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## POPULAR AND PRACTICAL ENTOMOLOGY.

### Further Remarks on Collembola.

BY CHARLES MACNAMARA, ARNPRIOR, ONTARIO.*

(Continued from page 245.)

and more grateful air, come out in constantly increasing multitudes.

Experiments showed that a temperature of zero Fahrenheit killed *Achorutes socialis* in less than an hour, while at 5° F. they survived indefinitely. But although 5° F. seems to do them no harm, they never expose themselves voluntarily to that degree of cold. The lowest temperature at which I have seen them on the surface was 18° F., and that was very exceptional. As a rule they do not appear until the thermometer approaches 25° F., and from 30° F. upwards they reach their greatest abundance. Their reaction to a rising tempera ture is rapid. Even when the snow lies two feet deep or more, they are out within an hour or so after the milder weather begins, and after 24 hours of thaw they may be looked for in large numbers. No marked difference in response to temperature changes can be noticed between the various snow frequenters, and usually three or four different species can be found at the same time. In this district *Achorutes socialis* is generally in excess of all the others, but oc casionally, for some reason or another, the mild weather fails to attract it, and *Isotoma nigra* or *I. macnamarai* may be the predominant species on the snow.

Outside of temperature, the other weather conditions have little influence on them. Provided the day is mild, they come out as readily in wind, pouring rain or heavy snow as in calm sunshine. During a snow-storm it is interesting to watch how they keep constantly climbing to the surface in order to avoid being buried by the falling flakes.

It is quite possible that sometimes the insects reach the surface by coming up straight through the snow. Their integument is far too delicate for any forceful burrowing, but snow lying loosely as it falls, always has interstices between its particles amply wide enough for the free passage of these minute creatures. This mode of emergence, however, cannot very often be used in mid-winter, for generally the snow stratum, when it attains any thickness, includes one or more layers of crust that are quite impervious to the soft-bodied springtail. Nevertheless, another exit is open to them. Around every stalk of grass, brushwood stem, tree trunk or other object projecting through the snow, there is always a clear space, no matter how deep the snow, resulting partly from the shrinkage of the snow as it settles, and partly from the radiation of absorbed heat by the object. It is from these sally-ports that the snow-flea hosts principally issue.

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* We regret the awkward division of Mr. Macnamara's article. Through an unfortunate oversight the concluding sentence of the first part in the November number was left unfinished.

This method of reaching the surface together with other snow habits of the insect were well illustrated in an enormous outbreak of *Achorutes socialis* Uzel that I observed one day in February, and which may be taken as a good example of snow appearances in general. But here, in order to explain how I came on the insects on this occasion, I must make a slight digression.

*Achorutes socialis* has a strong and distinctive but inconstant smell. I have never seen any reference to it in literature, but Dr. Folsom tells me that he has noticed it both from *A. socialis* and from the closely allied *A. packardi.* It is not easy to describe, but it reminds me most of the smell of that favourite fruit-salad of the small boy: a slice of raw turnip. Sometimes the scent can be caught from half a dozen captives in a vial, at other times a hundred of them give off no appreciable odour whatever. Similarly, during an extensive emergence, sometimes no smell at all can be noticed, and sometimes it is so strong that it is possible to discover an outbreak of the insects by the sense of smell alone. The first time I experienced this I was walking through a hardwood bush one morning in December, and not thinking particularly of springtails, when it suddenly occurred to me that a few moments before I had smelled *Achorutes socialis.* I retraced my steps, and about 50 feet back there they were to one side of my path, coming out of a mossy log in thick, blue-black agglomerations.

It was in the same way that I discovered the insects this day in February. A favourite winter trail of mine at one place goes down the middle of a beaver meadow about half a mile long by 200 yards wide, through which in summer a small, sluggish stream meanders to a sandy bay of the Ottawa River. The meadow is bordered by an open growth of moisture-loving shrubs and trees, such as speckled alders, black and white ashes and soft maples. These occupy a strip a couple of hundred feet wide, and on the drier ground behind, cedars, spruces, hemlocks and pines are mixed with elms and hard maples.

The temperature had been above freezing point for the preceding 24 hours, and three inches of wet snow had fallen in the night, bringing the total depth on the ground up to 18 inches. At noon the thermometer stood at 36° F., the sky was overcast, and the relative humidity was 91 per cent. It was not the kind of day that most people would choose for a snow-shoe tramp for the snow was very wet and the going heavy, but it was ideal snow-flea weather, so I was out bright and early. There was the usual sprinkling of *Isotomas* in the drier woods and *Achorutes* in the damper situations, but I found nothing out of the common until I reached the beaver meadow. Here, while pursuing my accustomed track, as I paused a moment to pick up a specimen, in an instant I caught the familiar smell of *Achorutes socialis*, wind-borne from the south side of the meadow. I followed up the scent and among the ashes and soft maples I found them.

They were coming up to the surface through the spaces in the snow around the trees and shrubs, some climbing the snow wall, and some the trunks and stems. Most of the latter sprang off on to the snow, but a good many remained on the trees, and either gathered in blue patches here and there or went wandering up the trunk, although not to any height, for above 10 feet I could find none. The principal area of emergence was between 50 ft. and 100 ft. wide, and extended all along the south side of the marsh,—a distance of about 800 yards. Over this space there were from 50 to 100 insects to the square foot.

Their movements as usual seemed to lack decision, but the net effect of their apparently purposeless walking and aimless leaping was to spread them out from under the trees in the direction of the light, and they thinned out towards the open meadow into successive bands of approximately 25, 10 and 5 insects to the square foot, until at last in the middle of the marsh only an occasional jumper was to be seen. While the boundary of this edge of the outbreak was indefinite, the other edge, as I had often noticed before in similar cases, ended sharply at the dark evergreens, and not a snow-flea was to be found in the shadows beneath these trees. The insects are evidently possessed of a positive phototropism, although it does not work with the accuracy and directness of the similar tropism of a great many other invertebrates. Another factor in snow-flea distribution is the wind. I once saw the insects blown out on the snow in a long comet tail radiating from the base of an ironwood around which they were emerging during a strong wind, and on this occasion I am sure the fresh southerly breeze aided their spread over the meadow.

