UNITED STATES

DEPARTMENT OF AGRICULTURE

BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE NEWS LETTER

VOLUME IX

UNITED STATES DEPARTMENT OF AGRICULTURE

BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE

N E W S L E T T E R

FOR NOVEMBER 1941

Vol. IX, No. 1 (Not for publication) January 1, 1942

REMEMBER PEARL HARBOR

ADMINISTRATION

Rohwer and Popham Receive New Assignments

On December 4, 1941, Sievert A. Rohwer was placed in charge of regulatory work, retaining his position as first assistant chief of the Bureau, and William Lee Popham was appointed an assistant chief in charge of control operations.

Mr. Rohwer was born in Telluride, Colo., on December 22, 1888. He was educated in Colorado and came to the Department in 1909 as a taxonomist. In 1923 he was placed in charge of the new Division of Insect Identification of the Bureau of Entomology, and in 1927 was assigned to general administrative duties. When Plant Quarantine and Control Administration was created in 1928 he was appointed assistant chief of that Bureau. In 1933 Mr. Rohwer was transferred to the Bureau of Entomology as assistant chief and continued as such when the Bureau of Entomology and Plant Quarantine was created in 1934.

Mr. Popham was born in Corvallis, Mont., on February 26, 1901. He received a B. S. degree in agriculture from Montana State College in 1923, and did 2 years' postgraduate work in botany and plant pathology at the same school. His first position was with the Montana State Horticultural Board, and he entered the Department of Agriculture's Bureau of Plant Industry in September 1924 as a State leader in black stem rust control. In 1928 he became regional leader for Montana and Wyoming and in 1930 a field supervisor for 13 North Central States. He came to Washington as assistant chief of the Division of Barberry

Eradication in 1931 and when this work was taken over by consolidation with the Bureau of Entomology and Plant Quarantine in 1934 he was placed in charge of barberry-eradication work.

Report by Bureau Eyewitness of Attack on Pearl Harbor

"On the morning of December 7, 1941, Jim Nichols and I had gone to Hickam Field for a routine inspection of planes due to arrive at 6 a. m., and also to cover ships due to arrive at Pearl Harbor, which is adjacent to Hickam Field, a little later. Since the planes had not arrived by 7:30 a. m., I told Jim that perhaps I should go over to Pearl Harbor and see if the ships had entered. On the way over to the Pearl Harbor Gate, I had a hunch that maybe it would be better if I 'phoned the Officer of the Day from the Gate, and, if the ships were not in, go back to Hickam Field to help him. I called the O. D. and he told me the first ship would dock in about 45 minutes, and asked me to come up and have coffee with him and the customs officers. At first I thought I might do so, especially since I had not had any that morning, but before I had much time to think, I had told him that I had to go back to Hickam to do some work. When I returned to Hickam Field, about 7:45, Nichols was walking around outside the operations building. I honked, and he came over and sat in the car with me. We had sat there talking perhaps 5 or 6 minutes when suddenly the quiet Sunday morning air was torn with the droning, whistling screech of planes in the direction of Pearl Harbor. Then we heard an explosion, then another, We immediately got out of the car, and saw dive bombers diving into Pearl Harbor in quick succession, each releasing his deadly explosives. We watched this, stunned, for perhaps 30 seconds, thinking at first--and hoping--that it was practice fire. Boiling, swirling clouds of black smoke told us, however, that this was not a practice session, but the real thing. Of a sudden there came roaring from high above on our right a dive bomber, nosing directly toward our location in Hickam Field. The bomb burst within perhaps a hundred yards of our car, sending giant streaks of bluish-brown soil high into the air. Up to this time, I had noticed no unusual activity on the field; the men standing around seemed stunned, as we were, at the show taking place before our eyes. Then I asked Jim if he didn't think we should try to get out of the reservation before activities or bomb holes blocked our way. I suppose he said 'yes,' because we were soon under way. Now the air was filled with planes—not only dive bombers but with bombers skimming just over the trees and over our heads as we drove along. Army men with pistols pulled them out and shot at the invaders. They replied with machine-gun fire. The bullets made puffs of dust along our way and zinged through the air as they ricocheted off the pavement and other objects. We could see the bombs under the low-flying planes as they flew into Pearl Harbor. In the excitement, it seemed that there were hundreds of the ships, all enemy, but perhaps there were not more than a hundred. Before we were more

than a mile from Pearl Harbor, other clouds of smoke were billowing from the Naval Reservation, and the sky was flecked with puffs of antiaircraft shells. Back in Honolulu the streets were quiet and no one seemed to know of the attack. Our fellow workers on Sunday duty in the Post Office laughed at our story of an attack on the islands. Of all the birthdays I will ever celebrate, December 7 of 1941 will no doubt remain the most indelibly marked."

W. C. Goolsby

BUREAU EMPLOYEES CALLED TO THE COLORS OR TRANSFERRED TO SPECIAL NATIONAL DEFENSE ASSIGNMENTS

James, Edwin F., Under Biological Aide, Fruit Ins., inducted, Select. Serv., November 7, 1941.

FRUIT INSECT INVESTIGATIONS

Lead arsenate injures peach foliage in South.--This year weather conditions in the South were unusually favorable for injury to peach trees from the use of lead arsenate. According to Oliver I. Snapp, of the Fort Valley, Ga., laboratory, some precipitation was recorded on 19 days in June, 16 days in July, and 16 days in August. Injury from lead arsenate applied to Elberta peach trees according to the regular schedule increased until, by the end of peach harvest on July 21, it amounted to very heavy foliage injury, severe defoliation, and occasional fruit injury. The trees that had received the regular schedule of lead arsenate sprays during the season were from 90- to 95-percent defoliated when the final observations for foliage injury were made on September 12, 7 weeks after peach harvest, whereas the trees that received no lead arsenate during the season were in full foliage on that date. This injury caused many fruit buds to open in September, which will reduce the 1942 peach crop on these trees.

Partial protection of raisins from saw-toothed grain beetle.--Two experimental stacks of boxes of stored raisins, prepared by Charles K. Fisher, of the Fresno, Calif., laboratory, were sampled at intervals. One stack was protected by an oil-filled trough barrier at ground level and by a canvas cover, edged with a tanglefoot preparation, to prevent infestation by insects falling from the roof structure. The other stack was unprotected. Before the storage period began, the raisins were passed over a cleaner. The calculated infestation of Oryzaephilus surinamensis (L.) per ton in the protected and unprotected stacks is shown in the following table.

Date of sampling	O. surinamensis in--			
	Protected stack		Unprotected stack	
	Immature	Adults	Immature	Adults
	Number	Number	Number	Number
December 7, 1940 1/	1,099	2,777	457	2,511
Do. 2/	111	186	69	379
March 1, 1941	0	0	0	263
April 5, 1941	0	203	0	2,548
May 3, 1941	5,212	316	14,579	1,944
June 7, 1941	6,329	1,600	48,806	6,314
July 5, 1941	8,867	7,126	11,670	13,157
August 2, 1941	3,033	2,933	3,038	4,921
September 6, 1941	649	1,538	802	6,915
October 4, 1941	249	3,019	120	15,218
November 1, 1941	384	1,536	114	35,380

1/ Before cleaning.

2/ After cleaning.

MEXICAN FRUITFLY CONTROL

No larvae nor adults found in Texas.--Grove inspections were made in November in 2,256 citrus plantings in Texas without finding any larval infestations of the Mexican fruitfly. Approximately 9,000 traps were also operated throughout this period, but no adult Mexican fruitflies were taken. From these results it would appear that the annual fly movement northward from Mexico is no further advanced than normally, and may be somewhat later this season than usual. Fruit certified for shipment from the regulated area amounted to 4,496.1 equivalent carlots during the month of November. For the season, fruit shipments have reached 7,398 equivalent carlots. This is a slight decrease from the amount of fruit moved from the area for the corresponding period last season.

CEREAL AND FORAGE INSECT INVESTIGATIONS

Coleoptera captured in Japanese beetle traps during 1941.--Philip Luginbill, Lafayette, Ind., reports that, for the fourth consecutive season, the May beetles captured in Japanese beetle traps operated at many of the field stations of this Bureau through the cooperation of Erle G. Brewer, in charge of Japanese beetle quarantine operations, were sent to the Lafayette laboratory for determination and study. With these Phyllophaga were many beetles of other genera, most of which were identified and included in a special report, which is on file in this Division. The collections during 1941 yielded 9,668 May beetles, representing 54 species and 3 varieties. These came from 64 locations in 22 States and, as in previous years, most of these were from the southern part of the

United States. These collections also provided new State records for 8 species, and 63 new county records for many other species.

Rice stinkbug as a pest of sorghum.--R. G. Dahms, Lawton, Okla., reports that sorghums at the United States Dry-land field station at Lawton were attacked by hordes of rice stinkbugs (Solubea pugnax Fab.) from August 7 to August 23, 1941. As there were many varieties and strains of sorghums growing at the station, an opportunity was afforded to study the effect of this insect on different varieties and on sorghums that matured at different dates. The varieties that were nearing maturity when the bugs invaded the field were injured less than were those in the early bloom stage. Plats of Sumac sorgo maturing on August 13, August 18, and September 5, yielded 49.6, 20.3, and 7.4 bushels per acre, respectively. One variety, White Darso, Ks. 33-378, was injured much less than were two other varieties of White Darso (Sharon X Darso Wdw. 48-12 and Dawn X Darso Wdw. 52-29), although all three varieties were "first headed" on the same day.

JAPANESE BEETLE CONTROL

Safety practices and Red Cross first-aid training.--To inexperienced men, scouting over rough terrain, climbing large trees, and topping and felling trees are dangerous occupations if definite safety practices are not observed. The use of poorly adapted W. P. A. personnel for such work has increased the need of safety training. Because the field crews are often away from roads and other help, first-aid training is important. Furthermore, the possession of good first-aid and snake-bite kits and a knowledge of first aid has often made it possible to help injured nonemployees. The foremanship training manual carried by each field crew contains a section on safety orders, regulations, and suggestions, and a section on first aid. The first-aid section is written to serve the type of injuries likely to occur and the conditions likely to be present at the accident site. Each crew or truck carries a 10-unit first-aid kit. The crews working at distances from their trucks carry pocket kits. Crews working in poisonous-snake areas carry snake-bite kits. Antivenom for the use of our men is kept at conveniently located hospitals, police stations, and physicians' offices. Red Cross first-aid training has been used extensively during the last 3 years to supplement our safety and first-aid training. Not only are all supervisors urged to take advantage of any Red Cross first-aid courses but security-wage workers are encouraged to join classes, often conducted by our supervisors. Of a total personnel of 2,200 over 350 have taken Red Cross first-aid work. In addition to these 350 men now employed, it is estimated that 1,000 former W. P. A. workers took first-aid courses when working on Dutch elm disease. Ten regular employees have instructor's certificates, 13 others have had advanced courses, and 45 have standard certificates, whereas only 8 have not taken advantage of first-aid courses. Among the field security-wage workers, there are 3 instructors, and 8 advanced and 262 standard certificates. Among the regular and W. P. A. employees at the Division headquarters there

are 4 with standard training and 14 who expect to enroll in courses this season. Those now conducting standard and advanced courses are O. N. Liming, J. F. Wootten, D. H. Slayback, R. E. McCarthy, H. L. Cramer, S. L. Stonebraker, F. Theall, A. E. Peters, V. S. Manifold, and D. Buxton.

Connecticut sanitation crews aid in extinguishing fires.--A sanitation crew arrived at a property in Clinton to haul away a Graphium tree. They found painters had been burning paint off an unoccupied house. Blow torches had set fire to the walls and the fire had already reached the roof. The foreman immediately put into use his fire pump and at the same time sent a driver to the nearest telephone to notify the fire department. By the time the fire equipment arrived the blaze was pretty well under control. On another occasion a crew foreman, scouting ahead of his crew tagging trees to be removed, smelled smoke. He knew that he had no fires going in the vicinity and that there were no occupied residences nearby. He finally located a grass fire, which was spreading rapidly toward the barn in an unoccupied farmyard. With the help of one of his crew members, he beat out the flames and by the time help arrived had the fire under control.

Many confirmations obtained by sampling elms removed within 25-foot radius of confirmed trees.--Results obtained in Pennsylvania from removal of elms within 25 feet of original Dutch elm disease cases offer additional corroboration of the benefits of this practice. Some 20 confirmations have been obtained in the Allentown work area in this manner. In most cases the original suspect was removed as beetle material, and the removal of the 25-foot-radius elms could not be considered at that time. After a confirmation was received, permission was obtained for the cutting of nearby elms and several other diseased trees were found. In many instances the trees involved displayed no outward symptoms and very little streakage was present. In some places confirmations were obtained beyond the 25-foot radius by sampling all elms in the immediate vicinity of the original D. E. D. In the Easton district, 6 elms that were within the 25-foot radius have so far been confirmed. All were tagged by sanitation workers while carrying out assignments to remove these trees as elms near D. E. D. Four of the 6 so removed showed extremely few dying tips, while 2 showed none, and it is doubtful whether any apparent symptomatic wilt was present when the scouts first inspected them.

Beetle material left after lumbering in Berkshire County, Mass.--Beetle-material scouts in Massachusetts located an area of about 50 acres which had been cut over in connection with lumbering operations. Approximately 100 elms have been cut for lumber or damaged in the process. The elms cut are sawed into 2-inch by 6-inch timbers which, it is reported, are to be used for the crating and shipping of defense machinery built by a manufacturer in Pittsfield. The operation was started early in the fall and is still going on. The material first cut is heavily infested with Scolytus, and that cut at a later date is still potential beetle material. The beetle

material in this area is almost as great as the total amount tagged in other parts of the area to date. It is believed that the Scolytus found in this area are the first to be found in Lenox Township. This discovery is not surprising as Scolytus has been found in nearly all of the adjoining townships. The county of Berkshire has large stands of white pine, and defense needs have increased the cutting of large amounts of this timber. In nearly every instance some elm is cut or damaged in the process. Seven of these areas have been found to date and they are an important source of beetle material.

Cooperation of property owners in Connecticut.--Through contact with the Connecticut Experiment Station, R. J. Benham, of Washington, Conn., learned that this project would remove and burn beetle-infested elm material, so he wrote the district supervisor asking that he inspect a tree on the Congregational Church property in Washington. The Experiment Station had notified him that it was beetle-infested and should be removed. It was a large and difficult topping job, and with the present scarcity of capable toppers in the district, it would have been an extremely difficult undertaking. Mr. Benham agreed to have the tree topped by a commercial tree company, and also made all arrangements necessary for acquiring a burning location from a local selectman. Permission was also obtained for the removal of freshly cut elm wood nearby. It is believed that Mr. Benham's active participation in the problem gave him a greater interest in the Dutch elm disease eradication project than if this project had taken over the entire job.

Opening of hunting season necessitates care in placing men.--With the opening of the small-game season in Pennsylvania on November 1, a large number of gunners were afield. Although some of the crews were scouting in areas well stocked with various kinds of small game, the shooting caused the men no inconvenience and there was no reason for removing the crews from these areas; however, when the bear and deer season opened the latter part of the month, crews were removed to safer areas. The possibility of being mistaken for a deer or bear is too great; then, there is always the chance of being struck by a stray high-powered-rifle bullet. A crew assigned to scout for beetle material in a large special problem swamp in the East Stroudsburg district of Pennsylvania ran into a bear and they all made for trees. One or two men who could not climb in training were able to make the grade under these circumstances.

Nursery cooperates by advising location of slash.--One of the local nurseries is wholeheartedly cooperating in the attempt to free the Wilkes-Barre, Pa., district of elm slash, which in the past has been found in large quantities and which in many cases has attracted large numbers of beetles. The nursery is engaged in clearing electric light and telephone wires in the city of Wilkes-Barre, the city of Nanticoke, and in the borough of Plymouth. During the course of this work they naturally cut considerable elm slash large enough to harbor beetle infestation. They keep the district office

informed as to where the brush and limbs are taken, affording the opportunity of seeing that it is completely burned by the dump attendants or by our own crews.

Heavy beetle infestation in beaver swamp.--A large crew has been engaged in removing infested trees from a beaver-flooded swamp in the town of Washington, Dutchess County, N. Y. This work progressed rather slowly because of the deep water which covers most of the area. Beetles are extremely abundant in the trees being removed, Scolytus galleries predominating. Adults of Hylurgopinus were observed hibernating in the outer bark of some of the trees. A quantity of this material was collected for use of the Morristown forest-insect laboratory. As an indication of the density of the beetle population in this swamp, it was observed that the woodpeckers waddle rather than fly from tree to tree.

Ohio forest ranger approves burning methods.--The ranger of the State Forest at Zaleski, Ohio, made an inspection tour of the burning operations within forest lands in the Athens, Ohio, Dutch elm disease work area. He expressed his complete satisfaction with the methods of burning used on the project, especially the precautions exercised in presuppression work before fires are set. He was in full accord with the manner in which fires were safeguarded for the night, which consists of covering over the burning piles or ashes with a thick layer of earth.

Trees have place in war spheres.--The following news item appeared in the Stamford, Conn., Advocate of November 4: "The slogan, 'Doughboy, spare that tree!' may gain currency in the army if the advice of a Stamford tree expert is followed. In a letter to Secretary of War Stimson, F. A. Bartlett urged better protection of trees around army camps and airports for camouflage purposes. Reports from the European battle fronts, he said, indicate that high-speed cameras have exposed camouflage with fake trees and paint."

Interesting removal in Pennsylvania.--An interesting D. E. D. tree was removed in the Philadelphia district of Pennsylvania the first week of the month. It was a blown-over tree and color was found where the beetles had attacked it. This proved to be Ceratostomella ulmi, and when the tree was cut it was found that the color had penetrated to the stump. The tree stood on the bank of a wet-weather stream. When the top was removed, the trunk and stump assumed an upright position and the trunk section had to be felled in the regular way.

Tree-surgery company cooperates.--Mr. Sandt, a representative of a tree-surgery company, visited the East Stroudsburg district office of Pennsylvania and advised that he had a crew on line-clearance work for a power and light company and was conducting operations along the Delaware River and west to Log Taverns Ponds. He agreed to notify the district office of any elm material left over 3 inches in diameter.

Scolytus found entering green wood.—Recent observations in the southern part of Delaware County, Pa., indicate that Scolytus multistriatus Marsh. has again been attempting to enter green elm wood.

Property owner hires crew.—Three men in Columbia County, N. Y., did such a good job of removing a tree on a property that the owner hired them to take down another tree on one of their days off duty.

Speedy Bureau action authorizes reshipment of out-of-area elms.—Information was received on November 5 from a nursery located in the New Jersey Dutch elm disease regulated area, to the effect that they had an order for some elm trees to be delivered to a number of defense-housing projects in adjoining States outside the infected zone. They wished to purchase these trees in nonquarantined sections, bring them to their nursery, and ship them to the destination points along with items other than elms. Under proper safeguards there would be no hazard involved in handling elms from noninfected points when they are both received and reshipped during the dormant season of the insects that spread the disease. Observations of the Division of Forest Insect Investigations at the Morristown, N. J., laboratory show that the insect vectors of the disease fungus may come to nursery trees to feed and to hibernate any time between April 15 and October 15. Accordingly, such receipt and reshipment might be permitted with safety between November 1 and March 31. Recommendations for the issuance of administrative instructions to authorize reshipments of this nature were forwarded to Dr. Annand on November 5, and he issued the administrative instructions as B. E. P. Q. 517 on November 8, effective November 10. A form of identifying tag to cover these reshipments was devised and the nursery made their first reshipment under this authorization on November 24. There is a Japanese beetle inspector on full-time assignment at this nursery, so that the matter of receipt and segregation of the trees was under constant observation. This inspector also issued the tags at the times of reshipment. The reshipped trees had been received from a firm in Iowa.

Difficulty in obtaining temporary inspectors.--Competent, temporary inspectors, such as are usually available in the New England States during the Christmas-tree- and greenery-cutting season, have been almost unobtainable this year, owing to the draft and the demands for defense workers. The same difficulty was experienced in obtaining men for the seasonal nursery- and greenhouse-inspection work in the large Connecticut nurseries. In both instances it was necessary to employ some inspectors with little or no previous gypsy moth experience after a short period of schooling. Men who returned to the Bloomfield, N. J., headquarters from Japanese beetle soil-treating work in North Carolina and Ohio were immediately reassigned to the Christmas-inspection activities. Ordinarily these men would have been loaned to the Division of Domestic Quarantines for transit-inspection work during the heavy

movement of Christmas ornamentals. Because of the threat of a railroad strike in November, cutters intensified their efforts to get their shipments off early. In a few instances it was necessary to employ some men in New Jersey and send them to New England on a temporary assignment. Nurseries and greenhouses are experiencing the same problem in obtaining help. Some of the establishments in the Philadelphia area were reported as unable to fill their orders for this reason. In New Jersey a number of nurserymen have offered to employ their help during the winter months, if they agree to stay until the end of May. In some instances wages have increased as much as $1 a day.

Heavily infested soil intercepted.--Among the interceptions at the Japanese beetle highway inspection station on U. S. Route 211 at Sperryville, Va., was a truck containing about ½ yard of soil, en route from Arlington, Va., to Roanoke, Va., the latter a point some 130 miles outside the main regulated area. The nurseryman had been doing some landscaping at Arlington and had loaded on his truck the surplus dirt remaining on the ground after his plantings had been completed. When informed of the quarantine, he immediately unloaded the soil and left it at the inspection station. Seventy Popillia japonica larvae were removed from the soil by screening prior to the usual fumigation of confiscated soil.

Baltimore office moved to Pikesville.--The district Japanese beetle quarantine office previously located in room 306, Post Office Building, Baltimore, Md., was moved late in November to 2 Sherwood Avenue, Pikesville, Md. The new quarters are in a one-story, concrete-block building. They are particularly satisfactory from the standpoint of light, office, garage, and parking space. The location is more centrally situated for activities in this area. The new office is a short distance south of Route 140.

FOREST INSECT INVESTIGATIONS

Pine reproduction weevil found on Sierra National Forest.--C. B. Eaton, of the forest-insect laboratory at Berkeley, Calif., reports the discovery early in November of an outbreak of Cylindrocopturus eatoni Buch. on the Harris Ranch burn, Miami ranger district, Sierra National Forest. The outbreak is in a stand of reproduction growing on the fertile slopes of a ridge southwest of Signal Peak Lookout. The infestation extends over an area of approximately 4,000 acres, which was naturally restocked with ponderosa pine seedlings following the fire that burned off the original stand of timber in 1934. It is estimated that between 25 and 40 percent of the pine on the burn has been killed. The appearance of the weevil-infested reproduction resembles the damage light ground fires sometimes cause to similar stands. Many trees are dead, having brown needles, while others are sickly and yellow. The mortality is not confined to individual trees scattered throughout the dense brush (Ceanothus spp.), which forms a major part of the cover, but it occurs in the patches of pure-pine reproduction spotted over the area, and in the scattered pine seedlings growing in the open over bear clover. By far the greater part of the damage has occurred

within the last 2 years; however, there are remnants of trees infested earlier, and probably there has been an endemic infestation for some time. The insect is now in the larval stage, and a large potential population of weevils is present. This is the first occasion in which the pine reproduction weevil has been found to be causing economic damage in naturally established stands. Hitherto, it has only been known to be injurious to planted stock in the brush fields of northeastern California.

Infestation of Cacoecia conflictana in northern New Mexico.--An aspen leaf roller, which has caused severe defoliation of aspen on the Rio Pueblo drainage southeast of the Angostura Camp Ground, on the Carson National Forest in northern New Mexico, has been determined by J. F. G. Clarke as Cacoecia conflictana (Walk.). According to observations made by N. D. Wygant, Berkeley, from August 25 to 29, the infestation occurs at elevations of about 10,000 feet, and 2,000 acres or more have been heavily defoliated. Light damage to aspen was also observed in other areas on the Carson and Santa Fe National Forests in northern New Mexico. Previous records indicate that this insect is widely distributed from Maine to Utah and northward to Labrador and Alaska. At the time of the examination the insect was in the egg and newly hatched larval stages. The eggs are laid in flat masses, leaf-green in color, on the leaves and trunks of aspen. The larvae apparently feed on the leaves for a short time and then go to the ground for hibernation. The heavy defoliation occurs in the spring, when the larvae curl the leaves into trumpet-shaped rolls. When the insect was first observed by David O. Scott, district ranger on the Carson National Forest, on July 7, it was in the last-instar and pupal stages. Mr. Scott observed that the general emergence of the moths in the field was from about July 20 to about August 10. An ichneumonid parasite, Herpestonus hariolus (Cress.), was reared by him from both C. conflictana on aspen and C. fumiferana (Clem.) on white fir.

Tent caterpillar defoliates aspen in northern New Mexico.--The tent caterpillar Malacosoma, probably fragilis Stretch, defoliated about 4,000 acres of aspen in the Big Tesuque Creek Basin northeast of Santa Fe on the Santa Fe National Forest and about 25,000 acres northwest of Taos on the Carson National Forest in New Mexico during June and July, according to Mr. Wygant, who examined the area in the latter part of August. The infestation on the Big Tesuque Creek Basin received considerable attention by the press in New Mexico, leading people to believe that much of the aspen would be killed unless control is brought about. The aspen, much of which is 3 to 6 inches d. b. h. and 20 to 40 feet high, has little commercial value, but is highly prized by the natives for its scenic, recreational, and watershed-protection values. According to the Forest Service personnel, the insect has been widespread in the aspen in New Mexico and Arizona for years, with the worst epidemic years probably 1933-35. The heavy epidemic centers seem to shift from year to year, indicating that its natural control factors build up locally and bring about its control. Several consecutive years of defoliation are necessary to kill the trees on the usual sites, therefore little mortality of the trees has resulted. On the poorer sites the trees succumb to the effects of defoliation more quickly and mortality has been considerable in such small local spots.

Heavy infestation of Jeffrey pine cone moth in northeastern California.--Heavy damage to the 1940-41 Jeffrey pine cone crop was reported to P. C. Johnson by officials of the Modoc National Forest, during the annual forest-insect

survey of this area early in October. An examination of Jeffrey pine stands in the Big Valley ranger district revealed a widely distributed infestation of cone moths, subsequently determined as Laspeyresia toreuta Grote. Preliminary field counts of cones showed a heavy incidence of attack and several sacks were collected from trees and shipped to the Berkeley laboratory. An examination of this material by J. E. Patterson on October 28, showed full-grown caterpillars and pupae in the axial region of the cone. Out of a total of 15,222 seeds, 35.8 percent had been destroyed by the young caterpillars; however, 90 percent of the cones were infested. This checked to some extent with records of the Durbin Nursery at Susanville, Calif., where 200 sacks of seed from this same area yielded slightly less than 50 percent of the expected normal amount. The examination at Berkeley further disclosed the presence of the following parasites and predators: A chalcid (8.0%), an ichneumonid (1.5%), a small maggot (2.4%), and an enoclerid (0.5%). Efforts of the Modoc National Forest to fully utilize the current Jeffrey pine cone crop, one of the heaviest in recent years, ended in disappointment and the abandonment of cone-collecting activities following the discovery of the infestation. Examinations of Jeffrey pine stands in the Lassen National Forest also showed a widely scattered but lighter infestation of cone moths. The current infestation in these two areas is of economic importance, owing to the infrequency of good seed years and the increasing demand of seed for reforestation.

Defense program accelerates salvage from Tillamook burn.--Early in November, while making an examination to determine the extent of insect-caused deterioration of fire-killed Douglas fir trees in the 8-year-old Tillamook burn, R. L. Furniss, of the Portland, Oreg., laboratory, found that the output of salvage operations has been greatly increased in response to the recent demand for low-grade lumber. Logs that only a short time ago would have been culled because of excessive borer holes are now being marketed at a profit. It is expected that the increased use of lumber cut from borer-infested logs will swell the already numerous reports of borers emerging from various parts of new homes. Cerambycids of the genera Criocephalus and Asemum are the principal insects responsible for these reports. Although the holes they cause are of considerable concern to property owners, the actual structural damage is slight. Apparently there is no danger of reinfestation.

Low winter temperature study continues.--Temperatures lethal to overwintering broods of the western pine beetle have not occurred in the pine forests of eastern Oregon and Washington during the last 4 winters. Nevertheless, according to J. M. Whiteside, of the Portland laboratory, a study designed to obtain data on low winter temperatures within the forest proper has again been set up this winter. Six natural divisions of the pine region of eastern Oregon and three life zones, corresponding to high, mid, and low elevations, within each division were selected for sampling. Thirty-six duplicate stations were located on the western pine beetle survey check plots within each zone. All we need now is some 20°- or 30°-below-zero weather to complete an analysis of variance.

Sanitation-salvage integrated with other marking practices.--Marking ponderosa pine timber on a sanitation-salvage basis, to remove from the stand trees highly susceptible to attack by the western pine beetle, is now being studied by the Forest Service and private operators as a desirable feature to combine with other marking practices, according to W. D. Bedard, Portland. Two 40-acre sample plots on the Deschutes National Forest have been marked in three different

ways, including sanitation-salvage in combination with a system of value selection. The Forest Service and lumber operators will study the results of the various systems for effect on the stand, value, and grade recovery, in the hope of evolving a revised marking rule which will be satisfactory to both Federal and private interests for use on Forest Service timber sales.

Elm bark beetle trapping experiment.--R. R. Whitten, of the Morristown, N. J., laboratory, has compiled data covering 4 consecutive years during which elm bark beetles have been trapped in a small woodland plot located at Whitehouse, N. J. The object of this experiment was to determine whether traps were effective in reducing the elm bark-beetle populations in small woodland areas. The traps used in this experiment were elm trees killed by the internal application of a water solution of sodium chlorate. Approximately 4 percent of the trees standing in this plot were used for each series of traps. This plot has an area of 3-2/3 acres and is surrounded by open farm lands, with occasional scattered elm trees. Through the cooperation of the Federal Dutch elm disease eradication unit, for the last 3 years all the elms within 2 miles of the plot area have been carefully examined and pruned of all parts infested or likely to be infested. This year, in addition to trapping beetles in this area, samples of the beetles were collected in individual, sterile, gelatin capsules and submitted to P. V. Mook, of the Bureau of Plant Industry, to be cultured for the presence of the Dutch elm disease fungus (Ceratostomella ulmi). The trapping results for 1938, 1939, 1940, and 1941, and the culture results for 1941, are presented in the following table:

Year	Total trap trees	Total sections	Scolytus multistriatus: Total galleries	Scolytus multistriatus: Average galleries per section	Hylurgopinus rufipes: Total galleries	Hylurgopinus rufipes: Average galleries per section	Beetles contaminated with C. ulmi
	Number	Number	Number	Number	Number	Number	Percent
May to July Traps:							
1938	22	95	5,667	59.65	2,850	30.000	—
1939	20	113	3,990	35.31	5,141	45.500	—
1940	18	120	2,298	19.15	4,849	40.410	—
1941	18	83	733	8.33	2,925	33.240	1/ 23.4
July to October Traps:							
1938	2/ 21	106	10,314	97.30	1	.009	—
1939	8	44	979	22.25	1	.023	—
1940	18	112	4,612	41.18	26	.232	—

1/ Beetles trapped 3 miles from Whitehouse plot were 14.5-percent contaminated.

2/ Beetles in over 50 percent of the traps treated did not die and so have not been included in the data.

