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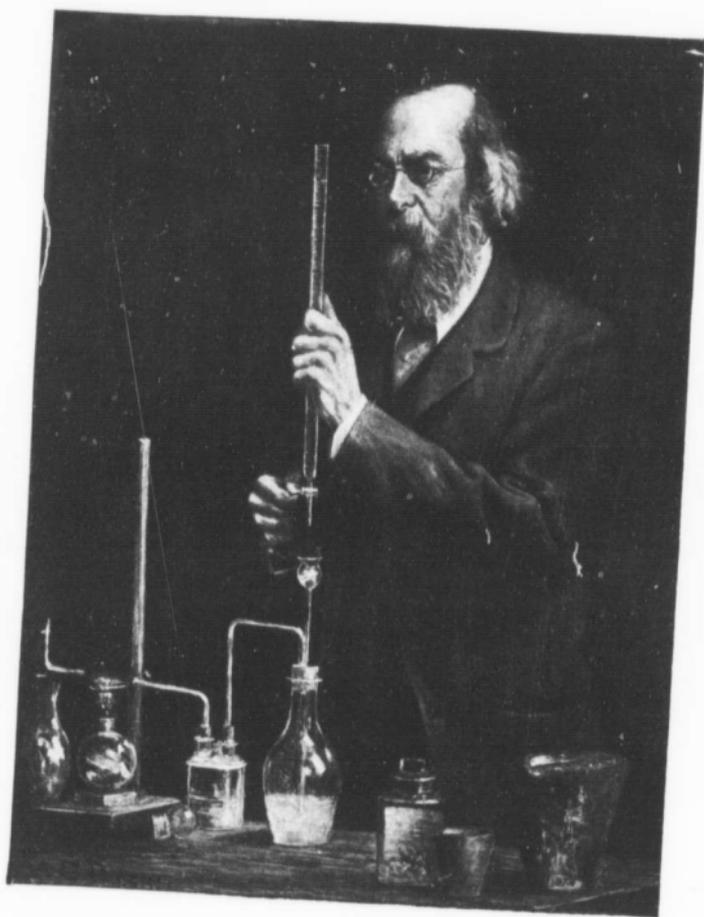
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HENRY HOLMES CROFT, D. C. L., F. C. S.
President of the Entomological Society of Ontario, 1863-4; 1868-71.

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No. 1

PROFESSOR H. H. CROFT, D.C.L.

A most interesting memoir of the first President of the Entomological Society of Ontario, by Mr. John King, K.C., has recently been published by the Macmillan Company of Toronto.* Through the kindness of the publishers we are enabled to present to our readers an excellent portrait of one of the pioneers in Canadian Entomology, who was largely instrumental in founding the Society.

Henry Holmes Croft was born in London, England, in 1820; his first schoolmasters were French and Spanish refugees from the great Napoleonic wars, who strove to make a precarious living by teaching boys in their city of refuge. From them he passed on to Tavistock House, where he received an excellent training and the foundation of a sound education. During this period, while still a mere lad, he manifested a great taste for chemistry and carried on experiments in a small closet under the kitchen stairway in his father's house, much to the annoyance and disgust of the members of the family, who showed no appreciation of a science which seemed to produce only alarming explosions and abominable smells.

After leaving school he spent a year in the office of his father, who was Deputy Paymaster-General in the Ordnance Department, then situated in the Tower of London. With him and an elder brother he walked to the Tower and back, eight miles each way, morning and evening throughout the week, and by this means acquired vigorous health and a robust constitution which continued through life. Office work was by no means congenial, and the heart of the youth was in his little den under the stairs. By the advice of Professor Faraday, whom his father consulted, he was sent to study chemistry at the University of Berlin. He did not, however, confine his attention to this subject, but took courses of study in biology, physics, anatomy and physiology, geology and kindred sciences, and became greatly interested in entomology.

* McCaul: Croft: Forneri: Personalities of Early University Days. By John King, M.A., K.C. The Macmillan Company, St. Martin's House, Bond Street, Toronto. (Price \$1.25).

After three and a half years of steady work, he left the University with every distinction that a student could desire and returned to England in the autumn of 1841.

In the spring of the following year the University of King's College, Toronto, was being organized, the selection of a staff being placed in the hands of the Governor-General, Sir Charles Bagot. A number of eminent scientific men in England, including Professor Faraday, were consulted, and they one and all recommended in the highest terms young Croft for the chair of Chemistry and Experimental Philosophy. He was then but two and twenty years of age.

In January, 1843, Professor Croft arrived in Toronto and at once entered upon his new duties, which he discharged for thirty-six years with the utmost devotion and unqualified success.

It would be out of place to refer to the bitter controversies over University matters that raged for many years in Toronto, and in which Professor Croft took an active and influential part. The abolition of King's College and the establishment of the University of Toronto and University College are matters of Canadian history. In the former Professor Croft became Vice-Chancellor in 1849 and *ex-officio* a member of the University Senate; he was also a member of the College Council, and in both these governing bodies he was zealously interested and exercised important influence.

"In the lecture room"—to quote from the volume referred to above—"he was an admirable expositor and a happy and dexterous demonstrator. Like all good teachers of a rapidly-advancing science, he made his pupils eager for more than he gave them. In a far wider sphere than his lecture-room he, more than any other teacher in Canada, simplified and legitimately popularized chemistry, and he may be said to have laid the foundation of our educational system of practical chemistry and the admirable methods of illustration in chemical research and analysis."

He did not, however, confine his energies to the laboratory and lecture-room, but took an active interest in many organizations of public importance. He was a leading member of the local agricultural and horticultural societies, and repeatedly drew attention to the intimate relation which chemistry bears to the practical work of both departments.

In Entomology he was especially interested and formed a collection of Coleoptera of the Province, and it was through his interest in this branch of natural history that attracted the writer to him and that led to a warm friendship. My first acquaintance with him was made in 1858 at meetings of the Canadian Institute which I attended as a junior member when a student at Trinity College. Professor Croft treated me with the utmost kindness and helped and encouraged me greatly in the study of Entomology. Through him also I came to know the late Dr. William Saunders, Director of the Experimental Farms of the Dominion, who was a life-long and deeply esteemed friend.

In 1862 our devotion to the collection and study of insects arose to such a height that we thought the time had come for drawing together all those in Canada who were of similar tastes and forming a society for mutual help and encouragement. Professor Croft warmly approved of the scheme and, through his influence and that of his colleague, Professor Hincks of the Botanical Department, the Society was duly launched in the spring of 1863.

The following account is given by Mr. King in his memoir:—
“Professor Croft was very honourably identified with a Society which was brought into existence chiefly through his instrumentality, and whose laudable objects are closely associated with the progress of skilled husbandry everywhere, namely, the Entomological Society of Ontario. He was the founder, or at least one of the founders, of this Society; the first meeting of its originators was held at his residence, and its present standing and widely acknowledged usefulness are largely due to his fostering care, warm advocacy, and powerful support. In disseminating information in regard to the insect pests of the agriculturist and horticulturist, as well as to insects friendly to their products, the Society has performed a work of vital service. Its admirable collections at the Centennial Exhibition at Philadelphia in 1876, comprising 86 cases filled with thousands of specimens carefully classified and named, attracted universal attention, and were far in advance of any other exhibit of the kind in the whole Exhibition. The economic worth of such collections can be estimated only by those who have given some attention to the subject; they form a groundwork upon which may be built up observations of great value, and

must have the effect of stimulating intelligent research in this important department of natural science."

"Within comparatively recent years the bounty of the Government has greatly assisted the operations of this Society. Its periodical publications, ranging over many years, contain a vast amount of original matter, recording valuable observations of a most instructive character on insects in all parts of Canada. These publications have been much sought after, both in Europe and America; some of the early numbers have been reprinted in order to meet the demand, and complete sets of the Society's works are now found in many prominent scientific libraries on both continents."

This quotation from the work of a barrister, who is not particularly interested in natural science, is highly appreciated testimony to the usefulness and value of the Society which Professor Croft was largely instrumental in founding.

Another Society which owed much in its origin and early years to the fostering care and enthusiastic support of Professor Croft, one of its founders, is the Canadian Institute of Toronto, now by warrant of His Majesty King George entitled to the prefix of *Royal*. Twice Professor Croft was elected President and for a long series of years he was a member of its Council and regular attendant at its meetings. Its periodical, "The Canadian Journal," received many contributions on chemical subjects from his pen. He was not, however, a voluminous writer, and it is much to be regretted that his stores of experience and research were not rendered available to students in a permanent form. His work on Analytical Chemistry for the use of students in Arts and Medicine was long employed as a text-book, and was an evidence of what he might have done in the field of scientific authorship, had he been so inclined.

