

cially by the hand. No one need ever be afraid of taking hold of even the most ferocious looking beetle, for not one of the vast tribe possesses the power of stinging, and few are able to bite hard enough to wound the fingers. They may be found literally everywhere—under stones, bark, logs, on flowers, leaves, grass, and everything else; in fungi, excrements, water, mud; about dead animals and old bones, and even in ants' nests. The simplest and best apparatus for collecting and killing them is a wide-mouthed bottle about two-thirds filled with fine sawdust, moistened with alcohol or spirits of any kind, the purer the better, and with a few fragments of camphor in it. Drop the beetles in this: they will burrow into it, and die in a few minutes. There they can remain for weeks, months, even years, and can be taken out and set at any time. In setting, pass the pin through the right wing-cover, a little before the middle, but never through the thorax. Draw out the legs and antennae to their natural positions; wipe off any adhering sawdust with a camel's hair pencil; let them dry thoroughly, label and replace in the cabinet. Minute specimens should be collected in small vials partially filled with alcohol: in setting they should be gummed to the points of triangular pieces of cardboard, the pins being passed through the bases.

BUGS (Hemiptera) may be collected in the same way as beetles, but in their case the pin should be passed through the middle of the thorax.

DRAGON-FLIES, LACE-WINGED FLIES, ETC., (Neuroptera), may be killed with spirits or chloroform, and set like butterflies.

GRASSHOPPERS, CRICKETS, LOCUSTS, ETC., (Orthoptera), like the preceding.

TWO-WINGED FLIES (Diptera) may be treated as the smaller Hymenoptera; the extreme delicacy and fragility of many species render them difficult objects to preserve.

Should any collector desire further information on any point, we shall be happy to render it to him to the extent of our ability: we have collected many thousands of specimens during the past ten years, and fancy now that we are up to the best "dodges" in catching, killing, and preserving insects. We may mention that the best German insect pins, English sheet-cork, and jointed net-rings are usually kept in stock by the Entomological Society: lists of prices can be obtained by addressing the Secretary (Credit, P. O., Ont.) Wide-mouthed bottles and nests of pill-boxes can be procured at any druggist's.

Value of Entomology.

It is well known that elm trees, as well as apple trees, in certain localities in the United States, are sometimes eaten almost bare by that common looping caterpillar called the Canker-worm, and that these worms have been checked and controlled by those who are acquainted with their peculiar habits, by

fastening leaden troughs of oil round the butts of the trees. Like the larvæ of many other moths, this worm buries itself under the ground to change into the pupa state; but unlike the great majority of moths, the perfect male has wings, and the perfect female has no wings at all, and is therefore compelled to crawl up the trunks of trees to deposit her eggs, instead of flying on to the trees, as almost all insects have the power of doing when in the perfect state. Hence the philosophy of the practice above alluded to, which depends for its efficacy on this trait in the natural history of the canker-worm. Not very long ago, the elm trees which ornament the city of Baltimore were attacked by a larva that stripped them bare. Supposing it to be the notorious Canker-worm, the corporate authorities spent a good many hundred dollars in fixing leaden troughs filled with oil, after the most approved fashion, round their trees. They might just as well have built a tight board fence round a cornfield to keep out the crows and blackbirds. The insect that was afflicting their trees was not the Canker-worm, but the larva of a beetle (*Galeruca californiensis*) imported by some chance or other from Europe, where it often strips the elm trees in the same way; and, unfortunately for the city fathers of Baltimore, the female of this beetle has wings, and was not in the least inconvenienced by the oil-troughs. A little time spent in investigating the habits of this beetle would have saved them all their trouble.

A similar instance of just such entomological folly occurred a couple of years ago in southern Illinois. A certain fruit-grower in Union county, for lack of a proper knowledge of the habits of that little pest the Curculio, took it into his head that this insect had no wings and could not fly, and that it could only reach the fruit, in consequence, by climbing up the tree. Hence he very sapiently went to work and fixed a band of wool around every tree in a large orchard, containing about ten thousand. Now, as the Curculio has ample wings, and can fly with the greatest ease, this procedure was of no earthly use in protecting this worthy fruit-grower's peaches. He might just as well have wrapped the wool round his stove-pipe under the delusive idea that he could thereby keep the flies and mosquitoes out of his house.

There is a small timber-boring beetle, called *Limnæon navale*, or in English the Naval Timber Pest, which is very common in the oak forests of the north of Europe, and occasionally occurs in such numbers in the Swedish and French dockyards as to do a considerable amount of damage. About one hundred years ago the Swedish Government found out that this insect was doing millions of dollars' worth of damage in their dockyards, by boring the timber full of holes, so that if it had been put into a ship, it would have let the water in like a sieve. The

Swedish Government concluded that it would not answer to incur such a heavy annual loss, and they did the very wisest thing that they possibly could have done. They applied to the celebrated Linnaeus, the father of the science of entomology, though to many, perhaps, he is only known as a great botanist. Linnaeus took the matter in hand, and having investigated the habits of the insect, discovered that it came out of the timber in the perfect or winged state in one particular month only (June), when it flew around, paired, laid its eggs on any oak timber to which it had access, and shortly afterwards perished. So he said to the Swedish Government: "Gentlemen, all you have to do is to sink all your oak timber under water during the month of June, so that the female beetle may not be able to deposit her eggs on it, and you will be no more troubled for a great many years to come with *Limnæon navale*." The Government did so, and the result was just what Linnaeus had predicted. Dr. Harris informs us that not very long afterwards the insect occurred in similar profusion in a French dockyard, and although a naval officer, who was also a good entomologist, suggested the Linnaean remedy to the authorities, they neglected to apply it, having perhaps the common unfaith in science, and thinking with the vulgar that the study of bugs was all a humbug. As might have been expected, they reaped the reward of their ignorance, and suffered an immense amount of valuable timber to be destroyed by this insect, which might just as well have been saved.—*American Entomologist and Botanist*.

Bot-flies.

There are many kinds of bot-flies, constituting the family *Gestrifæ*, all of which pass their larvæ or grub state in the bodies of herbivorous quadrupeds. They are well known to inhabit the horse, the ass, the ox, the sheep and the deer; and they have also been found in the rhinoceros, the rabbit and the badger.

Three kinds of bot-flies infest the horse. One lays its eggs on the lips, another under the throat, and the third on the fore legs. The last is much the most common, and the only one of any practical importance. The female deposits her eggs or nits whilst on the wing, attaching them to the hairs, one by one, by means of a conical tube at the end of her abdomen. So persistent is she that though repeatedly knocked down, if not actually crippled, she will as often return to the task. Her touch is so slight in performing this operation that the horse would not be conscious of her presence if he did not hear the buzzing of her wings. Yet he exhibits great alarm at her approach, probably confounding the bot-fly with the horse-flies (*Tabanidae*) which inflict a sharp wound. The horse licks off these nits—whether by accident or by special instinct it is difficult to tell—and swallows them. They hatch in