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UNITED STATES OF AMERICA.

PRIZE---ESSAY.

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THE
SILVER PITCHER,

OFFERED BY

H A. STOLLENWERCK & BROS.,

FOR

THE BEST ESSAY

ON THE

DESTRUCTION of the CATERPILLAR,

AWARDED TO

✓
J. D. HOYT, - - - Livingston, Ala.

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7. Oct. 1874
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SELMA, ALA., AUGUST 14TH, 1873.

MR. GEO. O. BAKER,
Pres. Selma, Ala. Exposition,

DEAR SIR :

The efforts made to destroy the caterpillar by poisonous applications will, we hope, have been sufficiently tested to develop some sure and effectual plan to destroy them on future crops.

We think it has been fully demonstrated that arsenious preparations will destroy them. The future want of this country is the best and cheapest formula, combined with the most expeditious manner to apply it, either in solution or powder, and also the right time to the growing cotton.

We authorize you to offer a premium, properly inscribed, of a Silver Pitcher, worth \$100, for the best essay written on this subject and embracing the above points, to be awarded by a committee of four or five planters selected by you, who have an experience in the application of arsenious preparations, and who have confidence in the practical success of the plan to give it their endorsement.

Very respectfully,

H. A. STOLLENWERCK & BROS.

SELMA, ALA., JULY 14th, 1874.

To the President and Directors of the Selma Exposition,

DEAR SIRs :

We, the undersigned, appointed by you to examine the essays on the destruction of the cotton worm, respectfully decide that, in our judgment, Mr. J. D. Hoyt, of Livingston, Ala., is entitled to the prize of Messrs. H. A. Stollenwerck & Bros.

Many of the essays are entitled to honorable mention, and contain much valuable information, and we recommend that they all be published.

Respectfully,

WILLIAM W. DRANE,
JOSIAH ALEXANDER,
JAMES H. ROBINSON.

Practical Modes OF Destroying the Cotton Worm.

At last, when the knowledge is brought home to us, without trouble or labor on our part, it has become a clear matter of fact that the great enemy of the Cotton Crop—the Cotton Worm (*Anomis Xylina*)—can easily be destroyed. And how simple are the means found to be;—as nearly all truths are when understood. Fogysm will now, probably, cease to laugh, as the remedy has become a *fact*, and not an *experiment*. Yet how many have, probably, been deterred from experimenting in this very matter, for fear of ridicule. Fulton had his scoffers,

when first applying steam as a motive-power to vessels. But such did not invent the Engine, the Cotton Gin, the Telegraph, the Sewing Machine, the Reaper and Mower. We of the South have not been an inventive people in the past. Our *domestic institution* tended not to stimulate in that line of enterprise. But times and conditions have changed; and we are becoming more an investigating and inventing people.

The question of destroying the cotton worm is one of importance, from the frequency and suddenness of the damage to the crop,—amounting to \$20,000,000 in a single fortnight, as has been estimated; and may, as has been done in the past, destroy nearly the whole crop. Yet, heretofore, no successful mode of relief has been devised; nor have our State governments offered inducements or employed competent men to seek a remedy or to investigate the obscure subject of *entomology* as have some of the other States; and to which means we are much indebted for the knowledge we have on this subject.

To the address of Prof. Riley of Missouri, at the National Agricultural Congress at

Indianapolis, are we much indebted for the impulse given to the destroying of the cotton worms by *poison* the present year. But of the *patent rights* which have been offered to the public, we cannot see much merit of original discovery in the use of poisons proposed, as substantially, the same have been used—as stated in the Agricultural Reports—a number of years in the Western States, to destroy the *Colorado potato bug*. And although a certain *mixture* might be rightly patented, that is a condition of but little importance.

