REPORT OF THE ACTING CHIEF OF THE BUREAU OF PLANT QUARANTINE, 1934

UNITED STATES DEPARTMENT OF AGRICULTURE,
BUREAU OF PLANT QUARANTINE,
Washington, D. C., August 28, 1934.

SIR: I transmit herewith a report of the work of the Bureau of Plant Quarantine for the fiscal year ended June 30, 1934.

Respectfully,

AVERY S. HOYT, *Acting Chief.*

Hon. HENRY A. WALLACE,
Secretary of Agriculture.

INTRODUCTION

Work of the past year has been notable primarily for progress in the suppression or eradication of known outbreaks rather than in the finding of new or startling developments. The discovery of a considerable infestation of the Japanese beetle in St. Louis constitutes the only major finding of a well-known serious pest in a new section of the country.

The eradication of the Pennsylvania outbreak of the gypsy moth was stimulated and intensified as a result of the allotment of funds from the Public Works Administration and other emergency organizations of the Government. This infestation has proved to be large and thoroughly established, and almost half of the egg clusters destroyed in the Department's gypsy moth campaign during the year were found in that State. Similar allotments of emergency funds also made it possible to extend the suppressive activities in western New England eastward from the barrier zone into the Connecticut River Valley to aid in the elimination of infestations in that region which were threatening to spread westward to localities outside the present known infested sections.

Because of the overlapping of the areas infested by Japanese beetle and gypsy moth, it was found advisable in the interests of economy to merge the enforcement work on the two quarantines. With the spread of the Japanese beetle in the New England States and the extension of the quarantine in that area, the Bureau was in the position of having two sets of inspectors in the same area while the work of inspection and certification of products could be handled by one unit. The enforcement of the satin moth quarantine which is operative in the same territory was also combined with the other two quarantines.

Progress is reported in connection with the pink bollworm outbreak on wild cotton in southern Florida. A new infestation consisting of the finding of two infested fields in Georgia necessitated some additions to the regulated area but is not believed to threaten the success of the eradication effort in that part of the United States. Through the cooperation of the Agricultural Adjustment Administration it was possible to establish a cotton-free zone surrounding the infested premises for 1 year and this additional safeguard, it is believed, will constitute an important aid in the extermination of the pink bollworm from the southeastern part of the United States.

Among the new and improved methods described in this report may be mentioned the use of glass flytraps for determining the status of citrus groves as to Mexican fruit fly infestation in the lower Rio Grande Valley, and a number of improvements in methods of treating cotton for the pink bollworm, and in spraying equipment used in the gypsy moth project.

The work of the port-inspection service, which is maintained for the protection of the agriculture and horticulture of the United States from injurious foreign insects and plant diseases, resulted in 25,305 interceptions of insects and plant diseases. Those which it was possible to determine definitely were found to belong to 1,277 different species of insects, 166 different species of fungi and bacteria, and 14 species of nematodes. In making these interceptions, the

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inspectors checked on all the shipments of plants and plant products entered through the customs service from outside the United States and went over the ships' stores and passengers' baggage of the ships and airplanes arriving from foreign countries.

DOMESTIC PLANT QUARANTINES

GYPSY MOTH AND BROWN-TAIL MOTH CONTROL

CONDITION OF THE INFESTED AREA IN NEW ENGLAND

During the summer of 1933, defoliation caused by the gypsy moth (*Porthetria dispar* L.) to forest, shade, and fruit trees was considerably in excess of that recorded the previous year. Slight to complete defoliation was found on 397,730 acres, as compared with defoliation on 286,395 acres recorded for the summer of 1932. In the eastern part of the infested area defoliation was not much more severe than that recorded the previous year, but areas of defoliation were found much farther west in Worcester County, Mass., than have been recorded previously, and some defoliation was noted near the Connecticut River in Massachusetts; also one small area west of the river in Massachusetts and another in Vermont. In Connecticut the largest defoliated area ever found in the State was discovered near New London. Losses to tree growth due to defoliation were severe, although exact records are difficult to obtain. In the southeastern part of Massachusetts serious loss was caused to cranberry bogs, the owners estimating a crop reduction of 16,888 barrels. On the basis of prices obtained for the crop, this loss amounted to $151,992. Reports received through June 1934 indicate that there are many large defoliated areas throughout the State as far west as the Connecticut River and that in the section immediately east of the river more serious defoliation is likely to result than at any time in the past. This indicates that if the work west of the river had been long delayed the results would have been disastrous to the barrier zone.

The winter of 1933–34 was the most severe winter experienced in the New England States for many years. Temperatures were very low, and many gypsy moth egg clusters were killed in some localities. Killing was not so extensive as has been recorded in some severe winters in the past, and an abnormal fall of snow protected large numbers of egg clusters that were deposited close to the ground, so that in many infestations sufficient hatching resulted to cause heavy defoliation. In a considerable portion of the territory west of the Connecticut River in Connecticut the mortality due to excessive cold was not severe.

SUPPRESSIVE WORK

Gypsy moth control activities for the year were directed along three main lines: (1) Searching for and bringing under control the scattered infestations in western New England, both in the barrier zone and between that zone and the Connecticut River, (2) eradication activities in the outlying infestations of Pennsylvania and New Jersey, and (3) controlling the interstate shipments of materials which might carry infestation to other parts of the United States.

The work done west of the Connecticut River in New England and in New York and Pennsylvania, including that done by Civilian Conservation Corps camps east of the barrier zone, is summarized in table 1.

TABLE 1.—*Summary of work accomplished in gypsy moth control, fiscal year 1934* [1]

State	Woodland scouted	Roadsides scouted	Trees examined in open country	Egg clusters destroyed
	Acres	*Miles*	*Number*	*Number*
New York	55,919	420	147,663	0
Vermont	935,437	3,238	819,025	147,925
Massachusetts	422,584	388	173,199	384,507
Connecticut	423,775	3,142	1,639,144	21,334
Pennsylvania	54,475	2,444	1,326,587	478,826
Total	1,892,190	9,632	4,105,618	1,032,592

[1] In addition to the work listed above, 2,597 acres of woodland were cleared of worthless trees and brush; nearly 70 miles of barbed wire were erected for temporary use around areas selected for spraying; 109,663 burlap bands were applied to trees; 268,364 gypsy moth larvae and pupae were crushed under these bands; 11,537 acres of woodland, 8,272 isolated trees, and 2,763 properties in residential sections were sprayed with arsenate of lead.

WORK IN NEW ENGLAND AND NEW YORK

In New York five towns in Clinton County adjoining Lake Champlain were scouted, and no gypsy moth infestation was found. This completed the scouting of a group of towns approximately one tier in width extending from the Canadian border to and including Putnam and Hague, N. Y. Towns other than the five indicated in Clinton County had been examined in previous years by this Bureau and by gypsy moth experts employed by the Conservation Department of the State of New York.

Cooperation with the State department of agriculture and the State department of conservation in enforcing the State gypsy moth quarantine on Long Island was continued throughout the year. A total of 2,989 shipments of nursery stock, lumber, and other materials which might carry infestation were inspected and certified before being shipped out of the area. The conservation department in carrying through the scouting and clean-up work on Long Island, located 14 infestations totaling 128 egg clusters in North Hempstead and 25 infestations totaling 386 egg clusters in Oyster Bay Town. These infestations were all sprayed during June, and the Bureau cooperated to the extent of lending three spraying machines and the necessary equipment to carry on the work. Territory in the eastern part of Long Island has been scouted during the year by men from Civilian Conservation Corps camps, supervised by regular employees of the conservation department, but no additional infestations have been found. One small infestation in the New York section of the barrier zone was located in the town of Northeast and was thoroughly treated and sprayed.

For many years it has been realized that infestations between the Connecticut River and the barrier zone were a distinct menace in keeping the zone free from gypsy moth infestation. For the past 2 years evidence was reasonably conclusive that reinfestation of cleaned-up territory in the zone was due to the spread of small larvae from the infested area to the eastward by wind. A large share of the work in western New England was accordingly devoted this year to the destruction of egg clusters east of the barrier zone.

In Vermont the first scouting was done in towns located on both sides of the barrier-zone line from the Canadian border as far south as Hancock and Goshen. This territory covers the summit of the Green Mountain Range. Wooded elevations ranging from 3,000 to over 4,000 feet are common, and the work presented unusual difficulties. Scouting in most of these towns was completed, as was that in many towns between this area and the New York State line. In a number of towns the scouting was not completed on account of unfavorable weather conditions.

In the southern half of the territory in Vermont, where work was to be carried on, the woodland in a number of towns was completely scouted, and the territory along the Connecticut River was given particular attention. It was impossible to complete the scouting in all the towns in this southern section, for the most part because of the reduction of funds, necessitating a change in plan. With the exception of towns bordering the Connecticut River, only one gypsy moth infestation was found in the territory scouted in Vermont. This was in the town of Shoreham, where remnants of egg clusters were discovered on a sled that had been purchased by a farmer and brought there from eastern Massachusetts. In the southern part of the territory along the Connecticut River heavy infestation was found, as is indicated in table 1. The creosoting of egg clusters was carried on both by the regular force and by men from a C. C. C. camp near Bellows Falls, and five spraying machines were operated in the worst infestations throughout June. Scouting work was done in 98 towns in Vermont; from slight to very heavy infestations were found and treated in 17 towns.

In Massachusetts the scouting indicated that many of the towns were more generally infested than had previously been suspected, and some infestation was found in all towns except a few in the western part of the area nearest the barrier zone. Special arrangements were made in carrying on the work east of the zone in Massachusetts because each town has a local organization that is doing gypsy moth work. The funds appropriated by the towns are seldom adequate to do the work that is absolutely necessary in the villages and orchards and on the street trees and to make examinations of the woodland areas. Accordingly, an agreement was made between the local authorities, the State department of conservation (which has general supervision over gypsy moth work in Massachusetts), and the Bureau of Plant Quarantine so that the Federal and local work could be coordinated to eliminate friction or duplication of effort. The results have been satisfactory, and table 1 indicates the acreages covered and the

treatment that has been applied. Twenty spraying machines were used throughout the season in the worst infested and most dangerous places. This entire Massachusetts area embraces some 1,067 square miles with much semimountainous country and included many locations where egg clusters that had been treated with creosote might have been sprayed to advantage had additional equipment been available and had it been possible to carry through an extermination plan. The results show very clearly that there were infestations sufficiently heavy to have caused defoliation this summer and opportunity for spread of the insect into the barrier zone next spring if treatment had not been applied. Up to this time only one large defoliated area has been found west of the Connecticut River, and that is located within a few miles of the river. Scouting work was done in 49 towns, and 36 were found to be infested. Some heavily infested areas were discovered within a few miles of the barrier zone.

In Connecticut west of the Connecticut River conditions are not quite so serious as in Massachusetts. For a number of years the gypsy moth force, working under the direction of the State entomologist, has concentrated much effort in carrying on scouting and clean-up work in the towns west of the river, particularly those near the barrier zone. As a result of this, smaller infestations were found in Connecticut; and in a considerable number of towns near the border of the zone and in the territory near Long Island Sound no infestation was discovered by the scouting force. Nineteen spraying machines were used in the State during June, and all colonies that were found during the year were either creosoted or thoroughly sprayed, or both. Scouting work was done in 70 towns, and 34 towns were found to be infested. There is in the southern part of the barrier zone in Connecticut a rather large group of towns where the woodland has never been scouted, and this area, as well as the area in Vermont that could not be completed, should have early attention, there being a possibility that infestations of which we have no knowledge may be building up.

During the winter civil works funds were made available for the States of Massachusetts and Connecticut to carry on gypsy moth scouting and treatment in territory east of the Connecticut River. This resulted in the treatment of large numbers of gypsy moth egg clusters and the discovery of large colonies in woodland areas the presence of which was not known heretofore. This work was of great value, as it indicated the need for more detailed inspection and treatment, particularly in the area in these States where the gypsy moth was known to exist in only a relatively small number of localities. The value of this work is emphasized by the fact that there now exist in the territory east of the Connecticut River more extensive defoliated areas than have ever been observed heretofore. The need for more work along this line is evident.

Emergency conservation work on the gypsy moth was carried on from 18 camps in towns between the barrier zone and the Connecticut River—1 in Vermont, 10 in Massachusetts, and 7 in Connecticut. Originally these camps were all under the control of the Forest Service, but during the year 5 of those in Massachusetts were transferred to the supervision of the Department of the Interior. Scouting and the treating of egg clusters were carried on by these men under the supervision of foremen experienced in gypsy moth work and contributed very materially to the results that have been obtained during the year on the gypsy moth problem.

PROGRESS IN ERADICATING NEW JERSEY AND PENNSYLVANIA OUTBREAKS

In New Jersey the small force employed by the State put up and examined assembling cages during the summer and carried on scouting work in the area that seemed most likely to be infested. Three gypsy moth egg clusters were found at the site of the 1933 infestation. This area was sprayed early in June. The spraying machine, equipment, insecticide, and operator were furnished by the Bureau, and the unskilled labor was supplied by the State.

In Pennsylvania a small amount of spraying was done immediately after July 1, 1933, in order to complete the work that had been carried on in June of the preceding fiscal year. Four hundred and forty-eight acres of woodland and four hundred and forty-nine properties in residential sections were sprayed. Burlap bands were applied in especially dangerous areas, and all caterpillars found under them were crushed. Only a small force was carried during July and most of August, but by September 7 the force was expanding rapidly as a result of obtaining emergency funds from the Public Works Administration. This force was built up to 470 men and was maintained rather constantly until about the first of March, 1934, when a reduction in personnel became necessary. About the middle of May the force was increased for the spraying season.

In September, after the force had been assembled and trained, work was taken up along the Susquehanna and Lackawanna Rivers in order that any infestation that existed might be treated to prevent the movement of egg clusters on driftwood during high water. The Susquehanna River banks were scouted from the Newport Township line north to the Falls Township line, a distance of approximately 25 miles, and the banks of the Lackawanna were scouted a distance of 7 miles from its mouth northeastward. Only 5 small infestations were found as a result of this work, 3 in Pittston Township and 2 in the boroughs of Old Forge and Taylor. Prior to this time 1,823 assembling cages were put up in 54 towns surrounding the badly infested area and were patrolled by the field men. Sixty-one moths were taken from 31 of these cages.

An effort was made in Pennsylvania to scout and treat the area known to be most heavily infested and to determine as far as possible the outlying infestations by scouting the roadsides, orchards, and trees along the woodland borders. This resulted in finding infestations in territory that had not been examined the previous year, and on March 1 the Pennsylvania State quarantine was extended to cover the area of 700 square miles known to be infested at that time. Since that date, scouting has been continued in the territory surrounding the infested area, particularly toward the north, east, and south, and several small isolated infestations have been located. This brings the acreage of territory that should be placed under quarantine up to 880 square miles. The scouting disclosed no outlying colonies beyond the generally infested area, and this indicates that the problem in Pennsylvania consists of the difficult task of wiping out the infestation in the large area described above. The work accomplished is listed in table 1. Twenty-one spraying machines were operated in this territory during the summer. Over 2,700 residential properties were treated, but most of the work was done in woodlands where long lines of hose and irregular terrain made progress slow and difficult.

In the enforcement of the State quarantine, which was handled cooperatively with this office, 1,999 shipments were inspected and certified. Most of this material consisted of mine props and lagging, but nursery stock, and a miscellaneous assortment of forest products, cable reels, etc., were also inspected before movement was permitted.

On August 16, 1933, an allotment of $2,020,620 was made by the Public Works Administration to the Bureau for the purpose of carrying on the control and extermination work in Pennsylvania, in the barrier zone in New England and New York, and in the strip of territory between the barrier zone and the Connecticut River in Connecticut, Massachusetts, and Vermont. After this allotment had been made the funds carried in the regular appropriation for scouting and extermination were withdrawn and the gypsy moth force, with the exception of the quarantine section, was transferred to work under this allotment. The work was organized rapidly and men began reporting the first week in September. More than 2,000 men were employed through the offices of the national reemployment service in the States where the work was to be done. The force decreased somewhat during the winter, and in March and early April 1934 drastic reduction in personnel was necessary in order that $459,282 of the funds available could be carried over for use after July 1. The number of employees was decreased to approximately 450, but by the 1st of June it was necessary to employ additional men to take care of spraying, and the rolls for that month averaged 1,200 men.

On June 30 the emergency work was discontinued and all temporary employees dropped, with the exception of a small force needed to care for and repair equipment and compile and complete the records of the project.

Through a provision in the agricultural appropriation bill, $360,000 was made available to carry on the regular work of this project for the fiscal year 1935.

In order to carry through the gypsy moth project on the increased funds available during the year, additional supplies of insecticides, tools, and other equipment were purchased. One hundred and sixty-five tons of arsenate of lead and 10,500 gallons of fish oil were purchased for the spraying work in the New England territory, and 80 tons of arsenate of lead and 3,500 gallons of fish oil were purchased for the Pennsylvania area. Most of the supplies in Pennsylvania were procured by the State. It was also necessary to remodel most of the spraying equipment so that constant spraying could be maintained to prevent delay in filling the tanks, and 10 additional high-power spraying machines, mounted on light automobile chassis, were obtained.

The funds allotted for this work, amounting to $2,020,620, were reduced by $459,282 as previously stated, so that $1,561,338 was available for the fiscal year 1934. It is estimated that not less than 80 percent of the work originally planned for the full amount of funds has been completed, and in the New England area the largest and most threatening colonies, particularly those in the woodland, were treated before the end of the fiscal year. These results were accomplished in spite of the fact that during the winter weather conditions were abnormally severe. In many sections of New England where the work was carried on, record-breaking subzero temperatures continued for extended periods, and the snowfall was above normal. Progress could not have been made in many of these areas without equipping the men with snowshoes and, although 1,200 pairs were in use, serious consideration was given at one period during the winter to discontinuing the work until there were better conditions for traveling. All woodland scouting in New England was done on the 40-foot strip method, while in Pennsylvania the woodlands that were covered were given a more intensive inspection.

The opportunity afforded by the allotment of emergency funds to do much-needed constructive work on the gypsy moth project has made it possible to determine with reasonable accuracy the menace that exists in the territory adjoining the barrier zone. The treatment that has been applied to the infestations found will give temporary relief, but cannot be expected to afford continuous protection to the zone unless control work is carried on annually in a systematic way. The work in Clinton County, N.Y., makes it possible for the Department to consider the elimination and release from the barrier zone of the territory in northern New York west of the Vermont State line as far south and including the towns of Putnam and Hague, an area embracing 1,056 square miles. Certain territory in Vermont may in addition be released from the regulated area on the basis of the scouting in that State. In Pennsylvania treatment of the known infested area has prevented defoliation this year and has resulted in the discovery and treatment of outlying infestations. The quarantined area in that State can now be extended so that material passing from all the infested territory can be inspected in order to protect the uninfested parts of Pennsylvania and other States.

THE BROWN-TAIL MOTH

Observations made in the summer of 1933 showed that 20 towns in Maine, outside the quarantine line, were infested with the brown-tail moth (*Nygmia phaeorrhoea* Don.); 18 towns in New Hampshire outside of the line showed infestation, and 5 towns in Vermont were infested. Much of the southern half of New Hampshire and extensive areas in southern and eastern Maine were heavily infested, and the trees were severely defoliated. Late in the fall hibernating webs were extremely abundant in the above-mentioned sections of the two States. In Massachusetts most sections of the quarantined area were lightly infested, but here and there towns were found with spots of heavier infestation and some defoliation.

On December 1, 1933, the Civil Works Administration approved an expenditure of $870,850 for a brown-tail moth extermination project, to be carried on as a Federal project in the States of Maine, New Hampshire, Vermont, and Massachusetts, under the supervision of the Bureau of Plant Quarantine. This extermination project was one on which large numbers of men could be given useful employment in cutting and burning the hibernation webs present in abundance on the trees in many sections of the infested area.

The work was organized very rapidly, and eventually more than 4,500 people were employed. The project was discontinued on February 15, 1934, although the work had not been completed in any of the States. Approximately $515,000 was expended on this project, and the plan could have been completed if an extension of time had been allowed. More than 95 percent of the funds used were expended for personal service.

Webs were cut in towns inside the quarantined area in Maine, New Hampshire, and Massachusetts; also in a few towns outside of the quarantined area in New Hampshire and Massachusetts. As the quarantined area did not extend as far west as Vermont, all towns in that State in which work was done were outside of the quarantined area.

As the work progressed very heavy infestations were found in many towns in southern Maine and New Hampshire. In these two States there were a number of towns containing from 200,000 to 300,000 webs, and there were also many towns from which over 100,000 webs were cut. In Massachusetts the towns were not so heavily infested as in Maine and New Hampshire, but some towns yielded

from 40,000 to 50,000 webs. In the Vermont towns in which work was performed, infestation was generally light and scattered, but there were spots of slightly heavier infestation.

During the progress of the work webs were cut in 221 towns in Maine; in 140 in New Hampshire; in 227 in Massachusetts; and in 20 in Vermont. In these towns in Maine 9,857,689 webs were destroyed; in those in New Hampshire 9,766,970; in those in Massachusetts 328,310; and in those in Vermont 1,280. This makes a total of 19,954,249 webs destroyed in these four States. After the termination of the Federal project in New Hampshire arrangements were made for future work by State officials, and approximately 3,900,000 additional webs were cut and destroyed.

COOPERATION

Cordial relations have continued between the Federal gypsy moth staff and the various State and other agencies cooperating. The results accomplished during the fiscal year 1934 have been due in a large measure to the excellent support and interest displayed by all agencies with which this project has cooperated.

THE SATIN MOTH

There was no appreciable spread of the satin moth (*Stilpnotia salicis* L.) in the New England States beyond the territory that was found infested in 1933. The only extension of infested territory of consequence was at the extreme northeastern point of the infested area in Maine, where 6 additional towns were found infested—5 being in Aroostook County and 1 in Penobscot County. One additional town was found infested in Franklin County, Maine, and 1 in Grafton County, N. H. Within the infested area severe defoliation was recorded at Bangor and Brewer, Maine; at Alton, Ashland, Campton, Center Harbor, Freedom, and Laconia, N. H.; and at Yarmouth, Mass. Elsewhere in the infested area the defoliation was not severe, although feeding was noticeable in many towns.

GYPSY MOTH AND BROWN-TAIL MOTH QUARANTINE ENFORCEMENT

CONSOLIDATION OF ENFORCEMENT PROJECTS

Quarantine-enforcement work on the gypsy moth and the brown-tail moth was merged with the Japanese beetle quarantine project on January 1, 1934. This transfer was made for the purpose of combining in a single unit the moth and Japanese beetle quarantine-enforcement activities, both of which involve inspection and certification of nursery products in overlapping areas. Although there existed a cooperative arrangement between the two inspection corps prior to the merger, it was not possible to assign all quarantine activities in a district to a single inspector of either project. As Japanese beetle infestation spreads in the New England States, inspection work of the two projects increasingly will overlap. A merger of the projects was therefore in the interests of economy and unified field supervision. With a few exceptions, the former gypsy moth enforcement personnel was transferred to the combined units. Field supervision of the consolidated projects was assigned to L. H. Worthley. Coordination of the nursery-inspection activities peculiar to both quarantines had largely been effected by the end of the fiscal year. The enforcement of the satin moth quarantine was also included in the merger.

CERTIFICATION OF QUARANTINED PRODUCTS

Under a revised procedure effected late in March, nurseries and quarries in uninfested sections of the lightly infested territory are given a preferred status. In lieu of individual inspection of quarantined products, an examination of the entire locality and all supplemental material brought onto the premises is accepted as a basis for the issuance of certificates or permits covering the movement of products from the establishment. This has eliminated much routine formerly attending the issuance of quantities of certificates at a number of large Connecticut nurseries and the numerous quarries in the Barre and Rutland, Vt., districts.

Aggregate totals of quarantined products certified during the 12-month period closely approximated the totals of commodities shipped under certification during the preceding fiscal year.

Summarized in tables 2 to 4 are the quantities of articles of the respective quarantined products certified during the period covered by this report.

TABLE 2.—*Evergreen products certified under gypsy moth quarantine, fiscal year 1934*

Material	Bags	Bales	Boxes	Bundles	Carloads	Packages	Trees	Truck loads	Products found infested	Gypsy-moth egg clusters found
Balsam twigs	53	6	1	1	0	87	0	0	0	0
Boughs	0	13,328	0	0	42	0	0	0	0	0
Christmas trees	0	0	0	0	459	0	103,438	0	0	0
Laurel	503	4,866	1,098	1,052	0	43	0	0	0	0
Mixed greens	30	272	4,938	125	0	1,819	0	2	0	0
Miscellaneous	3	102	332	308	0	45	0	0	0	0
Total	589	18,574	6,369	1,486	501	1,994	103,438	2	0	0

TABLE 3.—*Forest products certified under gypsy moth quarantine, fiscal year 1934*

Material	Bags	Barge loads	Boxes	Bundles	Carloads	Cases	Cords	Lots	Pieces	Truck loads	Products found infested	Gypsy moths found: Egg clusters	Gypsy moths found: Larvae and pupae
Barrel parts	0	0	0	294	4	0	0	0	0	1		0	0
Crates and cratings	0	0	0	0	0	0	0	0	115	2		0	0
Fuel wood	1	0	2	7	40	5	160	0	30	956		0	0
Logs	0	0	0	0	66	1	0	0	723	1,436	1 truck	1	0
											1 car	2	0
Lumber	0	1	0	9	638	6	0	183	162	500	2 trucks	5	0
											1 barge	185	0
											1 piece	2	0
											13 cars	49	0
											1 lot	2	0
Piles and poles	0	4	0	1	33	0	0	0	2,990	39	3 barges	34	0
											1 car	8	0
											1 truck	6	0
Posts	0	0	0	0	1	0	0	0	1,459	15		0	0
Pulpwood	0	0	0	0	1,112	0	337	0	0	353	2 cars	1	2
Reels	0	0	0	1	50	0	0	0	5,815	2	2 lots	2	1
											2 cars	24	1
Shavings	0	0	0	0	45	0	0	0	0	0		0	0
Shrub and vine cuttings	0	0	122	211	0	15	0	0	0	0		0	0
Ties	0	0	0	17	407	0	0	0	235	3	3 cars	0	7
Miscellaneous	29	0	53	4,471	370	26	23	6	18,250	65	10 bundles	10	9
Total	30	5	177	5,011	2,766	53	520	189	29,779	3,372	(1)	331	20

[1] Infested total: 4 trucks, 22 cars, 4 barges, 1 piece, 3 lots, and 10 bundles.

TABLE 4.—*Stone and quarry products certified under gypsy moth quarantine, fiscal year 1934*

Material	Barge loads	Barrels	Boxes	Carloads	Crates	Pieces	Truck loads	Products found infested	Gypsy moths found: Egg clusters	Gypsy moths found: Larvae and pupae
Crushed rock	0	0	2	1,322	0	0	5		0	0
Curbing	0	0	0	47	0	10	0	2 cars	0	80
Feldspar	0	0	5	74	0	0	0	1 car	1	0
Granite	28	0	92	1,857	425	84,115	546	26 cars	185	0
								3 pieces	2	1
Grout	42	0	0	139	0	49	0	1 car	0	1
Marble	0	0	10,168	611	22,117	3,382	4		0	0
Paving	2	0	0	676	0	0	0	9 cars	6	26
Miscellaneous	0	11	347	18	26	121	63	1 car	2	0
Total	72	11	10,614	4,744	22,568	87,677	618	40 cars	[1] 196	108
								3 pieces		

[1] This does not include 48 egg clusters found on cleating and blocking used to secure granite on cars. In addition, 17 adult brown-tail moths were found on a carload of granite.

Snow, high winds, subzero temperatures, and impassable roads were responsible for a decrease in the quantity of material inspected throughout the regulated areas during February and March. Nursery shipments were completely suspended, and all activities in wood lots and quarries were either discontinued or greatly curtailed until the weather moderated in April.

Nursery stock certified for movement from the regulated areas totaled 80 carloads, 1,683 truck loads, and 27,700 individual containers. In the course of the inspection of this stock, 9 gypsy moth egg clusters and 5 larvae were removed from 3 carloads, 2 truck loads, and 4 individual shipments.

Permits were issued for the movement of 3,467 individual or bulk lots of quarantined products brought into the regulated areas for reshipment to noninfested territory. Two hundred and sixty-three firms or individuals dealing in products manufactured, processed, or stored in a manner to eliminate all possible infestation, shipped under permit during the fiscal year 30,939 bulk or individual lots of restricted materials.

All the spare time of inspectors not occupied in actual inspection and certification was utilized in infestation surveys in the vicinity of nurseries and tourist camps in their respective districts. Inspections were made of 443 camps. Gypsy moth infestations were observed in 137 of these camps, and winter webs of the brown-tail moth were found in 41 camps. The necessity for the destruction of the infestation was called to the attention of the manager of each infested property.

SCOUTING IN LIGHTLY INFESTED AREA

Late in May, six temporary inspectors made a rough field survey of towns in the lightly infested area of Maine adjacent to the generally infested section of the State. An average of 12 hours' scouting was performed in each of 46 towns. Large numbers of egg clusters were noted in a strip of territory approximately three towns wide, north of the generally infested zone of Maine.

ROAD PATROL

Road-patrol operation on the principal exit highways leading from the lightly infested area of Connecticut began on April 14. Permanent stations on the Boston Post Road and the principal entrance highway to New Haven from Hartford and Meriden, were supplemented by two mobile patrols covering a total of 8 less-frequented highways. These line stations were discontinued on May 26. The principal westbound-exit highways were thus guarded during the peak of the 1934 spring nursery-shipping season. While the road-inspection work was in progress, inspections were made of 13,992 vehicles, 1,341 of which were found to be transporting uncertified quarantined products.

VIOLATIONS

Through personal visits by district inspectors or correspondence with the consignors and agents of the common carriers involved, investigations were made of 230 apparent violations of the gypsy moth and brown-tail moth quarantine intercepted by transit inspectors of the Department. A few of the violations occurred through unintentional carelessness on the part of a commercial shipper. Approximately two-thirds of the uncertified shipments were made by private individuals who were uninformed of the requirements for certification. In the absence of evidence of deliberate attempts to evade the inspection requirements, no legal action was instituted in any of the cases investigated.

JAPANESE BEETLE QUARANTINE AND CONTROL

CONDITIONS OF INFESTATION

Marked deficiencies in rainfall during June and July 1932, contributed to notable reductions in the 1933 populations of adult Japanese beetles (*Popillia japonica* Newm.) in some heavily infested sections. Similar unfavorable climatic conditions were factors in the disappearance of many small isolated infestations determined in 1932, and in the reduced numbers in which adults reappeared in other scattered infestations.

