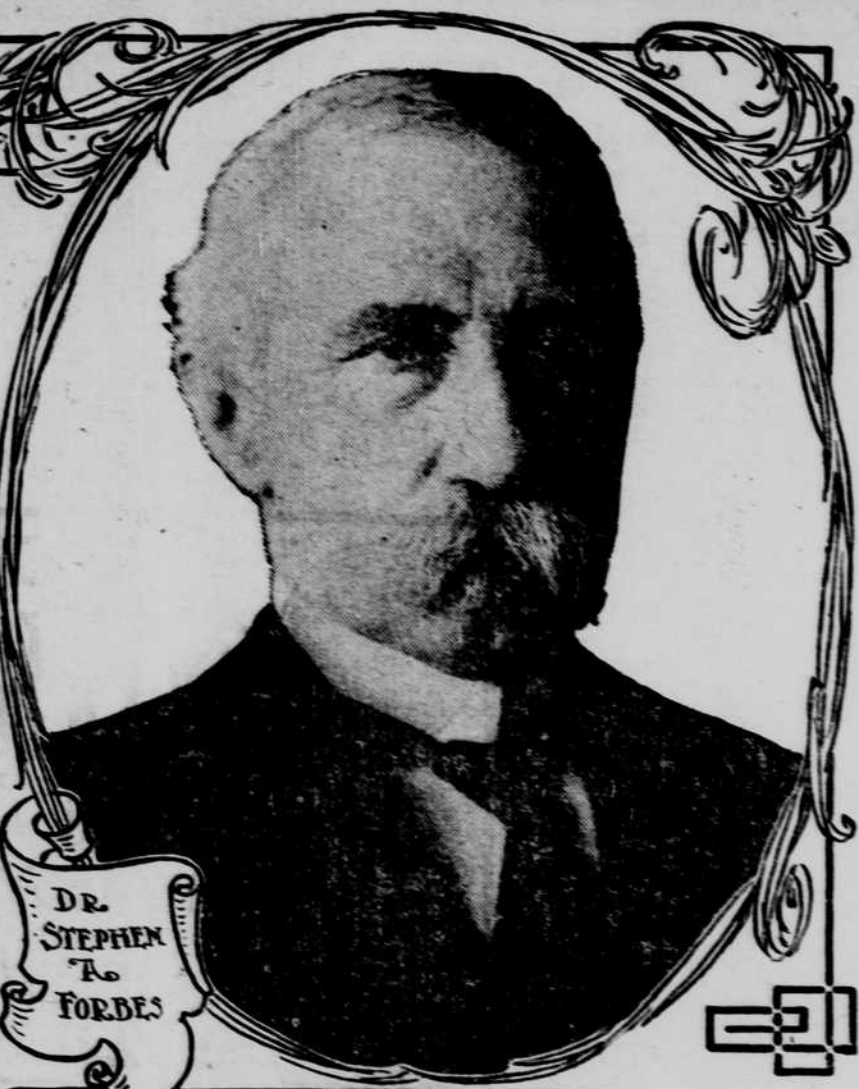


THE DATTLE WITH THE BUGS

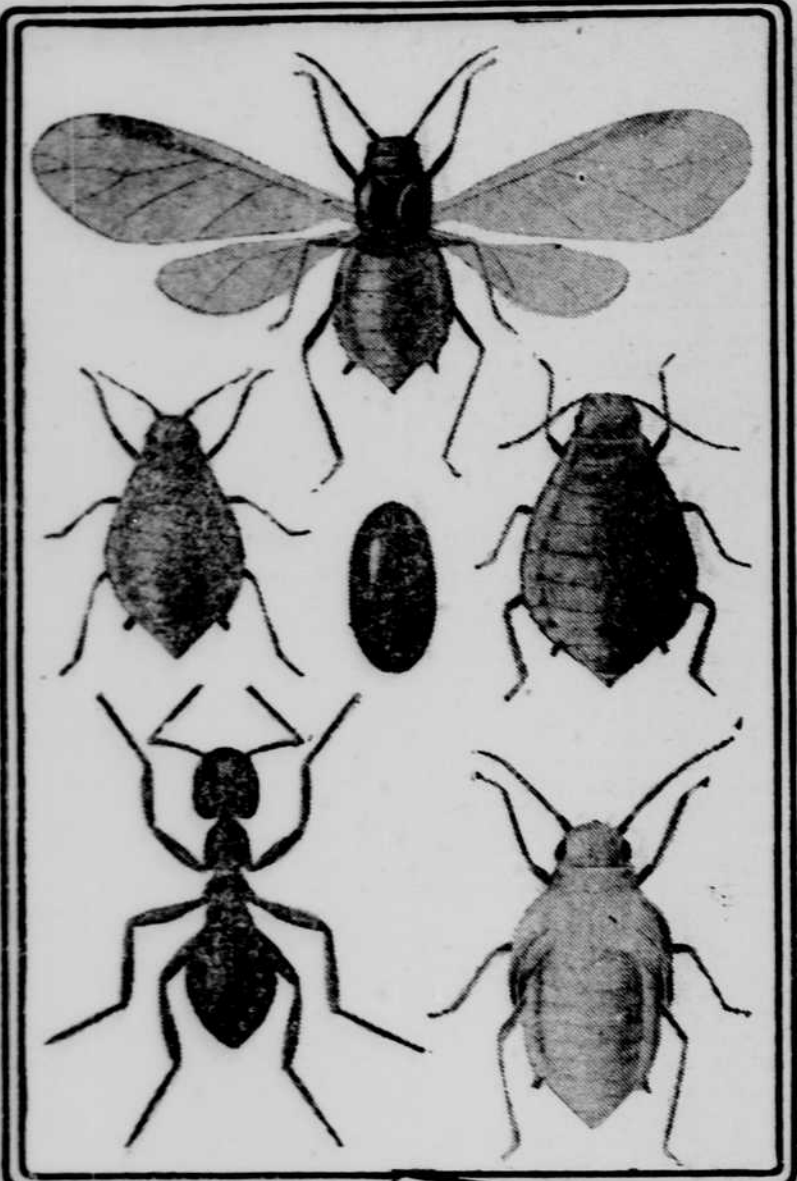
By BERT E. POWELL



DR. STEPHEN A. FORBES



HERE is an underworld not invaded by novelist or playwright. Yet in it occur strange and often subtle dramas of survival and destruction. Nor is it a noiseless underworld. Every evening after a hot sunset it forms an orchestra which shrills out its prowess and flaunts its coming achievement. And in all the world there is no orchestra so well paid. To be sure it gets little in the matter of attention, but in ways more substantial it is rewarded handsomely. For it is permitted to levy toll upon the corn and the wheat, the cabbage and the apple, as they grow. It is allowed to eat the profits of the miller and the grain