tibiæ and metatarsi I. and III., tibia with three false articulations.

Southern California.

*LEPTOBUNUS*, gen. nov.

Legs short, joints but little thickened, femur I. much shorter than the body; femur II. frequently not as long as the body. Eye-tubercle narrow, usually smooth. *L. californicus* is the type. In this species the palpal claw is smooth, and metatarsus I. has but one false articulation; lateral pore is very large and looks outward. In the two other species the palpal claw is dentate, metatarsus I. has several false articulations, and the lateral pore is like that of *Liobunum*. For these reasons the last two species may form another genus,

- |   |   |  |                     |
|---|---|--|---------------------|
| 1 | { | Metatarsus I., with one false articulation . . . . .     | <i>californicus</i> |
|   |   | Metatarsi I., with several false articulations . . . . . | 2                   |
| 2 | { | Dorsum smooth . . . . .                                  | <i>maculosum</i>    |
|   |   | Dorsum granulate . . . . .                               | <i>grande</i>       |

*Leptobunus grande*, Say.

*Liobunum similis*, Weed.

Va., D. C., Ohio, Ill.

*Leptobunus maculosum*, Wood.

Pa., W. Va., Ohio.

*Leptobunus californicus*, n. sp.

Length, 6.6 mm. ; femur I. 2.7 mm.

Colour—white above, mottled with brown and black, the vase-mark indefinite; beneath whitish, with a few brown spots; legs yellowish, with an apical brown ring on each joint. Eye-tubercle low and smooth; body smooth; legs smooth, except the tarsi, which have spines at each articulation. Legs quite stout; metatarsus I. with one and tibia II. with two false articulations; palpi with the fourth joint longer than the third; fifth joint about equal to the third and fourth together.

Southern California (Davidson).

*LIOBUNUM*, Koch.

*Forbesium*, Weed.

The genus *Forbesium* is based on young forms of previously described species. *Liobunum* is very rich in species; many forms remain to be described. I will mention but one, readily recognized by having two large yellow spots.

*Liobunum bimaculatum*, n. sp.

Length, 4.2 mm. ; width of abdomen, 3.5 mm. ; femur I., 11.9 mm. ; femur II., 19.5 mm.

Colour—dark brown, with two large yellow spots over the juncture of the cephalothorax and abdomen; the eye-tubercle black; venter, palpi and legs yellowish; patellæ and tibiæ at tip brownish; metatarsi and tarsi somewhat brownish. Body short and broad; the end of abdomen bent under; the side-pieces of the sternum appear to be completely separated from the sternum proper; coxæ, venter and sternum with a few granules. Eye-tubercle moderately high; more than its length from the anterior margin, and with two rows of spines above. Abdomen with a few transverse rows of small, stiff hairs. Legs extremely long, with some small spines

and a few larger ones at the tips of the femora and patellæ; tibia I. without false articulations, tibia II. with several. Second joint of palpus with small spines beneath, the third and fourth joints about equal.

Southern California. Kindly loaned to me for description by Dr. Geo. Marx.

The remaining species of this genus are as follows:—*L. vittatum*, Say, *L. dorsatum*, Say, *L. nigropalpi*, Wood, *L. exilipes*, Wood, *L. verrucosum*, Wood, *L. ventricosum*, Wood, *L. calcar*, Wood, *L. bicolor*, Wood, *L. politum*, Weed, *L. elegans*, Weed, *L. longipes*, Weed, *L. nigripes*, Weed. All are from the eastern United States except *L. exilipes*, from California; this also occurs near Olympia, Wash. State (Trevor Kincaid).