In the formerly heavily infested section of Philadelphia the reduction in beetle population was pronounced. Reduced infestation from the swarm conditions of former years was also apparent in various sections of the continuously infested territory in east-central New Jersey. Intense foliage damage was found in a large part of southern New Jersey, in a localized east-and-west band across the

State north of Trenton, in the Philadelphia suburban sections, and throughout the extreme northern river-front section of Delaware. Lack of rainfall during those months of 1932 when oviposition was taking place and the larvae for the 1933 beetle population were hatching was largely responsible for the moderated flight. A number of 1932 first-record infestations at which only a few beetles had been collected did not recur. Climatic factors were probably responsible for these reductions, as well as for those in the densely infested zone. In Cleveland, Ohio, where a 1932 infestation of nine beetles failed to reappear in 1933, there had been notable deficiency in rainfall during July 1932. In Virginia, the disappearance of 4 small, isolated infestations and distinct decreases in 4 others corresponded with unusually dry weather in the State during June and July 1932. In Portland, Maine, however, where 11 beetles were captured in 1932 and 52 in 1933, there was an excess of precipitation during July and August 1932, when the grubs were hatching. The survival of the infestation in Portland and the collection of 139 beetles at an apparently established infestation at Waterville, in the same State, indicate that the insect is capable of overwintering in latitudes of this country where the winters are severe and the growing seasons short.

Surveys in nonquarantined States showed no wide-spread dissemination of the insect during 1933. Traps operated in the summer of 1933 totaled 52,000. These were distributed in 451 nonregulated communities. Traps were already in operation at the beginning of the fiscal year at 52 points in South Carolina, 61 localities in North Carolina, 26 towns and cities in West Virginia, and 134 points in Virginia. As the season of probable beetle emergence occurred in the respective States, traps were set at 30 locations in Ohio, 11 cities in Michigan, and 15 cities in Maine. In nonregulated portions of States already partially infested, traps were maintained in 64 communities in Maryland, 9 Pennsylvania cities, 32 New York locations, 10 Vermont cities, and 7 New Hampshire localities. In small communities as few as 10 traps were placed, while from 396 to 814 traps were scattered throughout sizable cities. In larger cities traps were usually operated for a period of 60 days. In smaller communities traps were lifted at the end of 30 days, unless beetles were still being caught. The removal of the late-operated traps in the New England States was completed by the middle of October. The season's captures totaled 724 beetles, trapped in 87 communities. Infestations had been found during 1932 in 28 of these communities.

Only two important first-record infestations that appear to be established were discovered in 1933. A large number of small infestations were disclosed that were possibly of stray beetles carried to the isolated points during the current year. The ability of traps to disclose the presence of even a stray specimen has been clearly demonstrated. Positive trap catches were made in Augusta, Biddeford, Portland, and Waterville, Maine; 25 communities in Maryland; Detroit, Mich.; Woodsville, N. H.; 13 New York cities and towns; 15 localities in North Carolina; Canton, Columbus, Washington Court House, and Youngstown, Ohio; Erie and Warren, Pa.; Florence and Greenville, S. C.; Burlington, Vt.; 15 Virginia towns and cities; and Clarksburg, Fairmont, Keyser, and Princeton, W. Va. Of these 87 new or recurring isolated infestations, 75 yielded fewer than 9 beetles each. At 40 of them it was possible to trap only a single beetle each. From 2 to 8 beetles were caught at each of 35 additional infestations. The only points in nonregulated territory at which 10 or more beetles were trapped during 1933 were Erie, Pa.; Waterville and Portland, Maine; Salamanca, N. Y.; Keyser, W. Va.; and Berwyn, Bethesda, Bladensburg, Chevy Chase, Hyattsville, Riverdale, and Silver Spring, Md. The trap catches ranged from 10 beetles in Berwyn, Md., to 167 beetles in Erie, Pa.

Of the 59 first-record finds in nonregulated sections, only 2, those at Waterville, Maine, and Keyser, W. Va., represent unquestionably established infestations. These two infestations were also the only new ones found at any considerable distance from the zone of continuous infestation. All other newly found infestations consisted of from 1 to 12 beetles each. Ten of these fifty-nine localities had been trapped, with negative results, in 1932. First-record infestations yielding the most beetles were Waterville, Maine, 139; Keyser, W. Va., 25; Bladensburg, Md., 35; Hyattsville, Md., 31; Riverdale, Md., 24; Silver Spring, Md., 18; and Berwyn, Md., 10.

Comparative results of this season's trapping activities in 45 infested towns and cities located outside the 1933 regulated zones show that 9 of these infestations, ranging from 1 to 11 beetles each in 1932, showed negligible increases in 1933 to a range of from 3 to 52 specimens. The largest comparative increase was from 11 to 52 beetles in Portland, Maine. An additional 19 isolated infestations found in 1932 showed an equal or reduced carry-over in 1933. Exclusive of Erie,

Pa., these 19 infestations ranged from 1 to 24 beeties in 1932. In 1933, none of them yielded more than 12 beetles. In the city of Erie the number of beetles decreased from 282 in 1932 to 167 in 1933. Negative results in 1933 trapping activities showed that 15 isolated infestations found in 1932 in Maine, Maryland, New York, Ohio, Virginia, and West Virginia, ranging from 1 to 11 beetles each, failed to persist.

It was possible to carry on such an extensive trapping campaign this year only through the use of welfare labor supplied by State and county relief organizations. Practically all trap inspectors employed in West Virginia, Pennsylvania, Ohio, Michigan, New York, New Hampshire, and Vermont were men paid from unemployment-relief funds. Many of these were part-time workers. At the end of August 180 men furnished by emergency-relief boards were employed on various phases of quarantine and control activities. Their employment permitted the utilization of the Bureau's entire trap supply and made possible trap survey work in sections where otherwise these activities would have been abandoned because of insufficient funds. Trap inspectors and foremen in Maine were paid from State funds. Throughout the winter the entire supply of traps was completely renovated, repainted with aluminum paint, and packed in specially constructed wooden boxes for distribution. Comparative tests have disclosed little difference in the catches in traps painted with the standard green-and-white combination and those painted with aluminum. The aluminum protective coating was applied in the interests of economy and durability. The reconditioning of Japanese beetle traps was a Civil Works Administration project which employed 10 men.

Arrangements were made for the construction by a Pennsylvania manufacturer of 500 Japanese beetle traps for the Canadian Department of Agriculture. Since trapping activities in 1932 disclosed a small infestation in Niagara Falls, N. Y., it is the intention of the Canadian authorities to distribute these traps in 1934 on the Niagara Peninsula. In view of the proximity of the insect to the Canadian border, the Dominion Entomological Branch desires to take precautionary measures to forestall the establishment of the insect in Canada.

Despite subzero weather early in February throughout most of the regulated territory, soil temperatures in the zone did not drop below 27° F., whereas ground temperatures of from 10° to 20° are required to freeze large numbers of grubs. The frigid temperatures therefore had no appreciable effect on the grub population.

Trapping activities under way at the end of the fiscal year included traps set in 38 Virginia localities, 2 cities in West Virginia, and 44 Maryland communities, in addition to 800 traps distributed in St. Louis, Mo.

Early in 1934, through the State plant officer of Missouri, a report was received that specimens of the Japanese beetle had been collected in St. Louis by amateur entomologists in both 1932 and 1933. The collection of the insect in the southern section of St. Louis in the summer of 1932 first came to the attention of the State plant officer in March 1933. A few additional specimens were collected in the same locality in June 1933. Subsequent to the latter find, a State inspector applied a small quantity of lead arsenate to the yard in which the beetles had been taken. Information concerning the 2 years' recovery of the insect was not conveyed to the Bureau of Plant Quarantine until February 7, 1934. Results of the early season trapping in 1934 in St. Louis indicate that the delay in suppressing this infestation has permitted the insect to establish a scattered infestation over a rather extensive section of the city, approximately 30 blocks southwest of the union station. Traps set in and surrounding the reported center of infestation resulted in the collection between June 22 and June 30, 1934, of 513 beetles in an area comprising 83 contiguous blocks. Many additional beetles were captured in the city as the trapping program continued into the next fiscal year. Inspectors for the St. Louis traps were employed by the Missouri Department of Agriculture. Welfare labor was also supplied by the city of St. Louis to assist in the trap work. There had been no additional first-record infestations determined in nonregulated territory at the end of the fiscal year, except the findings at St. Louis and a small infestation at Upper Marlboro, Md.

RESULTS OF CONTROL WORK IN PREVIOUS YEARS

There was no recurrence in 1933 of the infestation in the sections of Richmond, Va., that were treated with arsenate of lead in the fall of 1931. In 1931, 15 beetles were caught. Last year 88 beetles were trapped, and this year 16 beetles were collected in the city. Although a number of the 1933 findings were made

in the vicinity of the treated blocks, all trapping in the poisoned sections gave negative results.

Sections in which 8 beetles were caught in Detroit, Mich., in 1932 were treated with lead arsenate in September of that year. During 1933, 1,000 traps distributed throughout Detroit caught 4 beetles, none of which were trapped in the treated areas. Three of the specimens were caught in the vicinity of the Michigan Central Railroad. A single beetle was found in a city park approximately 4 miles distant from other findings. Trap activities in Detroit were supplemented by the city's spraying sections in which infestations had previously been found. The spraying operations began on July 25. A total of 535 trees and a large number of shrubs were covered with the spray. A quarter of a ton of coated arsenate of lead was applied to the two sprayed sections of the city.

There was no carry-over from the infestation of two beetles trapped in Florence, S. C., in 1932, and treated in the fall of that year with lead arsenate furnished by the State of South Carolina. Although a single beetle was trapped in 1933 in Florence, it was taken at a considerable distance from the previous year's find.

Excellent control has been obtained at established infestations in Erie, Pa., where intensive eradication measures have been practiced during the past 2 years. During 1931, 170 beetles were collected in 4 adjacent city blocks in the residential section near the city park. In the fall of 1931, 32 acres in and surrounding the infested premises were treated with arsenate of lead at the rate of 500 pounds per acre. This dosage did not give satisfactory control, for in 1932, 270 beetles were trapped in this treated area. Twelve beetles were also caught outside the poisoned section. The 1932 trap work was supplemented by repeated applications of an attractive poisonous spray to all foliage in the infested sections. Following the disappearance of the adult beetle in 1932, additional applications of lead arsenate were made to the original centers of infestation, to other adjacent small infestations, and to two infestations of a few beetles each at some distance from the sections previously treated. The 1932 treatments involved the application of 11.2 tons of soil insecticide to 40.6 acres. Yards that appeared to be centers of infestation were treated at the rate of 750 pounds per acre in addition to the previous application of 500 pounds per acre. The remainder of the treated sections was dosed at the rate of 500 pounds of poison per acre. Three premises and adjacent properties, near the original infestation, on which single beetles were trapped in 1932, received treatment at the rate of 1,000 pounds per acre. This rate was also used in treating an isolated infestation of 5 beetles. Early in July 1933 coated arsenate of lead was sprayed on the foliage in 34 residential blocks in which beetles were trapped in 1932. Small cages from which attractive liquid bait was vaporized were hung in the principal sprayed host plants to attract the beetles and to induce feeding on the poisoned foliage. During the summer of 1933, 1,282 traps were concentrated in Erie, with the result that 167 beetles were caught. Only 10 of these were trapped in sections where the soil had previously been treated with lead arsenate. Only a single beetle was caught in a yard where 151 beetles were trapped in 1932. In the most heavily infested block, the catch was reduced from 200 beetles to 6. Traps in the latter area were baited with both bran and liquid bait to ensure the catch of all beetles present. As new infestations were disclosed, soil treatments with lead arsenate were made at the rate of 1,000 pounds per acre. The 1933 soil treatments covered an area of 55 acres.

REGULATORY CHANGES

Subsequent to a public hearing held on October 24, 1933, for a discussion of the advisability of extending the quarantine to include the States of Maine and West Virginia, parts of these two States were brought under restriction, and boundaries of the regulated zones in Maryland, New York, and Virginia were slightly modified. In Maine the section placed under regulation includes sufficient territory to make a continuous area from the New Hampshire line to and including the city of Portland. Waterville, Maine, was included as a detached regulated zone. Along with the addition to the restricted zone of the town of Keyser, W. Va., sufficient Maryland territory was added to form a continuous strip from the previously regulated zone in the Cumberland, Md., district to the West Virginia line adjacent to Keyser. One West Virginia district south of Cumberland also was added to facilitate quarantine enforcement. In Maryland several sections were added to bring under regulation a number of infestations in localities suburban to the District of Columbia. An additional magisterial district in Henrico County, Va., was added for the purpose of including an infested nursery in that subdivision. The remainder of Norfolk County, Va.,

was placed under regulation. By the inclusion of two towns in Cattaraugus County, N. Y., a small area was added to connect the infested city of Salamanca with the main regulated zone in Pennsylvania.

Except for the extension of the regulated territory, there were few important changes in the twelfth revision of the quarantine regulations effective December 1, 1933. The territory from which quarantined fruits and vegetables may be shipped without certification and to which similar articles may not be moved without certification from the remainder of the regulated territory, was extended to include the isolated areas of Waterville, Maine, and Henrico County, Va. Slight modifications were also effected to exempt certain commodities not subject to infestation and to simplify the certification procedure on lot freight shipments.

CERTIFICATION AND TREATMENT OF NURSERY AND GREENHOUSE STOCK

Nursery and greenhouse scouting, begun in Virginia, Maryland, and Delaware in May 1932, was extended on July 1, 1933, to classified establishments in New Jersey and Pennsylvania. In Connecticut and northern New York, crews started scouting on July 10. Such scouting began in southern New York and on Long Island on July 17. In New Hampshire, Vermont, Massachusetts, and Rhode Island the work was organized from July 19 to 24. The examination of classified premises in Delaware, Maryland, and Virginia was completed shortly after the middle of August. Similar work in Pennsylvania, New Jersey, and the more northern quarantined States was concluded early in September. As a result of the 1933 scouting of 1,978 theretofore uninfested nurseries and greenhouses, infestations were discovered in 133 property units. There are now 2,376 regular shippers who comply with the requirements for maintaining a classified status under the regulations. The premises of 604 of these are infested, and special safeguards are required before shipments from them are allowed. This is a net increase of 117 infested classified establishments for the year.

Establishments added to the classified list as a result of the extension of regulated territory effective December 1, 1933, number 33. Of this total 3 are located in West Virginia, 2 in Virginia, 19 in Maryland, 3 in New York, and 6 in Maine.

With moderate weather conditions prevailing until late in the fall of 1933, nursery stock continued to move under certification until the end of November. Ordinarily it is not possible to dig this material much after the latter part of October. Severe winter weather, with heavy snows and subzero temperatures, caused a virtual suspension of nursery activities during February. Even shipments from greenhouses were not considered safe. In nurseries it was impossible to dig stock from the frozen ground. Until the latter part of March, continued frost in the ground further delayed spring nursery shipping. When the weather at last permitted the ground to thaw and dry enough for lifting stock there was an immediate and heavy demand for the inspection and certification of large quantities of plant material to be moved to nonregulated territory. During the February and March lull in nursery and greenhouse inspection, a number of inspectors assisted in transit-inspection work. These men were stationed in New Haven, Conn., Alexandria, Va., Washington, D. C., New York City, Philadelphia, and Pittsburgh. Replacements of winter-killed stock materially stimulated the 1934 spring nursery trade. Stocks of stored, dormant roses were early exhausted. Volumes of sales increased over 1933, resulting in greater demands for inspection and certification. Although the movement of nursery stock was necessarily delayed early in 1934, the spring shipping season was in some sections prolonged until late in May, an unusually late date for such stock to be moved.

A Japanese beetle shipper's guide, containing a digest of the regulations and a list of all cities and towns within the regulated zones, was again prepared and forwarded during December to the approximately 15,000 shippers and agents of common carriers on the Bureau's mailing list.

Joint-certificate stamps which may be used to certify products under the Japanese beetle and/or gypsy moth quarantines were issued to inspectors early in January.

Carload fumigation of sand and soil has been considerably simplified by the use of an injector constructed by the treating division of the project. By means of this device, the correct dosage of carbon disulphide is quickly drawn into a tube by suction. The injector is then pushed into the soil or sand to the required depth and the liquid discharged.

Analyses of soil samples from 413 nursery plots, 271 coldframes, and 17 heeling-in areas were completed by the Technological Division in May. These 701 treated units are scattered throughout 18 nurseries in New York and Pennsyl-

vania. The nursery area from which the soil samples were collected aggregates 113.6 acres. Of this acreage, 39.6 acres required the addition of approximately 6.5 tons of lead arsenate to bring the concentration up to the required dosage of 1,500 pounds of the poison in the upper 3 inches of surface soil throughout the areas. Totals of 217 nursery plots, 227 frames, and 6 heeling-in plots were found to contain lead arsenate equaling or exceeding the required amount. The renewal of the lead arsenate concentration in all nursery plots containing growing plants was accomplished by the end of the fiscal year. On May 31 all chemical apparatus and reagents were transferred from the technological laboratory at White Horse, N. J., to the Japanese beetle research laboratory of the Bureau of Entomology at Moorestown. The State-owned White Horse laboratory was reconditioned for occupancy by the New Jersey Department of Agriculture.

Instructions to Inspectors on the Treatment of Nursery Products, Fruits, Vegetables, and Soil, for the Japanese Beetle was issued on March 14, 1934, as B. P. Q.–359. This 17-page mimeographed circular replaces P. Q. C. A.–224, dated April 16, 1929, and 7 supplements issued later. These instructions now assemble in a single manual complete details of all types of treatments currently employed as a basis of quarantine certification under the regulations.

CERTIFICATION OF FRUITS, VEGETABLES, AND CUT FLOWERS

For the first time since 1923 it was possible to maintain a continuous 24-hour fruit and vegetable inspection service in the Philadelphia market district from June 15, the effective date of the seasonal quarantine on these commodities, until the restrictions were lifted. The fumigation of bananas loaded at wharves on the Philadelphia water front was also unnecessary. In the Philadelphia market and water-front districts where formerly there have been dense flights of the insect, the adults in 1933 were present in greatly reduced numbers. It was still possible to find beetles in fair quantities in these sections, but swarming did not occur.

Advantageous prices in Chicago, St. Louis, Detroit, Indianapolis, Cleveland, and Cincinnati for string and lima beans grown in southern and central New Jersey and eastern Pennsylvania occasioned an unprecedented demand for the inspection and certification of these commodities. The midwestern drought of 1933 and the large influx of visitors to the Century of Progress Exposition at Chicago probably created the great demand for eastern-grown beans. Speedy inspection of the large quantities of beans examined was accomplished through the use of 22 mechanical bean-inspecting machines. The largest number of beetles separated from a single consignment consisted of 430 specimens removed from a carload of 667 bushels of string beans consigned from Morrisville, Pa., to Chicago. During the height of the bean inspection there was a differential of $0.95 per bushel between the price obtained in the midwestern markets and that received on the New York market. Approximately 9,900 beetles were removed from the machine-inspected beans.

Observations in sections from which quarantined fruits and vegetables were being certified showed that adult-beetle flight had, by the middle of September, subsided enough to justify the removal of the restrictions on these two items. Accordingly, the seasonal restrictions on the movement of fruits and vegetables were lifted, effective on and after September 15. Restrictions on the movement of cut flowers were allowed to remain in effect until October 15. Inspectors in the Philadelphia wholesale cut-flower market found adult beetles in cut flowers as late as October 5.

VEHICULAR INSPECTION

Already established for approximately 3 months at the beginning of the fiscal year, 25 vehicular inspection stations continued in operation on the borders of the regulated territory in Virginia, and along the Maryland-West Virginia, Pennsylvania-West Virginia, and Pennsylvania-Ohio State lines. A roving patrol of Pennsylvania inspectors continued to check traffic on exit highways leading into the nonregulated territory in the northwestern part of the State. The 4 State-employed inspectors comprising a mobile patrol on highways at the boundary of the regulated zone in northwestern New York continued their schedules on 10 roads until October 16. At the end of October the personnel at the remaining posts was reduced from 53 to 42 men. Ten of the remaining inspectors were relief workers, supplied through the Pennsylvania Emergency Relief organization. Closing of the remaining 31 stations was accomplished from November 9 to 15.

Road patrol for 1934 was begun on March 27 with the establishment of two posts in Virginia. Additional stations were opened shortly thereafter. By the

end of April there were in operation 7 posts in Virginia, 2 posts on the Maryland-West Virginia State line, 1 post in West Virginia, and 7 posts on the Pennsylvania-West Virginia and Pennsylvania-Ohio State lines. On the border of the regulated zone in northwestern Pennsylvania there were 3 established posts operated by 1 inspector each, with 2 additional inspectors supplied with cars guarding 8 other exit highways in that section.

Fumigated soil was kept on hand at all road posts. This permitted the removal of soil from uncertified stock, the replacement of the possibly infested soil with treated soil, and the certification of the plant material at the post. Consequently, the private motorist transporting a few plants was not obliged to surrender his uncertified material or return it to a designated inspection center for certification. This procedure reduced to a minimum the quantities of quarantined products surrendered at the road posts. Statistics covering the fiscal year's operation of the road patrol showed that 2,768,060 vehicles stopped at the posts. Of these, 18,959 were found to be carrying uncertified quarantined material. In the course of the examination of soil removed from articles inspected at the road stations, 112 Japanese beetle larvae were collected.

SURVEY OF DAMAGE IN HEAVILY INFESTED SECTIONS

The canvassing of farmers, estate owners, city residents, and superintendents of golf courses, parks, and cemeteries was undertaken in 1933 to determine expenditures for control of the Japanese beetle and actual losses from crop destruction by the insect. Two men were assigned to this work during July and August. Supplemental survey work was performed by regular New Jersey and Pennsylvania personnel as their seasonal inspection duties permitted. The survey was designed to procure signed statements from individuals showing definite and accurate losses and control costs. Interviews and correspondence were confined to individuals in the area of continuous Japanese beetle damage. Conditions representative of the degree of injury to be found rather generally throughout the entire zone of continuous damage were selected. Information concerning extreme localized injury by the insect was discarded. Indefinite or questionable data were also omitted from the final tabulations. Twenty-nine golf clubs reported average annual expenditures of $618 per course for the control of Japanese beetle grubs. These courses reported total expenditures for this purpose of $60,000 over a period of years. The yearly total cost of trapping, spraying, and sod treatment on 19 private estates averaged $513 per estate. Average annual expenditures of $225 per unit were reported by superintendents of 11 cemeteries, parks, and community-spraying organizations. In the city-block canvass, inquiries were made of all residents in 4 blocks each in Philadelphia and Trenton, 2 blocks in Princeton, N. J., and 1 block in Lawrenceville, N. J. These blocks were selected at random. Expenditures by individual property owners in these blocks averaged $2.50 per year. Annual expenditures per block were $62.80. Nineteen growers, whose field corn plantings totaled 511 acres, submitted statements showing that their corn crop was injured from 3.5 to 80 percent. Their cash losses totaled $2,540, or an average of approximately $5 per acre. Thirteen sweet corn growers with 195 acres of this crop reported crop losses through beetle injury averaging 35 percent. The average loss per acre was approximately $17.50. Commercial orchardists whose holdings include 37,000 bearing apple trees reported an average fruit injury of 43 percent on 6,300 apple trees of the varieties susceptible to beetle injury. Crop loss from this injury amounted to $12,200. Eleven of the 13 reporting orchardists applied sprays specifically for Japanese beetle control at a total cost of $700. The average apple injury per acre was $123. The average control cost per acre was $7.15. Commercial peach orchards covered in the survey include 10,600 trees of the varieties particularly subject to Japanese beetle injury. The normal yield of these varieties was reduced 27 percent, resulting in loss of sale of 9,100 bushels valued at $12,500. Ten of the 18 orchardists attempted spray control at a total cost of $712. This was an average injury per acre of $154, plus an average per-acre expenditure for control of $8.80. The survey also extended to 28 farms, comprising 3,480 acres. The total crop damage on these farms amounted to $6,130, or an average of $219 per farm. This was an average per-acre loss of $1.76. The canvass also included cost of control and crop losses by growers of grapes, raspberries, strawberries, blueberries, and greenhouse-grown roses. As a result of the canvass, there is now available an abundance of reliable evidence concerning the extent of Japanese beetle injury to various crops, together with accurate costs of protecting susceptible plants from adult and larval attack.

OCEAN AND BAY FLOTATIONS

One unusual occurrence observed for the first time in 1933 was a large flotation of Japanese beetles in Delaware Bay, and another in Raritan Bay and the Atlantic Ocean at Staten Island and Long Island. When first observed, quantities of beetles were being washed in with the tide at a beach near Delaware City, Del. Quite an infestation was observed feeding on nearby foliage. Beetles were later found washed up on Woodland Beach in lower Delaware. Most of the beetles were dead when washed ashore, but a goodly number of the survivors recovered and began feeding. Six Delaware-owned traps placed at Reedy Point Bridge caught 3.5 quarts of beetles in 2 weeks, and 18 traps set at Woodland Beach collected 7.5 quarts. Beetles in considerable quantities were washed ashore along Delaware Bay from Delaware City south to Kitts Hammock, a stretch of about 40 miles. Sections adjoining this coastal area are important agricultural sections of the State. A still heavier flotation was observed in Raritan Bay between New Jersey and Staten Island, N. Y. Large numbers of the beetles were washed up along the shore near Princess Bay, on the southwestern shore line of Staten Island. A large number of beetles could be picked up for a distance of several miles. About 25 percent of them were able to crawl. Further evidences of beetle flotation were noted along the southern shore of Long Island. A distinct line of Japanese beetles along the beach at high tide was observed on Long Beach. It was estimated that there was an average of 100 dead beetles per yard along the high-tide line. Nearly the same number of beetles was found at Point Lookout, 10 miles farther east. Examination of 10 miles of shore line at Jones Beach disclosed beetles remaining from the high tide of the previous day. At the easternmost point examined, the number of beetles decreased to an average of approximately 1 per inch. This would indicate an eastward drift of beetles for at least 60 miles from the heavily infested sections of New Jersey and Staten Island. From 5 million to 10 million beetles were washed ashore along the 60-mile stretch from the eastern point of Long Island to the Suffolk County line.

STATE AND COMMUNITY CONTROL ACTIVITIES FOR BEETLE-POPULATION REDUCTION

Early in the summer of 1933 sprays of coated lead arsenate were applied to foliage in the heavily infested sections of Laurel, Elkton, and Colgate, Md. Bait-dispensing cages were also distributed in these localities. This work was performed in cooperation with the Maryland State Horticultural Department. Sixty-two hundred traps were also distributed in 38 Maryland localities of known infestation within the regulated zone for the purpose of reducing beetle population. These traps caught over 1,400,000 beetles. One million one hundred thousand of this total were trapped at an open-field infestation near Elkton. The State of Delaware operated 814 State-owned traps at 17 points, and made catches totaling 164,000 beetles.

This year's suppression campaign carried on by the New Jersey Department of Agriculture involved the use of 980 traps, each having a 40-quart container, and 300 standard-sized traps. These were distributed to 150 farmers, whose catches totaled over 47 tons of beetles. In New Jersey favorable trapping weather was limited to less than 3 weeks, between July 1 and 9 and July 17 and 25. During 3 days in the first week in July, 6 large-sized traps captured 65 gallons of beetles. Also in New Jersey, 700 State-owned traps were used in determining degrees of infestation in 15 towns and around several lakes in the northern counties of the State.

The Rhode Island Department of Agriculture also set out 807 State-owned traps in 6 cities. Trap and hand collections were made totaling 45,000 beetles. Three hundred and sixty-three Connecticut-owned traps were operated in Middletown, Manchester, Putnam, and Winsted. These traps captured 147 beetles.

In cooperation with the State authorities of Virginia, 2,057 traps were operated in 8 previously infested cities in the regulated area. These traps caught approximately 39,000 beetles. The operation of traps for beetle-population reduction in the District of Columbia resulted in catches of over 315,000 beetles.

Active campaigns designed to reduce Japanese beetle populations to a minimum were sponsored during the summer of 1933 by a number of civic organizations and municipal officials in Barrington, Hackensack, Manville, Perth Amboy, Spotswood, and Woodbridge, N. J., and Mount Vernon, N. Y.

Large-sized Japanese beetle traps were sold by a committee of the New Jersey Board of Agriculture at $1.50 each to 510 purchasers throughout New Jersey and in Norfolk and Richmond, Va.; West Grove and Allentown, Pa.; Bronxville, N. Y.; and Stamford, Conn. Traps of the type sold were not available through regular commercial channels.

INFORMATIONAL ACTIVITIES

Four reels of motion pictures depicting Japanese beetle quarantine and control work were released early in November. Two reels are entitled, "Methods of Control." The other two reels portray life history, damage, and spread. These have been shown before a number of audiences this year.

Sectioned Japanese beetle traps were displayed at the Pennsylvania farm show in Harrisburg from January 15 to 19 and at the New Jersey agricultural fair held at Trenton, N. J., from January 23 to 27.

Twenty-six photographs showing various phases of quarantine activities, together with suggested titles for the pictures, were furnished to the university extension division of the University of Wisconsin. These photographs were made into lantern slides for use in a set of educational pictures for distribution to the schools and colleges in the State. In addition, a set of selected photographs illustrating typical plant-quarantine situations was furnished to a publisher of school textbooks in Newark, N. J., for use in illustrating a general science textbook. Literature concerning the insect has been furnished to numerous schools and museums for the use of students interested in insect study.

CERTIFICATES ISSUED, VIOLATIONS INVESTIGATED, AND PROSECUTIONS INSTITUTED

Certificates of all types issued during the 12-month period total 526,504.

Listed in table 5 are the quarantined articles fumigated or sterilized during the fiscal year. These articles were intended for shipment from the regulated territory or for use in certified greenhouses or as surface soil in nursery plots, heeling-in, or plunging areas.

TABLE 5.—*Materials fumigated or sterilized under Japanese beetle quarantine regulations, fiscal year 1934*

Material treated	Treated with—			
	Arsenate of lead	Carbon disulphide gas or emulsion	Naphthalene	Steam
Plants—number	33,850			
Potting soil—cubic yards	15	2,189	17	949
Mushroom soil—do		142		
Manure—do		3		19
Leaf mold—do		2		
Sand—do		1,681		17
Surface soil—square feet	94,656	8,500	17,098	
Surface soil with plants—do	128,433			
Berries—crates		2,388		

Nursery and ornamental stock, sand, soil, earth, peat, compost, and manure were certified for shipment from infested premises within the regulated zones during the fiscal year in the following quantities:

Plants	number	19,616,209
Sand, earth, and clay	carloads	6,654
Peat	do	57
Manure and compost	do	163

A total of 171,348 shipments not individually recorded as to contents proceeded under certification from nursery premises determined as uninfested. In addition, 53,683,940 plants were certified for movement between classified dealers within the regulated territory.

Fruits, vegetables, moss, and cut flowers certified during the seasonal quarantine on these articles were as follows:

Fruits and vegetables	packages	3,030,788
Sphagnum moss	bales	2,616
Cut flowers	packages	48,031

Violations reported from all sources during the fiscal year numbered 1,101. Apparent violations on the part of private individuals were investigated by letter. Where necessary, all shippers of uncertified material were furnished with quaran-

tine literature and informed of the quarantine official through whom future certification might be obtained. Irregularities on the part of express and freight agents were investigated through the general managers of the common carriers. Of these violations, three were considered so deliberate and flagrant as to justify prosecution in the United States district courts. Two of these prosecutions were pending at the end of the fiscal year.

