MOSQUITO NOTES.—No. 5.—Continued.

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In the article describing *Grabhamia nigromaculis** mihi, reference was made to a group of mosquitoes in the north-western part of the U. S., and probably occurring also in Canada, in which the species are closely related and the individuals show great variation, and to which *nigromaculis* belonged. Two more of this group are described below, one of which lies close to *G. Currici*, Coq., but the distinct, clean-cut abdominal markings and difference in colouring are characteristic; though corresponding to the habit of the group, there is variation among the individuals.

Grabhamia mediolineata, n. sp.—(Female.)

Head dark brown or black, covered with long, curved, pale, almost white scales, a few ochraceous ones; bright brown flat lateral, and slender white forked scales on the occiput, some brown bristles between the eyes and around the eyes; antennæ dark brown, verticels dark brown, pubescence white, first joint testaceous, and in some lights all the joints are apparently light banded, basal joint testaceous, with slender flat white scales on the median surface; palpi black, a few white scales at the tip, and occasionally at the base of penultimate joint; proboscis black and quite long, tip black; clypeus black; eyes black and silver.

Thorax black, prothoracic lobes with long pale ochraceous curved scales (spatulate?); mesonotum covered on the median third with bright brown slender curved scales for about two-thirds its length, the caudad third with slender pale curved scales; immediately laterad of this median stripe is a broad pale stripe of rather broader curved scales, and exterior to this another stripe of brown curved scales extending to the wing joint; scutellum black, covered with long slender curved scales; pleura black, with long white spatulate scales; metanotum black.

Abdomen black, covered with black and white or "dirty-white" scales, so arranged as to make a slender median light line, transverse white bands mostly basal, but involving both segments, and on the more caudad segments are almost entirely apical, the distal segments being in some cases mostly white; white lateral spots, which are really extensions of the

*A new American mosquito.

The University Bulletin, The George Washington Univ., Washington, D. C., Jan., 1907.

white scaling of the venter, and on most of the segments extend the whole length.

Legs: coxæ and trochanters light, and white-scaled; femora white ventrally, speckled black and white dorsally, a narrow black ring just proximal to the tiny white knee spot; fore and mid tibiæ white ventrally (on the hind legs this is reduced to a white line), speckled dorsally, a little darker near the apex, but the apex light, and in the hind legs there is a distinct dark band and light apex as on the femora; metatarsi speckled, those of the fore legs having light apices, of the hind legs having both slightly lighter bases and light apices. On the fore legs the first tarsal joints are black, with basal light bands, all the other joints dark; on the mid leg the first and second joints are still a little speckled, and have white basal bands and tiny white apical spots, sometimes unbanded, third and fourth joints dark; on the hind legs the first and second joints are dark (black), with basal and apical light bands, the third has a basal light band, and the fourth is light; all ungues equal and uniserrate.

Wings clear, speckled with black and white scales, the costa being mostly black, and the sixth long vein white, first submarginal a little longer and more narrow than the second posterior cell, the petiole in each case about half as long as the cell; mid cross-vein twice as long as the "supernumerary," and equal to the posterior cross-vein, which is about its own length distant; halteres, light stem and dark knobs.

The leg banding involves both sides of most of the joints, and in this greatly resembles *G. Curriei*, the thoracic marking suggests *G. lativittata*, but the abdominal marking is clear, in some cases being only clean-cut lines, in others a little ragged. The types do not, however, suggest either species more than to indicate their close relationship, having a peculiarly tidy appearance which the others lack.

Length, 7.5 mm.

Habitat, Fort Lincoln, N. D. Taken June, July, August.

Grabhamia grisea, n. sp.—(Female.)

Head dark, covered with slender curved scales, light ochraceous on the occiput, a triangular space of darker golden brown, scales just external, and ochraceous flat scales on the sides; no fork scales; antennæ brown, verticels brown, pubescence light, basal joint brown, covered with flat ochraceous scales; palpi entirely brown scaled; proboscis brown, a light band, narrow on the dorsal and wider on the ventral aspect, at the apex of the proximal half; clypeus brown; eyes brown and gold.

