Schwarz states that in life the larva was covered by a white waxy secretion which is now dissolved by the alcohol. The secretion of the host has likewise disappeared, both in the alcoholic and the dry specimens, but Mr. Schwarz thinks that it was originally present. The color of the larva is destroyed by the alcohol, but it was an obscure whitish. All these characters agree with *Epipyrops anomala*.

As to the systematic position of this insect, I cannot agree with any published opinion. That of Sir George Hampson, referring it to the Limacodidæ is the most reasonable, but is negatived, among other characters, by the structure of vein 8 of the hind wings and by the abdominal feet of the larva. It is a Tineoid form, apparently not referable to the Tineidæ proper. Meyrick's tables seem to place it in the Zeuzeridæ, Hampson's in the Dalceridæ; but it will probably prove deserving of separate family rank.

[Dr. Howard has since called my attention to a note (Proc. Ent. Soc. Lond., p. xx, 1883) recording this genus from Central America, but the larvæ were apparently not bred. The note is by Mr. Champion and states that larvæ were not infrequently found attached to and feeding on the white cottony secretion so abundant about some of the smaller Fulgoridæ. As many as three larvæ had been seen attached to one imago. The Fulgoridæ were very sluggish in their habits.]

—Mr. Benton called attention to a particular in which, he had observed, the Cyprian variety of bees differ in their habits from native and Italian varieties. Instead of driving out and killing all drones at the end of the honey harvest, they kill about four-fifths of them and permit the others to go back into the hive, only gradually destroying these, and, in some instances, permitting a few to live over the entire winter, even in colonies normally supplied with queens.

Dr. Dyar then presented the following paper:

NOTES ON MOSQUITOES ON LONG ISLAND, NEW YORK.

By Harrison G. Dyar.

These observations were made at Bellport and Amagansett. The village of Bellport is on the south shore of Long Island, about the middle of the length of the island on Great South Bay. The land is flat and sandy, cut by sluggish streams forming lakes and pools. The bay is strongly brackish but without salt marshes in this vicinity. Mosquitoes were abundant in the season of 1901.

The woods and grass swarmed with *Culex sollicitans* and *C. cantans*, while Culex and Anopheles entered the house in some numbers in spite of screens. Larvæ were found in various situations, as will be described in detail in the following notes. No larvæ were seen, however, in any body of water large enough to be roughened by the wind, nor in any water so shaded by the woods as to be dark. Several suspicious looking pools hidden in the dark woods were barren of mosquito larvæ, though the adults swarmed there as they did almost everywhere else.

Anopheles crucians Wied.

This was the commonest Anopheles in the house, though not bred from collected larvæ. Several examples were taken in the act of biting.

Anopheles punctipennis Say.

Not common as adult, though the larvæ occurred in numbers with the following species in nearly equal proportion. Dr. Howard states in his publications on mosquitoes that the larva differs from that of *maculipennis*, "chiefly in the markings of the head." I was not able, however, to differentiate them by this or any other very definite character. The Anopheles larvæ occur in two forms, one with the back spotted with white, the other unspotted. These were separated, but gave both species in nearly equal proportion. A puddle formed by rain at the side of the road contained a pure colony of *punctipennis*, and these were almost entirely of the white spotted form. This particular colony was entirely killed by the drying of the puddle shortly after I had collected from it. A similar puddle near Washington, D. C., contained this species, unmixed.

Anopheles maculipennis Meig.

The larvæ occurred more or less commonly in nearly every pool and pond, and even in the blacksmith's rain-water barrel. A few could be found along the stagnant margins of swiftly flowing streams. *A. punctipennis* usually occurred mixed, in fact it was generally slightly the more abundant of the two. The Anopheles imagoes did not fly about the streams where their larvæ occurred, at least they did not attempt to bite, whereas swarms of Culex occurred in such localities, especially *C. sollicitans*, whose breeding places were miles away. The maculation of the Anopheles larva varies from none to a few dots or a complete band of white pigment down the back. This pigment is in the skin, and is often very white like porcelain. The larvæ seem darker as a rule than *punctipennis*, and the white spots, when present, are more contrasted. The heads seem to me to be practically identical.

Culex sollicitans Walk.

