THESIS

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AGRICULTURAL QUARANTINE AND INSPECTION IN

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Carl Albin Noren

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Signature redacted for privacy.

Department of

Signature redacted for privacy.

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INTRODUCTION

Quarantine and inspection as generally applied, both in the past and at present, has been limited to horticultural plants and horticultural plant products as nursery stock including trees, shrubs, vines, cuttings, ornamentals, scions, buds, rootings, bulbs, herbs, dried fruits, etc. This application is without a question too narrow, as it should be made to apply to all agricultural plants and plant products.

Historical. To obtain the history of the earliest attempts at horticultural quarantine and the legislation pertaining to it would probably be an impossible task. Historical records show that there was some form of legislation on the subject of insects in the time of the early Hebrews, particularly in relation to agricultural ants. However, this subject now has historical interest only and is of no practical value.

California was the first community unit to take the initiative and a quarantine against nearly all plant life was passed by that state in 1881. This law was known as the Viticultural law and its object was to prevent the spread of diseases and insect pests of the grape. England passed the "Destructive Insect and Pests Act" in 1877, but it was only of little consequence for many years. In 1876 Cape of Good Hope
passed an act entitled "An Act to Regulate the Introduction into This Colony of Articles and Things, By reason of Disease or Otherwise, Might be Injurious to the Interests Thereof." There were no regulations passed under the above act until September 1, 1914, hence its effectiveness must have been of slight value previous to that time.

By 1893 fifteen states of the United States had passed quarantine laws, most of them being provided against San Jose Scale which, after its introduction, had spread rapidly throughout that section of the country. In 1908 thirty-nine states had legal legislation for the control of traffic in nursery stock.

The factors which developed the necessity for quarantine laws were the introduction and rapid spread and destruction of the San Jose Scale, Codling Moth, Grape Phylloxera, and the Cottony Cushion Scale. Up to about 1900 nearly all of the states in the Eastern United States prepared their horticultural laws for the control of the San Jose Scale. California's first quarantine was against the Phylloxera, which was rapidly devastating the vineyards, and against the Cottony Cushion Scale which was doing much damage to citrus trees.

It is interesting to note that at first all laws were based on extermination, while later laws were based on methods of control.
QUARANTINE MEASURES OTHER THAN HORTICULTURAL

Medical quarantine. Quarantine, in the French language, is a period of 40 days, and was originally applied to the old sanitary system of holding ships and persons at ports of entry on account of plague. If no plague had developed during this period it was deemed safe to unload the ship's cargo and persons on board.

The crudest form of quarantine was the early isolation of lepers and the attempt to check the invasion of syphilis in Northern Europe about 1490. The first lasaret was founded by Venice in 1403 and was followed by Genoa in 1467.

The first quarantine act was passed by the English Parliament in 1790. Plague was prevalent in Poland and the Baltic and this first act was made to prevent its being imported into the British Isles. This protective act, however, was enforced in very haphazard ways. In 1721 two vessels carrying cotton from a port where plague was present, were ordered to be burned and the owners were paid 23,935 pounds as an indemnity. Another time two ships laden with hides from Magador, Morocco, were ordered to be sunk with their cargoes and the owners were paid 1500 pounds. The expense of quarantining a ship ranged as high as one-half the value of the cargo.

Quarantine acts were passed for every new out-
break of the plague. In 1788 England passed a very oppressive quarantine act, with provisions affecting cargoes in particular, but at the beginning of the nineteenth century there was a marked change in quarantine legislation as all following acts were less drastic. In 1823-24, after an elaborate inquiry, another act was passed making the quarantine only at the discretion of the Privy Council and at the same time recognizing yellow fever to be as dangerous as the plague. The steady approach of the plague over all Europe in 1831 practically did away with quarantine. In 1847 the Privy Council admitted all ships if there had been no case of plague during the voyage.

Since 1852 there have been several conferences between delegates from different nations, with a view towards uniform action in preventing infection from the East. All but the Conference of 1897 dealt with cholera. No results came of the earlier conventions. Each following conference has been followed by an international convention on the part of the nations. The effect of this has been the abandonment of high quarantine doctrine of "constructive infection" of a ship coming from an infected port, and instead working toward the principles which England has been advocating for some time. The aim of each sanitary convention has been to obtain a uniform minimum of preventive action, but permitting further restrictions on individual states.
Quarantine of domestic or other animals in order to prevent the spread or importation of disease is much more recent than quarantine in relation to the human race. This is undoubtedly due to the fact that because of the superiority of the human race its welfare was considered first. Due to the great mortality of the plagues prevalent in earlier times the public was made to realize that something must be done.

Veterinary Quarantine was brought about exactly for the same reason as medical quarantine, the great loss of animals through disease, and an attempt towards its control. The importation of Texas fever (splenic fever) from Mexico, and its rapid spread through the United States, alarmed stock raisers. Large annual losses of stock were also caused by pleuro-pneumonia, anthrax in cattle, and hog cholera. Stock raisers in many states appealed for help. These states found that they were without laws under which to act and without the necessary money to carry on protective work.

The first state to enact some form of quarantine was South Carolina. In 1879 its legislature passed "An Act to Create a Department of Agriculture," the Board to have power to quarantine or kill stock in case of contagious diseases. Wyoming followed in 1882 with "An Act to Suppress and Prevent the Dissemination of Contagous and Infectious Diseases Among Domestic Animal"
In 1884 Congress passed "An Act for the Establishment of a Bureau of Animal Industry to Prevent the Exportation of Diseased Cattle and to Provide Means for the Suppression and Extirpation of pleuro-pneumonia and Other Contagious Diseases Among Domestic Animals." The next states to act were Kansas, Connecticut, Michigan, and Illinois, in 1886. During the few years following, nearly every state had passed some act in relation to quarantine. In 1890 the Bureau of Animal Industry ruled that all "Sheep and Swine Imported from Canada and European Countries Must be Held in Quarantine for a Period of not Less Than 15 days to Prevent the Introduction of Diseases."

From the foregoing discussion it will be seen that the principle of quarantine is the same for the three different cases, still a quarantine for one would not do for the other two. One quarantine deals with plants and plant products while the other two deal with animals and human beings. It would be possible to combine animals and humans under the same quarantine as the diseases are very much similar. However, these must be separate from plant quarantine, due to the great differences in the diseases attacking plant and animal life.

THE VALUE OF QUARANTINE AND INSPECTION

The value of quarantine and inspection lies in
its effectiveness. If we pass strict quarantine and inspection laws and do not place properly trained men who are competent to do the work the results are of little or no value. The first requisite is to have proper laws which should be uniform. Second, the enforcement of these laws should be free from all politics. Third, all inspectors and quarantine officers should have a technical and practical knowledge of entomology and plant pathology. Only with these fundamentals as a basis can we hope to get effective quarantine and inspection.

The theory of horticultural quarantine and inspection as applied to horticulture is that the most efficient method at our disposal for fighting insect pests and plant disease enemies of our horticultural and agricultural industries is to prevent their introduction. We have no record of an instance where an insect or a plant disease once introduced has ever been extirpated; although it may be kept below the danger point, the menace is still present.

About 50 per cent of our serious injurious insect pests and plant diseases are of foreign origin. The following well known insects and plant diseases have all been introduced: Codling Moth (*Cydia pomonella*), San Jose Scale (*Lepidosaphes ulmi*), Hessian Fly (*Mayetiola destructor*), Angoumois Grain Moth (*Sitotroga cerealella*), Cotton Boll Weevil (*Anthonomus grandis*),
Brown Tail Moth (*Euphroctis chrysorrhoea*), Gypsy Moth (*Porthetria dispar*).

