species is a subject of great interest, and one about which but very little is known at present.

I have in my possession a male *Papilio turnus* which has only two wings. An examination shows that the hind wings are undeveloped; on one side the membrane is pushed out and rounded at the end about as large as the head of a pin, and on the other side the membrane is no longer, but is broader and somewhat flattened, showing plainly that the wings have not been broken off, but have never developed. This specimen was captured on the wing, while hovering over lilac blossoms, and appeared to fly as well as perfect specimens.

In the summer of 1884, I captured a male *Papilio turnus* which differs very much from any I have ever seen or read of. The outer half of the upper side of all the wings is black, except the row of yellow spots on the outer margin of the wings. These are round or nearly so, instead of elongated, and there are only six on the fore wings. The inner half of the fore wings is like the ordinary *P. turnus*, except that the two black streaks are united from the costa down about half their length. The under side of the fore wings is like the upper side, but slightly dusted with yellow. The under side of the hind wings has the blue extended nearly as far in as the black upon the outside, and, together with its black border, is very strongly curved or toothed towards the base. All the yellow on the wings is darker than on the common form, and the insect when flying looked more like a male *P. asterias*, except in size, than like a *P. turnus*.

It was captured in June on the bog where *Chionobas jutta*, *Chrysophanus epixanthe*, and several other rare lepidoptera are found.

NOTES ON CERESA BUBALUS, SAY.

BY JOHN G. JACK, CHATEAUGUAY BASIN, QUE., CAN.

Read before the Montreal Branch Ent. Soc. of Ont., 9th Feb., 1886.

During the past two years, but more especially this season, we have been very much troubled and annoyed by the attacks of the Buffalo Tree-hopper (*C. bubalus* Say) on the young trees in the orchard. Most of the trees have been seriously injured by having the bark cut up by the ovipositors of these insects, when depositing their eggs. These incisions

and the eggs in them were so numerous that in many cases it was impossible to raise the bark for the purpose of "budding" the trees.

The incisions and eggs are usually most abundant on the south and the upper side of the limbs, comparatively few being found on the shady or under sides. The first imagines were noticed in the orchard on July 16th, and a few days later they became quite abundant. On the young tender twigs of the apple trees, especially those nearest to the ground, large numbers of the insects were found busily extracting the juices with their slender beaks. Upon close examination the twigs plainly showed the traces of their punctures. They were also very abundant on beans, potatoes and several kinds of weeds, in many cases completely covering the stems, and all engaged in feeding upon the juices of the plants. Bean-stalks that were attacked in this way were considerably injured, as numerous dark knotty formations occurred at the places that were much punctured, so that the growth of the plant was decidedly checked.

The insect was first noticed depositing eggs about August 12th, and a few incisions were then to be found on the branches. This depositing of eggs continued until Oct. 8th, when a severe frost killed a great many of the tree-hoppers, although a few escaped and continued the work until Oct. 26th. After that date they were not noted.

Some of the eggs of the season of 1884 were collected last spring and kept in a very tight box. They were hatched during the first week in June, and with them were a number of small Dipterous flies, evidently parasites upon the eggs of *Ceresa*. I watched for these parasites in the summer and autumn, and first found them August 31st, on limbs where the tree-hoppers were depositing eggs. The parasites were found in larger numbers a little later, and I had the satisfaction of distinctly seeing a number of them insert the abdomen and sometimes almost the entire body deeply into the gaping slits made by the ovipositors of the tree-hoppers. Prof. Riley thinks that the parasite may be an undescribed species.

As I did not know the best conditions or food for the young larvæ of *Ceresa*, I placed them in a glass jar and gave them the tender twigs and leaves of apple trees. From these they seemed to extract the juices, and they could be seen in rows on the ribs of the leaves, with extended beaks, while little particles of a clear gummy substance were often found at the places where the insects had been sucking the juices. I afterwards added bits of grasses, etc., to their food, but after some time they ceased feed-

ing, and finally they all died, none of them being more than half grown. This was about July 5th, and about this time I found a number of the larvæ about some raspberry canes in a shady place, and on July 13th I took more of them among low juicy grasses and thistles, growing thickly in a cool, moist place, several rods from any trees of any kind. On July 17th, nearly all these larvæ changed to the adult form.

