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Queen Victoria.

BORN MAY 24TH, 1819; ASCENDED THE THRONE JUNE 20TH, 1837; DIED JANUARY 22ND, 1901.

The death of our beloved Queen, who has been our sovereign for more than three score years, is to each of her subjects, in whatever part of the world he may be, a loss beyond what words can express. We have all been filled with reverence for her majesty—admiration for her character—and deep affection for her person. Whether we regard her as Empress and Queen in stately dignity—as sovereign ruler over the vast British Empire, inspired with justice, wisdom and truth—as wife and mother living a home life of purity, love and peace, unsullied by any stain,—in whatever aspect we regard her, our feelings, our judgment, are the same. The grief which now wrings our hearts is shared in, and sympathized with, by the nations of the world; everywhere there is the same tribute of respectful sorrow.

Victoria's name will ever stand in the annals of the world pre-eminent among exalted women; and it will ever remain in our hearts and memories as an example of all that is good and noble, of all that is pure and without reproach.

NOTES ON THE GENITALIA OF HALISIDOTA HARRISII, WALSH.

BY HARRISON G. DYAR, WASHINGTON, D. C.

I see by Mr. Lyman's address (1899) before the Entomological Society of Ontario that he is a convert to the view of the specific distinctness of *Halisidota tesselaris* and *H. Harrisii*. I believe this to be correct.

When I last referred to the genitalic differences of these species, I expressed a possible doubt that the apparent differences might be found evanescent in a large material. Having just examined 74 preparations, I do not find this to be the case. In *tesselaris* the upper point of the side piece is free from the outer lobe and projecting (fig. 2);

in *Harrisii* this point is concealed behind the lobe and pressed close to it (fig. 1). The differences are small, but readily perceptible. The preparations were made from two bred *tesselaris* and three bred *Harrisii;* afterward 69 captured examples were examined. These were a part of the specimens from Poughkeepsie, N. Y., recorded in Insect Life, and they proved to be 96% *tesselaris*. The total number captured should therefore be approximately 2,570 *tesselaris* and 106 *Harrisii*. *Harrisii* is evidently considerably the rarer species of the two.

REFERENCES.

1862. Harris, Ins. Inj. Veg. (Flint), 364.
1863. Walsh, Proc. Boston Soc. Nat. Hist., IX., 288.
1864. Walsh, Proc. Ent. Soc. Phil., III., 413, 430.
1891. Dyar, Ins. Life, III., 324.
1891. Dyar, Psyche, VI., 162.
1892. Dyar, CAN. ENT., XXIV., 306.
1900. Lyman, 30th Ann. Rep. Ent. Soc. Ont., 25.

SOME PLANT-LICE AFFECTING PEAS, CLOVER, AND LETTUCE.*

BY E. DWIGHT SANDERSON.

Nectarophora pisi, Kalt., and varieties.

The "Green Dolphin" is one of the best-known pests of peas and vetches in Europe, though but little concerning its economy has been recorded by European writers. In this country, *N. pisi*, Kalt., has been noted by Thomas[1], Oestlund[2], and Williams[3], but as their specimens were never compared with any from Europe, and as plant-lice are exceedingly variable and descriptions of them are, therefore, often of but little value even when accurate, the identity of their specimens with the European forms has been somewhat in doubt.

At the beginning of the present outbreak of the pest in the spring of 1899, as specimens of *N. pisi* of both American and European authors were unavailable for comparison, and as most of the European writers described the species as very much smaller than the remarkably large form under consideration, the species was named *Nectarophora destructor* by Prof. W. G. Johnson[4], and described by him as new[5]. Prof. Johnson gives[4] Mr. Th. Pergande as authority for the species, stating that he "considers it an undescribed species," and adds, "Inasmuch as Mr. Pergande does not care to describe it, it is my privilege to name the insect."

In Dec., 1899, the attention of the writer was called to a species of *Nectarophora* doing serious injury to lettuce under glass. Careful study failed to reveal but a few minor characteristics by which this species could be separated from *N. destructor*, Johns., the chief difference being its smaller size, but many specimens were as large as small *destructor*. The similarity of this aphid to *destructor* led to a study of the plant-lice infesting lettuce foliage, and also of the variation in size, form and colour of *N. destructor*, taken at different times during 1899 and 1900. The following table gives the average measurements of different series of specimens of *destructor*, those of *N. pisi*, Kalt., as given by various authors, and those of *N. destructor* as described by Prof. Johnson. Numbers 3, 4, 5, 11, 17, 20, 21 and 22 are all unquestionably *N. destructor*, Johns.:

(*From the Entomological Dept. of the Delaware College Agricultural Experiment Station, Newark, Del.)

1 Thomas, 8th Rept. St. Ent., Ill., p. 64 (1879).
2 Oestlund, Bull. No. 4, Geol. and Nat. Hist. Surv., Minn., p. 82 (1887).
3 Williams, Spec. Bull. No. 1, Univ. Nebr., Dept. Ent., pp. 6, 9, 18, 20, 23 (1891).
4 W. G. Johnson, Bull. No. 20, n. s., Div. Ent., U. S. Dept. Ag., pp. 94-9 (1899).
5 W. G. Johnson, CANADIAN ENTOMOLOGIST, XXXII., pp. 55-60 (Feb., 1900).

Nectarophora pisi Kalt., and varieties.

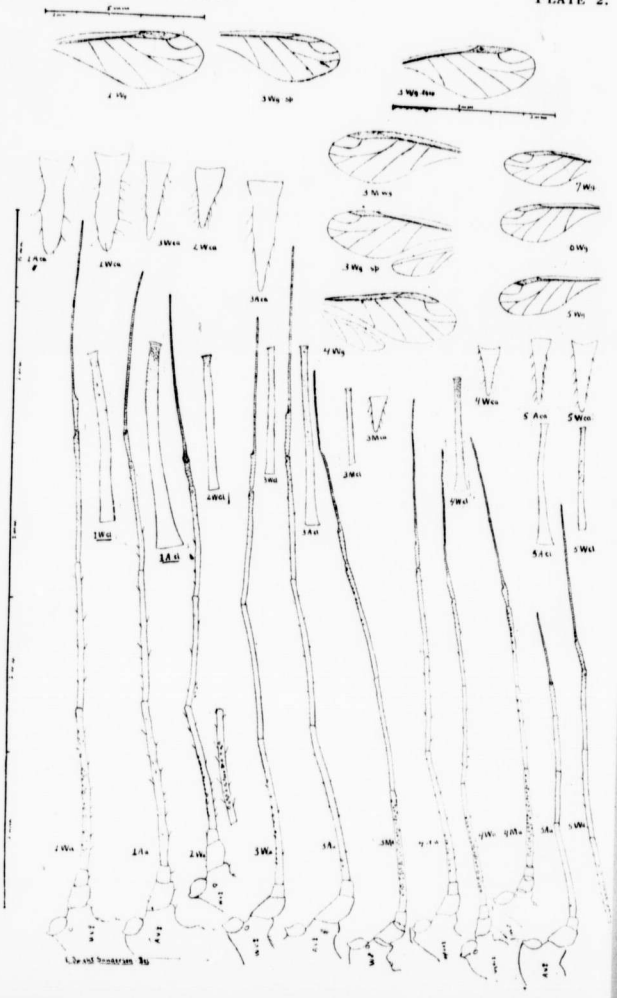
(Measurements in 1-100 millimeters.)