dealer. Certain members of the shrilling tribe go farther and demand greater concessions in their greed. Not satisfied with money tribute, they exact human lives. Their gruesome tracks are made upon the faces of little children. Then from places where poverty forces women and babies into filth and sickness, they take wing and they bear their death message into homes fair and clean—homes where the inmates cannot concern themselves with life's wretched ones. And so nature in her inexorable circle from which neither the producer nor the poorest can escape, herself supplies the link which brings the miserable home to the fair one.



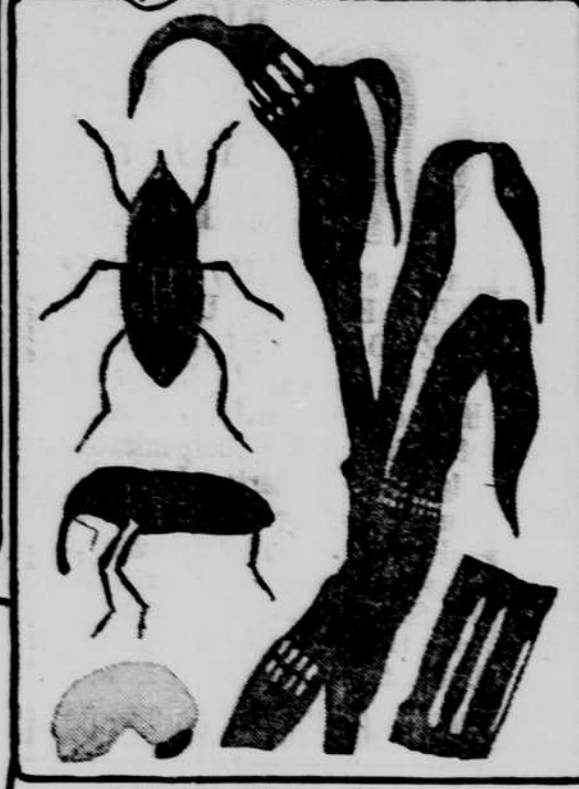
CORN ROOT-APHIS AND ITS ATTENDANT ANT: Winged Female, Two Wingless Females, Egg and Pupa of Aphis, and Worker Ant.