Caged elm trees infected with Dutch elm disease fungus through S. multistriatus.--W. D. Buchanan, of the Morristown, N. J., laboratory, reports that 5 of 80 well-established trees growing in a large cage developed foliar symptoms of the Dutch elm disease. The trees were attacked by approximately 4,000 S. multistriatus that emerged from field-infested and infected logs in 1941. About 7.7 percent of the beetles were found to be contaminated with the Dutch elm disease fungus. Discoloration caused by the organism was found in the 1941 vessels of 8 of the 80 trees, but foliar symptoms developed in only 5 of them. The culture results indicate that most of the beetles had a very light load of C. ulmi, which probably explains why the Dutch elm disease did not develop in more of the trees.

GYPSY MOTH AND BROWN-TAIL MOTH CONTROL

Gypsy moth inspection work and Christmas trees.--The volume of evergreen boughs and Christmas trees cut in western Massachusetts and the southern half of Vermont appears somewhat smaller than usual, because of scarcity of skilled choppers. The operators have had to rely largely on the purchase of small lots of trees cut by farmers who have been attracted by the high prices. While little difficulty has been encountered in examining woodland areas for the gypsy moth well in advance of the regular cutting crews, the field supervisors have had to remain constantly on the alert to inspect the smaller scattered locations where the trees were being cut by the farmers. The operators are not permitted to cut boughs or trees in the immediate vicinity of an infested area.

Brush-disposal machines transferred to new locations.--The brush-disposal machine which was operated for several weeks in townships along the western border of Berkshire County, Mass., was recently transferred to Charlemont, in the eastern section of the county. Arrangements were also made to transfer the other machine from Connecticut to Massachusetts. The latter machine has completed the disposal of approximately 1,200 piles, or about 600 cords, of brush accumulated in some 35 acres of woodland found to be infested by the gypsy moth during the past year.

W. P. A. gypsy moth work in Vermont.--Six crews of scouts and one crew of laborers performed gypsy moth work in Vermont during November. Two of these crews continued scouting work in Lowell Township, Orleans County, where the prospect of completing the work in the most inaccessible areas before the advent of severe winter conditions had appeared to be good. However, the resignation of several W. P. A. employees reduced these crews to such an extent that it is now very doubtful whether the scouting work in Lowell can be finished before the minor roads are blocked by snow. Another crew has found no evidence of the gypsy moth while scouting in Swanton Township, Franklin County, where woodland areas are relatively small and scattered. Three single-egg-cluster infestations were found and creosoted by two crews which have already finished scouting a large portion of Middletown Springs Township, in Rutland County. No indication of gypsy moth infestation has been discovered by a crew scouting in Sudbury, Rutland County. The crew of laborers was engaged in chopping dead and worthless trees and creosoting egg clusters at a woodland infestation in Woodford, Bennington County. Scouting conditions were generally good during November, although some time was lost because of stormy weather during the first part of the month. A 7-inch snowfall in Lowell Township caused no serious interruption in gypsy moth work. Unseasonably warm temperatures and drying winds caused the forest litter to dry rapidly and again

produced dangerous fire conditions during the latter part of November. The gypsy moth crews were detailed to work in open country in the vicinity of settlements, and in other localities not likely to be frequented by hunters during the deer-hunting season, which comprised the last week in November.

W. P. A. gypsy moth work in Massachusetts.--At the beginning of November 9 W. P. A. crews were engaged in scouting for the gypsy moth in the townships of Hinsdale, Mount Washington, Richmond, Savoy, Washington, West Stockbridge, and Windsor, in Berkshire County, and in Blandford Township, Hampden County. Numerous small scattered infestations were discovered in each of these towns. In addition to the scouting, considerable treatment work at infested locations was performed by 10 crews of laborers in the townships of Alford, Lanesboro, North Adams, Peru, Richmond, and West Stockbridge, all in Berkshire County. The work of the laborers consists chiefly of rough creosoting of egg clusters;cutting dead, defective, and otherwise worthless trees; and piling the resultant brush and limb wood for disposal by burning or by means of the brush-disposal machines. The crews engaged in thinning and ground work at a gypsy moth infestation in Richmond Township have already accomplished much treatment work, including the creosoting of large numbers of egg clusters in the most heavily infested spots scattered through the woodland area. As usual, these spots of heavy infestation are found in areas where the tree growth is composed of species most favored as food by the gypsy moth. So far as possible the favored species, such as poplar, gray birch, and oak, are being removed.

W. P. A. gypsy moth work in Connecticut.--Of the 4 W. P. A. gypsy moth scouting crews working in Connecticut at the beginning of November, three were scouting in Litchfield and Salisbury Townships, in Litchfield County, and the other was working in Southbury Township, New Haven County. All scouting work planned for Litchfield Township was completed by the middle of November, and the crew was assigned to scout in the vicinity of infestations located during the last fiscal year in the neighboring town of Cornwall. A few scattered infestations were found in each of these towns. A crew of laborers was detailed to treatment work at a gypsy moth infestation in Litchfield Township during the month. As a result of a cooperative arrangement with the State of Connecticut, one State crew was assigned to scouting work in Kent Township, Litchfield County. Considerable difficulty has developed in connection with the transportation of W. P. A. workers, particularly in Connecticut and Massachusetts, because age or physical infirmity renders many of the men assigned to gypsy moth work unfit to operate Government-owned vehicles. In some sections it has been necessary to assign regular employees to the task of transporting W. P. A. crews to and from work daily.

W. P. A. gypsy moth work in Pennsylvania.--The number of W. P. A. employees engaged in gypsy moth work in Pennsylvania remained fairly stable during November, ranging from a high of 630 to slightly less than 600. This force was divided into 32 crews of scouts and 12 crews of laborers. Fourteen of these scouting crews and 4 crews of laborers were assigned to work in Luzerne County, 8 scouting crews and 5 crews of laborers to work in Lackawanna County, 8 scouting crews and 3 crews of laborers to work in Wayne County, and 2 scouting crews to work in Carbon County. In addition, 4 crews of N. Y. A. enrollees performed scouting work in Luzerne County. Several of the crews in the Pennsylvania area were engaged in scouting wood lots found to be infested in previous years, and which were subsequently thinned and cleaned of ground

debris. Work in such locations progresses more rapidly than in the average woodland, where many egg clusters are deposited in concealed locations in dead or defective trees, in thickets, and on all types of ground litter. Much treatment work was done at gypsy moth infestations in South Canaan and Salem, in Wayne County, where it was necessary to tear down numerous stone walls, creosote the egg clusters, and rebuild the walls. Selective-thinning operations were also conducted at these infestations. About 15,000 gypsy moth egg clusters were destroyed at the center of the South Canaan infestation. The outside limits of these infestations, indicated by the absence of egg clusters, were located early in November. Close scouting work around an infestation in Paupack, Wayne County, indicated that only a small area is affected, and it is believed that this colony can be exterminated without difficulty. Scouting work at a site where a male gypsy moth was recovered at an assembling cage in Cherry Ridge, Wayne County, was completed in November. No indication of the presence of the gypsy moth was found.

PLANT DISEASE CONTROL

Bureau-sponsored W. P. A. project for North Dakota.--Presidential letter dated September 29, 1941, approved a Bureau-sponsored W. P. A. State-wide barberry-eradication project, which was started November 3 in Emmons County. Work will also be carried on in Logan and McIntosh Counties, which are in the same W. P. A. unit and district as Emmons. At present the assigned personnel consists of 1 nonrelief superintendent and 19 relief laborers, including 4 foremen. State, district, and local W. P. A. officials, as well as farmers, business men, and others located in the areas in which operations are in progress, are manifesting interest and cooperation in barberry eradication.

Barberry bushes found in Big Fork area of Montana.--Work under the recently approved State W. P. A. project was started in the Big Fork area on a narrow strip of land, much of which is low and swampy, at the north edge of Flathead Lake. In this area 18 escaped bushes were located, ranging in height from 3 inches to 6- and 8-foot fruiting bushes. Upon completion of this small tract, the survey was moved to wooded areas along the Flathead River and, by the close of November, 8 additional bushes had been found, mostly large and fruit-bearing. In this area some of the most suspected terrain has not yet been worked; however, preliminary reconnaissance in this locality already had revealed 1 location of 15 "escapes" including fruiting bushes, and 2 other locations of large, individual fruiting barberries. At this time 35 relief laborers and 1 nonrelief superintendent are assigned to the project. As is the case elsewhere, it is necessary to take assignments of a number of older men, several of whom are from 60 to 65 years of age. The average age of relief laborers now on the project in Flathead County is 51 years.

Barberry-eradication activities in Nebraska.--During the current fiscal year inspection crews have been established in various counties in Nebraska. At present, seven crews are operating in the northern Nebraska counties and four are working the southern unit. As workers become available additional crews will be added in the southern counties. With the State enjoying one of the most favorable crop-production years in nearly a decade, plus the stimulus of defense activity, procurement of efficient labor under current limitations proved to be a difficult problem. All of the

certified skilled workers employed on the Nebraska project entered private employment with the approach of the harvest season. With the exception of three foremen who later returned to the project, all have continued in the status of private employment.

Memoranda to crew men.--Enthusiastic reports have been received concerning a series of memoranda prepared and distributed in Massachusetts this year by C. C. Perry, State leader, for the information of the field men engaged in the actual eradication of Ribes. During the 1941 field season 14 memoranda were issued; that is, 1 approximately every 2 weeks. These brief statements were designed to give emphasis to important points involved in the field work and to acquaint the workers with different phases of the entire control program so as to stimulate their interest, and psychologically they seem to have a very helpful effect in that the system serves to tie the individual field man into the general control setup. The 1941 series of memoranda were titled as follows: (1) The Blister Rust Control Crew as a Unit; (2) Searching for Ribes; (3) Favored Locations for Ribes Growth; (4) Uprooting and Disposal of Ribes; (5) Making and Following "The Line;" (6) Miscellaneous Weaknesses in Control Work; (7) Blister Rust Kills White Pines of All Sizes; (8) The Eradication of Ribes is Effective in the Control of Blister Rust; (9) Annual Examinations Not Needed to Maintain Control of Blister Rust; (10) Blister Rust Quiz--Questions; (11) Blister Rust Quiz--Answers; (12) Blister Rust Cankers on White Pine Persist after Ribes-Eradication Work; (13) Why Blister Rust Control is Important in the Economic System; and (14) Thank You for Your Efforts! The final memorandum was mailed direct to the laborers (relief and nonrelief). It contained a brief word of recognition of the part played by the individual worker in the control program. The fact that this word came direct from "the office" seemed to be especially appreciated.

Blister rust display.--C. C. Perry also reports that he assisted District Leader William Clave with a blister rust display at the second annual Worcester County Conservation Congress and Exposition, held cooperatively by the biological department of Clark University and the Worcester Museum of Natural History. The display was a duplicate of the one recently staged by District Leader R. E. Wheeler at the Eastern States Exposition, which proved to be very successful. David Potter, director of the Museum of Natural History, saw the original display at Springfield and was so impressed by it that he requested District Leader Clave to abandon another display he had been planning and to duplicate the one at Springfield. Mr. Perry has been requested to transfer the central panel of this display to the Worcester Museum of Natural History to be used as a part of their collection of aids to visual education in natural history.

Data on white pine.--The following, selected from a list published in the July issue of Northern Region News, region 1, Forest Service, are a few facts on the importance of western white pine in the Northwestern region: "More than a million matches can be made from an average Idaho white pine tree. In order to supply the demand for matches made from Idaho white pine, about 13,000 acres must be logged annually. The manufacture of a million feet of finished pine lumber provides employment for 13 men for the greater part of a year. In 1939, 77 percent of the lumber cut in the Northern Rocky Mountain region was Idaho white pine and ponderosa pine, compared with 65 percent in 1929 and 54 percent in 1919. Less than one-third of the merchantable

timber remaining in Montana and north Idaho is white pine or ponderosa pine."

Development and use of Ribes-eradication tools.--H. R. Offord, of the Berkeley, Calif., office, reports that the two-pronged Ribes peavey and the hydraulic Ribes jack were tested on a number of R. roezli plants. The two-pronged peavey has proved to be an excellent tool for auxiliary clean-up work in areas where the power methods are being used. It is planned to make several more tools of this same design this winter. The hydraulic jack works effectively but appears to have no practical place in R. roezli eradication that cannot be taken care of as well or better by other tools and methods. The special problem which has been kept in mind in the development of the Ribes jack has been the eradication of large R. nevadense in stony ground, of which the Yosemite National Park has a considerable amount, where the draws are too narrow and steep to operate a tractor and where dynamite cannot be safely used because of stony soil and absence of trees or stumps for protection of the workers.

Inspection of pine and Ribes in the High Sierra country.--W. V. Benedict made a trip in the High Sierra country of Yosemite Park this fall, in company with Park Superintendent Frank Kittredge and members of his staff. The party examined principally the high country in the upper basin of the South Fork of the Merced River, along the boundary of the park as it adjoins the Sierra Forest. They noted a general distribution of both Pinus albicaulis and P. monticola in the high country, but in no locality did these 5-needle pines occur in sufficient number to be considered as blister rust control units at present. Ribes montigenum, R. viscosissimum, and R. cereum were observed, and frequent inspections of the first two species were made to determine whether or not either blister rust or pinyon rust was present. No infections were found.

COTTON INSECT INVESTIGATIONS

Division conference.--The Division of Cotton Insect Investigations held a conference at the Delta Branch of the Mississippi Agricultural Experiment Station, Stoneville, Miss., on December 10, 11, and 12. Representatives from all the field laboratories and the Washington office were in attendance. In discussing past and future investigations, the 19 divisional workers in attendance had the benefit of comments and suggestions from F. C. Bishopp, assistant chief of Bureau; C. M. Smith, of the Division of Insecticide Investigations; F. M. Wadley, statistical consultant of the Bureau; H. C. McNamara and others, of the Bureau of Plant Industry and the Delta Branch Experiment Station; Clay Lyle and A. L. Hamner, of the Mississippi Experiment Station; J. C. Gaines, of the Texas Experiment Station; Dwight Isely and W. R. Horsfall, of the Arkansas Experiment Station; and others. Results reported regarding investigations of the boll weevil and cotton aphid and their control suggested several changes in Bureau recommendations, as follows: (1) The making of boll weevil infestation counts may be simplified. The grower who wishes to determine the percentage of squares infested simply walks across his field, picking cotton squares at intervals until 100 squares are collected, taking care that the squares are collected in about equal numbers from the bottom, middle, and top branches of the cotton plants. These 100 squares are carefully examined and the number punctured by boll weevils is the percentage of infestation.

(2) Instead of the former recommendation that dusting with calcium arsenate be started when 10 percent of the squares are infested, the studies indicated that in fields with fertile soils and plenty of moisture, where the cotton grows rank and continues fruiting until late in the season, it is not profitable to begin dusting until from 25 to 30 percent of the squares are infested; in fields where, because of low soil fertility, insufficient moisture, determinate growth of plants, or other factors, the plants do not grow rank and stop fruiting early, it is recommended that dusting begin when from 10 to 15 percent of the squares are infested. In areas where boll weevil damage is serious the growers are advised not to plant cotton in fields that cannot be expected to produce at least one-third of a bale if the weevil is controlled. (3) To prevent losses from the cotton aphid following the use of calcium arsenate for the control of the boll weevil, it was decided that the safest recommendation is the addition of 2-percent nicotine to the calcium arsenate for each alternate dusting. Investigations will be continued with 0.5 percent rotenone in each application that gave promising results in 1939 and 1940 but only fair results in 1941.

Boll weevil conference called for Atlanta.--In response to a call from agricultural officials in the Southeastern States for a full discussion of various phases of the boll weevil problem, P. N. Annand, chief of Bureau, M. L. Wilson, director of extension work, and James T. Jardine, chief of the Office of Experiment Stations and director of research, invited many State and Federal agencies to participate in a conference to be held in Atlanta, Ga., on January 8 and 9. The agencies requested to send representatives to this conference were the experiment stations, extension departments, agricultural colleges, departments of agriculture and other State agricultural officials in the eight Southeastern States--Alabama, Georgia, Florida, Mississippi, North Carolina, South Carolina, Tennessee, and Virginia. Invitations to participate were also sent to the following agencies in this Department: Agricultural Adjustment Administration, Bureau of Agricultural Chemistry and Engineering, Bureau of Agricultural Economics, Agricultural Marketing Service, Farm Credit Administration, Farm Security Administration, Federal Crop Insurance Corporation, Forest Service, Bureau of Plant Industry, and Soil Conservation Service.

Effect of boll weevil and cotton aphid control on yield, factorial experiment.--Experiments employing factorial designs were again conducted in 1941 at Florence, S. C., Gainesville, Fla., Tallulah, La., and College Station, Tex., to determine the comparative effect on infestation and yield of treatment with calcium arsenate dust for boll weevil control, with nicotine dust or spray for aphid control, and a combination of the two treatments. Small plots, ranging in size from 1/20 to 1/4 acre, arranged in randomized blocks, were used. The results at the different localities have been summarized by R. C. Gaines as follows: The combined records for all localities show that the treatment-locality interaction was highly significant, indicating as in 1940, that the differential response to treatments at the various localities may be attributed to the combination of infestations which prevailed during the course of each experiment. At Florence there was a heavy boll weevil infestation and an extremely light infestation of aphids. At Gainesville there was a very light infestation of weevils and a heavy aphid infestation. At Tallulah there was a heavy infestation of both weevils and aphids, and at College Station the boll weevil infestation was intermediate and the aphid infestation light. Average records of the boll weevil

infestations, aphid populations, and the yields at all localities are shown in the following table.

Treatment	Boll weevil-punctured squares	Aphids per square inch	Yield per acre
	Percent	Number	Pounds
Check	35	5.92	668
Calcium arsenate	18	22.54	900
Either nicotine dust or spray	36	1.07	738
Calcium arsenate and either nicotine dust or spray	17	3.51	1,150

Parasites of the pink bollworm.--L. W. Noble, of the Presidio, Tex., laboratory, reports that a shipment of Calliephialtes dimorphus Cush. was received from Brazil on November 6. This was the second shipment received this year through cooperation with the Division of Foreign Parasite Introduction. It arrived in good condition and consisted of 2 adults and 66 pupae. Breeding of this species was continued during the month and the larvae after spinning cocoons were placed in cold storage. Small-scale breeding of Chelonus pectinophorae Cush., Microbracon nigrorufum Cush., and the new Microbracon sp. (near vulgaris (Ashm.)) was continued. The Microbracon larvae were placed in cold storage. C. pectinophorae will be carried over winter by continuous breeding on the Mediterranean flour moth. Material for a parasite hibernation test was collected from a field in which Chelonus blackburni Cameron and C. pectinophorae had been released during the summer. Approximately 4,500 bolls were collected and placed in hibernation cages on November 13.

PINK BOLLWORM AND THURBERIA WEEVIL CONTROL

Gin-trash inspection.--During the month inspection of gin trash was continued in Arizona in Maricopa, Pima, and Pinal Counties, and 264 additional specimens of the pink bollworm were found in the vicinity of Glendale, Maricopa County, bringing the season's total for that rather limited area to 701 specimens. No pink bollworms were found in any other part of the Salt River Valley, and results were negative for the season in Pima and Pinal Counties. Last year 2 pink bollworms were found in Pinal County. In the Pecos Valley of New Mexico inspection of 156 bushels of trash from Eddy County yielded 12 pink bollworms. From about that same quantity of trash last year 266 pink bollworms were taken. In Chaves County inspection of trash yielded 1 specimen of the pink bollworm, which is the first finding since the 1938 crop, when 3 larvae were found. In Luna County, N. Mex., 19 specimens of the pink bollworm were taken for the season through examination of about 9 bushels of trash. In the Texas Panhandle regulated area larger quantities of trash were examined than for several years past, but the only pink bollworms found were in Terry County, where 2 specimens were taken. These were the first pink bollworms taken from that county since 1938. Last season very light infestations were found in that area in Howard, Martin, and Midland Counties. Outside of regulated areas, inspection was performed in the San Joaquin Valley and Riverside County, Calif., with negative results as to pink bollworm infestation. Some inspection was also done at Mexicali, Baja California,

Mexico, with negative results. Inspection of a considerable quantity of trash in Sonora and Sinaloa, Mexico, gave negative results as to pink bollworm infestation. Inspection of trash in the Juarez Valley of Mexico showed several rather heavily infested spots. Gin trash inspection of the 1941 cotton crop was brought to a close at the end of November. As a result of the season's inspection, no new areas were found infested with the pink bollworm, and in a considerable number of counties found infested last year results were negative for the 1941 crop.

Stalk destruction.--Climatic conditions in south Texas are conducive to the growth and fruiting of the cotton plant throughout the year. Consequently, in combating the pink bollworm in that region it is necessary to create an off-cotton-growing season by destroying the stalks as soon as the crop is picked out, and, in order to maintain this condition, all sprout or stub cotton that develops prior to the fruiting of the subsequent planted crop must be destroyed. On account of extremely unfavorable conditions over a period of several months farmers were unable to comply with the State regulation requiring the completion of stalk destruction in October, and extensions were granted to permit completion of harvesting. Fairly good progress was made with stalk destruction in November, although rains interfered with all field activities in most areas. Of the 206,700 acres planted to cotton in the counties comprising the Coastal Bend district, stalks had been either cut or plowed on 204,298 acres at the end of November, leaving 2,402 acres of standing stalks. In the lower Rio Grande Valley counties of Cameron, Hidalgo, Starr, and Willacy, comprising 233,100 acres of cotton, only 765 acres of stalks remained standing at the end of November, 395 acres of this being in the area flooded by high waters from the Rio Grande and a little over a hundred acres is abandoned acreage. Also, during the month, fields were being systematically checked for standing random stalks or sprout cotton, and grubbing crews were operating in Cameron, Hidalgo, and Willacy Counties in an effort to destroy all plants that might furnish material for build-up of infestation. In many instances farmers are cooperating by replowing fields where stalks make grubbing impracticable. At the end of November grubbing crews had removed scattered stalks or sprout plants from 35,393 acres.

Wild cotton eradication.--Wild cotton eradication work for the present season began during the first half of October with a small number of W. P. A. workers. At the beginning of November, 65 workers had been assigned and by the close of the month the number had been increased to 88. The increase in number of workers was reflected in the increase in acres covered and plants destroyed. A total of 3,033 acres was covered, from which 89,230 plants were removed. It is encouraging to note that only 65 of these plants were far enough developed to produce fruit. At the close of November the first clean-up for the season had been completed on Long Key and the Matecumbes in the Keys subdistrict, and most of Key Largo had been covered, and work was in progress in the Marathon and Key West sections and along the west coast of Florida. The first clean-up for the season in Florida Bay and along the Dade County mainland east of Cape Sable was started about the middle of the month.

TRUCK CROP AND GARDEN INSECT INVESTIGATIONS

Carbon disulfide treatment effective against wireworms.--A marked reduction of wireworms in shade-grown tobacco plots treated with carbon disulfide

was noted by A. W. Morrill, Jr., of the Windsor, Conn., laboratory, during a small-scale experiment in which the effects of carbon disulfide treatment were compared with those of deep plowing and of no control. A total of 36 plots, each containing 1/40 acre, were arranged in randomized blocks and each treatment was replicated 12 times. The carbon disulfide was applied, in holes made in the soil, at the rate of 1 ounce every 15 linear inches, or a total of 30.25 pints per plot. The population of wireworms, as revealed by an examination of 144 1/4-square-foot samples taken at random at the rate of 12 per plot, showed a highly significant reduction of 90.47 percent in the plots treated with carbon disulfide, as compared to 30.3 percent in the untreated plots. The reductions occurred during a week of unusually hot weather with no precipitation, characteristic of much of the season. This condition of high temperature and low moisture in the soil, while ideal for the use of carbon disulfide, is unfavorable for recovering wireworms for comparison. Results on effect of plowing cannot be determined until spring. The difference between populations in areas receiving various control treatments appears less marked when the general population is small than when it is relatively large. The principal species of wireworms involved in these tests was Limonius agonus (Say), referred to in many publications as the eastern field wireworm, in synonymy with L. ectypus (Say). It is now believed that the former species is the predominant one in this region since no specimen of L. ectypus (Say) have been recovered in tobacco or potato fields.

Fumigation tests with 1, 1-dichloro-1-nitroethane.--R. W. Brubaker and W. D. Reed, of the Richmond, Va., laboratory, report that high mortality of the larvae of the cigarette beetle (Lasioderma serricorne (F.)) was obtained in the fumigation of baled tobacco at reduced pressure with 1, 1-dichloro-1-nitroethane. Six replications each were conducted with bales of imported cigarette tobacco (Turkish types) using dosages of 4 pounds and 3 pounds, respectively, per 1,000 cubic feet, with an exposure of 3 hours. The tests were conducted in a steel vacuum chamber 50 by 36 by 22 inches, with a total volume of 33 cubic feet. The following is a summary of the results obtained.

Dosage	Larvae treated	Mortality at inches' depth--				
		1-1/4	3-1/4	5-1/4	7-1/4	9-1/4
	Number	Percent	Percent	Percent	Percent	Percent
4 lb. per 1,000 cu. ft.	1,500	99.7	100	99	99.0	99.3
3 lb. per 1,000 cu. ft.	1,500	99.3	99.7	99	94.6	99.0

These results are the first obtained with this gas on tobacco. At these dosages it is apparently highly effective against cigarette beetle larvae, and further tests will be conducted at lower dosages. No deleterious effects on the tobacco were noted.

Relation of crops to survival of new-brood wireworms.--Studies by E. W. Jones and K. E. Gibson, of the Walla Walla, Wash., laboratory, performed in 1/100-acre plots and in 5 by 5-foot cages, have shown some differences between

certain crops as to their effect on survival of wireworms during their first season of growth after hatching from eggs. There is some difference in the survival of the Pacific coast wireworm (Limonius canus Lec.) and the sugar-beet wireworm (L. californicus (Mann.)) on the various crops, but in general the following seems to be true for the last several seasons: The best survival by far was shown when germ-killed corn was the only food in the cages. When growing crops were used as food the best survival took place with wheat and potatoes in both the plots and cages. The poorest survival was with onions and alfalfa. Clover and corn show a good survival of new-brood larvae the first season, but not so good as with wheat and potatoes. Sugar beets, lima beans, and carrots seem to be intermediate between the above crops in their effect on survival.

Increased infestation of narcissus bulb fly in Pacific Northwest.--In the annual survey conducted by the staff of the Sumner, Wash., laboratory during August and September 1941, to determine the infestation of Merodon equestris (F.), C. F. Doucette reports that the heaviest general average infestation ever recorded was encountered this season. The average infestation for 22 plantings in Washington was 5.14 percent, for 18 plantings in Oregon it was 9.14 percent, and the average for the 2 States combined was 6.66 percent. The highest infestation previously noted was last year, when it was 4.84 percent in Washington, 7.71 percent in Oregon, and 5.85 percent for the 2 States combined. The figures are comparable because the same narcissus variety and the same size of bulbs have been sampled throughout the survey work. In 1941 infestations above 20 percent were found in 5 places, with the highest 27.4 percent. At 9 places the infestation ranged between 10 and 20 percent, at 9 places it ranged between 5 and 10 percent, and in 17 places it was below 5 percent. At 2 locations the findings were negative, corresponding with similar findings in previous years.

Effect of pepper weevil insecticides on aphids.--Observations by R. E. Campbell and J. C. Elmore, of the Alhambra, Calif., laboratory, on the effect of applications of insecticide dusts to commercial plantings of peppers, for the control of Anthonomous eugenii Cano, showed that the application of calcium arsenate resulted in a considerable increase in the aphid population on peppers, and that cryolite caused a moderate increase in the population of aphids. The addition of a sufficient quantity of cube to give a 0.5 percent content of rotenone in the final mixture of the dust retarded the rate of aphid development and increase in abundance. The aphid infestations became quite serious in several fields dusted with calcium arsenate, showing considerable honeydew and sooty mold fungus. In 1941, however, before the aphid infestation became bad enough to cause defoliation, natural enemies of the aphids appeared and so reduced the number of aphids that little damage was done.

Beet leafhopper in sugar beets grown for seed.--Van E. Romney, of the Phoenix, Ariz., laboratory, reports that a survey of all seed-beet-growing districts in the Southwest, as well as of the surrounding desert areas, to determine infestation by Eutettix tenellus (Bak.) was completed during the latter part of September. This survey showed that populations of the leafhopper were low in the beet fields located in the Salt River Valley, Ariz., and that desert conditions are such that further movements of any consequence from these areas to the beet fields are improbable. Seed-beet plantings near Perris and Hemet, Calif., contained low populations of the leafhopper but conditions were such in the breeding source that additional movement

to the fields may be expected. Beet field populations at Safford, Ariz., were fairly high and additional influxes of the leafhoppers from adjacent desert areas are expected. Control measures will undoubtedly be necessary in this area and preparations for spraying were being made by the seed contractors and farmers. Seed beet plantings in the Mesilla Valley of New Mexico contained moderately high populations of the leafhopper on September 26. At that time only one field examined had sufficiently high numbers to warrant control measures. Conditions in the surrounding desert territory were such that additional influxes of the leafhopper were expected. Spraying will probably be necessary in at least some of the fields susceptible to curly top in this region. Sugar beets grown for seed in the Southwest are planted in the fall, usually late in August or in September. From the time the two-leaf plants appear until soil coverage by the foliage is attained during the latter part of October, the beet leafhopper is the major insect pest of varieties susceptible to curly top.

Pyrethrum-oil sprays for stored-tobacco insects.--J. N. Tenhet, of the Richmond, Va., laboratory, reports that a pyrethrum-oil spray containing 0.2 percent total pyrethrins, applied at 7-day intervals in a tobacco warehouse, gave apparently satisfactory control of the tobacco moth (Ephestia elutella (Hbn.)). Test lots of tobacco moths were placed in the warehouse during applications and the mortality was about 100 percent. The mortality of cigarette beetles (Lasioderma serricorne (F.)) was only 16 percent when placed under the same conditions. Records obtained from insect traps showed the spray to be more effective in controlling the tobacco moth than were applications of pyrethrum powder. Data obtained during the experiment indicated that sublethal dosages of pyrethrum affected the rate of oviposition of females of the cigarette beetle. Trap catches for the period May 1 to September 14 showed a total of tobacco moths per warehouse as follows: Sprayed warehouse, 2,147 moths; dusted warehouse, 11,806 moths; and untreated warehouse, 35,385 moths.

INSECTS AFFECTING MAN AND ANIMALS

Diking as a control measure against sand flies.--J. B. Hull, of the Fort Pierce, Fla., laboratory, reports that in a series of 8 1-quart samples collected from diked marshes of pickleweed and mangrove, an average of 2.62 larvae per quart sample was isolated, as compared to an average of 8.92 larvae isolated from an equal number of samples collected from undiked marshes.

Cooperative advisory service to county agents and others for control of cattle grubs.--Arrangements have been made with the Texas Extension Service by E. W. Laake and R. W. Wells, of the Dallas, Tex., laboratory, for cooperative demonstrations on the control of cattle grubs and cattle lice by the use of powered equipment. Demonstrations will be made in Anderson County (eastern Texas), Johnson County (north-central Texas), and four counties in west-central Texas.