In these days of terrible war it is interesting to know that Professor Croft took an active part in the formation of the Canadian Volunteer force, which was brought into being during the winter of 1861-62, when there seemed to be imminent danger of an armed conflict between this country and the United States in consequence of the "Trent affair." Professor Croft called a meeting of students and ex-students at the University and excited

the large gathering by a rousing speech to form an active rifle corps. He was at once elected Captain and the ranks were speedily filled. "The University Rifle Corps" was firmly established and soon attained a high degree of efficiency. Subsequently it formed a part of the famous Queen's Own Rifles of Toronto and bore a share in the engagement with the Fenians at Ridgeway in June, 1866, when three of its undergraduate members were killed and several wounded.

Years went by, each one filled with steady work and each adding to the esteem in which the Professor was held by many successive generations of students and by the public at large. At length, his health began to fail and the strong, vigorous man found that he could no longer sustain the burden of his University work, and that the time had come for his retirement. In 1879 he resigned the Professorship that he had so long and so ably filled, and removed with his family to Las Hermanitas, near San Diego, in Texas. There he spent a few pleasant years of rest and quiet and died on March 1st, 1883. Seven years later a Protestant Episcopal Church was erected in San Diego by his children and dedicated to his memory and that of their mother. At the University of Toronto his name is commemorated by the portrait in the Senate Chamber (from which our photograph is taken) and the beautiful round building now known as "The Croft Chapter House," which for many years was his laboratory and the centre of his work. In the words of his biographer, "It was there that his hundreds of students were initiated into the mysteries of his favourite science, and learned those lessons of patient enquiry and minute observation which are invaluable in the lifework of every man. Those who in times past were his pupils and found delight in his scientific investigations will not soon forget his enthusiastic zeal, his enlarged acquaintance with the literature of his department, his kindly interest in all amongst his friends and followers who manifested a regard for his favourite studies."

"He retired from his field of work with a consciousness of duty well done, and with the gratitude which is certain to follow one who, after a long term of public service, has finished a work which has been carried on with conscientious fidelity and far-reaching success."

C. J. S. BETHUNE.

POPULAR AND PRACTICAL ENTOMOLOGY.

HELIOtropISM IN BUTTERFLIES; OR, TURNING TOWARDS THE SUN.

BY ALBERT F. WINN, WESTMOUNT, QUE.

Those who have read Dr. G. B. Longstaff's book, "Butterfly Hunting in Many Lands," have enjoyed his accounts of the peculiar habit that some species of butterflies have of carefully adjusting themselves to a certain position when they settle. Most of us will recall similar instances, such as our common Sulphur, *Colias philodice*, which is often seen in great numbers near puddles of rain water along country roads, resting with the wings closed over the back frequently leaning over at an angle of 45° to even 30° to the ground; or the Vanessas and Graptas alighting on a fence or tree trunk only to immediately shift the position of the body to one perhaps at right angles to what it had been or even exactly reversing the direction in which the head pointed. But until attention was called to it as a phenomenon of which an explanation was desired, it has been generally passed by as being an everyday occurrence, without any effort being made to try to find out *why* the insect should act so, or to keep accurate notes on exactly what the respective positions were, as well as the position of the sun, direction of the wind, temperature and nature of the object settled on.

A theory of Dr. Longstaff is, that in assuming a position inclined sideways the butterflies more easily escape detection, as the shadow is reduced to a minimum. This may be the true explanation in the case of the insects which Dr. Longstaff has seen and studied in his extensive travels, and we do not wish to imply or express the slightest doubt on his interesting conclusions, but only to call attention to a subject that has been little written about in the life-histories and habits of our Canadian butterflies, and careful observations may prove valuable as well as being interesting to the student of nature.

So far as *Colias philodice* is concerned, this *orientation*, as it is termed, was referred to in an article in one of the early volumes of this journal by Wm. Couper—"A Dissertation on Northern Butterflies" (Vol. VI, p. 92). He says: "When it alights on a flower, instead of being erect on its feet, it lies sideways, as if to receive the warmth of the sun." The same idea has been maintained by

January, 1916.

Major Tulloch, F.E.S., in regard to *Catopsilia pomona* in Hong Kong (Ent. XLVI, 205), but it would seem that neither the shortening of the shadow nor the obtaining of warmth will explain all there is to be learned. Unless my memory serves me badly, I can recall patches of roadside where *Colias philodice* had congregated in dozens, many of them resting with their wings at a decided angle, and they were not at all agreed as to the direction of the body; some had the body at right angles to the sun's rays, others with the tail towards the sun, others again intermediate. So the shadows would be all sorts of sizes and shapes, besides which it seems to require explanation how a number of shadows on a dusty or muddy road would add to the conspicuousness of these sulphur butterflies, so bright and attractive are they when they collect in little flocks, some members of which are constantly fluttering about. Of course, we can only judge this from their appearance to the human eye; what natural enemies they fear is another matter. My own observations being confined to a robber fly (*Asilidae*) catching one on the wing, and another being gobbled up by a big toad, this latter victim was leaning over, and many others within a few inches were erect. The idea of warmth being sought seems to fail in that some of the hottest days appear to be favourable for leaning over, and one flock will be found for the most part leaning over, while in another perhaps only a few feet away they will all be erect, while on cool days, though bright, none may be at an angle. It seems that a combination of circumstances is often involved, and that perhaps the brightness of the midsummer sun full face is too great and makes many of them prefer to turn their profile towards it. The direction of the wind, if strong, may also affect them to some extent, so also may the direction of the road, for many of the roads loved by the sulphur butterflies are full of ruts and ridges made by cart and carriage wheels, and a butterfly settling on such a ridge longitudinally must either stretch out the three legs on one side more than the other three or he would inevitably lean over. When resting on flowers, say thistle, their heads certainly point in all sorts of directions; but those that are feeding should be noted separately from those that are not, for an insect will do all sorts of gymnastics to get its dinner, and the same remark should apply to flocks about damp patches on the

roads, and very careful attention is necessary to see whether the tongues are in active use.

Now, let us look at the Graptas and Vanessas. Dr. Longstaff quotes the following from Parker (Mark Anniv. Vol., p. 453-469). "*Vanessa antiopa* and the Graptas settle with their wings full expanded and adjust their position so that the axis of the body is parallel to the sun's rays with head turned away from the sun."

One spring afternoon I was in a grove near Montreal and noticed many insects about a large maple tree, whose sap was flowing freely from wounds made by real estate subdivision "artists." On the western side in the sunlight were several *Vanessa antiopa* and one *Grapta progne* all settled with wings wide open, while on the shady side were a larger number of *V. antiopa* and three or four *Grapta j-album* all with their wings closed over their backs.

On another occasion, this time in August, sugared patches on my fences were attractive to butterflies. A post on the east side was in the full glare of the sun at 2 o'clock, and an *antiopa* and a *Pyrameis atalanta* kept settling on the sweetened place—curiously the *antiopa* always approached the patch from above and settled head downwards, while *atalanta* flew upwards and settled head up, and both kept the wings expanded. On the opposite side of the garden, which, of course, was in the shade, another *antiopa* settled head up and kept the wings tightly closed.

While on my holidays a couple of years ago at North Hero, Vermont, a capital chance was afforded to watch a male *Grapta comma*. It was a particularly hot, cloudless day, and the only comfortable place was in the lake, and the whole morning was spent at the beach. When we beached our boat, the butterfly was there to meet us, just fluttering a little way aside to let us pass across the beach to disrobe. After a lengthy dip, I had to wait a considerable time before my son could be persuaded that he had enough, and, for want of something better to do, I lay down in the shade of the boat and watched the butterfly, which continued to fly about, always within a radius of perhaps 10 yards, and this is what he did:—

1st—Settled on the sand, head towards the north, closed wings over back, and inclined at an angle of about 60° with the ground, the tips of wings towards the west.

2nd—Settled on sand, head towards south, held wings out flat, shifted slightly so head pointed towards southwest.

3rd—Settled head towards west, wings closed and perpendicular.

4th—Same position as No. 1, but did not orient.

5th—Settled on sand, head towards west, then shifted towards northwest, raising up body as if pitching forward, the wings closed and vertical.

6th—Settled on a log, head towards north, wings closed and vertical, remaining in full sunshine for at least 10 minutes, and was only disturbed when touched with an oar.

7th—Returned to exactly same spot on log, head northward, wings outstretched.

8th—On sand, head towards west, wings closed and slightly leaning over towards south.