The two latter insects are of recent introduction and so far have cost the New England states and the United States Government over $1,250,000 in control measures alone, to say nothing of the enormous losses incurred. The Codling Moth causes an annual loss and cost of treatment of $16,000,000, while the San Jose Scale causes a loss of $10,000,000, and the Hessian Fly $50,000,000 to $100,000,000. This is but an example of the depredations caused by a few common insects. It has been estimated that the yearly losses of farm crops chargeable to insects amounts to at least $1,000,000,000.

Apple Scab (*Venturia poni*), Chestnut Blight (*Endothia parasitica*), Potato Wart (*Chrysophylictis endobiota*), Potato Powdery Scab (*Spongiospora subterranea*) are a few common diseases which are very serious. The two latter diseases are of recent introduction and strenuous efforts are being put forth to prevent their spread.

Some dangerous insects liable to be introduced are Citrus White Fly (*Aleyrodes citri*), Mediterranean Fruit Fly (*Ceratitis capitata*), Melon Fly (*Dacus cucubits*), Mexican Orange Maggot (*Trypeta ludens*), Dagger Moth (*Apatela auricoma*), and many others. Of dangerous plant diseases we may include Citrus Canker, White Pine Blister Rust (*Peridernium strobi*), *Sclerospora magdis*, a disease of the Indian corn.
From the foregoing, the great importance of these insect pests and plant diseases can readily be appreciated. It is safe to say that most of these diseases and insects could have been kept out of this country if the United States had early passed proper quarantine and inspection laws, since most of them were introduced on nursery stock and ornamentals.

Some people argue that because an insect is not present in our country we have no means of ascertaining whether it would become a pest under our conditions and therefore it is unnecessary to prevent its introduction. This argument has even been brought up in case of the Mediterranean Fruit Fly, in spite of its record in all countries and climes. Take the state of California which has probably the best quarantine service in existence: Since its establishment in 1881 no serious insect pests or plant diseases have gained entrance through any of its ports. It is true that the White Fly (*Aleurodes citri*) and the Chaff Scale (*Parlatoria pergandii*) have gained entrance into California, but not through any port. The White Fly probably was introduced through the mail from the South or East while the Chaff Scale probably came from the Holy Land through New York.

What has already been said in regard to foreign quarantine and inspection applies equally well to the control of insect pests and plant diseases already in
this country, but it is harder to enforce. In the case of our United States quarantine, insect pests and plant diseases have a great number of ways by which they can be disseminated and their spread cannot be prevented by state lines. At present, one state will quarantine against another state but in many cases, due to improper laws, lack of funds, and inefficient officials, very little effective work is done. The only way to control plant diseases and insect pests within the country is by means of uniform state horticultural laws or a national law because the only effective quarantine is by geographic boundaries.

Quarantine between isolated countries is the simplest form of quarantine. It would be an easy matter for New Zealand to pass and enforce quarantine laws against the Hawaiian Islands for the reason that Honolulu is the only port of entry in the latter, and the former has but two ports—namely, Auckland and Wellington. All goods from other countries must enter by either one of these two ports.

STATE VERSUS NATIONAL CONTROL OF QUARANTINE

Many authorities argue that quarantine and inspection of foreign importations of nursery stock as well as the domestic trade is the duty of the states and not the Federal Government. The fundamental principle in quarantine and inspection is uniformity through
out all the states and this is impossible to obtain by state laws because of the fact that the interests of the states are so dissimilar. A few of the large fruit growing states have very good laws and efficient quarantine and inspection service, but in other states where fruit growing is a minor agricultural industry the laws are usually poor and the inspection inefficient. Any laxity or carelessness in one state would in the end seriously affect other states.

National quarantine would be more just and efficient as well as cheapest. State quarantine is often not made on the merits of the case; as for instance, the nursery men of one state may want to exclude the trade of nurserymen of other states which could be done by passing some unjust quarantine regulation against the nurseries of other states. A case of this nature came up quite recently. A certain state produced large amounts of onions and the growers in order to keep up prices attempted to prevent importations from a neighboring state by appealing to the State Horticultural Board of their state to pass a quarantine on imported onions because they were affected with Onion Mildew. Upon investigation it was found that the onion mildew was found in both states and that the quarantine act was a selfish act to gain for themselves financial benefit. Instances of this kind are liable to come up at any time under any system of state control.
There should be quarantine ports with inspectors to handle all imports of nursery stock, ornamentals, and other agricultural products liable to carry injurious insect pests and plant diseases. On the Atlantic seaboard they would be New York, Baltimore, Charleston, Washington, and New Orleans; and on the Pacific Coast would be San Diego, Los Angeles, Santa Barbara, San Francisco, Eureka, Portland, and Seattle. As mentioned before, the state of California maintains an excellent quarantine service but Oregon and Washington to the north have none. Therefore, in spite of California's strenuous efforts in keeping out insect pests and plant diseases they could enter through some port in Oregon or Washington and eventually reach California by the many routes. Proper Federal quarantine would obviate this danger as all ports would have equally good quarantine.

Quarantine stations must also be maintained along the Mexican and Canadian borders. California makes all necessary inspection of products from Mexico, but no products from Canada are inspected; while on the other hand, Canada inspects all horticultural and agricultural products brought to that country from the United States. Our quarantine stations on the two borders should be located at all main railroads carrying commerce between the two countries.
QUARANTINE IN FOREIGN COUNTRIES

Quarantine in foreign countries is as variable as state quarantine is in the United States, a few countries having good quarantine and inspection laws. Canada probably has the best laws and the best method of enforcing them. There are a few small countries that as yet have not made any attempt towards quarantine legislation. Some foreign countries have only sufficient quarantine to enable them to export nursery stock.

As far as is known the Colony of the Cape of Good Hope was the first foreign country to pass a legislative quarantine act. It is entitled "An Act to Regulate the Introduction into This Colony of Articles or things Which by Reason of Disease or Otherwise Might be Injurious to the Interests Thereof" and was passed in 1876. However, the Import Regulations to the above act were not perfected until May 5, 1914.

A Digest of the Regulations:

1. The introduction of the horticultural fruit products grown elsewhere than in South Africa is prohibited except by sea or by post.

2. The importation of the following articles is prohibited: Grape vines (except by government), coffee plants, eucalyptus trees, and coniferous trees, stone fruits grown in the United States or Canada or in any other country where peach yellows or peach rosette is present, peach stock or stones from any country what-
soever.

3. The importation of any tree or any portion thereof except fruit, seeds, seedlings, and blight resistant stock of apples shall be allowed only by special permission of the Minister of Agriculture.

4. All horticultural materials shall be examined by an officer.

5. Inspection and fumigation expenses shall be borne by consignee.

6. Inspection to take place at port of entry except by special permission.

7. If upon examination the products are found to be satisfactory, a certificate is issued to the consignee.

8. Articles coming by post and subject to examination are treated as above.

9. For violation of these acts there is a penalty of not more than one hundred pounds sterling or imprisonment.

Quarantine and Inspection in England. The Horticultural Branch of the Board of Agriculture and Fisheries is charged with the administration of the Destructive Insects and Pests Acts of 1877 and 1907.

The staff consists of:

1. The Head of the Branch
2. The Entomologists
3. Two general inspectors
4. Six District Inspectors
5. Twenty-four Sub-Inspectors
There are also a large number of inspectors appointed by local authorities who deal with minor points of local administration.

All the inspectors are required to pass a civil service examination.

England is divided into six districts, each having a district inspector and a varying number of sub-inspectors and local inspectors. Some of the sub-inspectors are shifted from one district to another as exigencies of the work require.

The duties of the staff are: (1) The administration of the Orders of the Board which deal with the plant pests scheduled as dangerous in England, and (2) the inspection of nurseries and consignment of plants destined for exportation to countries where government certificates are required before landing.