Cube-wettable sulfur dip retains toxicity for at least 10 days.--An examination on November 29 by Messrs. Laake and Wells revealed no living lice on 2 animals dipped in a vat containing cube-wettable sulfur dip, which had been used 10 days previous for dipping 661 animals. The dip had remained exposed for the interval indicated and had retained sufficient toxicity to destroy all the motile forms of the short-nosed ox louse.

Sesame oil and pine oil as synergists for pyrethrum in mosquito larvicides.--In a series of tests on lots of Culex larvae, G. H. Bradley, of the Orlando, Fla., laboratory, reports that no increase in mortality was obtained with the use of sesame oil and pine oil as synergists for pyrethrum extract, when used in the proportions of 1 part activator to 9 parts pyrethrum extract.

Public Health Service employees report for preliminary instruction.--H. D. Pratt, assistant entomologist, and John Fluno and Eugene Gerberg, junior entomologists of the U. S. Public Health Service, reported at the Orlando laboratory the last week in November for preliminary instruction before undertaking salt-marsh-mosquito surveys in the vicinity of National Defense areas.

FOREIGN PLANT QUARANTINES

Moths at sea.--On September 15, R. F. Wilbur boarded the small American sailing yacht White Cloud, which had just arrived direct from Hawaii at Tacoma, Wash. He found four dead moths adhering to the oiled deck of the yacht. R. R. Pratsch, owner, captain, and navigator of the yacht, told Mr. Wilbur he had run into a great cloud of these moths on September 10 at 46° 37' N., 130° 10' W., which was about 240 miles southwest of the nearest land, Vancouver Island, British Columbia. He said the air was full of the moths for several hours and many of them lit on the yacht. The wind was from the north-northwest. Mr. Pratsch was particularly interested and made a notation of his location in his logbook at the time. The moths were identified as Peronea variana (Fernald). On June 20 the Forest Service submitted to us for identification some larvae which they had received from outside sources, collected at Snoqualmie Pass, where infestation was said to be very heavy on white fir. E. I. Smith reared the larvae, the adults emerging during the first week of August. This material was submitted to the Washington, D. C., office on August 21 and was also identified as Peronea variana. Referring especially to Mr. Pratsch encountering the flight of moths at sea, indicating a possible migratory habit, an article "Butterfly Travelers," in the May 1937 issue of the National Geographic Magazine, by B. C. Williams, chief entomologist, Rothamsted Experimental Station, Harpenden, England, is of interest. Mr. Williams requests information on flights of moths and butterflies.

Gladiolus smut.--In the News Letter dated April 1, 1941 (v. VIII, No. 4, pp. 27-28) is summarized the status of the Papulospora and "smut" found or reported on gladiolus corms. In a paper appearing the following month (Torrey Bot. Club Bul. 68:289-294, May 1941), B. O. Dodge and Thomas Laskaris seemed to feel that a single fungus was involved in reports of the occurrence of gladiolus smut (Urocystis gladioli (Requien) Smith) and that it was not a smut but a Papulospora, which they described as P. gladioli (Requien) Dodge and Laskaris, comb. nov. D. P. Limber gave Mr. Dodge a culture of the Papulospora found at the Inspection House on gladiolus corms from Holland, and from Pennsylvania Mr. Dodge received a culture of the fungus found on gladiolus in Pennsylvania and reported as U. gladioli. J. A. Stevenson received a letter from S. P. Wiltshire, director of the Imperial Mycological Institute, Kew, Surrey, England, in which he stated that their collections include specimens of a true smut on gladiolus. On November 7 Mr. Limber discussed the matter with Dr. Dodge at the New York Botanical Garden and learned

that Dr. Dodge had received material of a true smut on gladiolus from the herbarium of G. L. Zundel, of Pennsylvania State College, and had studied the afore-mentioned cultures. He now believes that probably three species of Papulospora are involved--P. gladioli, which he found at various times on 20 percent of diseased corms in collections made from a commercial storage house; P. coprophila (Zukal) Hotson, as determined by J. W. Hotson on Holland corms taken at the Inspection House; and the undetermined species found in Pennsylvania and first reported as U. gladioli. Apparently a true smut occurs on gladiolus abroad, but is not known to occur in the United States, and considerable care must be exercised to avoid possible confusion of species of Papulospora with the smut.

Sclerotinia kerneri (?) on fir in New Hampshire.--The finding of what appeared to be Sclerotinia kerneri Wetts. on balsam fir from Newfoundland was reported in the December 1, 1940, News Letter (v. VII, No. 12, p. 27). Later similar symptoms were found on material from Nova Scotia. While on vacation, L. J. McConnell, one of the New York inspectors, found similar symptoms on balsam firs growing near Lonesome Lake, in the White Mountain National Forest in New Hampshire. In November 1941 the same symptoms were found by J. T. Beauchamp, of the Boston inspection force, on balsam fir Christmas greens from Lancaster, N. H. S. kerneri causes the host to produce buds in practically every leaf axil in young growth. Sclerotia form later within the scales in some cases and most of them or the male cones drop out, leaving rows of scale rosettes. The only sclerotia seen, in American material, were a few in one collection from Christmas trees from Newfoundland. Only weathered material had been noted until the Lancaster, N. H., material was found to bear great numbers of small unopened buds in the axils of the leaves. It is hoped that interest in the fungus may be stimulated to the point where its distribution, life history, and likelihood of spread with Christmas greens and nursery stock may be made available.

Entomological interceptions of interest.--Living specimens of the thrips Anaphothrips orchidaceus Bagn. were intercepted at San Francisco on October 30 on Odontoglossum sp. in mail from England. Two dead larvae of the euribiid Anastrepha mombinpraeoptans Sein were intercepted at Boston on October 19 in grapefruit (not cultivated) in stores from St. Vincent. This represents our second interception of an Anastrepha from St. Vincent. The first interception was also made at Boston in mango in stores. The coccid Asterolecanium miliaris longum (Green) was found at New York on August 22 on a bamboo leaf in mail from Antigua. Living larvae of the cerambycid Clytus arietis L. were taken at Seattle on September 4 in an elm branch used as cleat to hold plants in place from England. Forty-four living larvae of the Mediterranean fruitfly (Ceratitis capitata (Wied.)) were intercepted at New York on October 10 in apples in baggage from Portugal. Twenty-nine living larvae and approximately 50 eggs of the melonfly (Dacus cucurbitae (Coq.)) were taken at San Francisco on October 1 in three pods of Phaseolus vulgaris in stores from Hawaii. Living and dead adults of the bostrichid Dinoderus pilifrons Lesne were intercepted at New York on October 24 in dry bamboo used as dunnage from India. Living adults and nymphs of the mirid Eurycipitia vestitus (Dist.) were found at Laredo on September 30 on orchids in baggage from Mexico. Living specimens of the lygaeid Exotochiomera tumens (Stal) were intercepted at Hoboken on August 8 with Cattleya sp. in cargo from Venezuela. A living larva of the tortricid

Platynota rostrana (Walk.) was taken at New York on August 26 in grapefruit in cargo from Cuba. A living adult of the curculionid Tadius erirhinoides Pascoe was taken at San Francisco on August 19 on Cypripedium haynaldianum in air express from the Philippines.

DOMESTIC PLANT QUARANTINES

Survey of wild host plants of sweetpotato weevil yields significant data.—An over-all survey of wild morning-glory plants and other species of Ipomoea was conducted early in the fall by T. R. Stephens, field project leader on sweetpotato weevil control. In the commercial sweetpotato-growing areas where eradication of the weevil is in progress, wild morning-glory plants have not been considered a serious problem, as they are rather sparsely distributed in the eradication areas and it is believed that they do not harbor the weevils over winter. However, in the southern coastal areas there are concentrations of numerous wild host plants, some perennials and others essentially so, which have seemed, on rather limited observation, to be capable of harboring the weevils throughout the year. Further information was needed as to the relative abundance of Ipomoea, native host plants of the genus, and their relation to the weevil, for use in considering possible expansion of control operations into these coastal areas. The survey, which was purely cursory, was made in the five coastal counties of Alabama and Mississippi. Special attention was given to concentrations of host plants in close proximity to the formerly infested areas. Infestations were found in I. sagittata, the perennial marsh morning-glory, which grows abundantly along water edges. Light infestations were found in the upland type, I. pandurata. No weevils were found on the annual species of wild morning-glories. Very recently infestations have been found in sweetpotato fields from which the weevils apparently had been eradicated, and of special significance was the discovery that in a number of cases these infestations were in close proximity to native host plants. The survey further showed that infestations are established in some species of wild plants remote from places where sweetpotatoes have been planted, at least in recent years. The information derived from this general survey, which points suspicion to several species of Ipomoea as plants which carry the weevils over winter, will be the subject of a conference with State cooperators in considering future policies of the control programs in these States. Georgia State inspectors found, in the inspection of nearly 1,800,000 wild host plants at Thomasville, that sweetpotato weevils will overwinter in that area on I. trichocarpa, a plant of perennial characteristics. The only weevils recently found in the city of Thomasville, after more than 4 years of eradication measures, are those on the wild host plants. The eradication of these plants from the Thomasville area has been conducted by W. P. A. laborers. This work has recently been suspended for the winter.

Sweetpotato inspections resumed in Texas.—Inspection activities were resumed in Texas in November, with the return to this project of the inspector who had been temporarily assigned to citrus canker inspection. With the assistance of State inspectors, sweetpotato weevil inspection was conducted in Angelina and San Augustine Counties and resumed in Madison and Harrison Counties. The work in Angelina County was centered on formerly infested properties where eradication was undertaken in 1940 for the protection of the commercial areas in the adjacent counties of Nacogdoches and Cherokee from which, it is believed, the weevils have been eradicated.

Chinch bug survey approaches completion.--The chinch bug survey, begun on November 3 in Illinois, Indiana, Iowa, Kansas, Missouri, and Nebraska, and on November 22 in Oklahoma, was completed in three of these States by the end of the month and nearly completed in the other States. Throughout the survey, Philip Luginbill, of the Division of Cereal and Forage Insect Investigations, maintained contact with State leaders and discussed with them survey methods and procedure and made field observations.

Mole cricket control work terminated.--The program, which was begun on September 9, for the control of mole crickets in parts of Florida was completed in the week ended November 26. All equipment and supplies were transported to Gulfport, Miss., for storage, with the exception of equipment and trucks used by the research units. Preliminary reports show that during the season nearly 2,200,000 pounds of bait was mixed and furnished to the Florida State Mole Cricket Control Committee for distribution to growers in 11 counties, 3 percent having been distributed in the Plant City area. Last year over 2,500,000 pounds of bait was mixed and distributed to growers in 12 counties, 43 percent having been used in the Plant City area. Throughout the program, close contact was maintained between the control supervisors and research workers of the State of Florida and the Division of Truck Crop and Garden Insect Investigations in order to take advantage of current information in regard to infestations and optimum-control methods.

Survey and plans on grasshopper and Mormon cricket control.--The grasshopper egg survey of the areas infested with Melanoplus mexicanus (Sauss.) was completed in November in nearly all areas. The survey is yet to be made in infested sections of the Southwest. The survey personnel in the Denver office continued the analysis of the survey data obtained thus far and the computation of bait estimates for 1942.

Conference on grasshopper and Mormon cricket control.--Representatives of the Federal and State agencies cooperating in grasshopper and Mormon cricket control will meet at Denver on January 19-20, to discuss a suggested plan of operations for the control of these pests in 1942. Invitations are being extended to directors of extension, and to directors or commissioners of agriculture and State leaders to attend this conference.

Infected peach trees removed.--The November work on the phony peach and peach mosaic project was confined to the removal of diseased, abandoned, and escaped peach trees. In Georgia, on November 11, there remained in Macon County 16,000 phony trees which had not been destroyed, because of inability to obtain relief labor. To meet this situation, three tractors borrowed from the white-fringed beetle project were employed, and with the use of these machines the number of infected trees throughout the State had been reduced to 3,000, which are rapidly being taken out. In Alabama the standing infected trees were reduced during the month from 7,840 to 20. The destruction of phony trees also went forward in Arkansas, and of mosaic trees in California and Colorado. State cooperation was represented by 3 field supervisory employees in Alabama, 2 in Georgia, and 1 office worker in Alabama.

Citrus canker eradication.--Citrus canker inspection was conducted in 13 Texas counties in November and crews of W. P. A. laborers, totaling 102,

strip-worked formerly infected properties in 6 counties, destroying 167,000 seedlings of Citrus trifoliata. In the Navasota area, where citrus canker was found last February, formerly infected properties have been rechecked at regular intervals and recurring seedlings destroyed in cycles of germination in an effort to destroy any incipient infection before it could spread to other properties.

Transit-inspection activities.--The recent strike of express employees at Detroit, resulting in an additional burden on parcel post, freight, and trucking, necessitated rearrangement of the inspection tours to meet the irregularity of the movement of plant material passing through this gateway. A considerable movement of woody plants, greenhouse stock, bulbs, citrus fruits, and granite was found, with heavy express shipments after the strike was settled. At Chicago arrangements have been made with a freight company operating air freight to report to inspectors all shipments of plant material. At New York, with the approach of the Christmas season, the regular force of four inspectors has been increased by the assignment of three transit inspectors from other cities to inspect shipments of Christmas trees from the New England area. A Japanese beetle inspector at New York is also assisting. Interceptions of uncertified evergreen cones and bittersweet cuttings were made in November, one consisting of a freight shipment of cones. On three occasions since July 1, Japanese beetle grubs have been found in shipments intercepted by inspectors in the Northeastern States.

Permits to barberry shippers.--Forty-six nurserymen have been issued permits under the provisions of the black-stem rust quarantine to ship species of Berberis and Mahonia not susceptible to rust infection into or between the protected States, namely, Colorado, Illinois, Indiana, Iowa, Michigan, Minnesota, Missouri, Montana, Nebraska, North Dakota, Ohio, Pennsylvania, South Dakota, Virginia, West Virginia, Wisconsin, and Wyoming. The permits, which are valid for the current fiscal year, are based on inspections conducted by the Division of Plant Disease Control.

CONTROL INVESTIGATIONS

Toxicity to adult mosquitoes of aerosols produced by spraying solutions of insecticides in liquefied gas.--A paper on this new method of producing insecticidal aerosols was read at the Eastern Branch meetings of the American Association of Economic Entomologists by W. N. Sullivan. The work was done in cooperation with L. D. Goodhue, of the Division of Insecticide Investigations. This paper described the preparation and application of the aerosols in controlling adult mosquitoes in confined spaces. Aerosols of pyrethrum oleoresin and sesame oil were prepared by allowing a solution of these materials in dichlorodifluoromethane to escape through an atomizing nozzle. The solvent evaporates very rapidly and leaves the insecticide suspended in the air. After some preliminary tests to determine the dosage for complete mortality in 5 minutes, tests of a practical nature were run on Culex, Aedes, and Anopheles mosquitoes. Culex mosquitoes were fed only on sugar solution, but the other species were also given a blood meal. The nontoxic nature of this insecticide to man and animals, its noninflammability, its ease of application with no power requirement, and its nonstaining properties appear to answer the requirements proposed for the control of mosquitoes on airplanes. Additional preliminary tests show the aerosol to be very effective against several kinds of flies and promising against other

insects. These findings will be published in the February 1942 issue of the Journal of Economic Entomology.

A new laboratory method for testing roach sprays.--When petroleum-oil spray, similar to petroleum-base fly sprays, is discharged at close range directly from the sprayer onto cockroaches, the amount delivered in a very short time is usually far more than enough to cause 100-percent mortality. It is also true that if a sprayer is turned on and off rapidly to reduce the quantity of insecticide applied, the type of spray produced is often decidedly different from that produced when the sprayer is operating continuously; furthermore, extremely short intervals of spraying are difficult to time accurately if the valve controlling the spraying is operated manually. To meet these difficulties, E. R. McGovran and J. H. Fales constructed a pendulum apparatus which permitted the spray to pass through an opening onto the roaches only while the pendulum was in one phase of its swing. A 10-inch pendulum was used, which was short enough to travel rather rapidly. As the rate of swing of a pendulum of a given length operating through a given amplitude is constant, such an apparatus should give an accurately timed, although very brief, exposure of the insects to the direct spray. Below the pendulum a glass cylinder 9 inches tall and 6 inches in diameter, with a 3/4-inch hole in the top and a 1/4-inch opening around the bottom, covered a metal pen 3-1/2 inches in diameter and 2-1/2 inches deep (tin cups with the handles removed) which confined the insects. The inner surface of the wall of the cup was very lightly coated with petroleum oil of heavy medicinal grade, to keep the roaches from escaping or clinging to the walls of the pen. To operate the apparatus the pendulum was pushed to one side until the spray nozzle (a nasal atomizer with the tip pointed down) was directed at the crescent-shaped partition attached to the oscillating end of the pendulum about 1 inch from one end of the partition. The air pressure was turned on and the atomizer was sprayed on the end of the partition until the mercury gage indicated the correct air pressure had been established. The pendulum was then released and allowed to swing uniformly the number of times needed to give the required deposit. The average deposit of insecticide for each passage of the 2-inch opening in the partition on the pendulum over the hole in the top of the cylinder was 0.104 mg. of spray per square centimeter. A summary of comparable tests of sprays of pyrethrins dissolved in refined kerosene, ranging in pyrethrin content from 1 to 5 mg. per ml. and in deposit from 2.6 to 0.8 mg. per cm.^{2}, against adult female German cockroaches (Blattella germanica (L.)), large nymphs, and adult males, caused mortalities of 73, 87, and 98 percent, respectively, indicating that the adult females were the most resistant to these sprays. A series of tests on each group with a much heavier deposit (7.3 mg. per cm.^{2}) of highly refined kerosene without pyrethrins added caused 97, 60, and 41 percent mortality of large nymphs, adult male, and adult female German roaches, respectively. While the adult females were the most resistant to this spray, as in the ones containing pyrethrins, it is worthy of note that the nymphs were much less resistant than the adult males, which reverses their order of resistance as compared with the pyrethrum sprays. As these sprays were applied as "wet" sprays to the dorsal surface of the insects the wings of the adults may have absorbed some of the oil and thus reduced its lethal effect.

INSECTICIDE INVESTIGATIONS

Plants reported to contain rotenone.--A list of plants reported to contain rotenone or rotenoids has just been compiled by H. A. Jones. Rotenone

or compounds related to it have been definitely reported in 67 different species of leguminous plants. Of these species, 21 are of the genus Tephrosia, 12 of Derris, 12 of Lonchocarpus, and 10 of Millettia. Eleven additional species of legumes are listed in which reports indicate the probable presence of rotenone or rotenoids. It is of interest to note that there is to date no authentic record of these compounds having been found in a plant not of the family Leguminosae and of the subfamily Papilionate. The list should prove helpful in the development of new sources of rotenone and rotenoids in case supplies of the usual commercial sources are curtailed because of the war.

Preparing insecticidal aerosols by spraying solutions in liquefied gases.--Numerous requests have been received for directions on the preparation of insecticidal solutions in liquefied gas similar to those tested against mosquitoes by Sullivan, Goodhue, and Fales. The following brief outline of the method is suggested by L. D. Goodhue and more complete details will appear shortly in an ET circular. The safest liquefied gas to use is dichlorodifluoromethane known to the trade as "Freon 12." It is relatively nontoxic to man and animals, noninflammable, and is generally available at any local refrigeration-supply house. A solution of pyrethrum oleoresin, with sesame oil as a synergist, in the solvent produces, when sprayed under its own pressure (approximately 90 lbs. per sq. in.), a persistent and safe aerosol which is very effective against mosquitoes, flies, and, at high concentrations, against roaches. The apparatus required consists of a 5-pound-capacity freon tank and an oil-burner nozzle of about 2-gallons-per-hour capacity. Enough pyrethrum oleoresin to make about 5 mg. of total pyrethrins per g. of solution and twice this amount of sesame oil is drawn into the empty tank by suction. The air is again withdrawn from the tank and the freon is introduced from a large supply tank through a flexible hose. The amount is determined by difference in weight. Some shaking mixes the solution. With the nozzle attached it is only necessary to invert the tank and open the valve to produce the aerosol.

BEE CULTURE

Nectar from Pima and Acala cotton blossoms.--Geo. H. Vansell, Davis, Calif., reports on his investigations on nectar secretions, which are being conducted under controlled laboratory conditions. Pima cotton blossoms secreted nectar far in excess of the Acala. The respective averages of the quantity per blossom throughout October 1941 were 58 mg. and 4 mg. No significant difference was noted in the sugar concentration of these two varieties; both averaged, when protected from evaporation, from about 18 to 20 percent. The Pima variety had daily more than twice the number of blossoms per plant as the Acala variety of the same age and treatment. The nectar secretion occurs only during part of the first day the blossoms open. Secretion proceeds in a seemingly normal fashion, even when a blossom is severed from the plant. Chemical analysis revealed the practical absence of sucrose in this nectar. The respective percentages of sucrose, levulose, and dextrose were 0.35, 9.25, and 10.36 in a liberal quantity of Pima nectar. Acala nectar was not significantly different.

IDENTIFICATION AND CLASSIFICATION OF INSECTS

Two species of Mezium in the United States.--For some years it has been thought that only one species of spider beetles of the genus Mezium was

represented in the United States. It is evident now that the European species Mezium affine Boield. has been in this country at least since 1904 but has been misidentified as M. americanum Cast. The latter species was originally described from South America. From specimens at hand, it appears that M. americanum is restricted to the Gulf States, whereas M. affine is distributed throughout the eastern part of the country, southward to Florida and westward to Iowa.

Artipus floridanus abundant in Florida.--Occasionally an insect ordinarily of little economic importance becomes sufficiently numerous to attract attention. This seems to be the case with Artipus floridanus Horn, one of the otiorhynchid weevils, which was reported to be especially abundant at Fort Lauderdale, Fla., in November. The beetles seemed most numerous near the seacoast. Among the plants attacked were Citrus, sea grapes, Melaleuca, Ixora, coco palms, Plumbago, Hibiscus, Chalcas, and roses.

Larvae of Gasterophilus removed from lion.--There were received for identification recently larvae of a species of the botfly genus Gasterophilus, which had been submitted by C. M. Herman, technical adviser, Los Angeles Wildlife Disease Research Station. Mr. Herman stated that the larvae were taken from a lion on October 17, 1941, at Gay's Lion Farm, just outside of Los Angeles. The specific differences for the larvae of this genus are not completely understood; therefore a specific identification is not possible at present. However, the larvae appear to be very similar to those of G. nasalis (L.), which usually attacks the horse. This is the first known record of botfly larvae from a lion.

Type material added to collection of Hymenoptera.--Type material of 25 species of wasps was deposited recently in the National Collection by K. V. Krombein. Identified material of only one of these species was present previously in the collection of the United States National Museum.

Probable origins of incorrect records of host-parasite relationships.--Many of the published records of host relations of parasitic insects are incorrect because of various circumstances such as misidentification of host or of parasite, the assumption that all parasites reared from material known to be infested by a certain species were parasitic on that species, confusion of notes or labels, and other factors. An excellent example of an erroneous record of host-parasite association has recently come to notice. A Bureau field worker submitted for identification a hymenopteron said to have been reared from the pupa of a coccinellid beetle. It was suggested by the specialist making the identification that the record must be incorrect, because the parasite in question is known to attack only chrysopid larvae. Subsequent investigation of the host material, which had not been submitted with the specimen, disclosed the fact that a chrysopid larva had spun its cocoon within the pupal exuviae of the coccinellid. This indicates what extreme care is sometimes necessary to avoid mistakes in host-parasite records.

---oOo---

UNITED STATES

DEPARTMENT OF AGRICULTURE

BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE NEWS LETTER

VOLUME IX

UNITED STATES DEPARTMENT OF AGRICULTURE

BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE

N E W S L E T T E R

FOR DECEMBER 1941

Vol. IX, No. 2 (Not for publication) February 1, 1942

REMEMBER PEARL HARBOR

OBITUARY

A. C. Davis

Alonzo C. Davis, assistant entomologist of the Division of Truck Crop and Garden Insect Investigations, who was stationed at Beltsville, Md., died suddenly on January 4. Mr. Davis was born in Honolulu, T. H., on March 4, 1901. He received the following degrees from the University of California: A. B., in 1926 and M. A., in 1927. During 1926 and 1927 he was employed by the Bureau for seasonal work on the pepper weevil project in California. From 1927 to May 31, 1931, he was employed as an agent, in cooperation with the University of California, on this same project. He was appointed as assistant entomologist and was assigned to mushroom investigations at Arlington, Va., on June 1, 1931, being transferred later to Beltsville, Md.

Mr. Davis accumulated a wealth of practical information on the biology and control of insects and related pests which attack mushrooms, and is the author of several bulletins issued by the Department on this subject. Incidental to his formal assignment, in recent years he has been engaged on investigations of thrips attacking roses.

Early in his career he became interested in the natural history and taxonomy of certain Coleoptera and the insect fauna of rodent habitats. Several valuable papers have resulted from these observations and studies.

Mr. Davis' service was characterized by a sincere devotion to duty and an inherent desire to do a thorough job of whatever he undertook. Although his career was short, he left behind him an excellent record, not only in the Bureau but with officials of the mushroom industry, with whom he worked closely.

He is survived by his wife and four children.

J. L. Webb

On January 20, 1942, Jesse Lee Webb died at Washington, D. C. He was born in Bloomington, Ill., on April 9, 1878. He attended the public schools in Rippey, Iowa, and graduated from the Washington State College, receiving the degree of B. S., in 1900. He received the M. S. degree from West Virginia University in 1902.

Mr. Webb's term of service with the U. S. Department of Agriculture extends back to 1901, when he started work with the Bureau of Forestry, now the Forest Service. In 1903 he carried on entomological work with the Insular Government in the Philippine Islands for 3 months, returning to the Department to continue his work with the Bureau of Forestry. In 1904 he was transferred to the Bureau of Entomology, where he carried on miscellaneous insect investigations until 1909, when he was assigned to work on forest insects. In 1912 he was transferred to Southern Field Crop Insect Investigations and devoted considerable of his attention to rice pests. He contributed many valuable publications to the literature of economic entomology and his biological studies on horse flies were outstanding. From 1928 to the time of his death he was associated with investigations on insects affecting man and animals and showed much ability in preparing scientific material for popular consumption.

In 1904 Mr. Webb was married to Florence Evans and is survived by his widow and his only son, Delmar Evans Webb.

BUREAU EMPLOYEES CALLED TO THE COLORS OR TRANSFERRED TO SPECIAL NATIONAL DEFENSE ASSIGNMENTS

Hill, Henry J., Unskilled Laborer, Truck Crop Ins. Resigned December 31, 1941, to enlist in U. S. Army.

Jackson, Calvin W., Agt., PBW, inducted, Select. Serv., November 6, 1941.

Ozanne, Theodore W., Agt., Mexican Fruitfly Cont. Resigned January 10, 1942, to enlist in U. S. Army.

"Ex-Blister Rusters" on Midway and Wake Islands.--Now that the small Pacific islands of Midway and Wake have been so much in the public eye it will be of interest to know that several hundred men from the Rogue River Valley of southern Oregon, many of them "ex-blister rusters," were among the labor crews employed on these islands on National Defense improvements. So long as the ammunition held out these old squirrel snipers should have given a good account of themselves.

FRUIT INSECT INVESTIGATIONS

Fecundity of the raisin moth.--Pairs of adults of Ephestia figulilella Greg., from larvae reared on dried mulberries in an incubator at 82° to 84° F., were held in celluloid vials at room temperatures during their egg laying. The work was done at the Fresno, Calif., laboratory by Oscar G. Bacon, using 50 pairs of moths. Half of them were given water and the others received

25-percent solution of honey. The females given water deposited an average of 350.6 eggs, while those given diluted honey averaged 306.5 eggs. The largest daily batch contained 190 eggs, and the most prolific female laid 692.

MEXICAN FRUITFLY CONTROL

No Mexican fruitfly taken since August.--The last Mexican fruitflies to be trapped in the lower Rio Grande Valley were taken in the Laredo district early in August. Since that time an average of 9,000 traps have been operated monthly without taking any Anastrepha ludens Loew. Usually about 20 flies are trapped before January 1, and, while the late appearance of flies this season indicates a probably light infestation, it should not be taken as an indication that the Mexican fruitfly will not be abundant in the regulated area before the harvesting season is completed. Fruit shipments for the season through December 31 totaled 12,174.3 equivalent carlots, which is slightly greater than the amount of fruit shipped during the same period in 1940. Weather was favorable for field work during December and 1,912 groves were inspected. A large amount of insect-damaged fruit was inspected, but no larvae were found.

CEREAL AND FORAGE INSECT INVESTIGATIONS

Parasitization of European corn borer in southeastern New England.--Charles A. Clark, Moorestown, N. J., reports that a field survey to determine the status of parasitization of the summer generation of the corn borer (Pyrausta nubilalis Hbn.) was conducted late in July 1941. The areas included were 491 square miles in southeastern Massachusetts and 177 square miles in central Connecticut. In the Massachusetts area parasitization averaged 24.9 percent, as compared with 40.0 percent in 1940. This reduction is attributed to a sharp decline in effectiveness of the dominant parasite, Macrocentrus gifuensis Ashm., combined with or immediately following a great reduction in borer population. The tachinid parasite Lydella grisescens R. D. was also less effective in this area in 1941 than in 1940. Inareolata punctoria Roman and Chelonus annulipes Wesm. were recovered in some numbers in the southeastern Massachusetts area. In the central Connecticut area an increase in parasitization both by the locally dominant I. punctoria and the less important L. grisescens was recorded in 1941, as compared with 1940, notwithstanding an apparently great reduction in corn borer population. In the area surveyed in 1941 parasitization was 47.0 percent, of which 41.3 percent was by I. punctoria and 4.6 percent by L. grisescens. Of particular interest and importance was the first recovery in central Connecticut of M. gifuensis released here in 1940.

Egg masses of European corn borer produced for manual infestation of experimental corn varieties.--Ray T. Everly, Toledo, Ohio, reported that during the period June 16 to July 5, 1941, 63,200 moths of P. nubilalis, comprising 32,600 males and 30,600 females, were collected at Toledo from a large field cage, which had been stocked in the previous fall with cornstalks heavily infested with hibernating corn borer larvae. Of the moths thus produced, lots were placed within oviposition cages in a room maintained at 78° F. and over 90 percent relative humidity. Here the moths deposited egg masses on waxed paper sheets placed in the cages for that purpose. Subsequent pinning of these masses entailed a loss of 14.5 percent, while 4.5 percent of the masses

were discarded as of abnormal size, it being considered that any containing more than 40 or less than 10 eggs were unsuited for infestation purposes. These operations resulted in 131,887 egg masses of normal size, available for manual infestation of corns grown at Toledo in the resistant-variety tests. Of these egg masses, 90,906 were placed on field corn and 40,981 on sweet corn.

Toughness of plant tissue and resistance to European corn borer.--According to G. T. Bottger, Toledo, extensive tests were conducted with a special spring puncturing device for the purpose of measuring physical resistance to puncturing of green leaf tissue of five different strains of corn, including both dent and sweet types, and its possible relation to the corn borer resistance inherent in some of these strains. Leaf resistance to pressure puncturing increased as plant maturity advanced. There were no significant differences in leaf resistance to puncturing between any of the five strains tested, when based on averages of all values for each strain. Tests made of seven strains of dent, sweet, and popcorn types at the same stage of maturity (within 2 days before tassel appearance) showed statistically significant differences between certain strains, but the results were too erratic to indicate any strain relationship to the physical resistance of leaf tissue within types; consequently, no relation between leaf resistance to puncturing and corn borer resistance was indicated. The data did, however, indicate that the toughness of corn-leaf tissue is associated with types of corn and to this extent may possibly be related to corn borer survival, resistance to puncturing being less and corn borer survival greater, in general at the same stage of maturity, in the sweet and popcorn types than in the dent type of corn strains tested.