No.	Description.	Date.	No. Specimens	Wing Exp.	Length.	Width.	Antennæ. A.						Tibia. T.			Cauda.	Cornicles.
					L.	W.	L'gth.	III.	IV.	V.	VI.	VII.	I.	II.	III.	ca.	cl.
1	*Winged Viviparous* From G. B. Buckton	*Female.* June 17, 47	1	1100	410	160	450	140	103	84	21	114	200	200	263	63	114
2	N. destructor, Johns.....	CAN. ENT. Feb., 1900		1100	400 500	100 115	525 (+30)	150	100	75	50	150				½cl.	100
3	Newark, Del., on pea....	Nov. 1, 1899	1	1000	300	116	430	100	100	82	35	112	200	200	250	46	115 82
4	" "	Oct. 26, 1899	5	1000	320	110	434	94	87	82	30	113	182	180	240	48	86
5	" "	Oct. 10, 1900 Spring 1900, 1892	6	1000	345	115	427	95	90	83	30	116	181	186	255	49	86
6	Kaltenbach	1843			250												
7	Koch*	1859		900	300 330	120	350	90	60	50		110	120	130	150	35	80
8	Oestlund	1887					(395)	90	75	70	20	110				45	90
9	Buckton	1875		914 964	227	88	381										
10	From G. B. Buckton.....		2		270	114	385	78	76	68	21	120	183	183	240	40	101 92
11	Newark, Del., on pea....	Nov. 17, 1900	13	930	314	105	390	88	81	72	28	97	162	162	225	42	70
12	Lexington, Ky., on lettuce	Feb., 1895	4		315	105	360	87	71	68	20	102	160	170	221	30	83
13	Newark, Del., on lettuce.	Dec., 1899	3	900	230	80	340	93	75	59	14	90	150	150	200	30	70
14	Balto. Co., Md., on lettuce	Feb., 1899	2	700 800	235	85	313	82	61	56	14	100	145	145	185	33	71
15	Milford, Del., on pea	May 1, 1900	7	700	216	85	300	75	54	52	17	82	133	133	180	30	60
16	Iowa Agr. Coll., clover ..	Oct. 15, 1891	1		230	90	300	64	54	56	20	86	120		170	40	65

	Winged Male.																
17	Newark, Del., pea.....	Nov. 17, 1900	3	900	250	95	362	77	71	73	23	102	157	150	190	24	50
17a	Newark, Del., lettuce....	Dec., 1899	1	750	200	75	300	63	65	52	14	111	132	135	165	16	42
	Apterous Viviparous	*Female.*															
18	From G. B. Buckton	June 17, -47	2		400	160	440	110	86	80	22	112	195	205	271	66	132
		CAN. ENT.			400	100											
19	N. destructor, Johns.....	Feb., 1900			600	200	Longer	than	winged.							750 \ 570 /	125 200
20	Newark, Del., on pea....	Oct., 1899															
		" 1900	13		320	115	450	112	92	80	28	108	191	187	274	66	113
21	Milford, Del., on pea	May 1, 1900	10		339	159	451	111	91	80	294	107	186	185	270	70	110
22	Newark, Del., on clover .	May, 1892															
23	Kaltenbach	1843			250 400												
24	Koch*.	1859			320	130	350	80	60	50		110	120	120	150	20 +	80
25	Taschenberg.....	1871			400												
26	Lexington, Ky., lettuce ..	Feb. 23, 1895	4		300			92	69	58	15	93	155	155	225	41	75
27	Newark, Del., lettuce....	Dec., 1899	4		300	130	355	90	60	56	17	100	163	170	210	42	90
28	Iowa Agr. Coll., clover ..	April 17, 1893	2		300	137	215	57	35	38	21	43	89	95	135	43	74
29	Buckton.....	1875			270	127	355										88

* Measured from figure—probably inaccurate. ( ) Partly computed by writer.

CAN. ENT., VOL. XXXIII. PLATE 2.



This study showed that the measurements given in the description of the species by Prof. Johnson represented specimens in May and June, when the species is at its maximum size, but specimens much smaller were found at that season, and those collected in October of 1899 and 1900 were uniformly smaller. It was found that the average size of specimens measured was as near that of *N. pisi*, Kalt., of Oestlund, as *N. destructor*, Johns., with no marked difference in colour. A careful review of European literature showed the size of *N. pisi*, Kalt., as given by different writers, to be quite variable; the length, for instance, as given by Koch (No. 7) is 3.3 mm., while Buckton (No. 9) gives 2.27 mm., and Taschenberg states that the winged female is slightly shorter than the wingless (No. 25), which he describes as 4 mm. long. The coloration as given by these writers is also variable.

In October, 1900, a form of the winged female (No. 11)—described below—was found migrating from peas to clover, which was much darker and smaller than the summer broods and in many respects more similar to some of the descriptions of *N. pisi*, and at the same time the apterous females and nymphs were distinctly pulverulent, which was not observed in June, but is mentioned in descriptions of *pisi*. A few winged males (No. 17)—described below—were also secured.

Having become well convinced of the identity of the two species, specimens of *N. pisi*, Kalt., were secured from Mr. G. B. Buckton, F.R.S., Haslemere, Eng., who kindly lent me two slides containing several specimens in Canada balsam. The specimens of one slide, collected at "Southgate, June 17, -47" (1847?) (Nos. 1 and 18), were of exactly the same size as *N. destructor* as described by Prof. Johnson, with exception of segment VI. of the antennæ being very much shorter. They also differed in having the cornicles and antennæ (Pl. I., 1a., 1cl.) considerably thicker than the smaller specimens of *destructor*, though very probably this is largely due to their having been flattened by the pressure of the cover glass and the drying of the balsam. The surface of the tips of the cornicles is reticulated, which has not been observed in typical *destructor*. None of these differences can, however, be considered as of sufficient value to separate the species, especially when one considers the variability of the species as given by European writers. The specimens of the other slide, marked by Mr. Buckton, "*Siphonophora pisi*?—Fool's Parsley," are considerably smaller, but are similar to the smaller forms of *destructor* found here, and lack the reticulation on the cornicles. There

is little question, therefore, but that the species (*N. destructor*, Johns.) so injurious during the past two seasons is the well known "Green Dolphin" (*N. pisi*, Kalt.) of Europe[6].

Past History.—In Europe the "Green Dolphin" has been known as one of the worst pests of peas and vetches for over a century. Kirby and Spence, writing in 1815, give an account of the damage done by this pest which corresponds very closely with our own experience, "those (aphids) which attack pulse spread so rapidly, and take such entire possession, that the crop is greatly injured, and sometimes destroyed by them. This was the case in 1810, when the produce was not much more than the seed sown; and many farmers turned swine into the pea fields, not thinking them worth harvesting. The damage in this instance was caused solely by the aphis, and was universal throughout the kingdom so that a supply for the navy could not be obtained. The earlier peas are sown, the better chance they stand of escaping, at least in part, the effects of this vegetable Phthiriasis." It is also remarked that the pest is worse in dry seasons.

The insect is evidently either native to America or has been established here for many years. The first record of its occurrence was in Minnesota in 1887 on Shepherd's Purse[7]. Since then it has been noted in Nebraska and Illinois on clover, beets, peas, and other plants.

Early in May, 1890, an experimental plot of crimson clover at this station was so badly attacked by what was undoubtedly this species of aphid that for a time it was feared the experiment would prove a failure.

One or two extensive growers of crimson clover inform me that they have seen this pest on crimson clover for at least six or seven years. As no other aphid is known to attack clover in any considerable numbers, there seems to be little doubt but that the same species has been present in Delaware for at least ten years. Mr. F. A. Sirrine writes me that Long Island pea growers state that "they had a similar trouble with their

6 The full bibliography of the species appears in the Report of the Del. Coll. Ag. Exp. Sta. for 1900. *Aphis ulmariæ*, Schrank, is undoubtedly the same species and several writers have preferred to use that name. Schrank's description, however, is not clearly recognizable, and I have preferred, therefore, to follow the majority of writers in using Kaltenbach's name. Exception might be taken to this usage, as very many aphids are not to be recognized from the original description of the species, but where types are not extant for purposes of comparison it would be much better were such descriptions discarded.

7 Thomas mentions it in Illinois in 1879, but it is doubtful whether his description applies to this species.

peas eight or ten years ago." In 1887 an aphid very similar to this species, and probably the same, was observed by Dr. L. O. Howard, U. S. Entomologist, on clover at Washington, D. C. Mr. R. H. Pettit, of the Mich. Agl. Experiment Station, informs me that one or two Michigan pea growers state that they have known a similiar plant-louse to infest peas for the past twenty years.

Fall Migratory Winged Viviparous Female.—Wing expanse, 9.3 mm. Length, 3.15 mm.; width, 1.05 mm.; Antennæ, 3.9 mm., III., 0.88 mm.; IV., 0.81 mm.; V., 0.72 mm.; VI., 0.28 mm.; VII., 0.97 mm. Tibia, I., 1.62 mm., II., 1.62 mm., III., 2.25 mm.; Cauda, 0.42 mm.; Cornicles, 0.70 mm. Average of 13 specimens.

Coloration same as male, except chitinous plates are slightly lighter, lateral spots and those above spiracles in abdomen are wanting, with two dark spots on subgenital plate, subventral plate green, lacking sensoria on V. antennal segment.

Apterous Viviparous Female.

Specimens late in October and in November are more or less covered with a distinct whitish pulverulence, are smaller, and darker green than in the summer.

Larvæ of these same broods have antennæ, cornicles and legs blackish or dark brown, body with more or less whitish pulverulence, which is especially marked and distinct on distal half of hind tibia; very different from larvæ in spring or summer.