9th—On the body of a small dead rock bass, head north, wings closed, then opened out flat and turned around facing south and walked to the head of fish and apparently inserted its tongue into the eye-socket of the bass.

10th—On the bow of boat, in the shade, wings closed, pointing northwest, head downward; had to be stirred up.

11th—Settled on sand, wings outstretched, head towards west.

The arrival of a large motor-boat with a cargo of very hilarious week-enders put an end to a peaceful aspect of nature, and we left *G. comma* on the shore and rowed home for our dinner.

The results of watching the habits of one single butterfly in one hour of its existence shows next to nothing as might be expected. It requires a lengthy study of the combined efforts of students of nature in many localities and different seasons and conditions to arrive at an adequate understanding of the reasons a creature has for its actions. One point worthy of mention is that in no case did it remain directly facing the sun, and incidentally also the wind which was (as is customary on Lake Champlain) south, except when on the dead bass. It may also be worth mentioning that the beach was strewn with dead fish, bass, perch and pickerel, and the sand, though dry and warm on top, was doubtless permeated with decomposed fish, and the butterfly, on settling in the sand, may have inserted the tongue down to where there was moisture of a flavour suited to its taste.

NOTES ON SMICRONYX WITH DESCRIPTIONS OF A
NEW SPECIES AND A NEW VARIETY.

BY W. S. BLATCHLEY, INDIANAPOLIS, INDIANA.

Among some specimens of *Smicronyx* sent me about a year ago by Col. Thos. L. Casey, of Washington, D. C., was one bearing the label, "*S. vestitus* Lec. from Indiana." This species was described by LeConte* from a single Kansas specimen. A comparison of Col. Casey's specimen with the type in the LeConte collection at Cambridge shows the latter to be much larger and more robust, with head, beak and thorax wholly black, elytra dull reddish; scales large, close-set and evenly distributed; thorax wider than long; elytra with distinct, coarse inclined setæ. LeConte gives its form, colour and vestiture as: "Rather robust, convex, black very densely clothed with grayish and yellowish broadly oval scales; antennæ and legs ferruginous brown." He states that the intervals are flat, each with a row of whitish hairs, and gives the length as 2.75 mm., all of which characters agree with his Kansas type. Both Col. Casey and Dr. Dietz have misinterpreted LeConte's species, as neither one had the type before him when describing the species they call *vestitus* in their papers on the genus,† and Dietz, loc. cit., p. 160, criticizes Dr. LeConte's description as "defective and misleading, as the terms 'robust' and 'prothorax densely and coarsely punctured' do not apply here, nor is any reference made to the reddish colour of the elytra."

Since the species they called *vestitus* is evidently undescribed, I have prepared the following description from the specimen sent me by Col. Casey and from others labelled "*vestitus*" by Dietz, and now in his collection at Cambridge:

***Smicronyx caseyi*, sp. nov.**

Elongate-oval, slender. Head, thorax, suture of elytra and under surface black; beak, antennæ, legs, apex of thorax and elytra except suture pale reddish-brown; above sparsely clothed with

* Proc. Am. Phil. Soc., XV, 1876, 172.

† Casey, Ann. N. Y. Acad. Sci., VI, 1892, 393; Dietz, Trans, Am. Ent. Soc., XXI, 1894, 159.
January, 1916

oblong white scales, condensed on sides of thorax and in irregular patches on sides of elytra, elsewhere very unevenly scattered; under surface densely clothed with larger, rounded, concave white scales. Beak of male scarcely as long as head and thorax, feebly curved, finely striate, scaly and densely punctate on basal half, naked and more finely punctate toward apex; of female half as long as elytra, smooth, cylindrical, slightly scaly near base. Antennæ in male inserted at apical third, second joint of funicle half the length of first, scarcely longer than third; of female inserted behind the middle, second joint as long as the next two. Thorax slightly longer than wide, sides feebly rounded, disc slightly constricted near apex, rather densely and finely punctate. Elytra one-half wider and three times as long as thorax, sides parallel to apical third, then rapidly converging to a subacute apex; striæ fine, indistinctly punctate; intervals feebly convex, minutely transversely rugose, their setae almost invisible. Length 2 mm.

The range of *caseyi* (*vestitus* Casey and Dietz nec. LeConte) is given as Kansas, Dakota, Colorado and Montana, and it is possible that the specimen donated by Casey is as wrongly labeled as to locality as it is to name. Named in honor of Col. T. L. Casey.

The species recognized by Dietz and in part by Casey as the *Smicronyx corniculatus* of Fahræus, † the type of which was from Pennsylvania, agrees fairly well with the original description except in the colour of the elytra, which was given as "nigra, griseo-tomentosa, fusco-nebulosa." As with many other North American species described in Schonherr's work, the types of which are now in Stockholm and therefore difficult of access, there has been much difference of opinion as to what form Fahræus had in hand. In the Cambridge collection are two species placed side by side, each bearing the label "*corniculatus* Fahr." in LeConte's writing. One of these is what we now know as *sculpticollis*, the other as *apionides*, both described by Casey. It was probably from the former that LeConte drew up the description (1876, 173) in which he gave the colour as "dark brown, not very densely clothed with narrow small whitish and yellowish scales," and the thorax as "much

† Schon. Gen. et Spec. Curc., VII, Pt. II, 1843, 309.

rounded on the sides." Casey (1892, 391) combined LeConte's *squamulatus* with the *corniculatus* as recognized by Dietz and his description is a composite of the two. Dietz (1894, 164) described a form as *corniculatus*, and then mentions four varieties. These, as lettered in his collection at Cambridge, appear to be *a*, a small form of his *nebulosus*; *c*, the same as described by him as *corniculatus*; *b*, and *d*, the *squamulatus* of LeConte, of which Dietz's *columbianus* is a synonym. Until the type of Fähræus is studied by some American Coleopterist familiar with our species of *Smicronyx*, the name *corniculatus* may, as well as any other, be ascribed to the form so recognized by Dietz.

A study of the type of *S. lanuginosus* Dietz in the Horn collection shows it to be a dwarf form (2 mm.) of *corniculatus* with the "conspicuous long, hair-like setæ" mentioned by Dietz visible only when viewed in profile, and then scarcely if any more obvious than those of *corniculatus* when similarly viewed. I consider it scarcely worthy a varietal name.

As mentioned above, *Smicronyx squamulatus* LeConte (1876, 173) was treated by Casey as a synonym of *corniculatus*, which it closely resembles, but differs in the maculate elytra, paler antennæ and distinct setæ of both thorax and elytra. Dietz (1894, 177) mentions it as unknown to him, but "probably a variety of *corniculatus*." His types show, however, that he had described it (1894, 162) as *S. columbianus*, and also (p. 165) as varieties *b* and *d* of *corniculatus*.

***Smicronyx quadrifer texana*, var. nov.**

Differs from *quadrifer* Casey in having the scales of upper surface mostly pale brown, the lateral stripes of thorax obsolete on apical third, the median one reaching only to basal third; elytral dark spot beginning at basal fourth instead of basal sixth, with a white line running from its front margin to base along the third intervals; each interval with a row of large, white, inclined scale-like setæ, these absent on the median black spot.

One specimen from Brownsville, Texas; May 25.

NEW LIFE HISTORIES AND NOTES IN PAPAIPEMA SM.
(LEPIDOPTERA).

BY HENRY BIRD, RYE, N. Y.

(Continued from Vol. XLVII, p. 151).

Papaipema nelita Strk.

A recent examination of Strecker's type reaffirms our early determination of this species which was made from scanty material, and we can report the larvæ were found at favourable stations in the environs of Chicago, the type locality, in July of the current year. Its association was with the previously recorded food-plant, *Rudbeckia laciniata* L., so far the only known choice. Our larval note in this magazine, Vol. XXXIX, p. 313, where it is assumed from the penultimate stage the young larvæ belong the group showing a continuous dorsal line, needs correction. A summary for stages III, IV, V may reflect, viz.:

These instars correspond to the normal features of the group; head polished, darkened at ocelli, but without the prominent side line; tubercles not large, blackish, IVa does not appear on joint ten; the white dorsal and subdorsal lines are broken at the middle, where the mahogany brown body colour prevails as an encircling ring on the posterior portion of joint three, on four, five, six and seven, becoming paler with each molt; lengths, 15, 18, 21 mm.; May 20-June 15, Chicago (larvæ per A. Kwiat).