Hydrogen-ion concentration and resistance to European corn borer.--Mr. Bottger also reports that in order to study the possible relation of pH readings to corn borer tolerance, pH tests were made at six successive intervals on seven different varieties of corn. The tests were made in the field on growing plants. The electrometric method was employed, utilizing a factory-sealed glass electrode and saturated calomel electrode with a Beckman pH meter adapted for making pH readings directly from the calibrated potentiometer dial. The data indicate a curvilinear relation of pH readings of corn-plant tissue and maturity. Statistically, the pH readings of R4 X L317 (resistant) and Golden Cross Bantam (intermediate) are lower than readings for popcorn (intermediate) and the sweet corn strain Mich. 1828 (resistant). The pH readings for R4 X Hy (resistant) also averaged significantly less than did those for popcorn (intermediate). While significant physiological differences are doubtless reflected in these strain differences, no relation of pH readings to corn borer resistance in the varieties tested is indicated. In view of indications of the data and known facts gathered from other experiments incident to nutrition investigations of the European corn borer, it is concluded that pH readings of growing plants may have some utility in determining relative concentrations of certain chemical substances in growing corn plants and in this capacity may possibly be useful in determining relative resistance of corn varieties to the European corn borer.

Commercial-scale field tests indicate feasibility of controlling hessian fly by use of resistant varieties.--W. B. Noble, Sacramento, Calif., states that in 1941, for the third successive year, the fly-resistant wheat Big

Club 38 (Dawson X Big Club[3]) was grown on a commercial scale under field conditions in a section where hessian fly has long been abundant. In 1939 this wheat showed no fly infestation and noticeably outyielded nearby regular Big Club, in which 64 percent of the plants were infested. In 1940, 4 percent of the plants of Big Club 38 were infested and it yielded 30 percent more grain than adjacent regular Big Club, in which 69 percent of the plants were infested. Yield figures for the 1941 commercial planting are not available, but in this field only about 2 percent of the plants were infested, while four neighboring fields of regular Big Club had an average plant infestation of 79 percent. In the 1941 nursery Big Club 38 was uninfested and yielded 69 percent more grain than did nearby regular Big Club, in which 100 percent of the plants were infested.

JAPANESE BEETLE CONTROL

Infestations in inspected material.--During the month 76 gypsy moth egg clusters and 1 brown-tail moth webbing were removed from products submitted for gypsy moth inspection and certification. This material was destined to points in Minnesota, Maryland, Ohio, New York, Virginia, Illinois, Connecticut, Michigan, New Jersey, and Pennsylvania.

Christmas-greenery inspection.--More than 20 tons of balsam boughs were inspected at Arlington, Mass., for making wreaths and table pieces to be shipped outside the gypsy moth area. Christmas-tree inspection in the Greenfield, Mass., area was greatly increased over that of last year. Dealers in mixed greens in this area reported that their business this year exceeded that of 1940. Shipments of Christmas trees and greenery from the White River Junction, Vt., district was heavier than in recent years. During December, 20,935 trees were certified in the latter area for shipment to New York, Pennsylvania, Florida, and a few other States.

Large temporary inspection force.--During December, 31 temporary inspectors were engaged in gypsy moth inspection work, 28 of whom were employed on the inspection of Christmas trees and evergreen boughs, 2 on nursery products inspection, and 1 on forest products. Extra work performed by the temporary men included extensive scouting operations in the Greenfield, Mass., district, where 52 bough lots, comprising 2,308 acres, were scouted. Twenty-two of these were found to be infested. In addition, 3,430 100-pound bales of boughs were inspected piece by piece. In all, 12,093 bales of boughs were certified from this area. A total of 20,314 Christmas trees were hand inspected.

Christmas tree certified for shipment to Iceland.--At the request of the Maine Department of Agriculture, the district inspector at Portland certified a 25-foot Christmas tree for shipment to Reykjavik, Iceland. At Augusta, Governor Sewall attached a Christmas message and the tree was trucked to the Brooklyn, N. Y., Navy Yard, where it was transferred to a naval vessel for transportation to its destination. The tree was consigned to a lieutenant who had written to his parents from Iceland that he feared Christmas trees would be hard to find on the barren island. His father thought it would be nice to send a community tree as Maine's gift to the soldiers and sailors at this North Atlantic outpost. Permission from both the Army and Navy was required before this shipment could be made. The War Department specified that the tree should be accompanied by a Federal gypsy moth certificate.

Unexpected freedom from infestation.--For several years heavy gypsy moth infestation has been prevalent in the towns of Conway, Jackson, and Bartlett, N. H. Observations showed that the infestation in these towns was confined to the valley areas and the foothills of the White Mountains. During December several carloads of square-edge lumber, which had been sawed early in the spring and piled for air drying in and among birch-tree growth, were piece inspected. No gypsy moth egg clusters were found. Ordinarily lumber piled under such circumstances in an infested area during the egg-laying season would be found infested. The extremely early hatching of egg masses in the spring of 1941 was apparently responsible for the high mortality of the moth larvae in these towns.

Decorative material accompanying game birds certified.--Over 500 certificates were issued during the month to cover individual cartons containing a brace of pheasants, with a background of spruce boughs, a few pine cones, and branches of elderberry for decoration. This decorative material required gypsy moth inspection.

Certification refused at infested nursery.--Upon the finding of 11 gypsy moth egg clusters on blue spruce trees submitted for inspection at a nursery located in central Connecticut, certification of the inspected trees and all other stock from the unit involved was suspended. Four of the clusters were found on November 28 and 7 on December 1. Connecticut State Nursery Inspector M. P. Zappe closed this nursery unit against further shipments until it has been freed from infestation and has again been inspected and certified by the State.

Power company stations man for elm disposal.--The following incident indicates the extent of cooperation being received from utility companies in Connecticut. One of our crews in Middlesex County had occasion to haul some elm wood to a town dump to be burned. They found there a man from one of the power companies who was stationed for an indefinite period to take care of elm wood, which the power company's trucks were hauling into the dump for disposal. As the larger elm logs were brought in, the man was boring a series of holes in them, charging the holes with dynamite and exploding the charge with the battery from his car. In this way he was splitting the larger logs into small enough pieces so they could be more easily handled and burned more quickly.

W. P. A. Dutch elm disease personnel reduced in Connecticut.--By action of the State W. P. A. during the week ended December 13, personnel on the Dutch elm disease project in Connecticut was reduced by 55 percent. The laborers transferred from the project were assigned to airports and other first-priority National Defense projects. The personnel retained was almost entirely within the border zone, with a comparatively small number not actually living in that zone but sufficiently close to it so they could be used entirely within the zone. Work within the infection zone necessarily was virtually discontinued.

Crew extinguishes fire set in swamp.--While sanitation workers were burning several woodpiles accumulated prior to the hunting season on a hunting reservation in Pike County, Pa., the caretaker requested the general foreman to set the whole swamp on fire and burn it off. Our men refused to start the fire, whereupon the caretaker started fires in the swamp while Dutch elm men were burning woodpiles. As soon as this condition was discovered, all hands

began fire fighting and extinguished the blaze set by the caretaker. This incident could have resulted in a serious, unjustifiable accusation against the project, had the fire escaped into the forest.

Scolytus attacks healthy elms.--It has become increasingly evident that during last summer and fall S. multistriatus in large numbers has been attacking apparently healthy, full-leaved elms. In the first half of the month this condition was discovered in 3 widely separated locations in Pennsylvania. The number of trees attacked in any 1 location ranged from 3 or 4 in one spot to 25 and 40, respectively, in 2 other counties. Most of these trees were slippery elms. An item of interest in connection with this condition is that at each location woodpeckers had already begun to feed heavily on beetles in the infested trees.

Elm tree stripped of bark by woodpeckers.--A beetle-infested tree removed in Sussex County, N. J., in December had been completely stripped of its outer bark by woodpeckers, making it look more like a sycamore than an elm. C. W. Collins, of the Morristown laboratory, was notified and on examining the tree and taking pictures of it, said that he had never seen a tree in such bad shape as this one. The greater number of the beetles had emerged, but there were still numerous larvae left in the inner bark.

Clerk loaned to recruiting office.--The clerk in the headquarters office at Bethel, Conn., was temporarily assigned to the United States Navy Recruiting Station in Danbury, because of the rush of enlistments in the Navy following the attack by the Japanese on December 7. She was returned to the office with a letter of appreciation from the recruiting officer, stating that she had been of considerable service during an unprecedented rush of business.

Elm wood hauled to Army camps in New Jersey.--In the latter part of the month, 17 loads of elm wood approximating 24 cords were delivered to the army encampments around Paterson, N. J., to be used as fire wood. This Division was advised that the camps could use about 100 cords for their immediate requirements.

W. P. A. Federal agency project discontinued.--At the end of December, the W. P. A. Federal Dutch Elm Disease project was closed out, with the expectation that it would later be resumed under the sponsorship of the various State W. P. A. agencies.

Methyl bromide fumigation activities.--A large plant grower at Bound Brook, N. J., recently completed a new fumigation chamber with a capacity of approximately 600 5-inch potted plants. The grower has fumigated large numbers of hydrangeas and reports very satisfactory results with his new unit. This grower used his fumigation chamber not only for Japanese beetle certification purposes, but for destroying all insects infesting his plants. Because of the apparent stimulating effect of methyl bromide fumigation on some varieties of hydrangeas, the grower expects to save coal that would otherwise be used in growing on these plants. Some of his customers are demanding fumigated plants, because they save at least 2 weeks in propagation. Members of the treating section of the Division conducted an experimental methyl bromide fumigation of canna roots at a Long Island establishment. Beetle infestation was found there for the first time this summer. The fumigated roots are now

being tested in the greenhouse for damage. If no harmful effects are noted, this firm may construct a sizable chamber to eliminate hand inspection of thousands of these roots that will be shipped to nonregulated points and to other classified dealers within the regulated zone this spring. Another Long Island establishment sterilized 60,000 spirea clumps in their methyl bromide fumigation chamber.

Morning after Pearl Harbor (actual telephone conversation at New York City office, December 8).--"Agriculture, Bureau of Entomology and Plant Quarantine." "Is this the Japanese Beetle Office?" "Yes." "This is Reuters British News Agency. I saw your listing in the telephone directory. Just what do you have to do with the Japanese?" "We don't do anything for the Japanese. We enforce a plant quarantine to prevent the spread of the Japanese beetle. This is an insect that was accidentally introduced into this country from Japan." "How long has this been going on?" "In the neighborhood of 25 years." "Oh, then it isn't something that started since the war?" "No, the beetle was discovered in this country in 1916." "Do you have any Japanese working for you?" "No, there are none working here, and none in the Bureau to my knowledge. If you want any more definite information you can call our Bloomfield, N. J., field headquarters." "Well, that won't be necessary. I think you have given me all the information I wanted. Thank you!"

Mild weather a boon to nurserymen.--Nurserymen on the Eastern Shore of Maryland and Virginia reported that, owing to the unusually mild weather prior to Christmas, they were able to dig stock and fill and ship orders which, under ordinary circumstances, would not have been filled until the regular spring shipping season. This was especially gratifying to nurserymen, as it partially solves their labor-shortage problem. One large Maryland nursery required the services of an inspector on 24 of the 27 working days in the month. In the Syracuse, N. Y., area, the mild weather permitted the inspection of bare-rooted nursery stock until late in the month. Most of this stock was placed in storage for spring shipment. Nurseries in the Harrisburg, Pa., area made many shipments to southern points during the open weather.

Late interception of infested material.--A midwinter interception of beetle-infested material was made at the Japanese beetle highway inspection station on U. S. Route 1 at Fredericksburg, Va., when 2 Japanese beetle grubs were removed from soil about the roots of 12 miscellaneous plants being transported by a motorist from New York City to Miami, Fla.

European corn borer certification discontinued.--The limited amount of European corn borer inspection and certification work performed by inspectors throughout the Japanese beetle and gypsy moth regulated areas, as well as in Michigan and Indiana, was discontinued after December. Arrangements were made by the Bureau with plant quarantine officials in the infested States to take care of the added inspection duties, and States that had theretofore required Federal corn borer inspection and certification agreed to modify their quarantines so that such products would be accepted on the basis of State certification.

FOREST INSECT INVESTIGATIONS

Report on elm hanger study and resultant bark beetle attack concluded.--On December 2 R. J. Kowal, Morristown, N. J., completed the examination of 124 hangers and 35 hanger stubs for attack of elm bark beetles and the Dutch elm disease fungus. This study was begun in June 1940 in an effort to determine the importance of wind- and ice-damaged limbs insofar as they furnish breeding material for the principal insect vectors of the Dutch elm disease fungus, namely, Scolytus multistriatus Marsh. and Hylurgopinus rufipes (Eich.). Attention was also given to the possibility of the fungus being introduced into elm trees directly by beetles attacking the hanger and the remaining stub. The results of the creation of hangers in all months of the year showed that no attack by S. multistriatus would be expected in limbs felled from October to February. September hangers having no living attachment were in all cases attacked but the resulting progeny died in all cases. Attack and development were obtained in hangers created from March to August, inclusive. S. J. Smucker, of the Bureau of Plant Industry, examined the 35 hanger stubs. Discolored streaks in the xylem, usually emanating from the cut end of the stubs, were found in approximately half of the 35 stubs. All discolored streaks were cultured. One discolored streak 1-1/16 inch long and 3/16 inch from the dead portion yielded Ceratostomella ulmi Buisman. This streak appeared to have originated from a beetle attack, which scored the xylem.

Effective introduced parasite of Neodiprion sertifer (Geoff.).--C. L. Griswold, Morristown, reports that Microplectron fuscipennis Zett., a European prepupal parasite of Gilpinia polytoma (Htg.) and Neodiprion sertifer (Geoff.), was originally introduced into Canada and New England to assist in combating G. polytoma. With N. sertifer attaining outbreak proportions in New Jersey in 1938 and 1939, liberations of this parasite were made in several infested localities in June 1939. Establishment of this parasite was found to have taken place in some of these infested areas in 1940, including an area at Lamington, N. J., where severe defoliation on red pine occurred yearly since 1938. In December 1941 a search was made at the Lamington, N. J., area for cocoons of N. sertifer for the purpose of determining whether or not another introduced parasite of the sawfly had been established since its liberation in 1940. The search disclosed that a very large proportion of the sawfly coccons found, both old and new, had previously been attacked by M. fuscipennis. An examination of the red pine needles also revealed a very limited egg deposition by N. sertifer, forecasting a greatly reduced infestation in 1942, for which the rapid build-up and effectiveness of M. fuscipennis is believed to be responsible.

Nursery elms and their susceptibility to Hylurgopinus rufipes.--R. T. Webber, Morristown, reports that during the period December 8-18, 1941, inclusive, 135 nursery elms located in 6 nurseries in New Jersey were examined for H. rufipes infestation. This examination was made for the purpose of obtaining additional data on the susceptibility of nursery elms to attack by H. rufipes, which is a carrier of the Dutch elm disease fungus. These trees ranged from 1.0 to 6.0 inches in diameter, with an average of 2.7 inches. As a result of this examination, it was found that the elm stock in 3 of the nurseries inspected showed conclusive proof of Hylurgopinus attack. Moreover, in 2 of the 3 nurseries where an infestation existed, hibernating beetles were present in variable numbers. The data, arranged in tabular form, follows.

Diameter of trees 6 inches above ground (inches)	Trees examined	Trees with evidence of H. rufipes attack	H. rufipes bark cells	Bark cells occupied by living adult H. rufipes
	Number	Number	Number	Number
0.75 to 1.50	20	2	2	0
1.51 to 2.50	55	8	28	5
2.51 to 4.00	42	14	102	25
4.01 to 5.00	14	4	38	5
5.01 to 6.00	4	2	14	0
Total	135	30	184	35

Scolytus multistriatus prevalent in Ohio River Valley.--D. E. Parker, of the Columbus, Ohio, forest-insect laboratory, reports that the smaller European elm bark beetle (S. multistriatus) is becoming more prevalent in the watershed of the Ohio River, where the phloem necrosis disease of elm is active. The killing of elms by this virus disease supplies large amounts of breeding material suitable for Scolytus. S. multistriatus was first recorded in Columbus in 1939 in one section of the city. At present most of the trees killed by phloem necrosis in all sections of the city are very heavily infested. Other disease areas in Ohio and adjoining States present a similar situation.

Western pine beetle survey finally completed.--According to F. P. Keen, Portland, Oreg., the annual pine beetle survey of Oregon and Washington, a cooperative undertaking between the Forest Service, the Indian Service, and the Bureau of Entomology and Plant Quarantine, was completed late in November. Curtailment of C. C. C. funds made it necessary to drop the training school, which heretofore had preceded the survey work. Notwithstanding these difficulties, the crews covered 71,360 acres, a 0.65-percent survey of the 11,000,000-acre pine area in these two States.

Ips-caused damage decreases on the Ochoco National Forest.--Ips-caused damage to ponderosa pine reproduction following logging is being investigated by W. J. Buckhorn, of the Portland laboratory. He has found, from a study of the Wolf Creek logging area on the Ochoco National Forest, that damage caused by Ips oregoni (Eich.) occurs almost entirely during the first year following logging. On cut-over areas subject to attack in 1941, approximately 3 percent of the residual reproduction was killed by I. oregoni. On similar cut-over areas subject to attack in 1939 and 1940 the losses caused by this insect were 7 and 10 percent, respectively. The lessening of current losses is attributed, at least in part, to increased tree vigor resulting from the abnormally heavy precipitation of 1941 (News Letter v. 8, No. 12, p. 12, Dec. 1941).

High percentage of cocoons of an imported pine sawfly remained in diapause through 1941.--J. V. Schaffner, Jr., of the New Haven, Conn., laboratory, reports that the first serious defoliation by the European sawfly Gilpinia frutetorum (F.) in New England occurred in the fall of 1940 on a municipal watershed in Southington, Conn., where the defoliation of red pine trees on 5 acres ranged from 25 to 60 percent. The feeding in the fall of 1941 was fully

as severe as that in 1940. Many acres in nearby stands are at present lightly infested. In July 1941 the duff in a series of samples covering a total of 528 square feet was examined with the following results:

Condition of cocoons	Cocoons found	
	Number	Percent
From which adult sawflies had emerged	2,629	21.24
Destroyed by mammals	1,924	15.54
Destroyed by predaceous and scavenger insects	1,293	10.47
Destroyed by hymenopterous parasites	2,543	20.54
Dead from unknown causes	449	3.62
Apparently healthy when collected	3,539	28.59
Total[1] (all conditions) found in samples	12,377	--

[1] As all cocoons were collected, some of them were 2 or more years old.

The 3,539 cocoons that appeared to be healthy were immediately isolated in glass vials for rearing in the laboratory. Early in the winter all unissued cocoons were dissected.

Rearing data	Number	Percent
Adult sawflies emerged July-September	1,860	52.56
Cocoons containing hymenopterous parasites	528	14.92
Cocoons dead from unknown causes	386	10.90
Cocoons alive and in diapause, December 1941	765	21.62

A further analysis of the data shows that for the entire collection, 4,489 cocoons, or 36.27 percent, produced sawflies and 3,071, or 24.80 percent, were parasitized by Hymenoptera, 2,760 of these having been attacked by the European species Microplectron fuscipennis Zett. The outstanding points of these studies indicate that a high percentage of cocoons remained in diapause through 1941 (21.62 percent based on field collections examined in the laboratory). The importance of the multibrooded parasite M. fuscipennis is also shown.

Gypsy moth egg cluster population low at Eastford, Conn.--H. A. Bess, New Haven, presents the following data on the annual population of the gypsy moth egg clusters in the ecological study areas. The insect has never been abundant in the general region of Eastford, although it was found there over 25 years ago. Outbreaks have occurred in the other areas represented.

Winter	Eastford, Conn. (1,000 acres 1/)	Freetown, Mass. (220 acres)	Petersham, Mass. (80 acres)	Alfred, Maine Tract 1D (120 acres)	Alfred, Maine Tract 1E (37 acres)
1936-37	2/ 0+	---	---	---	---
1937-38	0+	3/ 700±110	---	---	---
1938-39	0+	12±6	250±50	900±450	3,100±370
1939-40	0+	7±5	5±5	220±40	430±90
1940-41	0+	250±35	0+	---	230±40
1941-42	4/ 0	960±160	10±8	35±15	15±10

1/ Only 120 acres of the area was surveyed this fall but the remainder will be surveyedbefore spring.

2/ No egg clusters were present in the samples taken but a few were noted in the experimental area.

3/ The numbers are rounded to one-sixteenth of the standard error.

4/ No egg clusters were seen but probably a few are present.

GYPSY MOTH AND BROWN-TAIL MOTH CONTROL

Brush-disposal machines returned to storehouse.--The two brush-disposal machines, which have been operating in the field for several months, were returned to the storehouse at Greenfield, Mass., about the middle of December, after field conditions became favorable for burning brush. One of these machines had been in constant operation in Massachusetts since last September and had disposed of brush at gypsy moth infested sites in the towns of Sandisfield, Mount Washington, Alford, and Charlemont. The other machine was transferred to the field at about the same time, but was used for several weeks on properties in the Connecticut area, where authority to burn the accumulated brush could not be obtained, before moving to infested sites in Massachusetts. Although large quantities of brush and other waste wood were reduced to sawdust or small chips, very little mechanical trouble developed in either machine during their long periods of operation. The caterpillar tractor used in moving the machines from one pile of brush to the next was also returned to the storehouse. It has been equipped with a snow plow and is available for immediate service when needed.

Visit made to offices of State administrators.--During the first week in December A. F. Burgess, in charge of moth work; Eli Abbott, Jr., assistant administrator of the W. P. A. in Washington; and Paul P. Stewart, of the Secretary's office, visited the offices of the State administrators of Massachusetts, Connecticut, Vermont, and New York, to discuss problems connected with the change-over from Federal Agency to Federal W. P. A. projects under the State program, which will take place on January 1, 1942.

Gypsy moth colony found in town free from infestation for 15 years.--A gypsy moth crew, temporarily assigned to open scouting in Danby Township, Rutland County, Vt., during the open season for deer, discovered a small

gypsy moth infestation in an old apple orchard. Danby was first infested by the gypsy moth in 1924, and several small and scattered infestations were also found in 1925 and 1926. Owing to intensive extermination measures conducted at that time, no further evidence of infestation was found in Danby until this year.

Gypsy moth work retarded in Massachusetts.--The unusual weather conditions, the modified scouting work necessary in Massachusetts during the deer-hunting season, together with a reduced force caused by workers taking time off to hunt, all contributed to an appreciable retardation in gypsy moth work in that State during the first week in December. Satisfactory progress had previously been made by the 8 crews of scouts and 10 crews of laborers working in the Massachusetts section of the barrier zone.

W. P. A. work in Connecticut restricted to treatment of infested areas.--The force of W. P. A. workers was reduced from 37 to 25 on December 8, at the specific request of the W. P. A. State administrator in Connecticut, who stated that this action was necessary in order to keep within the State quota, and that similar reductions were being made on other W. P. A. projects. This necessitated a change in the work plan, as the W. P. A. force was too small to perform both scouting and treatment work adequately. Several agents were detailed to make special surveys of large blocks of woodland in townships of the barrier zone where small and scattered gypsy moth infestations were found and treated several years ago, but where little or no check-up work has been possible during the last 2 years, because of the lack of available W. P. A. employees. In addition, 3 2-man crews of experienced agents were assigned to determine whether infestations exist in the most dangerous parts of the barrier zone area. These men will traverse the woodlands about 100 feet apart and will creosote all single egg clusters found. The centers of the larger infestations will be marked, in order that they can be readily located and treated by the W. P. A. crews. By this method, the entire time of the small force of gypsy moth workers now employed in Connecticut will be utilized in areas where their labors will be of maximum advantage to gypsy moth control work.

N. Y. A. gypsy moth work discontinued in Pennsylvania.--The N. Y. A. gypsy moth project was placed on the inactive list on December 3, and the men were either furloughed or transferred to projects more closely identified with National Defense. However, the N. Y. A. shop project was permitted to continue, as it was considered in the nature of defense work, because of the excellent mechanical training received by the enrollees.

Gypsy moth workers withdrawn from woods during deer-hunting season.--At the end of the first week in December, 34 W. P. A. gypsy moth crews were engaged in scouting and 12 crews were employed on ground or thinning work in the Pennsylvania area. These crews confined their activities to residential areas or to open country during the 2-week open season on deer, which began on December 1. All gypsy moth work in woodlands is suspended at this time, as there is always grave danger of injury to workers from stray bullets from high-powered rifles, which are permitted in Pennsylvania. Gypsy moth work in woodland areas was resumed on December 15.

PLANT DISEASE CONTROL

Federal Agency projects discontinued.--All Federal Agency W. P. A. projects in barberry eradication were terminated by December 31 or earlier. Bureau-sponsored W. P. A. projects were started promptly in January in all States in the area, except Ohio, South Dakota, and Wyoming. In Ohio the application was approved in December but the Presidential Letter was not received until January 5, 1942. In South Dakota the application has been approved but no project is being operated at present, due to shortage of labor in areas where survey is necessary, and also because of weather conditions. No labor program is anticipated for Wyoming. In general, the change from Federal Agency to State W. P. A. projects was accomplished with a minimum of confusion and interruption

Mild fall weather favors progress in Michigan.--The Federal Agency W. P. A project, started October 1, was terminated December 31. During this period intensive survey was conducted in Benzie, Grand Traverse, Huron, Kalkaska, Leelanau, Manistee, Sanilac, St. Clair, and Wexford Counties. M. E. Turner, State leader, reports that from the standpoint of results and accomplishments this was perhaps the best 3-month period of work that he has had for some time in Michigan. One important reason for this was the fact that W. P. A. officials approved an assignment quota of 200 employees for this period. In addition, weather conditions were very favorable for survey, and the personnel assigned was above average. On January 1 the entire Federal Agency personnel was transferred to the State W. P. A. project. It is expected that work will be continued on about the same basis, except that survey operations were suspended in St. Clair County because all laborers in that county were assigned to a certified Defense project. To supplement the loss of St. Clair County, survey operations were started in Genesee County.

Area of escaped barberry bushes in West Virginia.--W. M. Watson, State leader in charge of barberry eradication in West Virginia, reports an interesting find of barberry bushes in Marshall County. This area is located about 6 miles southeast of Moundsville and in the vicinity of the village of Rosby's Rock. Approximately 400 common barberry bushes were located on this property, and most of them were exceptionally large and heavily fruited. At least 2 were estimated to be more than 15 feet high. Although the bushes showed no evidence of aecial infection this year, nearly all farmers who were interviewed concerning stem rust problems agreed that grain crops of all kinds had been severely damaged by stem rust in past years. Some of the older residents in this area were questioned as to the location of the original planting responsible for the escaped bushes. Several of them related the story of the French wine maker, who developed the present Beebout property into a hillside vineyard. The wine maker was a lover of flowers and shrubs. Many important and rare shrubs were said to have been planted around the original home and only a few hundred feet from the site of the largest escaped bushes. The exact location of the original planting was never ascertained, but the present owner of the property is certain that the "spice hedge" planted in profusion around the wine shop was imported barberry. Several old residents in the area referred to the escaped bushes as wild "spice hedge." The old homestead and wine shop were razed about the turn of the century and the site was transformed into a tillable field. At present the entire area is overgrown, and only traces of the site remain visible.

Barberry eradication in Ohio.--In 1941 an inspection was made of all barberry locations in 10 Ohio counties. This inspection was conducted by a trained Bureau employee at times when his services could be spared from other duties. The purpose of this inspection was to check the effectiveness of previous eradication methods and to look for the presence of fruiting barberry bushes on old properties and nearby. Harry Atwood, State leader, reports that barberries were found on 3.2 percent of the 1,666 properties checked. Five new locations were found, only 1 of which had escaped bushes. Approximately 92 percent of the barberries were found on old properties. No seedlings were noted on any of the properties inspected; however, of the bushes found on old properties, 11.3 percent were fruiting, as compared to 13 percent of those found on new properties.

Barberry eradication project reorganized.--R. O. Bulger has been promoted to project leader to fill the vacancy caused by the new assignment of W. L. Popham, who on December 1 was made assistant chief of the Bureau in charge of control operations. L. Kenneth Wright, heretofore State leader of barberry eradication in Pennsylvania, will take Mr. Bulger's place as assistant project leader. The project headquarters have been moved from Washington, D. C., to Minneapolis, Minn., and all field operations, not only in barberry eradication but also in connection with rust surveys and barberry identification and susceptibility studies, will hereafter be handled through the Minneapolis office, which will report direct to the chief of the Division at Washington.

Blister rust damage to merchantable white pine on Pack Demonstration Forest.--At the 1938 blister rust control conference of supervisory personnel in the Northeastern States, Clifford H. Foster, director of the Charles Lathrop Pack Demonstration Forest at Warrensburg, N. Y., presented a very interesting paper on blister rust damage. Mr. Foster reported that 250,000 board feet, or 5 percent, of the standing pine timber on the forest would be lost from blister rust stem cankers which originated prior to the application of control measures. During the last 3 years, many established blister rust stem cankers have become more readily visible. For this reason, studies of blister rust damage now in progress at the Pack Forest have added to the total of observed old stem infections on merchantable timber. Mr. Foster now believes that his 1938 estimate of 5 percent potential loss from blister rust must be revised upward and may reach 20 percent, or 1,000,000 board feet, before the count is complete. This condition at the Pack Forest shows that old stem infections on large trees are not readily observed, even by competent trained foresters, until such time as these infections have become almost unavoidably fatal. Foresters or woodland owners may be led into a false sense of security by the lack of conspicuous cankers, when many of the best trees in the stands may be undergoing the last stages in the process of destruction. In his thinning operations Mr. Foster has found frequently that the crop trees he desired to leave for additional growth were the ones having stem cankers. In fact, such infected pines have frequently caused Mr. Foster to revise his management plans. Further serious blister rust infection in the forest, however, has now been prevented by the eradication of currant and gooseberry bushes.

White pine acreage increasing in northern Wisconsin.--White pine acreage is on the increase in some counties in northern Wisconsin. Several pine areas worked initially in 1936 were found to contain a greatly increased acreage of native pine, when given a second workin- this year. One area in Marinette

County contained 75 acres of first-priority pine when worked in 1936. Five years later, in 1941, the same area was reworked and it had expanded to about 520 acres of first-priority pine. A substantial portion of this additional pine acreage consists of seedlings and small trees growing under aspen, which serves as an excellent cover crop for the young white pines. Ribes cynosbati bushes, from 2 to 3 feet high, were found generally distributed over that part of the area requiring initial eradication. This example of an increase from 75 to 520 acres of first-priority pine through natural reproduction is an indication of what is happening under favorable circumstances in other parts of the white pine region.