COOPERATIVE FINANCING

Effective cooperation in quarantine enforcement and suppressive measures was supplied by infested States. Finances for joint activities were made available during the year by Connecticut, Delaware, Maine, Maryland, Massachusetts, New Jersey, New York, Pennsylvania, Rhode Island, and Virginia. Officials of the Michigan Department of Agriculture and the Detroit Department of Parks cooperated in measures to combat the infestation in Detroit.

EUROPEAN CORN BORER CERTIFICATION

Federal certification to authorize the movement of restricted commodities to the eight States requiring a certificate issued by a Federal inspector continued with the European corn borer inspection corps already in the field at the beginning of the fiscal year. In June Utah was added to the list of States permitting the entry of certain likely carriers of the corn borer (*Pyrausta nubilalis* Hbn.) when accompanied by a Federal certificate. States imposing similar requirements during the entire year were Arizona, California, Colorado, Georgia, Louisiana, Nevada, and Oregon. In the course of the year corn borer inspectors issued Federal certificates covering 10,418 shipments of restricted commodities. The value of articles certified is conservatively estimated at over $100,000. Owing to a general decline in fall trade among dealers in quarantined material, demands for certification during the fall and winter were at a minimum. In April there began a distinct upward trend in the movement of plant material and farm products requiring inspection, resulting in the certification during the last quarterly period of over 80 percent of the year's volume of inspections. Of the total number of shipments certified, New Jersey led with 4,300, followed by the Massachusetts-New Hampshire district with 1,471, Pennsylvania with 1,456, and New York with 1,365. The rest of the shipments were distributed throughout the remaining infested States.

In sections of the Japanese beetle regulated territory where the volume of inspection could be handled without interference with the regular routine, Federal inspection and certification to comply with State corn borer quarantines was supplied by the Japanese beetle inspection personnel. The certification requirements in northern New Jersey and Long Island were sufficient to justify the assignment of a full-time corn borer inspector to perform the certification work in that section. Two corn borer inspectors in central New York, and single inspectors in southeastern Connecticut and western Pennsylvania cooperated with the Japanese beetle personnel in joint certification of quarantined commodities. Otherwise, throughout the States quarantined on account of the Japanese beetle, corn borer certification work was performed by the permanent enforcement personnel.

Wherever possible a joint-certificate stamp was impressed on the shipment to cover both quarantines. Insertion of the letters ECB after the numeral 48, representing the Japanese beetle quarantine, was employed to indicate such joint certification. Inspection service in States in the 1-generation corn borer infested zone and outside the Japanese beetle infested territory was performed by five corn borer inspectors. An inspector stationed in Grand Rapids covered most of the State of Michigan outside the environs of Detroit. The work in and near Detroit required that an inspector be stationed in that city. Another inspector with headquarters at Indianapolis made all corn borer inspection within the State of Indiana. Effective inspection throughout the State of Ohio required the services of two inspectors, one working in the northern part and the other in the southern part and in West Virginia.

Few important changes were effected in the State quarantine orders operative at the beginning of the fiscal year. The Arkansas State plant board issued an amended quarantine effective February 3, 1934, rephrasing the State regulations regarding the movement of all classes of restricted articles from the 13 States designated as infested. A revision of the Kansas quarantine in the interests of uniformity with other State quarantines became effective July 1, 1933. The Missouri and Nebraska quarantines were rewritten in the uniform style adopted

by many of the quarantining States. The Missouri quarantine was reissued effective July 10, 1933. The first revision of the Nebraska notice of quarantine was effective January 15, 1934. An Ohio corn borer quarantine against the 2-generation form of the insect was promulgated on July 7, 1933. A revision of the Utah quarantine prohibiting the movement of carriers of the corn borer from infested States was issued August 5, 1933. The Washington State quarantine order pertaining to the corn borer was reissued in the same form on July 11, 1933.

Indiana, Michigan, and Ohio, although infested with the 1-generation form of the borer, uniformly restrict the movement into their boundaries of all classes of quarantined commodities from the New England States, New York, New Jersey, Pennsylvania, and Virginia, these 10 States being designated as infested with the 2-generation form.

There now remain but six uninfested States (Alabama, Delaware, Minnesota, Montana, North Carolina, and North Dakota) which have taken no quarantine action to restrict the movement into their borders of likely carriers of the corn borer.

In June 1934 a representative of the State Board of Agriculture of Utah agreed to accept Federal certification of articles usually eligible for certification under the customary form of State corn borer quarantine. Prior to this administrative action, the Utah quarantine had acted as a complete embargo against the entry into the State of articles designated in the regulatory order. With the Utah embargo restrictions modified, the Wyoming quarantine is now the only State order completely prohibiting the importation into the State of all classes of quarantined articles from States in both the 1-generation and 2-generation zones.

Regulatory measures remained unchanged during the fiscal year as promulgated in the form of notices of quarantine, quarantine orders, proclamations, warnings, rules, and regulations, or revisions, modifications, or amendments thereof, by the States of Arizona, California, Colorado, Florida, Georgia, Idaho, Illinois, Indiana, Iowa, Kansas, Kentucky, Louisiana, Michigan, Mississippi, Nevada, New Mexico, Ohio, Oklahoma, Oregon, South Carolina, South Dakota, Tennessee, Texas, Virginia, Wisconsin, and Wyoming.

Commodities requiring certification for movement from the States uniformly regarded as infested with the 2-generation strain of the corn borer include, in most of the State quarantines, lima beans in the pod; green shell beans in the pod; beets with tops; rhubarb; cut flowers or entire plants of chrysanthemum and aster; and cut flowers or entire plants of gladiolus and dahlia, except the corms and tubers thereof, without stems.

Articles designated in most of the State quarantines as requiring certification from all States commonly designated as infested with either strain of the borer, comprise the stalks, ears, cobs, or other part or debris of corn or broomcorn, sorghums, and Sudan grass, except clean shelled corn and the seeds of broomcorn, sorghum, and Sudan grass.

Growers shipping plant material subject to either State or Federal certification under the State corn borer quarantine orders and regulations have in numerous instances expressed a decided preference for Federal inspection service. Some dealers have stated that Federal certification apparently carries with it a more official recognition of the measures growers take to rid their stock of infestation, and also elicits more interest on the part of the consignee receiving the material. The expeditious service rendered by Federal corn borer inspectors was also cited as facilitating the movement of orders requiring certification.

All State corn borer quarantine orders were reviewed during January and information contained in the quarantines tabulated in the form of a six-page mimeographed shipper's guide showing the requirements for shipments consigned to States having quarantines on account of the borer. Copies of the shipper's guide were distributed to all growers or dealers known to be shipping quarantined commodities from infested States. Later, summaries of the current State quarantine regulations were compiled by the Division of Domestic Plant Quarantines in more detailed form and issued as circular B. P. Q.–346, revised March 15, 1934.

February and March seasonal declines in shipments of articles requiring Federal inspection permitted a number of the inspectors to devote considerable time to transit-inspection work. Only such hours were spent in transit inspection as could be spared without interference with regular inspection duties. Inspectors were thus available for transit inspection in Detroit, Cleveland, Pittsburgh, and New York City. In addition, during the trapping seasons in 1933 and 1934, inspectors engaged exclusively on corn borer inspection work

in Ohio, Indiana, Michigan, and Long Island were temporarily reassigned to supervise some of the trapping activities in nonregulated Japanese beetle territory. This work was in exchange for an equal amount of time devoted to corn borer inspection work by the regular Japanese beetle personnel in Connecticut, New Jersey, and Pennsylvania.

Sweet corn harvested in Rhode Island in July 1933 had from 35 to 75 percent of the ears infested with corn borers, according to the Rhode Island Department of Agriculture. Corn borer infestation was general throughout the State in 1933, although it was more serious where corn was grown in large quantities. The wide-spread infestation was attributed to unusually wet weather in the early spring, which prevented a postponed clean-up of the cornfields and also favored the development of the corn borer larvae. Inspection by State employees of Rhode Island fields where corn was grown in 1933 was begun early in April 1934. Owing to the wet condition of the fields in some parts of the State, the clean-up date was extended from April 20 to May 15.

In Connecticut, the first-generation borers caused considerable damage in early sweet corn, some fields being a total loss. Surveys to ascertain the extent of the 1933 commercial damage done by the corn borer and the approximate borer population in Connecticut were made under the direction of the Connecticut Agricultural Experiment Station from the middle of July until late in October. Thirty-nine farms on which were grown 192.5 acres of early sweet corn were visited. Total damage amounting to $11,320, or an average of $58.80 per acre, was reported. Thirty-seven growers having a total of 32.5 acres of late sweet corn experienced a net loss of $850, or an average of $26.15 per acre. The borer population count, made during October, included the same towns in which a similar survey had been made in 1932. A large increase in borer population was indicated. With the exception of two towns, an average annual increase of 100 percent was observed. The survey was made in sections adjacent to New London, Glastonbury, and Milford. Connecticut's 1934 spring corn borer clean-up, under the supervision of the State Agricultural Experiment Station, began on April 18 and was concluded late in May. Twenty-one men, each equipped with a light truck, were assigned to patrol every road in the State to locate any fields or lots containing cornstalks. A few prosecutions under the Connecticut General Statute were necessary to secure the complete destruction of the stubble and stalks observed in the course of the survey.

There were no scouting activities under Federal supervision for the purpose of determining the absence or presence of the borer in territory outside the previously regulated zones. The only field-inspection work reported to the Bureau was that performed under the auspices of the Wisconsin Department of Agriculture. Specimens of the borer submitted for identification by the Wisconsin authorities indicate that corn borer larvae were recovered during the summer of 1933 in the following townships of the State: Liberty Grove, Sevastopal, and Sturgeon Bay, Door County; West Kewaunee and Carlton, Kewaunee County; Two Rivers, Manitowoc County; Herman, Sheboygan County; Calumet, Fond du Lac County; Germantown, Washington County; Mequon, Ozaukee County; Granville and Milwaukee, Milwaukee County; Caledonia, Racine County; and Somers and Pleasant Prairie, Kenosha County. Infestations previously had been found in Manitowoc, Sheboygan, and Racine Counties; otherwise, the collections represented first-record finds in the respective counties. With the exception of the infestations in Fond du Lac and Washington Counties, all first-record finds were in townships bordering on Lake Michigan, or contiguous to coastal townships. Infestations were discovered in the northernmost and southernmost townships bordering on the lake, indicating a wide range of infestation along the lake front.

PINK BOLLWORM

The release of the Salt River Valley of Arizona from the quarantine enforced to prevent the spread of the pink bollworm (*Pectinophora gossypiella* Saund.), progress in the extermination of the recent Florida outbreak, and the discovery of the insect in Georgia and in additional sections of Florida, New Mexico, and Texas, were the most important developments of the year in the pink bollworm situation. They indicate, on the one hand, the practicability and effectiveness of the suppressive measures now in use for accomplishing eradication, but, on the other hand, the continuous danger of reinfestation from Mexico and other parts of the world.

The new findings involve 1 county in Florida, 3 in Georgia, 2 in New Mexico, and 8 in Texas. As the infestation is light, there is no cause for undue alarm,

because similar infestations in the past have yielded to eradication measures. The pink bollworms are so scarce in these areas that they would probably have remained undiscovered, had it not been for improved methods of detecting them, particularly the use of the gin-trash machine. With this machine new infestations can be found while still exceedingly light, and without the expenditure of unduly large sums. The discovery of such infestations at a very early stage facilitates prompt control.

NEW INFESTATIONS IN GEORGIA AND FLORIDA

On September 18, 1933, two larvae were discovered in gin trash at Enigma, Berrien County, in the southern part of Georgia, and 4 days later another specimen was found in gin trash at Brookfield, Tift County, about 5 miles away. This is the first time the insect has ever been found in the cotton fields in Georgia, and the infestation is very light, as is the case in the other new areas. Immediately after these findings additional inspectors and gin-trash machines were sent to the area, and the State entomologist also placed a number of his men in the field. Gin-trash inspections were continued until the end of the season without any more specimens being found. Field inspections were concentrated in Berrien and Tift Counties, particular attention being given to the area around Enigma. It was not until October 27 that worms were found in the fields, on which date 9 living specimens were taken in a planting 2½ miles south of Enigma. The following day another specimen was taken on an adjoining farm. The field inspections were continued for some time without any additional specimens being found.

The fact that so few specimens were found as a result of the intensive inspections indicates that the infestation is extremely light and that a very small area is involved. This made it advisable to conduct a field clean-up campaign, and all fields within a radius of about 1½ miles of the two infested fields were cleaned during November and the early part of December. The fields were small and scattered, and the work involved only 227 acres, which were cleaned at an average cost of $4.39 per acre.

Shortly after this the Agricultural Adjustment Administration inquired of this Bureau as to the practicability of utilizing the cotton-curtailment program to aid in the control and eradication of the pink bollworm. After some consideration it was decided to eliminate the growing of cotton from the area where field clean-up had been conducted for the 1934 crop season. The farmers involved willingly signed contracts covering the acreage. About four rows of cotton, each 10 feet long, were planted in the two fields where infestation had been found, to see whether or not there would be a recurrence of the infestation. All of the blooms were to be picked daily and, as the cotton had been considerably retarded by rains, only a few had been produced by the close of the fiscal year. These were inspected without any signs of the insect being noted.

On September 22, 1933, one dead larva of the pink bollworm was discovered in gin trash at Madison, Madison County, Fla. This county is west of the area in Florida where infestation was found in 1932, but where no pink bollworms have since been discovered. Intensive gin-trash inspections were carried on in Madison and adjacent counties throughout the remainder of the season without any additional specimens being found. After the discovery of the larvae in gin trash, a considerable amount of field inspection was done in an effort to locate the infested field, but without success.

The measures taken to prevent the spread of the new infestations in Georgia and Florida included, in addition to the cotton-free zone described, primarily the extension of the Federal quarantine to the infested areas, the heat treatment of 91½ tons of seed, and the compression of the lint produced in those areas, the disposal of gin trash, and clean-up of gins and oil mills after the close of the season's operations.

WILD COTTON IN SOUTHERN FLORIDA

The eradication of wild cotton in southern Florida is being undertaken to eliminate a severe pink bollworm infestation which was discovered in 1932. The Cotton Belt of the Southeastern States can never be considered safe from infestation so long as the insect persists in the wild plants on the keys and along the coast.

Because of climatic conditions this eradication work can be carried on only in the fall, winter, and early spring. The work this past season was begun about the first of November, and especially good progress has been made. All of the areas previously cleaned were recleaned, and in addition an original clean-up was

conducted over some 4,000 acres. This is the acreage from which plants were actually removed, and not the total acreage covered, as a very large area had to be scouted to locate the plants. Approximately 375,000 mature and 150,000 seedling plants were removed from the area cleaned for the first time. From the area recleaned approximately 9,500 mature, 1,280,000 seedling, and 110,000 sprout plants were removed. The greater portion of these plants during both the first and second clean-ups was removed from the Cape Sable area. The cotton at Cape Sable is not very accessible, and while the work was being carried on this past season it was necessary for the men to cut some 25 miles of trails so that the laborers could be transported directly to the cotton. It was also necessary to construct a number of bridges over canals. These bridges were made of drift lumber and logs without any expense to the Department, and considerable ingenuity was exhibited by the inspectors in constructing them. Many of the keys in Florida Bay were cleaned for the first time. Most of the cotton remaining to be cleaned is in the Cape Sable area, and some is on keys in Florida Bay. Toward the close of the fiscal year a second recleaning this season was made along the west coast from Naples northward and on the mainland keys over which the highway passes so as to prevent any seedlings from producing fruit before the work can be resumed next fall. Since the clean-up was begun in June 1932 approximately 1,000,000 mature, 250,000,000 seedling, and 130,000 sprout plants have been removed from some 9,500 acres. As an example of the progress being made, it is of interest to note that the first clean-up on Lower Matecumbe Key in 1932 required 114 man-days. Naturally part of this time was devoted to cutting trails through the dense growth to reach the cotton. This key was recleaned in April of this year and required only 26 man-days. A second recleaning was made in June, and this required only 4 man-days. Each time an area is recleaned considerably less time is required, as there is less cotton to be removed and the inspectors know just where it occurs. On the west coast several places where colonies were cleaned last season were found to be entirely free of cotton this season.

Last year some experiments were begun to determine the practicability of destroying wild cotton with poison. It has now been determined that this can be done, but the poisoning treatment alone is rather expensive. Therefore, a combination method has been worked out whereby the poison is applied only to plants growing in rocky places where they cannot easily be grubbed. The most effective method of applying the poison is to cut the plant off, leaving a stump from 3 to 6 inches high. The stump is then lacerated and about half a pint of sodium arsenite solution, in the proportion of 2 pounds of sodium arsenite to a gallon of water, is poured on it. Excellent results are now being obtained with this treatment.

As noted in last year's report, several small experimental plantings of cultivated and wild cotton were left at Chapman Field to avoid any possibility of driving the pink bollworm to some other malvaceous plant. In cooperation with the Bureau of Plant Industry, all fruit from this cotton was removed and inspected. Incidental inspections of *Hibiscus* and okra blooms were also made from time to time. On August 23, 1933, 2 pink bollworm larvae were found in *Hibiscus* blooms, the plant having been identified as *Hibiscus rosa-sinensis*, a hybrid. Immediately after this finding an intensive examination of *Hibiscus* blooms, particularly in the vicinity of Chapman Field, was made, and the examinations were continued from time to time until the close of the year without any more specimens being found. It therefore appears that the above infestation was casual, and that no general infestation exists in *Hibiscus*. The results of the inspection of cotton blooms continued negative until June 19, 1934, when 1 larva was found, followed by 2 on June 21, and 4 additional ones the last week of June. The last finding before this was in March 1933, at which time it was attributed to overwintering larvae in the soil. These later findings, however, indicate that the infestation is now coming from some outside source, and efforts are being made to locate it.

CLEAN-UP IN BIG BEND AREA OF TEXAS CONTINUED

The special control program begun in the Big Bend area last season to reduce the heavy infestation and thereby lessen the danger of spread of the pink bollworm to the main Cotton Belt has been continued. The measures consist of the clean-up of fields and premises after picking is completed, delayed planting the following spring, and the use of trap plots of cotton. As stated in the last annual report, infestation had been found by June 30, 1933, in 47 of the 67 plots and in only 14 of the adjacent fields. These trap plots were continued until the middle of July, at which time the field cotton had reached the same size and fruiting stage

as the plot cotton. Worms had been found in 60 of the trap plots and 37 adjacent fields, indicating that the infestation was building up slowly. This was further borne out by the results of the gin-trash inspection which began the latter part of August. In the first 5 bales ginned an average of 136.6 worms per bale was found, whereas the previous season the first cotton from this same farm contained an average of 1,160.5 worms per bale. Another farm had an average of 336.5 worms per bale in the first cotton of the 1933 crop, whereas the first cotton of the 1932 crop had contained an average of 922 pink bollworms per bale. The infestation continued to increase, and by the end of the season as many worms per bushel were being taken in gin trash as in the 1932 crop. The number of worms found during the two seasons is hardly comparable, however, as floods put an end to gin-trash inspection in 1932. If these floods had not occurred there is very little doubt that a considerably larger number of worms would have been found in the 1932 crop than in the 1933 crop. The actual field damage was considerably less than that in the previous year.

During the 1933 crop season, as the farmers feared another flood, the cotton was picked as fast as it opened, and ginned. This permitted the cleaning of fields early in November, the most heavily infested ones being cleaned first. In Brewster County 130 acres were cleaned, and 3,305 in Presidio County, making a total of 3,435 acres for the area. This was cleaned at an average cost of $3.49 per acre. The previous season the average cost per acre was $4, the decrease being due in part to the fact that the laborers were able to do better work on account of the previous year's experience, but principally to the fact that much more assistance was received from the farmers. They realized that it was to their advantage to help in this undertaking, and one of them furnished a truck and driver, while others furnished sacks and tools and spent considerable time in the field assisting in the work without any remuneration. In addition to the field clean-up, a clean-up was made along certain roads where the underbrush had dragged seed cotton from the wagons. This was followed by a house-to-house canvass, and all places where cotton had been stored, together with all trucks, wagons, etc., used in hauling seed cotton, were cleaned.

Trap plots were used again this season, but they were confined to the most heavily infested part of the area. A total of 25 plots, consisting of 400 plants each, were put out in the Presidio section. These plants were grown in hotbeds and later transferred to the fields. On one farm in this section some stub cotton came up, and about 60 plants were left as a trap. In Brewster County two ½-acre plots were used, the cotton having been planted in the field early in March. Fortunately no cold weather was experienced and these plots did very well. The first blooms occurred the latter part of May, and a few worms were found in the two plots in Brewster County and in the stub plot in the Presidio section. By the end of the fiscal year worms had been found in all but 3 of the 28 plots. The moths seem to have emerged later than usual this year, and during the first part of June the number of worms increased rapidly, but there was a considerable reduction during the latter half of the month. The State requirement that planting be delayed until April 15 was uniformly observed throughout the area. Cool weather set back the field cotton somewhat and it had just begun to bloom toward the close of the year, with the result that only 29 worms had been found in 8 fields adjacent to the trap plots.

NEW AREAS INVOLVED IN NEW MEXICO AND TEXAS

The two counties involved in New Mexico are adjacent to those involved in the newly infested area in west Texas and, as much the larger part of the cotton produced in them is ginned in Texas, these two areas will be discussed together. The first worm was found on October 17, 1933, during an inspection of gin trash in Gaines County, Tex. This finding was followed by others in Dawson, Terry, Hockley, Lamb, Bailey, Cochran, and Yoakum Counties. The findings in cotton from Lea and Roosevelt Counties, N. Mex., were made while the cotton was being ginned in Texas counties. Following the findings in gin trash a considerable amount of field inspection was carried on, and as a result an infested field was located in each of the 2 New Mexico counties and in 4 of the Texas counties.

After infestation had been found in this area, steps were immediately taken to safeguard the movement of cotton products from it. It was too late in the season to have seed-heating machines installed. Therefore arrangements were made to have all the seed moved to certain designated oil mills. Seed is cooked by millers to improve its working qualities, and seed from dry areas is often cooked at the very beginning of the milling process in order to soften it. The cooking temperature used is approximately 175° F., which is amply sufficient to kill any pink

bollworms. Therefore the seed was required to be heated to this temperature or higher and only such mills were designated as met this requirement. A number of compresses were also designated to take care of the lint. It is gratifying to report that all of the plants involved cooperated whole-heartedly in this undertaking.

A check of the gin records disclosed that considerable quantities of seed had been returned to the farms, especially in the area of western Texas. As some of the seed undoubtedly contained living worms and would be used for planting purposes, steps were taken to have all of this seed sterilized. The work was done by the State authorities under the supervision of inspectors of this project. Approximately 4,300 tons of seed were treated in Texas, and about 115 tons in New Mexico. As this was just a little over half the seed returned to the farms in Texas, a check-up on the farmers shown as having returned seed to the farm but not having had it sterilized was immediately begun. As was to be expected, large quantities of this seed had been used for feeding purposes, and other amounts had later been sold to gins, oil mills, etc. This checking had not been quite completed at the end of the fiscal year, but the results obtained indicated that practically all of this seed would be satisfactorily accounted for. Only a few farmers planted untreated seed, and the acreage involved in such plantings was quite small.

THE SITUATION IN OTHER REGULATED AREAS

Inspections were begun in the Salt River Valley of Arizona early in the spring of 1933 as soon as the cotton began to fruit and were continued throughout the summer until gin trash was available for inspection. The entire output of trash from some of the gins was inspected, and a large percentage of the trash from the others. This work was continued until the middle of December, at which time most of the crop had been ginned and, as no signs of the pink bollworm had been found during the past two seasons, the area was released from quarantine, effective December 23, 1933.

In the remaining areas of Texas, New Mexico, and southeastern Arizona, sufficient trash was inspected to afford information as to the degree of infestation. There was a general increase in all of these areas, except parts of Arizona, the increase being especially marked in the Pecos Valley of Texas and New Mexico. A summary of the various kinds of inspection, together with the number of specimens found, is shown in table 6.

TABLE 6.—*Summary of inspections for the pink bollworm in regulated areas, crop season 1933*

District	Gin trash inspected		Field inspections		Laboratory inspections	
	Bushels	Bollworms collected	Man-days	Bollworms collected	Samples	Bollworms collected
Formerly regulated areas:	*Number*	*Number*	*Number*	*Number*	*Number*	*Number*
Pecos Valley, N. Mex.	437	182	0	0	111	2
Pecos Valley, Tex.	537	1,463	0	0	190	22
Big Bend, Tex.	118	171,269	0	0	0	0
Hudspeth County, Tex. (southeastern part)	99	14,008	0	0	76	1,883
El Paso Valley, Tex.	466	1,174	0	0	109	5
Mesilla Valley, Tex. and N. Mex.	743	145	0	0	234	4
Tularosa, N. Mex.	18	5	0	0	0	0
Deming, N. Mex.	1	1	0	0	0	0
Duncan Valley, Ariz. and N. Mex.	0	0	0	0	0	0
Safford Valley, Ariz.	1,911	34	0	0	600	0
Salt River Valley, Ariz.	40,252	0	11	0	1,840	0
Tucson, Ariz.	588	0	46	0	669	0
Northern Florida	345	0	22	0	273	0
Total	45,515	188,281	79	0	4,102	1,916
New areas:						
Madison County, Fla.	248	1	123	0	18	0
Southern Georgia	2,624	3	358	10	314	0
Western extension, Texas and New Mexico	5,902	60	259	14	160	5
Total	8,774	64	740	24	492	5
Grand total	54,289	188,345	819	24	4,594	1,921

INSPECTION OUTSIDE THE REGULATED AREAS

Inspections during the 1932 crop season were the most extensive on record, and, considering the negative results, together with the necessity for economy because of reduced appropriations, it was decided to concentrate the inspections of the 1933 crop in those areas most under suspicion. As in past seasons gin-t ash inspection was begun in Texas in the lower Rio Grande Valley, and the inspectors operating the machines worked northward as the crop advanced. Machines were also used in Mississippi, Alabama, and South Carolina, and outside the regulated areas in Florida and Georgia. Some inspections were also carried on in the border States of Mexico, most of this being confined to the areas opposite the Rio Grande Valley of Texas. Except in the Juarez Valley of Mexico the results of all such inspections were negative. After the ginning season had ended, laboratory inspection of green boll and bollie samples collected in various cotton States was begun. This work had not been completed at the close of the fiscal year, but thus far the results have been negative.

The amount of each class of material inspected and the State from which it came is shown in table 7.

TABLE 7.—*Summary of inspections for the pink bollworm outside regulated areas, crop season 1933* [1]

State	Gin trash	Man-days of field inspection	Laboratory samples	State	Gin trash	Man-days of field inspection	Laboratory samples
	Bushels	*Number*	*Number*	Mexico:	*Bushels*	*Number*	*Number*
Alabama	2,230	0	250	Chihuahua [1]	110	0	0
Florida	1,203	51	360	Coahuila	37	5	0
Georgia	9,477	28	820	Nuevo Leon	134	0	0
Louisiana	0	0	1,000	Tamaulipas	994	0	0
Mississippi	522	14	230				
South Carolina	493	34	45	Total	1,275	5	0
Texas	26,150	93	2,320				
				Grand total	41,350	225	5,025
Total	40,075	220	5,025				

[1] All results negative except that 3,577 pink bollworms were found in the Juarez Valley.

CHANGES IN REGULATIONS

During the fiscal year 1934 three changes were made in the pink bollworm quarantine regulations. The first change, effective September 19, 1933, was a revision of the regulations. Under this revision no essential changes were made in the means of control and the prevention of spread of the pink bollworm, but there was considerable rearrangement of the regulations in the interest of clarity and to facilitate administration. The regulated areas were divided into heavily infested and lightly infested areas.

Effective October 24, 1933, the regulations were amended for the purpose of adding Gaines County, Tex., to the regulated area.

Effective December 23, 1933, the regulations were again revised for the purpose of adding the newly infested sections of Florida, Georgia, New Mexico, and Texas to the regulated areas. The revision incorporated the amendment issued on October 24, 1933. At the same time the Salt River Valley of Arizona was released from regulation. At present the regulated areas include 3 counties in southern Arizona, 7 in north-central Florida, parts of 3 in southern Georgia, 9 in southern New Mexico, and 15 entire counties and parts of 3 additional ones in western Texas. Of this area 5 counties and part of another in Texas were designated as heavily infested, and all the remaining area as lightly infested.

NEW MACHINES

In past seasons it has not been practicable or economical to operate the gin-trash machines at isolated gins and at others where the output of trash is quite small. Therefore, during the summer of 1933 a small gin-trash machine was developed which embodies the same principles of separating worms from trash as does the large machine, power being supplied by turning a crank by hand. The machine weighs about 75 pounds and is so built that it can be placed in an enclosed light delivery truck, making it possible for one inspector to operate the

machine. Its efficiency has been thoroughly tested, and it has proved to be extremely useful in scouting activities, several of the infestations this season having been found by means of this small machine.

During the early part of the fiscal year the treating of cotton by steaming, in lieu of fumigation, was developed by the Texas State Department of Agriculture. The equipment consists of a 25-horsepower upright boiler, together with a tube, having a capacity of one bale, and capable of withstanding 25 pounds pressure. Preliminary tests showed that worms could be killed to a depth of 3 inches by a 1-minute exposure to steam under 15 pounds pressure, but in the commercial treatment of lint a 3-minute exposure is given, compression being relied on to destroy all worms below the 3-inch depth. Only cotton from the heavily infested area is required to be fumigated, and as the amount involved is very small the charges are naturally rather high. It was to relieve farmers of this high cost that the State developed and operated two steam-pressure plants during the season.

CONTROL AND ERADICATION MEASURES

The present measures enforced to control and prevent the spread of the pink bollworm from infested areas are (1) the disposal of gin trash, (2) sterilization of seed, (3) the supervision of oil mills, (4) fumigation, compression, steaming, and roller treatment of lint, (5) the establishment of a road station, and (6) cooperation with Mexico.

The disposal of gin trash.—Practically all of the gins are equipped with cleaning machinery through which the cotton passes in the process of ginning. This machinery removes a considerable amount of trash from the cotton, and in infested areas most of the pink bollworms present are discharged with it. The regulations require the daily disposal of this trash by burning, sterilization, or grinding. The Texas and New Mexico regulations require this daily disposal to December 1 of each year, the average date of killing frost being prior to this. In years when there was no killing frost before December 1, the ginners have always cooperated by continuing the daily disposal until a killing frost occurred.

Seed sterilization.—Perhaps the most important single measure for controlling and preventing the spread of the pink bollworm is seed sterilization. All gins within the regulated areas are equipped with machines whereby the seed is heated to a temperature of 145° F. as a part of the continuous process of ginning. A thermograph is installed in the seed-heating machines so that the temperature of the seed is recorded at all times. During the past season 120 of these machines were in operation, and slightly over 90,000 tons of seed were heated. In addition, two special machines were operated to treat planting seed. This seed is held at a temperature of 145° for 1 hour, after which, with proper handling, it is permitted to move to any destination. Approximately 10 tons of planting seed were so treated.