The object of the Board is to control and, if possible, extirpate the pests in the country. A study is made of all pests in order that all possible conditions may be understood and the regulations adjusted accordingly.

Every nurseryman who desires may have his nursery inspected free of charge but a fee is levied if the nurseryman wishes to obtain a certificate to enable him to trade with America.

All plants, except gooseberry bushes, may be
imported and currant bushes are admitted by license only. However, all imported plants are inspected for any pests.

**Quarantine and Inspection in Canada.** The introduction of the San Jose Scale and the previous experience of its destructiveness in the United States was responsible for the passage of the San Jose Scale Act in 1898, which prohibited the importation of nursery stock from countries in which it was found. Because of the introduction of Brown Tail Moth (*Euproctis chrysorrhoea*) in 1909 and the small power of the Dominion Government in the prevention of the introduction of destructive pests, the "Destructive Insects and Pests Act" was passed in 1910. The act gives the government power to take whatever power it deems necessary to prevent the introduction of spread of plant diseases and insect pests.

**Substance of Regulations:**

All plants, except bulbs, herbaceous perennials, and greenhouse plants may be imported at certain seasons only, the shipments to pass through certain specified ports for inspection and if infested with any pests to be destroyed or refused entrance. All plants imported must be fumigated. Special inspection is made of plant shipments from Brown Tail and Gypsy Moth infested districts.

Notice must be given the Dominion Entomologist of any...
importation of plants. The Customs officers cooperate with the Entomologist and notifies him of the arrival of foreign shipments.

Field officers are employed to inspect orchards and conduct eradicative measures, this being done in cooperation with the respective Provincial Governments. When it is deemed necessary, the Minister of Agriculture can quarantine any given region to prevent the spread of pests.

The Provincial Governments have also instituted measures against pests.

In 1892, the Province of British Columbia passed an Act to prevent the introduction and spread of pests. The last act provides for the inspection of all plants and fruits entering the Province. If it is found infested, the shipment is fumigated or destroyed. The Province of Ontario has laws referring to the inspection of nurseries and the treatment of plants grown in nurseries. Nova Scotia has given the Department of Agriculture power to inspect orchards and to take steps to eradicate or control serious diseases and insect pests.

Germany. This country prohibits by the decree of 1898 the importation of horticultural products and fresh fruits from America if upon examination San Jose Scale is found. It was amended in 1900 so that dried fruits could be imported without inspection.
France. By the decree of 1898, France prohibits the entry into and passage through the country of horticultural products from the United States. It also prohibits the entry of fresh fruit when upon examination insects are found.

France established its nursery inspection service in 1910 due to the pressure brought to bear by the United States Federal Board of Horticulture because of the large number of Brown Tail Moth nests found on nursery stock which was introduced.

Two chief inspectors are in charge respectively of plant diseases and insect pests. Each have minor temporary agents who conduct a duel inspection of all nurseries asking for the same. A fairly high standard of education and practical experience is required.

The inspection law has many weaknesses, chief of which is the lack of obligation in the inspection. Inspection and certification is only made upon demand where the exigencies of the business of the firm seem to require it. Therefore, nursery stock can be imported from non-inspected nurseries. That the system is very lax is proven by the repeated introduction on nursery stock of a large number of insects.

Japan. This country enacted a law in July 1914 which prohibits the importation of all kinds of horticultural material infested by insect pests and plant diseases. Quarantine stations are established at the
South Australia. The Vine, Fruit, and Vegetable Act was passed in 1885. The introduction of the following trees was prohibited except through Port Adelaide namely: bananas, oranges, apples, pears, passion fruit and pineapples.

Regulation relating to the introduction of fruit passed in 1907 as follows:

1. No fruit material can be landed without a written permission of an inspector.

2. All horticultural materials introduced into Port Adelaide on being landed shall be taken to such place as inspector or customs officer directs at expense of consignee.

3. The horticultural materials shall be examined by an inspector and treated or destroyed if he deems it necessary.

4. The importation of the Mediterranean Fruit Fly (*Ceratitis capitata*) and all other species of fruit flies are prohibited.

The regulations are few but explicit and very broad including all horticultural products and are quite rigorously enforced. After 30 years operation it has prevented the introduction of nearly all the serious plant diseases and insect pests.

The cost of the quarantine has been about 4000 pounds per year. Twelve permanent and 12 casually
Quarantine and Inspection in the United States.

In the discussion of the origin of horticultural quarantine and inspection a brief history of quarantine and inspection in the United States was included, but it is thought necessary to enlarge upon that phase of the question at this point.

Past History. Since California was the first state to institute horticultural quarantine and inspection and at present has the most highly developed quarantine service in the United States, it would be well to follow its development from the beginning in 1880 up to the present time. On March 4, 1881, the Viticultural Law was passed, its object being to prevent the spread of vine diseases and insect pests. In Section 3 of this law we first find the use of the word quarantine as applied to horticultural materials. Section eight provided for the appointment of an officer to formulate and enforce quarantine regulations. On April 5, 1881, the Board of State Viticultural Commissioners appointed eleven practical horticulturists, these men to serve as the first Board of State Horticultural Commissioners. These men on the same day elected by ballot Matthew Cook as Chief Executive Horticultural Officer. At the next meeting of the Board (June 30) Mr. Cook presented a system of quarantine
rules and regulations but they were not acted upon until at a later meeting held on September 30, when they were read, altered and adopted by section, under the caption "Horticultural Quarantine Rules," were signed, printed and issued on November 12, 1881, by Mathew Cook. With enthusiasm he promptly proceeded to enforce them after January 1, 1882, in different parts of the state, but soon found himself in the court under orders to abandon their enforcement. In 1883 the Supreme Court of the State held that the Quarantine Rules were unconstitutional. This was a hard blow but Mr. Cook immediately began a campaign for the protection of horticulture in California and on March 13, 1883, the State Board of Horticulture was created.

The causes which brought about the creating of the above board was the increasing damage done by the San Jose Scale, Codling Moth, and the Cottony Cushion Scale; and the increased interest taken to promote and establish horticulture on a firm basis. Several features of the provisions creating the State Board of Horticulture need discussion. First, the members of said board shall receive no compensation whatsoever. The nine men composing the board went to work with cheer and determination and organized for business on April 5, 1883, and in addition to constructive work they laid the foundation for the present quarantine and inspection service. Secondly, authority was given to
appoint the necessary "quarantine guardians" to carry out the provisions of the act. Lastly, quarantine procedures were but rules and regulations established by the board with no penalty provided for punishment in cases of violation.

In 1885 conditions were improved upon by the passage of "An Act to Prevent the Spread of Fruit Tree Pests and Diseases and to Provide for their Extirpation". In section two of this act the duties of the inspector of tree pests and quarantine guardians were set forth and a penalty for violations was provided. This act gave the Quarantine Officers authority to enforce any rules they desired.

In 1891 much agitation was stirred up by those whose merchandise was included in the rulings. They maintained that the quarantine regulations were intended for commercial purposes rather than for sanitary reasons. In November of the same year the State Board of Horticulture issued amendment regulations, the subjects of which were: importers of horticultural products into the state were ordered to notify the Quarantine Officers of its arrival; a 14-day quarantine period was established for infested imports in order to determine the effect of the treatment of the pests found upon them; and all nursery stock and other propagation material subject to "peach yellows" was denied admittance into the state from any part of the
country known to be infested with the disease. No penalty was provided. In December, 1893, the State Board of Horticulture again amended the quarantine regulations, striking out a restriction and adding a clause which prohibited the introduction of any plants or nursery stock infested with insect pests or fungus diseases not known to be found in the state. Due to the rigorous enforcement of the quarantine regulations during 1894 it became necessary to reinstate the restrictions on infested fruits and prevent the admission of any animals injurious to horticulture. In 1899 the horticultural quarantine law became effective, which placed a statutory quarantine on "peach yellows," and made it a misdemeanor for violating any of its provisions.