The larva becomes much elongated as it begins to cast the last envelope, and one of them, noticed when just beginning the operation, took three hours to complete it.

The full grown larva is about 8 m.m. in length, and light green in color, somewhat lighter than that of the mature insect. The young larvæ appeared to be of a darker green than they were at a later period of their growth. The general shape is triangular, like that of the mature insect, but the broad horn-like projections are not seen in the larva. The eyes are prominent. On the front of the elevated thorax, and behind each eye, are two short, strong spines, one above the other, armed with several lateral prongs or forks; higher up, near the apex of the triangular shaped throat, are two more, somewhat larger armed spines, and the last two visible thoracic segments are each provided with a pair of these branching spines that are still longer. There is also a pair of these spines, each armed with about 6 or 7 barbs, on each of the abdominal segments next to the terminal. These are graduated in length, the shortest being on the last segments, and the longest hardly more than a millimeter in length. The thoracic spines project forwards, while those on the abdominal segments are drawn forward at the base and then curve back, strongly suggesting the dorsal fin of a fish. On the last segment, which is long and tapering, there are two short armed spines directly above the anal opening, which is terminal. The ventral surface of the abdomen is scatteringly covered with short, strong bristles or hairs. The legs are also covered with stiff hairs.

The eggs, in batches of from 5 or 6 to a dozen (rarely more), are deposited obliquely in the bark, and often the incision continues into the wood, if the bark is thin. In this way the bark and wood become fastened together, and will not separate at any season, and the dark spots in the wood and the rough knotty bark bear evidences of the injuries for many years.

The eggs are of a dirty transparent white, about 1.5 m.m. in length, smooth, slightly tapering, and sharply rounded towards the interior end,

but tapering much more gradually at the exterior end. Although normally round, the sides are generally found to be more or less flattened by pressure from the tissues of the wood and bark of the tree. So numerous were these eggs on some trees that a careful estimate shows that there must be at least from six to eight hundred eggs in a section of the branches not more than an inch long and half an inch in diameter.

I have not been able to find a remedy, and perhaps the best is to destroy as many of the egg-bearing limbs as possible. It is to be hoped that the little parasitic flies will increase, and this seems probable. On Sept. 17th I found 5 or 6 tree-hoppers ovipositing on a piece of branch about 4 inches long, and on the same section were 12 or 15 of the parasitic flies.

THE COLIAS CONTROVERSY.

BY R. H. STRETCH, SAN FRANCISCO.

It is to me a most distasteful task to take part publicly in the "Colias" controversy between Mr. Edwards and Dr. Hagen, as I was an invited guest of Dr. Hagen on the trip to Washington Territory, where the events took place which have given rise to the discussion; but in the interest of science, which seeks nothing but the truth, it seems as though the time had come when I ought to state in a concise manner what I know of the whole matter. I have been cut off from all my books for the last five months, while travelling from place to place, or this letter would have been written earlier. I did not know till quite recently the phase to which the controversy had arrived. Probably the best thing I can do is to state the manner in which our party was organized, and the manner in which our collecting was done.

The party consisted of Dr. Hagen, and his assistant, Samuel Henshaw. In San Francisco I was invited to join it, and did so.

Mr. Henshaw was a skillful coleopterist, a department of entomology of which I knew but little, so by mutual agreement I became practically the lepidopterist of the party, as he was the coleopterist, and we both collected such other groups of insects as came in our way. Purely scientific work, or mere collecting, was discouraged, as the party was an "Economic Entomological Expedition," a fact repeated over and over again to the wonder-stricken pioneers of the wilderness.