The supervision of oil mills.—As in past years the lack of oil mills in some sections of the regulated areas made it necessary to designate mills outside the area to handle quarantined seed. Some 10 mills were designated this season, in addition to the 14 mills inside the area. Approximately 64,000 tons of seed were crushed at these mills. Several of the mills are equipped with rollers for treating second-cut or mill-run linters, and 8,865 bales were so treated.

Fumigation, compression, steaming, and roller treatment of lint.—Most of the regulated areas are now designated as lightly infested, and fumigation is not required; therefore, only 4 plants were operated during the season, at which 345 bales of lint and 387 bales of linters were treated. At the seven compresses 148,728 bales of lint and 2,762 bales of linters were treated. A number of gins in the lightly infested area are equipped with rollers, and 56,753 bales of lint and 8,865 bales of linters were so treated. Most of this cotton was produced in the Salt River Valley of Arizona, and the two steam-pressure machines previously discussed treated 4,698 bales of lint.

The establishment of a road station.—A road-inspection station, located 1½ miles south of Marfa, Tex., at the junction of the Presidio and Ruidosa Roads, was operated to prevent the movement of infested material from the Big Bend area. This station was opened on September 1 and closed on December 31, after clean-up operations had been completed. During this period 3,682 cars were inspected and 49 confiscations made. The confiscations consisted principally of small lots of seed cotton, cottonseed, and lint; also 28 cotton-picking sacks were treated and passed. Of the 49 confiscations made, 20 were infested with the pink bollworm, 122 living and 34 dead worms being found. No live specimens were found in seed that had been sterilized.

Cooperation with Mexico.—A considerable amount of cotton is produced in the Conchos and Juarez Valleys of Mexico, these areas being immediately adjacent to the Big Bend and the El Paso Valley of Texas, respectively. This cotton is also infested with the pink bollworm, and the Mexican officials are endeavoring to control the pest with measures similar to those enforced in this country, such as field clean-up, seed sterilization, and safeguarding of products at the oil mills. There is naturally frequent interchange of visits between the inspectors of this project and the Mexican officials in coordinating and carrying out the various measures. An excellent spirit of cooperation has always been maintained.

THURBERIA WEEVIL

During the year only about 400 acres were planted to cotton in the Thurberia weevil area of Arizona, necessitating the operation of only one gin. All of the trash produced at this gin was inspected with one of the small machines. As there was not sufficient cotton for the gin to operate steadily, field inspections were made from time to time. After the ginning season closed a general inspection was made of all fields in the area. A supply of bollies was collected, and this material is now being inspected. No specimens of either the Thurberia weevil or pink bollworm were found in the area during the entire season.

The same safeguards used in controlling the pink bollworm are also employed in controlling the Thurberia weevil. These consist of the disposal of gin trash, sterilization of the seed, compression and vacuum fumigation of lint, and a clean-up of gins, oil mills, etc., at the close of the season's operations. The results of each of these activities are included in the figures given for the pink bollworm.

Effective October 2, 1933, the Thurberia weevil regulations were revised. Under this revision the use of various improved treatments and other safeguards that have been developed by the Department in recent years was authorized. The changes in every case provide for the issuance of permits for interstate shipments, on conditions with which it will be simpler and less expensive to comply than it was with those previously required, or under which a wider market for cotton products is authorized. Changes include a provision under which cottonseed given special heat treatment of 145° F. for 1 hour may move to any destination; baled cotton lint may be either fumigated under vacuum, or compressed or roller-treated instead of having to be both compressed and fumigated as heretofore; and cottonseed hulls may be shipped to nonregulated territory after such special treatment as may be required by the inspector. The regulated area includes Cochise, Santa Cruz, and parts of Graham, Pima, and Pinal Counties, in the southeastern part of Arizona.

MEXICAN FRUIT FLY

INFESTATIONS IN TEXAS

The extensive use of glass flytraps during the fiscal year resulted in taking specimens of Mexican fruit flies (*Anastrepha ludens* Loew) from approximately three times as many groves in the lower Rio Grande Valley of Texas as were found infested in any previous year. Despite intensive inspections of the fruit in the 176 groves in which adult flies were taken, no larvae were found until the latter part of April after the end of the harvesting and shipping period, when fruit gleaned from four groves in the tree-to-tree inspections in the Mission district was found infested. Adults had previously been taken in three of these groves. Of interest in the larval findings was the fact that several green "October-bloom" fruit were found infested with full-grown larvae, indicating that the eggs had been laid while the fruit was decidedly immature.

The inability to locate larval infestations, even in view of a 35-day extension of the harvesting period, indicates that the number of flies present in the valley was considerably less than during some previous years, even though the number of groves involved shows a rather general scattered infestation. Traps were operated during the year in 1,440 groves throughout the valley. Adult Mexican fruit flies were taken in 176 groves, or approximately 12 percent of those trapped. This seemingly high rate of infestation may be accounted for by the fact that the most susceptible groves were chosen for trapping, and also by the efficiency of the glass traps. Data accumulated in the trapping work indicated that the adult flies did considerable drifting about. As further evidence of the effectiveness of the traps it is interesting to note that of the 154 females taken, only 30 had eggs in the ovaries, the remaining 124 presumably having been trapped before their

eggs had developed. Undoubtedly in many of the groves the flies were taken before they had had an opportunity for oviposition.

The inclusion of Willacy County, the citrus area of which is a continuation of that in Cameron and Hidalgo Counties, in the regulated area when the quarantine was made effective in 1927, was justified by the taking of 3 adult Mexican fruit flies in 3 groves in that county during the fiscal year. These were the first specimens of *A. ludens* taken in this county.

OTHER ANASTREPHA

In addition to the 280 adult *Anastrepha ludens*, several other kinds of fruit flies of the same and related genera were taken in the traps. These included 511 *A. serpentina* Wied., 312 *A. pallens* Coq., 52 *Toxotrypana curvicauda*, 51 *A.* species *X*, 31 *A. fraterculus* auct., 16 *A.* species *Y*, and 1 *A. striata* Schin. The details are shown in table 8.

TABLE 8.—*Infestations of fruit flies in Texas, fiscal year 1934*

District	*Anastrepha ludens*			*A. serpentina*		*A.* species *X*		*A.* species *Y*		*A. fraterculus*		*A. pallens*		*A. striata*		*Toxotrypana curvicauda*	
	Adults	Larvae	Premises	Adults	Premises	Adults	Premises	Adults	Premises	Adults	Premises	Adults	Premises	Adults	Premises	Adults	Premises
Mission	80	179	45	115	53	12	10	0	0	5	4	39	32	1	1	9	7
McAllen	53	----	24	65	23	9	8	1	1	6	6	56	23	0	0	15	13
Edinburg	14	----	12	24	19	3	3	3	3	1	1	22	17	0	0	0	0
Pharr-San Juan-Alamo	44	----	32	57	33	11	10	3	3	6	6	28	21	0	0	13	12
Donna	16	----	7	25	8	3	3	2	2	1	1	34	11	0	0	3	3
Weslaco	18	----	13	112	34	5	5	0	0	6	6	26	19	0	0	1	1
Mercedes	23	----	15	49	22	2	2	1	1	4	4	25	18	0	0	5	4
La Feria	7	----	7	21	20	2	2	2	2	1	1	17	17	0	0	2	2
Raymondville	3	----	3	3	2	1	1	0	0	0	0	30	19	0	0	1	1
Harlingen	14	----	12	11	10	2	2	1	1	0	0	11	9	0	0	2	2
San Benito	6	----	5	26	11	1	1	2	2	1	1	23	14	0	0	1	1
Brownsville	2	----	2	3	3	0	0	1	1	0	0	1	1	0	0	0	0
Total	280	179	177	511	238	51	47	16	16	31	30	312	201	1	1	52	46

There was a considerable increase over the preceding year in the number of *A. serpentina*, *A. fraterculus*, and *A. pallens* taken in the traps. Only 1 specimen of *A. serpentina* and 2 of *A. fraterculus* were taken during the fiscal year 1932. So far as is known the species *X* and *Y* are new to science, whereas the *A. striata* was the first adult of this species taken in the continental United States. Whether these various species are feeding on citrus fruits, whether they have a native brush host, or whether they are a part of the northward migration of *Anastrepha* in Mexico is problematical. The specimens of *A. striata*, taken in the Mission district, undoubtedly drifted across the Rio Grande from Reynosa, Mexico, as guavas infested with this species are frequently observed in the Mexican markets.

Papaya fruit flies (*Toxotrypana curvicauda* Gerst.), two specimens of which had previously been taken in the Weslaco district, were captured in fairly large numbers throughout the valley.

INSPECTIONS

The trapping operations planned as a supplement to the regular inspection of fruit for larval infestations proved so effective, through the use of the glass traps, that this phase of the work was given precedence in determining the extent of infestation for the year. Approximately 5,500 glass traps were in operation in the Texas groves from October 1933 to June 1934. A total of 245,615 inspections were made of these traps. An additional 3,500 glass traps were purchased near the end of the year, making a total of about 9,000 traps that will be in use during the next year.

In addition to the trapping operations, 12,358 regular grove inspections were made for the purpose of enforcing the regulations and locating larval infestations in the fruit. Intensive inspections were made of the fruit in those groves in which adult fruit flies were taken in the traps.

COLLECTION OF SPECIMENS

A total of 5,213 collections of specimens, comprising 7,089 adults and 18,823 larvae, were identified during the fiscal year. Of the adults, 1,343 and of the larvae 18,726 were fruit flies. Most of the collections of larvae were made in Matamoros, Mexico, from fruits shipped into that city from other parts of Mexico.

In an effort to determine, if possible, whether any of the native brush fruits were serving as hosts to any of the various species of *Anastrepha*, systematic collections of brush fruits were made and forwarded to the laboratory at Harlingen for pupation studies. A total of 700 such collections were made. A number of adults of *Zonosema* sp. emerged from collections of *Solanum* and two trypetid pupae were recovered from huisache beans.

FRUIT STERILIZATION NOT REQUIRED

The evidence of the trapping records indicated that adult fruit flies drifted considerably from grove to grove. Intensive inspections of fruit during the harvesting season in those groves in which adult fruit flies were taken gave negative results insofar as larvae of *A. ludens* were concerned, no fruit infested with such larvae being found until after the harvesting period had closed in the spring. As it cannot be stated definitely that the fruit in a grove in which adult fruit flies were taken was infested with larvae, it was not deemed advisable to declare infested zones, with the consequent requirements of sterilization or limited destination of the fruit. However, the growers and packers cooperated splendidly in seeing that practically all of the grapefruit from the groves in which adult fruit flies were taken was harvested immediately and shipped to northern markets outside the area in which the Mexican fruit fly is likely to be able to become established.

HOST-FREE PERIOD

Under an administrative order issued in July, the harvesting period for citrus fruits was extended 3 months, the opening and closing dates being September 1, 1933, and April 30, 1934, rather than October 1 and March 1, respectively. This extension was made necessary by the potential crop on the trees at the time, the harvesting of which would have been impracticable in the regular 5-month period. Two severe tropical hurricanes occurred on August 4 and September 4, however, and destroyed about 75 percent of the citrus crop of the year. The small crop left by the storms was practically harvested by the end of March, and in view of the considerable numbers of adult fruit flies taken in the traps during the winter months, it was deemed advisable to revoke the extension and close the harvesting season on April 5.

The better price offered by buyers for the relatively small amount of fruit left on the trees after the storms, caused the cutting crews and grove owners to make an exceptionally clean job of harvesting the marketable fruit in the groves. Very little "off-bloom" fruit was noticed in any of the orchards. In view of the unusual cleanliness of the groves, it was believed that the amount of money heretofore expended for labor in making a tree-to-tree inspection of the bearing trees of the valley could be more advantageously used in the purchase of additional glass traps. Accordingly, at the close of the harvesting period in the spring of 1934 the inspectors checked the groves of their respective districts closely enough to make sure that no more than an occasional fruit remained in the trees.

ELIMINATION OF ALTERNATE HOST-FRUIT TREES

During the year, 330 alternate host-fruit trees, including 254 guava, 62 peach, 6 plum, 4 apple, 3 sapote, and 1 pear, died or were dug up. A number of these were old trees that had died of root rot or from the effects of the hurricanes referred to above. The remainder were mostly seedlings, which were dug out with the owners' permission. A total of 40,623 alternate host-fruit trees have been destroyed during the past 6 years.

POISON SPRAY

Experience gained in the four valley-wide applications of nicotine-molasses spray during the fiscal year 1933 showed that a complete coverage of the larger trees with the spray was an impossibility with the knapsack sprayers. It was believed that the complete coverage obtainable with a power sprayer in groves

in which the use of the glass traps showed infestation would be more effective as an eradication measure than the more or less spot spraying of all the bearing trees with the hand sprayers. After the trapping of adult Mexican fruit flies in December a three-way agreement was therefore entered into, whereby Cameron and Hidalgo Counties each purchased a small power sprayer, the Bureau supplied the material for the spray and the automobile chassis on which to mount the sprayers, and the State of Texas furnished the labor for the application. These sprayers were small enough to be driven between closely planted trees, yet developed sufficient power to allow the application of the poison to the tops of the highest trees. As an additional precaution, the bearing trees within a considerable zone around several of the most heavily infested areas were given an application of the spray. Details of the spraying activities are given in table 9. The proportions of nicotine and molasses used were the same as those reported last year.

TABLE 9.—*Summary of spraying operations, fiscal year 1934*

Month	Trees sprayed	Premises sprayed	Material used	
			Nicotine	Molasses
	Number	*Number*	*Gallons*	*Gallons*
January	4,668	13	20	392
February	13,615	34	59	1,367
March	13,489	28	67	1,357
April	24,838	71	121	2,433
May	32,542	69	122	2,427
June	6,505	28	30	605
Total	95,657	243	419	8,581

CERTIFICATION OF FRUIT

Prior to the tropical hurricanes that struck the valley in August and September the potential crop had been estimated at 16,000 carloads of citrus fruit. Despite the loss occasioned by these storms, total shipments equivalent to 4,091 carloads were certified during the season, which was only 570 carloads less than quantities shipped during the preceding season.

Of particular interest is the fact that 53 percent of the crop was shipped by truck, as compared to 44 percent shipped by rail and 3 percent by express. This was the first season that the truck shipments exceeded those by rail. About 92 percent of the entire orange crop of 984 carloads was handled by the truckers. Although the majority of the truck shipments were destined for points in Texas and were certified under the Texas regulations, 2,431 Federal master permits were issued for shipments by road vehicles to 21 States and the District of Columbia.

In order to relieve the district inspectors of the onerous burden of issuing permits for the large number of trucks loaded on holidays and after 5 p. m., the office at Edinburg, the gateway of the valley, was kept open on holidays and from 5 p. m. to 1 a. m., for the purpose of supplying permits for truck loads of fruit originating in the various packing plants of the valley. Loads not clearing through a packing house were required to be covered by permits issued by the inspector in the district in which the grove of origin was located.

ROAD-TRAFFIC INSPECTION

The road-traffic-inspection station on the main highway leaving the lower Rio Grande Valley was operated from September to the close of the harvesting period on April 5. As no limited destination or fruit-sterilization requirements were in effect owing to the absence of any known larval infestation during the harvesting period, inspections were confined to commercial loads moving by truck, and passenger automobiles were allowed to proceed without checking as to the presence of fruit. As will be seen from table 10, a total of 10,934 truck loads of fruit were checked by the station during the time it was in operation. During the height of the shipping season an average of 75 fruit trucks passed the station daily.

TABLE 10.—*Road-traffic inspection, fiscal year 1934*

Month	Trucks inspected		Fruit passed, packed in boxes and baskets						Fruit passed in sacks		Fruit returned to area	Fruit confiscated
	Passed	Not passed	Grapefruit		Oranges		Total					
	Number	*Number*	*Boxes*	*Bushels*	*Boxes*	*Bushels*	*Boxes*	*Bushels*	*Number*	*Pounds*	*Bushels*	*Bushels*
September	529	0	6,175	40,181	76	6,048	6,251	46,229	207	15,240	-------	-------
October	573	0	5,632	34,346	109	15,194	5,741	49,540	62	4,960	-------	-------
November	1,262	7	14,779	66,404	333	48,205	15,112	114,609	56	3,120	-------	-------
December	1,958	5	13,410	86,199	3,669	100,168	17,079	186,367	529	30,660	-------	-------
January	2,132	2	13,474	116,261	4,170	92,365	17,644	208,626	352	26,290	-------	-------
February	2,118	6	14,843	108,610	2,838	89,529	17,681	198,139	1,757	98,740	192	16
March	2,118	4	11,859	92,004	5,201	93,456	17,060	185,460	3,241	229,585	38	11
April	244	1	1,247	8,777	883	8,475	2,130	17,252	388	26,280	-------	11
Total	10,934	25	81,419	552,782	17,279	453,440	98,698	1,006,222	6,592	434,875	230	38

Two State laws, the Fruit Standardization Act and the Maturity Act, were in effect during the season, requiring the checking of trucks moving over the highway for the enforcement of their provisions. Arrangements were made, therefore, to have the inspectors at the road station enforce the regulations of the three organizations concerned.

No reports were received of fruit trucks using the ranch roads to the northwest in leaving the valley, and therefore no patrols were placed on these roads.

CENSUS OF FRUIT TREES

In order to know the number of trees over which it is necessary to maintain supervision, a census is made each spring of the growing trees in the quarantined area. On account of the large number of trees killed by the storm of September 4, a particularly close check was made of the trees this spring. The corrected figures show that there are in orchard form 8,201,211 citrus trees in the lower Rio Grande Valley in Texas, 203,529 fewer than were in orchard form on April 1, 1933. The storm killed 580,419 trees, but this loss was partially offset by the planting of 376,890 trees during the period April 1, 1933, to March 31, 1934. The figures given above do not include the dead trees or the resets in groves in which only an occasional tree was lost, nor do they include 176,812 trees classified as noncommercial. The mortality among the trees will undoubtedly continue for some time.

VIOLATIONS

The usual minor infractions of the regulations were encountered and corrected during the year. Five reports from the transit inspectors of small shipments of fruit in violation of the regulations of the Mexican fruit fly quarantine were received and investigated. One attempt to smuggle storm-blown fruit by the road station was apprehended but, in view of the circumstances surrounding the case, the offender was released with a reprimand after being required to bury the contraband fruit. The nearest approach to a willful violation of the quarantine was the case of the owner of about an acre of trees in the Lyford community. This grower refused at the opening of the host-free period to remove from his trees a small amount of ripe and off-bloom fruit. He was finally prevailed upon to allow the State inspectors to clean the trees.

INFESTATIONS IN MEXICAN TOWNS ALONG THE BORDER

The control work on the Mexican side of the Rio Grande was expanded during the year to include regular trapping operations in Reynosa, across from McAllen, Tex., and in a number of ranches scattered along the river from Matamoros to Rio Rico. A number of traps were operated for a short time in Nuevo Laredo, across from Laredo, Tex Matamoros continued to be the center of control operations, as it received far more fruit from fly-infested districts of Mexico than any town directly across the Rio Grande from the citrus-growing area of Texas.

A total of 18,636 specimens of *Anastrepha* were taken on the Mexican side of the Rio Grande during the fiscal year. Adult *A. ludens* were trapped in Matamoros, Reynosa, and Nuevo Laredo; *A. serpentina*, *A. striata*, and *A. pallens* in Matamoros; and *A. fraterculus* in Reynosa. The *A. serpentina*, *A. striata*, and *A. fraterculus* were the first adults of these species to be trapped in the Mexican border towns since the work has been in progress.

All larvae were recovered in Matamoros. Of the imported fruits, mangoes continued to be most heavily infested, 10,669 larvae of *A. ludens* being taken from this fruit in June alone. The number of larvae of *A. ludens* taken from imported oranges showed an increase over previous years. Larvae of *A. striata* were taken from guavas. *A. serpentina* was taken from peaches, and in all probability from apples, mameys, and quinces, the characters of the larvae from these latter fruits being very similar to those of the larvae from peaches. The determination of larvae from peaches originating in Ramos Arizpe, Coahuila, Mexico, as *A. serpentina*, was made by the Mexican inspector in Matamoros by rearing adults from the infested fruit. This established a new host for this species in Mexico and also a new locality infestation. A number of *Anastrepha* larvae definitely determined as not being *ludens* were taken from Manila mangoes shipped to Matamoros from Vera Cruz.

Inspection of local fruit in Matamoros in July resulted in the taking of 121 larvae of *A. ludens* in sour oranges on 2 premises. The trees on these premises were stripped of all fruit and sprayed with a mixture of nicotine and molasses. The nicotine-molasses spray was also applied to the trees on the 24 premises on which 81 adult *A. ludens* were taken during the year. No fruit in stages susceptible to larval infestation was available subsequent to the September hurricane.

The danger of reinfestation of Texas groves by infested fruit reaching Mexican border towns is exemplified by the taking of an adult *A. ludens* in a trap in the brush on the banks of the Rio Grande directly across from Reynosa; by the taking of several adult flies in the village of Hidalgo, also across the river from Reynosa; and by the taking of an adult *A. striata* in the Mission district. These findings undoubtedly originated in infested fruit shipped to Reynosa. The details of the fruit-fly findings in the Mexican towns along the border are shown in table 11.

TABLE 11.—*Infestations of Anastrepha in Mexican border towns, fiscal year 1934*

Month	Local fruit						Larvae found in imported fruit—								Pupae found in imported fruit	Total
	Adults trapped					Larvae found in sour orange	Apple	Guava	Mango	Mamey	Orange	Peach	Quince	Unknown [1]		
	A. ludens	*A. serpentina*	*A. pallens*	*A. striata*	*A. fraterculus*											
July	27	1				121		[2] 407				[3] 11				567
August			1				[3] 5		9		1	[1] 123	[3] 56			195
September																0
October											155					155
November	1							[2] 1			560					562
December	5							[2] 2			119				1	127
January	5							[2] 6		[3] 16	4					31
February	2				1			[2] 15			14					32
March	3		1	1					18							23
April	2		1						500		15					518
May	2								10, 669		156			255	1	11, 083
June	36								4, 201		52	[3] 4		1, 050		5, 343
Total	83	1	3	1	1	121	5	431	15, 397	16	1, 076	138	56	1, 305	2	18, 636

[1] Specimens taken from box in which fruit was carried from market to office.
[2] *A. striata.*
[3] Probably *A. serpentina.*

DATE SCALE ERADICATION

Inspection and clean-up work was continued in the date-growing areas of Arizona and California. Inspection from ladders was discontinued in some areas, only offshoots and such foliage as could be reached from the ground being examined. Many plantings were given their final inspections and are considered free from *Parlatoria* date scale (*Parlatoria blanchardi* Targ.). Certain areas were rescouted to locate unlisted palms. Checking previously cleaned areas for volunteer plants was also continued. The details are given in table 12.

TABLE 12.—*Palm inspection and treatment, date-scale eradication project, fiscal year 1934*

Item	Arizona		California		Total
	Phoenix district	Yuma district	Coachella Valley district	Imperial Valley district	
Palm inspections	59,764	2,172	203,841	27,695	293,472
New infested properties	0	0	0	0	0
Total infested properties	0	0	0	1	1
Date palms infested	0	0	0	11	11
Other palms infested	0	0	0	0	0
Total	0	0	0	11	11
Treatment:					
Defoliated and sprayed	0	0	0	10	10
No treatment (dead scale)	0	0	0	1	1
Total	0	0	0	11	11
Valueless palms dug out in infested areas; not included above	10	0	605	9	624

COACHELLA VALLEY

During the year 203,841 palm inspections were made in the Coachella Valley and no *Parlatoria* scale was found. This is the second successive year since the beginning of the project that no scale has been found in that district, and the third successive year in which no new infestation has been found. Many volunteer plants growing from seed and parts of stumps in previously cleaned plantings were destroyed, and 605 valueless palms in the infested area were dug out. Several hundred palms were pruned to facilitate inspection, and 50 were stripped of fiber in order than the leaf bases might be examined. A total of 8,847 offshoots were inspected for movement.

IMPERIAL VALLEY

In the Imperial Valley, 27,695 palm inspections were made during the year. Eleven infested date palms were found on 1 property, an old infestation, as compared with 2 infested date palms and 5 infested Canary Island palms on 4 properties in 1933. While, as indicated, the infested property represents an old infestation, the original infestation had apparently been cleaned up, and the present infestation probably came from an outside source. One rather heavily infested palm was found in July, and the other 10, very lightly infested, were found during the period September to May. These 10 palms were grouped closely around the palm found in July, and the infestation on them undoubtedly resulted from spread from the latter.

Careful rescouting was carried on in 134¾ sections to locate unlisted palms.

PHOENIX DISTRICT

In the Salt River Valley of Arizona, 59,764 palm inspections were made, and no scale was found. Only 1 infested palm has been found in Arizona in the past 3 years. All palms on previously infested properties were pruned where necessary for close inspection, and 10 were dug out and destroyed. Leaf bases were removed from all but 2 previously infested palms. Rescouting for unlisted palms was carried on in certain areas.

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YUMA DISTRICT

In the city of Yuma and vicinity, 2,172 palm inspections were made, and leaf bases were removed from 14 previously infested palms. No *Parlatoria* scale has been found in the Yuma district for the past 3 years.

QUARANTINE ON DOMESTIC NARCISSUS

In the absence of a Federal appropriation for the enforcement of the narcissus bulb quarantine, the inspection required as a condition of interstate movement has been carried out by the nursery-inspection organizations of the various States. Prior to this fiscal year, the Federal Department was able to assign temporarily a few men employed on other projects to aid the States in such inspections when the State officers so desired. The retrenchment program in the Department forced the Bureau, beginning in 1933, to discontinue such assistance, and for the fiscal year here reported, therefore, inspections and certifications have been made entirely by State forces. A number of the State organizations are also carrying on their work with greatly reduced funds and have notified the Department that it is becoming difficult if not impossible for them to carry out the necessary narcissus inspections.

The nursery inspectors of the various States reported that during the summer and fall of 1933, they had made inspections of 305,875,898 bulbs of all types, an increase of about 1 percent over the number reported the previous year. About 59 percent of the bulbs inspected in 1933 were Paper White and other polyanthus varieties commonly grown in the South, a larger percentage than in 1932; and about 41 percent were of the daffodil type produced in the Northern States, a smaller percentage than in 1932.

Of the bulbs inspected, 228,978,135 were certified as uninfested; 18,578,820 were fumigated with cyanide and certified, and 15,291,197 were treated with hot water and certified after treatment. In some cases the fumigation or hot-water treatment was precautionary and therefore did not necessarily represent infestation in the stock concerned. This is especially true with respect to fumigation in several of the leading daffodil-growing sections of the country where fumigation with calcium cyanide dust constitutes routine practice, owing to the general and scattered establishment of the narcissus bulb fly. The numbers of bulbs certified indicate the supplies available for shipment so far as adequate inspection and freedom from pests are concerned. The greater proportion of such bulbs, however, are replanted by the growers, who estimate that only from 20 to 30 percent of the bulbs are involved in interstate commerce during any one year.

Infestations with the bulb eelworm (*Anguillulina dipsaci*, formerly called *Tylenchus dipsaci*) were reported in 1933 in one or more plantings in each of the following States: California, Florida, Georgia, Illinois, Maryland, Michigan, Missouri, New Jersey, New York, North Carolina, Ohio, Oregon, Tennessee, Virginia, and Washington. In addition to the States reporting it in 1933, this species had previously been reported as occuring in Alabama, Indiana, Kansas, Kentucky, Mississippi, Rhode Island, Utah, and Wisconsin. Some of these properties on which bulb eelworms were found have not since been reported as inspected, and infestation may possibly still be persisting in some of them.

Greater bulb flies were again reported in California, Michigan, New York, North Carolina, Ohio, Oregon, Pennsylvania, and Washington. They have also been found in previous years in Illinois, Rhode Island, Utah, and Virginia.

BLACK STEM RUST QUARANTINE

Under the black stem rust control program, the Department is cooperating with 13 grain-growing States of the Middle West in the destruction of those kinds of barberries that spread the rust to grainfields. The barberry quarantine was established to prevent the shipment of susceptible barberries into those States. Under its provisions, nurserymen who grow only rust-resistant species are issued permits under which such resistant species may be shipped into the protected States. Such permits are required for the shipment into the 13 States concerned of all kinds of barberry and mahonia plants except the Japanese barberry (*Berberis thunbergii*), which is immune to rust infection.

At the present time some 26 species of *Berberis* and *Mahonia* plants are known to be either entirely immune to black stem rust or so resistant that they could not be a factor in the spread of the rust. More than 100 species and varieties are susceptible to black stem rust attack. These species cannot be shipped into the protected States. In addition to these groups, about 17 species and varieties are

still under test, and until their reactions are more fully known, their transportation into the barberry-eradication area is not being authorized.

In enforcing the quarantine, the Department sends a specialist to go over the premises of applicants to be sure that the kinds of barberries grown are limited to the resistant types. If susceptible plants are found, a permit is refused, while if no barberries except the resistant kinds are grown, a general permit is issued, and the nurseryman is supplied with shipping tags which authorize the transportation of the resistant barberry and mahonia plants to the protected States.

During the shipping season of 1933–34, 23 nurserymen held permits for the shipment of resistant species. Nine of these nurseries were located in Ohio, and the others in Colorado, Illinois, Indiana, Kansas, Michigan, New Jersey, Pennsylvania, Virginia, and Washington.

In finding and destroying the barberries that have been planted or are growing in the woods and fields in the protected States, these States are cooperating with the Bureau of Entomology of this Department. According to that Bureau, 441,902 barberry bushes, seedlings, and sprouts were destroyed in these 13 States during the calendar year 1933, a total of 19,107,305 having been destroyed since the campaign was started in the spring of 1918. The States in which this work is being carried on are Colorado, Illinois, Indiana, Iowa, Michigan, Minnesota, Montana, Nebraska, North Dakota, Ohio, South Dakota, Wisconsin, and Wyoming.

During the fiscal year 28 violations of the barberry quarantine regulations were intercepted by transit inspectors and returned to the sender.

PREVENTION OF SPREAD OF PHONY PEACH DISEASE

Following the revocation of the Federal phony peach disease quarantine, effective March 1, 1933, the responsibility for the control of the movement of those classes of nursery stock known to be susceptible to the phony peach disease reverted to the States. As was announced in the last annual report, the Department has since been cooperating with the States in increasing the efficiency of the inspection of peach-growing nurseries and their environs by directly aiding in such surveys and in assisting the States in the development and adoption of improved culling practices to eliminate all borer-infested and borer-injured stock.

Conferences of State plant quarantine officers were held in the spring of 1933 to decide on the most desirable type of State regulations to be put into effect after the Federal quarantine was revoked. As a result of these conferences, regulations relating to the prevention of the spread of the phony peach disease have been issued by the States of Alabama, Arkansas, Delaware, Georgia, Louisiana, Mississippi, Oklahoma, South Carolina, Tennessee, and Texas. Most of them provide that peach stock be accepted for shipment or sale either (1) if the environs of the nursery are free from the phony peach disease for a distance of 1 mile, or (2) if the peach nursery stock is inspected tree by tree at digging time by State or Federal inspectors and all trees found infested by the peach borer are culled out and destroyed.