On March 25, 1903, an act was approved creating a State Commission of Horticulture with a single commissioner. Extraordinary powers were given the commissioner such as the establishment of quarantine at the boundaries of the state or elsewhere within the state, with the approval of the Governor. The authority to create and commission quarantine guardians was omitted. At this time the famous sentence "reasonable cause to presume" was added which has made the protective system impregnable. On June 26, 1911, the Act of 1903 was amended, the most important feature being the restoration of the authority to appoint and commission
state quarantine guardians. This law as it now stands upon the statute books of the state is generally accepted as a standard in this class of legislation. Dr. Marlatt, in speaking of the California Quarantine Service, said: "Well nigh perfect, the best in the world."

It can readily be seen that the horticultural laws of California have gone through many stages of development. There have been gloomy times but the men who had the welfare of the states horticultural interests always in mind, each time came forward and met the situation in an admirable manner.

On account of California's rigid enforcement of her quarantine laws, other states and countries soon began to take notice for the reason that their fruits, nursery stock, and ornamentals were often refused entrance on account of being infected with disease and insect pests. Oftentimes the losses to the parties doing the shipping were large and this caused them to appeal to their states or governments for aid. The states and countries which were most affected soon found that it was to their own interest to improve their conditions, so that their horticultural products would be accepted by California quarantine officers and at the same time make provisions to protect themselves in the same manner.

In 1885 only four states had horticultural laws and all were western states, showing the great influ-
ence of California. In 1893 San Jose Scale was discovered in the Eastern United States, which caused 15 states to pass laws preventing the introduction or, when present, providing means for its extirpation. In 1908 thirty-nine states had legal legislation for the Control of traffic in nursery stock. The importation of the Brown Tail and Gypsy Moth and the discovery of the Cotton Boll Weevil resulted in further rigorous legislation. It is interesting to know that at first the laws aimed at the extirpation of the insect pests and plant diseases while later laws were based on means of control.

Of all the ports of entry into the United States there is no provision for the inspection of horticultural products except at the California ports. The Federal Horticultural Law provides for inspection at points of delivery but this is quite unsatisfactory as will be brought out later on.

**Future Status.** To predict the future of inspection and quarantine is impossible. That it is here with us to stay is certain and it seems reasonable to believe that much improvement will be made both in the laws and their method of enforcement. It is doubtful if any of us will see the day when uniform laws are generally adopted throughout the country, but among the nurserymen, inspectors, and quarantine officers there is a strong agitation in their favor which indicates that
they are desired.

The National Law. At first thought it may seem strange that a Federal Quarantine Law was not passed before 1912. This was due to the lack of interest among fruit growers in general and by the great opposition by the nurserymen. The nurserymen objected to the passage of such a bill because they thought that it was aimed at their business. They did not object to the inspection and the quarantine of their outgoing and incoming business.

The Department of Agriculture wanted the bill because it would protect the country by quarantining against such pests as the Mexican Fruit Fly (Trypetaludens), Mediterranean Fruit Fly, White Pine Blister Rust, etc. Furthermore, the Department wanted power to regulate shipments of nursery stock and other horticultural materials in inter-state commerce so as to safeguard against the spread of Gypsy and Brown Tail Moths and other pests.

There are advantages to be gained by a National Law. First, it will serve to outline a standard law and the states by amending their laws to conform to it will be working in the direction of uniformity in the horticultural laws. It will provide for quarantine and inspection of inter-country shipments which is of great importance. It will give foreign countries reason to clean up their nursery stock and cause
them to quit dumping their nursery stock into this country. It will cause the states to take more interest in the matter so that when they consider passing or amending state horticultural laws they will use greater care. It will stimulate better inspection in the United States.

**Plant Quarantine Act of Aug. 20, 1912.** Since 1897 several attempts have been made towards formulating a uniform quarantine and inspection law, notably in 1897, 1899, and in 1907, but it was not until a joint committee of the various organizations was called that any definite plans were arrived at. After much delay a bill was drafted and finally approved by nurserymen, inspectors, entomologists, and representatives of the Department of Agriculture. This bill was introduced into Congress in 1910, was favorably reported, but it failed to get the two-thirds vote in 1911. An entirely new bill was drafted by the Department of Agriculture, entomologists, and plant pathologists, which was approved and was introduced into the special session of Congress. It was finally passed August 12, 1912.

A summary of the act is as follows:

Importation of nursery stock without permit and certification of inspection shall be unlawful.

The Secretary of Agriculture and the proper state officials must be notified of the arrival of imported nursery stock.
In order to prevent the introduction or spread of disastrous insects and plant diseases, foreign countries and any portion of the United States may be quarantined.

Provision is made for the prosecution and punishment of all persons or concerns violating any provisions of the act.

The duty of carrying out the regulations of the act is vested in the Federal Horticultural Board which is appointed by the Secretary of Agriculture. C. L. Marlatt is the present chairman of the board.

Its effect on foreign countries is already noticeable in that imported nursery stock is more free of disease and insect pests.

Although the Act is not perfect, it is far better than nothing. If it contains any flaws they will soon be discovered when steps can be taken to amend it.

It was thought that this paper would not be complete without a short treatise on the Insecticide and Fungicide Act of 1910.

**Insecticide and Fungicide Act of 1910.** At the Chicago meeting of the Association of Economic Entomologists on December 27, 1907, the standing committee on Insecticides reported that it should be ascertained whether or not it was possible to secure an interpretation of the National Pure Food and Drugs Act so that it would include insecticides and fungicides; and if this
was impossible, that the committee draw up a suggested law. A suggested law was drawn up and presented before the 60th Congress. There was no opposition to the bill, but due to the presence of other business, it could not be brought to a vote. It was again introduced into the 61st Congress and was passed and approved by the President, April 26, 1910.

This measure has aided greatly in the standardization of the leading insecticides and fungicides and in deterring worthless or fraudulent compounds from being marketed. A summary of the act follows:

It shall be unlawful to misbrand or adulterate any fungicide or insecticide.

It shall be unlawful to offer for sale any adulterated or misbanded insecticide or fungicide.

A certain standard of composition is fixed for paris green and lead arsenate.

All compounds must conform to the label.

The Secretary of the Treasury is empowered to collect samples of insecticides and fungicides for analysis by the Department of Agriculture.

Substantial penalties are provided.

Any party or parties found guilty of violating this Act may appeal to the courts.
THE STATE LAWS

A review of the various state horticultural inspection laws and regulations reveals the facts that they contain a wonderful conglomeration of ideas, a great mixture of various types of inspection incorporated in one law and in many laws great prolixity. Too often do states pass drastic laws against each other which are often detrimental. Such Acts is a serious state of affairs because the laws should be of such a nature as to be of the greatest value to their individual state and also to the other states. Often the point is taken that "the interests of the fruit growers and the nurserymen are not mutual and are therefore antagonistic," this is entirely wrong because one depends upon the other and the basic law for one applies equally well to the other.

We want state laws that are understandably framed and intelligently administered in behalf of the horticultural and agricultural interests. "The enactment of laws presupposes a knowledge of conditions and facts requiring such laws, and we know only too well that in horticultural state legislation this is not so." Too many laws, regulations, and statutes are passed without due consideration of their necessity and practical application.

The horticultural laws should be founded on
common sense, justice, and on one principle if we are to have the right kind of laws. The reason so many states have bad laws is that they are not prepared by experts along the line of quarantine and inspection.