Winged Male.—Wing expanse, 9 mm.; Length, 2.5 mm.; width, 0.95 mm.; Antennæ, 3.62 mm.; III., 0.77 mm.; IV., 0.71 mm; V., 0.73 mm.; VI., 0.23 mm.; VII., 1.02 mm.; Tibia, I., 1.57 mm.; II., 1.50 mm.; III., 1.90 mm.; Cauda, 0.24 mm.; Cornicles, 0.50 mm. Average of 3 specimens.

Dorsal aspect head yellowish, ocelli black, eyes red, mesal line darker, a dark spot either side of meson caudally; ventral aspect head and thorax yellow, except mesosternum which is deep olive brown to blackish, shining, chitinous; rostrum reaches to centre of mesosternum, prothorax dorsally yellowish-green, thoracic dorsal plates dark-olivaceous to blackish; legs yellowish or reddish brown, tips of femora and tibia, and tarsi black; large blackish pleural spot on either side of mesothorax and two smaller spots caudad of it at bases of mesa and meta coxæ; abdomen light green, slightly whitish pulverulent, three or four lateral blackish spots cephalad of cornicles; cornicles green, tips black; cauda green;

irregular horizontal spots on either side of abdomen around pores of connexivum above spiracles.

VARIETIES.

Specimens of *Nectarophora*, on lettuce: collected at Lexington, Ky., in Feb., 1895 (Nos. 12, 26), kindly loaned me by Prof. H. Garman; on lettuce in Baltimore County, Md., Feb., 1899 (No. 14), by Prof. W. G. Johnson; and on clover at Ames, Iowa (Nos. 16, 28), by Mr. F. A. Sirrine; have all been carefully studied and measured. A similar form was also taken at Milford, Del., on peas, May 1, 1900.

The dimensions of series of these aphids, as given in the table, shade into each other and *N. destructor* and *pisi* so as to make it impossible to separate them satisfactorily on any distinctions of size. It should be remembered that the measurements of the table merely give the average size of each series and that individual specimens vary widely from them. Numbers 12, 13, 14, 15, 26 and 27 are of the same variety. They may be distinguished by segment III. of the antennæ of the apterous viviparous females bearing six to eight sensoria, about half of which are much larger than the remainder, while *N. pisi* has but one; the tips of the cornicles in both winged and wingless are reticulated as in No. 1 *N. pisi* from England, whereas in American forms of *N. pisi (N. destructor)* they are plain. A single winged male, seemingly of this species, was taken on lettuce at Newark, in Dec., 1899. It (No. 17a) is similar to the male of *pisi*, except that it is smaller and IV. has two sensoria, which are lacking in *pisi*, the sensoria on III. and V. being similar.

The winged (No. 16) and apterous (No. 28) viviparous females from Iowa lack the reticulation on the cornicles, and the sensoria are as in *N. pisi*, though they are so much smaller that they are probably a distinct variety. The apterous forms from Iowa (No. 28) are "stem mothers," having been hatched from winter eggs. They differ from the other apterous forms in the shorter antennæ and legs, and in VII. being shorter than III. It is not unusual, however, for the stem mother to differ from other broods. No distinctive characters could be found in the wing venation of any of these specimens.

For the present, therefore, from the material studied, we are obliged to consider all of these specimens as varieties of *N. pisi*, Kalt. A larger series and further observation of their life-histories may reveal specific distinctions. The present account is published merely to show the extreme

variability of this species (or, as it may prove to be, the likeness of several species), and the necessity of a careful study of it and allied species. The writer will be greatly indebted to any who may be able to aid him with material, preferably alive, for the prosecution of such a study.

Thomas's *S. pisi* (l. c.) does not seem to be the same as *N. destructor*, but is quite similar to the varieties described above.

N. erigeronensis, Thos., and *N. corydalis*, Oest., are very closely allied to *N. pisi*, but specimens of them have not come under our observation.* The types of neither seem to have been preserved.

(To be continued.)

*ADDENDA.—Since writing the above, Mr. O. W. Oestlund has kindly sent me specimens of these species. Concerning them he remarks:

"1. *N. erigeronensis* is well separated from *pisi* and *corydalis* by having the sensoria more numerous and scattered in several rows along the whole length of joint III., and by being raised above the surface or forming distinct protuberances. Front femur much shorter (0.70 mm.). Front wings shorter. Spur (VII.) of antenna equal to or not much longer than III.

"2. *N. pisi* is a much larger form. Sensoria less numerous (15–18) and nearly in a single row, and almost absent on apical ⅓ of segment; not forming protuberances. Front femur much longer. Front wings larger. Spur much longer than III. (1.20 : 0.90).

"3. *N. corydalis* comes very close to *pisi*, and possibly too close to stand, though in the general aspect of the insect it seems quite distinct. Size smaller. Sensoria fewer in number (12–15) and in a single row. Front femur, front wings, and spur much as in *pisi*."

The specimens sent me measured as follows:

Form.	Description.	Date.	No.	Wing Exp se.	L.	W.	Antennæ.							Tibia.			Ca.	Cl.
							L.	III.	IV.	V.	VI.	VII.		I.	II.	III.		
W. V. Female	N. pisi	Oct. 28, '00	3	850	270	90		80						150		210	32	85
A. V. Female.	"	"	3		295	100		89	70					155	160	225	42	95
W. V. Female	N. corydalis	Sep. 26, '85	4	800	208	85	290	65	57	60	15	88		130	130	190	34	64
W. V. Female	N. erigeronensis	June 27, '98	3	750	220	80	200	55	38	25	10	48		83	96	130	31	66
A. V. Female.	"	"	5		200		205	55	39	33	13	53		85	85	127	30	76

All were collected at Minneapolis, Minn.

This *N. pisi* is similar to Nos. 12, 13, etc. above, taken on lettuce, and shows the same differences between it and var. *destructor*. The specimens were collected on squash. The apterous viviparous female has 5 to 8 sensoria on III.

N. corydalis seems similar to No. 15 above. It does not differ materially from Oestlund's *pisi* (as he remarks), and I think it merely a variation, possibly a distinct variety.

N. erigeronensis is a quite distinct species. In the apterous viviparous female the cornicles are thicker, more finely reticulated at apex than in *pisi*, are blackish, reach beyond the cauda, curving outward; antennæ dark, 9 to 15 sensoria on proximal half of III. In the winged viviparous female the antennæ, tibiæ, distal half of femora, apical ⅔ of cornicles are blackish, cornicles reach to tip of cauda; sensoria numerous (20 or so) on III., and protuberant; capitate hairs scattering on antennæ and body.

E. D. S.

PRELIMINARY LIST OF THE MACRO-LEPIDOPTERA OF ALBERTA, N.W.T.

BY F. H. WOLLEY DOD, CALGARY.

Calgary (altitude 3,400 ft.) is strictly a prairie city, situate at the junction of the Bow and Elbow rivers, about 40 or 50 miles from the true base of the Rocky Mountains. For several hundred miles to the east, the prairie is, with the exception of a few spots on river bottoms, absolutely void of either timber or scrub. A very few miles to the west the country becomes decidedly hilly, and in places densely covered with dwarf willows. Still further west the hills increase in height, shrubs become proportionately more abundant, and several species of poplars make their appearance, the north and west sides of the hills being usually densely wooded. By far the greater portion of the material from which this list has been compiled has been taken by myself and Mr. A. Hudson during the past seven seasons amongst these hills (3,600-4,000 ft.) near the head of Pine Creek, about sixteen miles to the south-west of Calgary. This "hill-prairie," as I will call it, and which may be looked upon as the boundary between the prairie and the foothills, is well watered by numerous creeks, and the valleys and hillsides—where not too steep—are largely grazed and cultivated, but otherwise splendid hunting grounds for the entomologist. Another favourite hunting ground, and one which has yielded many species not occurring nearer home, is about twelve miles further west, near Mr. Billings's lumber mill. Here the poplars have given place to spruce, fir, and pine; shrubless spots outside the timber are scarce, and swamps abound. Here, in short, commence the actual Rocky Mountain foothills. Had I had leisure to explore these foothills more thoroughly, I have no doubt my list would have been largely augmented. Two entomological trips have been made further into the hills to the south-west, to Mr. Lineham's lower log camp, on the south fork of Sheep Creek. On the first of these expeditions Mr. Hudson was successful in discovering several species of butterflies not seen elsewhere, but during the second, when I accompanied him, all the elements seemed combined against us.