Since preliminary evidence obtained by the Bureau of Plant Industry indicates that the peach borer is probably the carrier of phony peach disease from diseased to healthy trees, consideration was at first given to the possibility of culling out all peach nursery stock in the infected States to eliminate all borer-infested and borer-injured trees. It was found, however, that most of the nurseries concerned usually dig their stock at irregular periods during the fall and winter months, and do not have large quantities available for inspection at any one time. This situation would make it physically impossible, with the limited number of inspectors available, to inspect tree by tree all peach-rooted nursery stock grown throughout the entire phony peach infected area. It was found much more economical and efficient to inspect, during the growing period, the environs of peach plantings for a radius of 1 mile, and then to release the stock growing in those nurseries within 1 mile of which no phony peach disease was found. This environs inspection also has a definite value from the standpoint both of finding the areas in various States which the phony peach disease has reached and in accomplishing the local eradication of the disease around nurseries, and thus furthering the general project of its ultimate complete extermination.

During the summer of 1933 the Bureau of Plant Quarantine, at the request of the State officers concerned, cooperated in making inspections for the phony peach disease around the peach-growing nurseries of Alabama, Georgia, Illinois, Louisiana, Mississippi, Oklahoma, South Carolina, Tennessee, and Texas.

As will be seen from table 13, the work involved covering the environs of the peach plantings of 139 nurseries growing an estimated total of 3,944,994 peach

trees and other trees budded on peach roots which were intended for movement during the season of 1933–34. The environs of 96 nurseries were found to be apparently free from infection for a radius of 1 mile. The disease was found within that distance of one or more plantings of the other 43 nurseries inspected. In Arkansas, Florida, Missouri, and North Carolina, the work was carried out entirely by the State nursery-inspection organizations, and in the absence of a detailed report from the State inspectors, the work in these States is not included in the table. In addition to the figures shown, the Illinois inspectors covered the environs of 2 nurseries without finding phony peach disease within the area; and those of Georgia covered the environs of 5 nurseries, and in each case found the phony peach disease within the area.

TABLE 13.—*Nurseries growing peach and nectarine trees inspected by Federal and State inspectors in cooperation to determine the presence or absence of phony peach disease in the vicinity*

State	Nurseries				Nursery trees		Total trees in inspected nurseries
	Without phony disease within 1 mile	With phony disease within 1 mile of all blocks [1]	With phony disease within 1 mile of some blocks only [1]	Total inspections	In blocks not exposed [2]	In exposed blocks [2]	
Alabama	4	6	1	11	256,700	191,875	448,575
Georgia	9	8	1	18	147,126	[2] 168,274	315,400
Illinois	10	----------	----------	10	[2] 323,000	----------	323,000
Louisiana	1	----------	----------	1	20,100	----------	20,100
Mississippi	1	3	----------	4	1,000	6,050	7,050
Oklahoma	12	----------	----------	12	[2] 142,859	----------	142,859
South Carolina	2	----------	----------	2	33,300	----------	33,300
Tennessee	25	1	1	27	[2] 1,508,756	129,219	1,637,975
Texas	32	20	2	54	[2] 691,073	325,662	1,016,735
Total	96	38	5	139	----------	----------	3,944,994

[1] Peach stock in the exposed nurseries was later called free from borer-injured trees under State and Federal supervision except that in Alabama the work was practically all done by State inspectors and in Mississippi much of the exposed stock happened to be unsalable for other reasons.

[2] No information was received as to the amount of stock in 2 nurseries in Georgia, 3 in Illinois, 2 in Oklahoma, 1 in Tennessee, and 2 in Texas. None of these except the 2 in Georgia, had been exposed to infection.

During the digging and shipping season, the Bureau received requests from the States of Alabama, Georgia, Tennessee, and Texas for assistance in improving the efficiency of culling susceptible nursery stock. In this work the State and Federal inspectors endeavor to find the most positive and definite ways of determining borer infestation and injury. In addition to the peach trees so culled, small quantities of flowering peach and of plum and apricot trees budded on peach roots were also examined. The fruiting-type peach trees included stock of the four principal nursery classifications, namely, June buds, dormant buds, year-old June buds, and carried-over dormant buds. The term "June buds" refers to seedling trees that are budded in June so that the resulting nursery stock is ready for sale the same fall or the following spring, and the term "dormant buds" refers to nursery stock that is not budded until the late summer and fall so that the trees are not ready for sale until the following year. The other two groups include trees which are 1 or more years older than the June buds or dormant buds.

Of special interest in this connection is the fact that peach-borer-infested and borer-injured trees were found in each of the four classifications as well as in the plum, apricot, and flowering peach trees budded on peach roots. It had not previously been certain that trees as small as June buds were attacked under field conditions in commercial nurseries. June-bud stock is exposed to infestation during only one season, and throughout a large part of the peach borer egg-laying period the small trees have very little top growth. Either the trees are so small that they are not attractive to the borer moths when the eggs are laid or possibly the absence of shade results in an unusually high mortality of the eggs and young borers through drying. In those cases where detailed notes were taken, the average number of June buds infested or injured amounted to 1.9

percent. The maximum percentage of infestation found in June buds was 3.77 percent. In dormant budded stock the degree of infestation varied from 4.14 percent to 42.79 percent. In the older nursery trees the average degree of infestation amounted to 47.71 percent; the maximum infestation noted in any single lot was 85.84 percent. A considerable variation was noted in the degree of infestation between different nurseries in the same locality and even in different parts of the same field. These differences are correlated with several kinds of local conditions, including the number of years the peach nursery stock has been grown in the field concerned, the proximity of neglected peach trees in home orchards in the neighborhood, and similar factors. In addition they seem to be correlated somewhat with the types of soil and the slope of the field, higher percentages of infestation appearing in trees grown in soil that holds moisture for long periods.

Particular attention was given to accurate methods of separating the trees on which borers had fed but which were no longer infested, from trees which were mechanically injured or bruised. It is important from the standpoint of prevention of spread that no borer-injured trees be passed. From the nurseryman's standpoint it is equally important to avoid condemning trees that have been subject only to slight mechanical injury. It was found that by observing the nature of the exuding gum and the types of markings, a high degree of efficiency in making such determinations can be reached, but further study is needed along these lines. In this work it is necessary to handle each nursery tree separately, and the work therefore cannot be done as rapidly as some other types of nursery inspection.

WOODGATE RUST QUARANTINE

No spread of the Woodgate rust, a disease which attacks Scotch and other hard pines, was reported outside the 10 counties in northern New York already known to be infected, and no violations of the quarantine have been intercepted.

WHITE PINE BLISTER RUST QUARANTINE ENFORCEMENT

The number of nurseries growing white pine whose plantings are protected against blister rust infection by the eradication of currant and gooseberry plants around them has been greatly increased during the past year. The change has been due partly to a revision of the blister rust quarantine regulations which became effective January 1, 1933, and which greatly extended the area into which protected white pines might be shipped from the infected States. Other important factors in the increased number of white pines produced, however, have been the recent impetus to reforestation in general and also the fear of nurserymen that the red pine, which has been extensively planted, may be seriously injured for reforestation as well as for ornamental purposes by the attack of the European pine shoot moth. Under the Federal laws, the Forest Service has not only purchased large quantities of forest-planting stock but has established a number of new nurseries which are expected to have a large annual output of seedlings and transplants. Among the forest trees grown in these nurseries, about 20,000,000 white pines will probably be produced. All such Forest Service nurseries producing white pines are being protected against the establishment of blister rust by means of the destruction of currant and gooseberry plants in and around their premises.

For the shipping season of 1933–34, the Bureau received applications for pine-shipping permits covering 37 nurseries in 10 States. These were scattered from Maine to Iowa and as far south as Virginia, in addition to 1 each in Idaho and Montana. Such applications are referred to the Division of Blister Rust Control, heretofore in the Bureau of Plant Industry, and the currant and gooseberry eradication in the sanitation zone is carried on under the direction of that Division in cooperation with State officials and nursery owners. This eradication involves finding and destroying all the currant and gooseberry plants within a zone 1,500 feet in width around the areas growing white pine, and all European black currant plants within a similar zone 1 mile in width. Authority for the destruction of wild or cultivated currant and gooseberry plants is provided in some States by law or regulation, while in other States the eradication is carried out entirely on a basis of cooperation between the nurserymen and the private owners concerned.

In the upper Mississippi Valley, the Lake States, the New England States, and the Pacific Northwest, currant and gooseberry destruction around nursery premises is often a difficult and expensive undertaking, owing to the fact that

such plants grow wild often in practically all types of land except that under frequent cultivation. Under favorable moisture and soil conditions they sprout readily from broken root stocks, and seedlings often come up in numbers from seed produced from 1 to a number of years previously. In these sections, wild currant and gooseberry plants are so persistent that the sanitation zone must be thoroughly covered each year in order to protect the pines. In Virginia and Maryland, on the other hand, currant and goosebery plants have not been found to be growing wild in the nursery sections except in one instance in which a few native black currant plants were located, and the work has therefore involved little or no expense to the nursery owners.

In the nursery-protection work, it is necessary to attain a very high degree of efficiency in currant and gooseberry eradication. Experience has shown that the presence of a very few plants within the 1,500-foot zone is likely to result in infection being carried to the white pine seed or transplant beds. It is therefore necessary that eradication crews work and rework the 1,500-foot zone until they are thoroughly convinced that the last currant or gooseberry plant has been detected and destroyed.

After the annual inspections of nurseries and the environs were made it was found possible to issue shipping permits for 22 premises, of which 4 are operated by Federal or State Governments and 18 by private individuals or corporations. Twelve of the applications for permits were withdrawn or disapproved for the reason either that blister rust infection was found, or that currant or gooseberry plants were so prevalent as to endanger the pines, and the applications of three nurseries in which the pines had not reached a salable size were tentatively approved. Of the commercial concerns, those whose applications were approved reported that they were growing 243,150 white pines and those whose applications were denied reported a total of 212,150 such pines. The four permittees whose nurseries are operated by the Federal or State Governments were growing 13,800,000 white pines.

During the fiscal year 56 violations of the white pine blister rust quarantine regulations were intercepted by transit inspectors and returned to the sender. In one case, blister rust infection was found and the infected twigs and branches destroyed.

TRANSIT INSPECTION

Transit inspection is the principal method used by the Department in insuring compliance with domestic plant quarantines so far as mail, express, and freight shipments are concerned. The inspectors under this project are stationed at the principal railroad-transfer points in various sections of the country, and at these points they check shipments of plants and other restricted articles to be sure that they comply with the Federal plant-quarantine requirements to prevent the spread of pests from infested to uninfested sections of the country.

This work is carried out in cooperation with the States in which such transfer points are located, and with the hearty assistance and support of the employees of the Post Office Department and the railway and express companies.

With the development of additional types of common-carrier movement, particularly airplanes and automobile-truck lines, the work has been extended where possible to the checking of such shipments also. No road stations are maintained under this project, but freight movement by way of interstate trucking lines which have regular stations in the principal cities are being checked to a limited extent.

Parcels moving by air mail and express are in most cases inspected at the post office and express platforms in the regular routine. In Chicago it has been found practicable to visit the airport regularly during certain seasons. In carrying out this plan during the past fiscal year, 82 shipments moving by air mail and 961 moving by air express were inspected. One quarantine violation was intercepted during such inspections. It consisted of cut flowers being shipped during the summer from the Japanese beetle-infested area of New Jersey to a point in Nevada without having been inspected previously and certified as free from the Japanese beetle.

The procedure of checking shipments to determine compliance with domestic plant quarantines has recently been considerably simplified by the publication of Miscellaneous Publication 189, A Synopsis of Federal Plant Quarantines Affecting Interstate Shipments in Effect January 1, 1934. This synopsis, in addition to outlining the quarantine requirements, gives the quarantines affecting shipments from and to each individual post office of the United States. The publication has been in considerable demand from shippers and the employees of transportation agencies as well as from various nursery inspectors and plant quarantine officers throughout the United States.

The results of the work are summarized in tables 14 and 15. It will be noted that 1,043,687 shipments were checked at 23 points. The list of stations given in table 14 includes not only those where inspectors are employed regularly under the transit inspection project, but also those maintained cooperatively with the States and with other projects of the Bureau. The number of shipments found moving in violation of quarantine regulations totaled 1,680. In practically all cases these were returned to the shipper with information as to the quarantine requirements applying to the shipment concerned.

TABLE 14.—*Shipments of nursery stock and other plants and plant products inspected in transit during the fiscal year 1934*

Station	Shipments				Carloads
	Parcel post	Express	Freight	Total	
Albany, N. Y.	721	508	1,516	2,745	
Boston	26,204	38,302	17,822	82,328	15
Chicago	138,365	20,072	1,425	159,862	199
Cleveland	2,354	6,770	1,095	10,219	
Detroit	7,297	2,979	1,502	11,778	158
Indianapolis	6,581	11,140	2,507	20,228	
Jacksonville, Fla.	9,084	25,880	22,546	57,510	
Kansas City	32,081	6,920	317	39,318	
Mechanicville, N. Y.			1,712	1,712	
New Haven			875	875	
New York	132,165	25,383	817	158,365	112
Omaha and Council Bluffs	20,529	2,824	2,117	25,470	
Philadelphia	146,936	68,388	17,787	233,111	175
Pittsburgh	63,333	19,692	1,640	84,665	6
Portland, Oreg.	25,244	6,618	3,754	35,616	
St. Louis	51	42		93	
St. Paul and Minneapolis	28,768	4,497	2,799	36,064	1
Seattle	22,299	5,865	459	28,623	
Spokane	38,731	4,724	567	44,022	4
Washington, D. C., and Alexandria, Va.	4,423	4,828	1,832	11,083	3
Total	705,166	255,432	83,089	1,043,687	673

TABLE 15.—*Summary of shipments of nursery stock and other articles intercepted in violation of Federal plant quarantines* [1] *at transit inspection points, fiscal year 1934*

Station	Number of shipments intercepted in violation of quarantine—									
	No. 6	No. 38	No. 45	No. 48	No. 52	No. 53	No. 62	No. 63	No. 64	Total
Albany, N. Y.				1						1
Boston			118	216		4	3	2		343
Chicago		11	10	83	2	3	124	12	1	246
Cleveland			2	3						5
Detroit			3	5						8
Indianapolis				9						9
Jacksonville, Fla.			5	53	1		7	1		67
Kansas City	1		4	30			27	6	1	69
New Haven			6	2						8
New York			72	294		9	28	6		409
Omaha and Council Bluffs		1	2	26			46	9		84
Philadelphia			39	205		2	6	2		254
Pittsburgh				49			10		1	60
Portland, Oreg.						1	20	8		29
St. Paul and Minneapolis		2	1	4			4	1	1	13
Seattle		11		1		4	11	5		32
Spokane		3					2	3		8
Washington, D. C., and Alexandria, Va.			1	27			6	1		35
Total	1	28	263	1,008	3	23	294	56	4	[2] 1,680
Commercial		8	133	539	1	8	230	31	1	951
Noncommercial	1	20	130	469	2	15	64	25	3	729

[1] Quarantine no. 6 relates to date palm scales; no. 38, to black stem rust; no. 45, to the gypsy moth and brown-tail moth; no. 48, to the Japanese beetle; no. 52, to the pink bollworm; no. 53, to the satin moth; no. 62, to narcissus pests; no. 63, to the white pine blister rust; and no. 64, to the Mexican fruit worm.

[2] The total number of quarantine violations represents 1,593 shipments, of which 83 were in violation of 2 quarantines, and 2 were in violation of 3 quarantines.

The value of maintaining a transit-inspection program cannot be measured by the number of interceptions alone, as commercial shippers are well informed concerning the transit-inspection work and consequently make every attempt to comply with the quarantine regulations and avoid the interception and return of their shipments. Experience has shown that when the shipments of restricted articles out of any quarantined area are not checked regularly, shippers become careless, and pests may be distributed to new localities as a result.

In connection with cooperation with the States, the transit inspectors report to the State authorities shipments observed moving in violation of State quarantine requirements, although in the absence of statutory authority, such shipments are not intercepted and returned. Similar reports are made to State officials, as well as to the Post Office Department, with respect to parcel-post shipments of plant materials which do not bear a valid State nursery-inspection certificate in accordance with postal laws and regulations and State nursery-inspection requirements. Express and freight shipments which are not properly certified are also reported to the State officials. As a result of several years of this cooperative type of work it is noted that there has been a decided decrease in the numbers of noncertified or improperly certified shipments observed moving through transit-inspection points.

In addition to the work outlined, the transit-inspection organization has been engaged from time to time in related activities at destination markets. Among these have been the supervision of sterilization of fruit exposed to fruit-fly infestation where the fruit concerned is shipped to destination markets and treated there rather than at the point of origin. During the season when freight trains are particularly likely to be responsible for transporting Japanese beetles to new localities, the cleaning of refrigerator cars that have come from infested areas has been supervised by the transit inspectors, who have also seen to the destruction of the refuse. Japanese beetles also are sometimes carried with nonagricultural freight or unrestricted articles, such as potatoes, where their association with the product is entirely incidental, due to the clinging of the beetles to the outside of the sacks, and as far as time permitted, the transit inspectors have checked on products of this kind from infested areas.

In addition to the information given in table 14, 16,000 pounds of freight were inspected at Boston, and 60,311 pounds at Chicago. At Jacksonville, Fla., 650,287 waybills and 247,371 car lots were checked to determine whether the shipments might need to be inspected for compliance with plant-quarantine regulations. At Chicago similar information was secured through telephone calls and the checking of waybills covering 13,710 freight shipments weighing 4,137,185 pounds; and 175 empty cars from the area regulated under the Japanese beetle quarantine were inspected at that point to determine whether they had been cleaned sufficiently to free them from Japanese beetles.

In addition to the figures shown in table 15, the transit inspectors intercepted 84 shipments moving intrastate in violation of State quarantines relating to pests covered by Federal quarantines. Of these interceptions, 1 was made at Albany, 4 at Boston, 2 at New Haven, 63 at New York, 10 at Philadelphia, 3 at Pittsburgh, and 1 at Washington.

FOREIGN PLANT QUARANTINES

Twenty-four foreign plant quarantines and regulatory orders of the Department prohibiting or restricting the entry of various plants and plant products into the United States, 8 domestic quarantines affecting the movement of such material between the Territories of Hawaii and Puerto Rico and continental United States, and 4 miscellaneous regulatory measures are enforced through the Division of Foreign Plant Quarantines by inspectors and collaborators stationed at the more important ports of entry and at foreign-mail distributing points, and working in close cooperation with employees of other Government departments. Detailed information on these quarantines and orders is available in other publications.

Enforcement activities in connection with these quarantines and orders are more fully explained in succeeding sections and are accompanied by tables presenting in condensed form records indicating the scope of the work or summarizing its results.

RECORDS OF IMPORTS OF RESTRICTED PLANTS AND PLANT PRODUCTS

Under the various foreign quarantines and orders certain plants and plant products are restricted as to entry, are subject to inspection and, if necessary, disinfection, for the purpose of excluding plant diseases and insect pests. Among such restricted plants and plant products are nursery stock, plants, bulbs, and

seeds; fruits and vegetables; grains from certain countries; cotton, cotton waste, cotton wrappings (bagging), and cottonseed products; cottonseed, seed cotton, and cottonseed hulls from the Imperial Valley, Lower California, Mexico; certain packing materials; and elm logs from European countries. A record is given of the importation of the products inspected by inspectors of the Bureau and, if necessary, treated under their supervision.

IMPORTATIONS OF NURSERY STOCK, PLANTS, BULBS, AND SEEDS

The importations recorded in tables 16 to 19 inclusive, are entered under regulation 3 of Quarantine No. 37, under permits that are valid until revoked and which do not limit the quantity that may be imported. The restrictions under this regulation are intended merely to afford opportunity to inspect and, if necessary, to safeguard the products as they are entered. Table 16 records the number of importations of fruit and nut cuttings and scions, and of rose stocks inspected and, if necessary, treated, during the fiscal year 1934. This table also shows the total number of such importations similarly handled during the fiscal year 1933. A record of certain bulbs entered under permit subject to inspection and treatment is furnished in table 17. In addition to the importations of bulbs, corms, etc., recorded in this table, there were imported under the provisions of item 6, regulation 3, for propagation, 7½ pounds and 110 tubers of Jerusalem artichokes from England and France, and 79,365 pounds of onion sets from Greece, 1 pound from Australia, and 1 pound from England. Table 18 records the number of various kinds of bulbs entered under permit for each of the past 8 years. Table 19 shows the number of pounds of tree seeds imported under permit for the fiscal year 1934 and the countries of origin of such seeds.

TABLE 16.—*Importation of fruit and nut cuttings and scions, and of rose stocks under regulation 3, Quarantine No. 37, from the countries indicated, fiscal year 1934*

[Figures indicate number of plants]

Kind of stocks, cuttings, and scions	Austria	Canada	Cuba	Czechoslovakia	England	France	Greece	Hungary	Italy	Lithuania	Mexico
Cuttings and scions:											
Apple	35	141			302				6	18	
Apricot		28									
Avocado			130								11
Cherry		12									
Fig									234		
Grape		5,000		104			159	60	82,687		
Nut		595									
Peach											
Pear	125	45							6		
Pineapple											30
Plum		135							17		
Prune									6		
Spondias			16								
Rose stocks					1,676,000	35,000					
Total	160	5,956	146	104	1,676,302	35,000	159	60	82,956	18	41

Kind of stocks, cuttings, and scions	Netherlands	Poland	Rumania	Scotland	Sweden	Switzerland	Union of Soviet Socialist Republics	Yugoslavia	Total	
									1934	1933
Cuttings and scions:										
Apple			12		51				565	522
Apricot							35		63	
Avocado									141	
Cherry			5		31	61			109	40
Fig									234	561
Grape								41	88,051	6,630
Nut		408							1,003	
Peach			5						5	23
Pear			24		54				254	41
Pineapple									30	
Plum					8				160	135
Prune									6	
Spondias									16	
Rose stocks	4,790,150			35,000					6,536,150	6,453,382
Total	4,790,150	408	46	35,000	144	61	35	41	6,626,787	6,461,334

TABLE 17.—*Importation of bulbs under regulation 3, Quarantine No. 37, from countries indicated, fiscal year 1934*

[Figures indicate number of bulbs]

Bulbs	Australia	Bermuda	Canada	Canal Zone	China	Denmark	England	France	Germany	India	Ireland
Chionodoxa											
Convallaria							2,024		9,476,619		
Crocus							287				
Eranthis							6				
Fritillaria											6
Galanthus							4,158				
Hyacinth			406			2	66	309,200			
Ixia											
Lily		234,396	424	12	254		1,947	519,704		3,262	43
Muscari											
Narcissus [1]					12,600						
Scilla			900				1,082	3			
Tulip	45		7,512				542	87,250	58		
Total	45	234,396	9,242	12	12,854	2	10,112	916,157	9,476,677	3,262	49

Bulbs	Italy	Japan	Manchuria	Netherlands	Philippine Islands	Sweden	Switzerland	Union of South Africa	Total
Chionodoxa				437,072					437,072
Convallaria				26,850		6			9,505,499
Crocus				7,158,191					7,158,478
Eranthis				326,978					326,984
Fritillaria				319,825		24			319,855
Galanthus				756,685					760,843
Hyacinth		264		12,188,128					12,498,066
Ixia				187,136				89	187,225
Lily	5,367	15,031,729	100	306,530	30				16,103,798
Muscari				1,118,667					1,118,667
Narcissus [1]									12,600
Scilla				1,720,924					1,722,909
Tulip	2,500	8,000		68,260,106			25		68,366,038
Total	7,867	15,039,993	100	92,807,092	30	30	25	89	118,518,034

[1] The order of the Acting Secretary of Agriculture of Oct. 31, 1928, authorizes the importation of the Chinese sacred lily (*Narcissus tazetta* var. *orientalis*) into Hawaii for local use and distribution under permit and subject to inspection, under the provisions of regulation 3 of Quarantine No. 37.

TABLE 18.—*Summary of bulb importations under regulation 3, Quarantine No. 37, for fiscal years 1927–34*

[Figures indicate number of bulbs]

Bulbs	1927	1928	1929	1930
Chionodoxa	466,872	439,075	487,228	476,422
Convallaria	20,558,460	24,738,880	23,087,167	23,661,236
Crocus	9,969,070	8,775,467	9,886,546	8,075,439
Eranthis	144,150	135,842	143,592	188,611
Fritillaria	125,688	111,778	115,658	122,699
Galanthus	844,544	662,989	718,130	751,523
Hyacinth	23,711,178	22,127,888	21,450,547	20,255,057
Ixia	529,404	704,644	827,154	461,252
Lily	16,228,762	19,917,477	21,453,024	20,737,428
Muscari	993,339	1,150,220	1,639,982	1,473,455
Narcissus [2]				
Scilla	1,553,313	1,341,685	1,436,988	1,544,889
Tulip	129,681,036	161,940,818	191,959,162	163,604,912
Unclassified	11,112			
Total	204,816,928	242,046,763	273,205,178	241,352,923

TABLE 18.—*Summary of bulb importations under regulation 3, Quarantine No. 37, for fiscal years 1927–34*—Continued

Bulbs	1931	1932 [1]	1933 [1]	1934 [1]
Chionodoxa	548,465	518,885	416.247	437,072
Convallaria	17,273,064	16,015,817	10,192,434	9,505,499
Crocus	9,033,346	8,801,592	7,002,833	7,158,478
Eranthis	186,516	186,630	145,019	326,984
Fritillaria	166,174	137,052	128,629	319,855
Galanthus	918,613	800,922	645,216	760,843
Hyacinth	21,759,225	19,360,849	16,672,803	12,498,066
Ixia	368,982	326,796	114,816	187,225
Lily	19,561,911	17.370.254	15,196,118	16,103,798
Muscari	1,523,243	1,361,018	934,073	1,118,667
Narcissus [2]	----------	17,880	14,820	12,600
Scilla	1,699.123	1,618,579	1,254,181	1,722,909
Tulip	153,868,063	125,381,713	92,755,262	68,366,038
Total	226,906,725	191,897,981	145,472,445	118,518,034

[1] The summaries of importations for the fiscal years 1932, 1933, and 1934 include importations into Hawaii and Puerto Rico.

[2] Narcissus importations under regulation 3 of Quarantine No. 37 are limited to importations of the Chinese sacred lily (*Narcissus tazetta* var. *orientalis*), the entry of which is permitted into the Hawaiian Islands for local use and distribution in those islands only.

TABLE 19.—*Importation of tree seeds under regulation 3, Quarantine No. 37, from the countries indicated, fiscal year 1934*

[Figures indicate number of pounds]

Country of origin	Apple	Apricot	Banana	Cherry	Elm	Nut and palm	Ornamental and tree	Peach	Pear	Persimmon	Plum	Quince	Rose	Miscellaneous	Total
Algeria	----	----	----	----	----	----	1	----	----	----	----	----	----	----	1
Anglo-Egyptian Sudan	----	----	----	----	----	----	1	----	----	----	----	----	----	----	1
Argentina	----	----	----	----	----	----	1	----	----	----	----	----	----	----	1
Australia	----	----	----	----	----	21,113	34	----	----	----	----	----	----	1	21,148
Austria	130	----	----	72	----	----	27,322	----	73	----	----	----	6	----	27,603
Belgian Congo	----	----	----	----	----	1	----	----	----	----	----	----	----	----	1
Bolivia	----	----	----	----	----	----	----	----	----	----	----	----	----	2	2
Brazil	----	----	----	----	----	192	2	----	----	----	----	----	----	----	194
British Guiana	----	----	----	----	----	4	2	----	----	----	----	----	----	----	6
British Honduras	----	----	----	----	----	1	1	----	----	----	----	----	----	----	2
Canada	----	----	----	----	----	----	2,493	----	----	----	165	----	----	----	2,658
Canal Zone	----	----	----	----	----	----	1	----	----	----	----	----	----	----	1
Canary Islands	----	----	----	----	----	4	5	----	----	----	----	----	----	----	9
Cayman Islands	----	----	----	----	----	----	----	----	----	----	----	----	----	11	11
Chile	----	----	----	----	----	----	2	----	----	----	----	----	----	----	2
China	----	----	----	----	115	----	1,039	----	----	----	----	----	----	----	1,154
Cuba	----	----	----	----	----	3	8	----	----	----	----	----	----	----	11
Czechoslovakia	----	----	----	----	----	----	11,388	----	----	----	----	----	----	----	11,388
Denmark	200	----	----	4	----	4	213	----	25	----	----	----	4	----	450
Dominica	----	----	----	----	----	2	2	----	----	----	----	----	----	----	4
England	----	----	----	----	----	----	27	----	----	----	----	----	----	----	27
Finland	----	----	----	----	----	----	4	----	----	----	----	----	----	----	4
France	8,130	----	1	1,045	----	23	238	36	523	----	----	25	----	----	10,021
Germany	27	----	----	----	----	----	11,881	----	7	----	3	----	12	----	11,930
Gold Coast	----	----	----	----	----	4	----	----	----	----	----	----	----	----	4
Greece	----	----	----	----	----	----	2	----	----	----	----	----	----	----	2
Guam	----	----	----	----	----	3	----	----	----	----	----	----	----	----	3
Guatemala	----	----	----	----	----	----	1	----	----	----	----	----	----	----	1
Honduras	----	----	----	----	----	2	3	----	----	----	----	----	----	----	5
Hungary	----	----	----	----	----	----	937	----	----	----	----	----	----	----	937
India	----	1	----	----	----	5	71	2	----	----	----	----	----	----	79
Iraq	----	----	----	----	----	----	1	----	----	----	----	----	----	----	1
Ireland	----	----	----	----	----	----	1	----	----	----	----	----	----	----	1
Italy	----	----	----	20	----	----	14,501	----	----	----	50	----	----	----	14,571
Jamaica	----	----	----	----	----	4	2	----	----	----	----	----	----	----	6
Japan	----	----	----	----	879	248	1,371	22	436	12	----	----	88	----	3,056
Java	----	----	----	----	----	1	----	----	----	----	----	----	----	----	1
Kenya	----	----	----	----	----	9	----	----	----	----	----	----	----	----	9
Manchuria	----	----	----	----	1	2	96	----	----	----	----	----	----	----	99
Mauritius	----	----	----	----	----	21	----	----	----	----	----	----	----	----	21
Mexico	----	----	4	----	----	----	103	----	----	----	----	----	----	3	110
Morocco	----	----	----	----	----	----	5	----	----	----	----	----	----	----	5
Netherlands	----	----	----	----	----	----	27	----	----	----	----	----	----	----	27

TABLE 19.—*Importation of tree seeds under regulation 3, Quarantine No. 37, from the countries indicated, fiscal year 1934*—Continued

[Figures indicate number of pounds]

Country of origin	Apple	Apricot	Banana	Cherry	Elm	Nut and palm	Ornamental and tree	Peach	Pear	Persimmon	Plum	Quince	Rose	Miscellaneous	Total
New Zealand							141								141
Nyasaland						1									1
Palestine							4								4
Philippine Islands							15							1	16
Portugal														1	1
Scotland							14								14
Society Islands							1								1
Sierra Leone						11									11
Straits Settlements						6									6
Tanganyika Territory						6	2								8
Trinidad						205									205
Turkey							22								22
Uganda						2									2
Union of South Africa							11								11
Union of Soviet Socialist Republics							7,631								7,631
Yugoslavia							5								5
Total [1]	8,487	1	5	1,141	995	21,877	79,632	60	1,064	12	218	25	110	19	113,646

[1] In addition to the seeds indicated in this table, 341 small mail packages of miscellaneous seeds were imported into continental United States from 57 foreign countries. The following were imported into Puerto Rico: 1,626 pounds of seeds of ornamentals and trees from the Dominican Republic, Guadeloupe, India, and the Virgin Islands; into Hawaii the following: 3 packages and 158 pounds of nut and palm seeds, 21 packages and 51 pounds of seeds of ornamentals and trees, and 3 packages of miscellaneous seeds from Australia, Canal Zone, Ceylon, China, Cuba, Fiji Islands, France, Germany, Guatemala, India, Japan, Marshall Islands, New Zealand, Philippine Islands, Samoa, Siam, Straits Settlements, and the Union of South Africa.