At Wilmington, Del., Mr F. M. Jones has encountered *nelita* at various stations, and his rearings of the moth show a small percentage which have the stigmata white marked, in contradistinction to the type form. If such happen to be of well-developed size, a superficial likeness is very strong with the white marked *P. frigida* var. *thalictri* Lyman, in instances of small specimens of that form. Under an adverse criticism, which would countenance no difference between these truly similar moths, all niceties of larval differentiation and departures of male structures would be swept away. So it appears best to give permanent attention to this departure with the Strecker species, characterizing it as variety *linda*.

January, 1916

Papaipema nelita linda, new variety.

Typical in the greyish brown ground colour, with golden brown irrorations medially, the purplish basal and postmedial areas; also in maculation; basal spots vague, not white marked, the orbicular and claviform are two rounded white spots, the reniform is a collection of dots around a central curved line, the outermost opposite the cell yellow, the rest usually white; ordinarily the conventional pattern for the white markings except the reniform is proportionately a little short. Expanse 36 mm.

A male type is with the author, a paratype with Mr^s Jones, and a specimen was forwarded to the British Museum for comparison with the type of *P. limpida* Gn. from which it is reported to be distinct by Sir Geo. F. Hampson. This new variety is dedicated to Mrs. F. M. Jones, whose efforts in behalf of entomological research warrant much more than this slight recognition.

Papaipema cerina Grt.

The apprehension of this larva is due to the efforts of Mr. Chas. Rummel of Newark, N. J., who encounters it occasionally in his locality. We were indebted to his liberality for early staged larvæ the current season, as well as for the privilege of bringing out this note. That this well-known eastern species had escaped larval notice seems due in part to its close resemblance to *P. cataphracta*, that its seemingly preferred food-plant, *Lilium superbum* L., is very generally bored also by the latter, and while it appears certain other plants than *Lilium* are involved, the similarity to this prototype, whose individuality was considered unique, has allowed it to escape notice. Thus in future generic groupings, the species should be associated with *cataphracta* and *duovata*, a position not assigned it heretofore and which is of some import since on "first species" rule it became Smith's type of the genus.

The larval habit doubtless follows the usual course, the overwintering egg hatching the last week of May. Larval stages IV and V are identical with *cataphracta* except that they are a fortnight in advance of the latter. Characteristics are fully typical, tubercles not large; colour livid purple-brown on which the white dorsal and subdorsal lines are contrastingly drawn without break.

Penultimate stage: Paler and more pinkish, the lines yellowish; tubercle I on joints four, five and six the same as on other joints, whereas the ally has them enlarged at this point.

Maturity: Head and plates typical; colour yellowish translucent, with lines entirely obliterated; tubercles mostly minute, I and II, except on twelve are only discernable as the merest dots under a lens, IV alone retains its usual size, and in comparison to microscopic I, II, III and IIIa, seems proportionately large, though it does not exceed the spiracle, on joint ten IVa shows same size as IV, a trifle high, but of similar prominence in bearing seta; length 42 mm.; leaves plant for pupation July 31.

The pupa shows no departure from the usual form, and is less cylindrical than its ally, which normally changes in its gallery and is effected by the confined quarters. Emergence data are not at hand, but from that of flown specimens must centre around the first ten days of September, whereas the near congener is a month later.

***Papaipema nepheleptena* Dyar.**

A recent re-examination of the unique type of this species, coupled with the wider acquaintance by the more extended breeding of *P. mawseri* Bird, (1911) furnishes conviction there is but one species involved, and that the Dyar name has precedence, being proposed in 1908. The type, a flown and rather worn specimen, is from New York, and regrets over our error of determination are now tempered by the establishment of the larval history for this local but heretofore elusive *nepheleptena*. Thus it will appear our larval notes for the Turtle-head borer, Can. Ent., Vol. XLV, p. 120, are to be associated with the latter name. A brief addenda to these may be made for:

Stage I—Cephalic and anal shields well developed, also the the setæ; the first four abdominal segments show as a dark girdle, the extremities semi-translucent.

Stage II—Head is without side line, nor is its continuation on the lower edge of shield yet manifest; the dark girdle not crossed by the white longitudinal lines; tubercles concolorous.

Stage III—Similar, with the generic features now well evident; the dorsal line alone crosses the girdle, showing as the merest white

thread; tubercle IVa on joint ten seems always absent in this species, ten larval preparations at least have it unindicated; lengths, 2.5, 6.5, 11 mm.; May 25-June 18; Buffalo, N. Y. (larvæ per H. Baumann).

***Papaipema circumlucens* Smith.**

When the late Dr. J. B. Smith advanced this specific name at the "Revision of *Hydroecia*," 1899, Trans. Am. Ent. Soc., Vol. XXVI, the knowledge of larval stages was not of avail, and the material for study scanty, and of inferior quality for the most part. Though his efforts for fullness were well directed, and the co-operation of museums and collectors very general, a misconception in regard to the individuality of *circumlucens* has been recognized for some time, in that more than one species was associated among his types. The writer had arrived at a conclusion as to what form Dr. Smith intended his name should apply, but it was not until 1914 that the larval history became positively known in the particular instance it was necessary to cite. Of his "types" and "co-types" we have recently had the advantage of comparing those in the U. S. National Museum, the Barnes and Rutgers collection, while a female co-type was in the possession of the writer. Three species are found to be involved—the Hop-stem borer, one whose chief foodplant is Dogbane; the true *circumlucens*, and *ochropenta* Dyar, a western species with the larva unknown. The Hop-stem borer has already been differentiated as *P. humuli* Bird, Can. Ent., Vol. XLVII, p. 113. We herewith restrict the type of *circumlucens* Smith to the female type specimen of the United States National Museum, which was without doubt a feeder in *Apocynum*, Dogbane, in its larval state, and for the following reasons. Of the six "types" or "co-types," this form predominates; in our own collection a perfect specimen of the Hop-stem borer was labeled merely "*circumlucens*," while a much-worn Dogbane feeder was ticketed "*circumlucens* Sm. female co-type"; *ochropenta* occurs in but one specimen. The other male "type" Washington is *humuli*.

It is needless to add that from the conventional pattern in the group and the nearness of coloration of the forms involved, the oversight at the time of commission is easily understood.

Regarding the life-history, Mr. A. F. Winn, of Montreal, was the first to call our attention to the fact that *Apocynum* was bored by some *Papaipema*, but his observations were made after the larval period, and were without further or specific verification. Several seasons later, in 1914, Messrs. A. Kwiat and E. Beer at Chicago discovered *Apocynum androsæmifolium* L. to be profusely bored there, and kindly forwarded larvæ which seemed different from any previously seen. At emergence there was surprise that the browner and larger specimens matched our co-type of *circumlucens*, while the smaller, yellower ones ran indistinguishably to *baptisiæ* Bird.

The current year the writer had advantage of personal studies of the prairie flora in the vicinity of Chicago, under direction of the local entomologists, and observed *circumlucens* extensively at work. The larva is a gross feeder, tunnelling out the lower stem and a considerable portion of the running rootstock when possible. By the middle of July the wilted or browned foliage is very noticeable, and it becomes one of the easiest species to apprehend. Pupation occurs in the burrow and emergence by the orifice, which has served for frass disposal, and without its further enlargement. A network of silk and fragments chewed from the woody stem encloses the gallery directly above the pupa, through which the moth easily breaks, but such details are somewhat dependent on the kind of food-plant occupied. As is usual where a species is super-abundant, dispersal to other plants may be noticed, and in *Mesadenia tuberosa* Nutt. (E. Beer) frequently, and in *Vernonia fasciculata* Michx. (A. Kwiat) rarely, larvæ were found at work, the former being apparently a true alternative food-plant. Quite a noticeable difference exists superficially between the *Apocynum* larva and that boring *Baptisia inctoria* L. productive of *P. baptisiæ* Bird, Can. Ent., Vol. XXXIV, p. 109, but the moths intergrade so completely there seems no warrant for the retention of this name even in a varietal sense. Hence *P. baptisiæ* Bird, 1902, falls to *P. circumlucens*, Smith 1899.

The typical, *Apocynum* feeding larva is larger, more cylindric and pink than that we had characterized from *Baptisia*, but it is believed to be due to food-plant conditions entirely. The principal larval features are generically normal.

Stage V—Head without side line, colour dull pink, lines yellowish, the dorsal narrow and alone continuous; tubercles appear dim from being nearly concolorous, IV most prominent, and IVa always defined on joint ten.

Stage VI—Very cylindrical, paler, otherwise no change.

Stage VII—Now more robust, tubercles conspicuous by reason of the semi-translucence; IVa has continued on ten, but has never equalled IV. Length, 33, 39, 43 mm. July 15-Aug. 12.