**County Ordinances.** In California each county can appoint a horticultural commissioner and pass any horticultural quarantine and inspection regulations it desires. What has been said in regard to state laws applies equally well to county laws. In short, these county ordinances are as diverse as the counties which framed them, and often are conflicting, inefficient, and objectionable. In county ordinances or laws there are greater chances for retaliation than in state laws because there are fewer people directly interested so that special interests find it easier to put through such laws as favor them. It happens very often that one county will pass an ordinance against another, prohibiting the importation of nursery stock purely to advance the interests of its own nurserymen. It is to be hoped that other states do not adopt the county system.

It is difficult to compare the value of the different laws because of their diversity and often aiming only at a few specific pests which are the only ones directly affecting the particular state. The laws should be simple, applicable, and effective with means for their enforcement. This latter point is the
one often lacking. The law itself may be very good but too little money is provided with which to enforce it. Of all the states, only four or five really have what we might call good laws and these are open for much improvement. The whole field is open for much criticism and the only solution is uniform horticultural laws.

Uniform Laws. The ideal toward which we should strive is uniformity in horticultural statutes the country over because this is imperative to the best interests of the individual states and the Nation. When a large portion of the people are directly interested national laws are to be preferred because of their uniformity. However, state laws fit the peculiar conditions of the individual states and are more easily and quickly enacted, as well as modified. In order to have thorough inspection and quarantine throughout the United States, it is necessary to have Federal aid. The federal government should act as a central office or clearing house by bringing all the states together while the actual work should be done by the states for the reason that they are better acquainted with their particular conditions. In order to get the necessary federal aid, the fundamental basis would be for Congress to make a substantial appropriation each year for each state, and each state in turn appropriating the remaining amount necessary. By this means both the
states and the federal government would be directly interested. Besides this, there could be a special appropriation to cover the inspection and quarantine of foreign imports, which work should be conducted at the point of entry in order to get results.

As mentioned before, a national law for all the states would be the ideal but will be hard to obtain because of the state's unwillingness to relinquish this power to the federal government. The second best is a federal inspection and quarantine law to cover foreign imports and uniform state laws. For the present this latter system is the most feasible.

Since there is very much danger from foreign importation of pests on various horticultural and agricultural products, it is necessary and even absolutely essential that the foreign quarantine and inspection is under the federal government so as to insure uniformity and absolute and thorough work by expert men at every port. One or two states might maintain an excellent quarantine service while the other states having ports of entry would do nothing, which is actually the case today. California is the only state having foreign quarantine, and it was forced to take it up in order to protest its great horticultural interests.

Supposing all state laws were good laws, they would fail on account of being too arbitrary in regard to boundaries between the different states. The law
may read that no plants can be brought into the state which harbor any certain pest or pests, but if this pest be present in the neighboring state it may jump the line, irrespective of what the law may say. The only way to quarantine is to do so by geographical boundaries. It is easy to quarantine against a certain valley but not against one-half of the valley, should it be divided into two states. By having a national law the federal authorities could quarantine certain infested districts and prevent their shipping any infested products out, while at present a few states might quarantine the infested district while the greater majority would not.

Uniform horticultural laws in all states is a good goal toward which we should strive, but as yet it is far away. The best we can do is to ever keep it in mind at all horticultural, entomological, plant pathological, and nurserymens' meetings, and bringing it up in the state legislatures. As soon as all of the fruit growers and other interests become generally interested it will be comparatively easy to bring the matter up before the different states' legislatures with the desired results.

A PROPOSED HORTICULTURAL BILL

A very good proposed horticultural bill which will fill all the requirements for a uniform horticul-
tural law has been originated in the Northwest and is the result of the labors of our best talent in this field. How it came to be brought about and the steps it went through follow: A committee of the Oregon State Horticultural Society prepared a bill on uniform horticultural laws. This committee, with a similar committee from the Oregon State Board of Horticulture, composed of three members and the chairman of the American Association and the Pacific Coast Associations of Nurserymen which reviewed and changed the bill and made it as really perfect as possible. The Nurserymen had also prepared a bill. The two bills were compared and the desirable points drafted into another bill. The Governor was then asked to call a convention from the Pacific Coast and the Northwest and the Rocky Mountain states, and asked the Governors of these states to send delegates.

This convention met at Corvallis, Ore., in December, 1914, went over the bills again, and selected the best points from each and worked it over, after which a committee was appointed consisting of Dr. A. J. Cook, of the California Horticulture Commission; Ray Roberts and Mr. Donald, both of the Oregon Nursery Company. This committee was given power to call in specialists to get opinions.

As the bill now stands, it is as nearly practically and scientifically perfect as it is possible to
make it. It is elastic, so far as to be applicable to all states or communities, and it will apply to any or all states in the United States. Not until a bill of this sort is adopted by a majority of the states can we hope for the desired uniformity in state horticultural laws, which uniformity is necessary before any real progress can be made.

Following is the bill in full:

**PROPOSED HORTICULTURAL BILL.**

**Bill No._____**

A Bill for an act creating the office of State Commissioner of Horticulture, (or Commissioners) defining their power and duties; prescribing for the appointment of inspectors, and defining their powers and duties; providing for the inspection of nursery stock, fruit, fruit trees, ornamental trees, shrubbery, plants, cuttings, grafts, buds, scions, pits, vines, and all horticultural and agricultural plants and plant products thereof; requiring shippers of nursery stock to have same inspected by an inspector; prescribing quarantine and the method employed thereunder; providing for the disinfection of fruit, fruit trees, ornamental trees and shrubbery, and all horticultural and agricultural plants and plant products thereof; defining the qualifications of inspectors and commissioners; providing for the destruction of infested and infected fruit,
fruit trees, ornamental trees, shrubbery, and all horticultural and agricultural plants thereof, including a lien against the property wherein the same is standing or growing, and providing for a right of action for all expenses thereto; authorizing the destruction of fruit, fruit trees, shrubbery, nursery stock and all horticultural and agricultural plants and plant products thereof infested or infected with pest or disease, and prescribing a salary for those enjoined to enforce the provisions of this act, and for their removal from office; to provide for the appropriation of money to pay the necessary expenses of the conduct of the office of State Commissioner of Horticulture and repealing Sections......

Be it enacted by the People of the State of......

Be it enacted by the Legislative Assembly of the State of......

Board: How Appointed

Section 1. The office of State Commissioner of Horticulture (with associate commissioners not to exceed four) is hereby created, which office shall be filled by appointment by the Governor, (or if preferred, by the following board: Governor of the State of......, President of the State Agricultural College, and Chief Justice of the State Supreme Court.)

Section 2. The State Commissioner of Horticulture shall be a practical horticulturist, and have a
working knowledge of entomology and plant pathology; he shall be appointed as soon as this act becomes effective and shall qualify within ten days after his appointment, and shall hold his office for a term of four years, or until his successor is appointed and qualified. He shall be a citizen of the United States.

Commissioner, Oath and Bond.

Section 3. The State Commissioner of Horticulture shall take oath as any other officer, and execute a bond to the State of...... ....in the sum of $....... with surety to be approved by the appointive power, conditioned for the faithful performance of his duties. The oath and bond shall be filed with the Secretary of State of the State of........

Commissioner, Removal of.

Section 4. The appointing power may at any time remove the said Commissioner (or Commissioners) from office, upon filing with the said Secretary of State, a certificate of such removal. In case of a vacancy in the office of Commissioner (or Commissioners) by death, resignation or other cause, the said appointing power shall forthwith fill the vacancy for the unexpired term.

Office at.

Section 5. The State Commissioner of Horticulture shall maintain his office at.......
Commissioner, Salary and Expenses.

Section 6. The State Commissioner of Horticulture shall receive a salary of........ payable monthly; he shall also be allowed not to exceed the sum of........ traveling expenses for himself (and his assistants), and not to exceed ........ per annum for stationery, postage, telephone and incidentals, and not to exceed ........ per annum for assistants.