Thorax dark brown, prothoracic lobes with slender curved light brown scales; mesonotum with slender curved scales, a distinct bare (dark) median line, immediately laterad of which on either side is a broad stripe of bright brown scales, then a light golden brown or ochraceous stripe extending cephalad from the scutellum to nape, external to these on the caudad half are the darker brown scales, and the lateral portion of the dorsum is covered with the lighter brown scales; scutellum dark, with light brown or ochraceous scales, and long light bristles on the margin; pleura ashy-brown, with white scales; metanotum dark brown.

Abdomen dark, heavily and closely covered by flat ochraceous scales; two tiny dark submedian points not large enough to call spots, and yet very distinct, on all the segments but the first, which has a large bunch of almost white scales and light hairs; ventrally the abdomen is also covered with ochraceous scales, but not so heavily as dorsally.

Legs: coxæ and trochanters mostly light-scaled; femora dorsally sprinkled with dark brown and ochraceous scales, darker toward the apex, but the very apex white; ventrad, caudad and cephalad aspects ochraceous. Tibiæ much like femora but darker, and on the hind legs have a distinct dark apical band; metatarsi on fore legs much like tibiæ, and all the following joints missing; on mid legs also much like tibiæ; tarsal joints dark, the first and second with small ochraceous basal spots; on the hind legs the metatarsi are quite dark but still slightly sprinkled with light scales, and it and all the tarsal joints except the fourth are heavily basally white-banded, the fourth dark; all ungues uniserrate.

Wings clear, mostly dark-scaled, especially near the costa, the sixth long vein mostly dark, first submarginal a little longer and about half the width of the second posterior cell, the stems in each case about two-thirds the length of the cell: cross-veins nearly equal in length, the posterior about its own length distant from the mid; halteres mostly light, a little darkened on the knobs.

Length, 5–6 mm.

Habitat, Boise Barracks, Idaho. Taken July.

This evidently lies near *G. Fletcherii*, but the abdominal marking is distinct, and the specimens of *Fletcherii* which I have seen do not show a marked band on the hind metatarsi, nor a white band on the proboscis.

Both species were collected by the Surgeon U. S. Army, on duty at the respective places, but in one case the name was not sent in.

The pupæ possess the power of movement to an astonishing degree, and when disturbed back quickly downward into their burrows. This is so characteristic of them that we were obliged to approach a tree rather carefully, and quietly tear away the grass and debris around the base without disturbing the cocoon if we wanted to be sure of our specimen. I lost some entirely, and cut others in two just as they were backing from their cocoon into the burrow in the tree. Again, so many pupæ backed out of their cocoons after the latter were removed that they dried out and failed to transform.

The records of the appearance of the moths are as follows :

Many empty pupa-cases found May 4.
One male May 8.
One female May 8.
One male May 9.
One female May 10.
One female May 11.
One male May 13.
Some are yet to transform (May 18).

These borers must injure the native Persimmon much more than a Peach-tree borer does a Peach tree, although I found no borers in large trees. They seemed to be confied to the young and small trees.

It is also an interesting fact that we were unable to find a single borer in the cultivated Japanese Persimmon trees standing in close proximity to the wild infested trees.

MOSQUITO NOTES.—No. 5.—Continued.

BY C. S. LUDLOW, M. SC.

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Among the mosquitoes sent in during the collecting period of 1906 in the U. S., was an Anophelina which has caused me some perplexity. The general colouring at once suggested one of the *sinensis* group, and it occurred to me that some joke had been perpetrated, so I wrote the collector, asking if it were possible that any Philippine mosquitoes had gotten in with these. He, however, said it was quite impossible, as he had no P. I. mosquitoes with him when this collection was made. No specimens resembling this had previously been received from the U. S., so that I was somewhat reluctant at first to accept it, but as closer study shows it

to be an *Anopheles* (as restricted by Theobald), and none of that genus has been received from the P. I., I have decided to publish it.

Anopheles perplexens, n. sp.—(Female.)—Head dark, with dark brown and white fork scales, the latter nearer the vertex, and a heavy tuft of slender, long curved white scales projecting cephalad between the eyes ; antennæ dark brown, verticels and pubescence dark, basal joint brown; palpi dark, covered with dark brown scales, a small tuft of white hairs at the very tip ; proboscis dark with dark brown scales, tip testaceous ; clypeus dark, eyes brown.

