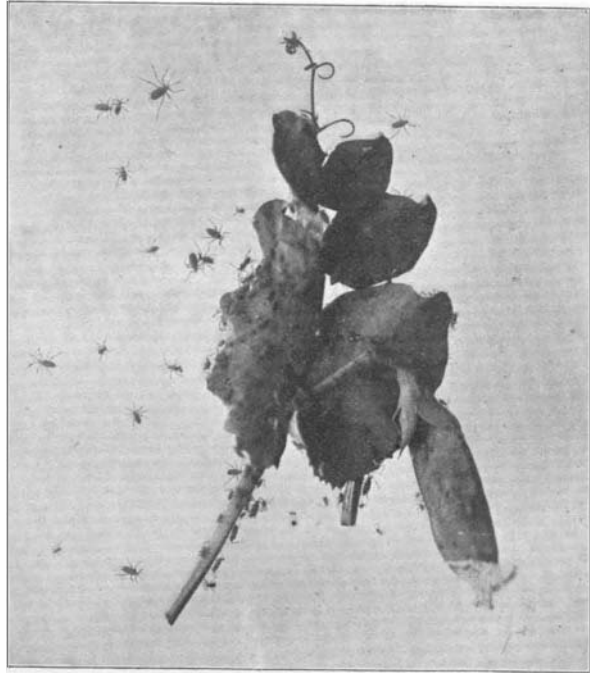


THE PEA LOUSE, A NEW AND IMPORTANT ECONOMIC SPECIES OF THE GENUS NECTAROPHORA.*

The following account is, perhaps, one of the most unique recorded in entomological literature.

The injury by the new pea louse in many places has been complete, and has not been confined to the pea-growing areas of Maryland. I have had it reported from Delaware, New Jersey, New York (Long Island), Pennsylvania, Virginia, North Carolina, Connecticut, and recently from Canada. So far as I can ascertain, this is the first season it has been abundant enough to



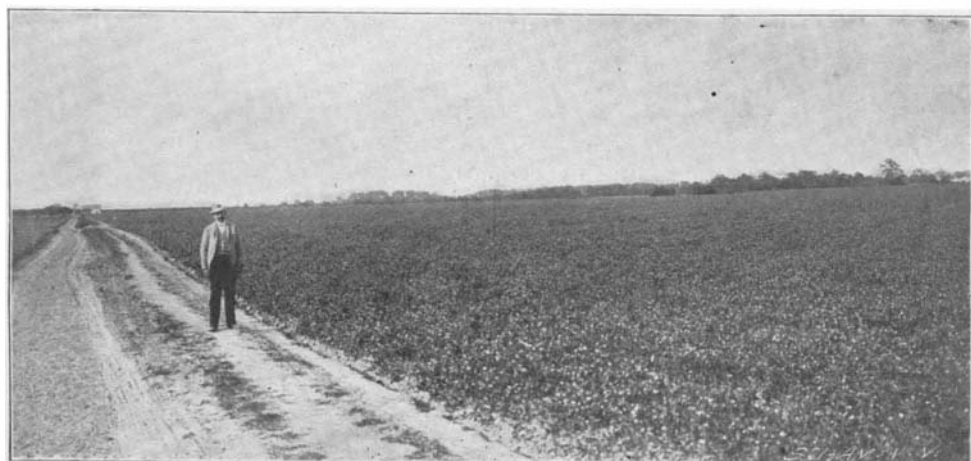
THE PEA LOUSE (*Nectarophora destructor*) WHICH DESTROYED \$3,000,000 WORTH OF PEAS IN MARYLAND THIS YEAR.

attract attention from the economic standpoint. Talking with some of our largest growers, I find that the louse was present in some sections last season, although it was not reported. Some of the laborers who handled the peas in the field complained that the lice got upon them, and some (colored) even refused to pitch peas from certain fields. Last fall the lice were observed on late peas in sections of New Jersey.

The lowest estimate of the loss in Maryland this season, given by the most conservative authority, is \$3,000,000. That this enormous loss should have been attributed to a single species, especially one new to science, hardly seems possible. The loss in other States has been proportionately as great as in Maryland. Never in the history of economic entomology has a similar case been recorded.