Abundant everywhere; the most common mosquito. They were very troublesome except at the actual breeding places, where they were scarcely more fierce than house flies. Apparently they are not prepared to bite immediately after emergence. The breeding places of this mosquito were not found till near the end of my stay, so that I had begun to think I should not find them at all. However a place was found at Amagansett where the species bred in swarms. The land behind the beach at this point is low and had been flooded at some time previously by high waves; subsequent rains had diluted this water. The swampy pool which it formed, full of grass, was examined on September 16th. It was at that time scarcely perceptibly brackish to the taste. It contained many pupæ and a few well-grown larvæ; no young ones. The grass in and about the pool fairly swarmed with freshly emerged *sollicitans*. A heavy rain had occurred the previous day so that the pool was evidently more diluted than it had been and it was too fresh for normal breeding. Of the examples carried home those at first emerging were all *sollicitans*, but the later ones were *cantans*. I did not at this time differentiate the larvæ of these species. They must be very similar. The adult must fly considerable distances. It was noted at Yaphank, which is three miles from the bay and over six miles from the ocean. It was only somewhat less common than *cantans* at that place, and I should judge it capable of reaching the middle of the island (15 miles). Since writing the preceding remarks, Prof. J. B. Smith has loaned me some larvæ that he is sure are *sollicitans*. They are indeed very similar to my *cantans*. The hairs are a little shorter, the air tube also shorter, being scarcely more than twice as long as wide, and the lateral comb of the eighth abdominal segment consists of fewer, slightly more irregularly shaped spines; but the characters are so slight that I am doubtful if they can be used in practical differentiation.

Culex cantans Meigen.

Nearly as common as the preceding, and more troublesome and persistent in the woods, though less common in the house. The larvæ breed in fresh-water swamps formed by rain in low lying, grassy places. A low place near the beach at Bellport, located much as the one at Amagansett above referred to, but lying behind a higher bar of sand, was not reached by the high waves. It was dry on August 27th but was filled with fresh water by subsequent rains. On September 13th it contained many larvæ in various stages of development, some of which pupated the following day. They emerged mostly *cantans*, though one

example of *sollicitans* came out with the white ring on the proboscis very small and a larva of *territans* was seen with the others. The larvæ fed on the flocculent brown sediment at the bottom of the pool. Some transferred to jars converted all of the sediment included with them into pellets of frass in a few days. A fresh-water Hydroid occurred in the same pool and proved a serious enemy to the mosquitoes. A single example fastened itself to the side of the glass and devoured all of the larvæ but one before it was noticed what was going on. It caught the larvæ with its tentacles and digested them bodily. Some of the larvæ were nearly covered with a little stalked Protozoon (Vorticella), but it seemed to do them no obvious harm.

Culex tæniorhynchus Wied.

Not common, though several were taken, both out of doors and in the house. The larva was not met with.

Culex pipiens Linn.

This species, bred commonly in every rain-water barrel, bucket, or old tin can in the town, and apparently nowhere else. The larva was not seen in any of the natural bodies of water. The fly entered the house to some extent, but was not much trouble out of doors, except on the porch, and even there *sollicitans* was the more persistent. The larvæ feed upon bacteria. A dish of water which was turbid and foully smelling was quickly cleared and all odor destroyed by these larvæ. Some were introduced into water from which a number of *cantans* larvæ had just been removed, intending them as food for the Hydroid; but they all died in a few hours without any obvious reason. Apparently they cannot live in water fit for *cantans*, which lived in this same water for weeks afterward. There seems no reason to doubt but that this species is really the European *C. pipiens* Linn.

Culex territans Walk.

This was identified for me by Mr. Coquillett, as were all the species. It was previously known to him only by Walker's description, and there seem to have been no specimens in American collections. The fly was not common, and looks very much like *pipiens*, so that it would have been hard to identify it in the field. The larvæ prefer cold water. A cold spring, forming a pool about 20 feet in diameter, contained numbers of these larvæ, with a few Anopheles; a rather cold lake formed by a dam in a small stream overhung by trees contained some larvæ with an abundance of Anopheles and a very few Uranotænia. They were not found in a warm, scummy pool, which yielded the other species freely. The larva is distinct from the other Culex here noted by the peculiarly colored antennæ, white in the middle and blackish at the base and tip.

The larvæ of the above four species of Culex resemble each other in general structure. They differ in several minor characters. *Pipiens* and *territans* agree in having a long, slender breathing tube, that of *territans* being especially long, and in the position of the antennal tuft, well developed at the outer third of the joint. They differ in the broad head of *territans* with the antennæ distinctly banded with white and the narrower head of *pipiens* with pale luteous or infuscated, unbanded antennæ. *Sollicitans* and *cantans* agree in the shorter conical or fusiform breathing tube, the antennæ blackish at the outer half, with the tuft at the middle of the joint, often weak or invisible. They do not sensibly differ; certainly not in any readily appreciable character that I have been able to find. All the larvæ from the Amagansett marsh had very short anal finger-shaped processes, while those from Bellport had them moderately long, but both colonies were mixed. Anyway, the length of the anal fingers is not a specific character.

The habits appear to be correctly expressed as follows:

Living in cold springs or lakes.....*territans.*
Living in small confined bodies of rain water.....*pipiens.*
Living in fresh water grassy marshes.....*cantans.*
Living in salt water grassy marshes.....*sollicitans.*

Uranotænia sapphirina O.-S.