By pacing the distances and carefully estimating the average number of insects to the square foot, I calculated that there were not less than 9,000,000 to 10,000,000 *A. socialis* disporting themselves on the snow along this narrow half-mile strip. They were of a well-grown generation, most of them reaching a length of 1.5 mm. with here and there a few 2 mm. individuals, which is the maximum length of the species. *A. socialis* seldom pays any attention to the close approach of the observer, but this day they were more alert than usual, and when I bent to examine a crowded alder stem with my magnifying glass, the occupants all flung themselves off on to the snow,and when, in focusing a wide procession wandering up a tree, I brought my face close to the trunk, a rain of the insects pattered down on my cheek and ear, and the raw turnip smell was very evident.

It was 11 o'clock in the morning when I reached the beaver meadow, and up to 5 p.m. there was no very apparent change in numbers or distribution of the multitude. They kept ceaselessly crawling and leaping, but without seeming to get anywhere in particular. About 5 o'clock, however, a slightly lower temperature set in, and with the first cool breath, the insects began to leave the surface by insinuating themselves between the snow particles, and by 5.30, when I had to leave for home, the numbers visible were noticeably diminished. The temperature was still above freezing, and it was evidently the downward trend and not the absolute degree that drove them to shelter. For although the thermometer registered no lower than 28° F. during the night, and stood at 31° at 9 o'clock next morning—temperatures at which the insects often emerge abundantly—when I got back to the marsh about half past nine, not a single *Achorutes* was to be found on the trees, and 95 per cent. of those on the snow had disappeared, as I ascertained by counting the few individuals remaining on areas I had marked out the day before.

In the course of the next few days I visited the place several times to study the further behaviour of the insects, and my observations may be conveniently summarized as follows:

When the colder and drier weather drives the snow-fleas to shelter, those on the trees and shrubs reach the soil by walking down the way they came up. The insects on the snow, however, show no tendency whatever to go back to the openings by which they reached the surface, they simply work their way into the snow wherever they may be. Probably when the bed of snow is shallow and soft, they soon get down to the ground, but on this occasion their progress earthwards was decidedly slow. For more than a week after they had left the surface they were still to be found scattered through the snow at various depths. Trenches dug in the snow at several points revealed three crusts—the result of thaws earlier in the winter—each about an inch thick and separated one from the other by from three to seven inches of loose, dry snow. The tiny creatures seemed to have had little trouble in finding passages through the upper crusts, but the bottom crust was solid ice, and here in the first days of my investigations I found the snow-fleas accumulated in considerable numbers. Later on, these insects gradually disappeared. Although lacking any direct evidence, I am of the opinion that by degrees many of them worked their way along through the snow until they encountered some twig or root that pierced the crust and enabled them to crawl down to the earth. There is no doubt, however, that a very large number of the adventurers perish. The fact is that in six years' observation of their winter habits, I have never seen two large emergencies occurring in the same locality, indicates that a great destruction of the insects must take place on every excursion.

After all that has been said about their appearances in the winter, it might be thought that the insects only come out when the ground is covered with snow. The truth is that in favourable weather they emerge just as readily when the ground is bare, but, of course, they do not then attract attention as when they are set off by the vivid background of the snow.

One calm misty morning in that golden prime of spring when the first wild flowers are all out and the mosquitoes aren't, I came down through the woods, leafless as yet, to a marsh that was flooded a couple of feet deep with the high water from the Ottawa River. The whole half mile of swamp, I remember, was ringing from end to end with an astonishing chorus of frogs,—a great volume of sound, but so steady and sustained that presently, like the music of the spheres, it went out of my consciousness, until suddenly I was made aware of it again by the startling abruptness with which it stopped: a marsh hawk sweeping over the water had struck the massed choirs instantaneously dumb. As I worked my way through the alders along the edge of the water, I noticed a good many *A socialis* climbing in the withered "beaver hay," the blue black colour of the minute insects rendering them conspicuous in the yellow grass As I advanced they became thicker, and here and there strings of them floated down runlets from the woods And then I came on the springtail metropolis. It was a large, moss-covered log so rotten that its species could not be determined, but it was probably a pine. It was bedded on the dead leaves of yester year just at the edge of the water, and from a crevice in its brown crumbling side, *A. socialis* were emerging in solid dark blue masses. The easiest way to appraise them would have been by dry measures. There must have been something over an imperial pint of them visible, and more were continually coming out of the log. On the damp leaves they were gathered into several patches six inches in diameter and fully half an inch thick. I filled a number of collecting tubes chockfull by merely scooping two or three times into these masses. A fine spray of leaping insects played continually over the side of the log, and the characteristic smell was very apparent. And strange to say, the insects made themselves unexpectedly manifest to another sense also. Rivalling the fairy-tale hero who could hear the grass growing, to my surprise I found I could hear the springtails leaping on the dead leaves. So many hundreds of them were jumping at the same moment, that the myriad simultaneous impacts became audible even to the coarse human sense of hearing, and sounded like the tiny rain we must suppose fell in Lilliput.

Watching any general movement of these insects is like watching the hour hand of a clock. They were evidently spreading out from this focus, but so slowly in spite of all their leaping and crawling hither and thither, that very little change could be noticed during the thirty or forty minutes that I observed them. When I returned to the spot the evening of the following day, they had as usual nearly all disappeared. On the leaves were many white patches of cast skins, and a few stragglers were still crawling over the log, but the millions of yesterday were gone.

These eruptions of *Achorutes socialis* and its congeners are due to overcrowding of the domicile, and in that respect they parallel the swarming of the bees and ants. But there the resemblance stops, for, of course, the springtails have no special organization whatever, and those found living in colonies are merely kept together by a common interest in some food supply or other favourable condition. When the place becomes too small to support them, practically the whole population leaves at the same time, each individual to seek his own private fortune, and the old home is completely abandoned. One obvious advantage of the movement, in addition to a more abundant forage, is the cross-breeding that takes place between different colonies. The increased vigour of the race which accrues no doubt more than counterbalances the large mortality among the emigrants.

The Collembola as an order have never attracted many students, and it is not likely that this article will do anything to increase the number, but "should one heart throb higher at its sway," it would be a pity not to encourage the aspirant to springtail lore, and so I will say something about collecting methods.

The Collembolist's collecting outfit is simple, inexpensive and not at all bulky, but as the insects are found in a variety of situations, several different pieces of apparatus are necessary to capture them. Among the first requisites are the small straight-sided bottles without shoulder or lip, known as shell vials. For general use in collecting and for storage purposes, round-bottomed shell vials about 50 mm. long by 10 mm. in diameter, as recommended by Dr. J. W. Folsom, are best. But for very minute specimens even smaller bottles than these are often desirable, and I usually carry a few vials 40 mm. and 25 mm. long by 6 mm. or 7 mm. in diameter. If not obtainable from stock, any dealer will have such bottles as these made to order at a small cost per gross.