In addition to the foregoing, there were imported from the Dominion of Canada under regulation 15, Quarantine No. 37, 8,859,163 bulbs, plants, trees, and cuttings, as compared with 119,990 during the fiscal year 1933. This enormous increase is attributable to the inclusion of 7,795,945 spruce seedlings and 850,053 pine seedlings (other than 5-leafed pines) for reforestation purposes. To authorize the importation of material under the provisions of said regulation, 746 permits were issued during the fiscal year 1934, as compared with 696 permits issued during the fiscal year 1933.

The record of entry under special permits issued under the provisions of regulation 14 of Quarantine No. 37 for the purpose of keeping the country supplied with new, improved, or unavailable varieties and necessary propagating stock and for experimental, educational, or scientific purposes, is furnished in table 20.

TABLE 20.—*Special-permit importations, fiscal year 1934, with combined total for the fiscal years 1920–34*

Class of plants	Fiscal year 1934				Total for fiscal years 1920–34			
	Permits issued		Importations under permits		Permits issued		Importations under permits	
	Number	Quantity authorized	Number	Quantity imported	Number	Quantity authorized	Number	Quantity imported
Dahlia	116	4,366	99	2,579	959	62,747	823	44,862
Gladiolus	102	105,578	85	82,351	2,091	50,908,749	1,768	28,812,978
Iris, bulbous	36	624,690	17	160,023	1,627	54,252,379	1,389	39,353,487
Iris, rhizomatous	63	4,248	49	1,131	1,629	297,910	1,429	159,992
Narcissus	73	1,140,709	53	265,950	1,474	164,220,442	1,229	79,486,003
Orchid	225	14,832	182	9,415	2,340	259,277	2,073	198,783
Peony	38	844	23	311	1,297	1,399,933	1,066	685,153
Rose	67	3,249	57	2,821	1,520	274,237	1,352	195,549
Fruit (trees and small fruits)	32	2,294	15	1,029	259	23,110	178	11,208
Herbaceous	160	16,394	125	11,895	1,879	4,887,373	1,507	3,056,929
Miscellaneous bulbs, roots, etc	181	76,662	125	34,860	2,088	13,106,154	1,788	6,864,157
Ornamental	324	138,938	333	95,881	2,885	4,131,961	2,601	2,391,810
Total		2,132,804		668,246		293,824,272		161,260,911

During the year 1,340 permits were issued authorizing the entry of 2,132,804 plants, bulbs, etc. A total of 668,246 plants, bulbs, etc., were imported as compared with 3,128,294 in 1933. The great disparity between the quantity authorized entry and the quantity actually imported during the year is explained in part by the fact that permits have been issued during this year for several relatively large bulb importations to be made early in the fiscal year 1935. Increased importations, as compared with those in 1933, are noted for dahlias, fruits (trees and small fruits), and ornamentals. In the last group 47,737 more plants, etc., were imported than in 1933. Bulbous iris importations were 1,634,566 bulbs less, and narcissus importations 810,406 bulbs less than in 1933. Proportionately large decreases in quantities imported are also noted in the case of peonies, roses, and the herbaceous group and miscellaneous bulbs, roots, etc. Sixty-two percent of the importations were authorized entry by mail as compared with 71 percent so authorized in 1933. A summary of special permits issued during the entire period of the quarantine to June 30, 1934, is given in table 21. The distribution of special-permit material by States is shown in table 22, which is cumulative.

TABLE 21.—*Special-permit importations, yearly totals for the fiscal years 1920–34*

Fiscal year	Permits issued		Importations under permits	
	Number	Quantity authorized	Number	Quantity imported
1920	311	10,752,844	171	3,484,195
1921	623	13,965,113	411	8,132,634
1922	751	9,573,223	519	3,344,050
1923	902	15,176,718	723	10,358,921
1924	1,115	15,381,913	869	12,561,574
1925	1,249	9,518,620	1,099	8,575,741
1926	1,465	80,983,487	1,220	6,022,041
1927	1,480	54,008,092	1,279	46,625,648
1928	1,638	37,955,017	1,386	24,645,001
1929	1,389	16,981,012	1,377	17,972,441
1930	1,343	11,219,533	1,102	2,073,116
1931	1,418	8,230,924	1,300	10,121,457
1932	1,306	6,276,579	1,195	3,547,552
1933	1,145	1,668,393	1,074	3,128,294
1934	1,340	2,132,804	1,007	668,246
Total	17,475	293,824,272	14,732	161,260,911

NOTE.—The disparity in the number of bulbs, plants, etc., imported, as compared with the number authorized entry, may be explained by the fact that permits for some classes of plants, particularly narcissus and bulbous iris, are usually issued during one fiscal year and the importations made during the following fiscal year.

TABLE 22.—*Distribution, by States, showing number of plants, bulbs, etc., of special-permit material imported for the fiscal years 1920–34*

State or Territory	Dahlia	Gladiolus	Iris, bulbous	Iris, rhizomatous	Narcissus	Orchid	Peony
Alabama		15,115	30,980		6,000		50
Arizona	14	12			1,000	14	
Arkansas			20,000				
California	6,952	1,935,544	11,125,148	34,931	5,680,516	42,092	4,192
Colorado	66	53,248	33,490			2,055	150
Connecticut	1,305	16,744	84,822	1,584	57,735	1,982	113
Delaware		2,000	169,300	22	28	2,128	1,018
District of Columbia	166	519	215	93	325	397	
Florida		48,930	357,362		6,915,130	3,607	
Georgia	360	9,210	330,479	181	14,760		
Hawaii	12	298		534		11,118	
Idaho		1,618	2,534	24			
Illinois	1,326	3,290,726	901,938	15,781	306,410	2,451	48,021
Indiana	238	2,390,112	502,765	3,126	1,414	360	10,213
Iowa		112,225	10,035	10	250		24,012
Kansas	99		32	2,263	141		3,070
Kentucky	408		51,200	1	564	415	133
Louisiana	129	2,695	32,744		10,363	2,070	
Maine		350		43		24	262
Maryland	576	41,906	844,490	413	1,923,725	648	20,833

TABLE 22.—*Distribution, by States, showing number of plants, bulbs, etc., of special-permit material imported, for the fiscal years 1920–34*—Continued

State or Territory	Dahlia	Gladiolus	Iris, bulbous	Iris, rhizomatous	Narcissus	Orchid	Peony
Massachusetts	2,537	3,461,497	542,687	3,732	102,539	29,127	6,828
Michigan	4,535	12,386,054	1,188,486	3,920	2,642,402	730	87,719
Minnesota	280	89,394	345	3,505	11,000	822	7,549
Mississippi	49	6,500	52,776	9	9,260	----------	----------
Missouri	253	3,173	281,211	641	1,238	4,910	991
Montana	----------	32	----------	----------	----------	----------	----------
Nebraska	276	1,142	----------	----------	----------	----------	14
New Hampshire	7	40,065	21,862	73	147	211	----------
New Jersey	8,410	130,069	1,177,696	11,515	1,283,993	30,135	41,069
New Mexico	----------	----------	5,123	6	270	----------	----------
New York	5,319	2,659,437	6,280,364	45,360	16,026,838	38,193	223,129
North Carolina	82	775,417	6,245,895	15	1,623,355	1,045	----------
North Dakota	----------	105,389	----------	----------	----------	----------	7
Ohio	3,165	495,131	67,129	20,786	1,307	720	129,396
Oklahoma	----------	510	14,000	----------	----------	----------	----------
Oregon	2,071	77,000	1,331,936	1,761	2,767,531	----------	2,831
Pennsylvania	2,154	394,156	462,768	2,997	3,569,418	20,335	53,983
Puerto Rico	----------	----------	----------	----------	----------	786	----------
Rhode Island	1,079	4,040	258,101	1,599	371,800	157	5,209
South Carolina	----------	----------	297,500	2	8,890,684	19	----------
South Dakota	----------	1,701	----------	54	----------	----------	2,443
Tennessee	623	----------	194,002	823	839,808	----------	242
Texas	1	2,000	961,669	50	7,766,143	30	----------
Utah	7	1,131	30,750	----------	11,400	----------	----------
Vermont	----------	32,325	8,010	36	----------	----------	2,359
Virginia	313	20,465	2,919,363	4	5,611,863	66	1,692
Washington	1,747	148,846	2,400,316	3,555	12,767,396	1,036	3,660
West Virginia	37	230	4,000	----------	----------	----------	----------
Wisconsin	266	56,022	109,964	543	269,250	1,100	3,965
Total	44,862	28,812,978	39,353,487	159,992	79,486,003	198,783	685,153

State or Territory	Rose	Fruit [1]	Herbaceous [1]	Miscellaneous bulbs, roots, etc.[1]	Ornamental	Total
Alabama	174	----------	115	335	1,879	54,648
Arizona	9	----------	239	4	5,413	6,705
Arkansas	50	----------	----------	----------	----------	20,050
California	43,412	568	5,144	136,598	2,105,800	21,120,897
Colorado	----------	----------	100	----------	5,887	94,996
Connecticut	31,608	10	2,572	565	158,115	357,155
Delaware	----------	----------	42	175	5,319	180,032
District of Columbia	379	----------	6	808	391	3,299
Florida	21	----------	321	86,268	279,454	7,691,093
Georgia	108	2	1	185	3,387	358,673
Hawaii	----------	1,428	13	1,910	4,958	20,271
Idaho	----------	----------	43	377	45	4,641
Illinois	10,271	7	3,426	6,165	230,660	4,817,182
Indiana	2,792	6	751	7,986	30,862	2,950,625
Iowa	----------	875	163	180	14,373	162,123
Kansas	60	----------	50	133	574	6,422
Kentucky	2	----------	92	----------	64	52,879
Louisiana	190	----------	111	773	1,831	50,906
Maine	----------	----------	202	980	1,013	2,874
Maryland	4,855	21	1,058	2,083	79,362	2,919,970
Massachusetts	3,466	24	1,636	4,781	438,584	4,597,438
Michigan	335	----------	16,831	17,217	574,370	16,922,599
Minnesota	160	----------	12	3,686	35,640	152,393
Mississippi	70	----------	----------	5	252	68,921
Missouri	----------	----------	274	167	19,803	312,661
Montana	----------	----------	----------	----------	100	132
Nebraska	----------	----------	14	----------	531	1,977
New Hampshire	----------	6	222	646	1,568	64,807
New Jersey	41,737	463	71,730	23,269	2,751,314	5,571,400
New Mexico	----------	----------	----------	12	----------	5,411
New York	29,208	870	57,715	325,541	3,117,487	28,809,461
North Carolina	2	----------	4	20,555	774	8,667,144
North Dakota	1	----------	----------	53	----------	105,450
Ohio	5,267	164	10,982	16,253	777,735	1,528,035
Oklahoma	----------	----------	----------	----------	202	14,712
Oregon	2,190	----------	680	72,508	55,292	4,313,800

[1] Prior to 1929 this material was recorded under ornamentals, etc.

TABLE 22.—*Distribution, by States, showing number of plants, bulbs, etc., of special-permit material imported for the fiscal years 1920–34*—Continued

State or Territory	Rose	Fruit	Herbaceous	Miscellaneous bulbs, roots, etc.	Ornamental	Total
Pennsylvania	13,187		653	12,203	256,560	4,788,414
Puerto Rico			400		335	1,521
Rhode Island	552		173	2,239	46,491	691,440
South Carolina			73	33	68	9,188,379
South Dakota	3,213		12		896	8,319
Tennessee	87	64		1,623	3,465	1,040,737
Texas	808	36	10		76,401	8,807,148
Utah				21	4,747	48,056
Vermont				98	2,621	45,449
Virginia	16		129	4,644	46,137	8,604,692
Washington	799	3	1,461	33,551	162,853	15,525,223
West Virginia			12		36	4,315
Wisconsin	520		1,134	2,636	50,036	495,436
Total	195,549	4,547	178,606	787,266	11,353,685	161,260,911

IMPORTATION OF ELM LOGS UNDER QUARANTINE NO. 70

Notice of Quarantine No. 70, on account of the Dutch elm disease, was approved October 21, 1933, and became effective the same date. Under the provisions of this quarantine elm logs have been imported from Europe subject to hot-water treatment as follows: Through the port of Baltimore, 5 logs; New York, 33 logs; and Norfolk, 6 logs, or a total of 44 logs. Hot-water treatment was applied to these logs at the places where they were to be converted into veneers, namely: Indianapolis, 29 logs; Long Island City, 2 logs; New York, 7 logs; and Portsmouth, Va., 6 logs.

IMPORTATIONS OF COTTON, COTTON WRAPPINGS (BAGGING), SEED COTTON, AND COTTONSEED PRODUCTS

Tables 23 to 26, inclusive, indicate, respectively, the importations during the fiscal year of cotton, cotton waste, cotton wrappings (bagging), seed cotton, and cottonseed products, which were inspected and, when necessary, fumigated or otherwise treated under supervision. The actual number of bales of cotton, cotton waste, and bagging is indicated, and inasmuch as bales vary in size they are referred to as running bales.

TABLE 23.—*Importation of running bales of ginned cotton, by country of growth and port of entry, fiscal year 1934*

Country	Boston	Calexico	Galveston	Houston	New Orleans	Newport	New York	Niagara Falls
Anglo-Egyptian Sudan	8,804							
Argentina	5							
British West Indies	12						25	
China	592						3,571	
Colombia							1	
Dutch East Indies	133						599	
Egypt	50,155						19,977	
Haiti							1	
India	6,765						22,405	
Japan							137	
Mexico		4,832					2,494	
Nigeria	107							
Peru	724						1,107	
United States (returned)	475		1,961	164	1	18	59	91
Unknown							216	
Total	67,772	4,832	1,961	164	1	18	50,592	91

TABLE 23.—*Importation of running bales of ginned cotton, by country of growth and port of entry, fiscal year 1934*—Continued

Country	Portland	Rouses Point	St. Albans	San Francisco	San Pedro	Seattle	Vanceboro	Total
Anglo-Egyptian Sudan								8,804
Argentina								5
British West Indies								37
China	252			11,657	100	4,601		20,773
Colombia								1
Dutch East Indies				304				1,036
Egypt								70,132
Haiti								1
India	50			1,568	1,470	50		32,308
Japan								137
Mexico				2,779	1,332			11,437
Nigeria								107
Peru								1,831
United States (returned)		1	77				291	3,138
Unknown								216
Total	302	1	77	16,308	2,902	4,651	291	[1] 149,963

[1] Includes 6,064 bales of linters.

TABLE 24.—*Importation of running bales of cotton waste, by country of origin and port of entry, fiscal year 1934*

Country	Baltimore	Boston	Buffalo	Charleston	Houston	Malone	Newport	New York	Niagara Falls	Norfolk
Belgium		1,309						2,449		
Canada		209	216			54	344		50	
China	200	1,469						6,910		50
Colombia								3		
England		8,639		30	5			4,611		
France		514						4,311		
Germany		1,183		49				1,678		
India		353						10,195		150
Italy								248		
Japan					120			654		
Mexico								31		
Netherlands	97	1,866		222				8,180		250
Scotland		25								
Spain								2,334		
United States (returned)		10							5	
Total	297	15,577	216	301	125	54	344	41,604	55	450

Country	Philadelphia	Richford	Rouses Point	St. Albans	San Francisco	San Pedro	Savannah	Seattle	Tacoma	Vanceboro	Total
Belgium											3,758
Canada		12	135	1,240						5	2,265
China	5,873				400	1		100			15,003
Colombia											3
England	233						138				13,656
France	50						134				5,009
Germany	41						26				2,977
India	50				935						11,683
Italy											248
Japan	2,505				50	505		918	120		4,872
Mexico											31
Netherlands											10,615
Scotland											25
Spain											2,334
United States (returned)											15
Total	8,752	12	135	1,240	1,385	506	298	1,018	120	5	72,494

TABLE 25.—*Importation of running bales of bagging, by country of origin and port of entry, fiscal year 1934*

Country	Baltimore	Beaumont	Boston	Buffalo	Charleston	Detroit	Galveston	Houston	Lake Charles	New Orleans	Newport	New York
Australia												2
Austria					454			233				
Belgium	961		659		141		799	1,145		2,100		4,351
Bermuda												18
Canada			3,143	134		4,336					133	1,170
China	615											24
Cuba	37						903			1,909		894
Czechoslovakia					503					43		
Egypt			430									2,601
England	1,674		546		2,017		22,321	4,714		10,053		2,910
France	76		673				2,843	10,174		998		4,920
Germany			217		890		11,110	7,366	514	1,136		3,334
India		50	306							1,905		
Ireland												175
Italy								8,330		3,186		2,276
Japan	1,595				10,020		5,955	1,200		227		654
Netherlands	989		147		324		2,687	3,675		4,369		3,046
Poland					252							1
Portugal							335	331		134		656
Puerto Rico												861
Scotland	429		318				41,565	2,200		10,991		3,184
Spain	235							438		80		3,270
Sweden												180
Wales												97
Total	6,611	50	6,439	134	14,601	4,336	88,518	39,806	514	37,131	133	34,624

Country	Niagara Falls	Norfolk	Philadelphia	Port Huron	Ranier	Rouses Point	St. Albans	San Francisco	San Pedro	Savannah	Seattle	Total
Australia												2
Austria		418								385		1,490
Belgium		1,275	286							1,989		13,706
Bermuda												18
Bulgaria		153										153
Canada	328			2,121	39	332	735					12,471
Canal Zone			3									3
China			204					580	1,401	2,541		5,365
Cuba												3,743
Czechoslovakia		1,406										1,952
Egypt												3,031
England		6,230	3,073							5,123		58,661
France		1,240	64							850		21,838
Germany		4,751	13							1,870		31,201
India		300										2,561
Ireland												175
Italy		1,501										15,293
Japan		3,620	1,200					1,998	1,420	400	3,711	32,000
Netherlands		1,511								1,551		18,299
Poland		330										583
Portugal												1,456
Puerto Rico		397										1,258
Scotland		210										58,897
Spain		1,680										5,703
Sweden		195										375
Wales												97
Total	328	25,217	4,843	2,121	39	332	735	2,578	2,821	14,709	3,711	290,331

TABLE 26.—*Importation of seed cotton, cottonseed hulls, and cottonseed products, fiscal year 1934*

Port	Seed cotton	Cottonseed hulls	Cotton-seed cake	Cotton-seed meal	Cotton-seed oil
	Pounds	*Pounds*	*Pounds*	*Pounds*	*Gallons*
Calexico		3,699,804			
El Paso			1	30	2
Hidalgo					10
New York			5		
San Luis, Ariz	40,617				
Total	[1] 40,617	[1] 3,699,804	6	30	12

[1] Entry of cottonseed, seed cotton, and cottonseed hulls grown in the Imperial Valley, Baja California, Mexico, is allowed under permit. No cottonseed was imported this year.

In addition, the Bureau supervised the entry of 13,135 samples of cotton, cotton linters, and cotton waste imported by freight, express, and parcel post and as passenger baggage.

IMPORTATIONS OF GRAIN AND BROOMS

Table 27 shows the importations of shelled corn inspected under the provisions of Quarantine No. 41.

TABLE 27.—*Importation of clean shelled corn under Quarantine No. 41, by country of growth, fiscal year 1934*

Country	Pounds [1]	Country	Pounds [1]
Anglo-Egyptian Sudan	1	Haiti	138,252
Argentina	5,420,792	Mexico	720,610
Canada	679	Peru	5
Colombia	88	Union of South Africa	442
Cuba	1,790,652	Union of Soviet Socialist Republics	13
Dominican Republic	5,359,677	United States (returned)	2,410
Egypt	5		
England	12,756	Total	13,446,385
France	3		

[1] To the nearest pound.

In addition, inspection was made under Quarantine No. 41 of the following: Broomcorn, 345 bales; brooms made of broomcorn, 15,466; corn on cob, green, 73,409 pounds; corn on cob, mature, 1,033 ears; jobs-tears, 101 pounds; sorghum seed, 5 pounds; and Sudan grass, 3,060 pounds.

The Bureau supervised also the entry under Quarantine No. 24 of 600,118 pounds of shelled corn; and under Quarantine No. 55 of 56,002 pounds of seed or paddy rice; 1,165 bales of rice straw and 7 bales of rice straw matting.

IMPORTATIONS OF FRUITS AND VEGETABLES

Tables 28 and 29 show, by countries of origin and ports of entry, respectively, the kinds and quantities of fruits and vegetables imported into the continental United States and into Hawaii and Puerto Rico during the fiscal year under permit and subject to inspection at the port of first arrival under the provisions of Quarantine No. 56 and under the regulations governing the importation of potatoes into the United States.

TABLE 28.—*Fruits and vegetables imported fiscal year 1934, by countries of origin*

[Imported under Quarantine No. 56 unless otherwise designated]

Kind	Country and quantity	Total
Apple---pounds	England, 4; Netherlands, 172; New Zealand, 225,800; Switzerland, 30.	226,006
Apricot---do	Chile, 288	288
Aralia cordata---do	China, 168; Japan, 977	1,145
Arrowhead---do	China, 173,858; Japan, 400	174,258
Asparagus---do	Argentina, 57,656; Mexico, 70	57,726
Avocado---do	Cuba, 6,118,243; Dominican Republic, 10; Mexico (seeds removed), 25,187.	6,143,440
Balsamapple---do	Cuba, 13,026; Mexico, 1,013	14,039
Banana---bunches	BritishHonduras,159,346; Colombia, 1,774,346; Costa Rica, 3,360,774; Cuba, 3,613,304; Dominica, 89; Dominican Republic, 6,634; Ecuador, 637,842; Guatemala, 3,515,969; Haiti, 40,433; Honduras, 13,157,761; Jamaica, 319,476; Mexico, 6,927,000; Nicaragua, 2,993,550; Panama (including Canal Zone), 5,102,159; St. Lucia, 187; Virgin Islands, 7.	41,608,877
Bean (green):		
Faba---pounds	Mexico, 82	82
Lima---do	Cuba, 3,605,265; Mexico, 48,997	3,654,262
String---do	Cuba, 259; Mexico, 1,219,940	1,220,199
Beet---do	Bermuda, 2,500; Mexico, 266,019; Newfoundland, 20	268,539
Berry (*Rubus*)---do	Newfoundland, 10; Norway, 484	494
Breadfruit---do	Cuba, 32	32
Brussels sprouts---do	Mexico, 1	1
Burdock---do	Japan, 550	550
Cabbage---do	Cuba, 30,276; Mexico, 27,388; Netherlands, 368,714; Newfoundland, 20.	426,398
Cacao bean pod---do	Costa Rica, 342; Trinidad, 235	577
Carrot---do	Mexico, 410,036; Newfoundland, 20	410,056
Cassava---do	Cayman Islands, 125; China, 1,400; Cuba, 120,021; Dominican Republic, 153; Panama, 150.	121,849
Cauliflower---do	Mexico, 1,614	1,614
Celery---do	Mexico, 25	25
Chayote---do	Cuba,8,101; Dominican Republic,2,783; Mexico,3,180.	14,064
Cherry:		
Dried, sour---do	Czechoslovakia, 12,090; Italy, 142,600; Yugoslavia, 992,536.	1,147,226
Fresh---do	Chile, 4,663	4,663
Chinese watermelon---do	Cuba, 5,576	5,576
Cipollino---do	Italy, 44; Morocco, 2,331,932	2,331,976
Citrus medica---do	Albania, 3,122; Greece, 1,377; Italy, 960; Palestine, 22,967.	28,426
Clover top---do	Mexico, 193	193
Coriander---do	Mexico, 287	287
Cowpea---do	Mexico, 24	24
Crescentia alata---do	Mexico, 190	190
Crosnes---do	Belgium, 397	397
Cucumber---do	Cuba, 1,435,885; Mexico, 7,502	1,443,387
Dasheen (includes colocasia, inhame, malanga, taro, and yautia)---pounds	Azores, 261,213; China, 357,835; Cuba, 82,140; Haiti, 156; Dominican Republic, 1,704,728; Mexico, 2,409; Japan, 151,500; Panama (including Canal Zone), 5.	2,559,986
Eggplant---do	Cuba, 3,615,774; Mexico, 138,610	3,754,384
Endive---do	Belgium, 786,695	786,695
Garbanzo---do	Mexico, 25	25
Garlic---do	Argentina, 683; Azores, 12; Belgium, 7,091; Chile, 2,797,451; China, 1,780; Hungary, 487,647; Italy, 745,817; Mexico, 637,844; Morocco, 247; Spain, 1,880,939.	6,559,511
Ginger (crude)---do	China, 340,861; Cuba, 52,250; Dominican Republic, 583; Japan, 1,013; Mexico, 24.	394,731
Grape:		
Fresh (not hothouse)---do	Argentina, 10,299,495; Chile, 992,776; Mexico, 517	11,292,788
Hothouse---do	Belgium, 78,093	78,093
Processed---do	Italy, 48,982	48,982
Grapefruit---do	Cuba, 2,287,376	2,287,376
Horseradish---do	Denmark, 4,249; Japan, 125; Sweden, 24,660	29,034
Husk tomato---do	Mexico, 6,965	6,965
Japanese horseradish---do	China, 420; Japan, 432	852
Kale---do	Bermuda, 223,940; Mexico, 18	223,958
Kohlrabi---do	Mexico, 34	34
Kudzu---do	China, 61,856	61,856
Leek---do	Mexico, 6	6
Lemon---do	Argentina, 440; Azores, 36; Cuba, 45; Italy, 3,805,191; Jamaica, 375; Mexico, 124.	3,806,211
Lettuce---do	Mexico, 35,566	35,566
Lily bulb (edible)---do	China, 24,282; Japan, 20	24,302
Lime (sour)---do	Antigua, 3,240; British Guiana, 2,560; Chile, 1,240; Costa Rica, 288; Cuba, 9,201; Dominica, 582,446; Dominican Republic, 6,795; Grenada, 9,310; Haiti, 3,154; Honduras, 37,701; Jamaica, 214,665; Mexico, 4,737,128; Montserrat, 233,851; Nicaragua, 783; St. Lucia, 478,526; St. Vincent, 3,480; Samoa, 20; Spain,8,675; Trinidad, 184,530; Virgin Islands, 8,615.	6,526,208

TABLE 28.—*Fruits and vegetables imported fiscal year 1934, by countries of origin*—Continued

Kind	Country and quantity	Total
Litchi fruit (in brine)—pounds	China, 20	20
Mango (seeds removed, frozen)—do	Philippine Islands, 114,408	114,408
Melon—do	Argentina, 339,186; Chile, 4,988,154; Italy, 390; Mexico, 2,083,110; Spain, 533,696; Uruguay, 1,770.	7,946,306
Mint—do	Mexico, 24	24
Mustard—do	Cuba, 2,939; Mexico, 102,801	105,740
Nectarine—do	Belgium, 90; Chile, 305,679	305,769
Nopale—do	Mexico, 15	15
Nuts:		
Acorn—do	Turkey, 25,426,014	25,426,014
Chestnut—do	China, 25,445; Italy, 8,229,038; Japan, 836,645; Portugal, 3,117,693; Philippine Islands, 50; Spain, 979,430.	13,188,301
Okra—do	Cuba, 1,355,706; Mexico, 37,367	1,393,073
Onion—do	Argentina, 10; Australia, 65,447; Azores, 30; Bermuda, 320; Chile, 2,374,166; Egypt, 99,448; Italy, 1,768,546; Mexico, 111,422; Netherlands, 44,800; New Zealand, 2,900; Spain, 414,427; Virgin Islands, 50.	4,881,566
Orange:		
Under Quarantine No. 56—do	Cuba, 35,625	35,625
Mandarin (Quarantine No. 28)—do	Japan, 1,499,040	1,499,040
Papaya:		
Natural—do	Cuba, 7,850; Dominican Republic, 60	7,910
Frozen—do	Philippine Islands, 88	88
Parsley—do	Bermuda, 3,040; Mexico, 17,582	20,622
Parsnip—do	Mexico, 5; Newfoundland, 20	25
Pea—do	Cuba, 1,951; Mexico, 4,872,245	4,874,196
Peach:		
Fresh—do	Argentina, 18,626; Chile, 175,575	194,201
Hothouse—do	Belgium, 10	10
Pear—do	Chile, 20,526; England, 15	20,535
Pepper—do	Cuba, 1,799,589; Mexico, 1,226,335	3,025,924
Peppermint—do	Cuba, 119	119
Pigeonpea—do	Cuba, 145	145
Pigweed—do	Mexico, 585	585
Pineapple—crates	Azores, 6; Costa Rica, 74; Cuba, 623,977; Dominican Republic, 6; Ecuador, 199; Haiti, 10; Honduras, 165; Mexico, 28,467; Panama (including Canal Zone), 11; Philippine Islands, 115; Portugal, 13.	653,043
Plantain—pounds	British Honduras, 227,950; Costa Rica, 648; Cuba, 2,054,899; Dominican Republic, 10,426,549; Ecuador, 2,250; Guatemala, 75; Haiti, 46,570; Honduras, 887,730; Mexico, 39,900; Nicaragua, 2,290; Panama (including Canal Zone), 680,630; Venezuela, 87,299.	14,456,790
Plum—do	Argentina, 14,358; Chile, 72,356	86,714
Potato:		
Under Quarantine No. 56—do	Bermuda, 1,667,156	1,667,156
Under potato regulations (order of Dec. 22, 1913)—pounds	Cuba, 15,000; Estonia, 2,200,551; Mexico, 147,258; Spain, 297,281.	2,660,090
Pricklypear—do	Mexico, 1,617	1,617
Pumpkin—do	Cuba, 96,548; Dominican Republic, 54,814; Mexico, 19,573; Panama (including Canal Zone), 30.	170,965
Purslane—do	Mexico, 1,710	1,710
Radish—do	Mexico, 129,158	129,158
St. Johns bread—do	Crete, 168,400; Cyprus, 537,600; Greece, 521,834; Italy, 474,549.	1,702,383
Salsify—do	Mexico, 3,418	3,418
Shallot—do	Netherlands, 5,000	5,000
Spinach—do	Mexico, 54,440	54,440
Squash—do	Bermuda, 6; Cuba, 11,720; Mexico, 160,773	172,499
Strawberry—do	Mexico, 4,316	4,316
Sweetpotato [1]—do	China, 7,461	7,461
Swiss chard—do	Mexico, 3,949	3,949
Tamarind bean pod—do	Antigua, 70,531; Barbados, 8,008; Cuba, 810; India, 40,320; Mexico, 2,459; St. Lucia, 12,800.	134,928
Tomato—do	Bermuda, 1; Cuba, 29,009,614; Dominican Republic, 100; Egypt, 3,735; Mexico, 14,307,151; Virgin Islands, 177,702.	43,498,303
Turnip—do	Mexico, 324,520; Newfoundland, 33,020	357,540
Vaccinium (cranberry, etc.):		
Natural—do	Estonia, 265; Newfoundland, 643,493; Norway, 535	644,293
Frozen—do	Newfoundland, 3,416,220	3,416,220
Water caltrop—do	China, 15,530; Japan, 15	15,545
Waterchestnut—do	China, 1,888,802	1,888,802
Watercress—do	Mexico, 5,007	5,007
Waterlily root—do	China, 18,828; Cuba, 40,946	59,774
Waterlily seed pod—do	Cuba, 166	166
Watermelon—do	Cuba, 218,520; Mexico, 1,312,647	1,531,167
Yam [1]—do	China, 26,896; Japan, 15,740	42,636
Yam bean root—do	China, 19,810; Mexico, 531	20,341

[1] These sweetpotatoes and yams were imported into Hawaii. Although the importation of sweetpotatoes and yams into continental United States is prohibited by quarantines 29 and 30, that prohibition does not apply to Hawaii or Puerto Rico.