## CORRESPONDENCE.

### UNIDENTIFIED BOMBYCIDS.

Sir,—In regard to Mr. Smith's note on page 164 in CANADIAN ENTOMOLOGIST for June, I would say that I am the authority for the reference of *Saligena personata* to *Raphia frater*, and for the fact that now a series of specimens of *Sphida obliquata* are in Brit. Mus. Coll. under the label of "Edema obliqua." I have not the Brit. Mus. lists before me, but this series of apparently bred specimens of *Sphida obliquata*, which I found on my second, were not in Brit. Mus. Coll. at my first visit, when I examined the collection, with a specimen of the moth, for the express purpose of identifying the species. They could not have escaped my notice. They must have been added subsequently to my visit and description. On this first occasion I discovered, quite misplaced, the type of the much more obscure species *Arzama densa*, Walk.; without this identification the name *Arzama* would have hardly been placed in our catalogues. I recognized *Sphida obliquata* as allied to the type of *Arzama densa* at a glance. I examined the *Notodontide* carefully, making several identifications, and the specimens now under *Edema obliqua* were not then there. A reference to our original paper in Tr. Am. Ent. Soc. Phil., will show that I examined the *Notodontians* carefully. The probability is, that the species must remain as catalogued by me, viz.: *Sphida obliquata*, G. & R., when the facts are all known. In cases where specimens are simply stuck without type labels under printed labels in Brit. Mus. Coll., they are not to be taken as Walker's type, when in any way disagreeing with Walker's descriptions. A. R. GROTE, Bremen.

## A BLACK MALE OF PAPILIO TURNUS.

Sir,—Having been a constant reader of the ENTOMOLOGIST for the past ten or twelve years, I have never found anything published in your valuable journal as regards the capture of a black male of *Papilio Turnus*. In the annual report of the Entomological Society of Ontario, for 1889, on page 38, Mr. Fletcher writes at some length in regard to the Tiger Swallow-Tail butterfly (*Papilio turnus*). The statement to which I wish to call your attention is on page 39, on the eleventh line from top of page, where he says: "No specimen of the black male has ever been taken; the only approach to this melanic form is a beautiful suffused variety." No doubt but the author was about right, for I had examined other journals and had failed to find any account bearing upon this subject, as I had one or two beautiful *Papilios* in my collection, and was uncertain as to what they were. The other day I was out collecting, and to my great surprise captured a beautiful ♂ and ♀ of *Turnus* in copulation, so you see there is no question as to their identity. This beautiful black male *Turnus* resembles *Papilio Troilus* in some respects, having its wings black; primaries with a marginal row of rich cream-coloured spots, whereas in *Troilus* they are a light or pale yellow; secondaries with bluish lunules, while in *Troilus* they are green, running along the margin. The anal spot with a bluish crescent as in *P. Palamedes* and in *P. Cresphontes*, while the anal spot in *Troilus* is entirely orange. Tails slender and black. After being a collector of insects for the past twenty years, both in the south and north, this was indeed the first golden opportunity and I had the pleasure of the capture of a black male *Turnus*. Its distribution covers a wide area, reaching from the far north to the confines of the tropics, going by the variety name *Glaucus* in the south, just in the same manner as *Papilio Machaon* of the old world, which is to be found in England, France, Germany, Northern India and Japan, and a huge variety *Hippocrates*, of Northeast China, while *P. Polydorus* and *P. Alexanor*, strictly of European origin, are limited to a much smaller territory than either *Turnus* or *Machaon*. Whilst *P. Rutulus* and its varieties *Arizonensis* and *Anmoni*, resembling in general appearance *Turnus*, but somewhat smaller, and being distinguished by its having the yellow band which runs along the posterior margin on underside of primaries unbroken, while in *Turnus* it is disconnected, is found throughout the Pacific states, *P. Eurymedon*, its var. *Albanus*, *P. Daunus* and *P. Pylumnus*, all of which belong to the yellow tribe of *Papilios*, range within the confines of the western states, while *P. Cebalus*, which bears a close resemblance to *Turnus* except that the yellow shows a slight tinge of orange, is found in Mexico, and thus far, has never been found elsewhere even as a winged visitor. More fully will these matters be treated of in my forthcoming work on "The Geographical Distribution of Butterflies and Moths."

A. S. VAN WINKLE, Keota, Iowa.

Mailed August 2nd.