From the end of October till nearly the end of April there is practically no outdoor work for the entomologist in this district. With the first few days of spring good work may be done after dark at sallow blossoms, provided the thermometer is a few degrees above freezing point. Almost before sallows have ceased to be attractive, *Erebia*

discoidalis and *Chionobas alberta* are out in swarms. Species continue to appear in gradually increasing numbers until July, which is perhaps the best all 'round month. Treacle may be worked with success from about the middle of June, sometimes earlier, and in some years (notably in 1894 and 1896) is very prolific until the middle of September, and attractive to a few autumn species even in early October. On one or two nights during the above mentioned years moths positively swarmed on the treacled fence posts. About eighty moths on a single treacle patch at one time and fifty-five or sixty species in a night's treacling is about my record. They couldn't have been thicker on the treacle, simply because there wasn't room! That was during hot, dry seasons. The last two seasons (1899 and 1900) have been cold and wet, and absolute failures as regards treacling, and Lepidoptera on the whole have been extremely scarce. When I say that during the present year (1900) we had four of five inches of snow on the ground on June 8th, and again on August 25th. and add, moreover, that these storms were only a very few degrees colder than many of those that occurred frequently during the whole summer, it may well be imagined that captures were few and far between. However, at this altitude and proximity to the eastern slope of the Rockies, summer frosts are of frequent occurrence even in the hottest seasons, and the minimum nightly temperature is rarely above 40 degrees. For some reason or other, treacle put on green poplars is rarely, if ever, of any use. The trees must be dead and dry. I usually treacle fence posts, preferring those with the bark on. Attraction of moths by light has not on the whole been by any means a success, though it has produced several species that have not been captured by other means. In a warm, dry season—*i. e.*, when moths are thickest—the sky is usually too clear for light to have sufficient attraction, and in wet seasons, when the sky is more frequently overcast and the nights consequently darker, moths are scarce. Owing to the shortness of the season, very few species are double-brooded here, and most of those that are are only partially so, the second brood consisting of but a few stragglers.

The fauna of this district was practically unknown five or six years ago, and even now specialists not only differ "inter se," but are often undecided as to the identity of some of my species even after seeing long series. The fact of living so far from "headquarters," of course, adds largely to my difficulty in getting correct names. Many of my names, therefore, are, and are likely to remain for some time longer, doubtful;

but where such doubt exists, I have, in the following list, explained the circumstances as best I can, quoting the authorities who have seen my specimens, and, where my own opinion differs from theirs, stating grounds for my verdict. Breeding from the egg would doubtless clear up many doubts, as well as cause many surprises, but, unfortunately, I have never been able to spare the necessary time and attention for such useful experiments. It is also much to my regret that I have never been able to spend much time collecting after the middle of July. On this account I am very poorly represented in some obscure species, notably in the genus Argynnis. This is the more unfortunate by reason of some of the representatives of that genus here in the West being very difficult to place. My thanks are due to Prof. J. B. Smith, who has done all in his power to assist me in naming my Noctuidæ; also to Messrs. Elwes, W. H. Edwards, Drs. Ottolengui, Fletcher, Skinner, Holland, and others who have from time to time named specimens for me. Mr. Bean worked the Laggan district for several years, in the mountains near the western boundary of Alberta, and a few of my records are on his authority. Mr. Sanson, of Banff Museum, and Mr. P. B. Gregson, of Lacombe, about a hundred miles north of Calgary, have also kindly assisted with supplementary lists.

(To be continued.)

ON SOME DIPTERA BRED FROM COW-MANURE.

BY L. O. HOWARD, WASHINGTON, D. C.

In the summer of 1889, while engaged in an investigation of the habits and life-history of the horn fly of cattle *(Haematobia serrata)*, the writer at various times brought to Washington from different points in Virginia, large quantities of cow-manure collected in the field, and eventually succeeded in working out the complete life-history of the horn fly, as displayed in Insect Life, Vol. II., No. 4, October, 1889. In this article the statement is made, in concluding, that the observations were greatly hindered and rendered difficult by the fact that fresh cow-dung is the nidus for a number of species of Diptera, some about the same size and general appearance as the horn fly, and that no less than twenty distinct species of flies had been reared from horse- and cow-dung, mainly the latter, and six species of parasitic insects as well. The plan finally adopted of securing the isolation of the horn flies was to remove the eggs

from the surface of the dung and place them with dung which was absolutely fresh and collected practically as it fell from the cow. A report upon the other species was promised, but was never published, although Professor Riley, in his report for 1890, listed eight parasites, only two of which were specifically determined.

The writer's recent investigations of the insect fauna of human excrement (Proc. Wash. Acad. of Sciences, Vol. II., pp. 541–604—Dec. 28, 1900) aroused his interest in the general subject of coprophagous insects, and the flies reared in 1889–90, from cow-dung, were looked up and have been named by Mr. D. W. Coquillett. The list is so interesting that it should be recorded. It will be noticed that several of the species are identical with those found breeding in human excrement. These are: *Sarcophaga incerta*, *Helicobia quadrisetosa*, *Musca domestica*, *Morellia micans*, *Myospila meditabunda*, *Ophyra leucostoma*, *Sepsis violacea*, *Sphaerocera subsultans* and *Limosina albipennis*. The rearing of *Ceratopogon specularis* from cow-dung is of especial interest, since, down to the record in the Washington Academy paper just referred to, no insects of this genus had been found to be coprophagous. Some of the other records are interesting for the same reason. The list follows:

Family CECIDOMYIDÆ.

Diplosis, sp. Issued Dec. 26, 1889; and Jan. 18, 1890; 4 specimens.

Family MYCETOPHILIDÆ.

Sciara, sp. Issued March 26 and 29, 1890; 2 specimens.

Family CHIRONOMIDÆ.

Camptocladius byssinus, Schrank. Issued Jan. 2, 1890. Issued Dec. 31, 1889; and March 25, 1890; 9 specimens.

Camptocladius minimus, Meigen. Issued Dec. 23, 26, 27, 30 and 31, 1889; and Jan. 13, 18, and March 25, 1890; 12 specimens.

Ceratopogon specularis, Coq. Issued August 28, 1889. Issued Dec. 30, 1889; 6 specimens.

Psychoda minuta, Banks. Issued Dec. 26, 30 and 31, 1889; and Jan. 11, 1890; 4 specimens.

Family RHYPHIDÆ.

Rhyphus punctatus, Fabr. Issued Sept. 2, 3 and 4, 1889. Issued Jan. 13, 16, 18, 20, 22, 24 and 29, Feb. 1, March 26 and 29, and April 5 and 9, 1890; 64 specimens.

Family SARCOPHAGIDÆ.

Sarcophaga incerta, Walker. Issued Aug. 31, 1889. Issued Aug. 30, 1889; 7 specimens.

Sarcophaga, sp. Issued April 23, 1890; 1 specimen.
Helicobia quadrisetosa, Coq. Issued Aug. 6 and 30, 1889; 2 specimens.
Pollenia rudis, Fabr. Issued Dec. 23, 1889; 1 specimen.

Family MUSCIDÆ.

Musca domestica, Linne. Issued Aug. 30 and Sept. 2 and 4, 1889; 20 specimens.
Morellia micans, Macq. Issued Aug. 30, 1899. Issued Dec. 23, 26, 27, 28, 30 and 31, 1889; Jan. 2, 6, 8, 9, 10, 11, 13, 14, 16, 17, 18, 20, 25 and 27, Feb. 1, March 25, April 5 and 9, 1890; 125 specimens.
Myospila meditabunda, Fabr. Issued Aug. 26, 28, 29, 30, Dec. 23, 1889; Jan. 9, March 25, 26, April 2, 9, 14, 15, 1890. Issued April 5, 1890; 48 specimens.
Hæmatobia serrata, Desv. Sept. 17; 2 specimens.

Family ANTHOMYIDÆ.

Hydrotæa armipes, Fallen. Issued Sept. 27, 30, Oct. 4, 1889; Jan. 2, 6, 7, 8, 9, 10, April 24, 1890; 38 specimens.
Hyetodesia umbratica, Meigen. Issued Feb. 13, 21, April 2, 9, 14, 15, 1890.
Ophyra leucostoma, Wied. Issued Sept. 6, 1889; 11 specimens.
Limnophora, sp. Issued Aug. 30, 31, 1889; 5 specimens.
Cænosia lata, Walker. Issued April 25, 1890; 1 specimen.
Cænosia flavicoxæ, Stein. Issued Aug. 31, 1889; 4 specimens.
Phorbia, sp. Issued March 29, 1890; 1 specimen.

Family SEPSIDÆ.

Sepsis violacea, Meigen. Issued Aug. 28, 1889; 8 specimens.

Family BORBORIDÆ.

Sphærocera subsultans, Fabr. Issued Aug. 30, 1889; 7 specimens.
Limosina albipennis, Rondani. Issued August 28, Dec. 23, 1889; 2 specimens.

ACKNOWLEDGMENT.

