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SCIENTIFIC AMERICAN SUPPLEMENT

No. 595.

For the Week Ending May 28, 1887.

Price 10 cents. For sale by all newsdealers.

THE PROTECTION OF SHADE TREES AGAINST INSECTS.

For many years the destructive effect of insects upon the shade trees in our city parks and in some parts of the country has been very marked. While an absolute destruction of the tree is rarely brought about, yet in many cases it is so completely denuded of foliage in the course of a season that it loses all its beauty and utility. Of the ordinary trees, the elm is perhaps as badly attacked as any. Certain species are particularly affected by insects, and it has now become a question of widespread interest how to deal with them. New Haven, famous for its elms, has suffered a great deal. Various means have been adopted to protect the trees. Annular troughs filled with coal tar or straw ropes coated with the same have been placed around the trunks near the lower branches, in order to intercept the march of the destroyers. Sometimes lime is scattered around the roots, or the trunk is scraped and whitewashed. These remedies have proved of value, but are far from complete.

Recently the attention of the U. S. Bureau of Entomology has been called to the condition of the trees in the park and capitol grounds in Washington. This brought forcibly before them the fact that a problem of much importance was to be dealt with, because the trees of other Eastern regions manifestly were exposed to the same influences that were so destructive to those in Washington. Accordingly, the chief entomologist, Prof. C. V. Riley, devoted considerable attention to the causes of the trouble, the natural history of the destructive insects, and to the most effectual way of dealing with them. The results are embodied in a pamphlet issued by the U. S. Department of Agriculture.* In it the subject is treated in an admirable manner, and the pamphlet should be in the library of every one interested in forestry and arboriculture.

Four kinds of insects are accredited with most of the injury. Their popular names are the elm leaf beetle, the white-marked tussock moth, the bag worm, and the fall web worm. The importation of the English sparrow it was hoped would lead to the destruction of many of the tree insects, but the most injurious insects have not been attacked by the birds. It is rather to be feared that the sparrow in driving away our native birds has favored the increase of the insects formerly devoured by the latter.

Various methods, as already alluded to, have been suggested for dealing with them. The elm leaf beetle (*Galeruca xanthomelana*) may be intercepted on their travels up and down the tree trunk by some adhesive girdle or trough. Sheets may be placed under the branches, and the larvæ and adults shaken into them by jarring the branches. The larvæ descend the tree trunk when they are fully grown, and, on reaching the ground, establish themselves near the tree and develop into pupæ. In the two weeks of larval life between the egg and pupa stages, they do their destructive work. This habit suggests one treatment. It is to build low boxes around the base of the tree. These may be a foot or eighteen inches in height, with their bottom edges sunk in the earth and the area within them cemented. The larvæ will accumulate in this space, and will change into pupæ. While thus confined, they can be killed with scalding hot water.

As a palliative of the evil, much may be done by a proper selection of trees. Thus the native American elm (*Ulmus Americana*) is practically free from the ravages of the beetle. But the question is one of present importance, and the trees, as now standing, must be dealt with.

The web worm is, perhaps, of equal or greater injury than the elm leaf beetle. Its webs on the branches of wild cherry trees are most disagreeably familiar to dwellers on Long Island. But they are nearly omnivorous. Over a hundred species of trees and shrubs attacked by them have been catalogued. They are easily disposed of when nested in their webs by burning. A convenient form of torch has been described by Major Key, agent of the Humane Society of Washington.

A piece of soft brick (salmon brick) is cut into an egg shape, and is suspended by wire to the end of a pole. This is saturated with kerosene. When lighted, it is held against the nests, and effectually destroys them by burning. One soaking will last long enough to destroy a number of nests. This is manifestly an improvement on the old kerosene-saturated newspaper with which destruction used to be wrought upon the webs. With no better weapon than the latter the writer has burned out many a nest of web worms.