In summer a small fragment of damp, rotten wood or a piece of a moist, dead leaf tamped down into the bottom of the vial will keep the specimen from dying of aridity until you get them home. In winter, when everything outdoors is dried up by the frost, my bottles are furnished with a scrap of filter paper, which can be moistened when required by dropping a granule or two of snow on to it. But one must be careful not to get the bottles too wet inside, or the insects will drown in the water film.

The Collembola, being all very soft-bodied, must be handled with great delicacy to avoid injuring them. The best implement for the purpose is the fine red sable brush used for oil painting, American size No. 1, (English size 00 or 0), preferably of the round shape, but the flat will do. The long handles may be cut down to a length of three or four inches convenient for the pocket or vial case. In a pinch an emergency brush can be made by chewing the end of a small succulent twig into fibres.

A great many Collembolans live under the bark of more or less rotten logs and stumps, and when collecting in this habitat a large pocket knife is very useful to separate the layers of bark. Also the student, unless he has exceptional eyesight, will find a watchmaker's glass necessary to discover the smaller specimens. A glass of two and a half inch or at most two inch focus is strong enough. Any higher magnification leaves too small a working distance. To prevent dewing of the glass in cool weather, two or three holes of about 4 mm. diameter should be bored through the mounting.

As any small object dropped into forest litter or long grass is very hard to find, I tie the collecting brush and the watchmaker's glass at either end of a fine string about 18 inches long This insures their safety, leaves the hands free, and enables the brush to be found without taking the eye off the quarry. Of course, like every other good thing, the arrangement has its drawbacks. But when the cord catches on some obstruction just as a particularly fine specimen has been sighted, and the glass is jerked out of the collector's eye, curses both loud and deep will be found to afford considerable relief to many temperments.

The very ingenious collector devised by Berlese is an admirable instrument for automatically extracting springtails and other small creatures from the debris of forests and such like materials But for adequate results the apparatus must be employed on a larger scale than is possible for an amateur without any special laboratory. And so, while I have used a small Berlese collector with some success, I prefer to sift for the insects in the open. My sieve consists of a wooden hoop 12 inches in diameter and one inch deep, to which is attached a sleeve of ticking about 10 inches long, while the netting is wire cloth of 12 meshes to the inch. A black silk handkerchief and a white linen one complete the outfit. In practice, one sits down in a likely place, puts a couple of handfuls of dead leaves into the sieve and shakes it over the handkerchief spread on the knees. Then by means of the brush, the dislodged Collembolans are transferred to a vial. Changing occasionally from the black to the white handkerchief, or vice versa, often reveals many minute and unsuspected insects of the contrasting hue.

For springtails of a different milieu a very useful device is a tin funnel 3½ inches or 4 inches in diameter at the mouth, such as can be bought at any hardware store for a few cents. A fair-sized, straight-sided bottle is corked to the tip of the funnel, and the implement is used to sweep herbage, the surface of pools, wet sand and similar formations. The leaping insects are caught in the funnel, and a sharp tap from time to time shakes them from the slippery sides into the bottle. Also the easiest way to capture specimens on loose pieces of bark is to shake them off into the funnel. And the catch can be safely transferred from the funnel bottle to the regular collecting tube by inserting the point of the funnel into the latter, and emptying the contents of the larger bottle into the funnel.

When he comes to use the brush, the collector soon sees that his manipulation must be varied according to the habit of the different species. The active high-strung *Isotoma* and the nervous *Tomocerus* must be "flipped" or herded into the bottle with a dry brush, while the non-leaping kinds, such as *Neanura* and *Onychiurus* and stolid genera like *Achorutes* and *Xenylla* can be picked up on a moistened brush without any trouble. Whatever others may say, the enthusiast sees no objection to moistening the brush with the lips. The absorption of an odd Collembolan that this practice may sometimes entail is entirely negative in result, as I can testify from several years' experience.

The insects are brought home alive, and are best killed, as Dr. Folsom advises, by the application of 95 per cent. alcohol heated almost to a boiling point. They may be then transferred to 80 per cent. alcohol for preservation. Springtails should never be mounted on points, as they soon shrivel up. Microscope preparations in Canada balsam, Dr. Folsom says, tend to shrink, and he suggests a mixture of glycerine jelly and acetic acid as the most satisfactory medium. An invaluable tool for "setting up" springtails and all other minute insects was discovered by Mr. J. M. Swaine, of the Entomological Branch, Ottawa, in the fine-pointed flexible wire instrument used by dentists to extract nerves, and known technically as a "broach."

As doubtless many collectors have discovered for themselves, the best work is done when one is alone. Unless your companion is equally interested with you in the particular insect you are after, his impatience and desire to move on distract, and his lack of sympathy chills you. I know people who could not watch one hour while a log was being examined with a magnifying glass, and whom even the discovery of a rare *Pseudachorutes* left quite cold.

## THE BEES OF GOLD HILL, COLORADO.

BY T. D. A. COCKERELL, BOULDER, COLORADO.

Gold Hill is a small mining town in the mountains of Boulder County, Colorado, with an altitude of about 8,600 feet. It is rather well known in zoological circles because it was the residence of an indefatigable student of birds and mammals, Denis Gale. At Ward, a few miles away, Gale discovered the mouse which Merriam named *Evotomys galei*. On July 13, 1919, my wife and I spent the forenoon collecting bees at Gold Hill, on the dry hill immediately east of the town. Twenty species were obtained, listed below. The fauna is by no means entirely of the boreal type; one species, *Andrena prunorum*, extends to Southern New Mexico.

*Prosopis varifrons* Cresson. Females at *Rubus*.

*Colletes kincaidii* Ckll. Both sexes abundant at flowers of *Frasera* (*Tessaranthium*).

*Sphecodes eustictus* Ckll. Female at *Geranium*.

*Halictus cooleyi* Crawford. Common, visiting *Frasera*.

*Halictus lerouxii* Lepeletier. One male.

*Halictus nigricollis* Vachal. One male. Described by Vachal from a male in the Vienna Museum, collected by Morrison in Colorado, and not previously recognized by me.

*Halictus arapahonum* Ckll. One male, this sex previously unknown. It is like *H. provancheri nearcticus* (Vach.), but the abdomen is olive green, with very distinct, faintly ochreous hair bands. Femora light ferruginous, without dark markings.