Commissioner, Powers of.

Section 7. The State Commissioner of Horticulture shall have power and it shall be his duty:

(a) To enforce the laws and foster horticultural (and agricultural) interests of the State.

(b) Examine, upon request, specimens of fruit, fruit trees, plants, nursery stock, ornamental shrubbery and trees, and other horticultural or agricultural plants or plant products sent to him, and report to the applicant the result of such examination.

(c) Formulate the rules and regulations for the guidance, and instruct, advise, direct and supervise the inspectors hereinafter provided.

(d) Hear and decide appeals from orders and decisions of inspectors.

(e) The Commissioner must make an annual report on or before the......day of....... ......of each year to.......... ....of the State, concerning general horticultural conditions and general statistics concerning
the same as nearly as can be ascertained; also a report
as to all acts and proceedings taken by him or under
him, giving the names and terms of employment of all
clerks and inspectors appointed and acting under him
and the amounts in detail paid out by or under him, and
generally report all matters of interest to horticulture
or agriculture coming within his knowledge or under his
observation.

(f) Formulate specific and necessary state quar-
tantine regulations which must be approved by the Gov-
ernor, and prescribe what is a menace or harmful to the
horticultural or agricultural interests of the state.

(g) Perform such other duties as may be pre-
scribed by law.

(Associate Commissioners.)

(Section 8. The Appointing Power may also ap-
point two or more, and not to exceed four Associate
Commissioners of Horticulture, who shall be practical
horticulturists. The Associate Commissioners acting
as an advisory board shall have equal voting power with
the Commissioner of Horticulture. In the event of the
appointment of Associate Commissioners of Horticulture,
the Commissioner of Horticulture shall be the President
of the Board, and shall have charge of the office and
be the executive officer thereof.)

(Associate Commissioners, Removal of).

(Section 9. The appointing power may remove
the Associate Commissioners of Horticulture in the same manner as they may remove the State Commissioner of Horticulture as hereinbefore provided.)

(Associate Commissioners, Salary of)

(Section 10. The salary of the Associate Commissioners shall be $...... per annum, payable monthly.)

Secretary.

Section 11. The Commissioner of Horticulture and the Associate Commissioners of Horticulture, if there be any, may appoint a Secretary who shall be thoroughly conversant in all matters pertaining to horticulture and agriculture and competent to perform the duties of the Commissioner of Horticulture in his absence or disability.

Appointment of Inspectors.

Section 12. The State Commissioner of Horticulture shall appoint inspectors as required properly to perform inspection duties, as and when necessary, not to succeed....... in number unless otherwise required and authorized in writing at a regular meeting of the Commissioner of Horticulture and his Associates, or in the event that there are no Associate Commissioners, then by the Commissioner of Horticulture and the appointing power. To be eligible to appointment the inspector must have the qualifications and fitness for such office determined by an examination before the Commissioner of Horticulture and his Associate Commis-
sioners, or, in event that there be no Associate Commis-
sioners, then before the State Commissioner of Horticult-
ture and the Dean of the School of Agriculture of the
State Agricultural College, or under civil service rules
provided the State has a Civil Service Commission. The
State may be divided into such inspection districts as
may be deemed advisable by the Commissioner and the
Associate Commissioners.

Inspectors, Removal of.

Section 13. Any and all inspectors may be dis-
charged at the will of the Commissioner (or commissio-
ners) of Horticulture, and no inspector shall be retained
in service, unless there are duties requiring his ser-
vice.

Inspectors, Salary and Bond.

Section 14. Inspectors shall be paid not less
than $.... nor more than $.... per day for time
actually employed, and shall be allowed necessary ex-
penses of transportation, all payable monthly upon pre-
sentation of the proper vouchers to the State Treasurer,
the same to be approved and signed by the State Com-
missioner of Horticulture; except that when an inspec-
tor is working within any county as hereinafter provided
in Section 44, his salary and expenses shall be payable
upon presentation of proper vouchers to the County Court
(or Board of County Supervisors) the same to be approved
and signed by the state Commissioner of Horticulture.
Each inspector shall be required to furnish a bond in the sum of $1,000 to be approved by the State Commissioner of Horticulture conditioned upon the faithful performance of his duty.

Inspectors, Duties and Powers.

Section 15. The inspectors shall be authorized and shall have power, and it shall be their duty:

(a) To enforce all laws relating to horticulture.

(b) To inspect orchards, nurseries, nursery stock, fields, fruit and all horticultural and agricultural plants and products thereof, supplies, packing houses, ware-houses and other places where fruit, or other horticultural and agricultural plant products are packed, stored, or shipped; also vines, ornamental shrubs and bashes, as well as other trees and property, for the purpose of ascertaining whether the same is infected with any disease, or pests injurious to fruit, fruit trees, or other horticultural or agricultural plants, and by taking steps to disinfect the same and prevent spread thereof, and, for that purpose, shall have free access to orchards, nurseries, fields, packing houses, storage houses and any place containing such plants or products at all times.

(c) To require the disinfection of all trees, ornamental shrubbery, orchards, nurseries or nursery stock, fruit packing houses or any other place infested with any pests, fungi or diseases injurious to the
horticultural or agricultural plant or plant products of the State of .......

(d) To inspect and examine orchards, fruit, nursery stock, fields and all other horticultural and agricultural plants and plant products, at the request of the owner thereof, for the existence of any disease or pest thereof, and report to the applicant the result of such investigation and prescribe proper remedies therefor.

(e) To prevent the shipping and sale of infected fruits, except that for commercial canning, preserving or making of cider or manufacture of other by-products within the State of ....... Such infected fruit may be sold under such rules and regulations as may be established by the State Commissioner of Horticulture.

(f) To prevent the delivery, sale, planting or shipping of infected nursery stock, fruit, fruit trees and other horticultural or agricultural plants or plant products and supplies, by notifying the owner thereof or the person having the same in charge, and requiring the proper disinfection of the same.

(g) To disinfect or cause to be disinfected, orchards, nursery stock, trees, fruit and other horticultural or agricultural plants or plant products, and to destroy or cause the same to be destroyed, those which cannot be properly disinfected.

(h) To sort and repack, or cause to be sorted
and repacked, infected fruit, or other horticultural or agricultural plants or plant products, if the owner thereof, or the person having the same in charge shall not do so after notice, subject to the direction of the Commissioner of Horticulture.

(i) To prevent the introduction and spread of diseases or of pests injurious to fruit trees and horticultural or agricultural plants, fruit and other horticultural or agricultural plant products and to prescribe and specify the means and methods to be employed for the disinfection of trees, fruit and horticultural and agricultural plant products, subject to the approval of the Commissioner of Horticulture.

(j) To issue certificates of inspection to nurserymen and tree dealers or other persons on stock and fruit inspected.

(k) To perform such other duties as may be prescribed by the State Commissioner of Horticulture.

(l) Each inspector shall attend an annual meeting and such other meetings of the State Inspectors at such times as may be designated by the Commissioner of Horticulture.

Owner to Spray and Disinfect.

