

FAILURE OF TEA ROSES.

HABITS OF FULLER'S ROSE BEETLE.—(*Aramigus Fulleri*, Horn.)
BY PROF. C. V. RILEY.

Within the last five or six years frequent complaints have been made of the failure of tea roses, the cultivation of which has become a very important and lucrative branch of flower culture. This failure has recently been ascertained to be due to the larva of a little gray snout beetle, belonging to the family *Otiorynchidae*, and shown in its different stages in the accompanying figure.

Mr Peter Henderson, of Jersey City Heights, N. J., has himself suffered very much from the work of this insect, and I have had considerable correspondence with him during the winter upon the subject. The following quotation is from one of my letters replying to his inquiries:

"The first knowledge which I obtained of this insect was through our mutual friend, Mr A. S. Fuller, who sent me specimens in 1875, the species being then undescribed. In 1876 it was described under the name of *Aramigus Fulleri*, by Dr G H. Horn, in the proceedings of the American Philosophical Society, vol. xv., page 94. Mr. Fuller had found it in greenhouses, and somewhat injurious to camellias. It seems to be quite widespread, occurring from the Atlantic at least as far west as Montana, and its habit of injuriously affecting roses and other greenhouse plants must be looked upon as a comparatively recent acquirement. Such instances of newly formed habits are constantly presenting themselves to me in my studies of insects. The beetle seems to be purely American, and the genus *Aramigus* was, in fact, erected for it and another species (*Aramigus tessellatus*) of about the same size, but of a silvery white color, with faint green hue, which I have found in Kansas upon the well known 'resin weed.' The beetle belongs to the same family and is pretty closely allied to a well known European beetle (*Otiorynchus sulcatus*, Fabr.), which is larger and darker in color, and is also very injurious to greenhouse plants, as well as to some grown out of doors. This species also occurs in this country, as I have specimens that were taken in Massachusetts. It is the habit of all these beetles, so far as their habits are known, to work in the roots of plants while in the larva state, just as your aramigus does. The eggs are doubtless laid upon the roots by the female beetle, which burrows into the ground for this purpose. Upon inquiry I find that what is evidently this same beetle has been more or less injurious to roses in and about Washington, and that Mr A. Jardin was obliged to give up the growth of tea roses here, a number of years ago, on account of its injuries."

In Bennet's excellent essay on "Rose Growing in Winter," he fails to mention this insect among the "causes of failure." Mr Henderson does not hesitate, in a recent number of the *Gardener's Monthly*, after a thorough investigation of the subject, and a correspondence with some of the best rose growers in six different States of the Union, to express his belief that in a large majority of cases failure is due to this insect alone.

The only remedy that has been employed hitherto is to persistently catch and destroy the perfect insects, and the experience of Mr. John May, who has for five years been fighting it in this way at Madison, N. J., is to the effect that no substance will destroy the insect in its larva state without at the same time injuring the plant.

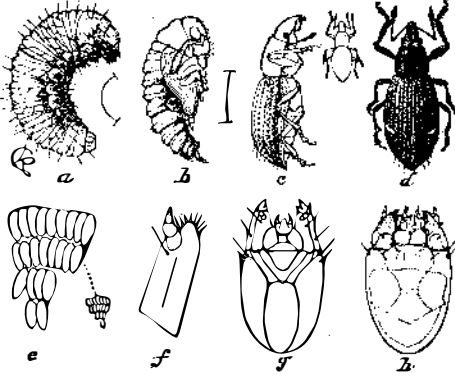
A study of the habits of this insect, which I have been able to make through the courtesy of Mr. Henderson, who sent me abundant material, enables me to add to his excellent account some facts that are both interesting and of a practical value. The most serious injury is done by the larvæ, which feed principally upon the more tender rootlets, and thus attack the plant in its most essential parts. This work being underground, is so insidious as to easily account for the fact that it has been generally overlooked.

I have had a quite healthy rose bush totally destroyed in three weeks' time by about three dozen of the larvæ, which were placed in the pot containing it. The symptoms that are manifest above ground when the grub is at work are partial stagnation of growth, weak pale shoots, and generally barren flower buds; and when these symptoms manifest themselves strongly a number of the grubs will be found if the plant be dug up and shaken. The parent beetles, like most other snout beetles, live for a considerable time, as I have kept them in confinement for nearly three months. They are nocturnal in habit, being quite active and feeding only after dusk. They shun the light during the daytime, and hide under the leaves or cling tightly to the branches or in some fork near the base of the plant, always in such position as not easily to be observed. Upon disturbance they drop to the ground, draw up their legs, and "play 'possum," remaining motionless for some time, and looking very much like a small lump of dry earth, the color adding greatly to the resemblance.