COTTON INSECT INVESTIGATIONS

Malvaceous plant, algalia, attacked by pink bollworm.--At the Presidio, Tex., laboratory many kinds of malvaceous plants are grown in small numbers to determine if there is danger that they may serve as hosts of the pink bollworm. On December 4, 60 mature seed pods of Abelmoschus abelmoschus from plants growing in close proximity to cotton were examined. Of these, 41 were found to be infested with pink bollworms. A total of 107 pink bollworms were taken, or an average of 2.61 per infested pod. This plant is grown occasionally as an ornamental in the extreme southern parts of the United States. The infestation of 68 percent in these seed pods at Presidio in 1941 was greater than in seed pods of this plant grown under similar conditions in Puerto Rico. In 1938 L. C Fife stated: "Algalia (Abelmoschus abelmoschus) is occasionally grown in Puert Rican gardens for its musk-scented seeds and for medicinal purposes. The large bristly seed pods average around 2-3/4 inches in length and 1-1/4 inches in diameter. Of 129 pods collected adjacent to infested cotton at Isabela, 10, or 7.8 percent, were found infested."

Pink bollworm hibernation in lower Rio Grande Valley.--The results of the last two seasons' work in the lower Rio Grande Valley have been summarized by W. T. Hunt, L. C. Fife, and A. J. Chapman, of the Brownsville, Tex., laboratory. As the field clean-up and closed season, when no fruiting cotton is permitted, are important measures used in the control program, an effort was made to determine the time and the place where long-cycle or hibernating larvae are formed under these conditions. Green and open bolls collected in July were examined for long-cycle larvae after keeping them under different conditions in the field for at least 30 days to permit pupation of short-cycle larvae. No long-cycle larvae were found in green bolls removed from the plants and exposed to the sun on the soil surface or in green bolls buried 3 to 4 inches deep. No long-cycle larvae were found in green bolls on plants that were cut and scattered over the soil surface, but larvae were found when the stalks were piled so that the green bolls were protected from the full force of the sun. No long-cycle larvae were found in open bolls placed on the soil surface in the sun, but larvae were found in open bolls buried 3 to 4 inches deep or on stalks cut and scattered over the field or placed in piles. The mean temperature for August was 83° F. and the precipitation 0.92 inch. Examinations of the soil beneath the bolls showed that the high temperatures had not caused the larvae to leave the bolls and enter the soil. No attempt was made to determine the percentage of larvae entering the diapause under these conditions, but it was definitely established that long-cycle larvae are found as early as the latter part of July. Long-cycle larvae were recovered from open bolls on and beneath the soil surface and on standing stalks in the lower Valley in each month from

November to April. No larvae have been found in cocoons in the soil, as is the case in arid regions. Open bolls were placed in hibernation cages on the soil surface, some were buried, and some were left on standing stalks between August 20 and December 10, to determine the duration of the resting stage. No survival was obtained from open bolls placed in cages on August 20, but from bolls placed on the soil surface in cages on September 26 moth emergence occurred as late as April 21 or after 207 days. The maximum duration of the resting stage was in open bolls on standing stalks. From material caged on September 25 the last moth emerged on June 11, or after 259 days. A higher survival also occurred in bolls left on standing stalks than in any other environment, emphasizing the importance of cutting all cotton stalks in the fall, even though the bolls are left on the ground. Between October 1, 1940, and May 31, 1941, the rainfall recorded at Brownsville was 26.54 inches, or 18.6 inches more than for the same period in 1939-40. Large areas of cultivated land were flooded on several occasions and, despite the fact that the hibernation cages were completely inundated for from 3 to 5 days on 5 different occasions, a light survival of pink bollworms occurred. It is known that excessive moisture increases larval mortality and expedites moth emergence, therefore very little carry-over to the 1941 crop was expected. The results of the bloom examinations, field inspections, and gin-trash examinations were in line with this expectation and showed considerable reduction over previous years.

Cotton dusting for insect control in Arizona.--T. P. Cassidy, Tucson, Ariz., and H. G. Johnston, extension entomologist, Phoenix, Ariz., report that 39,740 acres of cotton was dusted for insect control in Arizona in 1941. There was a total of 82,664 acre-applications of insecticides, or an average of 2.08 applications for each acre treated. For the control of Miridae, Pentatomidae, and other hemipterous insects 72,688 acre-applications were made on 29,924 acres of cotton, using a mixture of paris green 7.5 percent-sulfur 92.5 percent. This was applied at the rate of 15 pounds per acre-application, making a total of 1,090,320 pounds of the paris green-sulfur mixture used. For the control of the beet armyworm (Laphygma exigua Hbn.) and the cotton leaf worm (Alabama argillacea (Hbn.)) 9,978 acre-applications were made on 9,816 acres of cotton, using calcium arsenate dust at the rate of 8 pounds per acre-application, making a total of 79,808 pounds used. Ground machines were used in making 6,120 acre-applications and airplanes were used for 76,544 acre-applications. During 1941, 2 airplane companies operated in Arizona. The Agricultural Marketing Service of this Department estimates that 239,000 acres of the 1941 crop will be harvested in Arizona. The 39,740 acres dusted for insect control is therefore 16.6 percent of the acreage in Arizona. Before the investigations of Mr. Cassidy and his associates showed that dusting of cotton with insecticides is often a profitable practice in Arizona, practically none of the cotton in that State was dusted.

TRUCK CROP AND GARDEN INSECT INVESTIGATIONS

Diffusing odor of isoamyl salicylate in hornworm control.--L. B. Scott and Joe Milam, of the Clarksville, Tenn., laboratory, report the results of tests conducted in triplicate with several methods of diffusing the odor of isoamyl salicylate for attracting hornworm moths Protoparce sexta (Johan.) and P. quinquemaculata (Haw.). The standard vial-and-wick combination, consisting of a 1-inch vial, a short length of lamp wick, and a loosely fitting cork, was found to be less than one-fourth as effective as was 3 ounces of

lump fuller's earth placed in a small cloth bag and soaked with isoamyl salicylate. Rottenstone, charcoal, or Irish moss prepared in the same manner as the fuller's earth, or a 2-square-inch block of plaster of paris soaked in isoamyl salicylate, was found to be only slightly less effective than the fuller's earth. Following is a summary of the results based on 15 days' exposure of the materials during a period when moths were very scarce.

Diffusing material	Number of moths recovered						
	Northern[1]		Southern[2]		Total		Total
	Males	Females	Males	Females	Males	Females	Male and female
Vial and wick	4	3	15	3	19	6	25
Fuller's earth	12	18	72	26	84	44	128
Rottenstone	9	19	56	25	65	44	109
Charcoal	8	13	52	23	59	37	96
Plaster of paris	16	12	44	19	60	31	91
Irish moss	9	7	50	18	59	25	84

[1] Protoparce quinquemaculata.

[2] P. sexta.

Aphids infesting potatoes in relation to prevalence of leaf roll.--From a survey conducted in Aroostook County, Maine, during the summer of 1941 by this Bureau, cooperating with the Maine Agricultural Experiment Station, W. A. Shands and G. W. Simpson, of the Presque Isle laboratory, conclude that the large increase in the incidence and damage from the leaf roll disease in potatoes in that district in recent years may have been influenced by a change in the relative abundance of the species of aphids infesting potatoes, rather than by a change in the species. A comparison of the data from this survey with those obtained by Simpson in previous years discloses that, although the species of aphids found on potatoes were the same as those previously recognized as commonly infesting potatoes, there were differences in the relative abundance of the species. The green peach aphid comprised a larger proportion of the infestation than it did 5 to 10 years ago. Aphids are the only known vectors of this virus disease, and other workers have determined that the green peach aphid is the most important. The present survey consisted of making collections of aphids from adjacent fields of potatoes and clover, and from adjacent fields of potatoes, clover, and English peas. The collections, obtained before and at intervals on 2 occasions following pea harvest, were made on clover and peas by sweeping the plants with an insect net, while those on potatoes were made by removing the aphids on representative leaves of sample plants chosen at random on the side of the field adjacent to the peas or clover. Altogether, 60 collections containing 4,822 aphids were obtained from the 26 fields included in the study. The following table shows the total number of adult aphids of each species which the collections contained.

Insect	Adult aphids obtained from--			
	Potatoes	Clover	Peas	Young clover[1]
	Number	Number	Number	Number
Buckthorn aphid (Aphis abbreviata Patch)	99	11	0	6
Green peach aphid (Myzus persicae (Sulz.))	127	12	0	23
Potato aphid (Macrosiphum solanifolii (Ashm.))	96	14	0	15
Foxglove aphid (Myzus pseudosolani Theob.)	6	0	0	0
Pea aphid (Macrosiphum pisi (Klt.))	0	450	334	42
Miscellaneous	0	38	0	8

[1] In fields from which peas were harvested.

The data show that the collections from potatoes contained adults of only the four species of aphids recognized in previous years as commonly infesting potatoes in that district; those from peas contained mature forms of only the pea aphid; and those from clover contained mature specimens of the three species more commonly infesting potatoes, also the pea aphid and a few of two or three other species. The specimens were identified by using binocular or compound microscopes, under the supervision of P. W. Mason, of the Division of Insect Identification.

Wireworms seriously damage winter cover crops and lima beans in southern California.--A phase of the wireworm-winter-cover-crop investigations, now being conducted at the Ventura, Calif., laboratory, is to determine the extent of damage caused by the sugar beet wireworm (Limonius californicus (Mann.)) to lima beans during the growing season. The results in 1941, as reported by M. W. Stone, show that very low wireworm populations were responsible for considerable damage to lima bean plantings, and when populations averaged slightly below or above one wireworm per square foot more than one-fourth of the plants were destroyed. The following table shows the kind of cover crops being tested in three fields, the average wireworm population in 1941, and a summary of the wireworm injury.

Cover crop	Average wireworms per sq. ft., 1941	Reduction in plants in fields			Average reduction in plants
		Field No. 1	Field No. 2	Field No. 3	
	Number	Percent	Percent	Percent	Percent
Barley	1.53	40.9	49.1	17.1	27.2
Mustard	.74	33.3	36.5	16.3	25.2
Clover	.78	25.5	17.6	15.5	18.3
Vetch	.50	29.0	--	16.8	21.0
Fenugreek	.58	31.0	--	16.5	21.3
Control	.36	36.8	12.2	12.0	18.8
Average for all cover crops	--	32.6	32.2	16.5	22.6

Planting of beans in these fields was at the rate of 100 pounds per acre, or at an average rate of 2.5 beans per foot of row. Two weeks after planting

there was only 0.96 plant per foot and at the time of harvest only 0.75 plant per foot of row. This shows clearly the extensive damage done by wireworms to both lima bean seed and plants. The results in the above table were based on counts of plants made 2 weeks after planting and at the time of harvest, in 0.01-acre plots, or 174 feet of row located in the center of each plot. The cover crops were planted in November 1939 for 2 successive years and were plowed under early in the spring. There are 16 replicates of the barley, mustard, clover, and control plots and 12 replicates of the vetch and fenugreek plots. A total of 24 1/4-square-foot samples of soil to a depth of 16 inches were taken at random from each plot and sifted for wireworms prior to the planting of lima beans in May and June 1941.

INSECTS AFFECTING MAN AND ANIMALS

Double-action light traps effective in capturing gnats.--A. W. Lindquist, of the Nice, Calif., laboratory, reports that a double-action light trap, fitted with lamps totaling 400 watts, took 55.8 pounds of the Clear Lake gnat, whereas four small single-action traps with lamps totaling 400 watts attracted only 65.5 pounds of gnats. Mr. Lindquist also reports that traps set 7 feet from the ground attract the maximum number of gnats.

Cube dip kills brown winter tick on calves.--Fifty calves, each infested with approximately 500 Dermacentor nigrolineatus (Pack.) and weighing about 125 pounds, were dipped in a portable tin vat 39 inches long, 28 inches wide, and 22 inches deep, containing 25 pounds of cube, 6-3/8 pounds of soap, and 57 gallons of water. H. E. Parish, of the Menard, Tex., laboratory, conducted the test on December 18 and reports that when the calves were examined on December 22 and 29 no live ticks were found. Ticks of all stages were present on the treated animals. Mr. Parish also reports that 1 calf was severely infested with sucking lice when dipped but that no living lice were found when it was re-examined. For dipping, the calves were thrown and all 4 feet tied. With the aid of a block, they were lifted into the vats, back first. The head was then ducked and the calf hoisted over the vat until the excess dip drained into the vat. The operation was completed in about 2½ hours.

Smear 62 meets approval of livestock men.--W. L. Barrett, Menard, has estimated that about 90 percent of the livestock men in southern and southwestern Texas are now using Smear MS-62 for screwworm infestations. Many thousands of gallons of the smear were manufactured and sold in Texas during the last 6 months of 1941, when it was first released to the public. A direct saving to ranchmen has been shown in reducing labor bills by about one-half, because infested animals do not ordinarily need more than the initial treatment.

Ranch-management screwworm-prevention program.--Shearing goats and sheep in August and early in September reduces the December peak population of Cochliomyia americana C. & P. on the western escarpment of Texas, according to observations made by the Menard laboratory. Data obtained clearly show that the December peak populations of the screwworm can be markedly reduced, if not practically eliminated, by ranchers shearing 85 percent of the goats and sheep during the time indicated. Population studies indicate that the December population of this fly is a significant index to the winter carry-over in this part of Texas. No doubt the adjusted wound-treatment practice put into effect on individual ranches accounts for the present reduced population of this pest, as

compared with that of a year ago. The populations in all areas in Texas were lower during the period October-December 1941 than for the same periods in 1939 and 1940.

FOREIGN PLANT QUARANTINES

Citrus black spot in Argentina.--Among the items covered in a translation of excerpts from the quarterly bulletin of the Department of Agriculture of Argentina for October-December 1940, made by Roberto Ortiz, is a statement that Phoma citricarpa McAlp. was isolated from mandarin orange, the first report we have noted for this disease in South America.

Entomological interceptions of interest.--Living pupae of the whitefly Aleuroplatus cococolus Q. & B. were found at San Francisco on November 5 on leaves of Guzmania miculata in express from Guatemala. Eight living larvae of the Mexican fruitfly (Anastrepha ludens (Loew)) were intercepted at Baltimore on November 27 in oranges in quarters from Mexico. Living adults of the bruchid Bruchus emarginatus Allard were taken at New York on November 3 in peas in cargo from India. Larva and pupa of the bruchid Caryedon fuscus Goeze were taken at Philadelphia on October 21 in tamarind pod in mail from British Guiana. Eighteen living larvae and 10 living pupae of the curculionid Caulophilus latinasus (Say) were intercepted at Hidalgo on November 26 in 1 avocado seed in baggage from Mexico. Fifty-five living larvae of the Mediterranean fruitfly (Ceratitis capitata (Wied.)) were intercepted at San Francisco on November 12 in Coffea arabica in baggage from Hawaii. Eight living adults of the curculionid Cylas turcipennis Boh. were taken at New Orleans on November 8, in sweetpotatoes in stores from Java. Living larvae and pupae of the bostrichid Dinoderus bifoveolatus Woll. were intercepted at New York on August 15 in barbasco roots in cargo from Peru, and on August 6 and September 2 living adults were taken in derris roots in cargo from Straits Settlements and British Malaya. A living larva of the Tahitian coconut weevil (Diocalandra taitensis (Guern.)) was intercepted at San Francisco on November 7 in coconut in baggage from Hawaii. A living larva of the curculionid Epicaerus cognatus Sharp was found at Laredo on October 23 in potato in baggage from Mexico. A living adult of the curculionid Eucalandra setulosa Gyll. was taken at Hoboken on September 30 with Cattleya sp. in cargo from Colombia. Living adults of the bostrichid Heterobostrychus aequalis (Waterh.) were found at New York on September 24 in wooden packing cases in cargo from India. Living specimens of the coccid Lepidosaphes uniloba (Kuw.) were intercepted at San Pedro in August on Alyxia olivaeformis leaves in baggage from Hawaii. Three living larvae of the East Indian bean pod borer (Maruca testulalis (Geyer)) were intercepted at New Orleans on October 30 in string bean in stores from Puerto Rico. Living adults, larvae, and pupae of the scolytid Renocis mexicanus Blckm. were intercepted at Chicago on October 8 in bark of Eysenhardtia sp. in cargo from Mexico. Living specimens of the thrips Rhopalothrips bicolor Hd. were intercepted at Laredo on April 17 on cactus bloom in baggage from Mexico. This represents our second interception of this species. A living larva of the tineid Setomorpha insectella (F.) was taken at New York on November 3 in sweetpotato in stores from Peru. A living adult of the lygaeid Sisamnes contractus Dist. was intercepted at El Paso on July 23 with pineapple in cargo from Mexico. A living adult of the endomychid Trochoideus americanus Buq. was intercepted at Hoboken on November 25 with Cattleya sp. in cargo from Colombia.

Pathological interceptions of interest.--Alternaria fasciculata (C. & E.) Jones & Grout was found on November 12 at Philadelphia on peppers from Brazil. Cerebella andropogonis Ces. was intercepted on July 1 at New York on Paspalum sp. seed from Australia. Cercospora apii Fresen., which has been intercepted very infrequently for several years, was found on October 13 at Baltimore on celery from Brazil. Determination of Chlamydomyces palmarum (Cke.) Mason has just been received for diseased banana stems from Panama found in cargo on August 26, 1940, at New York. What was assumed to be Colletotrichum gloeosporioides Penz. was found on August 22 at Hoboken on Sarracenia sp. from New Foundland. No reports of a Colletotrichum on this host were found. Diplocapter coronata (Cobb) Cobb was found on October 17 at Philadelphia in potato tubers from Argentina. Gloeosporium rhododendri Br. & Cav. was intercepted at Seattle on September 7 on rhododendrons from England. Hormodendrum olivaceum (Cda.) Bon. was intercepted on September 25 at New York in several boxes of apples in baggage from Chile. Paranthostomella sp. was intercepted on June 27 at Brownsville on an orchid plant from Mexico. Phoma citricarpa McAlp. was found on December 7 at New York on oranges in stores from South Africa. Phoma nebulosa Mont. was found on November 20 at New York on parsnips in stores from Australia. Physalospora camptospora Sacc. was intercepted on November 3 at San Francisco on plants of Stanhopea bucephalus from Mexico. Puccinia asparagi DC, was intercepted on November 2, for the first time, on asparagus from Mexico at El Paso. Septoria dianthi Desm. was intercepted on November 6 at New York on carnation cuttings in baggage from Brazil. Uredo behnickiana P. Henn. was intercepted on August 18 at Hoboken on Oncidium oblongatum from Guatemala. Ustilago rabenhorstiana Kuehn was found on November 12 at New York on Digitaria sanguinalis used as packing for a mail shipment from Uruguay.

DOMESTIC PLANT QUARANTINES

Transit inspection of Christmas trees.--One of the highlights of the year's transit-inspection activities is the inspection of Christmas trees and Christmas greens in the Northeastern States. The Christmas season of 1941 ran true to form, with the exception of the manpower available, which was below that of previous seasons. The interceptions per man-day, however, exceeded that of any previous year. At Boston, the actual number of violations found was greater than that of last year, with the force of 2 inspectors undertaking the work usually performed by 4. Truck, rail, and water movement was closely checked at New York with inspection of mail and express in progress 24 hours a day. The December inspections in the Northeast resulted in interception of 218 violations consigned to 30 States and the District of Columbia, 95 percent of which involved the gypsy moth quarantine. Approximately 55 percent of these infringements were returned to the senders. When shipments of restricted materials also contained gifts or other articles of value every effort was made to inspect them in transit, attach the certificate, and allow them to proceed. Falsely labeled shipments were not so numerous as in past years. However, 1 shipment consisting of a small tree, wreath, branches, and cones was found sewed up in a piece of cloth to resemble a large balsam pillow, which is exempt from certification. At Buffalo, in a 14-piece shipment of clothing and household equipment consigned to Detroit, 1 crate contained 12 uncertified potted plants moving from the Japanese beetle area. The personnel force in the Northeastern region during December consisted of 10 inspectors, including 4 from the Japanese beetle force, and 1 stenographer. The well-coordinated and vigorous programs carried out in the last few years for check-

ing the movement of Christmas greens from the gypsy moth area are showing far-reaching results, according to the regional inspector in charge. The number of properly certified shipments from private individuals has increased by leaps and bounds, he states.

Truck shipments of Christmas trees inspected.--The truck movement of Christmas trees from New England was heavier than in the past and the inspection of several truck markets in New York City and the patrolling of the Boston Post Road at Pelham, N. Y., took precedence over rail inspection. As a result, 122 truckloads of greens and 1 truckload of granite were examined. Two loads were found to be uncertified, 1 consisting of about 1,000 trees bought in Boston, their original source unknown. The transit inspector, on examining about 2 percent of the trees, found a gypsy moth egg cluster. The driver was accordingly instructed to return the load to the gypsy moth inspector at Westfield, Mass., who, according to prior arrangements, checked up on its return and later reported on the disposition of the load. The gypsy moth eggs found on these trees were not viable; however, their presence indicated that the trees came from infested territory and that the load was a highly potential source of more egg clusters. Rail movement of Christmas greens was below normal. Eighty-seven percent of the carload movement of Christmas trees that arrived in New York City came from Canada.

Transit inspection in the Middle West.--In the Central States over 25,000 shipments were inspected in December and 520 waybills were examined, the commodities affected by plant quarantines consisting largely of citrus fruit. Approximately 2,000 L.C.L. freight shipments of nursery stock, granite, citrus fruit, Christmas trees, cotton linters, sweetpotatoes, and peach stock from Texas were checked for quarantine compliance during the month.

Peach trees removed in infected areas.--The December activities of the peach mosaic and phony peach control projects were directed, jointly with the States, toward the destruction of the remaining infected trees found in the 1941 inspection season and of peach trees that have been abandoned or are growing wild. All such diseased trees found in Louisiana, Mississippi, and South Carolina have been removed. Those in Georgia were reduced during the month from 3,000 to 326. In Alabama, Arkansas, Illinois, Missouri, and Oklahoma action is being taken, it is reported, toward cleaning up the remaining infected peach trees known to exist. An additional number of mosaic trees have been taken out of the Hemet district of Riverside County, Calif.

W. P. A. projects for peach-disease control have now expired.--The Federal W. P. A. projects on peach mosaic and phony peach control which have been operated annually since August 1935 expired on December 31, 1941. The funds appropriated for these projects have made it possible to accomplish a great deal more in the control of these diseases than would have been possible with the regular appropriation for this work. During the above 6½-year period, with the aid of relief workers, nearly 90,000,000 abandoned and escaped host plants of these diseases have been destroyed, as well as 484,308 phony-infected trees and 189,840 mosaic trees. Many of the abandoned peach orchards, particularly in the Southeast, were heavily infected with the phony disease and overgrown with pine and other native trees. The removal of such orchards, which were a constant source of infection to nearby healthy nurseries and orchards, has been of inestimable value to the peach industry. To replace thes

Federal agency projects, applications have been approved by the State administrators of Alabama, Arkansas, California, Colorado, Georgia, Oklahoma, South Carolina, and Texas, for federally sponsored W. P. A. projects in the State programs. A project application in Tennessee has tentatively been disapproved, because labor will not be available on account of National Defense needs. The Oklahoma project is now in operation.

Citrus canker eradication.--Sixteen inspectors and 126 W. P. A. employees worked in several different areas in Texas in December in locating and destroying seedlings of Citrus trifoliata, which constitute a menace to the Federal-State citrus canker eradication program. In Brazoria and Galveston Counties, however, the vigorous measures of extermination of such seedlings at frequent intervals since 1935 have greatly reduced the number of such plants. Only 82 were located in December on 17 of the 37 formerly infected properties in this area. Other areas worked in December included Navasota in northern Texas, where an active infection was found last year. Every property in the town was checked for citrus and over 95,000 seedlings were found and destroyed, as well as a hedge of these trees. At Brenham, in Washington County, rigid inspection and destruction of Citrus trifoliata have been carried on since last September for the reason that canker-infected trees found at Navasota, Tex., in February 1941 originated, it is believed, on a property near Brenham. In Harris County unusually close inspection is made at regular intervals of an area made up chiefly of large ranches, because citrus canker was once found on trees in this area which were accessible to cattle, and it is believed that Citrus trifoliata seedlings, now found generally scattered over the ranches, have been spread, in part, by cattle pastured in the area during the time the fruit-bearing trees were standing. No citrus canker was found at any point in December. In the extreme southern part of the State, inspection of citrus groves was conducted at Laredo, Carrizo Springs, and Crystal City. No citrus canker has been found in this part of the State for many years.

Chinch bug survey completed.--The survey begun on November 3, to determine the numbers of chinch bugs entering hibernation, was completed on December 13. Surveys were made cooperatively with the States in Illinois, Indiana, Iowa, Kansas, Missouri, Nebraska, and Oklahoma. According to reports from the States, the infestations are considerably lighter throughout Missouri, Illinois, Indiana, and eastern Iowa than for several years. Areas of severe infestation appear to be west of those found in the surveys of 1939 and 1940. The indications are that, under climatic conditions favorable to the pest, severe infestations may occur next spring in southwestern Iowa, southeastern Nebraska, northeastern Oklahoma, and in spotted areas throughout the eastern third of Kansas.

Correction.--In the News Letter dated January 1, 1942, in the note on page 28 entitled, "Mole cricket control work terminated," the percentage of bait distributed in the Plant City, Fla., area should be changed from 3 to 37.

CONTROL INVESTIGATIONS

Two nitrile chemicals effective against flour beetle.--H. H. Richardson and A. H. Casanges, in tests of various chemicals as fumigants at the Beltsville, Md., laboratory, found two nitrile chemicals, acrylonitrile and chloroacetonitrile, to be toxic to the flour beetle (Tribolium confusum Duv.). Con-

centrations of near 2 and 3 mg. per liter gave 50- and 95-percent kill, respectively, of the beetles in 5-hour exposures, at 77° F. under laboratory conditions. Acrylonitrile is also known as propenenitrile and has the formula CH_2 = CHCN. Chloroacetonitrile has the formula CH_2 Cl CN. Both have the cyano (CN) group present and appear in the vicinity but, as reported in the literature, not quite so toxic as hydrocyanic acid. They differ from hydrocyanic acid in having a slightly delayed killing action. For example, many beetles were still alive and active after a 5-hour exposure to a killing dosage of these nitriles, but all were dead in 3 to 6 hours later. These chemicals, liquids at ordinary temperatures, are available commercially. Acrylonitrile is used in the manufacture of artificial rubber. Chloroacetonitrile appears slightly more toxic than acrylonitrile but is also somewhat less volatile. Acrylonitrile has a boiling point near ethylene dichloride.

INSECTICIDE INVESTIGATIONS

"Thunder god vine."--The continued investigation by Fred Acree, Jr., and H. L. Haller, of Tripterygium wilfordii, commonly called "thunder god vine" by the Chinese (see News Letter v. VIII No. 9, p. 32, Sept. 1, 1941), has shown the isolated toxic fraction to consist of both a crystalline alkaloid and a noncrystalline fraction which likewise possesses alkaloidal properties. The pure crystalline alkaloid is a compound of very high molecular weight, having characteristics exhibited by some other naturally occurring alkaloids. The most striking of these characteristics is that the compound occurs as an ester. Saponification studies have shown the alkaloid to be esterified with at least one molecule of benzoic acid and several molecules of acetic acid. In a toxicity test by E. H. Siegler, the pure crystalline alkaloid appeared to be many times more toxic than nicotine to codling moth larvae.

Study of sodium fluoride and sodium fluosilicate.--Owing to wartime conditions, sodium fluoride has become a very scarce commodity. Sodium fluosilicate, however, should be more readily available because of the potentially large amount of silicon tetrafluoride that can be recovered during the manufacture of phosphate fertilizer. Sodium fluoride has been extensively used in the control of roaches, but sodium fluosilicate, despite reports of good results by some pest-control operators, has not been regarded as satisfactory. R. H. Carter and E. L. Gooden have started an investigation of the chemical and physical properties of all available commercial samples of these two compounds in an effort to determine what characteristics may be responsible for the differing efficiencies of these materials in their use as roach powders. Certain physical characteristics of sodium fluosilicate are probably of importance also for use in poison bait for Mormon crickets.

Particle-size apparatus soon available.--The various field stations that have need for obtaining measurements of average particle diameter of powders will be pleased to know that the self-calculating air-permeation apparatus recently patented by E. L. Gooden (U. S. Pat. 2,261,802 mentioned in the News Letter, v. VIII, No. 12, Dec. 1,1941), is being developed for commercial manufacture by Fisher Scientific Company, who hope to have it on the market by spring.

BEE CULTURE

Breeding of stock important in beekeeping.--C. L. Farrar and C. W. Schaefer, Madison, Wis., report wide differences in honey production between 7 lines of stock tested in 1941. These lines were represented by from 1 to 5 groups of 10 sister queens. Each group represented the progeny of a different breeder queen. Each queen was established with a 2-pound package. Average productions are based on colonies surviving with original queens, sister queen replacements, or supersedure daughters. An average of 3 colonies from each test group had to be eliminated because queens of other stock were used to make replacements. Five groups, line I, averaged 237 pounds of surplus honey. The range in average production for the 5 groups was 184 to 260 pounds. This line has shown superior production in all previous tests. One group, line II, averaged 101 pounds and stock of this line has shown low production in all previous tests. One group, line III, averaged 129 pounds. Three groups of double hybrids, line IV, obtained by crossing lines I, II, and III, averaged 219 pounds and a range in average production for the 3 groups of 188 to 246 pounds. The yield of the double-hybrid line suggests evidence of either hybrid vigor or dominance of the superior characteristics of line I. Three groups, line V, averaged 181 pounds and a range in average production for the 3 groups of 150 to 199 pounds. For 1 group each, line VI averaged 180 pounds; line VII, 145 pounds. The maximum and minimum yields for all colonies carrying through the productive season without supersedure were 341 pounds for line I, and minus 22 pounds for line V.

IDENTIFICATION AND CLASSIFICATION OF INSECTS

Primary larvae of Coleoptera in systematic entomology.--The study of coleopterous larvae, particularly primary larvae generally disregarded by systematists, is proving important in the field of taxonomy. It is through such study that problems in the relationships of various species and groups of species are being solved more and more frequently. There are numerous instances among the Coleoptera in which the systematic placement of a species appears to have been determined by other than characters of the adults. Study of the primary larvae, although not infallible, will sometimes solve these problems with such clarity that there remains little doubt as to the correctness of the solution. One such example is that regarding the systematic position of Schizopus sallei Horn. This species, which in current classifications is placed in the family Buprestidae, has recently (Rees, Wash. Ent. Soc. Proc., v. 43, No. 9, 1941) been shown not to belong to that family, but rather to the Schizopodidae (proposed by Le Conte in 1859).

In order that this example may be more fully understood, some of the facts brought out in this study will be cited. Although buprestid larvae possess characters common to the larvae of several families, there are certain characters that differentiate them from all others, and these main distinguishing characters are present and unchanged, within limits, in the larvae of all stages. Irrespective of the instar, a buprestid larva possesses cribriform spiracles and well-developed dorsal and ventral ambulatory plates in combination with a distinct labrum, but it lacks true legs, prolegs, and ventral glands. A study of the primary larva of S. sallei reveals the absence of dorsal and ventral ambulatory plates and the presence of biforous instead of

cribriform spiracles. These two characters alone, disregarding additional contrasting characters, exclude it from the Buprestidae. Furthermore the primary larva possesses well-developed prolegs and ventral glands, characters which exclude it from all other families of Coleoptera. Even though these may be disregarded as examples of specialized development the combination of other characters prevents placement of the species in any known family. Therefore, although the adult bears a superficial resemblance to buprestids and is now placed in the Buprestidae, the study of the primary larva makes it evident to students of both the adults and the larvae that the present classification of this species is incorrect and that the family proposed by Le Conte is warranted.