Moreover whole sections intended by nature for the production of particular crops often are compelled to abandon them for no other reason than insect infestation. This is especially true of horticulture. Myriad, indeed, are the insect foes that infest vegetables and fruit. If ever the life of this underworld is brought upon the stage as that of the barnyard has been, it may well open with this plaint of the truck grower:
The insects are busy in clover and grass. A-hatchin' out earlier for my garden case. They're happily hummin' their giddy refrain. The old mode will still be your sirs-o-plane.

first plan was to present the chinch with a contagious disease. It had been observed that it was subject to a fungous disease similar to that of the common house fly, which left the dead covered with a white mould. Why not spread it? It was tried upon the university fields and the bugs took it most obligingly and died most successfully. Before it could be considered more than an experiment, however, it was necessary to try it on a larger scale. Consequently letters were sent among the farmers, asking for boxes of sound bugs. These bugs were to be given the disease and returned with directions for spreading it. The response was surprisingly immediate. Boxes of bugs poured into the express offices and yet more boxes of bugs. Farmers from neighboring states heard of the offer and they, too, went bug hunting. The express companies worked overtime. The assistants in the entomologist's office became mere undertakers for bugdom. The mouldy bugs were sent out on their beneficent mission of destruction. Then the results came in. They varied; they did, indeed. Some thought the entire entomologist's office should be fitted out with a golden, glorious halo as the rescuer of its country; others alas! thought a fool's cap would fit the case more exactly.



White Grub in its Four Stages: June Beetle, Egg, Grub and Pupa.



Corn Bill-Bugs, Grub of same and Corn Plant showing Bill-Bug injury.

But although the disease project could not be called a complete success, means were found which make it possible to raise grain even in the very worst of the chinch outbreaks. The barrier methods and sprays with a kerosene emulsion will catch them every time. Just after harvest the scarcity of food in the wheat fields arouses in the chinch an instinct to migrate. On foot it sets out to get an appetite for corn. This is the time to make a ridge between the infested field and the field the chinch desires to infest. This is done by plowing a backward furrow which is packed with a light roller or by hand and has a line of tar poured upon it from a can with a tubular spout. Each hole is dug at intervals of about twenty feet. By keeping the tar line fresh his chinchship cannot cross, but will follow it to the posthole. Into which he speedily tumbles. It then is merely pleasant recreation for the farmer to travel out and pour a weak solution of kerosene upon his accumulated enemies. Kerosene is an excellent death dealer for these pests. When they get into the cornfields the farmers of Illinois sally forth with an emulsion containing four per cent of kerosene and half as much whole oil soap mixed by five minutes simple beating with a stick. This is flung by hand upon the corn in the cool of the day when the insects feed most thoroughly and when there is less danger of injury to the corn. Sometimes a single application does the work; when the infestation is very bad two and even three may be required.

Another enemy of the corn that Dr. Forbes has caught by cultivation is the bill bug, as certain beetles are called because of their long, hard snouts, which they poke into the farmer's business to ruin it. This time the cultivation must be with the plow instead of the disk and in the autumn instead of spring and in the fields of grass where the bill bugs breed. These bugs are distinguished by a billegery which is only equaled by their strength of look. One variety appeared in Illinois which looked so large to the harassed farmers that it was christened "elephant bug." Chickens turned into the fields to feast upon them fed in flapping, comical flight, unable to relieve their terrified souls by a squawk, as their bills were tightly held together by the