A chief parasite with the species is a *Tachina* fly, to which attention has been previously called with other species, as being a general check in the genus. Our reference to it as *Ceromasia myoidæa* we learn through the kindness of Dr. C. H. T. Townsend is in need of revision, and on this occasion we may deal with yet another correction. Our understanding of the matter is that the above name refers to a European, or an assumed cosmopolitan insect, but inferentially we would not expect such to be critically involved in the economy of a large American genus, a genus so thoroughly American that a selection of widely differing food-plants in many cases exists with plant genera found only in America. From our limited knowledge of the life history, it appears this fly may be associated only with *Papaipema*, or such similar boring larvæ as flourish at about the same date. Over-wintering puparia do not give up imagos until July, when the borers are of sufficient size to answer their purpose. There appears to be two broods of the flies, though it may be that those over-wintering are merely tardy larvæ in pupating, or possibly to having an unusually large food supply. A fortnight's difference in pupation seems sufficient to cause the later ones to overwinter. Ovi- or larviposition may be merely within the gallery opening, there being opportunity for attachment to the host, as it has frequently to come to the orifice to dispose of frass. Some of the *Ichneumonidæ* have been encountered 20 cm. down in these galleries, but on such occasions it was the pupa which was sought. While the fly larvæ must subsist internally, when about mature they may be found outside the decaying shrunken host from which they move a slight distance to pupate. The pupa is cylindrical, with ends rounded, unattached and unprotected in the gallery, colour brown.

This fly is now to be known as *Andrina radialis* Townsend.

Dr. Townsend has been good enough to prepare a characterization which is appended, over his signature.

Andrina radialis Townsend, new name.

Andrina radialis Townsend, new name for *Masicera myoidæa* Coquillett, 1897, Rev. Tach. 114 (nec. *Lydella myoidæa* RD., 1830, Myod. 114)—Holotype labeled by Coquillett as above, loc. District of Columbia, May 16, 1882 (Coll. C. V. Riley).

Holotype, No. 19601 U. S. N. M., female. Allotype, male, Rye N. Y. (H. Bird). Paratypes include six specimens reared by Mr. Bird from several lepidopterous larvæ boring the roots of plants underground; numerous specimens reared by the Bureau of Entomology from several hosts; specimen reared by Mr. W. R. Walton from *Nonagria oblonga* at Harrisburg, Pa.; and TD4468, female, Beverly, Mass., July 1, 1875 (Edward Burgess). The last was relaxed and dissected, being the only specimen available that had been collected, not reared. It was found to contain several hundred eggs and maggots. The egg is elongate and bowed. The maggot is without hairs, but with spine-rows encircling the body.

The species differs from *Andrina* (*Paraphorocera* BB. syn.) *senilis* Meigen as follows:—Arista thickened on only basal half; third antennal joint of male sharply angular on upper apical corner, that of female less so; male vertex about equal to eye-width, that of female but little broader; frontal bristles not descending lower than base of arista; face less receding, the vibrissal axis of head nearly three-fourths of antennal axis; microscopic hairs of facialia do not extend one-third way up in male, and less than one-fourth way in female; eyes faintly and thinly hairy. The cheeks are from little over to less than one-fourth eye-height. The species may stand as type of subgenus B of *Andrina*.

Two specimens from England, labeled by Brunetti *Masicera myoidæa*, are apparently *senilis* Meigen (*tincta* BB. syn.). The front and cheeks are much broader in *senilis* than in *radialis*. The female from England was relaxed and dissected, and found to contain the same eggs and maggots in a rather long coiled uterus (TD4469).—CHARLES H. T. TOWNSEND.

TWO NEW CANADIAN DIPTERA.

BY J. M. ALDRICH, ASST. IN CEREAL AND FORAGE INSECT INVESTIGATIONS, U. S. BUREAU OF ENTOMOLOGY.*

Exorista caesar, n. sp.

A black and silvery species with black palpi; runs to couplet 5 in Coquillett's Revision, p. 93, but does not have the characters of either alternative of the couplet.

Male—Width of front at narrowest compared with entire width of head gives for 8 males the decimals .263; .308; .233; .271; .263; .254; .268; .300—average, .270. These are micrometer measurements. Ocellars normal, proclinate; frontals 10, rather slender, reaching to the level of the arista; the uppermost stouter and rather far before the vertical; frontal stripe blackish, satiny, wider than either parafacial, the latter subshining above, with erect fine hairs which extend down below the anterior frontals a little; these hairs are most striking above, across the ocellar region; antennæ black, third joint four times as long as the second, extending almost to oral margin; arista thickened about 2.5 its length; parafacials narrow, silvery, bare; vibrissæ at oral margin, above them a short dense row of small bristles extending hardly $\frac{1}{4}$ of the way to insertion of antennæ (less in female); bucca about 1.6 the eye-height; palpi black; eyes densely hairy; proboscis short and retracted.

Mesonotum lightly cinereous between the rows of bristles, which are on shining intervals; sides from humeri back more silvery pollinose; dorsocentrals 4 behind, 3 before the suture; inner dc 3 and 3; scutellum with 3 marginal pairs and a small, nearly horizontal apical pair, also numerous long, erect hairs; sternopleurals 3; pleuræ cinereous pollinose; calypters pure white.

Abdomen shining black, anterior half of each segment silvery pollinose, which is not sharply limited and leaves an indefinite median black stripe; first segment with a pair of strong median marginals; second with one or more pairs of discals, a pair of median marginals and a pair of laterals; third segment with one or more pairs of discals, and a marginal row of 10; hairs of abdomen long and erect, more so toward tip.

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Legs entirely black, the brown pulvilli as long as the last tarsal joint on all the feet; middle tibia with one long spine below its middle on outer front side, and usually a small one above it; hind tibia with slightly uneven row of small bristles on outer hind side, one below middle being larger.

Wings almost hyaline; third vein with one or two hairs at base; fourth vein with rounded, oblique curve; apical cell open some distance before wing tip (more than half the distance separating tips of second and third); hind cross-vein rather oblique and bowed outwardly. Apical cross-vein parallel with hind margin.

Female—Front at narrowest compared with entire width of head gives in 5 specimens .360; .345; .327; .303; .322—average, .331. Parafrontals wider than stripe; third antennal joint about three times as long as second; above vibrissæ only a few small hairs; pulvilli short. Hairs of head, scutellum and abdomen not so long and erect as in male; middle tibia with two spines on outer front side.

Length 4.7 to 6.3 mm.

Described from nine males and five females, reared by Prof Lawson Cæsar from *Archips argyrospila* at Simcoe, Ont.; dates of emergence, July 1 to 15, 1915.

I dedicate the species to Mr. Cæsar, and follow the example of Linnaeus (in *Lucilia cæsar*) in leaving the specific name in apposition in the nominative case, instead of giving it a genitive ending.

Two specimens of each sex, including the type male, will be deposited in the Canadian National Museum; the remainder will be at the disposal of Mr. Cæsar.

***Frontina spectabilis*, n. sp.**

Female—Easily recognized by a dense coating of golden pollen, which uniformly covers the upper portions of head, thorax and abdomen, except that it is less distinct on the first abdominal segment.

Front of vertex, when viewed from above, as wide as one eye (.333 of entire head by micrometer measurement); ocellars and orbitals normal, proclinate; the frontals form a row of 7 (not

counting the vertical), which extend to the base of the third antennal joint; frontal stripe half as wide as parafrontal, reddish brown; parafrontal with a few small hairs; first and second antennal joints red, the third black, four times as long as second, reaching almost to oral margin, the arista with short penultimate joint, the last thickened almost to middle; parafacials silvery, more yellow above, bare, less than half as wide as the facial depression; facial ridged with a row of 7 coarse bristles, ascending above middle; vibrissæ at oral margin; palpi yellow, rather stout; eyes bare, bucca about one-fifth the eye-height.

Thorax with the pollen gradually becoming cinereous on the sides; dorsocentrals 4 postsutural, 3 presutural; inner dorsocentrals 3 and 3, one pair being just before the suture; scutellum with 3 marginal pairs and a small nearly horizontal apical pair; sternopleurals 3; calypters pale yellow.

Abdomen with pollen changing to gray well down on sides; the specimen shows no adaptations for depositing eggs or larvæ; second segment with a pair of median marginal bristles; third with a marginal row of 8, and some coarse hairs in the place of a discal pair; fourth with a row of 8 on the middle and a few irregular smaller ones at hind margin.

Legs black, middle tibia with one spine on outer front side below middle; hind tibia on outer side behind with an uneven row of small bristles, two near the middle being larger.