Another example of the value of primary larvae in establishing a more correct systematic placement was reported by J. W. MacSwain at the recent annual meeting of the Entomological Society of America. His example dealt with the proper position of the meloid genus Poreospasta. For many years this genus was considered distinct from Lytta and was placed in a different section of the family. However, Van Dyke (Calif. Univ. Pubs., Ent., v. 4, No. 12, 1928) indicated that it is rather closely related to Lytta on certain adult characters. MacSwain, studying the primary larva, corroborated Van Dyke's opinion and established the final proof that the genus had been incorrectly placed and in reality belongs in the tribe Lyttini of Leng.

These and other examples show the importance of the correlated study of adults and larvae. Unfortunately only relatively few Coleoptera are known in the immature stages. The larvae of most species, even those of many abundant forms, are not identifiable since they have not been associated with adults through rearing. Careful field and laboratory studies which will establish the identity of larvae are much needed and will contribute importantly to knowledge of beetle classification.

---oOo---

UNITED STATES

DEPARTMENT OF AGRICULTURE

BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE NEWS LETTER

VOLUME IX

UNITED STATES DEPARTMENT OF AGRICULTURE

BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE

N E W S L E T T E R

FOR JANUARY 1942

Vol. IX, No. 3 (Not for publication) March 1, 1942

REMEMBER PEARL HARBOR

ADMINISTRATION

Budget Estimates

The budget estimates for the fiscal year 1943 include a total of $5,488,360 for the work of the Bureau provided for under "Salaries and Expenses." This is an increase over the amount available for the fiscal year 1942. The total does not give an accurate picture of the situation, however, because the working funds under many of the items are reduced considerably and, with one exception, the increases are to meet additional costs in operation of W. P. A. programs occasioned by the change from Federal to State projects. The working funds available under all but two of the research appropriations are less. The estimate includes amounts for administrative promotions under the Ramspeck Act, which makes it difficult to compare totals. The following tabulation gives the changes in working funds for the various appropriation items.

General administration	$ - 1,980
Fruit insects	42,600
Japanese beetle control	--
Sweetpotato weevil control	--
Mexican fruitfly control	- 7,960
Citrus canker eradication	- 3,485
Gypsy and brown-tail moth control	+ 75,000
Dutch elm disease eradication	+ 100,000
Phony peach and peach mosaic eradication	+ 35,200
Forest insects	- 12,500
Blister rust control	—
Truck crop and garden insects	- 36,580
Cereal and forage insects	+ 500
European corn borer control	- 10,000
Barberry eradication	+ 42,500
Cotton insects	- 24,544
Pink bollworm and Thurberia weevil control	- 51,800
Bee culture	- 3,000
Insects affecting man and animals	—
Insect pest survey and identification	- 6,000
Foreign parasite introduction	- 18,000
Control investigations	- 7,518
Insecticide and fungicide investigations	- 10,000

Transit inspection	$ - 4,059
Foreign plant quarantines	+ 14,765
Certification of exports	- 1,862

The regular budget estimate provided for a reduction of $39,500 for the item, cereal and forage insect investigations. Subsequent to this, however, a supplemental estimate of $40,000 was submitted to provide for expansion of the research on European corn borer. The budget estimate proposes an increase of $690,000 in working funds for white pine blister rust control, of which $271,668 is for work carried on under the direction of the Bureau.

New Division in the Bureau

Claude Wakeland has been appointed leader of the newly created Division of Grasshopper Control, which will have charge of control operations of grasshoppers and Mormon crickets, as well as direction of any work the Bureau may do to cooperate with the States in the control of chinch bugs. The work is now unified under one division. The headquarters will remain in Denver, Colo.

Dr. Wakeland was born on August 2, 1888, at La Jara, Colo. He attended public schools in Denver and graduated from the Colorado State College with the B. S. degree in 1914. In 1924 he received the M. S. degree from the same institution, and in 1934 was conferred the degree of Ph. D. by Ohio State University. He started his active work in entomology with the Colorado Agricultural Experiment Station. In 1920 he was appointed extension entomologist for the University of Idaho. In 1928 he was appointed head of the department of entomology of the University of Idaho, from which position he was appointed to the Bureau of Entomology and Plant Quarantine in 1938 as project leader on Mormon cricket control, with headquarters at Salt Lake City. In 1939 he was made field director of the combined grasshopper and Mormon cricket control programs. Since 1940 headquarters for this work has been in Denver.

Dr. Gibson Retires

Dr. Arthur Gibson, Dominion entomologist and chief of the Division of Entomology of the Dominion Department of Agriculture, Canada, for the last 22 years, was retired on January 15. He was born in Toronto in 1875 and joined the staff of the Dominion Department of Agriculture in 1899. In 1914 an entomological branch of the Department of Agriculture was established with Dr. Gibson as chief of the Division of Field Crops and Garden Insects, and in 1920 he succeeded Dr. Gordon Hewitt as Dominion entomologist. Dr. Gibson has long been associated with cooperative entomological activities carried on between the Dominion and this country, and is well known to many of the members of the Bureau.

L. S. McLaine Succeeds Dr. Gibson

Leonard S. McLaine, chief of the Plant Protection Division, Production Service, has been appointed by the Civil Service Commission to the position of assistant director of Science Service, to succeed Dr. Arthur Gibson who is now on retiring leave. Mr. McLaine's appointment becomes effective July 16, 1942. In the meantime, the Deputy Minister has appointed Mr. McLaine acting Dominion entomologist, and he will take over his new duties immediately, relieving H. G. Crawford, who has been acting in this capacity since January 15. Mr. McLaine's long service in the Division, and more recently in cooperation with it, has made him acquainted with all the senior officers and most of the junior members of the staff. He may be assured of receiving their fullest cooperation.

BUREAU EMPLOYEES CALLED TO THE COLORS OR TRANSFERRED TO SPECIAL NATIONAL DEFENSE ASSIGNMENTS

Aufranc, Clarence W., Agt., Fruit Ins. U. S. Army Reserve, called to active duty Dec. 26, 1941.

Buckner, Robert J., Agt., Fruit Ins., enlisted, Marine C., Feb. 1, 1942.

Conradi, Karl P., Fld. Aide, Cotton Ins., inducted, Select. Serv., Jan. 12, 1942.

Dutky, Samson R., Asst. Bact., Fruit Ins., First Lt., U. S. Army Reserve, called to active duty, F. A. School, Fort Sill, Okla., Jan. 15, 1942.

Harwell, Rufus T., Agt., Cotton Ins., inducted, Select. Serv., Jan. 15, 1942.

Jordan, Austin R., Agt., PBW, inducted, Select. Serv., Jan. 7, 1942.

Klaus, Adolph A., Auto Mech., PBW, inducted, Select. Serv., Apr. 13, 1942.

Lowry, William L., Fld. Asst., Cotton Ins., inducted, Select. Serv., Apr. 27, 1942.

Messersmith, Harold A., Agt., Jap. Beetle Cont., inducted, Select. Serv., Jan. 26, 1942.

Monroe, Henry J., Asst., Clk.-Stenog., Dom. Pl. Quar. (WFB), inducted, Select. Serv., Feb. 5, 1942.

Parker, Lawrence B., Asst. Ent., Fruit Ins. Second Lt., U. S. Army Reserve, called to active duty for service in P. R., Feb. 11, 1942.

Shynkar, John, Unskilled Labr., Truck Crop Ins., inducted, Select. Serv., Jan. 8, 1942.

Thompson, John V., Jr., Asst. Biol. Aide, Fruit Ins., inducted, Select. Serv., March 12, 1942.

Wolfe, Homer R., Agt., Fruit Ins., enlisted U. S. Army, Nov. 21, 1941.

FRUIT INSECT INVESTIGATIONS

Development of raisin moth.--Larvae of Ephestia figulilella Greg., reared on dried mulberries by Oscar G. Bacon, of the Fresno, Calif., laboratory, passed through the larval, prepupal, and pupal stages, at 82° to 84° F., in an average of 43 days: Larval period 32, prepupal period 1, pupal period 10. The minimum time was 33 days and the maximum 59 days. The number of instars averaged 5, the range being from 4 to 8. The period of incubation at the same temperatures ranged from 3 and 6 days, the usual period being 4 days, and preoviposition period at room temperatures was 1 day.

MEXICAN FRUITFLY CONTROL

Trapping results for January.--Trapping operations in Texas during January indicated that the seasonal influx of flies had started. During the

month 15 adult Anastrepha ludens Loew were trapped from 14 properties, and several specimens of A. serpentina, A. mombinpraeoptans, A. sp. "Y," and A. pallens Coq. were also taken. Intensive inspection of fruit in the groves failed to disclose any larval infestations. Fruit harvested for shipment during the month amounted to 4,860.8 equivalent carlots. In addition to this, an immense amount of fruit was purchased by the Surplus Marketing Administration for canning purposes. At the close of January a total of 17,035 carloads of fruit had been shipped from the regulated area.

CEREAL AND FORAGE INSECT INVESTIGATIONS

Influence of nutrition on successive generations of European corn borer.--The relation of nutrition to the rearing of successive generations of corn borers in the laboratory has been studied by G. T. Bottger, of Toledo, Ohio. Attempts were made to rear successive generations on green beans and peas, green peas exclusively, sweet corn kernels preserved by quick freezing, and frozen corn internodes similarly preserved. Fourteen generations of corn borers have been reared successfully on the combination bean-pea diet and 13 generations on green peas alone. Very low survivals resulted when larvae were fed either corn kernels or corn internodes, with complete failure of reproduction in the F_1 generation reared on internodes and in the F_2 generation reared on corn kernels. No cumulative effect of laboratory rearing is indicated, either by the weight of 15-day-old larvae or by survival and pupation of 35-day-old larvae. Wide variation in larval weight between generations was apparently caused by differences in the nutritive quality of the beans and peas, as influenced by their maturity and the time which elapsed between harvest and feeding. Superiority of the green bean-pea diet over green peas alone is indicated by higher average weights, and percentages of survival and pupation, of larvae reared on the combination diet than resulted from feeding green peas alone. No permanent change in percentage of multiple-generation borers is indicated after rearing 14 successive generations in the laboratory. Although no cumulative effect of nutrition on oviposition is indicated, a possible direct influence of larval nutrition on resulting moths is suggested. It is concluded that laboratory rearing and nutrition, if supplied by green beans and peas of proper quality, should not constitute any limitations to rearing successive generations of the borer in the laboratory.

Control for Cyclocephala grubs.--P. Luginbill and H. R. Painter, Lafayette, Ind., report that in the fall of 1940 a small area of the athletic field of the Jefferson High School at Lafayette, infested with these grubs, was treated with lead arsenate-sawdust mixture, using 1 pound of the arsenate in 1 peck of sawdust, broadcast on 100 square feet of area. At the time of application from 15 to 20 grubs were found in a square foot of area. An inspection the following spring disclosed only about 1 grub per square foot of area.

Choice of silk color by corn earworm moth.--E. V. Walter reports that observations have been made for 4 years at Weslaco, Tex., on the possible choice of silk color by adults of the corn earworm ovipositing on sweet corn. Ten silk masses of each variety were examined on the third or fourth day after emergence and the color of silks and number of eggs found were recorded. A summary of these observations shows that green, pink, and red silks each had the highest number of eggs for 1 or more years, red had the fewest for 3 years,

and pink the fewest for 1 year, whereas green and pink were even for intermediate place.

Year	Varieties	Eggs per silk mass on color--		
		Green	Pink	Red
	Number	Number	Number	Number
1938--------	35	2.31	2.10	1.52
1939--------	57	1.57	1.44	.52
1940--------	58	2.58	3.12	.80
1941--------	124	1.65	1.59	2.07
Average--	--	2.03	2.06	1.23

Red and pink silks appear to have the fewest eggs, according to the totals for the year. That was partly because many of the varieties having green silks were earlier than those with colored silks, blooming when there was less host material available for oviposition. According to date of observation, there was no difference in number of eggs on sweet corn silks due to color.

JAPANESE BEETLE CONTROL

Japanese beetle money diverted to fight Japanese.--In 1938 residents of Rochester, N. Y., raised a fund to combat the Japanese beetle, which had recently invaded the city, but $788.53 of this fund was not used. From time to time attempts were made to divert the fund to other purposes, but the committee could never agree. In January the committee voted unanimously to turn the balance of the fund over to the Red Cross "to aid in the Nation's fight against the Japanese."

Safety factors of Japanese beetle fumigation chambers tested.--Since the approval of methyl bromide fumigation as a basis for Japanese beetle certification, many nurserymen have constructed fumigation chambers, but none of them have used gas masks while unloading the chambers, the period during which the operator is most likely to breathe the gas. It has been assumed that after a half-hour ventilating period the chamber has been sufficiently cleared to unload safely. To check further on the gas concentration at the time of unloading, arrangements were made by the Treating Section of the Division with R. D. Chisholm, of the Division of Insecticide Investigations, to cooperate in running a series of tests, analyzing actual concentrations of the gas at different stages of ventilation. The preliminary tests show definitely that a half-hour ventilating period is insufficient and that a longer period, in most instances an hour, should be allowed, depending on the capacity of the blower and the efficiency of the system.

Defense order increases gypsy moth inspection work.--A large New Hampshire lumber company has a contract with an arms-manufacturing plant in the nonregulated part of Connecticut to furnish lumber for use in the construction of National Defense articles. About 500,000 square feet of lumber is shipped each month to this firm, practically all of which originates in the gypsy moth regulated area and requires for the most part piece-by-piece inspection. Because of the sale of sawdust, shavings, and kindling wood from their mill, the

manufacturer will not process these by-products in a manner that would eliminate all danger of gypsy moth infestation being spread; therefore such lumber shipments cannot be permitted to move to the manufacturing plant under "limited permits." During January 191 gypsy moth egg clusters were removed from 21 carloads of lumber inspected and certified for movement to this firm.

Roving gypsy moth road inspectors check Christmas-tree shipments.--Two regular inspectors, working separately during December, checked on the movement of uncertified Christmas trees being trucked from the gypsy moth regulated area. These inspectors covered U. S. Routes 4 and 7, and State Route 11, in Vermont. Illegal shipments intercepted comprise 1,486 individual and 607 bundles of Christmas trees; 5 tons and 4 bundles of evergreen boughs; 1 truckload, 1,200 feet, and 38 individual logs; 1 truckload and 24,000 board feet of lumber; 10 cords of fuel wood; and 38½ cords of pulpwood. All products intercepted were either returned to the gypsy moth regulated area for proper inspection and certification or were inspected by the inspector at the point of interception.

W. P. A. Dutch elm disease eradication projects transferred to States.--At the end of December the large force of security-wage workers on the eradication projects was placed on indefinite furlough, as a change in regulations made it necessary to transfer sponsorship from Federal to State agencies. In New Jersey and Connecticut approval for the transfer was given promptly and workers were recalled to duty on January 5 and 6, respectively, with only a slight loss of personnel. In Pennsylvania W. P. A. employees returned to work in the various districts between January 15 and 27, with a loss of 153 men in the major work area and 68 in the Carbondale, Scranton, and Wilkes-Barre detached areas. In Massachusetts 52 men were assigned to work and reported on January 19. The W. P. A. project in Maryland was approved but was temporarily suspended because all of the men were needed on primary National Defense projects. The projects in Indiana, Ohio, and West Virginia have been delayed until details of supervision and expenses have been worked out. New York has not yet approved a project and the future there is indefinite.

Farmers, clearing fields, add to Dutch elm disease activities.--Many farmers in Bucks County, Pa., are cutting more trees than usual this year. Many trees have been removed to permit entrance to fields long abandoned, and some small wood lots have been cleared. The principal object of these activities is the cultivation of more land, to add to the national food supply. Whenever elm trees are involved, sanitation crews are usually needed to clean up the slash and smaller branches left by the cutters.

FOREST INSECT INVESTIGATIONS

A midge as an enemy of Douglas fir Christmas trees.--J. C. Evenden, of the forest-insect laboratory at Coeur d'Alene, Idaho, reports that during the harvest of Christmas trees on the Lolo National Forest in December many trees were found to be devoid of foliage in the upper part of the crown. Samples were examined, and the only insect damage was an injury to the needles by midge larvae. This injury appeared as a small brown spot about midway the length of the needle, from which, in most instances, the larvae had apparently emerged by rupturing the thin outer tissues. In other needles the larvae still remained. This is the first record of such injury that has been brought to the attention of this laboratory.

Scolytus infestation in different types and sizes of elm wood.--W. C. Baker, Morristown, N. J., reports on 6 locations in Pennsylvania where 297 elm trees were pruned of dead and dying branches during the winter of 1938-39, observed in August 1939, 1940, and 1941, pruned in September 1940 and 1941, then measured for area and examined for insect attack. Based on each 100 trees observed, 10 trees required pruning each year, averaging 7.7 square feet of material from 2.1 cuts per tree. In natural die-back material 97.4 percent and in storm-broken material 70 percent of the galleries of Scolytus multistriatus Marsh. were in 2-foot sections more than 2 inches in diameter. In storm-broken material 2 inches in diameter and less, there were 30.9 times as many S. multistriatus galleries as in the natural die-back material. In sections of all diameters there were 27.2 times as many S. multistriatus galleries in the storm-breaks as in the natural die-back material.

Failure of S. multistriatus to reactivate Dutch elm disease fungus.--The reactivation of Ceratostomella ulmi Buisman and contamination of S. multistriatus by feeding on elms with occluded infections have been investigated by W. D. Buchanan, Morristown, N. J., and S. J. Smucker, of the Bureau of Plant Industry. In an experiment extending over a 3-year period, 1938-40, inclusive, they were unable to find any evidence to indicate that occluded infections became active through injuries made by disease-free S. multistriatus. It was also found that S. multistriatus seldom became contaminated with C. ulmi by feeding on trees with occluded or active infections, and in no case was the fungus recovered from galleries made in trap logs by beetles that had fed on infected trees.

Recovery of introduced sawfly parasite.--On December 3 a collection of about 600 unissued cocoons of Neodiprion sertifer (Geoff.) was made by C. L. Griswold, Morristown. These were made at 3 sites beneath red and Scotch pine on the property of the East Orange Water Reservation in Essex County, N. J., where Microcryptus basizonius (Grav.), an introduced hymenopterous parasite of Gilpinia polytoma (Htg.), was liberated in August 1940. Between December 5 and 18, 1941, several hymenopterous adults, which have been tentatively identified as Microcryptus basizonius (Grav.), issued from the collected material.

GYPSY MOTH AND BROWN-TAIL MOTH CONTROL

Work now operating under Federally sponsored State program.--Gypsy moth field work was temporarily suspended on December 26 in order to complete the change-over to Federally sponsored W. P. A. projects operating under the State program. Owing to the careful preparations, the transfer was accomplished without delay, although the actual start of gypsy moth work under the new plan was somewhat delayed because of inclement weather on January 2. With few exceptions, all of the W. P. A. workers employed on gypsy moth projects in New England at the end of December were reassigned to gypsy moth work under the new plan, although several men were later transferred to National Defense trainee projects. However, it was necessary to terminate the services of 146 W. P. A. employees in Pennsylvania, in order to reduce the force to 400 workers, the number designated for that State. Gypsy moth work in Pennsylvania was benefited by the relaxation of W. P. A. regulations to the extent that W. P. A. gypsy moth workers may now work across county lines.

Gypsy moth work in New England.--Large quantities of brush and other waste wood accumulated at infested locations in selective thinning and cleaning operations was burned in January, the light covering of snow providing ideal conditions for fire control. The results of logging operations in different sections of the area provided contrasting potentialities. Considerable white and paper birch was cut in southern Vermont, where gypsy moth infestations are known to exist, and several property owners in southern Berkshire County, Mass., cut their poplar for manufacture into barrel staves. Both types of cutting remove species of trees particularly favored by the gypsy moth, and will tend to develop more resistant stands of trees. On the other hand, a gypsy moth crew scouting a large tract of land in a barrier zone town has been materially slowed down because lumbering operations carried on several years ago left tree tops and limbs in tangled masses on the ground or lodged in trees, and much of the seedling and sprout growth has developed malformed stems which will produce inferior lumber. Many scattering small gypsy moth infestations have been found by the regular employees engaged in special survey work in northwestern Connecticut, but no large infestations have been discovered. Most of the egg clusters found at several of the infestations were old.

Scouting and eradication work in Pennsylvania.--Sections of several townships in Wayne County, Pa., where male gypsy moths were recovered at assembling cages during the flight season were examined during the first half of the present fiscal year. Approximately 9,600 acres were scouted in South Canaan Township, and about 15,800 gypsy moth egg clusters were located and creosoted; 3,785 acres were examined in Paupack Township, and 312 egg clusters were destroyed; and 782 egg clusters were creosoted on 450 acres in Salem Township. No egg clusters were found in Cherry Ridge or Canaan, where assembling cages also attracted male moths. Some of the infestations were definitely delimited before the suspension of work, but the forest growth around several cages that attracted moths still remains to be examined. Extermination work, which was in progress at infested sites during the fall, was also resumed. These towns, although just outside the Pennsylvania quarantined area, are in territory subject to wind spread and where scattered infestations have previously been found.

Lot inspection and Christmas-tree and bough examinations, summary.--As a precautionary measure, lots located within the barrier zone, where evergreen boughs and Christmas trees were cut for shipment outside the zone, were examined during the Christmas shipping season, in order that all gypsy moth egg clusters might be destroyed by creosoting before shipment was permitted. In many localities individual inspection of trees and boughs was necessary because cutting had been started before the inspection of the lots could be completed. In Vermont more than 800 acres were examined in 14 towns located within the barrier zone in Addison, Bennington, Chittenden, Orleans, Rutland, and Washington Counties. No infestations were found. In Massachusetts more than 1,550 acres in 8 towns in the barrier zone area were examined in localities where Christmas trees and boughs were cut. With the exception of Monroe, Franklin County, all of the towns where inspections were made were in Berkshire County, and most of them were adjacent to the area under quarantine. The lot inspections in Massachusetts resulted in the discovery of 58 gypsy moth egg clusters, all of which were destroyed. None of these egg clusters were found on evergreens or boughs cut for shipment to outside areas. In Connecticut a total of 2,941 trees planted and grown on 2

farms in Litchfield County, especially for sale as Christmas trees, were examined prior to shipment. Most of them were transported from the farms to Waterbury, Naugatuck, and Litchfield, where they were sold to customers passing through the area, and under conditions where the final destination was not actually known at the time the trees were inspected. No gypsy moth infestation was found as a result of this work.

PLANT DISEASE CONTROL

Self-incompatibility in several Ribes species of Western States.--In California and Idaho, during the spring of 1940, controlled cross- and self-pollination tests were made on the flowers of the following Ribes species: R. glutinosum, R. nevadense, R. roezli, and R. viscosissimum. Tests on R. roezli were repeated in 1941. Cross-pollination was successful for all of the species just noted, and produced 163 mature fruits from 621 pollinated flowers. Self-pollination of the same 4 Ribes species under similar conditions failed to produce a single mature fruit. It is concluded, therefore, that the seed-bearing fruits of these 4 Ribes normally result from cross-pollination in nature. Seeds obtained in the controlled cross-pollination tests were viable and compared favorably with naturally formed seeds of the same species in respect to average number per fruit, size, color, and weight. We cannot conclude from these tests that isolated bushes of R. glutinosum, R. nevadense, R. roezli, and R. viscosissimum will never produce mature fruits under natural conditions, because little evidence is available on the distance of flight and habits of insects in searching for and pollinating Ribes flowers, and because the possibility of some degree of self-compatibility must be entertained. The chances of fruit production, however, would appear to become progressively poorer as the number of Ribes per acre is reduced by eradication. Also, because rodents have a strong liking for fruits and seeds of Ribes, their consumption of fruit becomes more important when viewed in the light of a diminishing crop.

New W. P. A. project approved for continuing barberry eradication in Illinois.--At the termination of the F. A. program on December 31 it was necessary to start an entirely new State W. P. A. project in Illinois to replace one previously in operation. The proposal was planned in consultation with district and State officials, was processed and approved on December 18, and funds were made available on December 26 for use beginning January 1. Field work is contemplated for all counties in which a Federal agency program was in operation in December. Practically all the same supervisors and foremen were assigned to the new project, according to R. W. Bills, State leader. About the only difference between the present project and the old one is that the new one is on the district basis, with each district project operating as a complete independent unit. A superintendent is in charge of each project, aided by a finance officer or timekeeper, and an assistant superintendent or State inspector. Increased industrial employment and National Defense jobs have limited the number of qualified men available in counties where work was necessary. One county unit had to be closed at the end of January in favor of a certified National Defense project.

Winter survey effective in North Dakota.--For the first time in the history of the barberry-eradication project, field work was conducted in North Dakota throughout December and January. G. C. Mayoue, State leader,

states that the project is operating satisfactorily, as weather conditions have been unusually favorable, with practically no snow. Since the beginning of the survey early in November, there has been no delay due to inelement weather, except for a few days early in January. Crew work will be continued the rest of the winter, unless interrupted by inclement weather and poor roads.

State W. P. A. project in Nebraska.--Beginning January 1, 1942, the field program of work in Nebraska was supplemented with a State W. P. A. project. M. E. Yount, State leader, says the project provides for 12 calendar months of operation, with an average field force of approximately 52 employees, divided into 2 units--1 in Cedar and adjacent counties and the other in Gage, Pawnee, and Nemaha Counties.

COTTON INSECT INVESTIGATIONS

Pink bollworm populations in Presidio Valley.--Examinations of green cotton bolls to determine the seasonal abundance of the pink bollworm, and examinations of the soil and surface debris to determine the overwintering populations in the Presidio Valley have been completed by L. W. Noble and O. T. Robertson, of the Presidio, Tex., laboratory. Twenty-seven representative fields were used for the biweekly green-boll examinations from August 1 to October 15. At the last examination the bolls infested ranged from 1 to 100 percent, with an average of 49.8 percent. Some of the fields having high populations in 1940 were given special attention in the clean-up, and were plowed and irrigated last winter. In these fields the infestations were lower throughout the season than last year. The population in green bolls at the last examination averaged 20,507 larvae per acre this fall, as compared with 22,789 in 1940, and 28,272 in 1939. The populations for the last 3 years have been much lower than for the period 1935-38. The examination of soil and surface trash in the 27 fields for hibernating larvae was completed the last week of January. The average number of larvae present this winter, in comparison with previous years, is shown in the following table.

Year	Larvae per square yard in--			Larvae per acre
	Surface trash	Soil	Total	
	Number	Number	Number	Number
1939-----	0.46	2.69	3.15	15,246
1940-----	.33	1.83	2.16	10,454
1941-----	1.59	.98	2.57	12,439

There was little difference in the total overwintering population, as compared with previous years, but fewer larvae were found in the soil, probably owing to the greater amount of soil moisture. The rainfall for the last quarter was 4.48 inches, and for the year 23.53 inches, as compared with a normal annual rainfall of 8.45 inches. Twelve of the 27 fields examined were flooded by the overflow of the Rio Grande on October 14-17 and the soil population in these fields was only one-third as great as in the 15 unflooded fields. Nine fields sampled before and after the clean-up showed a 72-percent reduction in population in the surface trash, as a result of the clean-up and pasturage. The effect of pasturage could not be dif-

ferentiated from that of clean-up. More fields than usual are being disked and plowed, which covers the trash well and, together with the wetness of the soil, should aid in further reduction in pink bollworm carry-over. In the date-of-planting experiment under the large field cage the number of hibernating larvae in the surface trash and soil was 2.05 per square yard in the section planted March 31, 2.65 in the section planted April 20, and 13.23 in the section planted May 10. Although there was less difference between the populations in the March 31 and April 20 plantings than in previous years, the later the cotton was planted and the later the stalks were cut and burned, the higher the overwintering population.

Boll weevil conference in Atlanta.--At the request of State agricultural officials of Georgia, a conference was called jointly by P. N. Annand, chief of Bureau, M. L. Wilson, director of Extension Service, and J. T. Jardine, chief of Office of Experiment Stations, in Atlanta, Ga., on January 8 and 9, to consider the boll weevil problem in the eight Southeastern States. The purpose of the conference was to present the research results of the State and Federal workers in order to clarify the confusion regarding control recommendations in the Southeast to afford an opportunity for the discussion of control methods by technical people in the various fields of cotton production, so that suggestions could be made for improving recommendations, to obtain a better understanding of the boll weevil problem, and to develop more intensive and unified action on weevil control by State and Federal agencies. Invitations to participate were extended to various State and Federal agencies interested in the boll weevil problem in the Southeastern States, including the agricultural colleges, experiment stations, extension departments, State departments of agriculture, and other State agricultural agencies in Alabama, Florida, Georgia, Mississippi, North Carolina, South Carolina, Tennessee, and Virginia. Among the agencies of the Department were Agricultural Adjustment Administration, Bureau of Agricultural Chemistry and Engineering, Bureau of Agricultural Economics, Agricultural Marketing Service, Farm Credit Administration, Farm Security Administration, Federal Crop Insurance Corporation, Forest Service, Bureau of Plant Industry, and Soil Conservation Service. Most of the State and Federal agencies were represented and 92 people were in attendance. Much interest was manifested in the reports by the State and Federal entomologists and extension workers on the results of control investigations and the methods now being used in different States. Ways in which the various agencies could assist in the more general adoption of control measures developed considerable discussion. At the close of the 2-day conference, committee reports on control recommendations, research needs for boll weevil control, and extension and educational programs were adopted.

PINK BOLLWORM AND THURBERIA WEEVIL CONTROL

Control program in south Texas.--In the semitropical area of the lower Rio Grande Valley of south Texas it is necessary that the destruction of cotton stalks following the harvesting of the cotton crop be followed by an intensive campaign for the elimination of all volunteer plants, which would otherwise continue to develop throughout the winter and early spring from parts of roots left in the ground. Very little sprout cotton was present throughout the lower valley area in January, and at the end of the month the only grubbing that remained to be done was in the Brownsville area in fields that had been under flood waters. However, with the advent of warmer weather

accompanied by spring rains, it will probably be necessary to again place grubbing crews in the southeastern part of the valley, where conditions favor abundant cotton growth and where the heaviest infestation has consistently occurred, in an effort to prevent any fruiting plants being available for build-up of infestation before the 1942 crop matures. Regulations were promulgated in January by the State Department of Agriculture, setting February 15 as the opening date for the planting of the 1942 cotton crop in the lower Rio Grande Valley. Such action is designed to delay the fruiting of the crop so that early emerging spring moths will find no food for sustenance. Parallel planting regulations were put into effect on the Mexican side of the Rio Grande.

Big Bend of Texas and Mexico.--A special program was inaugurated in 1938 for reducing the heavy pink bollworm infestation in the Big Bend area of Texas and Mexico, and results have been successful. Fields are cleaned immediately after the crop is harvested, and planting of the subsequent crop is delayed until April 20, permitting the peak of spring moth emergence to occur before food is available for propagation. For the present season, clean-up was completed late in January. Infestation this year was not high enough to necessitate pick-up or hand raking of fields.

