

is mottled and marked with black. Tubercles i and ii wholly black, iii, iv, and v black with a whitish centre, others black. Tubercle iii is widely circled with the ground colour of the body, and in most specimens on the posterior four or five segments. This is tinted with orange. Bristles from tubercles i and ii mostly black, from iii and lower tubercles nearly all yellowish or reddish. Spiracles light yellow ringed with black. Thoracic feet black at apex, reddish towards base; prolegs outside upper two-thirds black, shining, lower third pale, setae on feet pale reddish.

Stage V.—Length 16 mm. Larvæ in general appearance much as in previous stage. Head 2 mm. wide, same colour and marked as in Stage IV. Under the lens the skin of body is greyish-green, varying in intensity of these colours, marked with splashes or blotches of black, principally on dorsum. Dorsal stripe yellowish or whitish and faint. Tubercles i and ii black, shining; other tubercles whitish. Bristles faintly but distinctly barbed, from i and ii mostly black, remaining ones yellowish or rust-red. Bristles from iii and lower tubercles yellowish or rust-red and black, the reddish ones greatly predominating. Spiracles yellowish, rimmed with black, close to upper anterior edge of iv. Tubercle iii on four posterior segments is rather widely margined anteriorly with orange. Many of the tubercles also bear long, slender, silvery bristles. Thoracic feet pale reddish.

Stage VI.—Length 24 mm. Head 2.5 mm. wide, somewhat quadrate, slightly indented at vertex, flattened in front; yellowish-brown excepting front, which is dark reddish, almost blackish in some specimens, shining; anteclypeus, labrum and antennæ yellowish-white, mandibles dark reddish, setae yellowish, long and slender. Skin of body almost wholly black, i.e., greyish-green ground colour densely blotched and marked with velvety black, or very dark purple. The dorsal stripe has disappeared in most specimens, in some it is only present on anterior segments. Tubercles large (i about one-third the size of ii), in some individuals all whitish, but in most specimens tubercles i and ii are black, the remaining ones whitish. In some larvæ tubercles iii, iv, v, vi, vii, and viii are black at base, whitish at summit; in others tubercles vii and viii are wholly black. The bristles from the tubercles of most specimens are as in Stage V., but in a few examples all of the bristles from all tubercles are of a pale rust-red colour. Spiracles pale yellowish, black-rimmed. On segments 6 to 13, inclusive, a red patch occurs before tubercle iii, very conspicuous in some specimens, particularly on posterior segments. Thoracic feet reddish, prolegs also reddish, but paler, darkened exteriorly.

On July 18th one larva began to spin its cocoon, and by July 21st had changed to pupa. The cocoon, which is thin, was spun between the leaves in the bottom of the breeding-jar, the pupa being plainly discernible.

Pupa.—Length 15 mm., width at widest part 6 mm., dull reddish-brown; abdomen coarsely punctured; wing-cases and thorax wrinkled; spiracles pale yellow, black-rimmed; cremaster short, blunt, bearing 12 short, capitate bristles of varying lengths.

SNOW-INSECTS.

BY J. WILLIAM COCKLE, KASLO, B.C.

The collecting of entomological specimens is usually associated with the warm months of summer, when the ever-changing hues of gorgeous butterflies, the whirl of beetles, the singing of the mosquito, and the hum of bees and flies presents an ever-changing scene before the collector's eye. But allow me to draw your attention for a few minutes to what may be found on a winter day, when the thermometer is down to near freezing-point and the snow lies thick on the ground.

First let me introduce to your notice the snow-fleas of the genus *Aphorura*. Passing over the common black species of this genus, which may be seen in abundance on the melting snows in the spring, and which frequent water-holes and other damp places during the summer months, breeding in soft humus, we next come to one species which is only known to exist at Kaslo. Dr. Folsom has given this species, which is closely allied to *A. siberica*, the name of *A. cocklii*. It is a beautiful

golden yellow and is found at a low altitude having a southern exposure on the banks of Kaslo Creek. They congregate in millions, and when at the height of their emergence completely cover several square yards of snow, turning it to a golden patch. They exist only a few days, and, unlike their black brothers, die in the rivulets of water running off the melted snow. How and when they breed is unknown, and how they contrive to reach the surface of the snow from a depth of 2 or more feet is also wrapped in mystery. I have been unable to devise any suggestion of the whys and wherefores of their presence. I have in my collection specimens of four species of this genus, the golden one only being named, a black species found on melting snow, a smaller black species which breed in hotbeds, a white species found under a flower-pot in the house. None of these are yet identified.

We next come to a larger insect of the genus *Podura*. These may be also collected on the winter snows when the temperature is near freezing. They are very active, and when disturbed spring away several inches and wriggle themselves into any crevasses in the snow. They are about 0.05 mm. in length and dark grey to black in colour.

But possibly the most interesting find of a snow collecting trip are the snowfleas proper of the family *Boreus*. They may be seen on freshly fallen snow, usually singly, and resemble minute grasshoppers. They are presumed to share the characteristics of the order to which they belong and to be carnivorous in their habits. The late Dr. James Fletcher suggested that they probably fed on the genus *Aphorura* and *Podura*, but of this we have no evidence. Their leaping-powers are great, and I have often observed one jump 6 inches. Their usual mode of locomotion, however, is by walking. The most curious fact about them is that they are so little affected by cold. They will walk around when the temperature is several degrees below freezing, although they are most active when the mercury rises to 35-40 degrees.

In the *Canadian Entomologist* for March, 1908, I published a short paper on the peculiar mating habits of this insect, and more recently I prepared another article which more fully describes the extraordinary method of copulation, which I now take pleasure of presenting to this meeting of our Society. I have in my collection two species of these insects, *B. californicus* and another species which can only be identified from fresh specimens. The latter has a brown stigmatal fold, the wing-coverts black, and the species generally is more hairy. The difference in the colour of the stigmatal fold disappears after drying, so that the disparity cannot be cited as applicable to cabinet specimens.

I have many specimens of Diptera and other orders of flies which I have collected during the winter and have recorded. The capture of Tortricids, Tineids, and Chrysopa found under the bark of dry standing trees during the winter months, and as a systematic collector I am inclined to treasure my winter captures rather than the profusion of forms which are to be found everywhere in the summer.

THE MATING OF BOREUS CALIFORNICUS.

BY J. W. COCKLE, KASLO, B.C.

Whilst on the hunt for snow-insects to-day, February 9th, and having been successful in securing several specimens of *Boreus*, I was returning home when I discovered a pair in copulation. The temperature, which had been below freezing all day, had just risen, and at the time was about 33° Fahr. It is well to state here that I have found these curious insects hopping about on the snow when the thermometer showed several degrees of frost, but they are usually most active just after a snow-storm, when the temperature is from 35-40 degrees. Wishing to know how copulation was possible with these curiously formed insects, I lay down on the snow in order to be able to use the small pocket-lens for observation. The female was perched on the back of the male, her front legs folded up so that she