The larvæ occurred rather commonly in a warm pool filled with green algæ (Spirogyra) along with Anopheles. A few were found in the cold lake, as above noted. The little larvæ remain mostly at the surface, not being easily disturbed. They float flatly, though below the surface film, and were several times mistaken for the Anopheles with which they occurred. The head is elongate and blackish brown, the hairs of the first two abdominal segments are long, the rest short and stellate. Altogether the larva presents a good generic type, quite distinct from both Culex and Anopheles. The little adults caused no trouble and were not seen flying. I give a more complete description of this form in another place. (Jour. N. Y. Ent. Soc., ix, 179, 1902.)

Prof. Smith records this species as having been bred from the pitcher plant (Ent. News. xii, 189, 1901), but he informs me by letter that the published statement is an error and that he has not bred *sapphirina.*

I exhibit, for comparison with the foregoing, drawings of *Psorophora ciliata* Fab., made from Dr. Howard's specimens which were loaned to me by Mr. Kotinsky, *Aëdes smithii* Coq., from pitcher plant larvæ obligingly sent to me by Prof. Smith, after whom the species was named, *Stegomyia fasciata* Fab., from larvæ which I owe to the kindness of Dr. W. C. Reed, of the Army Medical Museum, and *Culex confinis* Lynch, which I

collected near Washington, D. C. Prof. Smith has also let me see larvæ of *Culex canadensis* Theobald, which I cannot distinguish from *C. cantans* very sharply. The air tube is a little longer and slenderer, and the anal fingers are longer than the segment, but these characters seem varietal rather than specific.

These drawings cover all the mosquito larvæ known at the time of writing. It appears from Dr. Howard's book that *Culex impiger* had been bred; but I learn from Mr. Coquillett that this is an error, and that the flies bred by Mr. Pratt as there described (page 79) really belong to *C. pipiens*. I have myself examined Mr. Pratt's flies and agree with Mr. Coquillett.

Finally, I show a drawing of a very curious larva without mouth brush, the antennæ jointed on the upper surface of the head instead of on the sides, and a lateral fringe on the widest part of the head. The last thoracic segment and first two abdominal ones bear lateral conical prolongations. The air tube is short, uniform; anal segment with four short, often invisible, fingers, a paired dorsal and single ventral tuft; no lateral comb on the eighth abdominal segment. Hairs of last thoracic and first two abdominal segments long, the rest shorter, but those of the eighth abdominal segment longer than the preceding ones.

Mr. Coquillett has named this species *Corethra brakeleyi* (Ent. News, xiii, 85, 1902).

The following table presents the differences between our mosquito larvæ in synoptic form. I have not included Corethra or Mochlonyx, genera belonging to the Culicidæ, as the adults have no proboscis and are, therefore, not "mosquitoes." *Mochlonyx culiciformis* is roughly figured by DeGeer without mouth brush, and with the curious bent antennæ arising from the side of the head, not from the upper surface, as in our Corethra. The larva is said to float horizontally in the water, but it has a distinct breathing tube, not sessile as in Anopheles.

Mouth hairs diffusely tufted, folded inward in retraction.
Air tube short, sessile; larvæ floating at the surface of water.
Eyes longitudinal.
Abdominal hairs unequal; ventral brush normal, large.
Body paler, the head contrasting darker...*Anopheles punctipennis.*
Body darker, the head not contrasting.....*Anopheles maculipennis.*
Air tube longer than wide; larvæ floating below the surface of water.
Eyes transverse.
Air tube elongate, four times as long as wide.
Lateral comb of eighth abdominal segment a patch of simple spines.
Antennæ with tuft beyond middle of joint, large.
Head square; air tube very long..... .....*Culex territans.*
Head rounded; air tube moderate .....*Culex pipiens.*
Air tube short, less than four times as long as wide.
Anal processes slender or reduced.
Lateral comb a patch of simple spines.....*Culex canadensis.*
. *Culex cantans.*
Culex sollicitans.
Lateral comb a row of few large spines, with toothed basal plates .....*Culex confinis.*
Anal processes dilated.
Lateral comb a row of several spines, with elongate basal plates.....*Stegomyia fasciata.*
Eyes rounded or longitudinal.
Abdominal hairs equal, ventral brush absent.
Anal processes dilated (2); head without conspicuous hairs.....*Aëdes smithii.*
Abdominal hairs unequal; ventral brush normal.
Anal processes slender, normal (4); head with four large coarse black hairs.....*Uranotænia sapphirina.*
Mouth hairs in a pair of remote pencils, folded outward, in retraction.
Eyes longitudinal; air tube longer than wide.
Anal processes very long, tapering at tip; ventral brush present .....*Psorophora ciliata.*

This communication occasioned much interest and was discussed at length by several of the members and others present. Mr. Kotinsky said he had reared larvæ of *Anopheles punctipennis* from pools on Mount Pleasant, D. C. Some of the larvæ were of a greenish color. Prof. Smith said that, in his experience, Anopheles bred everywhere. *A. punctipennis* was the common species in New Jersey. *A. maculipennis* was much less common