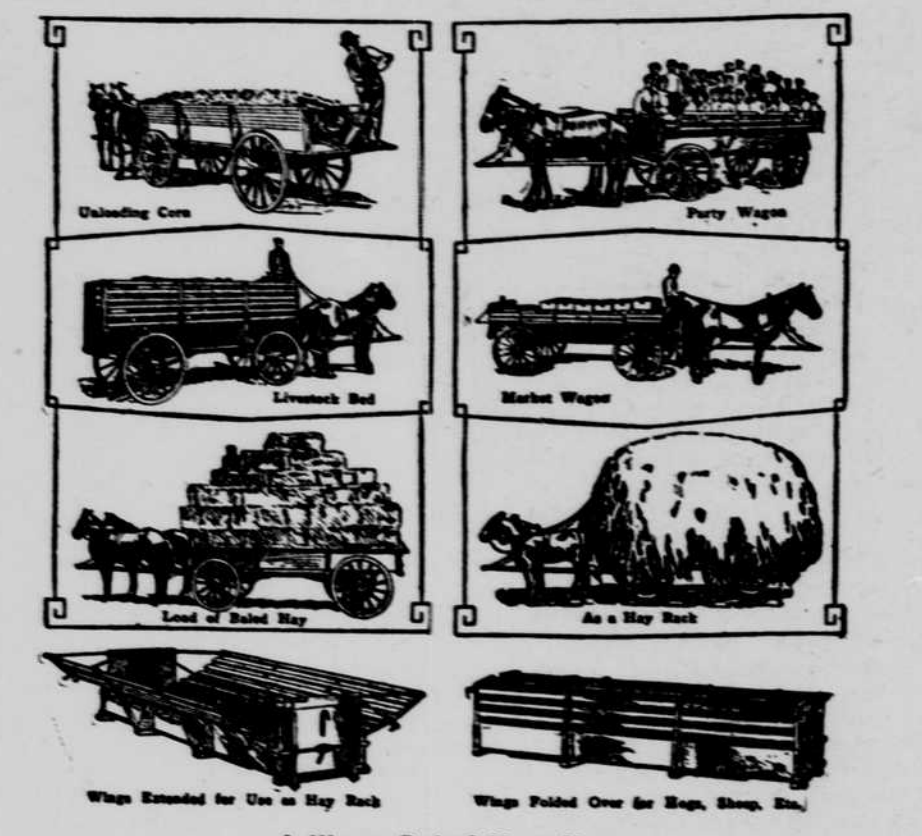
man's purse than rich relatives on a visit, there is the treacherous which gets sour like a colicky baby, and there are sturdy, hungry insect foes. Over two hundred of these attack corn, forty capable of doing notable damage. It is in discovering the way to conquer a pair of these precious rascals that Dr. Forbes has made his most valuable single contribution to science. They are the corn field ant and the corn root-aphis or, as it is better known, the corn root louse. For a long time they were the particular scourge of the corn grower who supposed that they operated each on its own account. Through the research of Dr. Forbes it is now known that one is helpless without the other. The resourceful and industrious ant is entirely unable to extract the coveted sap from the corn root, and the stupid aphis would, if left to itself, starve in the very presence of the corn. But the ant can carry the aphid to the corn root and deposit it thereupon; the aphid can extract the sap and then exude it, thus passing it on to the ant. Therefore it was not a problem of exterminating two foes but of outwitting the clever little ant. Were it banished, the aphid would soon disappear. The wretched little soft-bodied hunk of cream can do nothing for itself except lay eggs and suck corn sap. The ant gives it a home in its own burrows, hatches its eggs for it, carrying them to the warm surface if they are slow, bearing them farther into the ground if they threaten to hatch before its food supply is ready. And this protection extends through the aphid's life. If, because of plowing or other inadvertence, the ant finds its charges scattered, it will cheerfully collect them and reconstruct its home if that has been molested also. The ant has nothing else to do and it is as active as an outraged Puritan conscience. However, methods of control have been found. The use of the disk and crop rotation will exterminate them. The root-aphis refuses entirely to occupy ground planted to oats, so this crop is of the greatest importance in clearing fields of them. Also by disking two or three times with a 20-inch disk in spring, especially on a sunny day when the ants are likely to have their charges near the surface, they will be killed and scattered and their nests so broken up that even the enthusiastic little ant cannot reconstruct the colony.