*Halictus pruinosiformis* Crawford. One female.

*Halictus ruidosensis* Ckll. One female; a rather large form with strongly dusky wings, perhaps separable.

*Halictus galei*, n. sp. ♀. Length about 4.5 mm.; head and thorax bluish green, not bright, somewhat shining but not polished; hair of head and thorax white, not dense; head oblong, facial quadrangle much longer than broad; front minutely excessively densely punctured all over, but this does not extend to the region between the ocelli; antennæ black, flagellum obscurely reddish beneath toward end; tegulæ dark, not punctured; wings clear hyaline, nervures and stigma testaceous; mesothorax microscopically tessellate and with distinct punctures, about the diameter of a puncture apart; area of metathorax with very irregular strong plicæ, and smaller ridges between, the apical part hardly sculptured, its surface microscopically reticulate; legs black; hind spur with three long spines; abdomen black, shining; sides of second segment (especially basally) and all of the following covered with white hair, not so dense as to entirely hide the shining surface, the little hairs beautifully plumose; hind margins of second and following segments narrowly pallid.

In my manuscript key to the subgenus *Chloralictus* this runs to *H. perdifficilis* Ckll., which it resembles in the hairy abdomen. It differs from *perdifficilis* by being very much smaller, with narrower head, and also in coloration. The narrower face, with straighter inner orbits, at once separates it from *H. ruidosensis*, but the peculiarity is not carried nearly so far as in *H. longiceps* Rob., which I have from Southern Pines, N. C. (*Manee*).

*Andrena lupinorum* Ckll. Common on flowers of *Rubus*, and also collected from *Potentilla*. I had only the type of this fine species.

*Andrena apacheorum* Ckll. One female at *Potentilla*.

*Andrena prunorum* Ckll. Female at *Rubus;* scape red, clypeus mainly red.

*Melissodes confusiformis* Ckll. One male at *Geranium*.

*Epeolus hitei* Ckll. One male at *Geranium;* differs from the female by having the first two antennal joints black, and the third red only in part. I had only the unique type of female.

*Anthophora smithii* Cress. One male.

*Chelynia elegans* Cress. One male at *Geranium*.

*Osmia armaticeps* Cress. One female at *Gaillardia*.

*Megachile pugnata* Say. Both sexes at *Gaillardia*.

*Bombus juxtus* Cress. Workers common on *Frasera*.

The *Rubus* referred to is *R. melanolasius* Focke.

Summing up the principal results; the morning's collecting gave us one new species, two previously unknown males, one species described in Europe and not before recognized by us, and several specimens of a species of which we previously had only the single type. Also, the *M. confusiformis* was the first male in good condition. In connection with Mr. Sladen's recent interesting observations on the relation between climate and characters, it may be of interest to note that in a considerable series of *Chloralictus*, the tegulæ are dark in those species which come from the north and the mountains, light in those from the south and lowlands. Thus:

Tegulæ dark. *H. cressonii, nigroviridis, viridatus, perdifficilis, versans, ruidosensis, hortensis, planatus*, etc.

Tegulæ light. *H. semibrunneus, sparsus, floridanus, ashmeadii, versatus, zephyrus, gemmatus, bruneri, exiguus*, etc.

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## A LIST OF SYRPHIDÆ OF NORTHERN INDIANA.

BY M. R. SMITH, RALEIGH, N.C.

The following is a list of Syrphids collected in the vicinity of Plymouth, Indiana, during the summer of 1918. As the writer does not think he will have opportunity to collect in this region again, this short list is being published with the hope that it may be of interest to the Syrphidologist and to those interested in working up the State's fauna.

To Mr. J. M. Craig much credit is due for assistance in collecting.

The writer also wishes to acknowledge his indebtedness to Mr. C. L. Fluke for a number of the determinations.

UPLAND SPECIES.

*Eristalis tenax* Linn.
*E. arbustorum* Linn.
*E. transversus* Wied.
*E. dimidiatus* Wied.
*Sphaerophoria scripta* Linn.
*S. cylindrica* Say.
*Paragus bicolor* Fabr.
*P. tibialis* Fabr.
*P. angustifrons* Loew.
*Allograpta obliqua* Say.
*Mesogramma marginata* Say.
*M. geminata* Say.
*M. polita* Say.
*Syrphus ribesii* Linn.
*S. americanus* Wied.
*S. xanthostomus* Williston.
*S. abbreviatus* Zett.
*Syritta pipiens* Linn.
*Milesia virginiensis* Drury.
*Spilomyia hamifera* Loew.
*S. longicornis* Loew.
*Baccha fascipennis* Wied.
*Xanthogramma flavipes.*

MARSH SPECIES.

*Helophilus similis* Macq.
*H. latifrons* Loew.
*H. divisus* Loew.
*H. chrysostomus* Williston.
*H. conostomus* Williston.
*H. laetus* Loew.
*Volucella evecta* Walker.
*Xylota fraudulosa* Loew.
*X. ejuncida* Say.
*Tropidia quadrata* Say.
*T. calcarata* Williston.
*Pyrophaena rosarum* Fabr.
*P. granditarsus* Fabr.
*Platychirus quadratus* Say.
*P. hyperboreus* Staeger.
*Melanostoma mellinum* Linn.
*M. obscurum* Say.
*Neoascia globosa* Walker.
*Chrysotoxum pubescens* Loew.
*Pterallastes thoracicus* Loew.
*Eristalis bastardi* Macq.
*E. flavipes* Walker.

# THREE NEW CANADIAN ANTHOMYIIDÆ (DIPTERA).

BY J. R. MALLOCH, URBANA, ILL.

The three species described in this paper were submitted to me for identification, and in order to include them in synopses which are ready for the press, they are now described in full.

The generic name Aricia R.D., is preoccupied and the next available one Helina R.D., is used in this paper.

## **Helina fletcheri**, sp. n.

*Male.*—Black, so densely covered with gray pruinescence as to appear opaque gray. Orbits, face and cheeks with silvery pruinescence, antennæ and palpi black. Thorax without vittæ. Abdomen with a faint dark dorsocentral vitta, and a pair of small brown spots on segment 2 and another on segment 3. Legs black. Wings clear, veins pale, yellow at bases. Calyptræ and halteres pale yellow.