This habit of simulating death upon disturbance is common to many other insects of this family. They feed upon the leaves, but do more injury by severing them than by the amount of foliage consumed. The eggs are laid in flattened batches, consisting of several contiguous rows, and each batch containing from 10 to 60. The individual egg is smooth, yellow, ovoid, and about 1 mm. in length. The female shows a confirmed habit of secreting her eggs, which are thrust between the loose bark and the stem, especially at the base just above the ground. In the twenty odd batches which I have examined they have invariably been thrust either between the loose bark and as above described, or into any other crevice that could be found; as, for instance, that

formed by some paper around the edge of the bell glass in which some of my experiments were made. More rarely they are laid between the earth and the main stem just at the surface of the ground. The eggs are so firmly glued together and to the place of deposit that they are not easily seen, and are with extreme difficulty detached. It is for this reason that they have escaped the notice of rose culturists.

These eggs require about a month to hatch, and the new born larva, which is of a pale yellowish color, with light brown mouth parts, is quite active, and immediately burrows into the ground, and acquires, very soon after, a bluish hue. Just how long this larva requires to attain full growth I have not been able to ascertain, but, in all probability, it remains at least one month, and probably several more, in the ground, where the pupa state is finally assumed.



Aramigus Fulleri.—a, larva; b, pupa; c, beetle, side view; d, same, dorsal view, the outline between showing natural size; e, eggs, enlarged and natural size; f, left maxilla of larva, with palpus; g, underside of head; h, upper side of same, enlarged (after Riley.)

As the injury of this insect has been mostly to roses under glass, there will be found no great regularity in the periods of its transformation under such circumstances. In point of fact it is found in all stages during the winter and early spring months. Yet that, in a more general way, there are cycles of development, is proved by the fact that during a visit to Mr. Henderson, which I made last May, neither beetles nor eggs were to be found, though egg shells under the loose bark at base of the plants were common.

While the destruction of the parent beetles, when persistently followed up, is an excellent preventive of the injuries of the larva, and strongly to be recommended, yet when roses are extensively grown, some beetles are sure to escape detection. It is evident from the facts here set forth in relation to the eggs, that we have still another and more effectual preventive measure within our reach, namely, the destruction of the eggs before they hatch. For this purpose I would recommend the tying of a few thicknesses of tape or of narrow pieces of rag, or even stiff paper, around the butt of the plant, the bandages to be examined every three weeks, and detached and burned, if eggs are found in them. Where the number of plants is large, this destruction of the eggs might be expedited by the employment of traps, consisting of small stakes, around which such layers of cloth or paper are tied. These should be thrust into the ground near the main stem of the plant, and can be collected once every three weeks, thrown into a tub of hot water, subsequently dried, and used again without untying the bandages. Or, again, the materials always at hand in a florist's establishment may be employed, for I doubt not but that a few folds of oil paper placed in a slit made in an ordinary wooden label, and this stuck into the ground at the base of each plant, would form an excellent lure to the female in ovipositing. I am indebted to W. G. Le Duc, Commissioner of Agriculture, for the electrotype of the figure here used, and which was prepared for my report to the Department.

The Australian Exhibitions.

Mr. O. M. Spencer, United States Consul General at Melbourne, Australia, transmits to the Department of State a very full report of the proposed Exhibitions at Sydney and Melbourne. The first opens on the 1st of September, 1879, and will close on the 31st of March, 1880. That at Melbourne opens on the 1st of October, 1880, and closes on the 31st of March, 1881. This Exhibition will be held in the Carlton Gardens, comprising an area of 65 acres. Nearly all of the leading European governments have signified their intention of being present by royal commissioners. All of the Australasian colonies have entered heartily into the enterprise. The English government has taken a warm and decided interest in it. The Prince of Wales and others of the royal family will visit the Exhibition. The Duke of Genoa will come out in an Italian man-of-war, and France and Germany will be represented in a similar manner. The relation which exists between the Sydney and Melbourne exhibitors is one of generous rivalry and cordial co-operation. The two cities will soon be connected by railway. There are several lines of steamships now plying regularly between the two places, with low rates for freight. The expense of transferring goods from Sydney to Melbourne will be moderate, including storage. Goods will be received at the latter Exhibition building on the 1st of June, 1880.