Thorax: prothoracic lobes testaceous, with dark hairs ; mesonotum with broad, light median stripe, covered with white "frost," and white hairs arranged so as to suggest a "part," a dark median line extending half way to the scutellum, and two dark lateral bordering lines ; more or less of a tuft of these hairs at the nape ; laterad the dorsum is dark brown, with dark brown hairs ; pleura brown ; scutellum testaceous, "frosty," with brown bristles ; metanotum dark brown.

Abdomen dark brown, with light hairs (no scales).

Legs : coxæ and trochanters light, mostly light scaled ; femora ventrally light scaled, and extreme tips of femora and tibiæ ochraceous, remainder of legs dark brown ; ungues simple.

Wings clear, and rather heavily clothed with dark brown scales, except a few small ochraceous spots—one on the costa, just interior to a line drawn through the junction of the branches of the fork cells, a second tiny spot at the junction of the first long vein with the costa, extending a tiny bit on the long vein, and two very small faint light spots on the forks of the fourth long vein, also a tiny fringe spot at the distal end of the third long vein ; halteres with light stems and fuscous knobs.

Length, 2.5–3 mm. Habitat, Camp Roosevelt, Mt. Gretna, Pa. Taken August 25, 1906.

This interesting species was sent by Capt. E. B. Whittemore, Asst. Surg. U. S. Army, and, as will be seen from the description, bears a closer resemblance to tropical Anophelina than to those so far reported from the U. S., but as the group it most closely resembles has abdominal scales and rather broader wing-scales it cannot be referred to it.

It seems wise to call attention to some variations occurring in Philippine mosquitoes. Among the *Myzomyia Ludlowii*, Theob., from the Province of Batan, Luzon, and in some collections sent from the southern islands, come specimens showing much more extended speckling

of the legs than in those I took in Batan in 1901, or in those taken in Abra, and which were sent to Mr. Theobald for identification. In these earlier specimens the yellow spots on the legs are practically confined to the femora, tibiæ and metatarsi, and this is the case in many specimens still sent in, but in the collections referred to the spots extend well on to the tarsal joints, so that the last two are often the only ones lacking them. The femoral spots are in some specimens nearly white, and all of the legs are marked, the fore legs as prominently as the others. This difference is so noticeable as to be misleading, but there can hardly be doubt that, as the insect in other respects corresponds closely to *Ludlowii*, it must be regarded as merely an individual variation, not even worthy of place as a "variety."

Some of the specimens of *Ædeomyia squammipenna*, Arribalzaga, coming from the P. I., show marked variation from the type, and yet, as these differences vary, can only be counted as individual differences ; the palpi in some specimens have ochraceous instead of white scales near the base ; the wing markings vary much as to size, and, incidentally, a little in position ; the white leg-bands are often broader, and the distal tarsal joint on the hind leg is frequently pure white. Of course, if these differences ran true, they would suggest a new species, but as they do not, are only of general interest.

Some time since my attention was called to a general resemblance between *Tæniorhynchus argenteus*, mihi, and *Culex gelidus*, Theobald. I have therefore compared the two carefully and find the following differences : As to proboscis, *C. gelidus* yellow, with a brown band near the apex ; *T. argenteus* brown, with broad white band. As to thorax, *C. gelidus* has a heavy white marking extending about two-thirds the length of the dorsum, the caudad third being of the yellowish-brown of the scutellum. *T. argenteus* has the white marking extending over the whole mesonotum and scutellum, with the exception of two oblong spots near the caudad end of the mesonotum. These seem to differentiate the insects, and there are besides these some scale differences which seem to throw it into *Tæniorhynchus* instead of *Culex*.

Megarhinus LeWaldii, mihi, to conform to the binomial nomenclature, must be written *M. Lewaldii*.

Long study and acquaintance with *Myzomyia Rossii*, var. *indefinita*, mihi, has convinced me that it should never have been referred to *Rossii*, and that it must stand as a distict species—*indefinita*, Ludlow.