Paris Green or Scheele's Green(*arsenite of copper*) is the certain agent for the preservation of the cotton crop from the ravages of the cottonworms. Flour is probably the best material for admixture with the poison to fix it on the cotton leaves—one part of the poison to twenty parts of flour has been recommended. But, we must add, this is a *dangerous mixture* and may lead to fatal accidents. Also ashes, plaster, lime, etc., have been used as much cheaper than flour—particularly in our cotton section. All of these the writer has used, and found that a small part flour will answer every purpose;—say

five pounds to twenty of plaster and one of the poison, thoroughly incorporated. And also all plaster (*gypsum*) has proved entirely effectual. Lime is objectionable on account of its impalpable dust rising and floating in the air or wind, in the manipulation and application of it, and which is unpleasant and injurious to the *lungs*. Ashes is also a coarse material and dusty in a wind. And we must say that the land plaster is the best material, on the score of economy and convenience, being cheap, heavy and free of dust in the handling, and very well secures the poison on the rough surface of the cotton leaves. Then it is generally worth its cost as a fertilizer on the land. And, on the whole, we must recommend this for general use in our cotton plantations,—say twenty-five to thirty pounds plaster to one of the poison, well incorporated, by mixing in a box or barrel, say a spoonful to the twenty-five times that quantity of the plaster, and so on till enough for a given area of cotton—say an acre—be mixed. Then, after thoroughly stirring the mass, it should be sifted through a common meal *seive*, to insure thorough incorporation; and this is best to be done a day or two be-

fore using. One to two pounds of the poison is enough for an acre of cotton,—depending on the size of the cotton and quantity of foliage to be dusted.

The best mode of application is with common meal *sifters* lined with muslin, and having handles three or four feet long, inserted through both rims of the sifters and secured. With the preparation in these, a small quantity at a time, hands of a fair intelligence, by passing along the rows, holding the seive over the cotton, and gently tapping them or the handles with a stick or the hand, the foliage can be lightly dusted. And the coating must be light, the least quantity of poison seeming to be effectual; and too much injures or kills the foliage—seeming to *crisp* it. And one means of securing uniformity of application can be by measuring off each acre, and then, by calculation, use a given measure of the preparation on each row of the cotton. And these means as described when used at the first appearance of the destructive brood of worms, we have demonstrated to effectually clear the cotton of the pests and keep it clear. One hand can go over one acre per day, in suitable weather; but

when the wind blows it cannot be properly applied. It adheres best when the leaves are wet with dew. It destroys the worms by their eating it with the substance of the leaf.

Arsenic (*arsenious acid*) is a cheaper poison than the compound Paris Green, and is nearly or quite as effectual, and is used in the same way as above described. But it is even a more dangerous mixture than the Green, as it does not color the flour. The price of this, in leading markets, has been seven to eight cents per pound. While the Paris Green has been about forty cents. Though the short period of excitement in the use of these, for the worms, was made an occasion by dealers to double the prices and even more. Both articles are deadly poisons, in sufficient quantity, to either animal or vegetable life. Paris Green is composed of arsenic and bluestone,—the *arsenous acid* being dissolved by the agency of potash, in boiling water, forming *arsenite of potash*; and the bluestone, or *sulphate of copper*, is readily soluble in water. From these elements, on being mixed, a chemical union takes place, forming the Green (*arse-*

nite of copper) and which is gradually precipitated to the bottom of the vessel. In this dissolved form we have used it in water,—about one pound of the poison in eighty or a hundred gallons. And this is the best form for use in water, as the Green, when in a finished market form, is insoluble in water, and must be kept in constant agitation to prevent settling. In either case, a common watering-pot is used to shower the cotton with. Or a cask mounted on a cart, could be used, having two or three pipes arranged to shower as many rows at once, as the cart should be passed along astride of one or two rows, as the width should suit. Or the solution could be thrown on the cotton in the form of a *spray*, by the force of steam from a boiler, or by force-power from a piston connected with the wheel-hubs of the cart. But we have found no advantage in the water mode of application. And, besides, it crisps and injures the cotton more than the dry powder; nor is it so lasting in its effects. Yet to obviate this objection some have recommended the stirring into the eighty or a hundred gallons of the preparation, about five pounds of flour made into a paste. But in this we have

found no advantage; and in the *solution*, as described above, it precipitates the Green, at once, to the bottom of the cask.