DESCRIPTION OF THE INSECT.—The creature to which a large proportion of this loss is attributed is one of the plant lice, a group of insects called aphids, and belonging to the hemipterous family Aphidæ. Strange as it may seem, this insect is one new to science, and by some change in conditions has become conspicuously abundant this season over wide areas upon the cultivated pea for the first time. Why this should be so is one of Nature's mysteries, and affords material for future investigation, reflection, and thought. The insect under consideration, while it had been seen before by entomologists and others, was not compared with other closely related species to see if it had been described. It properly belongs to the old genus *Siphonophora*, but as this name had been pre-occupied for the Myriapoda before Koch made use of it in his work, and is also used to denote an order of oceanic Hydrozoa, therefore, in accordance with zoological practice, we have been obliged to substitute another generic name. Mr. O. W. Oestlund, in his monograph on the Aphidæ of Minnesota, suggests the

* A paper by Prof. W. G. Johnson, of the Maryland Agricultural College, College Park, Md., read August 19, 1899, at the Ohio State University, Columbus, O., before the Association of Economic Entomologists. Revised by the author especially for the SCIENTIFIC AMERICAN.



FIELD OF 100 ACRES, SHOWING CROP OF PEAS DESTROYED BY THE PEA LOUSE.

name *Nectarophora* in place of *Siphonophora*. We accept this name, and henceforth the pea louse will be known in literature as a *Nectarophora*; specifically I propose to call it *destructor*. Its full name, therefore, will be *Nectarophora destructor*.

The insect responsible for this injury is a small, green louse, resembling the color of the vine, and when full grown is about one-eighth of an inch long. It has many interesting things about its life history and habits. In the first place, the young are born alive. If a person should watch one of the larger individuals for a short time, he would see the young protruding from the body of the mother. I have, upon several occasions, shown this wonderful operation to farmers and others this season. Upon the same leaf one will find the lice, from the newly born to the adult. As a rule, the majority of the lice are wingless; but as a plant becomes overcrowded or fails to furnish the necessary food supply, wings appear and they take flight to more favorable feeding grounds. Thus the species is spread rapidly from field to field. Upon one occasion this season, when I was making observations in a 42-acre field which had been completely destroyed, the insects were taking flight and leaving in such great numbers it was very disagreeable to ride or walk through the field. It obtains its food by sucking the juices from the leaf and stem. They cluster upon the plants in great numbers, getting between and underneath the leaves. They insert their lance-like beaks into the tissues of the plant and draw out the sap. The lice exude a honey-dew, and this is smeared over the plants. The lice cast their skins several times during growth, and these cast skins adhere to the leaves in the honey-dew, giving badly infested vines the appearance of having been dusted with something white. The vines wilt and die from the attacks of the lice. We know of one instance where 480 acres out of 600 were a total loss; we have records of another where 400 out of 510 acres of peas were lost. We have many records of acres, from the garden patch to a 100-acre field, that have been destroyed by this pest this season.

In view of the fact that we have, as yet, found no satisfactory remedy for the destruction and control of this species, we have spent much time observing the natural enemies.

The most important natural reducing agents have been the *Syrphus* fly larvæ. I have observed three species, one of which, *Allogropta obliqua*, has been abundant. In one instance twenty-five bushels of larvæ of this species were screened out by a prominent packer, the last three days he worked. Such a statement seems incredible; but actual observation proved that nature was doing her part thoroughly. At this time hardly a louse could be found, where only a week or ten days before they were working by countless millions.

The American *Syrphus*, *Syrphus americanus*, usually has been associated with the preceding species. The larva is larger than that of *Allogropta obliqua*, brownish in color, somewhat mottled, and longer. It also pupates upon the plant, or even at or below the surface of the ground. The adult is much larger and can be distinguished, even during flight, by its bee-like hum. The remaining species, *Spherophoria cylindrica*, was not common, but found in two localities associated with the others, and is much smaller than either of them. Of the native lady beetles, four species were observed feeding upon the lice. *Coccinella notata* was most abundant in Frederick and Carroll Counties, in which both adults and larvæ everywhere swarmed in the fields. June 30 I found pupæ of this species attached to weeds, leaves, grass, and corn—in fact, almost everything where larvæ could secure a hold. Sometimes three or four were found upon a single leaf. The lice were on the decrease, and it was clearly seen that the lady beetles, etc., would nearly destroy those remaining. *Megilla maculata* was found in nearly every field examined, and an occasional specimen of *Coccinella sanguinea*. *Hippodamia convergens* was also quite abundant. The larvæ and eggs of the laced-winged fly, *Chrysopa oculata*, were found throughout the infested districts of the State, and it has been an important factor in the reduction of the lice. The soldier beetle, *Podabrus rugolus*, was also observed by me feeding upon the lice in my garden near the college.

