

selves entirely to the consumption and removal of the excrement of the larger herbivorous animals. Need we say that they should, on no account, be destroyed?

7. LUMINOUS INSECTS (*Lampyridæ*).

In the regular order of families of beetles, according to the generally received classification of Coleoptera, we come to a number of decidedly noxious insects after the Dung-beetles just described; such for instance as the May-beetles and other leaf-eaters, (*Melolonthidæ*), the

Buprestis Borers that perforate the wood of a majority of our trees, (Fig. 76), and the Spring-back Beetles, (*Elateridæ*), parents of the justly dreaded Wire-worms. The first family of common insects that we come to after these, are the Fire-flies—luminous insects of the family *Lampyridæ*.



Fig. 76.

In tropical countries the fire-flies belong to two very different families of beetles, the *Elateridæ* and the *Lampyridæ*, but in Canada luminous examples of the former are very rare indeed, though we have myriads of the latter. Our fire-flies, in the perfect state, are soft flattened beetles, with the head almost entirely concealed under the projecting hood formed by the thorax; they are generally of pale colours, though sometimes black. They are voracious in their habits; feeding in the larval state, upon earth-worms and soft-bodied insects. The light which they emit proceeds from the extremity of the abdomen, and appears, from its fitfulness, to be under the control of the insects. Its origin and composition have long been a matter of doubt. According to Siebold, "the luminous organs of these insects consist of a mass of spherical cells, filled with a fine granular substance, and surrounded by numerous trachean branches. This substance appears, by daylight, of a yellow, sulphur-like aspect. The light produced from these organs, so remarkably rich in tracheæ, is undoubtedly the result of a combustion kept up by the air of these vessels. This combustion explains the intermission of the phosphorescence observed with the brilliant fire-flies, and which coincides, not with the movements of the heart, but with those of inspiration and expiration."

All our readers are, no doubt, perfectly familiar with the sparkling intermittent light exhibited by fire flies on damp summer evenings. They appear to take especial delight in moisture, frequenting low marshy grounds and river bottoms in myriads, while they but occasionally visit the drier air of high ground. We have sometimes seen them in tens of thousands, nay millions, when driving at night along some sequestered country road bordered by wet, swampy ground, or when taking a nocturnal ramble in search of insects up the valley of the Credit. Brilliant and numerous though our Canadian fire-flies are, they cannot be compared—judging from the accounts of naturalists—with the glories of the tropical species. There, besides species similar to ours, they have the huge lantern flies, said to be two or three inches long, and emitting a most brilliant light and also the large spring-back beetle (*Elater Noctilucus*) that gives forth a bright glow from spots on the thorax. Southey thus describes the appearance of these creatures in tropical America:—

"Soon did night display
More wonders than it veiled: innumerable tribes
From the wood cover swarm'd and darkness made
Their beauties visible; one while they stream'd
A bright blue radiance upon flowers that closed
Their gorgeous colours from the eye of day;
Now motionless and dark, eluded search,
Self-shrouded; and anon, starting the sky,
Rise like a shower of fire."

In England they have but one species of luminous insect, well known under the name of 'glow-worm.' The females of this insect are long, flat, soft wormlike creatures, quite destitute of wings; emitting usually a pale steady light from the extremity of the abdomen. The males, on the other hand possess complete wings and wing covers, and are but feebly luminous. We have taken them in early summer in the long damp grass beside hedge-rows in Lancashire, where their tiny light attracted us from some little distance. They did not, however, appear to be at all common.

In this country both sexes of the fire-flies are fully winged, and both appear to be equally luminous. The larvæ also of several species possess the property of emitting light; but of these we have rarely obtained specimens. In 1868 we obtained a remarkable larva