

The author of **Melanoplus borealis monticola** is Scudder and not Fieber, as I stated, and should read: Scudder, S. H. Proc. Amer. Phil. Soc. XXXVI., p. 24 (1897). The spelling is incorrect in **Melanoplus washingtonianus**, and should read: **Melanoplus washingtonius** (Bruner).

Tettigoniidae

In the previous list **Cyphoderris monstrosus** (Uhler) should be **Cyphoderris monstrosa** (Uhler), Proc. Ent. Soc. Philad., II., p. 551 (1864).

The use of varietal names in so variable an order as the **Orthoptera** is not generally considered advisable and **Anabrus simplex** var. **maculosus** (Caudell) is best recorded as **Anabrus simplex** (Haldeman). Stansbury, Exped. Great Salt Lake of Utah, p. 372 (1852).

Further study in the British Columbia material of **Conocephalus fasciatus** (De Geer) by Messrs. Rehn and Hebard has shown that **Conocephalus fasciatus fasciatus** (De Geer) and intermediates between this geographic race and **Conocephalus fasciatus vicinus** (Morse) occur, but probably true **vicinus** will not be found in British Columbia.

“VESPA”

The First Paper Maker

BY W. B. ANDERSON.

We, of this age of inventions, of useful commodities of all kinds, of thousands of things little and big which have been evolved for the convenience and the comfort of us pampered humans, seldom if ever pause to think of the long trails made by patient toilers, which lead eventually to the successes as we know them. Do we ever consider, when looking at and admiring a beautifully finished sword, that the first sword was made of a thin slice of intensely hard stone, cut from the larger block by means of a sandstone slip, sand, water, and days, nay weeks, of hard labour? Do we ever consider that the surgeon's keen scalpels had their beginning in a bit of sharp shell, or agate chip? Very few, among a million people, give thought to the evolution of the commercial article in every day use.

We read a book, admire the print, the binding, the texture of the paper. We sit down to write on various themes, and at times throw down pen or pencil with a “Pshaw, why don't they make better paper to write on?” Forgetting for the time, that the first documents were scribed on stone; then on bark, or papyrus, until at last some human more clever than the rest, or one who desired less manual labour in indicting his love letters or his declarations of war, hit upon a scheme whereby some vegetable substance was pulped, mixed with a glutinous vehicle, then spread thin and dried; with the result that a material was finally

produced which could be written upon. This probably was after the age of sheepskin; sliced piths of shrubs and plants and other substances which, in their day, were considered the "dernier cri" in material for the art.

Who was the man, and of what people came this observer? Of the Chinese? Perhaps; for these people have been, and probably always will be, better observers of natural phenomena and of Nature's handiwork than we "superior" races. For mark; there was a paper maker before his day. Had been, since Nature first evolved him from some obscure, crawling form of Primordial life.

We, to-day, look with wondering eyes on the vast intricacies of the modern paper mill. We see the great logs drawn into the gangs of saws, and we follow the course of the blocks until we see the sheets of beautiful snowy paper slowly rolling up, a hundred yards or more away from the starting point. We marvel that man ever could conceive the idea of thus turning a hard, woody substance into the beautiful, pliable commodity which, were we to now be suddenly deprived of, would stop the commerce of the world. But the basic method was followed ages before history began by a little insect which we know to-day as "Vespa," the Wasp. It only remained for an observant human with a disinclination for the hard work necessary in chipping or scribing hard stone, or dressing tough sheepskin, to note ways of friend Vespa, to copy him, and to improve his methods, until he produced a substance white enough, and tough and smooth enough, to enable him, with the aid of a pointed stick and a little coloured fruit juice, or blood, to easily set down his ideas. The rest was simply a matter of persistent endeavor in evolution.

Years ago, when a boy, I was fortunate enough, from a persistent habit I had of watching birds, beasts and reptiles going about their daily housekeeping tasks, to see Vespa busy at the operation of paper making, and, for the benefit of those of this Society who perhaps have not been so lucky, I shall describe as nearly as possible the way she went about the task.

In those days, what are known as "Snake" rail fences, went zig-zagging about all the fields. Made of 12-ft. split sections of the Douglas Fir, these singularly unbeautiful creations were nevertheless a boon for the wasp folk, for, as I watched a lady wasp buzzing about, she alighted on a rail, and, after a little searching, began to chew with her strong mandibles on a part of the soft layer of the annual ring, meanwhile wetting the resulting mass with a presumably sticky exudation from her mouth. After a few minutes work, she had collected a round ball, the size of a small pea, of perfect pulp, (I will here digress to read a bit from Kirby, Assistant in the Zoological Department in the British Museum, who, in describing "Vespa," says: "These nests are composed of a material resembling thin, coarse brown paper.")