This completes the list of predaceous insects observed and bred. I was surprised, however, in not finding any hymenopterous parasites in the lice. The only parasite bred was *Bassus letorius*, which is considered a parasite on the *Syrphus* fly larva. On June 18 I noticed

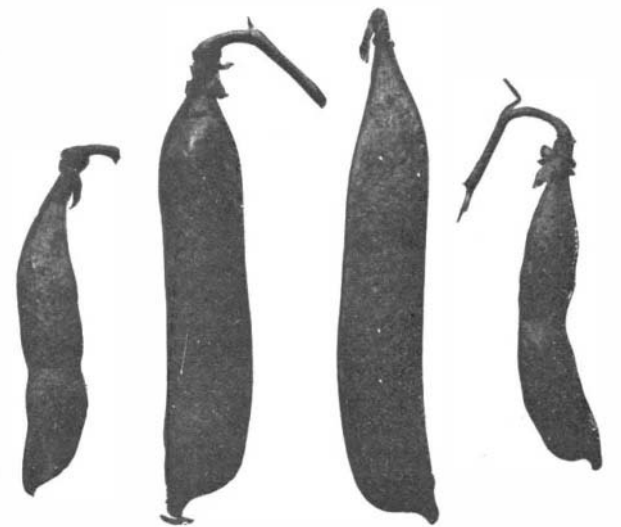
a number of dead lice. The disease continued until about the 25th of June and finally disappeared. Sometimes ten to twelve dead lice were found in all stages of development upon a single leaf. The same disease has since been reported to me in pea fields in New Jersey. A few lice were found on peas in my garden through the greater part of June and July, and in September were reported as still doing injury to sweet peas in Canada.

As to the future, candidly, I am of the opinion that it will be many a day before we shall see a repetition of such devastation of the pea crop by *Nectarophora destructor*. Nature has done her work well, and there is nothing left for the economic entomologist to do except to acknowledge his inability to cope with such mysterious visitants and plod along as best he can. Mother Nature seems to be calling a halt; but man, in his eagerness to gain a livelihood, is going ahead blindly, apparently not heeding her challenges that he is going too fast.

To bring more vividly before you the ravages of this pest, I have here photographs of a 42-acre field, also of a 100-acre field (shown in the illustration); and these are the places where the pea vines were plowed down at my suggestion. From the photograph you will see the normal peas in the middle, where they were not attacked by the insects, and those at the side showing the dwarfed, diminished peas usually found on the vines at the time the vines were found stunted and shriveled. In another view you will find a few of the lice themselves, literally covering the leaf.

Wood Pulp for Poultices and Surgical Dressings.

Mr. Frederick T. Gordon, a hospital steward at the League Island navy yard, has been for some time conducting experiments on the use of wood pulp in surgery and he gives the results of his experiments in a recent number of *The Medical Record*. Wood pulp is obtained in its crude form from the manufacturers and comes in sheets of any size and thickness. It is cheap, easily obtained and possesses valuable properties. When macerated in water, it wells up and absorbs from four to five times its weight of liquid, retaining it for a long time. As the pulp becomes soft a poultice of any desired consistency can be made by varying the quantity of the water. By using hot water the resulting poultice will retain its heat and moisture much longer than a similar poultice made of bread or flaxseed. Of course, antiseptic drugs soluble in water



PHOTOGRAPH SHOWING PEA POD IN NORMAL CONDITION AND DWARFED BY PEA LOUSE.

may be dissolved in the water in which the pulp is to be soaked, as the pulp itself is unaffected by most drugs. When dry, the pulp will absorb both oils and fats. This is particularly valuable, as it can be used as an emollient and antiseptic substitute for salves, etc., on lint as a surgical dressing. Wood pulp can be molded when moist, so that it can be used as a splint, owing to the fact that it dries very hard. When kept slightly wet with an antiseptic solution, the pulp remains soft and can be used as an absorbent dressing. Crude wood pulp can be sterilized by heating in an ordinary sterilizer. If the heat is increased so that the surface is charged, it will act as a deodorizing dressing. Poultices of wood pulp are far superior to flaxseed, and being perfectly stable do not deteriorate in any climate, and owing to its small compass a considerable supply can be carried. Should it become wet, it can be dried in an ordinary stove. It is an ideal material for the country practitioner, being always the same, insuring uniform results. A sheet four feet square costs only about 15 or 20 cents.