Section 16. It shall be the duty of each person within the state of ........ owning or in possession of premises on which there is or shall be growing or grown any nursery stock, fruit trees, shade trees,
ornamental shrubbery or other horticultural or agricultural plants or plant products, or the owner or possessor of any nursery stock, fruit, fruit trees, ornamental shrubbery, horticultural or agricultural plants or plant products, or situated upon premises owned, leased or occupied by him, or the owner of any nursery stock, fruit, fruit trees, shade trees, ornamental shrubbery or other horticultural or agricultural plants or plant products situated or being at any place within the State of ........, to take, adopt and use all methods and means provided by law or prescribed by the State Commissioner of Horticulture, for the prevention of pests or diseases to which nursery stock, fruit, fruit trees, shade trees, ornamental shrubbery or horticultural or agricultural plants or plant products may be subject, and keep the same in a healthful condition and free from disease and pests; and in the event it is found that such nursery stock, fruit, fruit trees, shade trees, ornamental shrubbery or horticultural or agricultural plants or plant products at any time are infested with any disease or pest to which the same may be subject, to promptly take and use such methods as may be prescribed by law or by the State Commissioner of Horticulture to disinfect the same, and in the event such nursery stock, fruit, fruit trees, ornamental shrubbery, horticultural or agricultural plant or plant products cannot be disinfected to promptly destroy the same.
Commissioner to Specify Pests and Diseases.

Section 17. The diseases or pests injurious to nursery stock, fruit, fruit trees, shade trees, ornamental shrubbery and horticultural or agricultural plants or plant products to be guarded against and treated and disinfected for, as in the next preceding section provided, shall include any and all such diseases or pests as the State Commissioner of Horticulture shall specify as injurious to the fruit and horticultural or agricultural interests of the state.

Rules and Regulations.

Section 18. The State Commissioner of Horticulture shall suggest the remedy for and the method and means for the disinfection of fruit trees, horticultural and agricultural plants, fruits and plant products, and shall make such rules and regulations relative thereto as he shall deem proper, which suggestions and rules and regulations shall be promulgated by him by means of bulletins, and any person interested shall be entitled to receive a copy of all such suggestions and rules and regulations at any time upon application for the same.

Inspector Authorized to Enter Premises.

Section 19. For the purpose of ascertaining whether any nursery stock, fruit, fruit trees, shade trees, ornamental shrubbery or other horticultural or agricultural plants or plant products are infected with any disease or pests to which same may be subject, the
the inspector shall be authorized to enter upon any premises at any time for the purpose of inspecting and examining any nursery stock, fruit, fruit trees, or horticultural or agricultural plants or plant products growing or stored thereon, or being situated thereon.

**Inspector Authorized to Enter Premises Where Fruit, Etc. Are Stored.**

Section 20. Said inspector shall also have the power at any time to enter upon any premises where fruit or horticultural or agricultural plant products are stored, or are being prepared or packed for shipment, or offered for sale, or are held for the purposes of delivery, upon any shipments or sale thereof, for the purpose of inspecting said premises and such fruits, horticultural or agricultural plant products to ascertain whether the same or any part thereof, is infected with any of the diseases or pests declared injurious by the State Commissioner of Horticulture.

**Notice to Disinfect or Destroy**

Section 21. If, after inspection, as provided in sections 19 and 20, hereof, the inspector shall ascertain that any nursery stock, fruit, fruit trees, shade trees, ornamental shrubbery or horticultural or agricultural plants or plant products, or any place where such fruit or horticultural or agricultural plant products are kept for sale or is being prepared for shipment or is stored, is infested with any disease or
pests declared by the State Commissioner of Horticulture, to be injurious to the horticultural or agricultural industries of the State, said inspector shall notify the owner or lessee or person having charge of the premises whereon said infected nursery stock, fruit, fruit trees, or horticultural or agricultural plants or shrubbery or plant products are standing or growing or held, or the owner or person having possession or charge of such nursery stock, fruit trees, shade trees, ornamental shrubbery, horticultural or agricultural plants, fruit, horticultural or agricultural plant products, or places of storage for sale or preparation for the market, in person or writing, requiring the disinfection, of any or all thereof which is capable of disinfection, and the destruction of such as is incapable of proper disinfection, subject to the provision hereof relative to the sale, disposition and use of infected plants or fruits, and shall fix a reasonable time in said notice within which the same shall be so disinfected or destroyed as the case may be, and such owner or person having the same in charge shall proceed to disinfect or destroy such nursery stock, fruit, fruit trees, or horticultural or agricultural plant products, as the case may be, in the manner required by law, and in the manner prescribed by the State Commissioner of Horticulture, and within the time specified in said notice. Said written notice may be given by telegram,
or by posting in a conspicuous place upon the premises or by registered letter, the signed receipt of the same by the addressee being prima facie evidence of the receipt of the notice.

**Separating--Disinfecting.**

**Section 22.** In the event of the infection of nursery stock, fruit, fruit trees, or horticultural or agricultural plants or plant products, as hereinbefore specified, if a part only thereof is infected so it cannot be properly disinfected, the owner or person in charge of the same shall have the privilege of separating the same into one or more of three classes, to-wit: Such as does not need disinfection such as can be properly disinfected; and such as cannot be properly disinfected and such owner or person in charge shall destroy such nursery stock, fruit, fruit trees, or horticultural or agricultural plants or plant products as cannot be disinfected within the specified time in said notice, except in case of fruit or vegetables which may be used or disposed of for canning, preserving, drying or other by-products, under the rules and regulations prescribed by the State Commissioner of Horticulture, as herein provided, and shall proceed to disinfect such as can properly be disinfected within the time specified in said notice.

**Inspector May Separate, Disinfect or Destroy.**

**Section 23.** In event of the failure of the
owner or person in charge of such nursery stock, fruit, fruit trees, or horticultural or agricultural plants or plant products, to separate or disinfect or destroy the same, as in the last preceding section provided, and within the specified time in said notice, the inspector shall have the right to enter upon the premises and perform the acts herein provided for, or cause the same to be performed, at the expense of the owner or person having charge of such nursery stock, fruit, fruit trees, horticultural or agricultural plants or plant products, and shall declare the same a nuisance and have a right to destroy all nursery stock, fruit, fruit trees, horticultural or agricultural plants or plant products which are infected so that they cannot be properly disinfected.

Cost Paid by Owner for Disinfection.

Section 24. In event of disinfection or destruction of any orchard, or fruit trees, ornamental trees, shrubs, vines, horticultural or agricultural plants, fruit, horticultural or agricultural plant products or other property by the inspector, or any person under his direction or orders, and upon the filing of an accurate statement of such expense, the costs thereof shall be charged against the owner of such stock fruit or products and the premises upon which the same may be growing, for the cost of such disinfection or the destruction of the property which cannot be prop-
erly disinfected, which charge may be recovered in an action at the law in the name of the State of ........ upon the complaint of the inspector against the owner or person having charge of such property; and shall also constitute a lien against the said property, and the premises upon which the same may be growing, and the bringing of an action at law to recover such costs shall not be deemed to be and shall not constitute a waiver of such right of lien. The State of ........ shall have a first lien thereof on the premises or personal property, so disinfected or destroyed, which lien may be enforced in any court of competent jurisdiction, and the premises or property sold to satisfy the same.

**Fine for Disobeying Order to Disinfect or Destroy.**

Section 25. Any person failing to disinfect or destroy any nursery stock, shade trees, ornamental shrubbery, fruit, horticultural or agricultural plants or plant products, or disinfect the premises upon which the same may be situated, as herein provided, within the time specified after notice from the inspector of the district wherein the same is situated, shall be deemed guilty of a misdemeanor, and upon conviction thereof shall be fined in any sum not to exceed $250.00.

**Notify Commissioner of Intention to Ship.**

Section 26. It shall be the duty of each person, firm or corporation dealing with nursery stock, or horticultural plants within the State of ........ to
notify the State Commissioner of Horticulture of his, their or its intention to ship any nursery stock, fruit trees, or horticultural plants from one point in this state, or from any point without the state to a point therein, for sale or delivery or for planting or for propagation. Said notice shall be mailed not later than the day of shipment, and the same shall show the name and address of both the consignor and consignee. Said notice shall also show whether such stock or trees, or horticultural plants have been inspected and passed at the initial point of shipment within this state by an inspector.