MOSQUITO NOTES.—No. 5. (Concluded.)

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This insect was described some months since, but by some error the MS. was not published as I expected, so I now use it as a conclusion to "Mosquito Notes, No. 5."

Ludlowia minima, n. sp.—Head light brown, covered with flat light yellow or yellowish-white scales, two brown bristles projecting forward between the eyes, a few brown fork scales in the nape; antennæ brown, verticels and pubescence brown, and normal; basal joint testaceous, with a few short brown hairs; second and third joints have a few flat brown scales; palpi brown, apical joints missing, those remaining heavily brown-scaled; proboscis brown, tip light; eyes brown; clypeus brown, with "frosty" tomentum.

Thorax: prothoracic lobes testaceous, with a few brown bristles; mesonotum dark brown, partly denuded, but the remaining scales on each insect are dark brown slender curved scales (not hairs) and a few dark brown bristles over the scutellum and wing joint; scutellum with dark brown slender curved scales and brown bristles; pleura light, with a couple of brown spots and a few white scales; metanotum dark brown.

Abdomen light, with dark brown scales and narrow ochraceous basal bands extending laterally as small basal light spots; venter mostly light-scaled.

Legs as a whole brown, but the colour changing with the direction of the light to a light brownish gray; coxæ and trochanters light; femora dark dorsally, ventrally almost white, tiny apical light spots on femora and tibiæ, distally dark, the rest of the joints missing except on hind legs, where the ungues are simple and equal.

Wings clear, densely covered with brown scales, lateral scales broadly lanceolate, median broadly truncate, showing very little if any symmetry; spine-like scales on the costa. Cells not so markedly short as in *Chamberlainii*. First submarginal about 1.7 long, and nearly the same width as second posterior, both very narrow; stem of former not half as long as cell, and about a fourth shorter than that of second posterior; mid-cross-vein meets supernumerary, and is slightly longer; posterior cross-vein slightly shorter than mid, and about twice its own length distant. Length, 2.5 mm.

Male.—Is very like female; fork scales on nape more numerous; antennæ missing; palpi longer than proboscis and clubbed; ungues on fore and mid legs unequal, the larger uniserrate, the smaller simple and comparatively straight; hind legs missing. Wing-cells shorter in proportion, and the stems longer. Length, 3 mm.

Habitat, Carandaugan, Mindanas, Philippine Islands. Taken January 19, 1906.

Neither specimen is perfect, and the male especially is in bad shape, but there can be no reasonable doubt as to the genus, or that the species is new.

Described from one male and one female sent by Lieut. W. H. Duncan, Assistant Surgeon U. S. Army, with specimens of *Chamberlainii;* it is an extremely small mosquito, quite as small as *S. minuta*, Theob., or *S. Amesii*, Ludlow.

NOTES ON RECURVARIA GIBSONELLA, KEARF.

BY ARTHUR GIBSON, OTTAWA.

Early in May, 1905, I collected at Hull, Que., which is just across the Ottawa River from Ottawa, some very small larvæ, each one of which was enclosed within several leaves tied together at the tips of the branches of the common Juniper, *Juniperus communis*, L. From this material I reared three moths, which were submitted to Mr. W. D. Kearfott for examination. Deciding that they were new to science, he honoured me by describing them in the January, 1907, number of the CANADIAN ENTOMOLOGIST under the name of *Recurvaria Gibsonella.*

During the past season some further observations were made on the species. On April 27 I again visited the original locality, and found larvæ very abundant in their characteristic winter quarters. At that time of the year each larva was found in a small tube-like enclosure at the tips of the main branches and side twigs. As many as nine or ten leaves were drawn together and fastened strongly with silk, in the centre of which the nearly full-grown larva passed the winter. As these leaves are dead, or partly so, and discoloured, the hibernaculum is easily found after having once been seen.

In early May a number of localities at and adjacent to Ottawa, where the common Juniper is abundant, were visited, and in every instance larvæ were found in considerable numbers. The species is evidently a common one, and will doubtless be found in many places where the above plant is plentiful.

December, 1907.