Eyes bare, separated by about 3 times the width across posterior ocelli; interfrontalia at its narrowest part a little wider than either orbit; each orbit with 3 or 4 strong bristles and one or two weak hairs parafacial at base of antennæ about as wide as third antennal segment, a little narrowed below; cheek not over twice as high as width of parafacial, with a series of bristles along lower margin, 2 or 3 of which, below anterior margin of eye, are upwardly curved a bristle above vibrissa; longest hairs on arista a little shorter than width of third antennal segment. Thorax without strong presutural acrostichals or prealar bristle; postsutural dorso-centrals 3; sternopleurals 3, in a nearly equilateral triangle. Abdomen cylindrical, slightly tapered behind; tergites 3 and 4 each with transverse median and apical bristles; hypopygium large but not protuberant, fifth sternite with a rather wide, deep, wedge-shaped posterior excision, a few long bristles on each lateral extension. Fore tibia with or without a median bristle, only the dorsal apical bristle strong; fore tarsus about equal in length to fore tibia; all pulvilli longer than apical tarsal segment mid femur with a complete series of long, strong bristles on postero-ventral surface, the antero-ventral surface bare; mid tibia with 1 weak antero-dorsal and 2 or 3 posterior bristles; hind femur with a series of long bristles on postero-ventral surface and another on apical half of antero-ventral; hind tibia with 2 or 3 short bristles on antero-ventral and postero-dorsal surfaces and 2 longer bristles on antero-dorsal, the apical antero-dorsal bristle long. Costal thorn small, outer cross-vein straight; veins 3 and 4 divergent apically; last section of fourth vein over twice as long as the preceding.

Length 5 mm.

*Type.*—Radisson, Sask., July 30, 1907, (J. Fletcher), in the Canadian National Collection.

This species has the appearance of a Coenosia. It differs from any other North American species known to me in having the eyes widely separated, the femora very strongly bristled and the postsutural bristles 3 in number.

## **Hylemyia pedestris**, sp. n.

*Male.*—Black, slightly shining, densely gray pruinescent. Head black, orbits, face, and cheeks with white pruinescence; palpi largely yellowish basally. Thorax with 5 black vittæ—a narrow median, two narrow submedian, and two broad lateral. Abdomen with a narrow black dorsal vitta, which is obsolete on apical portion of basal segment; hypopygium glossy black. Legs yellowish testaceous, coxæ, femora and tarsi largely fuscous, sometimes the femora almost entirely fuscous, or almost entirely pale. Wings slightly grayish, yellow at bases. Calyptra and halteres yellow.

Eyes separated at narrowest part of frons by a distance equal to width of anterior ocellus; parafacial at base of antenna about half as wide as third antennal joint, much narrowed below; cheek as high as width of third antennal joint, with a few long bristles along lower margin, one of which is upwardly curved, antennæ reaching nearly to mouth-margin; arista with very short pubescence. Thorax with 2 or 3 pairs of presutural acrostichal bristles and a few intermixed setulose hairs; prealar less than half as long as the bristle behind it. Abdomen short, depressed, parallel-sided; hypopygium large; fifth sternite in both specimens before me projecting downward, large, the processes slightly curved, rounded at apices, their inner halves furnished with dense, erect black hairs, a rounded elevation laterad of base of each process on each of which there are a few bristles. Fore tibia with a short, sharp apical posterior bristle; mid femur with a few bristles near base on postero-ventral surface; mid tibia with 1 postero-dorsal and 2 posterior bristles; hind femur with antero-ventral bristles long and widely separated, the postero-ventral surface with a rather closely placed series of short bristles on basal three-fifths; hind tibia with 1 antero-ventral, 2 antero-dorsal, and 2 postero-dorsal bristles; mid and hind tarsi shorter than their tibiæ. Costal thorn small, outer cross-vein slightly curved, veins 3 and 4 subparallel apically, the former terminating almost in the apex of the wing which is slightly pointed.

Length 5.5 mm.

Type and paratype, Godbout, Quebec, Canada, July 25, 1918, (E. M. Walker). Named in honour of the collector.

The series of short bristles on basal two-fifths of hind femora and the fringes on processes of fifth abdominal sternite distinguish this species from any known to me.

Type in the Royal Ontario Museum of Zoology, Toronto.

### **Hylemyia quintilis,** sp. n.

*Female.*—Black, shining, rather densely gray pruinescent. Head entirely black, the orbits and parafacials with white tomentum, the remainder of head with less dense pruinescence. Thorax with 5 poorly defined brown dorsal vittæ. Abdomen more distinctly shining than thorax, with a large patch of gray pruinescence on each side of each tergite posteriorly. Legs black. Wings with a yellowish brown tinge, veins dark brown, yellow basally. Calyptræ white. Halteres yellow.

Frons over one-third of the head-width, a little widened anteriorly, orbits well defined, each about one-fourth as wide as interfrontalia at anterior extremity of ocellar triangle, and with 3 bristles in front of lower supraorbital bristle, otherwise bare, interfrontalia with a pair of strong curciate bristles, and a few microscopic hairs on each side, ocellar triangle with 2 long bristles and several long setulæ, parafacial at base of antennæ wider than height of cheek and a little wider than third antennal joint, narrowed below, the vibrissal angle much produced, anterior upper margin of mouth forming a sharp ridge which projects well beyond the line of anterior margin of frons; lower margin of cheek with a few strong bristles in a single series and some short weak hairs, the series of strong bristles widely interrupted below parafacial; third antennal joint broad, about twice as long as second, arista almost bare, second joint longer than thick, third swollen at base. Presutural acrostichals 2-rowed, one pair strong, prealar bristle long; sternopleurals 2:2, the lower anterior one weak. Abdominal tergites with strong bristles on posterior margins; sternites 3 to 5 each with strong bristles on lateral margins, basal sternite bare. genitalia with two slender processes at apex. Fore tibia with a strong median posterior bristle, basal joint of fore tarsus nearly as long as the other four combined, third, fourth, and fifth joints broadened, third twice as long as fourth, the latter one-third as long as fifth, which is about three times as long as broad, mid legs lacking, hind femur with about 8 bristles on apical three-fifths of antero-ventral surface, and 1 bristle near base on postero-ventral; hind tibia with 3 short antero-ventral, 3 moderately long and 4 short antero-dorsal, and 3 long and 5 or 6 short postero-dorsal bristles. Costal thorn short; veins 3 and 4 subparallel apically, last section of the latter not much longer than the preceding section.

Length 7 mm.

Type.—Godbout, Quebec, Canada, July 25, 1918, (E. M. Walker).