All the usual facilities accorded at previous international fairs in other countries will be liberally afforded at Melbourne. The protection of inventions capable of being patented is fully secured. Should the United States decide not to send out a man-of-war, it is advisable to ship all heavy

goods in sailing vessels, via the Cape, not later than February, 1880. Goods from the Pacific slope and parcels of great value and small bulk may be shipped via San Francisco by the Pacific Mail Steamship Company, which runs a monthly line of steamers from San Francisco to Sydney. Show cases, shelving, belting, etc., may be procured in Melbourne at low rates, at the cost of the exhibitors.

On The Fallacy of Refrigerating Ships for the Destruction of Yellow Fever Germs.

There are reasons to believe that it is well nigh impossible to eradicate by refrigeration the spores of yellow fever from the holds of thoroughly infected ships; although, with the frosts of autumn, yellow fever generally disappears from districts where it has been epidemic. We can philosophically reason to this conclusion by comparison of the conditions with those of other more familiar phenomena of heat and cold.

The window pane of a heated room on a cold day, supplies more nearly than any other familiar example, the peculiar conditions under which the refrigeration of ships has been, and save exceptional cases, must be attempted, and a lesson or two from the pane cannot fail to be of service. The temperature of the window pane, when the frost upon it melts, must be the temperature of melting ice, and an exact compromise between the external and the internal temperature—the one much below the freezing point, the other much above. Similar conditions apply to the hull of the ship, aggravated greatly by its irregular inner surface.

In the case of a ship, floating in a medium, the temperature of which is far above freezing, or as may be the case in the Gulf of Mexico, at from 60° to 75° Fah. (U. S. Coast Survey, 1857, 102), although the general temperature of the air in the interior of the ship may be considerably below freezing, even enough so for the deposition of frost upon objects contained therein, it is no evidence that the cracks and crannies which are nearest or next the skin of the ship will be thoroughly refrigerated, but on the contrary, they will constantly have their temperature restored to them by convection of heat from the water lying against the wall of the ship, and were it possible for frost to collect upon the sides of the ship, it could completely overlap such crannies without reducing the inclosed air or substance to the freezing point.

It may, then, be asserted that it is practically impossible to so thoroughly absorb the heat from these interstices as to make the destruction of the spores a matter of certainty. The thermal condition of the hold of a ship under process of refrigeration, even supposing that a thorough circulation of cold currents could by any possibility be established, is no evidence that it is not possible for yellow fever germs still to exist there. It is reasonable, then, to suppose that the cause of the recent failure to disinfect by refrigeration a government ship, which was obliged to return to port on account of the fever again breaking out after the vessel had been thoroughly treated by the freezing process, may be referred to the circumstances above given.

Owing to essential differences in construction, iron ships are more especially subject to these conditions than wooden ones; but there exists, even in the case of wooden ships, but little encouragement for perseverance in this method.—*Science Observer.*

A Rapid Voyage.

The fastest long distance run on record is that of the English mail steamer Durban, Union Steam Company, Capt. A. S. Warleigh, with telegrams from the seat of war at the Cape. The Durban left Table Bay a little before 8 P.M., April 1, and averaged 298 miles a day to Madeira, where a stop of 4½ hours was made on the 14th day. Plymouth, England, was reached at 6 P.M., April 20. The entire distance, about 6,000 miles, was made in 18 days 16 hours, actual steaming, or an average of 13.1 knots the whole voyage. Much better time has been made across the Atlantic, but this is the best on record for so long a distance.

DR. LANDERER, a Hungarian naturalist, writes from Athens that a dead African eagle, *Gypactes barbatus*, was lately found at Maina, on the southern Greek coast. On examining the bird an iron headed arrow over a foot long was found transfixed under one of the wings. Evidently the eagle had been fired at and struck in Africa by some native, and had borne the arrow in its body in its flight over the Mediterranean until it fell dead from exhaustion on touching land at Maina.

Nuts.

It is estimated that there are in the United States over 400,000 railway cars of all kinds, also 16,000 engines. These engines and cars in traveling over the roads lose annually between four and five million of nuts. These will weigh over 1,500,000 lb., and their cost is between \$30,000 and \$40,000, and this loss is continued from year to year, saying nothing of the nuts thrown into the scrap heap, with their bolts worthless from the use of the jam nut, also the liability to accident from loose nuts.

A LARGE shoe manufacturer of New York State recently advertised in Boston and New York for 25 shoe fitters to work in his factory. He was ready to pay full current rates and furnish steady work, but had only one application. Apparently there are no large body of shoemakers out of employment.