If my audience will follow me, I think it will agree with me in spite of this authority's words that the material, apart from "resembling," is, in fact, coarse brown paper-grey, to be correct. To proceed; the wasp, after gathering together the little pellet of pulp, flew to a nearby shrub, where, on the underside of one of the smooth, wide leaves, carefully spread with feet and mandibles her little bit of paper material, then back to the rail to collect more pulp. Not always returning to the same bush for the spreading operation, until at length, I presume other household cares claimed her attention, as she flew away and came no more.

Afterwards, (shall I say the next day? I fancy that will be nearly right), I again took my post near the paper bush. I had not been there long when Mrs. Vespa came buzzing about, and though I then, and always have had, a deathly fear of wasps, I stood my ground, soon perceiving that paper making was to the lady of far greater importance than stinging a boy dressed in dirty face and ragged pants. Soon she alighted on the bush, on one of the very leaves under which she had plastered a bit of pulp. Carefully taking a corner of the now dry paper in her mandibles, she gently pulled the sheet clear of the leaf, and taking wing, flew away with a dirty grey banner trailing beneath her body, a sheet measuring perhaps three-quarter-inch of irregular shape.

That closed the book for the time being, for being "**Vespa occidentalis**" (or shall we say, "**Vespa vulgaris**, var. **occidentalis**?") her nest was underground, and the last I saw of her was a busy wasp dragging a folded bit of paper into a hole in the ground. Having become interested in this paper-making operation, I later watched nest building operations whenever possible, and was finally lucky enough to see the operation of building up. This time it was another of the paper-makers, the Black Hornet, who showed me the way, whose nest, being built above ground, gave a good view of the work. Alighting on the nest with a piece of paper of much the size and appearance of that made by "**Vulgaris**," the insect proceeded to a part evidently being built on or strengthened. She attached one corner of the sheet to the nest, and gradually spread it smooth, at the same time wetting the edges with (presumably) mucous saliva, tamping the whole quite smooth, the whole operation taking perhaps 30 seconds. This, in brief, is the story of Vespa's paper-making and building up. It is of course well known that the queen lies dormant in some snug place during winter. In early spring, she bestirs herself with the first warm rays. A small nest is made without delay, this of less than one inch in diameter, in some sheltered place above ground. I am again speaking of **Vulgaris**—in which she lays 3 or 4 eggs—seldom more at first, each in its tiny cell (paper cells too), and from this on the life history is easily traced. The first brood help build a bigger nest, also above ground, and this brood in turn help the colony, which, at a certain stage in life's affairs, digs its underground chamber in which is built the final nest from which the members emerge in search of prey, belted war-

riors filled with more concentrated, villainous bitterness than so many rattlesnakes, always prepared to give battle to any moving thing in the vicinity of the nest, the unwary entomologist included.

A habit of this same wasp which I at one time noted may be of interest. The season opened early and warm, and the common wasp made many flourishing colonies. Later on, the weather turned very wet, and in a field of barley, where were many wasps nests, the careful householders of the underground communities built chimnies of clay, to the height of three or four inches, above the mouths of their underground passages, without doubt to guard against flooding from sudden downpours of rain. I have never since been fortunate enough to see these structures at the mouths of the nests.

NOTES ON COLLECTING AT FLOWERS AND BLOSSOMS

BY A. W. HANHAM

Looking back over the notes and records started soon after I came to Canada in December, 1881, I have jotted down in this paper some items that may be of interest.

I had my introduction to Canadian Entomology at Ottawa in 1882, with such enthusiasts as the late Dr. James Fletcher, and the late W. Hayne Harrington, to speed me on my way; the former with the butterflies and moths, and the latter with the beetles. Later on, at Quebec, I had the pleasure of working in these with the late Rev. T. W. Fyles, and when I came out to this coast, with the late Rev. G. W. Taylor, and late Capt. R. V. Harvey, with insects and shells.

All these old friends and kindred spirits have passed on; yet one remains, your President, Mr. L. E. Marmont, with whom many happy days and outings were spent at Brandon and Rounshwaite, Man., during a number of years when I was stationed at Winnipeg.

From Ottawa, I was moved to Paris, Ont., and then to Hamilton and Brantford, Ont., thence to Quebec City, in 1891, to Winnipeg in 1893, and to Victoria, B. C. in 1901. From these remarks you will see that I have had exceptional opportunities of collecting in many parts of Canada.

In 1888 I recorded the capture of a number of noctuids—as many as 100 specimens in one evening—off sunflowers in my garden at Hamilton, Ont., in August, towards dusk. In May and June a number of species of **Coleoptera**, mostly **Cerambycidae**, off hawthorn blossom in open bush, along under the mountain there. In June, 1889, six species of **Sphindidae** from flower beds, one evening at Port Dover, Lake Erie, on June 12th, 1892, on Isle d'Orleans, lying in the St. Lawrence River,