

[For the Scientific American.]
WOOD-BORING BEETLES.

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Nature has, at all times, to preserve carefully the balance of power among her subjects, so that she may everywhere maintain the largest possible amount of life. She is full of contrivances tending to this end, and has co-ordinated the varied conditions of existence so beautifully, that her system is self-regulating. She wastes neither her material nor her time. We have already seen that it is a rule in her economy that decaying substances should not only be speedily made away with, but that they should, even in the process, afford sustenance to many forms of life.

It is also a matter of fact, that every plant and every animal is perfect according to its kind, that is, not in itself, but in its relation to the rest of the design of which it forms an item. Every organism, therefore, directly or indirectly, living or dead, sooner or later, has to contribute to the existence of many others. It may appear at times that some species, endowed with an excess of vitality, contravene this law; they obtain a seemingly undue predominance over surrounding races; without supporting their share of attendant life, they trample out, as it were, that of others. But this special exuberance is only temporary; it obtains for such forms a firm establishment, insuring them a prolonged existence among the host of foes that ultimately will prey upon them, so that this over-running and killing off of weaker species, by one of greater vitality, results eventually in the appearance of new forms, better suited to the latest of the ever-changing and progressive conditions of this continuous creation. Such species are not merely heralds of the new introductions, but they are an absolutely essential commissariat department sent on ahead of them. We find all these points illustrated in the history of forest life. Trees past their prime must be rapidly disposed of to make way for more vigorous growths; incoming forms must be of the strongest to insure their foothold, all weakness must therefore be killed off. On the other hand it is equally desirable that those species which have played their part should be finally extirpated. All these needs are made the means of support to a vast variety of organisms, vegetable and animal. The fungi and the higher plant-parasites, as the mistletoe, the orobanches, and the orchids, sap the strength of the vigorous tree, or derive their growth from its decay, and their work is shared and expedited by a vast host of insect laborers. In their turn, the wood-inhabiting population feeds a great variety of birds; the woodpeckers and the tree-creepers, the tomits and the wrens obtain a large part of their subsistence from the insects that live under the bark or whose grubs bore deeper into the wood. The insects which, in their larval and even in their perfect state, bore into wood, belong to several orders, and every man has a more or less direct interest in a knowledge of them and their habits. But it is among the coleoptera, or beetles, that we find the most abundant authors of internal injuries to both our forests and our orchards. Nor do their ravages cease with the living state of the wood, for, as all of us know to our cost, our furniture, the timbers of our houses, and the lumber in our yards, are subject to the attacks of a variety of foes. Nature, while she is fully capable of withstanding the attacks of man, pays no heed in return to his especial interests; her servants have been instructed to destroy the sapless wood, and they do so regardless of the uses to which human beings may wish to put it.

The practical use of entomology has been over and over again illustrated, by the history of Linnæus and the ship timber in the Swedish dockyards; but the story is significant rather by reason of the unwonted recognition of the value of natural science wrung from "practical" and "great" men by the Upsala professor, than from being by any means an exceptional case of damage by insects, or of a remedy suggested by the intelligent study of their habits. Among the beetles which pre-eminently rank as timber borers, while in the grub state, are the buprestidans. This family belongs to the group of serricornis (saw-horned), so named because the tips of the joints of the antennæ usually project more or less on the inside, somewhat like the teeth of a saw. Harris adds: "The buprestis of the ancients, as its name signifies in Greek, was a poisonous insect, which, being swallowed with grass by grazing cattle, produced a violent inflammation and such a degree of swelling as to cause the cattle to burst. Linnæus, however, unfortunately applied this name to the insects of the above mentioned family, none of which are poisonous to animals, and are rarely, if ever, found upon the grass."

It has been suggested that the Greek name referred to the blistering beetles (cantharides), and this seems plausible, although it is just possible that the evil quality of the beetle, whatever it may have been, so designated, may have been a fallacy of the vulgar, and the name as absurdly libelous as those of the goat-sucker and of the sap-sucker among birds. However this may be, the name is now attached to the kind of insect so well represented in the accompanying engraving. "The elliptical or oblong oval form, obtuse before, tapering

behind, and broader than thick;" the head very much shortened by being "sunk to the eyes in the thorax;" the short antennæ and small legs; these characters combined with their peculiarly metallic hues, will enable even the unscientific eye to recognize the perfect insect at sight; while the disproportionately enlarged segment in the forepart of the body of the white limbless grub equally distinguishes this from the larva of other beetles. Every one who has ever had the curiosity to examine the contents of the perforations in firewood, must often have noticed these odd-looking grubs; for, as Harris says, of our native species, "pines and firs seem particularly subject to their attacks, but other forest trees do not escape, and even fruit trees are frequently injured by these borers." Nor can the extent of the mischief that these creatures do be appreciated without recognizing the fact that they live for several years in the grub state, incessantly devouring the wood, hollowing in all directions the soundest parts, and undermining the vitality of the portions that they



METAMORPHOSES OF THE BUPRESTIS.

do not chance to penetrate. Say quotes an instance of the emergence of the perfect insect from wood in which the grub must have existed for at least twenty-two years.

As the distribution of the buprestidans is world-wide, the total amount of destruction they accomplish in the economy of Nature must be enormous; and as far as man's property is concerned, we only know of one kind of allies over which he has any control against this insidious enemy; these are the insect-eating birds, and more especially the woodpeckers. Unfortunately many of the woodpeckers are possessed of a handsome plumage, and every boy, attracted by their scarlet crests, makes the poor bird his aim. Older persons, too, think the sap-sucker, that girdles their apple trees, deserving of death for the deed; ignorant that if insects had not taken up their abode in the wood, the woodpecker would not waste his time in girdling in search of them; and utterly unconscious that it has probably been their own neglect of their valuable trees that has allowed them to fall into such a weak state as to encourage the attacks of the insects. For although it is a fact, that insects attack some sound trees, yet it is equally certain that any even unnoticeable feebleness will at once produce a condition peculiarly favorable to the development of insect life. Orchards, therefore, unpruned and unmanured, are first-rate nurseries for "bugs."