THE Wagner-Pullman Palace Car combination is an important event in the railway world. The Pullman Company was organized in 1867 to operate a service of sleeping and parlor cars. The company owns and controls about 500 cars, which are operated over 121,662 miles of railway in the United States, Canada, Mexico and in some places in Europe.

Science Notes.

The Appeal Court of England holds that a reporter has no copyright of the report of speeches giving not only ideas, but words by which the ideas are expressed. A lower court decided that *The London Times* had copyright in reports of speeches. *The Times* will take the case to the House of Lords.

There will be a model American post office at the Paris Exposition. Arrangements have been made with the French postal authorities whereby mails for Americans in Paris will be sent directly to this office instead of going through the regular channels. The post office will be fitted up with all of the modern postal appliances.

Serious apprehensions are felt that the drought now prevalent throughout the United States will prove a serious injury to the paper trade. There is great difficulty in filling orders. In Maine particularly the water supply has not run as low as at the present for nearly forty years. Mills which run by water power are seriously crippled in most cases.

A prize of \$100 has been offered by Dr. Louis L. Seaman for the best thesis on the following subject: "The Ideal Ration for an Army in the Tropics." The competition is open to all commissioned medical officers of the United States army and navy. It is offered through the Military Service Institution of the United States, and the competition will close on March 1, 1900.

It is said that silkworms are very sensitive to the action of light of different colors, and according to experiments recently described by Flammarion, before the French Academy of Science, silkworms were kept in boxes covered with glass of different shades. The silkworms all received the same food, but they gave different results as to the quantity of silk and eggs, and also in the proportionality of the sexes.

The Royal Institution of Great Britain has just published an attractive pamphlet on the Spottiswoode collection of physical apparatus, which was presented to the Royal Institution by W. Hugh Spottiswoode, in 1899. The late William Spottiswoode, who died in 1883, will be remembered for his remarkable experiments in electro-magnetism, by his great induction coil, by his work in light and for his frictional electrical machines.

An extraordinary operation was performed a few days ago at Bellevue Hospital, New York city. A messenger boy lost his nose and his right eye in a trolley car accident last June. In order to save his life the doctors allowed his wounds to heal; finally it was decided to perform an operation which should give the boy some relief from the disfigurement of his face. A gutta serena base was shaped, and over this the skin was drawn together with fine silk sutures and the wound was allowed to heal. The operation was an entire success.

Interesting experiments with the Pollak-Virág system of fast-speed telegraphy were made on several occasions recently between Budapest and Vienna; a speed of 1,300 to 1,500 words per minute was obtained. Transmission is effected by a perforated strip of paper as in the case of the Wheatstone automatic telegraph, and a telephone fitted with two small mirrors serves as the receiver, the diaphragm of the telephone being set into oscillation corresponding to the current impulses generated by the transmitter. These oscillations are made visible photographically. This extremely interesting system, illustrated by records, is given in the current number of the SUPPLEMENT.

The ordinary belfry bell, in order that its full power may be felt, is necessarily an imposing mass of metal, but an Englishman has succeeded in producing bells which are absolutely cylindrical and which do away with many of the disadvantages of the ordinary bells. Whatever be the note that is to be furnished, the tube that gives it is of constant diameter and thickness for the various tones, and differ only in length. The result is a great saving in metal, and the possibility of obtaining notes with mathematical precision. Such an advantage is not a slight one, since the harmonizing of ordinary bells necessitates a special corps of tuners. The tube bells are illustrated and described in the current number of the SUPPLEMENT.