Now let us talk about corn exclusively for a while. With that staple at its present price and with the grave gentlemen who produce statistics as hens produce eggs—the louder the cackling, the smaller the statistic—assuring us that it is on its lofty perch to stay, it seems that the farmer will have to cultivate automobiles and bad habits as obesity cures for his bank account. But, halt! Nature provides several. There is the weather, more exasperating and with less regard for a poor It did to several others of my acquaintances, and I think so yet, and so do they. However, when I was about forty my hair began to thin out little by little, and so quietly that I scarcely knew it was going. That is the one redeeming trait of baldness, it comes to a man without any physical pain. "By the time I was fifty a wig would have hidden considerable lack of hair, but I did not get one. Somehow or other I didn't think I needed it. There was not enough to comb, but the brush

WAGON BED CONVERTED INTO DIFFERENT USES

Agriculturist Has Often Found It Hardship to Be Obligated to Buy or Build Number of Vehicles Required on Farm.

A convertible wagon bed which can be changed into 15 different kinds of bodies for different uses around a farm, without adding to it or taking from it a single piece, has been designed and is undoubtedly the most radical improvement made in farm wagons for a decade, says Popular Mechanics. In a few minutes it can be transformed from a hay rack into a wagon for carrying live stock, and with equal quickness it can be converted into a vehicle for carrying a large number of passengers who can be provided with comfortable seats along the sides for picnicking, etc.



A Wagon Bed of Many Uses.

The remarkable versatility of the new wagon bed is secured by hinged malleable iron pieces attached to the sides. These support two folding sections on each side. The strain which is put upon these pieces when heavy loads are placed on the wagon makes it imperative that they should be of strong, dependable material. The agriculturist has often found it a hardship to be obliged to buy or build a number of wagons for the multifarious requirements incident to the operation of a farm. The wagon that could serve to carry boxes or crated vegetables and berries to market would not be of any use when hay time came around. When it was necessary to carry calves or live stock, still another wagon must be called into service. While reapers, threshers, and other farm implements have been continually improved, the farm wagon has remained practically at a standstill. Perhaps the fact that the automobile has made such wonderful progress has served to overshadow the humble beast of burden and his reliable wagon. Old Dobbin may be a second rate now, but he will continue for some time to fill his particular sphere of endeavor with a faithfulness which the motor car cannot always be relied upon to give.

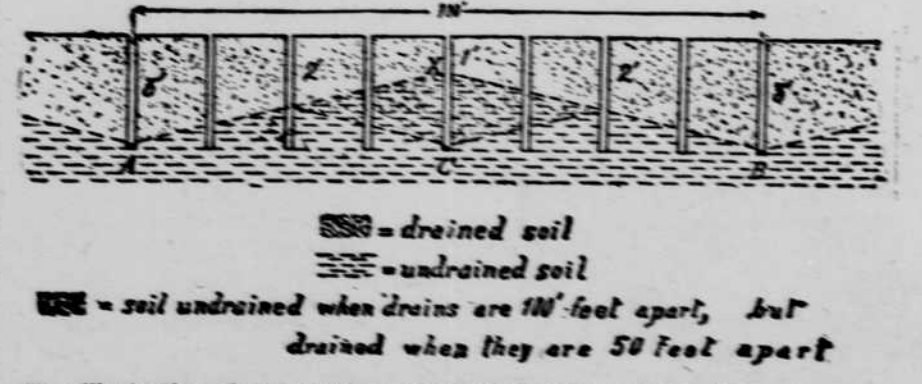
RIDDING FARM OF GRASSHOPPER

Favorite Remedy, Recommended By Colorado Agricultural College Is Arsenic Bran Mash.