Control program in Glendale area of Arizona.--Pink bollworm infestation was found in a small area in the vicinity of Glendale, in the Salt River Valley of Arizona, in the 1939 cotton crop. Since then circumstances have prevented the successful accomplishment of control in that section and, as a result, the 1941 cotton crop showed a substantial increase in infestation, but farmers are carrying out a program formulated by Federal and State authorities, consisting of field clean-up and cultural methods designed to reduce the infestation in the 1942 crop. The Agricultural Adjustment Administration is cooperating with State and Federal authorities in preventing the growing of stub or volunteer cotton in the control area.

Wild cotton eradication.--Effective December 31, 1941, the Federal W. P. A. project, which has operated in Florida for several years in connection with the eradication of wild cotton under the direction of this Bureau, was terminated and was superseded by a State W. P. A. project, which became effective on January 2. Approximately 90 workers were transferred from the Federal to the State project. From 16 to 38 Bureau employees were also engaged in wild cotton eradication during January. Work was performed in the Bradenton-Fort Myers, Cape Sable, and Keys subdistricts. A total of 4,034 acres was covered, from which 4,430 mature plants, 170,888 seedlings, and 228 sprout plants were removed.

TRUCK CROP AND GARDEN INSECT INVESTIGATIONS

Mole cricket species show differences in poison susceptibility.--A decided difference in susceptibility to a calcium arsenate-bran bait between two species of the same genus of mole crickets was found by members of the emergency research staff operating in conjunction with the mole cricket control program in central Florida during the period September to December 1941. This organization, under the direction of C. B. Wisecup, was composed of men from this Division, the Division of Domestic Plant Quarantines, and the State Plant Board of Florida. Vegetable growers had reported that the bait was proving less effective in 1941 than it was in 1940. A series of laboratory

and field experiments showed that the Puerto Rican mole cricket, or "changa" (Scapteriscus vicinus Scudd.), was readily controlled by the calcium arsenate baits, but that such baits produced only a moderate mortality against the southern mole cricket (S. acletus R. & H.). Sodium fluosilicate shows the most promise as a control for both species, while wheat bran continues to be the most satisfactory bait material. Some evidence was found that meat scraps increased the effectiveness of the bran baits, but no other attrahent has proved economically desirable. A series of soil samples shows a reversal in field populations during the last year, with S. acletus now the predominant form in almost all of the cultivated fields. This survey showed that S. vicinus matured much earlier in the season, as 75 percent of the specimens collected in November were adult, in contrast to 20 percent of adult S. acletus at the same time.

Small green leafhopper not harmful to sugar beets.--Field-cage experiments, conducted in 1941 by O. A. Hills at the Phoenix, Ariz., laboratory, to determine the effect of Empoasca solana De L. on sugar beets grown for seed, showed that these insects in numbers up to approximately twice as great as have ever been found in the field, had no measurable effect, either on the plant or on the seed produced. Insect-population studies in fields of sugar beets grown for seed in the Salt River Valley of Arizona have shown E. solana to be the most numerous insect in the fields throughout the season, and the data obtained by these cage studies will help to answer questions regarding its importance.

Preferred hosts of potato psyllid in Nebraska.--During the course of field-plot experiments in 1941, R. L. Wallis, of the Scottsbluff, Nebr., laboratory, found under comparable conditions of natural exposure that horsenettle (Solanum carolinense L.) and Chinese lantern (Physalis sp.) were definitely preferred as host plants by Paratrioza cockerelli (Sulc.) to potatoes, tomatoes, and certain species of weeds which heretofore have been considered its most important breeding plants. The average number of P. cockerelli nymphs found on 50 leaves of each species of plant or crop included in these tests were as follows: Horsenettle, 79.5; Chinese lantern, 75.5; cultivated groundcherry (Physalis exocarpa Brot.), 33.7; wild groundcherry (Physalis lanceolata Michx.), 15.3; buffalo-bur (Solanum rostratum Dunal), 14.0; tomatoes, 6.5; and potatoes, 3.0. Wild groundcherry and buffalo-bur have been considered previously the preferred wild host plants of the potato psyllid in the Colorado-Wyoming-Nebraska area. Other host plants on which potato psyllid nymphs were found in limited numbers include matrimony vine (Lycium halimifolium Mill.), wild tomato (Solanum triflorum Nutt), Jerusalem cherry, black nightshade (Solanum nigrum L.), egg plant (Solanum melongena L.), tobacco (Nicotiana tabacum), and ornamental pepper (Capsicum sp.). Horsenettle does not grow extensively in the North Platte Valley but occurs abundantly in other potato-growing areas of the West, and therefore may be an important psyllid breeding plant. Chinese lantern, a cultivated ornamental, is grown very little and will probably be unimportant as a breeding plant.

Range fires increase hazard of beet leafhopper infestation in southern Idaho.--J. R. Douglass, of the Twin Falls, Idaho, laboratory, says that the Division of Grazing reports 1,040,689 acres of range lands, practically all on the Snake River Plains, burned over. During the fire season, Bromus tectorum L. is the greatest range-fire hazard in the intermountain region, as

it will burn like tinder. On newly abandoned fields the successive plant covers are Russian-thistle (Salsola pestifer A. Nels.), mustard, either flixweed (Sophia parviflora (Lam.) Standl.) or tumblemustard (Norta altissima L.), downy chess, perennial grasses, and shrubs, in the order given. Mustards and Russian-thistle are important spring and summer weed hosts of Eutettix tenellus (Bak.), while the grasses are nonhosts. Observations made late in the season on a few burned-over areas showed that Russian-thistle, tumbleweed (Amaranthus graecizans L.), tumblemustard, flixweed, and downy chess had germinated. Russian-thistle and tumbleweed growing on one of the large burned-over areas germinated and produced seed after the fire. If downy chess is burned, under favorable conditions it may reseed itself and again form the cover; but under unfavorable conditions, such as heavy grazing and trampling by stock, Russian-thistle and mustards may reappear. Thus, the process from Russian-thistle and mustards to downy chess and back to Russian-thistle may continue in an endless cycle.

Sweetpotato weevil parasites recovered from wild host plants.--While dissecting wild host plants of Cylas formicarius elegantulus Summers in October 1941, K. L. Cockerham and O. T. Deen, at the Sunset, La., laboratory, discovered a number of parasties in the weevil tunnels. In some instances these parasites were actually feeding on weevil larvae. Seven species of wild host plants, totaling 224 plants and containing 3,284 specimens of sweetpotato weevil adults, pupae, and larvae were used in these observations. From plants of Ipomoea heptaphylla (Rotth. & Willd.) Voight, 7 parasitic larvae and about 12 cocoons were discovered. Three adults have emerged from this material. From I. quamoclit L., 1 larva and 3 cocoons were recovered, from which 2 adults have emerged. From I. hederacea Jacq., 1 adult was recovered. These parasites have been identified by C. F. W. Muesebeck, of the Division of Insect Identification, as Microbracon punctatus Mues. During similar examinations in 1940 a number of cocoons were recovered from weevil tunnels and these were identified as Microbracon, probably punctatus, by R. A. Cushman.

INSECTS AFFECTING MAN AND ANIMALS

Cooperative advisory service for cattle grub control.--Experimental demonstrations in cooperation with the Texas A. & M. Extension Service on the use of a powered sprayer for treating cattle for cattle grubs and lice in 3 counties in western Texas, was continued by R. W. Wells, of the Dallas, Tex., laboratory. In the southern half of Anderson County more than 500 4-H Club boys and Future Farmers also attended lectures and demonstrations given by E. W. Laake in 7 communities. More than 30 additional lectures and demonstrations were given by the county agent and his assistant, so that practically every livestock owner in this country has been contacted. Interest in cattle grub control has been aroused to such an extent that practically every animal in the entire county is slated to be treated at least twice during the current cattle grub season.

FOREIGN PARASITE INTRODUCTION

Yokohama station closed and staff interned.--In view of the restrictions on travel in Japan and the difficulties in the transmitting of funds for the conduct of the work in that country, instructions were sent to R. W. Burrell, in charge of the station, at the end of October 1941, to discontinue operations

and return to the United States. The station was accordingly closed and arrangements made through the American Embassy at Tokyo for return transportation. Mr. Burrell and J. D. Maple, his assistant, sailed from Yokohama on the S. S. Tatuta Maru on December 2, 1941. Travel by Japanese steamer was necessary, as no foreign ships were entering Japanese ports at that time. Upon the outbreak of war on December 7, the Tatuta Maru returned to a Japanese port. Advice received several weeks later, through the Swiss Legation at Tokyo, indicated that Dr. Maple was at Yokohama and Mr. Burrell presumably at Nagasaki. A cable was received from Dr. Maple on January 30, stating that he was interned at Yokohama. It is hoped that arrangements can be made later for the return of these two men.

FOREIGN PLANT QUARANTINES

Additional records for National Collection.--Three adults of the euribiid Spathulina hessi (Wied.) were intercepted at New York on Helichrysum sp. in mail from the Union of South Africa. A. Stone, who made the determination, states that this species had not previously been represented in the National Museum. H. Morrison makes the following statement about the coccids Aonidia pinicola Leon., which were intercepted at New York on pine in cargo From Portugal: "This is an interesting collection. Although placed only from description, it seems without question to be Aonidia pinicola Leon., described from Spain. More material would be welcome if available. Not previously represented in the coccid collection."

Another gladiolus smut paper.--Since the information regarding gladiolus smut and the fungus confused with it was assembled for the January 1, 1942, News Letter (pp. 25-26) another paper has appeared, entitled "The Morphological Distinction between Urocystis gladioli and Papulaspora gladioli," by H. H. Hotson (Mycol. 34:52-58, Jan.-Feb. 1942). Mr. Hotson presents evidence supporting the assumption stated in the News Letter, that a true smut of gladiolus does exist in Europe and is not known to occur in this country.

Pine-cone rust intercepted from Mexico.--A pine cone transformed into a rust gall by Cronartium conigenum (Pat.) Hedgc. & Hunt was intercepted in baggage from Sierra de Teras, Nacozari, Sonora, Mexico, on December 2 at Nogales, In Arizona this rust affects cones only of Pinus chihuahuana in its aecial stage, species of oak serving as alternate hosts. The intercepted specimen, the first from Mexico, was turned over to Dr. Hedgcock to add to the Department's collections. In Arizona, N. Rex Hunt found that soon after the galls reached maturity most of them were riddled by insect larvae.

DOMESTIC PLANT QUARANTINES

Grasshopper conference at Denver.--Representatives of Federal and State agencies cooperating in grasshopper and Mormon cricket control met at Denver on January 19-20, to discuss the results of the 1941 work and to plan for operations in 1942. The States were represented by State leaders and in some cases directors of extension and commissioners of agriculture were also present. The Extension Service of the Department, the Federal Crop Insurance Corporation, and the Bureau of Entomology and Plant Quarantine had representatives in attendance. The over-all plan for 1942 was discussed and adopted. In general, the proposed program is similar to that carried out in 1941, the extent of the infestations paralleling the outbreaks anticipated for that year. Memoranda of understanding are being developed between the Bureau and each cooperating State and other agencies.

Grasshopper control in 1941.--From reports of State leaders in grasshopper control and from Bureau records, it is estimated that the 1941 control operations conducted in 23 States saved crops valued at over $35,000,000. These savings represent a net benefit of $52.26 for each dollar expended by the Bureau. On the other hand, the States estimate grasshopper damage to crops at nearly $24,000,000.

Cost of Mormon cricket control reduced in last 4 years.--The cost to the Bureau for operations on the control of Mormon crickets has been reduced from $1.45 per acre in 1938 to 48 cents per acre in 1941. Consistent reductions from year to year have been effected first, by the replacement of hand dusters with power dusting machines; and second, by adopting the use of poison bait as a method of control, rather than the use of sodium arsenite dust. The baiting method also permitted control on a more extensive scale, operations having been conducted on over 550,000 acres in 1941, as compared with 300,000 in 1938. Sodium fluosilicate baiting was used in 1941 on 93 percent of the acreage worked, as compared with 7 percent dusted.

Use of tractors cuts cost of removing diseased trees.--With W. P. A. labor no longer available for removing phony peach trees in Macon County, Ga., the project workers recently met the problem by the use of 3 tractors borrowed from the white-fringed beetle project. Fifteen thousand trees were removed at the rate of 70 stumps an hour per tractor. The overall cost was slightly under 6 cents per tree, as compared with nearly 29 cents by W. P. A. labor.

Citrus canker inspection on Mexican border.--Owing to the existence of citrus canker some 24 years ago at Laredo, Tex., and vicinity, a reinspection was made during the current winter of commercial groves and dooryard plantings in this vicinity and also on every property across the river in Nuevo Laredo, Mexico. No citrus canker was found. The work was conducted jointly with the Texas State Department of Agriculture and the full cooperation of the Mexican government officials.

Highlights in sweetpotato weevil control in 1941.--Under the cooperative sweetpotato weevil control programs conducted in 1941, surveys were made in 47 counties. Inspections in the commercial area of eastern Texas did not result in finding additional infestations. Outside the regulated areas in Mississippi, Alabama, and Georgia, the results were negative. Within the eradication areas, operations were directed toward the maintenance of a host-free period during the winter and spring. There were released from quarantine the Mississippi counties of Forrest, George, Jones, Marion, Pike, and Walthall, and the Texas counties of Nacogdoches and Cherokee. Since July 1937, 1,561 properties in the 4 above States have been found infested, and 1,316 released from quarantine, leaving 245 properties on which active infestations exist. The States of Georgia and Alabama revised their quarantines during the year to permit the entry of sweetpotatoes from the western part of Florida.

Texas sweetpotato-eradication area extended.--The entire Texas counties of Angelina, Sabine, and San Augustine were added to the eradication area in that State in January and cooperative eradication operations were begun. The aim is to protect the tier of counties immediately to the north, where eradication has apparently been accomplished, and to include on the south a wooded

natural barrier for the protection of the larger commercial areas of eastern Texas.

New treatment authorized for killing white-fringed beetles.--The treatment of soil with either carbon disulfide or methyl bromide, applied as a liquid, for killing all stages of white-fringed beetles was authorized through administrative instructions in the fourth revision of Circular B. E. P. Q. 503, which became effective January 9, 1942.

Misused certificates caught.--A transit inspector at New York City recently detected an apparently deliberate misuse of Japanese beetle certificates on plants with soil, the certificates having been issued for use only with soil-free cuttings.

CONTROL INVESTIGATIONS

Certain nitroparaffin compounds found toxic as fumigants for confused flour beetle.--H. H. Richardson and A. H. Casanges, Beltsville, Md., have found some of the readily available homologs of nitromethane to be toxic to the flour beetle. This work was done in cooperation with M. S. Schechter and H. L. J. Haller, of the Division of Insecticide Investigations. Under laboratory conditions nitromethane was much more toxic than was carbon disulfide. Toxicity increased from nitromethane up to 1-nitrobutane, except for nitroethane which was slightly more toxic than 1-nitropropane, and 1-nitrobutane appeared near the toxicity of methyl bromide, but it is much less volatile than the latter. Substitution of the nitro group into the second carbon group, rather than the first, reduced toxicity definitely in the propane and butane compounds tested. In general, the vapor pressure of these compounds is rather low, nitroethane being in the same range as chloropicrin in this respect. These nitroparaffins are fairly cheap and have other qualities that make them appear worth further study as fumigants or other types of insecticides.

INSECTICIDE INVESTIGATIONS

A simple method for preparing lantern slides.--For the sake of clarity and emphasis, it frequently becomes necessary to employ lantern slides for presenting various types of data. Time and cost often make it inconvenient to obtain slides prepared professionally by means of photography. On several occasions this laboratory has resorted to an easy method of making lantern slides by hand. These have served just as satisfactorily as slides prepared by the photographic process. No elaborate equipment is necessary and all of the needed materials are readily accessible. The method consists essentially of cleaning glass lantern slides thoroughly and, after washing and drying them, applying the subject by freehand with a steel pen and waterproof drawing ink. The detailed directions have been submitted by F. Acree, Jr., and H. L. J. Haller for publication in the Bureau's ET series.

Nitroparaffins as insecticides.--The development of an efficient method for the vapor-phase nitration of paraffin hydrocarbons such as methane, which is the predominating hydrocarbon in natural gas, ethane, and propane, has made available commercially and at a reasonable cost nitrohydrocarbons such as nitromethane, nitroethane, and others. The compounds are liquids,

and the lower members of the series are slightly soluble in water. Nitromethane has a boiling point of 100° C. (the homologs, nitroethane, etc., boil higher), there being a gradual increase in the boiling point as the number of carbon atoms in the compounds increases. The compounds are reactive chemically and studies on them and their derivatives as possible useful insecticides are being carried on by M. S. Schechter and Mr. Haller. Nitromethane, nitroethane, 1-nitropropane, 2-nitropropane, 1-nitrobutane, and 2-nitrobutane have been tested by H. H. Richardson, of the Division of Control Investigations, as fumigants against the confused flour beetle and were found to be effective. The preliminary studies indicate that the nitrobutanes are more toxic than the lower homologs.

New insecticide patented.--U. S. Patent No. 2,271,350, covering a composition of matter for use as an insecticide, was issued on January 27, 1942, to Lloyd E. Smith and H. L. J. Haller. It is concerned with increasing the solubility of rotenone in hydrocarbon oils commonly used in fly sprays. The procedure consists of heating substantially pure rotenone with a fatty oil for a time sufficient to effect a solution which is then poured into the hydrocarbon oil. By such treatment the solubility of rotenone in deobase is increased from 0.01 to 0.27 percent, using soybean oil.

Corn borer tests with organic compounds.--A large number of organic compounds have been tested under laboratory conditions, at Toledo, Ohio, for the control of newly hatched European corn borer larvae. The results of these tests plus results of field tests with some of the more promising compounds are recorded in E-557 of the Bureau's mimeographed series, entitled "Laboratory and Field Tests of Toxicity of Some Organic Compounds to the European Corn Borer," by D. D. Questel, of the Division of Cereal and Forage Insect Investigations, and S. I. Gertler, L. E. Smith, and D. L. Vivian, of this Division.

IDENTIFICATION AND CLASSIFICATION OF INSECTS

Blowflies spread poliomyelitis.--Blowflies carry the virus of poliomyelitis, according to Paul, Trask, et al., Yale University School of Medicine, New Haven, Conn. (Science 94 (2443): 395-396, 1941). The discovery was verified by Sabin and Ward, Children's Hospital Research Foundation, Cincinnati, Ohio (Science 94 (2451): 590-591, 1941). A summary of the research work conducted by Sabin and Ward appeared recently in the weekly magazine Time (Jan. 5, 1942). These reports indicate "greenbottle flies" to be chiefly concerned, although other species of flies are possibly involved. Specimens collected from traps in endemic areas during outbreaks of infantile paralysis and used by Sabin and Ward in their experiments were referred to this Division. A number of different species of flies were included, one or all of which may have carried the virus. Blowflies (Calliphoridae) represented were Phaenicia sericata (Meig.), Phormia regina (Meig.) Protophormia terrae-novae (R.-D.), Calliphora erythrocephala (Meig.), and Cynomyopsis cadaverina (R.-D.). Other flies were Ophyra leucostoma (Wied.) Musca domestica L., and Muscina stabulans (Fall.), species which belong to the family Muscidae. Of the listed flies only Phaenicia sericata is a "greenbottle fly." Considering the comparatively large number of species of flies in the experiments, it would seem that more careful trapping or segregation of the test species is essential. It is possible that some of

the species do not carry the disease and, if they could be excluded from consideration, control or clean-up projects might be simplified.

Notes on biology of Xyela sp.--Observations on the biology of a primitive sawfly, Xyela sp., together with specimens, were sent in recently by L. A. Hetrick, of the Virginia Agricultural Experiment Station, West Point, Va. Some of the species of this genus feed, as larvae, on pollen, but the species reared by Mr. Hetrick form galls on the young shoots of Pinus taeda L. The infested shoots are often numerous and usually die, producing an effect on the tree like that of the pine-shoot moth (Rhyacionia frustrana (Comstock)). The female sawfly possesses a more heavily sclerotized and more pointed ovipositor than is true for the pollen-feeding species, whose eggs are inserted between the scales of the staminate cone of the pine. This condition is probably an adaptation for the more difficult task of depositing the eggs in the young shoots. The larva of the species submitted by Mr. Hetrick develops in the gall and, when full grown, drops to the ground. Larvae were placed in jars with soil in an outdoor insectary in May 1940, but adults did not emerge until December 31, 1941. Data are as yet insufficient to determine whether this long diapause is usual for the species as a whole or, as so frequently occurs among the sawflies, for only a part of the brood. When emergence finally did occur the pupal exuviae were found at the surface of the soil, which indicates that the pupa is capable of considerable movement, at least from the cell to the surface. It is equipped with heavily sclerotized mandibles, which are functional, and no doubt these assist the pupa in its movements. Another interesting fact derived from a study of the pupal exuviae is that the long basal segment of the antennal flagellum is composed of nine fused segments. Mr. Hetrick is continuing his study of this interesting species. From the galls, he has reared two hymenopterous parasites, namely: Eurytoma tylodermatis Ashm. and Habrocytus thyridopterigis Howard. Both of these also parasitize the larvae of the pine-shoot moth.

---oOo---

UNITED STATES

DEPARTMENT OF AGRICULTURE

BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE NEWS LETTER

VOLUME IX

UNITED STATES DEPARTMENT OF AGRICULTURE

BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE

N E W S L E T T E R

FOR FEBRUARY 1942

Vol. IX, No. 4 (Not for publication) April 1, 1942

REMEMBER PEARL HARBOR

ADMINISTRATION

CREATION OF AGRICULTURAL RESEARCH ADMINISTRATION

Executive Order No. 9069, issued under date of February 23, 1942, provided for the consolidation of certain agencies within the Department of Agriculture. Most of the bureaus in the Department were included in groups consolidated into several agencies; namely, the Agricultural Marketing Administration, the Agricultural Conservation and Adjustment Administration, and the Agricultural Research Administration. The Bureau of Entomology and Plant Quarantine was included in the Agricultural Research Administration. The paragraph in the Executive Order creating this Administration reads as follows:

> "The Bureau of Animal Industry, the Bureau of Dairy Industry, the Bureau of Plant Industry, the Bureau of Agricultural Chemistry and Engineering, the Bureau of Entomology and Plant Quarantine, the Bureau of Home Economics, the Office of Experiment Stations, and the Beltsville Research Center, of the Department of Agriculture, and their functions, personnel, property, and records are consolidated into an agency to be known as the Agricultural Research Administration of the Department of Agriculture, which agency shall be administered under the direction and supervision of such officer as the Secretary of Agriculture shall designate."

Subsequent to the issuance of the Executive Order, Secretary Memorandum No. 986, dated February 25, 1942, provided for the establishment and continuance under their respective designations as agencies of the Agricultural Adjustment Administration, of those Bureaus which had been consolidated into the Administration under the Executive Order. This Secretary Memorandum is quoted in full, as follows, for the information of all employees of the Bureau:

> "1. The Bureau of Animal Industry, the Bureau of Dairy Industry, the Bureau of Plant Industry, the Bureau of Agricultural

Chemistry and Engineering, the Bureau of Entomology and Plant Quarantine, the Bureau of Home Economics, the Office of Experiment Stations, and the Beltsville Research Center, which now form the Agricultural Research Administration, pursuant to Executive Order No. 9069, are established and continued under the same respective designations as agencies of the Agricultural Research Administration.

"2. Each of the agencies of the Agricultural Research Administration shall have the same functions, personnel, positions, property, and records that constituted the agency of the same designation prior to the issuance of the Executive Order, except that:

"(a) the activities of each of the agencies shall be subject to the direction and supervision of the Administrator of the Agricultural Research Administration;

"(b) the Administrator may transfer to his immediate office from any agency such personnel, property, and records as he may require for the proper discharge of his duties;

"(c) the Administrator may take such action as he deems to be appropriate with respect to consolidating or integrating the work of the several divisions, sections, and units which are engaged in the performance of business, personnel, information, administrative, or other facilitating services; and

"(d) the Administrator may take such action as he feels advisable with respect to integrating or consolidating the research of the several bureaus, divisions, sections, and units in order to promote economy and efficiency and to concentrate the Department's research efforts on problems that are most vital to the production and utilization of agricultural commodities.

"3. The Administrator of the Agricultural Research Administration may delegate to other officials or employees of the Administration or of the several agencies which constitute the Administration any of the authority now or hereafter conferred upon the Administrator."

BUREAU EMPLOYEES CALLED TO THE COLORS OR TRANSFERRED TO SPECIAL NATIONAL DEFENSE ASSIGNMENTS

Barrett, W. L., Asst. Ent., Ins. Affecting Man and Animals, inducted, Select. Serv.

Correction.--In the News Letter issued March 1, 1942 (v. IX, No. 3), the following changes should be made in the list:

Klaus, Adolph A., Auto Mech., PBW, inducted, Select. Serv., January 19, 1942.

Lowry, William L., Fld. Asst., Cotton Ins., inducted, Select. Serv., February 4, 1942.

The dates previously given were those effective upon expiration of accrued leave. The dates given above show when the men actually entered military service.

FRUIT INSECT INVESTIGATIONS

Propylene dichloride effective against peach borer.--Experiments just completed by Oliver I. Snapp, at the Fort Valley, Ga., laboratory, show that, even in cold wet soil, propylene dichloride emulsion at a strength weaker than that required of ethylene dichloride emulsion, is very effective against the peach borer in midwinter in the South. One-half pint of 15-percent propylene dichloride emulsion per tree, which is 5 percent weaker than the recommended strength of ethylene dichloride emulsion, applied on January 30, killed all of the borers in 30 4-year-old peach trees within a 2-week period. During the same period, that strength and quantity of propylene dichloride emulsion killed 87.9 percent and stupefied 6.1 percent of the borers in 22 9- and 10-year-old peach trees.

Flavor of raisins affected by paradichlorobenzene.--In samples of raisins fumigated experimentally with paradichlorobenzene shortly after harvest, the flavor of some of the berries had been altered by the treatment, according to Charles K. Fisher, of the Fresno, Calif., laboratory. Many of the individual raisins appeared to be unaffected, but occasional ones had the sickish taste of certain flavors of cheap candy. An attempt to reproduce the effect in the laboratory by exposing older raisins, both to the crystals of paradichlorobenzene and to the vapor alone, resulted in an abnormal flavor of a somewhat different quality, all of the fruit appearing to have been acted upon. There are records of this fumigant affecting the flavor of the flesh of certain animals, the milk of cows, the eggs of chickens, and lard from hogs fed on grain that had been fumigated with it.

MEXICAN FRUITFLY CONTROL

Trap catches low.--Fewer Mexican fruitflies (Anastrepha ludens Loew) were trapped during February in the Rio Grande Valley than in any other February since 1935. This is also the first February since 1935 that some infested fruit has not been found in the area. The results obtained from field inspections and trapping operations make it appear that this season's infestation is not only later, but is also going to be somewhat lighter than usual. Fruit is moving from the regulated area at a very rapid rate. Shipments certified by inspectors during February totaled 4,301.8 equivalent carlots, and for the season 21,336.9 carlots of fruit have been shipped. Weather conditions for field work were fair during the month. No damaging frosts or freezes have occurred this season.

GRASSHOPPER CONTROL

A change in operations designation was made on January 29, when the

Grasshopper and Mormon Cricket Control Project of the Division of Domestic Plant Quarantines became the Division of Grasshopper Control, with Dr. Claude Wakeland as Chief.

Conference on Mormon cricket control.--Representatives of the Division conferred in February with State representatives of those Mormon cricket infested States where control will be undertaken in 1942. The meetings were held for the purpose of discussing the general plan of work contemplated in the cooperative control program and to draft a memorandum of understanding outlining the procedure to be followed in each State. Conferences were held with State representatives, in the order named, of Wyoming, Montana, Washington, Idaho, Oregon, and Nevada. Early in February crickets were reported hatching along the Deschutes River in Wasco County, northern Oregon. A supervisor has been assigned to organize control work which will be under way soon.

JAPANESE BEETLE CONTROL

Mobilization of Departmental equipment for Civilian Defense.--At a meeting of the United States Department of Agriculture Regional Mobilization Equipment Committee of Defense Areas 1, 2, and 3, held in Philadelphia on January 26 to 28, Erle G. Brewer, divisional chief, was selected as vice-chairman of the committee for the Second Civilian Defense Region, comprising the States of New York, New Jersey, and Delaware. In this capacity Mr. Brewer is accumulating records of all Department-owned equipment in the Second Defense Area that could be used in civilian defense. He will also develop necessary contacts with State offices of the Office of Civilian Defense within the Second Area, so that proper instructions can be given for the use of the material in an emergency and, likewise, that employees and nonemployees might be signed up as O. C. D. enrollees to operate the equipment for defense purposes. A separate office in the Bloomfield headquarters has been devoted to the storage of these records and for activities connected with their collection and distribution.

Special handling of large-scale mail-order shipments.--Arrangements were made by the New York City office to handle large-scale shipments of certified plant material in individual packages to be advertised on in Nation-wide radio sales campaign. It is anticipated that about 400,000 individual packages will be involved, all of which will be shipped within as few days as possible after the mail orders are received. There is also a possibility of an increase of from 150,000 to 250,000 additional shipments if a further tentative plan is accepted by the advertising agency. As it is impracticable to affix a regular certificate to each of these small packages, special rubber stamps have been provided for certifying these packages. Inquiries have been received from a second plant grower who is endeavoring to obtain a large order from a national advertiser. Further large-scale shipments are reported from the Philadelphia area, where rose growers in the West Grove, Pa., area started to ship roses early in January. One grower started to fill orders for a national chain store and will continue to ship for this firm until the latter part of May. Another grower has potted 40,000 roses, using soil fumigated with carbon disulfide, for shipment late in April or early in May.

Methyl bromide fumigation of canna roots.--The Division's portable methyl bromide fumigation chamber was used during the month at a Long Island nursery for a test fumigation of canna roots. A similar test was made in December and the fumigated plants were forced in the greenhouse. There was definite indication of injury, but this was apparently complicated by the condition of the roots. The check plants also forced poorly because of an insufficient rest period. The latest demonstration was to recheck these varieties after a longer storage period. The plants were taken from cold storage and fumigated. Half of the plants were then set in the greenhouse for forcing, in order to compare them with those fumigated in December. The remainder were replaced in cold storage to be forced in the spring under normal conditions. The cannas now being forced are intended for use at the International Flower Show to be held in New York City the latter part of March.

Nurserymen cooperate in travel conservation.--Inspectors have been instructed to arrange their daily calls at nurseries and greenhouses so that travel by truck will be reduced to a minimum, with corresponding tire conservation. The nurserymen and greenhousemen have cooperated well in these arrangements, often making extra efforts to space their shipments so that a number of establishments in the same locality can fully utilize the services of an inspector for an entire day, thereby eliminating call-backs or further visits in that section during the week.

Mill installs brush to clean lumber.--A mill at Lakeport, N. H., where large quantities of lumber for Government war projects is being milled, recently installed a cylinder brush, about 6 inches in diameter, on the end of the conveyor table, ahead of one of the planes, in order to study the possibility of removing gypsy moth egg clusters from the under side of boards passing through the plane, when the under surface is to be left rough. The brush is power driven and revolves in the opposite direction to that traveled by the board. Owing to twist and warp in some boards, the mill is arranging to move the brush closer to the plane. At this point the plane holds the boards firmly. With this correction, it is expected that the performance of the brush will be satisfactory.