TABLE 29.—*Fruits and vegetables imported fiscal year 1934, by ports of entry*

[Imported under Quarantine No. 56 unless otherwise designated]

Kind	Port and quantity	Total
Apple---pounds	Detroit, 4; New York, 226,002	226,006
Apricot---do	New York, 288	288
Aralia cordata---do	Los Angeles, 168; Hawaii (all ports), 977	1,145
Arrowhead---do	Boston, 9,000; Buffalo, 16,400; Hawaii (all ports), 27,770; Los Angeles, 3,000; New York, 28,600; Niagara Falls, 7,000; Portland, 1,000; San Francisco, 71,300; Seattle, 10,188.	174,258
Asparagus---do	New York, 57,656; San Ysidro, 70	57,726
Avocado---do	Boston, 240; Brownsville (seeds removed), 5,327; Douglas (seeds removed), 961; Eagle Pass (seeds removed), 5,606; El Paso (seeds removed), 5,669; Hidalgo (seeds removed), 912; Key West, 806,631; Laredo (seeds removed), 2,221; Mercedes (seeds removed), 672; Miami, 28,026; Naco (seeds removed), 10; New Orleans, 2,069,107; New York, 1,901,404; Nogales (seeds removed), 3,417; Puerto Rico (all ports), 10; Rio Grande City (seeds removed), 106; Roma (seeds removed), 285; Tampa, 1,312.835; Ysleta (seeds removed, 1.	6,143,440
Balsamapple---do	Calexico, 1,013; New York, 13,026	14,039
Banana---bunches	Baltimore, 2,189,501; Blaine, 2,912; Boston, 3,053,000; Brownsville, 24,035; Buffalo, 425; Charleston, 1,040,446; Corpus Christi, 4,679; Detroit, 425; Eagle Pass, 8,927; Eastport, 2; El Paso, 235,377; Fort Covington, 425; Galveston, 2,334,944; Jacksonville, 444,655; Key West, 136; Laredo, 234,005; Los Angeles, 1,445,813; Miami, 188,662; Mobile, 1,828,609; New Orleans, 10,428,400; New York, 11,823,016; Nogales, 20,634; Norfolk, 194,729; Philadelphia, 4,103,848; Port Huron, 415; Puerto Rico (all ports), 6,631; San Francisco, 1,448,800; Sault Ste. Marie, 2,390; Seattle, 56,851; Sumas, 20,711; Tampa, 465,474.	41,608,877
Bean (green):		
Faba---pounds	Calexico, 27; Nogales, 55	82
Lima---do	Calexico, 3; El Paso, 34; Laredo, 30,837; New York, 3,605,265; Nogales, 18,123.	3,654,262
String---do	Brownsville, 801; Calexico, 1,669; Douglas, 1,328; Eagle Pass, 4,743; El Paso, 100,715; Laredo, 571,817; Naco, 317; New York, 259; Nogales, 529,681; San Ysidro, 8,869.	1,220,199
Beet---do	Calexico, 2,250; Douglas, 596; Eagle Pass, 655; El Paso, 253,496; Naco, 15; New York, 2,520; Nogales, 9,007.	268,539
Berry (*Rubus*)---do	New York, 494	494
Breadfruit---do	New York, 32	32
Brussels sprouts---do	Calexico, 1	1
Burdock---do	Hawaii (all ports), 50; Los Angeles, 500	550
Cabbage---do	Calexico, 721; Douglas, 4,009; Eagle Pass, 678; El Paso, 945; Laredo, 2,195; Naco, 246; New York, 399,010; Nogales, 18,562; San Ysidro, 30; Ysleta, 2.	426,398
Cacao bean pod---do	New York, 577	577
Carrot---do	Calexico, 2,834; Douglas, 594; Eagle Pass, 1,487; El Paso, 381,205: Naco, 88; New York, 20; Nogales, 23,813; San Ysidro, 15.	410,056
Cassava---do	Chicago, 100; Key West, 3,830; New York, 113,706; Puerto Rico (all ports), 33; San Francisco, 200; Seattle, 1,100; Tampa, 2,880.	121,849
Cauliflower---do	Calexico, 110; Douglas, 97; Eagle Pass, 75; Nogales, 1,330; San Ysidro, 2.	1,614
Celery---do	Calexico, 20; Nogales, 5	25
Chayote---do	El Paso, 2,440; Key West, 898; Laredo, 740; New Orleans, 45; New York, 9,941.	14,064
Cherry:		
Dried, sour---do	Boston, 51,723; New York, 859,083; Philadelphia, 236,420.	1,147,226
Fresh---do	New York, 4,663	4,663
Chinese watermelon---do	New York, 5,576	5,576
Cipollino---do	Boston, 44,069; New York, 2,253,679; Philadelphia, 34,228.	2,331,976
Citrus medica---do	Detroit, 136; New York, 28,290	28,426
Clover top---do	Douglas, 191; Nogales, 2	193
Coriander---do	Calexico, 287	287
Cowpea---do	Calexico, 19; Naco, 5	24
Crescentia alata---do	Nogales, 190	190
Crosnes---do	New York, 397	397
Cucumber---do	Calexico, 330; Douglas, 485; Eagle Pass, 52; El Paso, 1,800; Key West, 1,850; Laredo, 1,665; Miami, 4,501; Naco, 12; New York, 1,426,299; Nogales, 3,152; Tampa, 3,235; San Ysidro, 6.	1,443,387

TABLE 29.—*Fruits and vegetables imported fiscal year 1934, by ports of entry*—Con.

Kind	Port and quantity	Total
Dasheen (includes colocasia, inhame, malanga, taro, and yautia)---pounds--	Boston, 170,166; Buffalo, 8,080; Calexico, 2,399; Key West, 10,323; Los Angeles, 20,200; New York, 1,004,665; Niagara Falls, 14,635; Portland, 7,092; Providence, 97,847; Puerto Rico (all ports), 749,239; San Francisco, 350,664; San Ysidro, 10; Seattle, 88,844; Tampa, 35,822.	2,559,986
Eggplant----------do----	Calexico, 29; Douglas, 25; El Paso, 4,898; Laredo, 2,226; Los Angeles, 504; Miami, 550; New Orleans, 100,575; New York, 3,514,145; Nogales, 131,432.	3,754,384
Endive----------do----	New York, 786,695	786,695
Garbanzo----------do----	Nogales, 25	25
Garlic----------do----	Boston, 292,228; Brownsville, 4,909; Calexico, 139,259; Douglas, 2,269; Eagle Pass, 31,805; El Paso, 21,283; Hawaii (all ports), 1,780; Laredo, 402,201; Mercedes, 4; Mobile, 1,653; Naco, 760; New Orleans, 132,858; New York, 3,635,774; Nogales, 4,990; Philadelphia, 67,200; Providence, 12; Puerto Rico (all ports), 1,816,619; San Ysidro, 3,906; Ysleta, 1.	6,559,511
Ginger (crude)----------do----	Boston, 10,240; Buffalo, 12,979; Calexico, 24; Hawaii (all ports), 913; Key West, 52; Los Angeles, 15,100; New York, 98,571; Niagara Falls, 19,794; Portland, 800; Puerto Rico (all ports), 10; San Francisco, 219,368; Seattle, 16,880.	394,731
Grape:		
Fresh (not hothouse)----------do----	Brownsville, 25; Calexico, 157; Eagle Pass, 160; El Paso, 55; Laredo, 60; New York, 11,292,271; Nogales, 60.	11,292,788
Hothouse----------do----	New York, 78,093	78,093
Processed----------do----	New York, 48,982	48,982
Grapefruit----------do----	Boston, 660; Key West, 380,650; New Orleans, 286,570; New York, 1,546,736; Seattle, 72,760.	2,287,376
Horseradish----------do----	Hawaii (all ports), 125; New York, 28,909	29,034
Husk tomato----------do----	Calexico, 41; Eagle Pass, 159; El Paso, 5,254; Laredo, 1,493; San Ysidro, 18.	6,965
Japanese horseradish----------do----	Hawaii (all ports), 852	852
Kale----------do----	Calexico, 18; New York, 223,940	223,958
Kohlrabi----------do----	Calexico, 34	34
Kudzu----------do----	Boston, 3,610; Buffalo, 6,500; Los Angeles, 1,600; New York, 8,485; Niagara Falls, 5,520; Portland, 200; San Francisco, 34,311; Seattle, 1,630.	61,856
Leek----------do----	Calexico, 6	6
Lemon----------do----	Boston, 24; Calexico, 12; Eagle Pass, 112; New Orleans, 680,500; New York, 3,125,176; Norfolk, 375; Providence, 12.	3,806,211
Lettuce----------do----	Calexico, 1,268; Douglas, 3,220; Eagle Pass, 2,542; El Paso, 1,030; Naco, 403; Nogales, 27,103.	35,566
Lily bulb (edible)----------do----	Boston, 1,600; Buffalo, 1,760; Hawaii (all ports), 1,520; Los Angeles, 100; New York, 5,160; Niagara Falls, 1,760; San Francisco, 11,328; Seattle, 1,074.	24,302
Lime (sour)----------do----	Baltimore, 305; Boston, 19,443; Brownsville, 81,214; Buffalo, 4,893; Del Rio, 64; Eagle Pass, 530,767; El Paso, 120,199; Hidalgo, 1,020; Key West, 40; Laredo, 3,221,781; Los Angeles, 695,089; Mercedes, 3; Miami, 405; New Orleans, 9,565; New York, 1,795,995; Nogales, 6,248; Norfolk, 130; Philadelphia, 1,575; Puerto Rico (all ports), 745; San Francisco, 36,727.	6,526,208
Litchi fruit (in brine)----------do----	Portland, 20	20
Mango (seeds removed, frozen)---do----	Los Angeles, 7,256; New York, 101,847; Portland, 834; San Francisco, 3,321; Seattle, 1,150.	114,408
Melon----------do----	Brownsville, 172; Calexico, 2,426; Douglas, 39; Eagle Pass, 7,952; El Paso, 660; Hidalgo, 1,540; Laredo, 2,064,595; Mercedes, 37; Naco, 10; New York, 5,863,196; Nogales, 5,630; Rio Grande City, 4; San Ysidro, 45.	7,946,306
Mint----------do----	Calexico, 4; El Paso, 15; Nogales, 5	24
Mustard----------do----	Calexico, 24,738; Douglas, 366; El Paso, 71,478; New York, 2,939; Nogales, 6,219.	105,740
Nectarine----------do----	New York, 305,769	305,769
Nopale----------do----	El Paso	15
Nuts:		
Acorn----------do----	New York, 23,414,830; Norfolk, 2,011,184	25,426,014
Chestnut----------do----	Boston, 27,340; Hawaii (all ports), 124,690; Los Angeles, 187,090; New York, 12,229,577; Niagara Falls, 79,750; Seattle, 48,890; San Francisco, 490,964.	13,188,301
Okra----------do----	Calexico, 22; El Paso, 950; Key West, 30,121; Laredo[1], 36,395; Miami, 3,570; New Orleans, 464,300; New York, 515,855; Tampa, 341,860.	1,393,073

[1] Okra was admitted from Tamaulipas, Mexico, through the port of Laredo under special conditions.

TABLE 29.—*Fruits and vegetables imported fiscal year 1934, by ports of entry*—Con.

Kind	Port and quantity	Total
Onion ..... pounds	Boston, 801,428; Brownsville, 7; Calexico, 14,041; Douglas, 10,954; Eagle Pass, 9,246; El Paso, 43,599; Hawaii (all ports), 2,500; Naco, 2,730; New York, 3,900,289; Nogales, 30,789; Providence, 30; Puerto Rico (all ports), 50; San Francisco, 47,447; San Ysidro, 49; Seattle, 18,400; Ysleta, 7.	4,881,566
Orange:		
Under Quarantine No. 56 ..... do	Boston, 960; Key West, 160; New Orleans, 33,995; New York, 510.	35,625
Mandarin (Quarantine No. 28) .. do	Portland, 182,250; Seattle, 1,316,790	1,499,040
Papaya:		
Natural ..... do	New York, 7,910	7,910
Frozen ..... do	New York, 88	88
Parsley ..... do	Calexico, 73; Douglas, 78; El Paso, 17,354; Naco, 53; New York, 3,040; Nogales, 24.	20,622
Parsnip ..... do	New York, 20; Nogales, 5	25
Pea ..... do	Calexico, 407; Douglas, 1,274; Eagle Pass, 82; El Paso, 315; Laredo, 110; Naco, 24; New York, 1,951; Nogales, 4,699,152; San Ysidro, 170,881.	4,874,196
Peach:		
Fresh ..... do	New York, 194,201	194,201
Hothouse ..... do	New York, 10	10
Pear ..... do	New York, 20,535	20,535
Pepper ..... do	Brownsville, 3,389; Calexico, 2,362; Del Rio, 664; Douglas, 10,010; Eagle Pass, 46,471; El Paso, 273,356; Hidalgo, 443; Key West, 1,075; Laredo, 110,788; Los Angeles, 34,720; Mercedes, 18; Miami, 1,215; Naco, 1,905; New Orleans, 108,555; New York, 1,649,184; Nogales, 776,269; Presidio, 317; Rio Grande City, 10; San Francisco, 4,840; San Ysidro, 304; Ysleta, 29.	3,025,924
Peppermint ..... do	New York, 119	119
Pigeonpea ..... do	New York, 145	145
Pigweed ..... do	Douglas, 351; Nogales, 234	585
Pineapple ..... crates	Brownsville, 1,016; Detroit, 20; Douglas, 1; Eagle Pass, 112; El Paso, 6,953; Hidalgo, 55; Key West, 352,482; Laredo, 20,215; Los Angeles, 97; Miami, 2,621; Naco, 1; New Orleans, 56,143; New York, 203,723; Nogales, 32; Portland, 104; Providence, 6; San Francisco, 463; Seattle, 11; Tampa, 8,988.	653,043
Plantain ..... pounds	Jacksonville, 350; Key West, 267,622; Miami, 142,095; Mobile, 190; New Orleans, 482,040; New York, 3,602,597; Pensacola, 1,000; Philadelphia, 92,820; Puerto Rico (all ports), 9,273,379; San Francisco, 2,250; Tampa, 592,447.	14,456,790
Plum ..... do	New York, 86,714	86,714
Potato:		
Under Quarantine No. 56 .. pounds	New York, 1,667,156	1,667,156
Under potato regulations (order of Dec. 22, 1913) ..... pounds	Douglas, 93,059; Naco, 3,031; New York, 2,215,551; Nogales, 51,168; Puerto Rico (all ports), 297,281.	2,660,090
Pricklypear ..... do	Calexico, 47; El Paso, 1,253; Laredo, 290; Nogales, 27.	1,617
Pumpkin ..... do	Calexico, 2,086; Douglas, 3,051; Eagle Pass, 2,954; Hidalgo, 3,000; Key West, 5,699; Laredo, 6,509; Mercedes, 40; Naco, 630; New York, 120,691; Nogales, 1,034; Puerto Rico (all ports), 24,802; Rio Grande City, 38; Roma, 76; Tampa, 200; San Ysidro, 155.	170,965
Purslane ..... do	Calexico, 666; Douglas, 121; Nogales, 923	1,710
Radish ..... do	Calexico, 2,563; Douglas, 52; Eagle Pass, 75; El Paso, 116,385; Nogales, 10,081; Ysleta, 2.	129,158
St. Johns bread ..... do	New York, 1,259,693; Norfolk, 332,460; Philadelphia, 110,230.	1,702,383
Salsify ..... do	Calexico, 5; San Ysidro, 3,413	3,418
Shallot ..... do	New York, 5,000	5,000
Spinach ..... do	Calexico, 2,426; Douglas, 780; El Paso, 28,985; Naco, 105; Nogales, 22,144.	54,440
Squash ..... do	Calexico, 3,971; Douglas, 10,162; Eagle Pass, 2,334; El Paso, 32,155; Laredo, 85,000; Mercedes, 261; Naco, 497; New York, 11,726; Nogales, 26,273; Rio Grande City, 10; San Ysidro, 110.	172,499
Strawberry ..... do	El Paso, 4,315; San Ysidro, 1	4,316
Sweetpotato ..... do	Hawaii (all ports), 7,461	7,461
Swiss chard ..... do	El Paso, 3,949	3,949
Tamarind bean pod ..... do	Boston, 300; Calexico, 13; Eagle Pass, 258; El Paso, 430; Laredo, 1,160; New York, 132,169; Nogales, 4; San Ysidro, 594.	134,928
Tomato ..... do	Blaine, 18,900; Brownsville, 1,062; Buffalo, 44,750; Calexico, 7,015; Del Rio, 184; Douglas, 15,890; Eagle Pass, 93,845; El Paso, 166,888; Key West, 450,175; Laredo, 1,774,385; Los Angeles, 3,565,216; Mercedes, 71; Naco, 2,671; New Orleans, 1,159,979; New York, 27,174,173; Nogales, 8,214,512; Presidio, 69; Puerto Rico (all ports), 74,820; Rio Grande City, 8; Roma, 75; San Francisco, 733,485; San Ysidro, 126; Ysleta, 4.	43,498,303

TABLE 29.—*Fruits and vegetables imported fiscal year 1934, by ports of entry*—Con.

Kind	Port and quantity	Total
Turnip.....pounds..	Boston, 33,000; Calexico, 311; Douglas, 51; Eagle Pass, 120; El Paso, 317,109; Naco, 5; New York, 20; Nogales, 6,924.	357,540
Vaccinium (cranberry, etc.):		
Natural.....do....	Boston, 15,500; Chicago, 149,000; New York, 297,943; Port Huron, 173,600; San Francisco, 8,250.	644,293
Frozen.....do....	Boston, 1,123,590; Detroit, 108,000; New York, 1,728,090; Port Huron, 404,940; Sault Ste. Marie, 51,600.	3,416,220
Water caltrop.....do....	Boston, 300; Hawaii (all ports), 4,330; Los Angeles, 15; New York, 1,600; Niagara Falls, 300; San Francisco, 7,700; Seattle, 1,300.	15,545
Waterchestnut.....do....	Blaine, 300; Boston, 50,420; Buffalo, 104,085; Chicago, 50,000; Detroit, 10,000; Hawaii (all ports), 110,913; Los Angeles, 102,100; New York, 276,840; Niagara Falls, 87,386; Portland, 11,000; San Francisco, 600,280; Seattle, 485,478.	1,888,802
Watercress.....do....	Calexico, 65; Douglas, 300; Eagle Pass, 5; Naco, 21; Nogales, 4,616.	5,007
Waterlily root.....do....	Hawaii (all ports), 50; New York, 40,946; Niagara Falls, 200; Portland, 1,298; San Francisco, 6,160; Seattle, 11,120.	59,774
Waterlily seed pod.....do....	New York, 166	166
Watermelon.....do....	Brownsville, 49,860; Calexico, 1,061,027; Douglas, 1,515; Eagle Pass, 141; El Paso, 12,500; Hidalgo, 139,750; Key West, 1,800; Laredo, 4,100; Mercedes, 253; Miami, 2,500; Naco, 230; New Orleans, 26,010; New York, 188,210; Nogales, 39,293; Rio Grande City, 158; Roma, 1,600; San Ysidro, 2,220.	1,531,167
Yam.....do....	Hawaii (all ports), 42,636	42,636
Yam bean root.....do....	El Paso, 470; Hawaii (all ports), 1,910; Laredo, 60; Los Angeles, 1,000; New York, 700; Nogales, 1; San Francisco, 16,200.	20,341

PLANTS AND PLANT PRODUCTS ENTERED FOR EXPORTATION OR FOR TRANSPORTATION AND EXPORTATION

In addition to the regulated imports for consumption entry recorded in tables 16 to 29, this Bureau supervised the entry under permit, either for exportation or for transportation and exportation, of considerable quantities of plants and plant products, as follows: Flower bulbs, corms, and tubers, 397,113; fruit trees, 30,452; cacti and succulents, 2,489; orchids, 1,140; miscellaneous plants, 11,478; miscellaneous seeds, 299 pounds; apples, 10,161 pounds; avocados, 1,936 pounds; beans, lima, 800 pounds; beans, string, 9,254 pounds; cauliflowers, 42 pounds; chestnuts, 20,421 pounds; *Citrus medica*, 100 pounds; cucumbers, 22,450 pounds; eggplants, 57,250 pounds; garlic, 1,230,175 pounds; ginger root, 380 pounds; grapes, 191,080 pounds; grapefruit, 11,423,885 pounds; kudzu, 100 pounds; lemons, 5,154,290 pounds; lily bulbs (edible), 1,200 pounds; limes, sour, 8,525 pounds; melons, 704 pounds; okra, 700 pounds; onions, 10,799,862 pounds; oranges, 1,381,414 pounds; peas, 397,579 pounds; peppers, 90,778 pounds; pineapples, 125,005 crates; potatoes, 10,511 pounds; sweetpotatoes, 1,000 pounds; tamarind bean pods, 15,320 pounds; tangerines, 2,480 pounds; tomatoes, 15,752,989 pounds; waterchestnuts, 1,210 pounds; waterlily root, 439 pounds; broomcorn, 910 bales; brooms made of broomcorn, 1,200; corn, shelled, 1,285,602 pounds; cotton, 62,728 bales, including 1,421 bales of linters and 31 packages; cotton waste, 267 bales and 5 packages; cottonseed cake, 1,422,000 pounds; cottonseed meal, 186,412 pounds; seed or paddy rice, 403,488 pounds; rice straw, 15 bales; and wheat, 5,500 pounds.

MARITIME-PORT INSPECTION

SHIP INSPECTION

Ships from foreign countries and from Hawaii and Puerto Rico are inspected promptly upon arrival for the presence of restricted or prohibited plant material.

The inspection at ports in California, Florida, Hawaii, and at certain ports in Puerto Rico has been performed by State and Territorial officials serving as collaborators of the Bureau of Plant Quarantine.

A record by ports of the ship inspection appears in table 30.

TABLE 30.—*Ships inspected, fiscal year 1934*—Continued

Port	From Hawaii						From Puerto Rico						From United States ports via Panama Canal		
	Direct			Via United States ports			Direct			Via United States ports					
	Arrived	Inspected	With contraband	Arrived	Inspected	With contraband	Arrived	Inspected	With contraband	Arrived	Inspected	With contraband	Arrived	Inspected	With contraband
Baltimore				17	17	3	3	3	2	26	26	19	204	200	20
Bellingham	3	3	1	1	1	0							7	3	0
Boston				13	13	0	19	19	9	1	1	0	262	262	0
Charleston							9	9	4	6	6	2	39	39	5
Corpus Christi							1	1	0	1	1	0	17	17	0
Galveston							7	7	1	7	7	1	12	12	2
Honolulu [1]													112	112	0
Houston	10	10	0	2	2	0	20	20	1	11	11	0	122	122	4
Jacksonville [2]							5	5	0	9	9	0	42	42	0
Key West [3]													1	1	0
Miami [3]							8	6	1				3	3	1
Mobile				3	3	0	10	10	8	32	32	15	63	63	0
New Orleans	15	15	9	13	13	0	31	31	3	34	34	3	62	62	4
Newport News [3]													5	0	0
New York	2	2	1	35	31	5	124	123	96	36	17	5	263	219	4
Norfolk				1	1	0	5	5	0	21	19	0	103	103	4
Pensacola [3]										2	2	0			
Philadelphia	3	3	0	20	20	1	53	53	40	3	3	0	212	206	12
Port Arthur [4]							8	7	1				9	6	0
Portland, Oreg	1	1	0	4	4	1							393	393	0
Puerto Rico (all ports)													26	26	9
San Diego [3]	3	3	1							1	1	0	104	104	6
San Francisco [3]	152	152	19	12	12	5							551	551	5
San Pedro [3]	46	46	7	29	29	2	1	1	0				946	946	15
Savannah				1	1	0	6	6	5	1	1	1	33	30	3
Seattle	6	6	2	12	12	0							130	130	8
Tampa [3]							31	31	1						
Total	241	241	40	163	159	17	341	337	172	191	170	46	3,721	3,652	102

[1] Work handled by inspector stationed at Savannah, Ga.
[2] Work handled by inspectors stationed at Mobile, Ala.
[3] Collaborators stationed at these ports.
[4] Includes ships arriving at Beaumont and Sabine, Tex., and Lake Charles, La.
[5] Work handled by inspectors stationed at Boston, Mass.

NOTE.—The foreign-ship arrivals do not in all cases agree with customs figures. Foreign ships may put in for bunkers and be inspected by inspectors of the Bureau of Plant Quarantine but not entered by Customs. On the other hand, ships entered at certain small subports are included in Customs records but not in this report.

TABLE 30.—*Ships inspected, fiscal year 1934*

Port	From foreign ports											
	Direct			Via United States ports			Via Hawaii			Via Puerto Rico		
	Arrived	Inspected	With contraband	Arrived	Inspected	With contraband	Arrived	Inspected	With contraband	Arrived	Inspected	With contraband
Baltimore	405	395	250	695	674	410						
Bellingham	285	102	32	32	32	12	1	1	0			
Boston	1,203	1,201	638	294	290	127	1	1	0			
Brunswick [1]	14	14	9									
Charleston	142	142	123	154	154	89						
Chicago	11	11	9	24	24	18						
Corpus Christi	54	54	52	121	121	52						
Detroit	11	11	11	1	1	0						
Galveston	229	229	112	605	603	179						
Gulfport [2]	9	9	8	104	103	51						
Honolulu [3]	193	193	102	2	2	0						
Houston	300	300	83	641	639	33	2	2	0			
Jacksonville [3]	127	127	28	156	156	11						
Key West [3]	327	326	86									
Miami [3]	715	709	176	8	8	0						
Mobile	142	142	120	352	352	224	1	1	1			
New Orleans	930	930	633	473	469	272	3	3	1			
Newport News [3]	59	23	23	415	16	16						
New York	3,580	3,539	2,343	895	720	360				121	120	109
Norfolk	271	269	100	754	688	239						
Pensacola [3]	46	46	13	181	179	5						
Philadelphia	705	703	506	985	979	679						
Port Arthur [4]	315	304	65	265	261	10				1	1	0
Portland, Oreg	99	99	54	394	394	175						
Providence [5]	54	4	4	4	0	0						
Puerto Rico (all ports)	1,146	1,146	633									
San Diego [3]	989	989	22	33	33	0	2	2	0			
San Francisco [3]	467	467	54	659	659	48	102	102	56			
San Pedro [3]	1,304	1,304	350	554	554	50	92	92	48			
Savannah	57	57	39	242	230	148						
Seattle	1,373	1,218	216	310	310	196	4	4	1			
Tampa [3]	242	242	35	279	279	2						
West Palm Beach	72	72	2									
Total	15,876	15,377	6,931	9,632	8,930	3,406	208	208	107	122	121	109

CARGO INSPECTION

All importations of plants and plant products subject to plant-quarantine restrictions were inspected at the port of entry or the port of first arrival. A record of such importations by ports appears in table 31.

TABLE 31.—*Inspection of shipments of plants and plant products offered for entry, fiscal year 1934*

Port	Shipments inspected and entered under permit	Shipments refused entry	Port	Shipments inspected and entered under permit	Shipments refused entry
Baltimore	209	0	Naco	3	0
Bellingham	71	0	New Orleans	1,568	1
Blaine	68	0	New York	10,292	23
Boston	1,529	0	Nogales	1,576	0
Brownsville	455	0	Norfolk	270	0
Buffalo	330	2	Pensacola [1]	1	0
Calexico	165	0	Philadelphia	445	8
Charleston	134	0	Port Arthur	1	0
Chicago	30	1	Port Huron [1]	75	1
Corpus Christi	2	0	Portland, Oreg	44	0
Del Rio	15	0	Presidio	338	0
Detroit	278	6	Providence [2]	13	0
Douglas	20	0	Puerto Rico (all ports)	515	0
Eagle Pass	729	0	Rio Grande City	42	0
El Paso	5,098	0	Roma	50	0
Fabens	73	0	San Diego [1]	1	0
Galveston	376	0	San Francisco [1]	1,009	10
Hidalgo	110	0	San Pedro [1]	607	4
Honolulu [1]	340	52	San Ysidro	90	0
Houston	203	1	Sasabe	1	0
Jacksonville [1]	44	0	Savannah	106	1
Key West [1]	547	0	Seattle	304	1
Laredo	2,884	0	Tampa [1]	609	1
Mercedes	512	0			
Miami [1]	80	0	Total	32,333	112
Mobile	71	0			

[1] Collaborators are stationed at these ports.
[2] Work handled by inspectors stationed at Boston, Mass.

In addition to the importations credited to the Mexican border ports there were several thousand importations which were so small that no duty was assessed by customs and no entry made.

Disinfection is required as a condition of entry of certain commodities and of other commodities when inspection reveals the presence of injurious insects or plant diseases. The following plant material was treated under the supervision of inspectors of this Bureau during the fiscal year: Cotton, 137,506 bales; cotton linters, 2,997 bales; cotton samples, 672; cotton waste, 41,426 bales; bagging, 1,868 bales; chestnuts, 10,864 cases; tree seeds, 39 bags, 207 packages, and 24 cases; broomcorn, 345 bales; miscellaneous plants, 219 lots; narcissus bulbs imported under special permit, 183,304; and bulbous iris, 78,506.