But, we must say, that the first mode as described—the poison and land plaster mixture—will generally be found the best, the simplest and most practical mode of application. And when used promptly at the first appearance of the numerous and destructive brood of worms, they will be destroyed and the crop preserved; as myself and others have fully demonstrated; and the cotton has continued to form and mature till frost. Whereas, cotton that is not protected, and is stripped of its leaves by the worms, ceases all growth or further maturity,—the leaves being the *elaborators*, in which the air and its gases, light and heat, and the elements of plant food absorbed by the roots, are brought in contact, and elaborated, by Nature's chemical laws, into the specific nourishing fluid, which, passing upward and downward, adds growth to the plant and its fruit.

It may be questioned whether this poison, applied to cotton, becomes absorbed so as to render it poisonous to stock. But if the quantity is not sufficient to crisp or destroy

the leaves—as it should not—it is doubtless resisted by the vegetable life; or if sparingly absorbed, is again eliminated. And, from the surface, time and the rains, completely remove it. It is stated, however, by good authority, that a free application of these poisons to the soil, renders it deleterious to vegetable life. This condition, however, could hardly be produced by the yearly application for the worms.

However efficacious the application of poison may be, there are many who will not use it—many from indifference, or cost of the material and time necessary to apply it, and many from prejudice or caution as to the use of a poison. Even these need not suffer the destruction of their cotton crops by the worms; for this year's awakening to the subject, has been the means of well demonstrating the certainty that the pests can be destroyed by a little work, without poison. Hand-picking and destroying the first brood, which appear generally about the first or middle of June, lessens the numbers of the succeeding generations vastly. And from trial myself, and the testimony of others, the writer feels authorized to state, that young

worms, a few days after hatching out, and up to the size of half growth, cannot get up on the cotton stalks again, either from undeveloped instincts, or the want of strength and action. Then they are easily jarred or brushed off, and if exposed a short time to a hot sun, on the ground, are killed. The most rapid and practical mode of doing this, is to drag something like a piece of cotton bagging, along over the rows of cotton, forward and back; which may be long enough to extend across several rows, and having short lines attached to one edge, a little further apart than the width of the rows, and a hand at each line, and all abreast pass along between the rows, and then back; when the brushing and shaking of the stalks by the bagging will clear the cotton mostly of the worms. In this way, a set of hands can go over their crop in a day or two; when they should return to the beginning and go over again; and continue so doing as long as any number of worms are found on the stalks. And they will have the satisfaction of exterminating the pests and saving the crop, by a few days of light labor, only. This mode will doubtless be used very extensively here-

after, when necessary. But the Boll Worm, (*Heliothis Armigera*, of entomologists,) has been pretty numerous this year, and in some fields has done more damage than the cotton worm. For this there is yet no known remedy, except by bonfires or torches, to attract the moths at night, when they will fly into the fire and are burned or their wing singed. The torches can be carried slowly along the cotton rows for this purpose; or the fires can be built around the fields, and in various parts of it, on scaffolds, covered with sand or clay, about as high as the top of the cotton. These fires should be lighted at evening twilight, as the moths are then most active, and kept burning several hours, or till midnight. Also a *lantern-trap* has been devised and used for entrapping these moths, with some success. And plates containing molasses and vinegar or water, to attract them, and in which they stick and are destroyed, have been used with some success. This moth or miller, has wings of a yellowish white color, with a shade of red, and a dark band across near the margin, and with dark spots near the center. The moth of the cotton worm is of a dull fawn color, with a

dark spot near the center. These *hibernate* through the winter, in woods, old trees, logs, brush, fodder houses and stacks, or wherever they can get shelter; and in this state come out in the spring; and sometimes in warm days of winter are out, before their final exit. And this is the manner in which this species is preserved and continued from year to year.

The impulse given to this whole subject of destroying these pests, of our cotton crops, is fortunate; and it is to be hoped that the next year there will be such a general and concert of action among our planters, in one or the other feasible modes, demonstrated, that this costly and valuable crop shall be effectually preserved from these ravages.

J. D. HOYT.

Livingston, Ala.

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