First Aid instruction.--Nineteen members of the Bloomfield, N. J., headquarters staff completed American Red Cross standard and advanced First Aid courses on March 6. O. N. Liming, assisted by D. H. Slayback, was instructor. Both of these men are Division employees. Nine of those who completed the advanced course are enrolled in a lay instructor's course to be given in the Division's Bloomfield office from March 16 to 20, by an instructor from Washington, D. C. All appointed employees of the Connecticut Dutch elm disease office are either taking or teaching First Aid. Most of the New York personnel are similarly engaged. Men connected with the Dutch elm disease office in Pennsylvania are also prominent in First Aid training in their section.

Increased shipments from defense plant.--In the Middleboro, Mass., district, the district inspector began issuing gypsy moth permits for the movement of forest products from a fireworks plant last October. The first month's shipments totaled 30 carloads. Permits were issued during February for the shipment of 300 carloads of material from this establishment.

FOREST INSECT INVESTIGATIONS

Significance of Scolytus multistriatus to Dutch elm disease.--W. D. Buchanan, Morristown, N. J., reports that nursery elm trees planted in 1938 and enclosed in a large cloth-covered cage, were used in 1941 to test the significance of S. multistriatus Marsh. in connection with the Dutch elm disease. Approximately 5,000 S. multistriatus emerged in the cage between May 14 and June 17 from logs taken from diseased trees infested in the field. Ceratostomella ulmi was isolated from 7.69 percent of 918 of the beetles that were cultured. Foliar symptoms of the Dutch elm disease developed in 5 of 88 trees upon which the beetles fed extensively. C. ulmi was isolated from 3 other trees with discoloration in the 1941 vascular system, but these did not show external symptoms. The top and upper part of the trunk died on one of the 5 that showed external symptoms, but only a few small branches died on any of the other trees that became infected.

Species and varietal differences in twig crotch injuries to elms by S. multistriatus.--D. O. Wolfenbarger examined several thousand twig crotches involving 15 species or varieties of elm, to obtain data on species and varietal differences in twig crotch injuries made by S. multistriatus. S. J. Smucker, of the Bureau of Plant Industry, assisted in the determination of species and varieties of elm. It is generally accepted that twig crotch feeding by S. multistriatus is the principal means by which healthy elm trees are inoculated with the organism causing the Dutch elm disease. Any limitation of this activity through the discovery of species, varieties, or strains of elm trees less favored for crotch attack would be a control measure for the disease. The data obtained from these examinations, together with the results of many observations on the more common elm species, have given no indication of any preference or aversion by S. multistriatus for any species or variety.

GYPSY MOTH AND BROWN-TAIL MOTH CONTROL

Lack of competent employees retards gypsy moth work.--Gypsy moth field work was seriously handicapped during February in both the New England and Pennsylvania areas by subzero temperatures, accompanied by high winds, and by the inexperience and physical unfitness of many of the available W. P. A. employees. Thus far it has proved impossible to fill the desired quota for any State where Federal gypsy moth work is in progress, despite the acceptance of older men and of men with physical disabilities, and much of the recent work in some sections has been accomplished by regular employees usually employed in supervisory capacities.

Gypsy moth work in Vermont.--Gypsy moth scouting work has been completed in an extensive swampy area in the northwestern section of Swanton Township, Franklin County, Vt., where the Missisquoi River empties into Lake Champlain. The swamps, some of which are several miles long, have been frozen over for some time and the scouts have been able to reach and examine without difficulty the dense stands of trees that grow on ground rising above the swamp level. Although most of the growth consists of willow, red oak, white oak, poplar, gray birch, and other favorable food plants, Swanton has never been found to be infested by the gypsy moth. Scouting work was also completed in Middletown Springs Township, Rutland

County. Five single-egg-cluster infestations and one two-egg-cluster infestation were found. A gypsy moth infestation consisting of six egg clusters was found in Bennington Township, Bennington County, and additional egg clusters may be found later when ground conditions improve. Chopping and burning work continued at a gypsy moth infested site in Woodford Township, Bennington County. Several acres surrounding the infestation have been cleared and large quantities of dead and dying trees, brush, and windfalls have been destroyed.

Gypsy moth ground crews burn brush and creosote egg clusters.--Crews of W. P. A. laborers continued to burn dead, defective, and other worthless growth in woodlands infested by the gypsy moth in the barrier zone section of Massachusetts, although a heavy coating of ice and frozen snow rendered burning conditions difficult in some locations. Because of unfavorable ground conditions during most of the month, crews detailed to ground work were obliged to confine their activities chiefly to the creosoting of gypsy moth egg clusters found above the snow line.

Gypsy moth work in Connecticut.--Special survey work by a small crew of regular gypsy moth employees was completed in an area of approximately 4,000 acres in Norfolk Township, Litchfield County, and a few widely scattered egg clusters were found and destroyed. Several additional egg clusters were destroyed in an area of about 1,200 acres in another section of Norfolk Township by a Connecticut State crew working in cooperation with this activity. Special surveys were also conducted in three additional townships in Litchfield County. No gypsy moth egg clusters were found in the southwest corner of Salisbury Township, where no scouting work had been performed since 1937. Scouting on one of the highest elevations in Canaan Township resulted in the discovery of 12 egg clusters. Three crews of W. P. A. employees also worked in Connecticut during February. One crew was detailed to scouting work in Norfolk Township and two crews performed grou work at infested sites in Litchfield and Salisbury Townships, in Litchfield County.

PLANT DISEASE CONTROL

Spread of white pine blister rust in 1941.--The spread of white pine blister rust during 1941 was featured by a southward extension of the disease on Ribes from central Virginia and West Virginia into northern Tennessee and North Carolina, and by the finding for the first time of large numbers of cankers on sugar pine in northern California and southern Oregon in localities where Ribes were found infected in previous years. In the Appalachian region the rust spread southward on wild Ribes for a distance of about 134 miles. Infection on Ribes was reported for the first time in 16 new counties and on white pine in 2 new counties. This southward extension of the rust was expected sooner or later and is not especially serious from a control standpoint, as nearly all of the valuable white pine stands within the newly infected counties already have been initially protected by the eradication of Ribes. In the sugar pine region of California and Oregon many more cankers were discovered on sugar pines than have been observed in past years. In southern Oregon the wet season and the increase locally in the volume of aeciospore dispersal, resulted in general and heavy infection on Ribes. The rust is now more or less generally present in Oregon in all counties where 5-needle pines grow. The disease was found for the first time in Crater Lake National Park. Infection was confined to the

Annie Creek Canyon and was found on both pines and Ribes. A pronounced increase in the amount of disease on pines was observed in Josephine and Jackson Counties, and in Klamath County infection was found for the first time on both pine and Ribes. In California blister rust infections were found for the first time on Ribes in Mendocino and Humboldt Counties in the Coast Range, and in Sierra County in the Sierra Nevadas. The rust has thus spread southward in the Coast Range for some 200 miles and in the Sierra Nevadas for 170 miles. The most significant find of the season was the discovery of infected sugar pine near Cascade, in Plumas County, in the southern end of the Plumas National Forest. The discovery of rust on sugar pine so far south in the Sierra Nevadas and the large increase in the number of infected pines, is tangible evidence that the disease is beginning to establish itself over a wide area in northern California. The past year appears to have been unusually favorable for rust intensification in the western white pine region of northeastern Washington, northern Idaho, and northwestern Montana, because of abnormally wet conditions throughout the growing season. Infection on white pines was located for the first time in 1941 in the Glacier National Park. Blister rust infection in the North Central States was found for the first time on white pine in 7 counties and on Ribes in 2 counties. In general, weather conditions during the first part of the summer were unsatisfactory for the spread of the rust on Ribes, but after the middle of August they favored the spread of the disease on both host plants. In the Northeastern States blister rust has been prevalent for many years, and the progress of Ribes eradication since 1918 has brought the rust under control over extensive areas where these bushes have been removed and kept suppressed. In 1941 Ribes, in general, were from moderately to heavily infected, notwithstanding the drought, which prevailed during most of the field season. A few new pine infection centers were found in some of the States in this region, but these were areas where the disease had been present for several years. Old infection on white pines is conspicuous in many places, but in most of these areas Ribes have been kept suppressed and therefore new infection is absent. In the country as a whole, blister rust infection was found for the first time on Ribes in 22 counties and on white pine in 11 counties.

The Cathedral Woods logged.--S. H. Boomer, district blister rust leader in New Hampshire, reports that the famous grove of white pine in the northern part of Conway, N. H., known as the Cathedral Woods, has been cut in the interest of National Defense. For more than 70 years these woods have been used as a picnic area, as a starting point for various mountain trails and bridle paths, and as a landmark in this White Mountain town. It was one of the most widely known stands of white pine in the country. Owing to the demand for box boards for ammunition cases and airplane crates, the Cathedral Woods were cut early in 1941. The hurricane of September 1938 uprooted 270,000 board feet of the best trees, and these were salvaged the following winter. The 1941 cut amounted to 1,125,000 board feet. The trees were very tall, running up 5 and 6 logs. A considerable amount of red ring rot (Fomes pini) indicated that the stand was ready for cutting. Fortunately 1941 was an excellent seed year, as was 1938, and if fire can be prevented this area should grown another grove of Cathedral pines. There has been a large amount of cutting in this locality as a direct result of the war. The Merriman woods were cut in 1937-38, yielding 3,100,000 feet. The Pendexter pines across the town line from the Cathedral Woods, yielded 1,200,000 feet; the Gale woods in Lower Bartlett, 1,175,000 feet;

the Smith woods on the west side, 2,000,000 feet; the Lewis and Woodward lots in East Conway, 2,500,000 feet; and several other lots in the section were cut. Practically all was white pine.

Iowa counties allot funds for barberry eradication.--County boards of supervisors in 12 of the 16 Iowa counties in which crews were employed in 1941 made cash allotments or furnished automotive equipment for use on the barberry-eradication project, amounting to $6,473. The funds were used for purchases of gasoline, oil, repairs, and parts for Government-owned trucks; operation cost of county-owned trucks; rental of privately owned trucks and passenger cars; chemicals; and miscellaneous items. D. R. Shepherd, State leader, advises that the cash allotments were substantial and in some of the counties sufficient to pay all nonlabor costs of the project.

Suspension of W. P. A. projects will affect barberry eradication.--The stem rust control project is generally recognized by W. P. A. officials as being next in importance to certified Defense projects, and in 1 State the project has been definitely classified in this order. There has been a gradual increase in the number of certified workers assigned to barberry eradication since January 1, until now there is a total of 1,891 employees on the 15 State projects operating. Some reduction in the scope of operations during the active farming season is anticipated, in order that laborers will be available to work on farms. Notice has been given by W. P. A. that their projects will be suspended in numerous agricultural counties, and in other counties W. P. A. employees will be released for farm work when requested by farm operators. The availability of labor will necessitate adjustments in the barberry-eradication field program in most States; however, this problem has been given thorough consideration in formulating plans for the most beneficial operations.

Initial intensive survey to be continued in southern Indiana.--Stanley Castell, State leader, reports that a survey for rust-susceptible barberry was completed in 43 of the 92 counties in Indiana during 1941. These 43 counties will require no further organized survey until 1946. There are no Indiana counties in which subsequent survey will be required in 1942. It is planned to apply all available labor this year toward continuing the initial intensive survey in the 29 southern counties remaining to be completed. Operations are now in progress in Morgan, Owen, and Posey Counties, which are included in this group.

COTTON INSECT INVESTIGATIONS

Visitors to boll weevil and bollworm control experiments.--K. P. Ewing, of the Waco, Tex., laboratory, reports that several of his 1941 experiments on control of the boll weevil and the bollworm showed such remarkable contrast between dusted and undusted cotton that they were opened to the public as demonstrations during September and October. J. C. Patterson, county agent of McLennan County, cooperated very closely with the Waco laboratory in presenting these demonstrations to the public through a publicity campaign in the local newspapers, over the radio, and by circular letters and telephone calls. Visitors included farmers, bankers, merchants, oil-mill men, ginners, cotton breeders, and representatives of various agricultural agencies, such as the Farm Security Administration, Soil Conservation Service, Extension Service, Texas Cotton Association, Texas

Farm Bureau Federation, 4-H Clubs, and Community Agricultural Associations, also graduate students in entomology at Texas A. & M. College. No attempt was made to keep an accurate record of the number of visitors but it is conservatively estimated that several hundred visited the fields. At least 75 visited 1 experiment on September 26 between the hours of 9 a.m. and 12 m., when the county agent, assistant county agent, and Mr. Ewing were present to explain the measures used for boll weevil control in that particular experiment and to make recommendations for control of other cotton insects.

Effect of temperature and humidity on hatching of bollworm eggs.--Preliminary tests to determine the effect of temperature and relative humidity on the hatching of eggs of Heliothis armigera Hbn. were conducted by E. E. Ivy at Waco, Tex., last season. Eggs of uniform age, size, and shape, deposited by moths confined in black-percale cages, were used. A minute coating of albumen was smeared on a microscope slide and 25 eggs were transferred to one end of the slide with a moistened camel's-hair brush. The slides with the eggs above the liquid were placed in staining jars containing solutions that maintained relative humidities of approximately 7, 25, 31, 37, 46, 56, 73, 80, 90, and 100 percent. The jars were sealed with cover glasses and placed in an electric incubator that maintained temperatures within 2°-3° variation. A maximum thermometer was placed with the bulb at the same level as the eggs and the maximum temperature noted for each test. Seven tests with 250 eggs each were conducted. In each test a slide with 25 eggs was maintained at each of the relative humidities and exposed to the same maximum temperature. At 96.5° and 99.5° F. maximum temperatures bollworm eggs were resistant to both low and high humidities, but eggs were not resistant to low humidities and were adversely affected by high humidities at higher temperatures. Hatching of eggs exposed to a maximum temperature of 99.5° increased from 44 percent at 7-percent relative humidity to 100 percent at 100-percent relative humidity. When exposed to 103.5° maximum temperature no hatching occurred at relative humidities of 31 percent or below and at 105° maximum temperature no hatching occurred at relative humidities of 37 percent or below. At maximum temperatures of 103.5° and 105° the largest hatch--13 percent and 3 percent, respectively--occurred at 80-percent relative humidity. Only a few eggs hatched when exposed to a maximum temperature of 105° and no hatching occurred at 105.5° maximum temperature. The average hatch of eggs held at the 10 relative humidities tested with each maximum temperature was as follows: 96.5°, 81 percent hatch; 99.5°, 71 percent; 103.5°, 22 percent; 104°, 11 percent; 105°, 5 percent; 105.5°, 0 percent.

Pink bollworm in the El Paso and Juarez Valleys.--A survey of pink bollworm abundance and general crop conditions in the El Paso and Juarez Valleys was made in October by W. L. Lowry and O. T. Robertson, in cooperation with the Division of Pink Bollworm Control. In the El Paso Valley inspections of nine fields located from the vicinity of Fabens, Tex., to the lower end of the valley, or a distance of 60 miles, showed an average of 9 percent of the bolls infested and 0.44 larva per plant. This is compared with less than 3-percent boll infestation and an average of less than 0.1 larva per plant in 1939 and 1940. Cotton had been completely defoliated by the leaf worms but this occurred too late to affect the crop, except in a few late-planted fields. Inspections made in six fields in the Juarez Valley, from the vicinity of Guadalupe to Vado de Cedillos, or a

distance of 30 miles, showed an average of 58 percent of the bolls infested and 3.9 larvae per plant. A rather heavy general infestation was noted in this section and in practically every field visited casual inspections showed the presence of live larvae and exit holes. At all gins the seed was being sterilized, the lint passed through steel rollers, and the gin trash burned, as a part of the control regulations.

TRUCK CROP AND GARDEN INSECT INVESTIGATIONS

Seed beet varieties affected by Lygus bugs.--Field cage studies, conducted by C. A. Hills at the Phoenix, Ariz., laboratory, during 1941 to determine the relative susceptibility of various varieties of sugar beets grown for seed to injury by Lygus bugs indicate that of the five varieties tested all were equally damaged by insects. Results of previous work by this laboratory have shown that Lygus bugs reduce the percentage of viable seed produced. Several varieties of sugar beets are grown for seed in the Southwest and in some years certain of these varieties apparently produce a lower percentage of viable seed than other varieties, and the question of possible differences in susceptibility to Lygus damage has arisen. Results of the investigations last year indicated that the varieties are similarly affected by Lygus.

Talc, pyrophyllite, clay, and sulfur as diluents for pyrethrum and cube.--As the result of field-plot experiments in a 1941 fall-crop planting of cabbage at Charleston, S. C., W. J. Reid, Jr., found that a clay of the type generally used as a diluent in insecticides proved significantly inferior to talc, pyrophyllite, and sulfur as a diluent for pyrethrum powder in the control of the cabbage looper. No significant differences between talc, pyrophyllite, and sulfur were demonstrated. The cube-dust mixtures containing talc and pyrophyllite tended to be superior to clay and to a lesser extent to sulfur at the time of an insect count, made during the third and fourth days after the last of the two insecticide applications. A count made approximately 14 days after the last application indicated that there were no significant differences between the diluents used with cube. In reducing the numbers of cabbage loopers, the pyrethrum-dust mixtures (which contained 0.2 percent of pyrethrins) were highly superior to the cube-dust mixtures (which contained 0.75 percent of rotenone) at the time of both counts, but a significiant interaction between insecticide materials and diluents was shown at the second count. When data on the two insecticides were grouped, clay was shown to be greatly inferior against the larger loopers to talc and to pyrophyllite, but not to sulfur, at the time of the first count. At the second count the dusts containing clay were decidedly inferior to all the others, but there was a significant interaction between insecticide materials and diluents. In reducing the numbers of Agrotinae, consisting principally of several species of true cutworms, and the corn earworm, there were no significant differences between dust mixtures, insecticide materials, or diluents at the time of either count. There was, however, a tendency for the pyrethrum dust mixtures to reduce the numbers of small larvae.

Pyrethrum superior to fixed nicotine or hellebore in control of cabbage looper.--In field-plot experiments performed by Mr. Reid on a 1941 planting of fall-crop cabbage at Charleston, S. C., a pyrethrum-dust mixture containing 0.3 percent of pyrethrins, an impregnated dust mixture containing 0.3 percent of pyrethrins, and an impregnated dust mixture containing 0.15

percent of pyrethrins were not significantly different in giving an excellent control of the cabbage looper and were highly superior to both a fixed-nicotine-dust mixture containing 4.66 percent of nicotine and to a dust mixture containing 50 percent of a domestic hellebore powder. Each of the dust mixtures was applied four times during the plant-heading period and all contained pyrophyllite as the diluent. The hellebore-dust mixture was significantly superior to the nicotine-dust mixture at the time of the first count, but not at the second count, and neither dust mixture provided worth-while control of the looper. Against the Agrotinae, the nicotine-dust mixture tended to be most effective at both counts, and was significantly superior to the dust mixtures containing pyrethrins at the second count. The reduction of the Agrotinae by nicotine-dust mixture evidently was confined to the small larvae and did not affect the numbers of medium and large specimens, which do the chief damage. The experiment indicates that the use of a pyrethrins-impregnated-dust mixture offers a possible means of greatly conserving supplies of pyrethrum, as much as one-third to one-half in the case of cabbage caterpillar control, a saving especially valuable under war-time conditions. The fixed-nicotine and the domestic-hellebore mixtures did not prove promising.

Crop rotations affect wireworm populations.--That crop rotations have an important effect on the population of and damage caused by the sugar-beet wireworm and the Pacific coast wireworm in Washington was corroborated by K. E. Gibson, of the Walla Walla, Wash., laboratory, when the complete series of 102 crop-rotation plots on the Irrigation Branch Experiment Station at Prosser, Wash., was sifted in March 1941, for the third successive year. Alfalfa, sweetclover, wheat, sugar beets, corn, and potatoes are grown in these rotations. Ten 1/4-square-foot samples of soil, dug to a depth of 2 feet, were sifted from each plot. Relatively low wireworm populations (not over 3.3 per square foot) were found where alfalfa succeeded itself, where sugar beets followed any of the other crops, where corn or potatoes followed sugar beets, and where potatoes followed alfalfa. The highest populations were found where wheat or sweetclover succeeded sugar beets, corn, or potatoes, where corn succeeded wheat, and where wheat or potatoes succeeded themselves or each other. The depressant effect of alfalfa and sugar beets on wireworm populations is shown and, conversely, the tendency of irrigated wheat and potatoes to build up populations. A statistical analysis of data showed that where the crops were not rotated, both potatoes and wheat had average mean populations significantly greater than sugar beets or alfalfa. Also 2-year rotations of potatoes and wheat had populations significantly greater than third-year alfalfa. Two-year rotations of corn and wheat had significantly greater populations than corn and sugar beets. Other differences were shown between various rotations but most of them could not be proved significantly different. This season, wheat and corn showed the largest percentage production of adults of all the crops, and also the largest actual number of adults per square foot. Alfalfa and sugar beets were the poorest crops for adult production. Percentage production of adults and actual numbers per square foot were higher this year than last. A comparison of several years' siftings shows that the low wireworm populations in these plots remain fairly constant year after year, whereas the high populations tend to fluctuate rather widely below a maximum of approximately 20 per square foot. Limonius californicus (Mann.) does not seem to be competing successfully with L. canus Lec. in this series of truck- and forage-crop rotations, the former showing numerical

preponderance in fewer plots and rotations each year. The average mean elaterid population for the entire series of plots was 4.03 per square foot this season, as compared with 5.08 last season. The adult population was larger this year than last, but the larval population considerably smaller. Potatoes were grown in 22 of these plots and were examined in October 1941 for wireworm damage. Those that succeeded alfalfa in rotations showed the least damage, and the greatest damage was shown where potatoes succeeded themselves.

INSECTS AFFECTING MAN AND ANIMALS

Control of cattle grubs.--E. W. Laake, of the Dallas, Tex., laboratory, reports that excellent results in the control of cattle grubs have been obtained by using a mixture consisting of equal parts of cube and wettable sulfur dusts.

Sodium silico fluoride as a substitute for sodium fluoride for chicken lice.--Preliminary tests reported by Roy Melvin, of the Menard, Tex., laboratory, indicate that sodium silico fluoride of 35 percent purity was not so effective as sodium fluoride, but that sodium silico fluoride of 98 percent purity was approximately equal in effectiveness to sodium fluoride. No injurious effect has been observed from the use of these materials.

FOREIGN PLANT QUARANTINES

Seed cotton as packing.--Three small mail packages of souvenirs from Quito, Ecuador, were found to contain cotton packing when examined recently by the Customs inspector at Buffalo, N. Y., so he set them aside for plant-quarantine inspection. Approximately 1,000 cottonseeds were found in the cotton. Characteristic pink bollworm injury was found in a number of seeds but no living specimens were seen. Photographs of the material were made by a Postal employee and prints supplied to this Division. This affords another illustration of the necessity for keeping a close watch on packing materials and of the value of the hearty cooperation extended by Customs and Postal Services.

DOMESTIC PLANT QUARANTINES

Sweetpotato weevils found in Brooks County, Ga.--Sweetpotato weevils were discovered in Brooks County, Ga., on February 10 by a State inspector. Further delimiting surveys, conducted in the 5-mile environs of the infested property, resulted in locating six infestations. The survey is not yet complete. Weevils have not heretofore been found in Brooks County in the Federal-State activities of the last 4-1/2 years. The growers are entering into the eradication program with considerable interest.

Citrus canker inspection resumed in Louisiana.--Inspection for citrus canker was resumed in Louisiana on February 9, with a force of four Federal inspectors and two State men. The work was centered in Jefferson and St. Charles Parishes, the last known infection in the State having been located in April 1940 at Lafitte, in the latter parish. No citrus canker was found in February.

White-fringed beetle conference.--A program for control of the white-fringed beetle in 1942, similar to that conducted last year, was adopted at

a conference of Bureau and State workers held at Gulfport, Miss., on February 24-25. More emphasis will need to be given, it was pointed out, on the expansion of activities pertaining to the various phases of biological control, in order to reduce the destructiveness of this pest. The dissemination of parasitic nematodes on an experimental control basis is proposed. More widespread cultural procedures and crop rotation practices as an aid to profitable farming in infested areas will be encouraged as a supplement to suppressive measures. Progress in the treatment of nursery stock and soil was indicated in the modification of such regulatory requirements. The report of the recent white-fringed beetle survey conducted in South America by the Division of Foreign Parasite Introduction gave information of importance to the control and regulatory activities, particularly as to the seriousness of the beetle as a pest of potato plants and of the tubers in field and storage.

Strawberry root weevil found in air shipment.--A shipment of dormant rose bushes consigned by airmail from Patchogue, N. Y., to Fairview, Oreg., and intercepted by the transit inspector at New York City on February 9, was found to contain a larva of Brachyrhinus ovatus (L.). This is the second time this insect has been intercepted by a transit inspector during the current fiscal year.

Transit inspectors' conference.--Transit inspectors from New York, Boston, Buffalo, Pittsburgh, and Chicago met in conference at New York on February 18-19. Inspectors of the Japanese beetle force, as well as Washington representatives of the divisions of domestic and foreign plant quarantines, were also in attendance. Because many transit inspectors are working alone at their posts, meetings of this kind are met with enthusiasm and are found to put new life into the project. Recommendations relative to quarantine procedure and exemption of certain articles from certification were made at the meeting, and the work of transit inspectors in relation to national defense was discussed.

New motor freight terminal at New York.--The New York Port Authority recently announced plans for construction of a $2,000,000 freight terminal in lower Manhattan, to facilitate the accommodations for some of the 10,000 trucks that pass through the city daily. According to a recent survey by the Authority, there are 174 motor-freight terminals in Manhattan alone.

CONTROL INVESTIGATIONS

Injections change resistance of roaches to insecticides.--The injection of Chinese ink (carbon) particles in suspension in a physiological saline solution has been reported by E. R. McGovran, J. F. Yeager, E. L. Mayer, and Sam C. Munson to cause a variation in the resistance of nymphs of the American roach to pyrethrum extract in acetone and potassium fluoride in water, when these insecticides were applied as contact insecticides. After the ink was injected many of the blood cells in the roach took up the microscopic particles of carbon so that these cells were often filled with black particles. In some cases these cells adhered to each other to form clumps, some of which, no doubt, lodged in the tissues of the insect. In this manner many blood cells were removed from circulation through the insect and some of the functions of the cells that were partially or completely loaded with ink particles may have been interfered with. However, the injection of the ink, which had a striking effect on the blood cells,

did not cause appreciable mortality of the roaches treated with acetone or water that did not contain an insecticide. The solutionsof insecticides and the acetone and water treatments mentioned above were applied with a micropipette which delivered a measured dose on each insect. The liquids were applied between the wing pads of the nymphs and their body wall. As only a small quantity of water or aqueous solution (2.5 lambda per gram of body weight) could be applied without the probability of some of it being rubbed off by the roaches, even though they were confined individually, it was necessary to use a material that was quite soluble in water. For this reason potassium fluoride was used, instead of sodium fluoride, as a sufficient amount of the potassium compound to kill the insects could be dissolved in a volume of water that it was practical to apply and have retained on the insects. The insecticides were applied 24 hours after the roaches were injected. The results showed that the injection of ink caused a reduction in the resistance of the roaches during part of the first week of the tests and an increase in the resistance of the roaches during the latter part of the second week. When ink-injected roaches were treated with pyrethrum extract their resistance appeared to be slightly increased, as compared with saline-injected roaches, but the difference was not statistically significant. This variable response of the roaches indicates that the physiological mechanism within the insect that builds up its resistance to insecticides may be intricate and that the physiological mechanism may be different for each insecticide. The fact that carbon particles have great powers of adsorption for certain materials may account for some of the effects observed. The injection of trypan blue dissolved in saline into roaches that were subsequently treated with pyrethrum extract or potassium fluoride showed that trypan-blue injection did not produce an appreciable change in the resistance of the insects to the insecticides. The injection of trypan blue deeply stained the pericardial cells, indicating that they had taken up large amounts of the dye. This indicates that either the dye in the cells did not interfere with their function in maintaining the resistance of the insect to the insecticides used, or that the pericardial cells do not assist in detoxifying these insecticides within the insect, or that whatever change was produced in the pericardial cells by the dye was masked by the effect of the dye on the remaining tissues in the insect.

INSECTICIDE INVESTIGATIONS

New fungicides and insecticides patented.--Three public service patents have recently been issued to R. H. Carter. United States Patent 2,269,892, issued January 13, 1942, claims a fungicide and insecticide, containing as its essentially active ingredient a heavy metal salt of the dithiocarbamic acid of morpholine. United States Patent 2,269,893, issued on the same date, claims an insecticide, containing as its essential active ingredient the morpholine salt of the dithiocarbamic acid of morpholine. United States Patent 2,272,044 claims an insect repellent, containing as its essential active ingredient dimorpholine thiuramdisulfide.

BEE CULTURE

Expeller grades of soybean flour for feeding bee colonies.--C. W. Schaefer and C. L. Farrar, Madison, Wis., report that greenhouse colonies fed three brands of soybean flours treated by the expeller process reared 42 percent more bees than did colonies fed four brands of soybean flours refined under the chemical extraction process. Six colonies fed three brands of flour treated by the expeller process reared 37 percent as much brood as did two colonies fed pollen alone. Eight colonies fed four brands of flour treated by the chemical process reared 26 percent as much brood. One check colony reared 9 percent as much brood. The two colonies fed pollen alone averaged 14,500 bees reared between December 4, 1941, and January 29, 1942. Where the seven brands of soybean flour were supplemented with 25 percent pollen, three colonies fed expeller grades reared 83 percent as much brood as did those on pollen. Four colonies fed flours produced under the chemical process reared 46 percent as much brood as those on pollen. Three colonies started as checks, or failing to respond to the original food during the first period, reared an average of 7,200 bees when fed expeller grades supplemented with 25 percent pollen during the last three periods, as compared to 550 bees for the remaining check colony. Two other brands of the chemical type of flours were found unfit for bee food. One became gluelike in consistency when mixed with sugar sirup, which the bees could not handle, and the other soured soon after it was mixed. The amount of water used by the colonies was directly proportional to the amount of brood reared under the same environmental conditions. Colonies in the greenhouse with low humidity used nearly twice as much water as did those in a greenhouse with high humidity. Probably an average of less than 20 percent of the eggs laid in all test colonies were developed into bees. Fifty-four percent as much sealed brood was measured as unsealed eggs and larvae; however, measurements were made at 12-day intervals, the normal period for sealed brood, whereas the unsealed brood represents 8 days of egg laying. Thus the ratio should be reduced from 54 percent to a theoretical 36 percent had none of the eggs or larvae been removed. The measured ratio of sealed to unsealed brood for the pollen colonies was 60 percent; expeller flours plus pollen, 61 percent; chemically extracted flours plus pollen, 59 percent; expeller flours alone, 49 percent; chemically extracted flours alone, 46 percent; and check colony 32 percent. The theoretical ratios in each case would be two-thirds the measured ratio, which would obviously be too high. Light nosema infections were found in 18 of the 30 colonies in the test. In last year's tests, severe nosema infections were found in all 30 colonies. The reduction this year may be due to the use of inverted "pepper-box" feeders, whereas last year water was provided in open vessels. In both years the water containers were washed in hot water every 3 to 4 days.

---oOo---