(By S. ARTHUR JOHNSON, Colorado Agricultural College.) In spite of the fact that a great deal of work has been done by experimental stations on grasshoppers, no royal road to control has yet been found. Each attack has to be considered on its own merits and relief sought through the most promising channel. One of the favorite remedies is arsenic bran mash. This is made by mixing one pound of white arsenic with 25 pounds of bran. The arsenic is so near the color of the flour in the bran that it is not easy to tell when the mixing is well done. To overcome this difficulty, the arsenic may first be collected by adding a little dry paint. After the bran and arsenic are well mixed they should be moistened with water. Put in just enough to make the particles stick together. This mixture should be scattered where the grasshoppers are thickest. If the insects are invading a garden or potato patch, it is well to scatter the bran mash about the borders. In the fields of alfalfa or grain, the bran should be scattered where the grasshoppers congregate on ditch banks and dry places. All the insects will not find and eat it, but many will and often the crop can be fairly well protected. The writer has never used this preparation against young grasshoppers, but some farmers state that the crops may be completely protected by its use, while others claim that they will not eat it. Of course, it will not do to scatter his substance where chickens will be likely to pick it up, and none of the mixture must be left where domestic animals are apt to get it or be fed from the vessel.

Good Exercise. There is no harm in pigs rooting if they are in a field where rooting will do no harm. Pigs can secure much feed by rooting and the exercise will do them good. Where troublesome roots infest the soil they will often eradicate them if allowed to do so. The fattening hog should not be allowed to root, as the exercise consumes too much feed and energy.

TILE DRAINS IN CLAY SOIL



The illustration shows herewith is from a bulletin of the Ontario Department of Agriculture and shows how the water table of the soil depends on the location of drains. If a field that is undrained three feet deep a number of holes are dug it would be observed after a heavy rain that in those nearest the drains no water would remain. In the hole situated half-way between the drains at C would hold considerable water for a few days. In a clay in fairly good condition it will be found that the slope of the water table is about 1 foot in 25, in loam 1 foot in about 33. The illustration represents a clay soil with drains A and B 100 feet apart. Wells are dug 12 1/2 feet apart. At the end of 48 hours after a heavy rain the water will stand about as indicated by zig-zag lines, in a gradient of about 1 in 25, and hence will be two feet deeper in the centre well than at either drain. Hence if the drains are three feet deep there will be three feet of drained soil over A and B, but only one foot at X. Capillary and soil resistance to water flow play an important part in holding the water highest half way between the drains, and the gradient 1 in 25 represents their combined strength in clay, hence after this gradient is reached drainage becomes very, very slow, and the water table stands in this irregular shape until lowered by evaporation from the soil and plants. But during the months of April, May and sometimes June, when the rains supply at the surface all the water needed for

Value of Birds. A French naturalist asserts that if the world were to become birdless, in nine years' time man could no longer inhabit it. This seems a very sweeping statement at first glance, but when we come to reflect upon the matter we find that it is doubtless a true one. Insects and slugs would multiply so fast, notwithstanding all the sprays and poisons that could be manufactured to annihilate them, that they would destroy the orchards, forests and crops. The land would become one vast desert. Farm Problems. The main problem of agriculture is to show how a farm may be made to pay a reasonable return on the investment and on the labor performed. In a general way it is well known that a farm can be made to pay, and pay well, but throughout the length and breadth of the country there is a woeful lack of knowledge of the existing cost and value of production such as would throw the average business man into despair.

Would Surely Wear A Wig

That is, of course, when he needed one, but he was in no hurry to begin practice. "When I was young," said an elderly man, who was not quite so bald as he might have been, but still bald enough to answer the description, "I used to say that as soon as my hair began to grow my teeth on top of my head, if

it ever did, I would not hesitate to substitute the lost growth with an appropriate wig. I argued that it was not only the correct thing to wear false hair, when necessary, but foolish not to do so, and by the same token false hair was as correct, and that the finger of scorn and ridicule should not be pointed at one more than another. The argument seemed good to me as

could still get hold, and I used the brush exclusively. Now I am sixty and my hair is still thinner, but not thin enough yet for a wig. Of course, if I were as bald as some of my friends are I would not hesitate, but I am not. Maybe at seventy I will feel the necessity, and if I do, you may rest assured I will render nature all the assistance in my power. A wig is all right for any one who needs it, and far be it from me to join the rabble that scoffs at one, but why wear it unless one actually needs it? I don't know why

wigs are held in such bad repute, for they are not only useful but ornamental, and as I said before I repeat now, that when I need one I shall put it on fearlessly and show the scoffers that I am above such small prejudices." Proof Positive. Blix—Theorists are fools. Knox—Is that your theory. Blix—Yes. Knox—Then we will let it go at that.