I desire to publicly express the deep indebtedness of the Entomological Society of Ontario to O. C. Poling, Esq., of Quincy, Ill., for his generous gift to its exotic collection, of a box of mounted butterflies in prime condition, numbering 50 specimens of 30* named species and varieties, many of them being exquisitely beautiful forms.

J. ALSTON MOFFAT, Curator.

NEW JASSIDÆ FROM THE ROCKY MOUNTAIN AND PACIFIC REGION.

BY E. D. BALL, FORT COLLINS, COLO.

(Continued from page 11.)

EUTETTIX MILDREDÆ, n. sp.

Form and general appearance of *pulchella*; colour pattern of *scaber*, but with extra markings, and different colours on pronotum and elytra. Length, 5.5 mm.; width, 1.75 mm.

Vertex slightly angularly rounded, transversely depressed before the apex; front as in *scaber*, the margin between front and vertex more strongly produced. Pronotum slightly angularly rounding anteriorly, much more so than in *scaber*; lateral angles scarcely apparent, rounding from eye; pronotum and scutellum convex, elevated.

Colour: vertex orange yellow, paler at base; scutellum orange, the basal angles and the margins at apex irrorate with fuscous. Pronotum dirty white, some black spots next the eyes; disc irrorate, pale olive brown, omitting an oval spot on the posterior disc on either side and the median line. Elytra milk white, with black margined areas of olive brown, as follows: All of clavus except a semicircular spot at base and another at middle of claval suture; an oblique band on corium, beyond this spot narrowing to the costa. There are three pairs of black spots along the sutural margin of clavus, the apical pair largest. The claval suture between the white spots, and the anterior and costal margins of the oblique band, heavily black. Inner apical cells and a few spots on costa irrorate with black. Face orange, a black spot on outer angle of either lora. Below pale yellow and fuscous.

Genitalia: ultimate ventral segment of the female about twice the length of the penultimate, the posterior margin broadly, slightly rounding, the median third produced in two rounding lobes; the notch between them not as deep as their length, the lobes usually black; male valve obtusely triangular, a little over half the length of the ultimate segment; plates long triangular, about three times the length of the valve, the apex attenuate, filamentous, together with the margin clothed with long silky hairs.

Described from three females from Colorado Springs, taken by the author, and fourteen examples of both sexes from Manitou, collected by Prof. Van Duzee. This is one of the prettiest Jassids that I have ever seen, and I take pleasure in naming it after my wife, whose careful drawings will add much to the value of my future synoptic work.

EUTETTIX PERELEGANTIS, n. sp.

Form and colour pattern of *Mildredæ*, slightly smaller and darker. Length, 5 mm.; width, 1.5 mm.

Vertex slightly more angular than in *Mildredæ*, distinctly longer on middle than against eye, transversely depressed; front narrower than in *Mildredæ*, not rounding in to the clypeus. Pronotum not as convex, the posterior margin scarcely emarginate.

Colour: vertex pale creamy, six equidistant, pale fulvous spots on margin, basal half sparsely irrorated with pale fulvous. Pronotum dirty white, heavily marked with black behind the eyes; a broad parellel margined stripe on either side the median line, olive brown. Scutellum brownish fuscous, irrorate with pale, a small spot at apex, a pair of larger quadrangular ones on lateral margins back of the suture, and a minute one at each basal angle, milk white. Elytra, colour and pattern as in *Mildredæ*. Face dirty white spots on loræ as in the former species. Below fuscous and pale.

Genitalia: ultimate ventral segment of the female over twice the length of the penultimate, the posterior margin broadly rounding, the median fourth roundingly emarginate one-fourth the depth, with a stout median tooth often bidentate at the apex; male valve obtusely triangular, the apex roundingly truncate, trilobate; plates three times the length of the valve, long triangular, the apex acute, filamentous, margins with silky hairs.

Described from five females and one male from Salida, Ridgway and Durango, Colo. Readily separated from *Mildredæ* by the colour pattern of the vertex, pronotum and scutellum, and the distinct female segment.

EUTETTIX SAUCIA, n. sp.

Form and general appearance of *scaber*, smaller and paler, the vertex mostly pale. Length, 4.5 mm.; width, 1.5 mm.

Vertex longer, narrower and more angulated than in *scaber*; face narrower above, longer than its basal width, rounding to the clypeus. The pronotum broadly and evenly rounding in front, truncate behind, almost twice the length of the vertex.

Colour: vertex pale yellow, six minute points on anterior margin and three irregular irrorate patches on posterior margin brownish fuscous. Pronotum white, coarsely irrorate with dull brown except a narrow lateral margin and traces of three pale lines. Scutellum more finely irrorate, three ivory white points in a triangle beyond the transverse line. Elytra

milky white, closely and finely irrorate with dull brown, as follows: All of clavus except a narrow strip along basal two-thirds of claval suture, once or twice interrupted and broadened at the end; a rather narrow oblique strip across corium beyond this and some irregular markings towards the apex, which form two definite spots on the costa. Two pairs of pale spots along the sutural margin of clavus. Face pale yellow, below pale and fuscous.

Genitalia: ultimate ventral segment of the female nearly twice longer than penultimate, the posterior margin nearly truncate from the rounding angles, with two triangular, slightly protruding, median teeth; male valve very obtusely triangular; plates long triangular, their apices attenuate, black, clothed with fine silky hair.

Described from a pair from Denver, a male from Fort Collins, Colo., and another from Tucson, Ariz. This species is closely allied to *scaber*, from which the longer vertex, smaller form, lighter colour and absence of distinct band on vertex will easily distinguish it.

EUTETTIX SCITULA, n. sp.

Resembling *seminuda*, but with the pronotum darkened up. Length, 5.5 mm.; width, 1.5 mm.

Vertex almost parallel margined, twice wider than long, half the length of the pronotum, strongly depressed. Front rather flat, its length and breadth about equal. Pronotum long, its lateral angles distinct, disc but feebly convex.

Colour: vertex pale creamy yellow, six pale fulvous spots along the anterior margin, sometimes a pair of spots near eyes on basal half. Pronotum dull white, coarsely irrorate with dark fulvous, omitting the pale yellow anterior margin. Traces of three pale stripes. Scutellum pale, the fine dark brown irrorations usually heaviest in a spot just within the basal angles on either side, and another behind the transverse suture. Three spots in a triangle on apical half ivory white; posterior disc light. Elytra milky white, a few coarse brown irrorations along the humeral and sutural margins before the middle, a transverse band behind the middle as in *seminuda*, but darker brown, and some irregular infuscations towards apex. Face and below pale yellow, pale fuscous arcs on front.

Genitalia: ultimate ventral segment of female twice the length of penultimate, the posterior margin slightly rounding, with two small roundingly angular, median teeth; male valve obtusely triangular; plates long triangular, their apices attenuate, infuscate.

Described from numerous specimens from Fort Collins, Pueblo, Salida and Grand Junction, Colo. This species is most closely related to *seminuda*, but the genitalia and pronotal band will at once distinguish it.

EUTETTIX PULLATA, n. sp.

Form and general appearance of *scitula*, but darker, approaching *perelegantis* in shade, but lacking the definite pattern of that species. Length, 5.5 mm. ; width, 1.5 mm.

Vertex two and one-half times wider than long, half the length of the pronotum, transverse depression very shallow, front broad and flat. Pronotum rather flat, scutellum transversely depressed, the apex swollen, elevated.

Colour : vertex white or pale yellow, a narrow fuscous line just in front of eyes, in front of which are four dots, and behind which are three large irregular, sometimes confluent, irrorate patches. Pronotum light, coarsely and somewhat sparsely irrorate with brown. Scutellum with a brownish fuscous patch just within each corner, disc pale or orange yellow. Elytral pattern as in *scitula*, but broader and darker ; clavus entirely reticulated except for two transverse bands, one at base and a broader, interrupted one before the middle, the white area of the corium with a few dots or reticulations.

Genitalia : ultimate ventral segment of female three times the length of the penultimate, the posterior margin broadly rounding, the median fourth triangularly excavated, the apex of this excavation broad, rounding or bidentate ; male genitalia as in *scitula*, valve obtuse, plates long triangular, the margins straight, tips attenuate.

Described from eighteen specimens from Manitou (Van Duzee), and five from Colorado Springs and Salida, Colo., by the author.

EUTETTIX MUNDA, n. sp.

Form of *jucunda*, Uhler, longer and redder. Resembling *costamaculata*, Van D., but with the costa reticulate. Length, ♀ 6 mm., ♂ 5 mm.; width, 1.75 mm.