Less is to be said about the other insects, and the importance from a practical point of view of distinguishing between them has, to a great extent, disappeared. The reason for this is that one effectual way of destroying them all has been developed. It consists in spraying the trees with arsenic compounds suspended in water. A spraying in the middle of May, followed later by one or two more at intervals of two weeks, will protect all kinds of trees from the four insects, and presumably from others also. White arsenic or Paris green may be employed, but "London purple," a residue from the manufacture of coal tar dyes, is recommended as less liable to burn the leaves than either of the others. It also is easier to suspend in water than is Paris green, settling out more slowly therefrom, and owing to its color, poisoned trees can be distinguished from those not treated—a matter of some importance. From one-quarter to three-quarters of a pound is enough for a barrel (40 gallons) of water. With it should be mixed three quarts of cheap or damaged flour. This makes the poison adhere, and prevents it from burning the leaves. For young and delicate trees, not over half a pound to the barrel of water should be used. If Paris green is employed, as much as one pound may be mixed with the barrel of water.

A good spraying nozzle, several of which are described in Professor Riley's monograph, is mounted on a rod and connected by a hose with a pump in the barrel. The mixture is constantly agitated, and pumped up through the nozzle over the leaves of the trees. On the large scale the water may be carried in a special watering cart, and may be applied by three or four men to the trees on each side of a street or avenue. On the smaller scale a pail may be used to carry it about from tree to tree, and one of the well known hand pumps will answer to distribute it. The form of the nozzle and proper stirring of the powder in the water are the important points in the process. The operator should also remember that he is dealing with a deadly poison, and take every means to keep it from his person. A circular disk of leather should surround the pole near its top, to intercept any water running down it. A calm day should be selected, and due regard paid to any wind, in order that the spray may not be blown away from the trees, and upon the men applying it.

* "Our Shade Trees and their Insect Defoliators," by C. V. Riley, Entomologist. Washington, 1887. U. S. Department of Agriculture, Bureau of Entomology, Bulletin No. 10.

PRESENT CONDITION OF SHIPPING AND SAILORS.

Those who think our ocean freight ought to go in native ships may find no lack of evidence just now to prove how undesirable is the deep-sea carrying trade. A great fleet of ships lies idle at the London and Liverpool docks and along the Clyde; and those afloat engaged only in freighting which, during the past twelvemonth, have brought their owners more than 2½ per cent are said, on good authority, to be the exception rather than the rule. Commander Chadwick, of the navy, in an interesting article recently printed, says that English ship building fell off 50 per cent in 1884 from the tonnage turned out in the preceding year, and decreased another 50 per cent in 1885. For several years there has been a tendency to build sailing vessels, and at the present time it is the construction of such craft which alone suffices to maintain English tonnage above the declining scale. The chances of doing a profitable business in ocean freights are, it seems, better among the sailing than the steam fleet, because, during that part of the year when there is not enough freighting to go around, there is no such loss on a sailing vessel when tied up as on a steamer; and even during the best months the coal bill which a steamer runs up when afloat makes a big hole in such profits as can be made with the rates that have ruled during recent years.

It is, however, when we consider the means employed in the average freighter to keep down running expenses and to meet the fierce competition now obtaining that the carrying trade seems least desirable. The ships are undermanned, the crews underfed, overworked, and underpaid. Steam winches are used for hoisting the sails of the fore and aft sailing ships, and when they give out, both watches must be called. Indeed, it is usual in stormy weather to keep all hands on deck, because there are not enough men in a watch to man the tacks and sheets, and to work the ship. This constant exposure, with no rest, will break down the best crew, and when, besides this extra call upon their energies, the food served is bad or insufficient, illness invariably ensues. We had a striking illustration of this quite recently, when the British merchant ship Albania arrived at the port of New York from Manila, reporting three dead and all hands ill. The men complained that the food they got at sea was so bad they could not eat it. The flour was sour, the bread mouldy, and the corned beef, served twice a week, simply "revolting." Pea soup was occasionally served, but this was generally full of worms.

It would seem as if the master or owners, following a custom by no means unknown in the Atlantic trade, fed his men on food that had been bought cheap, because damaged. This, then, is the condition now prevailing in the trade which many zealous, but unin formed, persons insist should be ours. American sailors are not to be had to-day to man our war vessels, where the food is always good and plentiful and the pay $21.50 a month—not so bad when the general conditions of service are considered. Our war ships are manned by foreigners—Danes, Swedes, Norwegians, and Hollanders; and in order to encourage the Yankee to take again to the seas, the old and liberal wages of $30, $35, and $40 for able seamen must be offered, and a first class mess provided. Given such wages and food, the Yankee skipper could not compete with the