Wings hyaline, veins yellow on basal half; first posterior cell open rather near apex, as far from it as one-third the distance separating tips of second and third veins; third vein with 2 or three hairs at base; fourth vein with angle rather abruptly rounded, not appendiculate; hind cross-vein sinuous, nearer to bend than to anterior cross-vein.

Length 7 mm.; of wing, 6 mm.

One female, Wabamic, Ontario, collected by H. S. Parrish, Aug. 5, 1915; deposited in the Canadian National Museum.

I see no difficulty about referring the species to this genus, aside from the fact that the "cilia," or exterior row of bristles, on the hind tibia, are somewhat coarse and uneven.

NOTES ON CHRYSOTIMUS WITH THE DESCRIPTION OF
A NEW SPECIES (DIPTERA).

BY M. C. VAN DUZEE, BUFFALO, N. Y.

I took two of these little flies in Northern Ontario, one at Kearney and the other at Brulé Lake on the first and second of August, 1911. They are both males, and are no doubt the male of Loew's *Chrysotimus delicatus*, agreeing with his description in having the antennæ black, palpi yellow, and the posterior cross-vein before the middle of the wing.

It seems to me that the males described by Prof. Wheeler (Psyche Vol. V, p. 375) as the male of *C. pusio* Loew should have been considered a distinct species, as both males and females that he took in Wisconsin had the first two antennal joints yellow, the third brown as is the case in *C. concinnus* Zett, an European species, but it is not likely that it is that species, as in *concinnus* the cross-vein is before the middle of the fifth vein, while in Wheeler's specimens it is at or beyond the middle, if it answers Loew's description of *pusio* as he states. I have not seen Wheeler's material and therefore cannot be sure that his specimens represent a new species.

The males of this genus have the abdomen metallic green, while that of the female is mostly yellow. The hypopygium is conspicuous but scarcely bent under the abdomen; in all three species that I have seen it has a small, hairy, black appendage near the centre of the posterior edge

The males of *delicatus* Loew that I took in Canada have the abdomen and thorax bright metallic green with coppery reflections and thin grayish pollen; the hypopygium brown, conspicuous but imbedded, forming a rounded tip to the abdomen, which projects in a point slightly below the venter.

I took one male and three females at Colden, Erie Co., N. Y., Aug. 9th, 1914, which are no doubt the true *C. pusio* Loew. They have black antennæ and brown palpi; the cross-vein is in the middle of the fifth vein as in the male of *delicatus* Loew, but appears a

little nearer the tip of the wing, as the wing seems somewhat shorter. (This character is of little value in separating the species, as the difference is so slight that it would not be noticed without comparing the two). The male hypopygium is rather large and somewhat bent forward, projecting nearly half its length below the venter of the abdomen.

I have received from Prof. J. M. Aldrich a male which evidently represents another species. I do not think it can be the same as the males Wheeler had. The following is a description of this species:—

***Chrysotimus flavicornis*, n. sp.**

Male—Length 1.75 mm. Face and front green with white pollen, which does not conceal the ground colour; ocellar tubercle blackish; palpi brown; antennae yellow (third joint missing in the type). Thorax pale green with bright coppery reflections and thickly covered with grayish white pollen; prescutellar depression sharply defined; pleurae black with grayish pollen. Abdomen green with slightly coppery reflections and dulled with gray pollen; hairs and bristles of the thorax and abdomen yellow; hypopygium short, yellowish brown with a black appendage covered with rather long black hairs at the centre of the posterior side; venter yellow. Coxae and legs yellow. Tegulae, their cilia and the halteres yellow. Wings tinged with yellow; costa and veins yellow; third and fourth veins parallel beyond the cross-vein; apex of wing equidistant from the tips of the third and fourth veins; posterior cross-vein a little beyond the middle of the fifth vein.

Described from one male taken at Richmond Hill, L. I., N. Y., July 5th, by Mr Daecke. Type in the collection of Prof. J. M. Aldrich.

The yellow antennae and thick pollen of the thorax and abdomen separate this form from the two preceding species. It differs from Prof. Wheeler's description of the supposed male of *C. pusio* Loew in lacking the vivid green of the thorax and pleurae, the green of the dorsum of the thorax in this species being pale and scarcely shining, and the pleurae being black.

NOTES ON TYPES OF LEPIDOPTERA IN SNOW
COLLECTION.

BY J. MCDUNNOUGH, PH.D., DECATUR, ILL.

Through the courtesy of Prof. S.J. Hunter, I recently had the opportunity of examining the types of Lepidoptera contained in the Snow Collection at Lawrence, Kansas, and comparing with them specimens taken with me for that purpose. A list of these types is published in the Kansas Univ. Sci. Bull., Vol. VIII (1), 1913, p. 28, and it is with the purpose of correcting a few errors that have been introduced into this paper as well as offering some synonymic notes on several of the species that I have undertaken this article.

The types themselves either bear a large printed label "type" or a label "type specimen, discovered by F. H. Snow," with the locality and a red disk pinned below, but unfortunately, with but few exceptions, the actual name of the species is not attached to the specimen, but pinned alongside, as was formerly the case with Walker's types in the British Museum. Up to the present no great harm has been done as the collection remains as arranged by Prof. Snow, but one can readily see what might happen if an energetic but unscientific student were set to rearranging the collection; the few exceptions noted above are mostly in the Geometridæ and Pyralidæ, a number of which bear Grote's written type label.

In the *Noctuidæ* most of the types are those of species described by Grote from material collected by Prof. Snow in Idaho Springs, Colo., and near Las Vegas Hot Springs, New Mexico, and types of nearly all of these species are stated by Hampson to be in the British Museum and bear Grote's actual type label as I have personally verified. It would seem that whenever Grote received several specimens of one species he retained at least one to which a type label was affixed, but in the case of a unique this was returned to Prof. Snow. In view of this fact, it would be well in my estimation to restrict the type to the British Museum specimen wherever we find types stated to be in both collections, and fortunately this will lead to no confusion, as in every such instance the species represented by the two types is undoubtedly a single one. In

cases where Prof. Smith in his Catalogue of Noctuidæ gives the types as being in the Snow and Neumægen collections, we think that the Snow Collection should have the preference, Prof. Snow being the original collector. Concerning several species as given in Hunter's list, the following notes may be of value:—

Noctuidæ.

Hadena burgessi Morr.

This is not the type of *burgessi* Morr., but of *discors* Grt., described from Idaho Springs, Colo., in Proc. Kan. Acad. Sci. VII, 64; Prof. Snow had evidently rearranged the collection according to Smith's Check List, in which *discors* Grt. is made a synonym of *burgessi* Morr., for the name *burgessi* Morr. stands alongside a series of three specimens, two of which are true *burgessi* from the East, and the third specimen bears the label "Idaho Spgs., Colo." and the red disk beneath, and is without doubt the type of *discors*, agreeing with the original description in every particular. The species, *discors*, is however *not* a synonym of *burgessi* Morr., and is not even an *Hadena*, but belongs in the genus *Anytus*, with spined hind tibiæ, and will take priority over *vinela* Sm., described from Denver and Glenwood Spgs., Colo. We would call particular attention to the fact that the original description of *discors* Grt. distinctly states that the hind wings have a "black, distinct, incompletely-broken terminal line," and the thorax has "a fine line or collar and tegulæ lined with black," which does not apply to *burgessi* Morr.; various other points in the description of the primaries cannot apply to *burgessi* Morr., but do most distinctly apply to the Colorado *Anytus*.

Oncocnemis major Grt.

Under this name is a specimen bearing the label *Oncocnemis curvicollis* Grt. with red type disk, from Arizona; this may be one of the three originals from which the description was drawn up, but Smith states that the types of *curvicollis* are in the National Museum, Neumægen and Graef Collections; the matter will bear further investigation. The type of *major* Grt. is in the British Museum.

Chorizagrotis terrealis Grt.

The ♂ type with Grote's handwritten type label affixed is in the collection; we have not been able to match it; Hampson's figure from a drawing of a so-called "type" in the Neumögen collection is poor and too contrasted; according to our notes the species is a dark indeterminate form with basal dash and slight dark shading between the usual spots; the s. t. line is almost obsolete.

Euxoa verticalis Grt.

The specimen in the collection cannot be considered a type, as it bears the label "Hot Springs, New Mex.," whereas the type locality is Idaho Spgs., Colo.; it is, however, typical. The same remarks would apply to *Richia parentalis* Grt. and *decipiens* Grt.; the true types of all three species are in the British Museum.

Geometridæ.**Emplœcia inconstans** Geyer.

Under this heading is included the type specimen of *cephisaria* Grt.; the type of *inconstans* Geyer has, of course, long been lost, and the error is due to Prof. Snow's peculiar system of labelling.