Vertex sloping, transversely depressed, parallel margined, three times wider than long, two-fifths the pronotal length; front longer than its basal width, the margins evenly narrowing to the clypeus. Elytra broad, much longer than the body, the apices flaring ; venation distinct, the second cross nervure present, joining the fork of the inner branch of the first sector in nearly a straight line, the inner continuation of this fork leaving this line at about the middle.

Colour: vertex fulvous, a pair of approximate spots on tip, and sometimes a spot on either side of disc at base, fuscous. Pronotum pale olive, somewhat washed with fulvous, the posterior disc omitting the margins irrorate with testaceous. Scutellum pale, the apex and a point on each lateral margin ivory white, a pair of spots between these, black, a large spot just inside either basal angle and a pair of dots on disc testaceous. Elytra milky white, reticulated with coarse pigment lines between the sectors, and washed with brown; a definite light band at base, widest on the costa, and a narrower, less definite one across the second cross nervure, a heavy fuscous spot before the middle of the sutural margin, a smaller one behind, shut off by a white crescent, and a third at apex of clavus. Apical cells somewhat infuscate. Face fulvous, below pale fulvous.

Genitalia: ultimate ventral segment of the female over twice the length of the penultimate, the lateral margins narrowing to the slightly produced lateral angles, posterior margin between these angles truncate with a slightly produced, rounding, median lobe. Male valve obtusely angular, the apex produced, plates broad, slightly concavely narrowing to an acute point, four times the length of the valve, the apex curving up.

Described from seven females from Palmer Lake, Salida, Ridgway, Dolores and Durango, Colo., and one from White Mts., N. Mex., from Prof. Cockerell.

EUTETTIX MANITOU, n. sp.

Form and general appearance of *modesta*. Smaller and more distinctly golden yellow, especially in the male. Length, ♀ 4·5 mm., ♂ 3·75 mm.; width, ♀ 1.5 mm., ♂ 1 mm.

Vertex a trifle over half as long as its basal width, evenly rounding or very slightly angulate, disc slightly depressed, passage to front more rounding than in the preceding species. Pronotum more rounding anteriorly than usual in this genus. Elytra very flaring in the female, scarcely so in male, venation as in *oculea*, claval nerves tied together and to the suture before the middle, central anteapical cell constricted, usually divided.

Colour: female, vertex pale yellow, a pair of approximate spots at apex fuscous. Pronotum pale olive washed with golden, omitting about three pale stripes. Elytra milky, nervures brown, becoming fuscous before apex and on costa, disc with a testaceous brown cloud which is interrupted by a narrow, parallel margined, transverse light band just before the black-tipped clavus and another irregular band before the

apical cells. A few light spots at base of clavus and along the suture. Male, vertex lemon yellow, pronotum, scutellum, all the clavus and the adjoining part of corium bright golden yellow. Apical and costal margins of elytra yellowish subhyaline, the apical veins and the apex of clavus fuscous, some milky spots around the second cross nervure.

Genitalia: ultimate ventral segment of female three times the length of the penultimate, the posterior margin very slightly rounding with a broad, median production which is rounding or slightly bilobed; male valve very broad, obtusely rounding, the apex produced, plates four times the length of the valve, concavely narrowing, the margins and apex upturned.

Described from four females and two males from Manitou and one male from Dolores, Colo. The two Manitou males were taken by Prof. Van Duzee. The females of this species are quite similar to *moäesta*, but the male is much smaller and of a bright golden yellow. The genitalia are quite distinctive.

EUTETTIX OCULEA, n. sp.

Similar to *jucunda* in form, slightly broader and shorter, vertex fulvous. Eyes bright red. Elytra lacking the brownish cast of *munda*. Length, ♀ 4.75 mm., ♂ 4.25 mm.

Vertex not quite half as long as its basal width, two-thirds the length of the pronotum; the front longer than its basal width, clypeus broadly expanded at apex. Elytra rather broad and flaring, much longer than body, venation as in *munda*.

Colour: vertex fulvous, a pair of spots on the apex, a line in the depression and a spot on either side of the disc testaceous. Pronotum milky, the anterior margin washed with fulvous, anterior half of disc irrorate with fuscous. Scutellum pale fulvous, the basal angles and a pair of spots on the disc testaceous, the transverse line black. Elytra milky, the nervures and transverse pigment lines along claval suture, the costal margin and a spot in the central anteapical cell fuscous. A few fuscous spots along the sutural margin and on the apical veins. Face fulvous, front washed with testaceous, femora dark. Eyes bright red.

Genitalia: ultimate ventral segment of female three times the length of the preceding, lateral margins narrowing, posterior margin slightly angularly produced from just within the lateral angles, the apex roundingly bilobed; male valve very broad and short, posterior margin nearly truncate, with a median tooth, plates broad, concavely narrowing, their apices attenuate, the inner margins of which are concave.

Described from fourteen specimens from Rifle, Ridgway and Dolores, Colo. This and the two preceding species belong to a small group which includes *jucunda*, Uhler; *costamaculata*, Van D., and *modesta*, O. & B. They possess the second cross nervure, and have been referred to *Allygus* by some authors.

ATHYSANUS LITIGIOSUS, n. sp.

Broad and short, vertex almost parallel margined. Colour pale, with three transverse bands on vertex and dense irrorations on pronotum and elytra fuscous. Length, 5 mm.; width, nearly 2 mm.

Vertex broad and short, scarcely extending in front of the eyes, two and one-half times wider than long, scarcely longer on middle than against eye. Front very broad above, narrow below, scarcely longer than wide, disc feebly convex. Pronotum broadest behind, where it equals or slightly exceeds the width of the eyes, nearly three times the length of the vertex. Elytra broad, venation strong, resembling *extrusus*, the central anteapical cell rather long, enlarged at the apex.

Colour: anterior half of vertex black, almost divided into two transverse bands by a light line which is parallel with the yellow line separating the vertex and front, posterior half of vertex orange yellow, divided by an interrupted transverse fuscous band. Pronotum ivory white, heavily irrorate and vermiculate with fuscous, a few definite spots behind the eyes. Scutullem dark testaceous, the margins and a pair of irregular longitudinal lines white. Elytra ivory white, the nervures and many irregular reticulations fuscous, a band on tip and another across the apex of the clavus, a spot on the costa between the bands and another in the inner discoid cell fuscous. Between these bands subhyaline, especially along the margin. Face all black except a light line just below and parallel with the basal line. Legs black, the spines and an annulus on the posterior tarsus orange.

Genitalia: male valve broad and obtuse, angular, plates broad at base, about twice the length of the ultimate segment, roundingly narrowing to the acute apices, from which extend a pair of short divergent filaments.

Described from a single male received from Mexico (O. W. B.); probably from Cuernavaca. It is very distinct from any described form, and is not a typical *Athysanus*. The head and markings suggest *Scaphoideus*, but the form is too broad. The elytra are very much like some *Phlepsius* forms.

NEPTICULA POMIVORELLA, PACKARD; ALIAS MICROPTERYX POMIVORELLA, PACKARD.

BY AUGUST BUSCK, WASHINGTON, D. C.

During a visit to Professor Fernald, in Amherst, Mass., last spring, he showed me a Nepticula, bred from Apple, which he had described in manuscript as a new species, but which he afterwards had suspected to be *Micropteryx pomivorella*, Packard.

From reading the description and life-history of Packard's species, I felt sure that it was a Nepticula and presumably the same as Professor Fernald's species, and a week after, while studying the collection in the Agassiz Museum, Cambridge, I obtained definite proof that we were right.

There I found Packard's type—imago and cocoon—in rather poor condition, but easily recognizable as a typical Nepticula and similar to a large series of fine bred specimens in the U. S. National Museum.

The habit of this species of forming its cocoon on the twigs or the branches instead of descending to the ground, as is rather more common in the genus, makes the cocoon liable to be confounded with that of *Coptodisca* (Aspidisca) *splendoriferella*, Clemens, which is also frequently found in numbers on Apple.

Both have been mistaken for scale insects.

By a common hand-lens, however, they can be easily separated, as the Nepticula cocoon is made of matted silk, while the Coptodisca cocoon consists of two small, oval, pieces of the epidermis of the leaf cut out and spun together at the edges and fastened to the twig by small short silk bands.

The mines of the two insects are also easily distinguished, that of the Nepticula being a long narrow serpentine track only slightly widened as the larva grows, and, if empty, with a semicircular slit at the end in the upper epidermis, through which the larva has escaped; while the Coptodisca mine, which also begins as a narrow track, soon broadens out into a several times wider, more or less circular blotch, and when empty shows the oval hole in the leaf, where the larva has cut out the upper and lower epidermis for its case.

To distinguish between the shining dark Nepticula imago with its tufted reddish-yellow head and the large eye-caps and that of the equally shining light-coloured smooth-headed Coptodisca does not of course present any difficulties.