This species resembles the female of *latipennis* Zetterstedt, in having the apical fore tarsal joint dilated, but *latipennis* has the fourth joint much longer, distinctly longer than wide, the hind femur with 2 or 3 bristles on apical fourth of antero-ventral surface, and the hind tibia with 3 long bristles on the postero-dorsal surface, the short bristles being absent.

Type in the Royal Ontario Museum of Zoology, Toronto.

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## NOTES ON PLATYDEMA ELLIPTICUM FAB., AND ITS FUNGUS HOST.

BY HARRY B. WEISS, NEW BRUNSWICK, N.J.

During the middle of September, larvæ and pupæ of this species were quite abundant in the fungus *Polyporus gilvus* at Union, N.J. Many of the larvæ were full grown at this time, and adults had just started to emerge. Larval burrows were found throughout the fungus, but most of the pupal cells were located in the base of the fungus close to the bark of the tree. *Polyporus gilvus* is a woody fungus which is extremely common in Eastern Canada and Northern United States, occurring on dead deciduous wood.

Full grown larva.—Length 12 mm. Greatest width 1.7 mm. Elongate, subcylindrical, somewhat hard, whitish or with dark contents of alimentary tract showing. Head and anterior portion of first thoracic segment dark, reddish brown. Faint to dark transverse chitinized areas on dorsal surface of each segment. Head with a fine, white, U-shaped line which connects with a fine, median, dorsal line extending to first abdominal segment. Head bears a few punctures within the U-shaped line and many without. Head and body sparsely hairy. Legs bearing several spine-like hairs. Last abdominal segment bearing a row of five minute spines on its posterior edge, the middle spine being the largest.

Pupa.—Length 7 mm. Width across wing-cases 3 mm. Whitish, suboval, rounded anteriorly, gradually tapering posteriorly. Head, thorax and ventral surface sparsely hairy. Dorsal surface bears a number of fine, minute hairs. Hairs on anterior and lateral thoracic margins long and fine. Lateral body hairs longest. Sides of abdominal segments two to five produced into somewhat flat, plate-like, subrectangular, expanded tubercles. Anterior and posterior transverse edges of each expansion or tubercle chitinized and serratulate, the distal corner ending in a minute spine. Lateral edge of expansion bears a minute, median spine with a long hair arising from below the tip. The lateral expansion on the first abdominal segment has a heavily chitinized posterior edge, a minute, median, lateral spine but the anterior edge is not chitinized nor serratulate. Lateral expansion on sixth abdominal segment is smaller than the others and lacks the posterior edge. Last abdominal segment terminated at each edge by a comparatively prominent, pointed spine.

Adult.—*Platydema ellipticum.* This was described by Fabricius in 1801 (Syst. Eleut., II, 1801, 566). The beetle is elongate-oval, about 6 mm. long, black, each elytron having an oblique irregular reddish spot extending from the humerus to the suture. The thorax is finely and sparsely punctate, the elytra finely striate and the striæ with fine, distant punctures. It is generally distributed throughout New Jersey and occurs according to Smith (Insects of N.J., N.J. St. Mus. Rept. 1909) under the bark of fungus-covered trees. Blatchley (Coleoptera of Indiana) states that it is frequent in the southern half of Indiana beneath bark on fungus covered logs. Up to the present time this species has been found associated only with *Polyporus gilvus* in New Jersey, but it is extremely probable that it breeds in other woody fungi also.

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## A NEW ANTHOMYIID FROM LABRADOR (DIPTERA).

BY J. R. MALLOCH, URBANA, ILL.

The species described herein I have placed in the genus *Helina* Robineau Desvoidy (*Aricia* auct.) with some hesitation. The genus is, however, decidedly composite and pending a satisfactory subdivision of it the present arrangement is the best available. Stein in all his more recent papers on Anthomyiidæ uses the name *Mydæa* for this genus, but that name is, as I have pointed out in several of my papers, properly applicable to the small group of which *pagana* Fabricius is the type.

### **Helina tuberculata,** sp. n.

*Male.*—Black, shining, with conspicuous gray pruinescence. Head entirely black. Thorax with 4 broad, black vittæ. Abdomen with a pair of large, ill defined, subtriangular black spots on second and another on third segment. Legs black. Wings slightly brownish, more distinctly so along the courses of veins, yellowish basally. Calyptræ and halteres orange yellow.

Eyes distinctly hairy, separated by about width across posterior ocelli; parafacial at base of antenna at least as wide as third antennal joint at apex, not narrowed below; third antennal joint broadened apically, second with several long bristles above; arista short pubescent. Thorax with or without a pair of long presutural acrostichals; prealar bristle at least half as long as the bristle behind it; postsutural dorso-centrals 4; hypopleura bare; sternopleurals 1: 2; scutellum bare below and on sides. Abdomen ovate; first sternite bare;

fifth sternite with a broad shallow posterior emargination, a number of long bristles on each side at base of emargination, the lateral projections bare. Fore tibia without median bristle; mid femur gradually thickened to beyond middle, then rather abruptly attenuated to apex, a group of strong bristles at apex of swollen part on antero-ventral surface, and two or three bristles near base on postero-ventral surface; mid tibia slightly distorted, with about a dozen strong bristles on basal half of posterior surface, a small tubercle one-third from apex on same surface, and dense, short bristles on ventral surface from base to and covering the tubercle; hind femur slightly curved, slender basally, with a number of long bristles on apical half of antero-ventral surface; hind tibia very slightly curved, antero-ventral surface with about 9 short bristles, antero-dorsal surface with five or six short bristles, the posterior surface with about eleven long bristles on apical three-fifths. Third and fourth veins much divergent apically. Lower calyptra about twice as large as upper.

Length 9 mm.

Type.—Rigolet, Labrador, July 18, 1906.

This species has the hind tibia armed almost as in *pectinata* Johannsen, but the peculiar mid tibia separates the species from it and all other species known to me from this country or Europe.

This specimen was sent to me by Mr. C. W. Johnson, and pending its final disposition the type is in the collection of Illinois Natural History Survey.

## A PLEA FOR MORE ACCURATE TAXONOMY IN MORPHOLOGICAL AND OTHER STUDIES.

BY MORGAN HEBARD, CHESTNUT HILL, PA.

It has been noted by the author that morphologists and students interested in specialized studies of certain species are often inclined to give imperfectly or inaccurately the necessary taxonomy for the material treated.

This is understood only when we realize that the subject treated is of great interest in such papers, the proper name for the material studied often of little or no interest to the morphologist.

That the correct name is of very great importance it would seem must be admitted by all, when it is pointed out that from different species, though sometimes apparently very closely related, different results are often obtained, even from morphological studies.