Deilinia perpallidaria Grt.

This cannot be considered the type, which was a ♂ specimen from New Mexico (Snow), whereas the specimen in the Snow Collection, bearing a written label "*Thamnonoma perpallidaria*, n. sp.," is from Idaho Spgs., Colo., and a ♀; besides this, it does not agree with Grote's description, and is a *Macaria* species, I think. Where the true type is I do not know.

Lychnosea helveolaria Hulst.

The type under this heading is that of *aulularia* Grt., which seems correctly placed as a synonym of *helveolaria*.

Hyperitis indiscretata Hy. Edw.

The ♀ type of this species, labelled "*Tetracis indiscretata*, type" by Hy. Edwards himself, proves to be a *Sabulodes* and the same species as that described by Strecker as *Metanema vanusaria* from a single ♂, *indiscretata* taking priority over Strecker's name.

The species is allied to *arcasaria* Wlk., but the apical dark triangle at costal end of t. p. line is much narrower and the t. p. line is almost rigidly oblique; the ♂'s are considerably browner in colour than the ♀'s, which tend towards yellowish.

Sabulodes imitata Hy. Edw.

The ♀ type bears Hy. Edward's hand-written label, "*Antepione imitata*, type." It is closely related to the preceding species, but still more closely to *arcasaria* Wlk., the apical triangle being intermediate in width between *arcasaria* and *indiscretata* and the t. p. line bent as in the former species. *Costinotata* Tayl., judging by the ♂ and ♀ cotypes from Prescott, Ariz. (not 2 ♀'s from Phoenix, Ariz., as stated in original description, *vide* Can. Ent. XLIV, 275, 1912), becomes a synonym of this species.

Pyralidæ.

Elophila avernalis Grt.

The type specimen bears Grote's written type label; this has been placed by Dr. Dyar in his revision of the Nymphulidæ as *Ab. a* of *fulcalis* Clem. It turns out to be abundantly distinct and the same species as that described by ourselves as *Argyractis? confusalis* (1913 Cont. N. Hist. N. Am. Lep. II (3) 133, Pl. VIII, fig. 11), which thus becomes a synonym. The species was described from two specimens, so that the *two* cotypes (ex Coll. Fernald) from Hot Springs, Arizona (? New Mexico) which Dr. Dyar had before him at the time of the revision are probably spurious; one at least must be, which possibly accounts for *avernalis* being associated with *fulcalis*. We have a long series from New Mexico and Arizona, and find the species very constant.

King Ferdinand of Bulgaria, has been removed from the membership in the Entomological Society of France, which he has held since 1882. His name has also been erased from the membership list of the Petrograd Entomological Society. In this society there has been elected in his place M. Lameere, of Brussels, who is now working in the Paris Museum of Natural History.—*Science*.

NEW GALL MIDGES.

BY E. P. FELT, ALBANY, N. Y.

Below are given descriptions of a miscellaneous lot of gall midges showing a varied food habit and originating in widely separated portions of the world.

***Dasyneura sassafras*, n. sp.**

The midge described below was reared by W. A. Ross, August 12, 1915, from larvæ curling sassafras foliage at Gordon, Ont., and submitted for identification by Arthur Gibson, Chief Assistant Entomologist of the Department of Agriculture, Ottawa, Can. The species runs in our key to *D. apicala* Felt, noticed in detail on page 152 of New York State Museum Bulletin 175. It is easily separated from this form and also the somewhat similar *Dasyneura smilacifolia* Felt by structural and colorational characters.

Female—Length .75 mm. Antennæ extending to the second abdominal segment, sparsely haired dark brown; 16 sessile segments, the fifth with a length two and one-half times its diameter, the terminal segment compound, with a length four to five times its diameter and a more or less distinct constriction near the middle. Palpi; first segment subquadrate, irregular, the second with a length more than twice its diameter, the third a little longer than the second, more slender, the fourth one-half longer than the third, more slender. Mesonotum light yellowish brown, the submedian lines and scutellum yellowish, postscutellum reddish yellow. Abdomen sparsely haired, pale yellowish. Wings hyaline; halteres pale yellowish. Coxæ and femora mostly pale yellowish, the distal portion of femora, tibiæ and tarsi dark brown, the tarsi almost black; claws slender, strongly curved, the pulvilli nearly as long as the claws. Ovipositor pale yellowish, fuscous apically, as long as the abdomen, the terminal lobes with a length nearly four times the width, broadly rounded and sparsely setose apically. Type Cecid. a2676.

***Dasyneura gossypii*, n. sp.**

The small midges described below were forwarded under date of July 7, 1915, by Prof. T. Bainbrigg Fletcher, Imperial Entomologist of the Agricultural Research Institute, Pusa, Bihar,

India. Both sexes are figured on page 363 of his work on South Indian Insects and the species is considered by him as of minor importance. He states that the insect is locally known as the cotton flower bud maggot and the larvæ are recorded as inhabiting cotton buds, causing them to burst and drop. Pupation occurs in the withering buds.

Female—Length .75 mm. Antennæ extending nearly to the base of the abdomen, sparsely haired, pale yellowish, yellowish basally; 12 sessile segments, the fifth with a length about two and one-half times its diameter; terminal segment somewhat produced, with a length three times its diameter and tapering to a broadly rounded apex. Palpi: first segment subquadrate, the second twice the length of the first, more slender, the third three times the length of the second, somewhat dilated, the fourth about three-fourths the length of the third, more slender. Head yellowish, eyes black. Mesonotum pale yellowish brown. Scutellum and postscutellum yellowish. Abdomen yellowish brown, tapering. Wings hyaline; halteres, coxæ, femora and most of the tibiæ whitish transparent, the tarsi mostly pale yellowish, the pulvilli as long as the slender, strongly curved claws. Ovipositor with a length nearly equal to the body, the terminal lobes slender, with a length about four times the width. Type Cecid. a2678.

***Walshomyia texana*, n. sp.**

The midges described below were reared by Mrs. L. T. Binkley, Instructor in Zoology, State University, Austin, Texas, from a bud gall on the wild Texas or Mountain Cedar (*Sabina sabinoïdes*). The species is quite distinct from *W. juniperina* Felt, reared from the fruit of *Juniperus californica*, and while it presents some differences from the generic type, we believe that it should be referred to this genus.

Gall—This appears to be nothing but an enlarged, brownish bud with a length approximately 6 mm., diameter 5 mm.

Male—Length 2.2 mm. Antennæ extending to the fourth abdominal segment, sparsely haired, pale yellowish; 15 or 16 segments, the fifth with a stem one-half the length of the cylindrical basal enlargement, which latter has a length one-half greater than its diameter and tapers slightly distally; circumfili probably

reticulate apically, though not visible in the preparation; terminal segment produced, with a length four times its diameter and tapering to a broadly rounded apex. Palp consisting of one irregularly, broadly oval segment bearing a few stout setae subapically; eyes large, black, nearly contiguous. Mesonotum a nearly uniform fuscous yellowish. Scutellum yellowish transparent, postscutellum and abdomen light fuscous yellowish and sparsely clothed with fuscous setae. Wings hyaline; halteres yellowish basally, fuscous apically. Coxae, a light fuscous yellowish; femora, tibiae and tarsi a nearly uniform light fuscous straw; claws stout, heavily curved, simple, the pulvilli more than twice the length of the claws, greatly expanded. Genitalia fuscous; basal clasp segment stout, broad; terminal clasp segment moderately long, swollen near the middle and tapering uniformly to the obtuse apex and the irregular base; dorsal plate long, broad, deeply and triangularly emarginate, the lobes narrowly rounded and sparsely setose; ventral plate long, broad, broadly rounded apically. Harpes apparently represented by divergent, broad, slightly chitinized, submedian processes, obliquely truncate and narrowly rounded distally.

Female—Length 3 mm. Antennae extending to the second abdominal segment, sparsely haired, fuscous yellowish; 14 or 15 subsessile segments, the fifth with a length about twice its diameter, a subbasal whorl of moderately short, stout setae and subapically low, very irregularly reticulate circumfili forming three or four transverse bands (circumfili distinctly visible in only one specimen, a2694); terminal segment compound, consisting of two or three segments, closely fused and with a length three to five times its diameter; eyes large, black. Mesonotum dark yellowish brown. Scutellum and postscutellum a little lighter. Abdomen yellowish white, sparsely clothed with fuscous hairs. Ovipositor short, stout, the terminal segment with a length one-half greater than its diameter, slightly and variably chitinized basally and ventrally, the terminal lobes broad, broadly rounded and sparsely setose. Other characters nearly as in the male. Type Cecid. a 2693.