It is but a small compensation to us for all the mischief they do, that these insects afford ornaments to gratify the human love of finery, not only among semicivilized races, but even among the ladies of our northern world. Wallace first detected the existence of an entomological prize, "a grand new beetle" of this family, by seeing "one of its wing cases ornamenting the outside of a native's tobacco pouch;" thus reminding us that clues to new discoveries are to be found in the most unlikely places.

Earn what you Spend.

Three fourths of the difficulties and miseries of men come from the fact that most want wealth without earning it, fame without deserving it, popularity without temperance, respect without virtue, and happiness without holiness. The man who wants the best things, and is willing to pay just what they are worth, by honest effort and hard self denial, will have no difficulty in getting what he wants at last. It is the men who want goods on credit that are snubbed and disappointed and overwhelmed in the end. Happiness cannot be bought by the bottle, nor caught up by the excursion train, nor put on with any robe or jewels, nor eaten at any feast. It does not exist in any exhilaration, excitement, or ownership, but comes from the use of the faculties of body and mind.

The Wire Railway.

The practical application of the wire railway, or tramway, which consists in suspending a strong wire cable on posts and rollers, giving motion to the cable by a steam engine, and attaching the burdens to be carried to the cable, is rapidly extending. According to the *Mechanics' Magazine*, the plan is now in operation at Nevada:

We have watched with much interest the development of the wire tramway system of transport, and have from time to time noticed its progress. Its spread over several foreign countries, and some of our colonies, has been most remarkable, no less than forty-five lines having already been undertaken, most of which are constructed and in successful operation. One of the most remarkable instances of its success is that of the line constructed for the Ebertrard and Aurora Company, in Nevada, U. S. The materials for this line were forwarded from England late in the autumn of last year, and reached Nevada while the whole of the mountain district, in which they were to be placed, was enveloped in snow. Nevertheless, during the spring, the line (of nearly three miles in length) was constructed, and has recently been put into most successful operation, a telegram having been received by the directors of the Ebertrardt Company, in London, to the effect that the line was working splendidly. On it there are grades of 1 in 3, and spans from post to post of some hundreds of feet. The quantity of material carried is about 200 tons a day, and it may safely be asserted that the difficulties of this mountain country could not have been overcome, for the purposes of so considerable a transport, by the employment of any other means.

Lines have been forwarded to Peru and Brazil, for sugar cane transport. One has been opened in Peru, but too late for the season, and another at St. Kitt's, from which most favorable results have been obtained. In Austria, the system has been employed to the carriage of turf, and in Bohemia to the carriage of fire clay from pits, requiring an ascent of an angle of thirty degrees from the horizontal.

The Indian Government are now adapting the system to the development of the Salt Mines in the Punjaub; and the Spanish Government have applied it to a fifteen mile length in the mountains of Asturias, of which about nine miles are already in operation. The War Office have taken a line for transporting powder casks from the store at Purfleet to the examining shed and back again, the inducement being that the transport could by this means be effected without bringing either animal or steam

power within the precincts of the establishment. The power is to be supplied from a boiler situated at a distance of several hundred yards from the powder store. Stimulated by the rapidly increasing demands, not only of our countries, but the development of mineral and agricultural productions, means of transport are now in great demand, and rapidly on the increase.

The traction engine has received some remarkable improvements of late, and promises to aid, if not to frequently supersede, horses on common roads; but the wire tramway system has the advantage of not requiring a ready made road for its employment, and is undoubtedly the pioneer of all existing means of transport.

Freak of Nitro-glycerin.

Nitro-glycerin does not seem to become any more civilized as it mixes in scientific society. We read, in a German publication, an extraordinary account of the explosion of only ten drops of this substance, which a pupil in a laboratory had put into a small cast iron saucepan, and heated with a Bunsen gas flame. The effect of the explosion was that the forty-six panes of glass of the windows of the laboratory were smashed to atoms, the saucepan was hurled through a brick wall, the stout iron stand on which the vessel had been placed was partly split, partly spirally twisted, and the tube of the Bunsen burner was split and flattened outwards. Fortunately, none of the three persons present in the laboratory at the time were hurt. When nitro-glycerin is caused to fall drop by drop on a thoroughly red hot iron plate, it burns off as gunpowder would do under the same conditions; but if the iron be not red hot, but yet hot enough to cause the nitro-glycerin to boil suddenly, an explosion takes place.

The Vendôme Column.

The Vendôme Column, lately destroyed at Paris by the crazy Commune, was one of the noblest monuments in the world. It was erected by the first Napoleon, its exterior being covered with magnificent historical bas reliefs, commemorative of French military achievements. It was made from the bronze of 1,200 cannon, captured from the Russians, Prussians, and Austrians. It was begun on the 25th of August, 1806, and entirely finished in 1810. Total weight of the bronze, 600,000 pounds. The expenses for the construction were as follows:—Melting the bronze, 154,837 fr.; weighing same, 450 fr.; chiseling, 267,219 fr.; the statue, by Chaudet, 13,000 fr.; 33 sculptors for the bas reliefs, 199,000 fr.; sculptured cornices, 39,115 fr.; general designs, 11,400 fr.; masons, locksmiths, carpenters, and plumbers, 601,979 fr.; architects, 50,000 fr.; 251,367 kilog. of bronze, at 4 fr., 1,005,463 fr.; total, 2,352,468 fr., or about \$470,500.