A number of experiments have been carried out by Boland on the formation of pigment by the *Bacillus pyocyaneus* (Centr. f. Bak., xxv., p. 897). He finds that this organism forms only two pigments, a fluorescent one, apparently identical with that formed by many other bacteria, and the blue pigment pyocyanin, which by oxidation becomes converted into a reddish-brown pigment, pyoxanthose (pyoxanthin). A blue chloroform solution of pyocyanin becomes quickly changed to a green by sunlight. A blue watery solution of pyocyanin is likewise changed by chlorine. The green chloroform solution treated with dilute (1:3) sulphuric acid becomes a deep yellow; with dilute hydrochloric acid (1:3). The former mixture on being neutralized with an alkali again gives a green solution on shaking with chloroform; the latter by the same procedure yields a blue solution.

Engineering Notes.

The Philippine army has twelve Colt automatic guns, thirty-three Gatling guns, twenty-one 2-pounder mountain guns, twenty-two 12-pounder mountain guns, and twelve Sims-Dudley dynamite guns.

An official of the Spanish navy at Havana has made three attempts to sell the floating dry-dock at auction, but without success. The Spanish government has decided to tow it to Spain, as it is worth in the neighborhood of half a million dollars.

The New York Central and Hudson River Railroad has decided to equip five of its new locomotives now building with the Vanderbilt firebox, invented by Cornelius Vanderbilt. We have already described this firebox, and we are pleased to know that the railroad company is to make a further and more searching test of the device, which has already given such satisfaction.

A few years ago a sea wall was built at Barrow, England, to keep the sea from the workings of a mine, and it is now proposed to make an embankment 6,750 yards long to inclose about 170 acres of land under which the mine has been extended, the existence of ore having been demonstrated under that area. It is estimated that the work will cost nearly \$3,000,000, but the ore is of the finest quality.

The application of salt to roadbeds will be tried this winter in New York. It is believed that salt will prevent the top soil from freezing, thus obviating the mud which invariably comes with the thaw. According to The Municipal Engineer, Prof. Burr, of Columbia University, says of the proposed experiment that the effect of salt would be to lower the temperature at which the surface soil would freeze, and it would also take up the moisture, and so, perhaps, do away with the mud. It is an experiment which is well worth trying.

A suit for \$5,000 damages in each case has been brought against the Bridgeport Traction Company by an administrator of the two victims of the Stratford trolley disaster. The complainant in this case alleges gross and wanton negligence, imperfect roadbed, car, curves, guard rails, and overwork of motormen. The suit is commenced in view of a decision of Judge Wheeler in the Supreme Court just before the disaster, which held that under the State law practically only nominal damages could be obtained in a case where death was sudden and painless. The suit just brought will settle an interesting legal point.

One thousand eight hundred and thirty-three workmen are now engaged on the Assouan dam on the Nile on the Mohammed Ali portion, and 1,572 of these are natives. On the other portions, 5,983 are engaged, making a total of 7,816 employed in all. Excavations in rock and soft material are being carried on in the navigation channel, and at the side of the dam 14,035 cubic meters of masonry have been built; 466,000 bricks have been burned and 300,000 more are made, and a large quantity of stone has been quarried and dressed. At the Assiout barrage 12,000 men have been employed.

Tree and shrub planting along the Suez Canal to protect it from drifting sand is in progress. Reeds have been placed along about 9 miles of waterline of the canal proper and along the whole length of the Sweetwater Canal. These reeds are at first protected against the violence of the bank eddies caused by passing ships by fascines, while on the slopes and top of the banks of the Sweetwater Canal plantations of shrubbery have been set out. A system of irrigation has been organized for these plantations, the water coming from the Nile by the canals excavated when the ship canal was being built. The results so far have been very promising.

A short time ago, at the request of one of the Imperial Commissioners of Germany, the general passenger agent of the New York Central Railroad sent to Berlin photographs of the interior and exterior of our finest cars and other data in relation to the operation of American railways. Several other countries have asked for similar information, and there is a general awakening of foreign nations on the subject of transportation, brought about mainly by the wonderful achievements of American railways. Probably no one is better fitted to deal with the subject than George H. Daniels, whose very important address on American railroads is begun in the current SUPPLEMENT.