***Asphondylia sesami*, n. sp.**

The Gingelly gall fly, according to Prof. T. Bainbrigge Fletcher, Imperial Entomologist of the Agricultural Research

Institute, Pusa, Bihar, India, attacks young Gingelly (*Sesamum indicum*) capsules, producing a wrinkled, twisted gall instead of the fruit. He has figured the adult and gall on page 364 of his work on South Indian Insects, 1914, and classifies this insect as one of the minor pests. He has kindly placed reared specimens, which were labeled South India, Coimbatore, June, 1912, and 1913, at our disposal, and the species is described as new.

Exuvium—Length 4 mm., a nearly uniform chestnut brown except for the nearly transparent antennal cases, the latter extending to the base of the second abdominal segment, the wing cases to the fourth, and the leg cases to the sixth abdominal segment. The dorsum of the abdominal segments with a scattering, and on segments five to eight, respectively, a somewhat double, transverse row of short, stout spines near the basal third and a similar, single row of rather thickly-set, almost contiguous, longer, stout spines near the middle; terminal segment with the basal row of spines distinctly double and scattering, and the distal row irregular, there being three on each side of the median line and a compound, lateral, spiny process.

Male—Length 3 mm. Antennae extending to the fourth abdominal segment, sparsely haired, light brown; 14 segments, the fifth with a length seven times its diameter, the twelfth with a length nearly five times its diameter, the thirteenth and fourteenth segments missing. Palpi; the first segment irregularly and roundly quadrate, with a length nearly twice its diameter, the second greatly produced, slender, sparsely setose, and with a length nearly three times that of the first. The mesonotum slaty brown, the submedian lines sparsely haired. Scutellum fuscous yellowish brown with a few setae at the lateral angles, postscutellum a fuscous whitish. Abdomen sparsely haired, light brown, the genitalia fuscous yellowish. Wings hyaline, costa pale straw; halteres basally and apically mostly whitish transparent, the stalk dark brown. Coxae and femora reddish brown, the tibiae and tarsi mostly pale straw; claws long, rather slender, the pulvilli as long as the claws. Genitalia; basal clasp segment short, greatly swollen; terminal clasp segment subapical, short, greatly swollen apically and distinctly bidentate; dorsal plate short, broad, broadly and roundly emarginate. Other structures indistinct in the preparation.

Female—Length 3 mm. Antennæ extending to the third abdominal segment, the fifth with a length five times its diameter, the twelfth with a length two and one-half times its diameter, the thirteenth with a length about equal to the diameter, the fourteenth reduced, globose. Palpi; the first segment quadrate, with a length about twice its diameter, the second more slender, irregular and with a length about twice the first. Mesonotum dark slaty brown, the submedian lines rather thickly haired. Scutellum reddish brown, sparsely setose apically, postscutellum dark brown. Abdomen reddish brown, sparsely clothed with silvery setæ. Wings hyaline; halteres mostly yellowish brown, slightly darker subapically. Coxæ and legs mostly brownish straw, the distal tarsal segments somewhat darker; claws moderately stout, strongly curved, the pulvilli a little longer than the claws. Ovipositor when extended probably longer than the body, the basal segment moderately slender and with a well developed dorsal pouch, the acicula slender, acute. Type Cecid. a 2677.

***Feltiella americana*, n. sp.**

The midges described below were received from Prof. P. J. Parrott, of the Agricultural Experiment Station, Geneva, N. Y., under date of July 31, 1915, accompanied by the statement that they were reared from larvæ apparently feeding on a red mite occurring upon plum foliage. This species is quite different from an earlier described American form.

Male—Length 1.5 mm. Antennæ a little longer than the body, thickly haired, mostly whitish transparent; circumfili and numerous long setæ a light fuscous; 14 segments, the fifth having the stems with a length two and one-half and three and one-half times their diameters, respectively; terminal segment, basal portion of the stem with a length four times its diameter, the distal enlargement subcylindric, with a length two and one-half times its diameter, broadly rounded apically. Palpi; the first segment irregular, subquadrate, the second with a length about three times its width, the third a little longer, more slender, the fourth one-fourth longer than the third, more slender. Mesonotum fuscous yellowish. Scutellum and postscutellum pale yellowish. Abdomen mostly pale yellowish, slightly fuscous basally. Wings hyaline, the third vein uniting with costa at the apex of the wing, halteres

pale yellowish. Coxæ whitish transparent, the legs a fuscous whitish transparent; claws slender, strongly curved, the anterior and mid-pair unidentate, the pulvilli about two-thirds the length of the claws. Genitalia; basal clasp segment moderately long, stout, the basal lobe long, triangular, finely setose; terminal clasp segment long, slender; dorsal plate short, triangularly emarginate, the lobes obliquely and roundly truncate, the ventral plate long, broad, truncate or slightly emarginate apically; style long, stout, roundly acute apically.

Female—Length 1.5 mm. Antennæ nearly as long as the body, sparsely haired, fuscous yellowish; 14 segments, the fifth with a stem one-third the length of the cylindric basal enlargement, which latter has a length about two and one-half times its diameter; terminal segment slightly produced and tapering to a broadly rounded apex. Mesonotum dark yellowish brown. Scutellum and postscutellum yellowish. Abdomen a light fuscous yellowish. Halteres yellowish. Coxæ and femora basally yellowish white, the distal portion of femora and tibiæ a light fuscous straw, the tarsi darker. Ovipositor short, the terminal lobes irregularly ovate and rather thickly setose. Other characters practically as in the male. Type Cecid. a2679.

NOTES AND QUERIES.

NOTES FROM CLEMSON COLLEGE, S.C.

On Aug. 8th a large number of specimens of *Anosia plexippus* were taken in a pasture near the College. They were the stragglers of a swarm of this species passing through on that date. They disappeared two days later.

There was an outbreak of Army Worms (*Laphygma frugiperda*) in August. The principal disturbance occurred throughout the northern and eastern counties of the State. As usual, the attack began on crab grass and sorghum. In some sections peas were slightly damaged. The generation went into pupation Aug. 20-30, having done no serious damage. During this outbreak the larvæ of *Calosoma calidum* played an unusually conspicuous role. They

were very abundant in the fields around Glemson, and numerous specimens were sent from various sections of the State for identification. On Aug. 23 the writer collected a large number of specimens to observe their habits in the Insectary. They showed cannibalistic habits, a number of them being killed in this manner. The specimens were kept in jelly glasses containing sand and placed in a dark box. They were fed on Army Worms. On Aug. 25th they refused to eat, and on Aug. 28th they burrowed to the bottom of the sand and changed to the white pupæ, the adults emerging from four to six days later. Farmers sent the black larvæ to find out the name, on account of its good work in destroying the Army Worm.

On Sept. 22nd this office received a report from W. R. Pritchard, Hardeville, S. C., of the great damage being done to his cotton by caterpillars. G. M. Anderson, of this Division, who was stationed at the Columbia laboratory, made a thorough inspection of Mr. Pritchard's farm. He found that the caterpillars were *Alabama argillacea*, and that they were distributed over about fifteen acres of cotton, five of which had been seriously injured. They had nearly all gone into pupation on that date. No other report of damage has come to our attention during the season.

Clemson College, S. C.

M. R. SMITH.

NOTES FROM NEW JERSEY.

Halticus citri Ashm. injuring phlox in New Jersey (Hemip.). This "flea-hopper," according to "Insects of New Jersey," where it is listed as *Halticus uhleri* Giard, seems to be fairly well distributed over the State, specimens having been taken at Madison, New Brunswick, Jamesburg and Camden County. As no food plants are mentioned, the insects were evidently taken while sweeping. During September, 1915, this species was found injuring phlox growing in a nursery at Riverton. Most of them were found on the under sides of the leaves, and the injury appeared on the upper surface as small, irregular, whitish patches, resulting in a discoloration of the foliage. Dr. F. H. Chittenden mentions it

as attacking chrysanthemum, morning-glory and smilax in greenhouses, while Prof. F. M. Webster records it as feeding on many weeds, such as ragweed, crab grass, smartweed, etc. It is probably known best as a garden pest, being injurious to beans, beets, peas, cabbage, potatoes, etc. Considering the fact that the infestation on phlox was most severe after the blooming period was over and at a time when the plants were no longer cared for as ornamentals, it was not necessary to spray. Had it occurred earlier in the season any of the ordinary "leaf-hopper" remedies would have undoubtedly checked it successfully.

HARRY B. WEISS, New Brunswick, N. J.