It is true that the systematic work of the past has often left much to be desired, and many changes have been necessitated thereby. That, however, should not warrant slurring systematics any more than that equally unsatisfactory past work of morphologists and reversal of conclusions should cause interest in morphology to wane. The advance of all science is built in part upon the correction of past errors.

Another excuse for lack of proper taxonomic assignment is that it is often difficult to secure the required names from a systematist. This is indeed sometimes true, but, in the great majority of cases, one fiftieth the time and effort expended in preparing the material in question for study, would have secured the necessary determinations.

As a concrete instance, we would note Mr. E. Melville Du Porte's recent article, "The Propleura and the Pronotal Sulci of the Orthoptera."(1)

(1) Can. Ent., LI, pp. 147 to 153 (1919).

This excellent paper treats, in a masterly way, a most interesting subject. It is marred solely by inaccurate or incomplete taxonomy The taxonomic faults may be summarized as follows:

*Acridiidæ = Acrididæ.*

*Rhomalea = Romalea.*

*Tettigidæ = Acrydiinæ.*

*Tettix granulatus = Acrydium granulatum.*

The references in this paper to *Acrydium* are correctly referable to that genus, of which *granulatum* is a member.

*Locustidæ = Tettigoniidæ.*

*Conocephalus = Neoconocephalus*, a genus including but few North American species. It has been recently revised and the specific determination would, in consequence, have been easily made'

*Xiphidium = Conocephalus.*

*Microcentrum*. As there are but two, widely distributed, North American species of this genus, *laurifolium* and *retinerve*, the specific assignment could have been readily made.

*Gryllus pennsylvanicus = Gryllus assimilis.*

The taxonomy in this paper could have been corrected by a systematist in a few minutes. Would it not be desirable to have all such papers correct throughout, rather than satisfactory as far as the subject being studied is concerned, but full of inexcusable taxonomic flaws?

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NOTE ON MR. HEBARD'S ARTICLE.

The Editor, having given some attention to the taxonomy of the Orthoptera, was aware that the nomenclature followed in Mr. Du Porte's paper was not up-to-date, but considered it inadvisable to alter it, since the names employed have long been in common use, and are more or less familiar to the general student, for whom the paper is intended. The nomenclature of Orthoptera has undergone numerous changes in late years, and some of these changes, though doubtless necessary, if the law of priority is to be followed, are of a most unfortunate character. Many old familiar generic terms have been abandoned, or what is more confusing, transferred to other forms. For example, the little "grouse-locusts," generally known as *Tettix* are now *Acrydium*, while the large locusts formerly called *Acridium* are now *Locusta*, a name which used to be employed for insects of another family. Again, the name *Conocephalus*, so long and appropriately given to the large "cone-headed grass hoppers" must now be shifted to the little meadow grasshoppers familiar to all as *Xiphidium*, the cone-heads becoming *Neoconocephalus*. Such changes as these are, of course, very confusing to all but the specialist. Were they really permanent, it would indeed be desirable to promote their use as rapidly as possible, but what guarantee have we that they will remain more than a few years? They are not even universally accepted by specialists.

Is there such a thing as "correct taxonomy?" We think, at least, that systematists are inclined to over-estimate its importance; and while we agree with Mr. Hebard's contention that morphologists are too apt to be careless in regard to taxonomic matters, we think that the converse is equally true, that the systematist is usually very inaccurate in the use of morphological terms, and indifferent as to the morphological significance of the structures he describes.

## RECENT CANADIAN PUBLICATIONS.

(Continued from page 263.)

THE APPLE MAGGOT.—By L. Caesar, B.A., B.S.A., Provincial Entomologist, and W. A. Ross, B.S.A., Entomological Branch, Dominion Department of Agriculture. Bull. 271, Fruit Branch, Ont. Dept. of Agriculture. Pp. 1–32, with 17 figures in text.

The investigation upon which this excellent bulletin is based was commenced in 1911, when the apple maggot was abundant in many parts of Ontario, and has been continued during each succeeding year. It contains a detailed account of the life-history of this insect, with full data on its seasonal history, habits, distribution, influence of environmental factors and methods of control. Although normally the life cycle is completed within a year, a certain number of pupæ remain in the soil during a second winter, the flies emerging the following summer. There is also in the warmer parts of Ontario a partial second brood in some seasons, though a very insignificant one. The time of emergence of the flies, which begins as a rule about the first week in July, and continues throughout most of August, is not influenced by the time of pupation, i. e., flies from pupæ from early varieties of apples do not appear to emerge any sooner than those from later varieties.

Natural control seems to depend mainly upon weather factors, parasites being apparently of very minor importance. Hardening of the soil surface, as a result of heavy rains followed by drought, may either prevent the flies from emerging or the larvæ from pupating beneath it, and large numbers may perish in these ways.

Much variation exists in the susceptibility of different varieties of apples and crabs to infestation.

The most effective control measures are found to consist in spraying with arsenicals, the mixture recommended being arsenate of lead paste, 2½ lbs. to 40 gallons of water, without any molasses or other sweetening. "The first application should be given as soon as the flies begin to emerge, so that they may be killed before they can lay eggs," the proper date of application in an average season varying according to the district, from June 25, in the warmest parts of the province, to July 7 in the more northerly localities. A second application should be made as soon as the first shows signs of disappearing, and a third may be necessary if heavy rains should wash off the second, and is recommended in all cases the first year after a bad infestation.

Good figures from original photographs are given to illustrate the different stages of the insect and its work on the apple.

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REPORT OF THE PROVINCIAL MUSEUM OF NATURAL HISTORY FOR THE YEAR 1918, PROVINCE OF BRITISH COLUMBIA.—Victoria, 1919. Pp. T 1–16, with 2 plates. Entomology. By E. H. Blackmore.

Mr. Blackmore's article constitutes the greater part of the report (pp. 6–13), and consists chiefly of notes on the occurrence of uncommon insects taken in British Columbia during the season of 1918. These include 12 species, belonging to several orders, that were described as new during the year, and a considerable number of Lepidoptera, 20 species of which are illustrated on the two plates by excellent half-tones from photographs.

Four species of this order are reported as having been present in the province in destructive numbers, viz., the forest tent-caterpillar (*Malacosoma pluvialis*), the tortoise-shell butterfly (*Aglais californica*), the alfalfa looper (*Autographa californica*) and a tussock moth (*Hemerocampa vetusta gulosa*), which was devastating Douglas Fir at Chase, B.C.