The following are some of the more important references only to:

Nepticula pomivorella, Packard; *Micropteryx pomivorella*, Packard, 17th Ann. Rep. Bd. Agr., pp. 237–8, 1870; Amer. Naturalist, Vol. IV., p. 685, 1871; Hayden, Bull. Geo. Survey, Vol. IV., p. 157, 1878; J. B. Smith, List of Lep. No. 6020, 1891; Bull. No. 26 (new series), Dept. of Agr., p. 94, 1900.

DESCRIPTIONS OF SOME NEW SPECIES OF NORTH AMERICAN LEPIDOPTERA.

BY WILLIAM BARNES, M. D., DECATUR, ILL.

Euhalisidota Otho, n. sp. — Dasylophia Melanopa, n. sp.
Edema Suavis, n. sp — Euthyatira Superba, n. sp.
Dasylophia Saturata, n. sp. — Feralia Brillians, n. sp.

Euhalisidota Otho, n. sp.

♂, expanse 2⅜ in.; ♀, 2½ in. Fore wings long, pointed, apices depressed, of a uniform pale, rather dirty yellowish colour. There is a row of short intravenular dashes which form a narrow blackish line from apex to inner margin close to thorax. In the females this is almost straight, in the males it has somewhat of a downward curve. Another row of somewhat sagittal-shaped spots forms a second dark band from apex to inner margin a little within inner angle. Hind wings yellowish, semitranslucent, inner third dusky. Discal dot small, black. These markings, while distinct, are not heavy or pronounced. Thorax a little darker than wings. Abdomen dusky above, anal tuft yellowish. Beneath as above, only fainter. Thorax, legs and abdomen same, except inner side of fore femora, which are somewhat orange. Palpi dusky at extreme tip. Antennæ dusky, narrowly bipectinate in ♂, broadly so in ♀. The ♂ has the dusky shades darker than in the ♀, the abdomen being quite dark blackish brown above, contrasting with the light anal tuft. Types 2 pair in my collection from Huachuca Mt., Arizona. I take pleasure in naming this species after Mr. Otho C. Poling, of Quincy, Ill., as a slight token of my appreciation of the many favours he has done me.

Edema Suavis, n sp.

Western examples of Albifrons differ from the eastern in having the dark shade below the costal white patch considerably darker. The discal mark is short, thick and black. The collar is very dark grayish black, the thoracic patch being only a little if any lighter. Hind wings of male white, slightly dusky at base of fringes. In the female the hind wings are dusky, about same as in Albicosta. The pectinations of the ♂ antennæ are considerably longer than in Albicosta, which character seems to me to entitle the insect to specific rank, otherwise I should consider it a mere variety of Albifrons. Types 4 ♂ and 1 ♀ in my collection from Glenwood Springs and Durango, Colo.

Dasylophia Saturata, n. sp.

Pale yellowish or buff colour, most of the veins rendered prominent

by light brown edging on both sides. Inferior margin slightly grayish. No black basal dash as in Anguina and Melanopa. Spots at internal angle prominent. The dark shade following t. p. line about same as in Anguina, but somewhat more prominent from the contrasting lighter shade. Hind wings yellowish white, veins slightly dusky. Type 1 ♂ in my collection from Denver, Colorado. This is probably the Western form of Anguina, but it must be quite rare, as it is the only one I have ever received. The typical form I have from Texas, Illinois, Iowa, and Manitoba, as well as the Eastern States. The uniform buff colour, pale secondaries, and lack of the basal dash, present an appearance quite different from the commoner Eastern form.

Dasylophia Melanopa, n. sp.

Considerably larger than Anguina, the ♂ being 1 and 11-16 inch in expanse and the ♀ 1 and 15-16. Palpi externally flesh-coloured, bordered above and below with dark brown. Vestiture of head and collar ochraceous, of a darker shade between the antennæ. Patagiæ dark gray with a narrow central black line. Thorax ochraceous centrally in front, else dark gray with traces of narrow black longitudinal lines. Abdomen evenly coloured, dark fuscous. Lighter beneath. Legs rather heavily coated with rich brown hair externally, lighter internally. Fore wings have a subquadrate basal flesh-coloured patch, the margin of which begins at base of costa, extends in an even gradual curve to where the t. a. line crosses median vein; from this point it follows the t. a. line downward a short distance and then returns to base of wing. The median vein through this space is of a somewhat darker brown. The basal space above this patch is of a rich dark brown colour, sharply limited externally by the t. a. line. The remainder of the basal space, the lower third of the terminal and the whole of the median space is of a dark gray colour, rather thickly speckled with black. The costal edge of the median space is lightly washed with reddish. A very dark brownish shade covers that portion of the wing from the t. p. line to apex, darkest along costa, gradually merging into a paler yellowish brown patch below and to the outer side. This dark subapical patch extends along the t. p. line to the median vein, and seems to be a continuation of the dark basal patch, the gray median space cutting sharply through the middle of it. Four or five minute yellowish points on costa between apex and t. p. line at regular intervals. There are two black spots inside the terminal line in the submedian space and two opposite these, external to it. T. a. line

double, distinct, filled with gray, quite evenly scalloped. T. p. line distinct, especially above median vein, light filled. Subterminal line brown, deeply toothed above median vein, more even in the next two spaces and reduced to two small round spots in two following. The spaces between the teeth down to the median vein are filled with bluish gray externally and yellowish brown internally, the veins being narrowly lined with brown. Three or four dark dashes precede the lighter space. A fine dotted line at base of fringes, which are yellowish gray, darker at ends of veins. Secondaries blackish fuscous externally, gradually lightening somewhat internally, fringes paler. Beneath fore wings blackish, costa with two or three dark spots and about an equal number of light ones. Veins at outer margin prominently margined with buff-coloured scales. Hind wings somewhat lighter than above, veins as on fore wings. The ♂ differs in having the colouring much less pronounced, the basal space being largely encroached upon and obscured with blackish, the median vein being black. Hind wings lighter above and both wings very much lighter below. Types 1 pair in my collection from Huachuca Mts., Arizona.

Euthyatira Superba, n. sp.

♂ expanse 1⅝ inches. Head and thorax light brown with a purplish tinge, the latter marbled with lighter purplish shades. Abdomen yellowish fuscous, tufted. Palpi yellowish, externally darker, terminal joint dark fuscous. Tongue yellow. Fore wings brownish, costa somewhat shaded with black, ordinary markings indistinct. T. p. line double, lunulate, obscured at costal end by the dark shade. T. a. line black, indefinite. Reniform ovate, erect, brown centred, lighter ringed, not prominent. Orbicular a small scarcely discernible yellowish spot. Veins lightly shaded with black a short distance on either side of t. p. line. Fringes yellow with a darker yellow basal line. Terminal line dark, lunulate, cutting fringes along veins. The lunules are filled with ground colour in centre of wing, becoming more yellowish towards apex and internal angle. Pinkish white scales line the excavations of the terminal line, lightly towards apex, scarcely discernible at middle of wing and prominently so towards inner angle. There are five large, prominent, sharply-defined light-coloured spots on the wing. These are more or less completely ringed with white and filled with shades of pink and yellowish brown. The basal one is largest, extending completely across wing and outwardly to t. a. line, the course of which it follows.

The upper portion is filled with shades of pink and white, the lower by a double yellowish blotch. At the middle of the inner margin is a subquadrangular brownish spot, bordered above and to outer side with white. The spot at inner angle is oval, the lower edge cut squarely off by inner margin. Apical spot ovate, pink-filled, little or no trace of brown, white bordered along inner edge and inner portion of lower. The fifth spot is on costal edge, just within the apical, with which it is connected by a narrow white dash running from the middle of the costal to lower edge of apical, it is round, filled with yellowish brown and entirely bordered with pinkish white. There are one or two minute white points on costa between the two spots. Hind wings dark fuscous, fringe lighter, a faint narrow, lighter median band. Beneath wings yellowish white, spots of upper surface faintly discernible. Legs quite thickly coated with hair of a light purplish-yellow colour. Type 1 ♀ in my collection from Huachuca Mts., Arizona. Kindly presented to me by my friend, Mr. Poling.

Feralia Brillians, n. sp.