It has also been necessary to devote considerable time at several ports to the inspection of miscellaneous cargoes in order to establish the true status of the importations and to supervise the cleaning by importers of shipments containing prohibited packing material or contaminated with objectionable material such as soil.

AIRPLANE INSPECTION

Three thousand and fifty-one airplanes arriving from foreign countries were inspected during the fiscal year. The inspections were made at the ports of Brownsville, El Paso, and Laredo, Tex.; Nogales, Ariz.; Calexico, San Diego, and Los Angeles, Calif.; Miami, Tampa, and West Palm Beach, Fla.; Seattle, Wash.; and San Juan, P. R. A total of 923 interceptions of prohibited plant material was made.

FOREIGN PARCEL-POST INSPECTION

Through cooperation with customs and post-office officials, mail packages from foreign countries which are found to contain plants or plant products are referred to inspectors of this Bureau for examination. Such packages arriving at ports of entry where there are no representatives of this Bureau are forwarded by the postal officials to the nearest port at which a plant-quarantine inspector is stationed.

Table 32 indicates by ports the number and disposition of foreign-mail packages inspected during the fiscal year.

TABLE 32.—*Number of inspections of foreign parcel-post packages, fiscal year 1934*

Port	Inspected	Refused entry (entire or in part)	Diverted to Washington	Port	Inspected	Refused entry (entire or in part)	Diverted to Washington
Atlanta [1]	55	2	15	Mobile	1	1	0
Baltimore	925	42	63	Naco	65	0	0
Boston	3,539	174	1,476	New Orleans	127	25	39
Brownsville	704	4	0	New York	4,266	579	835
Buffalo	48	26	7	Nogales	215	19	1
Chicago	4,592	526	89	Philadelphia	7,773	227	351
Detroit	3,825	164	264	Portland, Oreg	16	9	8
Douglas	3	0	0	Presidio	3	0	0
Eagle Pass	218	3	0	Puerto Rico (all ports)	6	3	0
El Paso	657	141	60	St. Paul [1]	5,834	302	214
Honolulu [1]	573	25	2	San Diego [1]	24	1	0
Jacksonville [1]	457	61	108	San Francisco [1]	4,501	232	0
Key West [1]	1	0	1	Seattle	1,891	128	0
Laredo	146	21	5				
Los Angeles [1] [2]	4,482	147	1	Total	44,958	2,871	3,541
Miami [1]	11	9	2				

[1] Collaborators are stationed at these ports.
[2] 270 packages were diverted to San Francisco for treatment.

MEXICAN-BORDER SERVICE

The movement of railway cars showed a decided increase over that during the last fiscal year. A total of 17,592 freight cars was inspected in the Mexican railway yards. Of these 16,415 entered the United States, 5,408 being fumigated as a condition of entry. Seven hundred and eighty-six cars were found to be contaminated with cottonseed. Cleaning was required as a condition of entry. The usual fee of $4 was collected for each car fumigated, and all fees collected were covered into the Treasury as miscellaneous receipts.

A summary of the railway-car inspection and fumigation is given in table 33.

TABLE 33.—*Inspection and fumigation of railway cars crossing the border from Mexico, fiscal year 1934*

Port	Cars inspected	Cars with cottonseed	Cars entered	Cars fumigated	Fees collected
	Number	*Number*	*Number*	*Number*	*Dollars*
Brownsville	262	33	246	16	64
Douglas	509	7	509	21	84
Eagle Pass	1,886	127	1,770	613	2,300
El Paso	3,672	191	3,350	[1] 960	4,568
Laredo	7,131	265	6,721	2,861	11,160
Naco	660	38	660	1	4
Nogales	3,410	107	3,097	904	3,600
Presidio	62	18	62	43	172
Total	17,592	786	16,415	5,419	[2] 21,952

[1] Includes 11 cars not from Mexico.
[2] The apparent discrepancy in fees collected and the number of cars fumigated may be explained by the fact that it is customary for the railroads to purchase fumigation coupons in advance.

In addition to the freight cars listed in table 33, 2,650 Pullman and passenger coaches crossed the border and were inspected.

Plant-quarantine inspectors on the Mexican border take an active part, in cooperation with the Customs Service, in the inspection of vehicles, baggage, personal effects, and express packages from Mexico. Approximately 4,000,000 vehicles crossed the border from Mexico during the fiscal year, and 136,691 pieces of baggage were examined. The inspection of these vehicles and baggage resulted in the interception of a large quantity of prohibited plant material. A record of such interceptions appears in table 38.

INSPECTION IN PUERTO RICO AND HAWAII

In addition to the enforcement of the foreign-plant quarantines and regulatory orders, inspectors stationed in Puerto Rico also enforce the provisions of Quarantine No. 58. This involves the inspection of fruits and vegetables in the fields, in packing houses, and on the docks, and all shipments of such products moving to the mainland have been certified as free from pests.

Parcel-post packages originating on the island and destined for points on the mainland are also inspected. Eight hundred and twelve such packages were inspected, and seventy-five were found to contain prohibited plant material and were returned to the sender.

A record by months of the amounts of fruits and vegetables inspected and certified for shipment to the mainland appears in table 34.

TABLE 34.—*Summary of shipments of fruits and vegetables moving from Puerto Rico to the mainland, inspected and certified under Quarantine No. 58, fiscal year 1934*

Item	Inspected and certified during—												
	July	August	September	October	November	December	January	February	March	April	May	June	Total
Avocados—pounds		100		2,700	1,760								4,560
Bananas—bunches				2	19	1							22
Breadfruit—pounds			160	40	1,090	3,460	5,310	4,395	240	400	1,000	1,104	17,199
Cabbage—do										60			60
Celery—do												90	90
Chayotes—do		55	920	3,620	4,700	7,425	4,670	7,164	5,830	1,850	4,785	4,960	45,979
Citrons—do									6,000				6,000
Cucumbers—do			120	10,920	82,620	1,030,260	807,600	615,540	234,180	147,360	2,280		2,930,880
Cucumbers (Angola)—do					115	100	60				60		335
Dasheens—do			300		800		180	500	780	2,780	1,440		6,780
Eggplants—do					300	3,460	3,360	8,640	17,200	18,720	800		52,480
Ginger root—do	5,600	8,800	320	680		5,400	3,205	1,440	1,200	4,940	4,480	8,840	44,905
Grapefruit—do	106,560	703,260	11,409,660	3,554,460	1,973,700	1,458,090	1,405,080	1,327,140	2,572,200	3,216,150	5,615,610	2,848,140	36,190,050
Lemons—do			900	180		90	90	90				2,880	4,230
Lerenes—do						240	300	180					720
Lettuce—do								175					175
Lima beans—do					50		1,855	35	35				1,975
Limes—do	3,060	7,290	3,150	900	6,840	1,980	1,530	900	2,520	1,260	1,350	15,060	45,840
Malangas—do				2,600		600		365	400	2,000		1,680	7,645
Mixed fruits and vegetables—do		90	110		690	7,120	1,330	720	1,680	540		60	12,340
Onions—do								80		750			830
Oranges—do	90		4,050	194,760	460,450	179,280	85,590	155,250	203,130	95,940	178,920	8,820	1,566,280
Oranges (sour)—do		90					90	90	810	270	900		2,250
Papayas—do		1,020	530		1,200	360	1,540	1,082		420	620	1,500	8,272
Parsley—do		490	425	450	525	1,005	435	605	25	815	475	675	5,925
Peas (garden)—do						4,225	435	225	6,230	3,445			14,560
Peppers—do	850	650	1,005	560	175	740	10,905	10,510	18,510	14,665	3,325	750	62,645
Peppers (small)—do					675	3,935	2,920	395	119	255	375	575	9,249
Pigeonpeas—do					12,965	55,125	35,415	52,265	20,290				176,060
Pineapples—crates	33,575	5,462	4,224	1,155	1,186	1,777	1,704	11,045	89,517	68,734	106,336	45,792	370,507
Pineapples—half crates			923	495	614	211	546	2,417	13,090	13,527	15,074	6,185	53,082
Plantains—pounds					60				7				67
Potatoes—do								9,750					9,750
Pumpkins—do	2,720	1,280	4,710	11,120	19,195	4,720	12,230	30,200	21,350	5,870	10,285	19,730	143,410
Quenepas—do	1,440	4,500	3,000		150								9,090
Squash—do					570	26,260	23,640	49,380	9,720	180			109,750
String beans—do						70	3,640	3,010	105				6,825
Sweet corn—do							50						50
Tamarinds—do										280	160	960	1,400
Tangerines—do					18,460	15,750	90						34,300
Tomatoes—do						270	9,060	22,150	47,700	18,650			97,830
Watermelons—do						15,580	18,780		720				35,080
Yuca—do						270							270
Certificates—number	173	133	318	170	261	199	195	242	280	242	259	270	2,742

Inspectors stationed in Hawaii are engaged principally with the enforcement of Quarantine No. 13 on account of the Mediterranean fruit fly and the melon fly. Inspections were made in the fields, in packing sheds, and on the docks of such fruits and vegetables as are permitted to move to the mainland.

Parcel-post packages originating in the Hawaiian Islands and destined for points on the mainland are also inspected. A total of 75,365 packages was opened and examined, 82,884 packages were inspected without being opened, and 63 packages were found to contain prohibited plant material.

The practice of inspecting and sealing baggage as an accommodation to travelers between Hawaii and the mainland has been continued. During the year 2,061 pieces of baggage were inspected and sealed under this arrangement.

A record of the amounts of fruits and vegetables inspected and certified for shipment from Hawaii to the mainland appears in table 35.

In both Hawaii and Puerto Rico insular plant-quarantine inspectors rendered valuable assistance in the enforcement of foreign-plant quarantines and regulatory orders.

TABLE 35.—*Fruits and vegetables inspected and certified for shipment from Hawaii to the mainland, fiscal year 1934*

Month	Bananas	Pine-apples	Taro	Coco-nuts	Ginger root	Lily root [1]	Potatoes	Permits issued
	Bunches	*Crates*	*Pounds*	*Number*	*Pounds*	*Pounds*	*Pounds*	*Number*
July	7,148	4,365	5,660	1,755	4,410	30,750	----------	165
August	9,591	3,695	5,400	8,030	10,536	19,950	----------	157
September	8,755	2,665	4,580	1,856	6,605	17,400	----------	101
October	7,873	4,037	7,215	35	4,358	23,025	----------	91
November	6,880	1,040	900	33	12,260	26,700	----------	91
December	8,725	2,238	160	13,827	4,700	37,615	9,889	130
January	7,965	1,975	1,170	8,239	1,330	24,100	16,290	108
February	5,858	1,884	----------	866	14,050	14,650	21,990	120
March	9,042	1,920	2,725	4,019	11,810	14,300	843,377	155
April	7,248	3,200	1,660	363	20,300	25,500	187,400	154
May	5,244	1,940	----------	80	3,120	12,900	----------	101
June	3,809	2,360	1,050	154	5,840	18,300	----------	120
Total	88,138	31,319	30,520	39,257	99,319	265,190	1,078,946	1,493

[1] This edible root (*Nelumbium nelumbo*) is also known to the trade as lotus root.

INSPECTION OF SPECIAL-PERMIT AND DEPARTMENTAL PLANT MATERIAL

As in previous years, all plants imported under special permit have been inspected at ports of entry designated for such material. A tabular record of special-permit importations is presented in tables 20 to 22, inclusive. The majority of such special-permit importations have been, as in former years, inspected at Washington, D. C., and these together with departmental importations and distributions from Washington, including domestic plants entering and leaving the District of Columbia, are inspected and certified for shipment at the Department inspection house, in the nursery, or in freight, express, or post offices. A summary of the inspections made at Washington, D. C., is given in table 36.

TABLE 36.—*Summary of plants and plant products offered for inspection in the District of Columbia, fiscal year 1934*

Material inspected	Foreign	Do-mestic	Fumi-gated	Other-wise treated	In-fested with insects	In-fected with diseases
Lots of seeds (departmental)	2,098	4,194	2,941	273	148	65
Plants, cuttings, bulbs, roots, rhizomes, etc. (departmental)	11,699	319,627	4,734	5,012	[1] 460	[1] 459
Miscellaneous unclassified material, other than plants and seeds (departmental)	47	539	142	5	12	9
Shipments of plants under regulation 14, Quarantine No. 37 (commercial)	800	----------	172	66	245	185
Shipments of plants and plant products under regulations 3 and 15, Quarantine No. 37 (commercial)	795	----------	381	94	63	67
Containers of domestic plants other than departmental (mail, express, freight, and truck)	----------	9,183	----------	1	----------	8
Shipments of plants by private individuals	----------	2,988	8	42	49	41
Interceptions of plants and plant products referred to Washington	1,861	----------	453	651	80	16
Cotton samples referred to Washington	11,779	----------	11,779	----------	----------	----------

[1] Lots.

An effort is made to inspect, in the field, plants imported under regulation 14 of Quarantine No. 37 during at least two growing seasons to determine their freedom from plant pests, particularly plant diseases, which may have escaped detection or which were in such an early stage of development as to make detection impossible at the initial inspection at the time of entry, prior to shipment to the field. Only the more recent of the importations shown in table 22 are still under the observation of the Department. Owing to a reduction in funds available for the purpose only a small number of importations, as compared with former years, were given the field inspection. On the basis of these inspections and of such information as was available from inspections of previous years a total of 12,612,146 plants, bulbs, etc., were released from further observation. This represents imported plant material and its increase produced during the two or more growing seasons it was under observation, which was found to be apparently free of important plant pests likely to become established in this country.

During the fiscal year 118 collections of plant pests, 66 of which were diseases and 52 insects, were sent in for verification and determination. Among the more interesting pests found were the following: Diseases—*Cryptosporium minimum* (second report for the United States) on *Rosa* sp., mosaic on *Colchicum* sp. and on *Cymbidium* sp., all in Pennsylvania, *Phomopsis rudis* on *Colutea kesselringi* and *Laburnum watereri*, *Rhabdospora rudis* on *Laburnum alpinum*, and *Urocystis colchici* on *Colchicum autumnale*, all in Ohio, and *Uredo nigropunctata* on *Stanhopea* sp. in Maryland; insects—*Bregmatothrips iridis* (thrips) on iris, *Dialeurodes chittendeni* (whitefly) on rhododendron, *Eumerus* sp. (Syrphidae) in narcissus, *Furcaspis biformis* (Coccidae) on *Cattleya schroederiana*, *Lepidosaphes tuberculata* (Coccidae) on *Cymbidium* sp., and *Taeniothrips gladioli* (thrips) on gladiolus.

INSPECTION OF PLANT-INTRODUCTION AND PROPAGATING GARDENS

As heretofore, plants grown and distributed by the Bureau of Plant Industry from its plant-introduction and propagating gardens were inspected and certified prior to shipment. Plants shipped from Mandan, N. Dak., Coconut Grove, Fla., and Chico, Calif., were inspected by officials of the States concerned cooperating with this Bureau. Those distributed from Savannah, Ga., were examined by an inspector of this Bureau. Table 37 indicates the number of plants inspected and certified for distribution.

TABLE 37.—*Number of plants, bud sticks, cuttings, tubers, roots, and shipments of seeds examined for distribution from plant-introduction and propagating gardens, fiscal year 1934*

Station	Plants	Bud sticks, cuttings, tubers, and roots	Shipments of seeds
Bell	20,943	772	5
Chico	11,864	1,754	49
Coconut Grove	5,209	179	69
Savannah	45	133	----------
District of Columbia	3,259	12,502	6,077
Mandan, N. Dak	250,000	----------	----------
Beltsville	130	3,140	----------
Total	291,450	18,480	6,200

INTERCEPTIONS OF PROHIBITED PLANTS AND PLANT PRODUCTS

A record of the number of interceptions of prohibited plants and plant products made by inspectors and collaborators of the Bureau appears in table 38. Many of these interceptions were found to harbor insect pests and plant diseases, and many others, while showing no infestation or infection, must be considered potentially dangerous since they came from countries where pests not present in this country are known to occur. For example, 1,706 interceptions, representing 27,420 individual units, pounds, and containers of known hosts of the Mediterranean fruit fly from countries where that insect is reported to occur, were made.

Interceptions made at footbridges, ferries, and crossings at the Mexican and Canadian border ports have all been considered as having been taken from baggage.

TABLE 38.—*Number of interceptions of contraband plants and plant products, fiscal year 1934*

Port	In baggage	In cargo	In mail	In quarters	In stores
Baltimore	26	3	44	36	126
Bellingham	4	0	0	6	94
Blaine	1,129	0	0	0	0
Boston	225	19	253	6	5
Brownsville	2,668	0	4	0	0
Brunswick [1]	0	0	0	19	4
Buffalo	208	2	30	0	0
Calexico	1,937	0	0	0	0
Charleston	0	1	0	59	19
Chicago	0	27	618	0	27
Corpus Christi	2	0	0	13	4
Del Rio	435	0	0	0	0
Detroit [2]	251	7	214	0	6
Douglas	557	0	0	0	0
Eagle Pass	1,800	0	3	0	0
El Paso	7,122	0	144	0	0
Fabens	201	0	0	0	0
Galveston	2	0	0	44	17
Gulfport [3]	5	0	0	2	6
Hidalgo	769	0	0	0	0
Honolulu [4]	962	278	34	0	8
Houston	1	0	0	28	43
Jacksonville [4]	1	0	61	12	25
Key West [4]	195	0	0	56	3
Laredo	4,080	0	9	0	0
Los Angeles [4]	0	1	140	1	0
Mercedes	237	0	0	0	0
Miami [4]	924	10	6	348	65
Mobile	8	1	1	53	49
Naco	76	0	0	0	0
New Orleans	477	15	7	614	87
New York	2,510	550	627	132	29
Nogales	2,425	0	14	0	0
Norfolk	7	2	0	78	20
Pensacola [4]	0	0	0	8	27
Philadelphia	24	45	288	144	187
Port Arthur [5]	0	0	0	8	19
Port Huron [4]	92	1	0	0	0
Portland, Oreg	4	7	10	2	4
Presidio	152	0	0	0	0
Providence [6]	64	0	0	0	0
Puerto Rico (all ports)	146	0	0	7	0
Rio Grande City	72	0	0	0	0
Roma	349	0	0	0	0
St. Paul [4]	0	0	324	0	0
San Diego [4]	6	6	1	22	39
San Francisco [4]	261	31	44	158	123
San Pedro [4]	99	8	0	25	73
San Ysidro	4,349	0	0	0	0
Sasabe	117	0	0	0	0
Savannah	0	0	0	59	15
Seattle	123	6	122	0	2
Tampa [4]	14	1	0	21	31
West Palm Beach [4]	0	0	0	13	1
Ysleta	184	0	0	0	0
Zapata [7]	13	0	0	0	0
Total	35,313	1,021	2,998	1,974	1,158

[1] Work handled by inspector stationed at Savannah, Ga.
[2] Interceptions in baggage are recorded at 1 customs station only, and the number reported represents only part of the total for Detroit.
[3] Work handled by inspectors stationed at Mobile, Ala.
[4] Collaborators stationed at these ports.
[5] Includes interceptions made at Beaumont and Sabine, Tex., and Lake Charles, La.
[6] Work handled by inspectors stationed at Boston, Mass.
[7] Port closed Dec. 18, 1933.

PESTS INTERCEPTED

During the fiscal year the inspectors and collaborators of the Bureau collected from foreign plants and plant products insects belonging to 1,277 recognized species and others distributed among 1,071 genera and families, fungi and bacteria belonging to 166 recognized species, plant-parasitic nematodes belonging to 14 recognized species, and numbers of interceptions of diseases caused by fungi, bacteria, nematodes, or other agents that could be referred to family, genus, or

other group only. Many of these interceptions were of considerable economic or scientific importance.

A total of 25,305 interceptions of insects and plant diseases were made during the fiscal year 1934. A summary of these interceptions appears in table 39.

TABLE 39.—*Number of interceptions of insects and plant diseases made during the fiscal year 1934*

Port	Cargo		Stores		Baggage		Quarters		Mail		Total	
	Insects	Diseases	Insects	Diseases	Insects	Diseases	Insects	Diseases	Insects	Diseases	Insects	Diseases
Baltimore	349	27	179	255	9	9	33	21	0	16	570	328
Bellingham	21	27	11	3	0	0	1	0	0	0	33	30
Blaine	1	5	0	0	3	1	0	0	0	0	4	6
Boston [1]	148	98	337	264	94	32	17	7	81	38	677	439
Brownsville	14	0	1	0	141	1	56	0	0	0	212	1
Buffalo	15	238	0	0	0	0	0	0	3	6	18	244
Calexico	71	11	0	0	18	1	0	0	0	0	89	12
Charleston	371	0	32	88	0	0	1	0	0	0	404	88
Chicago	6	1	1	3	0	0	0	0	18	10	25	14
Corpus Christi	4	0	12	37	0	0	4	2	0	0	20	39
Del Rio	0	0	0	0	4	0	0	0	0	0	4	0
Detroit	37	36	0	6	2	0	0	0	30	23	69	65
Douglas	9	3	1	0	15	3	0	0	0	0	25	6
Eagle Pass	217	28	0	0	219	28	0	0	0	0	436	56
El Paso	44	27	0	0	120	138	0	0	8	4	172	169
Fabens	0	0	0	0	3	0	0	0	0	0	3	0
Galveston	55	1	43	96	5	0	10	12	0	0	113	109
Hawaii	66	0	1	0	39	0	1	0	93	0	200	0
Hidalgo	7	1	0	0	63	6	1	0	0	0	71	7
Houston	2	2	76	410	1	0	3	2	0	0	82	414
Jacksonville [2]	4	0	35	282	0	0	11	3	11	12	61	297
Key West [2]	0	0	0	0	14	2	7	0	0	0	21	2
Laredo	799	11	1	0	155	10	0	0	0	0	955	21
Los Angeles [2]	7	0	0	0	0	0	0	0	21	1	28	1
Miami [2]	10	3	45	15	165	17	101	2	0	0	321	37
Mobile [3]	472	2	161	310	6	0	32	5	0	0	671	317
Naco	3	0	0	0	64	5	0	0	0	0	67	5
New Orleans	1,324	124	201	436	86	25	209	59	7	4	1,827	648
New York	867	208	351	237	315	77	50	2	17	10	1,600	534
Nogales	1,090	468	2	1	472	130	1	0	3	2	1,568	601
Norfolk	76	1	12	31	1	0	7	11	0	0	96	43
Pensacola [2]	1	0	106	260	0	0	14	12	0	0	121	272
Philadelphia	2,289	337	613	1,122	44	34	142	110	228	110	3,316	1,713
Port Arthur [4]	0	0	6	14	0	0	0	0	0	0	6	14
Portland	3	3	0	0	0	0	0	0	0	1	3	4
Presidio	17	0	1	0	7	0	0	0	0	0	25	0
Rio Grande City	4	2	0	0	1	2	0	0	0	0	5	4
Roma	0	0	0	0	7	0	0	0	0	0	7	0
San Diego [2]	6	0	18	1	6	0	8	2	0	0	38	3
San Francisco [2]	522	40	235	250	192	7	249	4	250	27	1,448	328
San Juan	22	9	6	0	7	0	0	0	1	0	36	9
San Pedro [2]	314	2	111	10	79	1	13	0	0	0	517	13
San Ysidro	3	2	0	0	24	0	0	0	0	0	27	2
Sasabe	0	0	0	0	2	1	0	0	0	0	2	1
Savannah	5	1	25	106	0	0	13	5	0	0	43	112
Seattle	127	33	79	45	35	22	78	44	12	35	331	179
St. Paul [2]	0	0	0	0	0	0	0	0	8	3	8	3
Tampa [2]	3	2	27	89	7	0	14	0	0	0	51	91
Thayer	0	0	0	0	12	6	0	0	0	0	12	6
Washington, D. C	348	144	0	0	6	3	0	0	721	347	1,075	494
Ysleta	0	0	0	0	1	3	0	0	0	0	1	3
Zapata [5]	0	0	0	0	2	0	0	0	0	0	2	0
Miscellaneous	3	2	0	0	0	0	0	0	0	0	3	2
Total	9,756	1,899	2,729	4,371	2,446	564	1,076	303	1,512	649	17,519	7,786

[1] Includes interceptions at Providence, R. I.
[2] Collaborators stationed at these ports.
[3] Includes interceptions at Gulfport, Miss.
[4] Includes interceptions at Beaumont and Sabine, Tex., and Lake Charles, La.
[5] Closed Dec. 18, 1933.

NOTE.—Inspectors stationed at Puerto Rico made 12 interceptions of insects and 6 interceptions of plant diseases during their field and packing-house inspection of fruits and vegetables for shipment to the mainland.

CERTIFICATION FOR EXPORT

The demand for certification for export has continued to increase from year to year. During the fiscal year 1934, 7,222 shipments including 2,720,474 containers, were inspected and certified. Certificates were issued at 23 ports and covered 37 different commodities which were exported to 53 foreign countries.

Some of the more important commodities inspected and certified were: Apples, 3,212 shipments, consisting of 1,453,108 boxes, 76,957 barrels, and 125,028 baskets; pears, 1,255 shipments, consisting of 600,572 boxes, 145 barrels, and 2,608 baskets; potatoes, 707 shipments, consisting of 115,795 bags, 8,857 barrels, and 1,221 crates and boxes.

TECHNOLOGICAL DIVISION

Cooperative work on problems of sterilization and treatment of plants and plant products, much of it being a continuation of work already under way in the previous fiscal year, was carried on with other divisions and projects of the Bureau. Considerable construction work was taken up under the Public Works Administration appropriations and supervised by members of this organization.

A cottonseed sterilizer, designed in the spring of 1933, for treatment of cottonseed for pink bollworm larvae, was put into operation on a commercial basis at three gins in Florida during the season of 1933. In this machine, the seed is heated by conditioned air, the heat being furnished by steam or by means of a vaporizing burner. In the three machines installed in Florida, steam was used as a source of heat in all cases. The machine has a capacity of about 1½ tons of seed per hour, and during the season approximately 1,000 tons of cottonseed were sterilized by this method with these machines. A patent has been applied for on both the process and apparatus.

The fumigation of baled cotton at atmospheric pressures was studied, and it was found that by spacing the bales from 4 to 6 inches apart it was possible to kill any pink bollworm present in seeds in the cotton bale to a depth of 3 inches, even when the temperatures were as low as 50° F., with a dosage of 3 ounces of hydrocyanic acid per 100 cubic feet of chamber space, including the space occupied by the bales. This treatment is therefore effective for cotton which is compressed, as the survival of pink bollworm in compressed bales is practically all in the outer 3 inches of the bale.

Analyses of soil for lead arsenate in plots of growing plants in the Japanese beetle infested area were made during April and May. In this work, soil from 701 plots of growing plants, plunging frames, or heeling-in areas in 18 nurseries located in Pennsylvania and New Jersey was analyzed. In all, 851 samples were taken and 1,702 analyses made. Of these plots, 251 required additional lead arsenate to bring the concentration up to 1,500 pounds in the first 3 acre-inches, while in the remaining 450 plots no lead arsenate was required to maintain the plots in a certified status. The total area of the plots of which the analyses were made was 4,948,884 square feet, of which 1,726,608 square feet required additional lead arsenate to bring it up to the required concentration in the first 3 acre-inches. In all, 12,864 pounds of lead arsenate would be required.

A series of experiments was carried out in which the lead arsenate content of the upper 3 inches of soil in 16 nursery plots of various soil types was determined on six occasions at intervals of about a month. From these data no consistent rate of decrease in the lead arsenate content in the upper 3 inches of soil was evident. The proper time for sampling soil for these control analyses is thus apparently just before it is necessary to apply the treatment.

In a comparison of the adhesiveness of (*a*) lead arsenate with fish oil added, and (*b*) lead oleate-coated lead arsenate, as sprays for Japanese beetle, it was found that a much larger quantity of the insecticide was present on the leaves immediately after they had been sprayed with the fish-oil mixture and that it adhered better, as shown by analysis after 2 or 3 weeks.

A new house for the fumigation of freight cars was constructed at Brownsville, Tex., to replace the one destroyed in September 1933. Plans and specifications for the construction of this house and for 13 other projects on the Mexican border on funds provided by the Public Works Administration were prepared and the work supervised. These projects included new steel gastight doors at Laredo and El Paso, Tex., and reroofing the houses at Eagle Pass and El Paso. The installation of equipment for use of volatilized gas in fumigation at Eagle Pass and El Paso, fencing all fumigation houses, and building a retaining wall for diversion of flood waters at Nogales, Ariz., were also accomplished. Part of the work was done by contract and part by force account. All projects except

one were completed by July 1, 1934, and that was 55 percent completed on that date.

An increase in the gypsy moth control work during the present season made necessary an extensive spraying campaign in which this organization assisted in the remodeling, construction, and repairing of mechanical equipment used in this work. Approximately $90,000 was expended on remodeling the large fleet of sprayer trucks already on hand and, in addition, 10 new units were purchased. Quantities of spray-hose couplings and spray materials were purchased, and a number of improvements in the mechanical equipment developed, which made the work more economical and efficient. More than 100 small automobile trucks were reconditioned and prepared for service at a cost of $10,000. The entire program was begun in September 1933 and completed in April 1934, in ample time for the equipment to be available for the intensive control program of the gypsy moth project.

Considerable service work was performed for the other divisions of the Bureau during the past year, and a number of minor problems were given attention.

TERMINAL INSPECTION OF MAIL SHIPMENTS OF PLANTS AND PLANT PRODUCTS

The State of Arkansas discontinued terminal inspection during the fiscal year. No change was made in the inspection points or in the lists of plants and plant products subject to terminal inspection in any of the other States.

Terminal inspection is now maintained by the following: California, Arizona, Montana, Florida, Washington, the District of Columbia, Mississippi, the Territory of Hawaii, Utah, Oregon, Oklahoma, Louisiana, and the Territory of Puerto Rico.

CONVICTIONS AND PENALTIES IMPOSED FOR VIOLATIONS OF THE PLANT QUARANTINE ACT

The following convictions and penalties imposed for violations of the Plant Quarantine Act were reported to the Bureau during the year:

European corn borer quarantine (domestic): One conviction, with fine of $100.

Japanese beetle quarantine: Two convictions, with fines aggregating $60.

Mediterranean fruit fly and melon fly quarantine: One conviction, with fine of $10.

Nursery stock, plant, and seed quarantine: A fine of $22.50 was imposed by the customs official at New Orleans against a person caught attempting to smuggle in 12 orchid plants from Brazil.

Quarantines affecting Mexican plant products: Fines aggregating $316.50 were imposed by customs officials on the Mexican border against 120 persons caught attempting to smuggle in from Mexico prohibited plants and plant products.

Quarantines affecting Canadian plant products: Fines aggregating $10 were imposed by customs officials on the Canadian border against two persons caught attempting to smuggle in from Canada prohibited plants and plant products.