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Report of the Canadian Arctic Expedition, 1913–18.—Vol. III—Insects. Southern Party 1913–16. Ottawa, 1919.

Six parts of this volume have thus far been issued. Most of the collections in all the orders were made by Mr. Frits Johansen, and a large part of the material was collected at Bernard Harbour, Dolphin and Union Straits, Northwest Territories, and at Nome and other localities on the Arctic coast of Alaska.

Part A, Collembola. By Justus W. Folsom. Pp. 1–29, including 8 plates with 72 figures. This is a very full report on the 12 species and varieties of springtails taken by Mr. Johansen. All the species are described and the characters well illustrated. An extensive bibliography is also given. The species are distributed among the following genera: Podura (1); Achorutes (2, 1 n. sp.); Onychiurus (1 n. sp.); Tetracanthella (1); Isotoma (2 sp.); Entomobrya (1); Lepidocyrtus (1); Sminthurides (1).

Part B, Neuropteroid Insects, by Nathan Banks. Pp. 1–5 with 1 plate. Only two orders are represented in the collection, the Plecoptera and the Trichoptera, three species of the former and four of the latter having been taken. One species of each order is described as new, a Capnia and an Anabolia, but other new forms may be present as the specimens are not all specifically determinable.

Part C. Diptera. Craneflies; by C. P. Alexander. Mosquitoes; by H. G. Dyar; Diptera (excluding Tipulidæ and Culicidæ); by J. R. Malloch. Pp. 1–90, with 10 plates.

Craneflies. The collection is relatively rich in these forms, there being at least 16 species represented, including one Rhyphid (a Trichocera, represented by larvæ only) and 15 Tipulidæ. Five of these belong to the Limnobiinæ, embracing 4 genera, and 10 to the Tipulinæ, representing 3 genera. The largest genus is Tipula with 7 species. With but two exceptions the craneflies of this collection all belong to new species.

All the species, including larval forms, are fully described and figured.

Mosquitoes. Only two species are represented among the 134 specimens in the collection, both belonging to Aedes (Ochlerotatus). One of these, taken in large series and also reared is described as new, *A. nearcticus*. The other species is represented only by females and was left unnamed.

Diptera (exclusive of Tipulidæ and Culicidæ); pp. 34–90, pls. VII–X. These belong to 18 families in which they are distributed as follows: Sciaridæ, 3 sp.; Chironomidæ, 16 sp. (with a new species each in Tanypus and Diamesa); Simuliidæ, 6 sp. (1 n. sp. each in Prosimulium and Simulium); Leptidæ, 1 sp.;

Empididæ, 7 sp. (all Rhamphomyia, 5 new); Dolichopodidæ, 6 sp. (1 n. sp. each in Dolichopus and Hydrophorus); Phoridæ, 3 sp. (all Apiochæta, 2 n. sp.); Borboridæ, 1 sp., a new Leptocera; Syrphidæ, 8 sp.; Oestridæ, 2 sp.; Tachinidæ, 2 sp. (1 new Peleteria); Calliphoridæ, 4 sp. (1 new Phormia); Anthomyiidæ, 26 sp. (n. sp. in Phaonia, 1 Mydæina n. gen., 1 Aricia, 1 Hydrophoria, 1 Alliopsis, 1 Hylemyia and 1 Phorbia); Scatophagidæ, 8 sp. (1 n. sp. each in Gonatherus and Cordylurella, n. gen., Dasypleuron n. gen., and Allomyia n. gen.; Helomyzidæ, 3 sp. (1 n. sp. each in Oecothea and Neoleria); Piophilidæ, 1 sp. (a new Piophila) and Chloropidæ, 1 sp.

Much of the material in the collection was specifically indeterminable, so that it is probable that it contains a considerable number of undescribed species.

This paper also contains keys to the genera of Phaoninæ and Anthomyiinæ, and to those of the entire family of Scatophagidæ and Helomyzidæ.

Part D, Mallophaga and Anoplura. Mallophaga; by A. W. Baker; Anoplura, by G. F. Ferris and G. H. F. Nuttall. Twenty species of Mallophaga are listed from 13 bird hosts and one mammal. All belong to described species with the possible exception of three species which were too immature for specific determination. Four of the species are illustrated on the plate. Only three species of true lice or Anoplura were taken, one of these being the human head louse, collected from the head hairs of copper Eskimos.

Part F, Hemiptera, by E. P. Van Duzee. Pp. 1–5. The scarcity of Hemiptera in the Arctic regions is indicated by the small size of the collection, which consists of but 12 species. Only 6 of these were specifically determinable, one species being described as new, viz., *Euscelis hyperboreus*, n. sp.

Part H, Spiders, Mites and Myriopods. Spiders, by J. H. Emerton. Acarina, by Nathan Banks. Chilopoda, by Ralph V. Chamberlin.

Spiders (pp. 1–9, pls. I–III). The collection of spiders include 13 species of which three are described as new. They are distributed among the following genera: Erigone (1), Typhlocræstus (1), Tmetocerus (2, 1 n. sp.), Microveta (2, 1 n. sp.), Epeira (1), Dictyna (1), Lycosa (2, 1 n. sp.), Pardosa (2), and Xysticus (1).

Descriptive and distributional notes are given on many of the species and structural details of most of the forms are figured.

Acarina, (pp. 11–13). The mites belong to 7 families, 14 genera and 17 species, only one of which is described as new. (*Stigmæus arcticus*, figs. 1 and 2). They belong to the genera Rhagidia (1), Bdella (3), Bryobia (1), Stigmæus (1), Trombidium (1), Eylais (1), Hydrophantes (1), Thyas (1), Lebertia (1), Laminipes (1), Curvipes (1), Parasitus (1), Galumna (1), and Scutovertex (2).

Chilopoda (pp. 15–22, pl. IV). Two species of Chilopods, one belonging to the Lithobiomorpha, the other to the Geophilomorpha, are the only Myriopods collected by the Expedition, and both were taken in the Cape Nome region, Alaska. Mr. Chamberlin, however, gives a list of all the Alaskan Chilopods (14 species), a key to the genera of the family Chilenophilidæ, and a full description of *Cryophilus alaskanus*. n. gen. et sp. *Ethophilus integer*, n. sp., though not represented in the collection of the Expedition is also described, a subspecies (*alaskanus*) having been reported from Alaska. The typical form comes from Washington and Oregon.

E.M.W.

(To be continued).

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