Ground colour a brilliant grass green, ordinary lines black, shaded with white. Front vertex and collar green, varying in shade in different specimens, but in all lighter than thorax. Patagiæ and thorax dark green, the former fringed with whitish, as is also the thorax posteriorly. There is a fine black line at base of collar and some black hairs scattered along the patagiæ next to the white margin. At base of thorax there are also black hairs,which are apparently clustered into two or three tufts, but this may have been caused by the pins. Abdomen bronze brown, the anterior edge of segments fringed with green. Beneath whitish, except at tip, which is black. Thorax beneath pale greenish white, as are also the legs, except the tarsi, which are ringed with black and yellowish white. Antennæ fuscous above, yellow beneath. Palpi blackish externally, yellowish internally. Tongue yellow. Fore wings darker and lighter shades of the same tint of green, beautifully variegated by the bright black lines and white shades. Basal half line black, distinct, narrowly shaded with white externally. T. a. and t. p. lines strongly convergent at inner margin and connected by a short black dash just before reaching it. T. a. line black, heavy, general direction strongly outwardly oblique, irregularly scalloped. In one specimen it is more or less broken. Prominently shaded with white internally. T. p. line regularly scalloped, curved widely around cell, then nearly in a direct line to inner margin very

close to t. a. line, rather narrowly shaded with white externally. S. t. line black scalloped, inclined to be fragmentary, especially heavy at costa and just before reaching inner margin. Costa inclined to be lighter than ground colour, especially outer half, dotted with black. Orbicular large, round, bordered by a fine black line, within which is a narrow white shade,centre filled with green. Reniform large, upright, constricted, black ringed, a white ring lining the black encroaches largely on the green filling, dividing it into an upper and a lower patch. Fringes whitish, checkered with bronze between the veins. At the inner angle the check extends through the terminal space to the s. t. line, forming a conspicuous quadrangular bronze patch. Hind wings white, tinged with pale green outwardly, a few dark scales at inner angle. Fringes checkered white and pale green. Beneath pale greenish, lower portions of both wings lighter, markings of upper surface traceable. There is a rather prominent patch of dark scales on costa at inception of s. t. line, and in some specimens indications of one or two other costal patches. Types 2 pair in my collection. Huachuca Mts., Arizona.

TABLE TO SEPARATE THE GENERA AND SUBGENERA OF COCCIDÆ RELATED TO LECANIUM.*

BY T. D. A. COCKERELL AND P. J. PARROTT.

The following table of the forms related to *Lecanium* must be regarded as provisional, pending a thorough study of the different stages of the now very numerous described species. Certain species will be found not to fit into the table at all, but we defer the proposal of new generic names for them, pending further studies:

1. Female flat or slightly convex, legs and antennæ slender, normal... 5.
2. Female convex, usually hemispherical, hard when mature; legs and antennæ slender, normal..... 6.
3. Female more or less spherical, closely resembling *Kermes*..... 7.
4. Female not so; or antennæ and legs wanting or more or less rudimentary ..... 8.
5. Female with marginal hairs: body soft, moderately convex..... *Calymnatus*, Costa.

   Female with marginal hairs; skin hard, with large tessellations..... *Eucalymnatus*, Ckll., n subg. (Type *Lecanium tessellatum*, Sign.)

   Female with marginal fan-shaped scales..... *Paralecanium*, Ckll.

*A continuation of the tables in CANAD. ENTOM., Nov., 1899, p. 333. This part completes the Lecaniinæ.

6. Skin microscopically tessellated; holarctic group..*Eulecanium*, Ckll.
Skin with polygonal areas containing pits; tropical group.....*Saissetia*, Déplanches.

7. Male scale of the *Lecanium* type; holarctic group.....*Physokermes*, Targioni.
Male scale subcylindrical, felted, with a glassy operculum; Australian.....*Cryptes*, Crawford.

8. Adult female only moderately convex; antennæ short, tapering from a broad base; subterranean form of the holarctic region.....*Lecanopsis*, Targioni.
Not so.....9.

9. Adult female covered with a more or less distinct glassy test; skin crowded with large glands.....*Neolecanium*, Parrott, n. subg. (Type *Lecanium imbricatum*, Ckll.)
Not so.....10.

10. Mentum of female prolonged, forming a transversely corrugated sheath.....*Myxolecanium*, Beccari.
Mouth-parts normal.....11.

11. Larva greatly elongated, with parallel sides; adult female without legs or antennæ.....*Aclerda*, Signoret.
Larva otherwise; female very convex.....12.

12. Adult female dark red-brown, very convex, abdominal region conspicuously segmented; antennæ short and thick, 6 jointed; legs very short, rudimentary; Australian....*Alecanopsis*, Ckll., n. gen. (Type *A. filicum* = *Lecanopsis filicum*, Mask., 1893.)
Adult female not thus segmented; American.....*Toumeyella*, Ckll.

SOME EXPERIMENTS IN THE EXPORTATION OF BENEFICIAL INSECTS.*

BY F. M. WEBSTER, WOOSTER, OHIO.

I do not wish by this title to imply that there is not to be another phase to this experiment, but owing to climatic differences between Ohio and South Africa, whereby our winter months are their summer months, the export side of the problem came first. Next autumn, in South Africa, but spring with us, the tide of transportation will set in in the other direction.

Mr. Chas. P. Lounsbury, Colonial Entomologist at Cape Town, South

* Read before the Ohio State Academy of Science, Dec. 26, 1900.

Africa, visited me last summer, and, together, we perfected plans looking to the transportation of large numbers of our native Ohio Coccinellidæ to his country, with the hope of colonization there. It is but fair to say that when my former assistant, Mr. C. W. Mally, left me a year ago to take a position as Mr. Lounsbury's assistant, we planned something of the sort to be submitted to him by Mr. Mally after reaching Cape Colony, but not then expecting to be able to complete the arrangement with Mr. Lounsbury himself in Ohio.

The first consignment consisted of several hundred individuals belonging to the following species: *Megilla maculata*, *Hippodamia parenthesis*, *Cocinella 9-notata*, with scattering individuals of *H. convergens* and some *C. sanguinea*. This consignment was forwarded about the middle of October. Under date of November 14, 1900, Mr. Lounsbury writes me from Cape Town as follows: It is my pleasant duty to inform you how the Coccinellids arrived. The *Coccinella 9-notata* carried best, and fully nine-tenths of them were ready to feed. *Hippodamia parenthesis* carried next best, with say 20 per cent. mortality. The *Coccinella sanguinea* were about half of them dead, and the *Megilla maculata* about three-fourths dead.

A considerable number of *Pentilia misella*, a minute, black species, which feeds on the San José scale, were collected about Mentor, Ohio, by my assistants, and these were sent to Mr. Lounsbury at Boston, to be reshipped by him to South Africa. Most of these succumbed before reaching Boston, and were all dead when received at Cape Town. On October 27, however, I sent a lot of some 800 individuals of this last species to Cape Town direct, and a note from Mr. Lounsbury, dated December 4, informs me that the little fellows arrived in good shape, with lots of live beetles, and enough to start a large colony. How successful we shall be in getting these Lady beetles permanently established in their far-off home remains yet to be learned.

The beetles are collected and placed in a tin box without food, and the box filled with bits of crumpled paper. The package is sent to a gentleman in New York City, so as to reach him not later than Tuesday morning. They are at once taken to the steamer and placed in a refrigerator, and the Colonial Agent in London informed of their arrival when the steamer lands at Southampton, England. A messenger is at once dispatched to Southampton and gets the package, and sees it placed in the refrigerator of a steamer bound for Cape Town, where they are promptly delivered to Mr. Lounsbury.

PERSONAL.

PROF. W. G. JOHNSON, State Entomologist of Maryland, has resigned this position in order to undertake the editorship of the *American Agriculturist;* he enters upon his new duties at the beginning of this month. His address is at the office of the *American Agriculturist*, 52 Lafayette Place, New York.

His resignation will be a very great loss to the Agricultural College of Maryland, and to the farming and horticultural interests of the State. His scientific knowledge of entomology and his practical application of it to husbandry and fruit-growing, combined with his untiring energy and boundless enthusiasm, have rendered his services as State Entomologist of more than ordinary value. His work in connection with the use of hydrocyanic acid gas as an insecticide is especially noteworthy. It is to be hoped that he will not entirely drop out of the ranks of economic entomologists, but will continue to take an active interest in the progress of this department of the science and its beneficial employment for the welfare of the community.

While we deplore the withdrawal of Prof. Johnson from the active prosecution of economic work in entomology, we are glad to know that he is to fill so important a position as the editor of one of the most influential agricultural publications in America. He will still be able to take a large share in the work of educating his countrymen to realize the importance of a knowledge of insects and their ways, and to carry out in practice for the preservation of their crops the information that has been gained by the careful studies and experiments of those devoted to the pursuit.

We desire to unite with his many friends in the wish that Prof. Johnson may meet with the utmost success in his new position, and be enabled to accomplish much good and useful work of a literary, scientific and practical character.

Mailed February 5th, 1901.