Discoveries have recently been made in the lava beds of New Mexico which throw a new light on the very complete systems of reservoirs and irrigation viaducts which were employed by the ancient inhabitants of that part of the country. Under the lava which covers hundreds of square miles are found traces of cemented ditches and reservoirs that are marvels of civil engineering. Ditches wind in and out at the base of the mountain ranges, following the sinuosities of the canals in such a manner as to catch all the storm water before it was absorbed by the loose sand at the mountain's base. Reservoirs at convenient places stored the water, which was led in cemented ditches across loose soil to the various points where it was required. Chasms were crossed by viaducts.

Electrical Notes.

In Germany at points where there is danger of high-voltage electric currents, there is a conventional representation of a zigzag bolt of lightning. This is painted on transformer chambers, poles and similar places.

Aluminium feed wires will be used in the new Northwestern and Chicago Railway, and will consume 150,000 pounds of that metal. The feeders will be placed in a wooden box covered by a board walk between the double tracks, and will be supported on vitrified clay blocks placed about nine feet apart.

In both South and Central India the need of cheap power is specially felt, and in these portions of India are some of the grandest falls in the entire country. The falls of the Himalayas, in the northern part of India, could be utilized were they not too far from places where industries can be profitably carried on.

The Superintendent of the United States Geodetic Survey will have the "Pathfinder," the new vessel of the Survey, equipped with apparatus for the wireless system of telegraphy. The vessel will go to the Aleutian Isles, and it is thought that by the wireless telegraphy the difference in altitude of the islands will be determined accurately.

An electric rack-railway has been built at Laon, France, to connect the railway station with an elevated plateau 672 feet above the station, where most of the inhabitants live. The overhead trolley system is used in combination with a rack-rail track. Ordinary street cars are used seating forty passengers. The total cost of the line, which is a mile and a quarter long, was nearly \$90,000.

That the system of transfers which obtain on the trolley lines in our large cities is too liberal is shown by the fact that in New York a newspaper reporter determined to test the possibilities of the transfer system. He succeeded in transferring unchallenged 107½ miles, making 87 transfers for a single five-cent fare. The ride occupied twenty-four hours. It is said that he could have gone still further had he so desired.

A new electric railroad is to be built in Northern Ohio, to connect the city of Toledo with Norwalk, about 60 miles. The road will be built according to good steam railroad practice. It is designed for a speed of at least 40 miles an hour, and will be worked from one central power station, a three-phase alternating current being used at high voltage. The current will be transmitted at about 15,000 volts pressure and will be stepped down and transformed at the substations.

An electric light wire in Brooklyn broke on October 31, and was inadvertently stepped upon by a boy. It immediately coiled around his neck and arms. A policeman took hold of the boy's body and tried to pull him away; but he was knocked unconscious by the shock, and if he had not been wearing rubber boots he would also have been killed. It was some time before an ax could be obtained, and another man was overcome before the wire was cut, and it was then found that the boy was dead.

The French government is considering the advisability of discontinuing the use of the guillotine and contemplates the adoption in its stead of electrical execution. The head of the criminal is inclosed in a helmet somewhat similar to that used by a diver. When the executioner turns on the current two needles leap from their sockets, penetrate the temples and enter the brain. A powerful alternating current ruptures and destroys the brain cells so quickly that it is believed that death will be instantaneous. This seems like a clumsy method of execution, but there is no question that it will be efficacious.

A very satisfactory test of the McElroy-Grunow improved third rail system was made at New Britain, Conn., on the tracks of the New York, New Haven and Hartford Railroad on November 9. An improved circuit breaking device, the invention of Mr. William Grunow, Jr., was shown in operation, and worked well. The circuit-breaker used to break the circuit as soon as the car passes over the section of track beneath it, consists of an electro-magnet placed in a box supported on a spring connection adjoining the track. The terminals of the coils of the magnet are connected, one by a circuit to the third rail, and the other to an additional energizing rail beside it. The contact shoe on the car as it enters a section closes the circuit between the third and energizing rails which causes the armature of the magnet in the box to be brought in contact with the top of the box, thereby connecting the main feeder current from the feed wire, hung on the poles, to the third rail, the current passing through the cores of the armature and the box to the third rail. The energizing rail is made in sections equal to a car's length, the ends being beveled to permit one end to pass the end of the adjoining rail. This allows the shoe to maintain constant connection between the section the car is leaving and the next section of track ahead. There is thus no danger of sparking or of the circuit-breaker burning out. There is the further advantage that the track is guarded against short circuits, and made less dangerous for persons or animals who may cross it.