**Nursery Stock and Others, Inspected at Initial Point.**

Section 27. All nursery stock must be, and all fruit and other agricultural plants or products for State or interstate shipment may be inspected at the initial point and on such inspection if found free from injurious insect pests and diseases, a certificate shall be issued showing the condition of such nursery stock, fruit and other agricultural products, and such certificate when covering a shipment for delivery within the State may be accepted by the inspector at destination without further inspection. If said nursery stock, fruit or other horticultural or agricultural plant products when inspected at the initial point are found infected with injurious insects or diseases the inspector shall order it disinfected, or destroyed as
the case may warrant.

**Notification of Arrival at Destination.**

Section 28. Upon the arrival of any shipment of nursery stock, fruit trees, or horticultural or agricultural plants at its destination, it shall be the duty of the freight agent, express agent, or the agent of the persons or transportation company having such shipment in charge for delivery, unless the same is accompanied by a certificate of inspection and approval by an inspector showing that same was inspected and passed at the initial point of shipment, within this State, to notify the local inspector where delivery is to be made, of the receipt of such shipment, giving the name of the consignor and consignee and stating that such shipment is ready for inspection and delivery. Said notification may be made by telegraph, or by written notice delivered personally to said inspector, or left with some person of suitable age and discretion at his or her residence or office, or by mail addressed to said inspector at his place of residence; and the person having such stock in charge for delivery shall not deliver or turn over such shipment until same shall have been inspected by a horticultural inspector.

Provided, however, no further inspection at point of delivery shall be made, if shipment is accompanied by the certificate of an in-
spector showing inspection and approval at initial point of shipment within the state aforesaid, unless under special rules made by the Commissioner of Horticulture. (Any person may demand and have the

**Exclusive Service of Inspector**

exclusive service of a regularly appointed inspector, provided it does not impair the general service for such time as may be required upon application to the State Commissioner and paying the wages of such inspector into the State Treasury under arrangement with the State Commissioner of Horticulture.)

**Inspection on Arrival Except When Inspected at Initial Point.**

Section 29. The inspectors shall have the right to enter upon any premises where nursery stock, fruit trees or horticultural or agricultural plants, or fruit, vegetables or other agricultural or horticultural plant products are held or stored, when same have been shipped or sent to any point within the State for the purpose of sale or delivery and to inspect such nursery stock, trees or plants, fruit, vegetables or other horticultural or agricultural plant products for the purpose of ascertaining whether the same is infected with any of the diseases or pests menacing the horticultural or agricultural interests of the State to which the same may be subject, as hereinbefore described and in event he shall find such stock, fruit, vegetables
or horticultural or agricultural plant products, trees or plants or any parts thereof, are infected with any such disease or pest, he shall at once notify the person in charge thereof and having the same in his possession, not to deliver the same or permit the same to be removed from his possession until they are disinfected and he shall also notify the owner thereof or the agent of the owner, or the shipper thereof, or his agent, to disinfect such part thereof, as is capable of proper inspection and disinfection within a reasonable time from the date of such notice in the manner by law and prescribed in the rules and regulations of the State Commissioner of Horticulture, and it shall be the duty of such owner or his agent or the shipper of such goods to so disinfect and destroy such infected property within a reasonable time. Nothing in this section shall be construed to apply to any nursery stock, fruit or products which have been already inspected and passed by the inspector at the initial point of shipment within this State, unless under special rule made by the Commissioner of Horticulture.

Fine for Violation.

Section 30. Any person violating any of the provisions of the last named preceding section hereof, shall be deemed guilty of a misdemeanor, and upon conviction thereof, shall be fined in any sum not less than $5.00 nor more than $50.00
**Inspector May Disinfect or Destroy.**

Section 31. In event of failure of the said owner or his agent, or the shipment of such infected goods to properly disinfect and destroy same as required by notice hereinbefore provided for, it shall be the duty of the inspector, and he shall have the power, to forthwith enter upon premises where such nursery stock, trees, plants, fruit, vegetables or other horticultural or agricultural plant products are situated and to properly disinfect or cause to be disinfected such part thereof as is capable of disinfection, and to destroy such part thereof as is not capable of disinfection.

**Costs to be Paid by Owner.**

Section 32. In case of disinfection or destruction of diseased or infected fruit, vegetables, or nursery stock, or other horticultural or agricultural plants or plant products by the inspector, as in the last preceding section provided, the cost thereof shall be paid by the owner of said fruit, vegetables, or nursery stock, or other horticultural or agricultural plants or plant products, or his agent or the shipper of said fruit, stock or products, and such charge shall be a lien upon said property, and the enforcement of such charges may be paid in the same manner as provided for the enforcement of charges for inspection and disinfection of nursery stock, fruit and orchards as here-
Reciprocity Between States.

Section 33. When the State Commissioner of Horticulture has sufficient evidence that the inspection of fruit, fruit trees, nursery stock, plants, cuttings, grafts, buds, scions, seeds, pits, shrubs, vines, ornamentals, vegetables or horticultural or agricultural plants or plant products in any state or territory is as thorough and effective as that prescribed in this state he may instruct that shipment of such nursery stock, fruits, fruit trees, plants or plant products bearing certificates of inspections from any such state or territory shall be delivered to the purchaser upon arrival at destination without being held in quarantine for further inspection, and shall notify all transportation companies of the existence of any such state or territory so that the agents of such companies shall proceed accordingly.

Highways and Public Service Right of Ways.

Section 34. It shall be the duty of the inspector to disinfect or cause to be disinfected any bush, shrub, tree or plants standing or growing on any public highway in this state, right of way or canal or irrigation company, or on the right of way of any public service or transportation corporation, easement, right of way, parks or cemeteries, or public property whenever such public service tree or plant is in such
diseased or insect infested condition as to be a menace to the horticultural interests of the state and when same cannot be eradicated by disinfection or otherwise to summarily destroy same by burning with fire. The expense of which shall be recovered as designated in Section 24 of this act, provided, however, that the State or any County of the state may be privileged to disinfect or destroy and burn under the direction of the State Commissioner of Horticulture, any infected bush, shrub, tree or plant standing or growing on any State or County public highway, or property within a reasonable time after request is made by inspector.

License for Private Spraying and Fumigation.

Section 35. It shall be the duty of every person, firm or corporation desiring to do public spraying or fumigation to obtain a permit therefor from an inspector, which permit shall be furnished, providing the applicant shall show a proper knowledge of the character and time of spraying or fumigation or other treatment, the material to be used to bring about the best results for the destruction of insect pests and disease, and said permit shall be given without cost to the applicant on blanks furnished by the State Commissioner of Horticulture, conditioned upon his being qualified. Any person, firm, or corporation failing to obtain said permit, or willfully disregarding any of the essentials
of spraying or fumigation shall be guilty of a misde-
meanor, and upon conviction thereof shall be punished
by a fine of $10.00 to $100.00.

**Definition of "Inspection".**

Section 36. The term "infection" as used in
this act shall mean the finding of any nursery stock,
fruit, fruit trees, or horticultural or agricultural
or plant products to be affected by any one of the
species of infection or disease or pest specified and
described by the State Commissioner of Horticulture as
provided in Section 17 of this act.

**Appeal.**

Section 37. Any person deeming himself ag-
grieved by any finding, order or act of an inspector
may appeal from such finding, order or act, to the
State Commissioner of Horticulture and his associates
and said State Commissioner of Horticulture shall forth-
with proceed to hear and determine such appeal and
render his decision thereon, and report the same to
the appellant and to the inspector or from whose action
or decision such appeal is taken, and such decision
shall specify the further proceedings to be had in the
premises. Prior to, and during such appeal, inspector
or person having nursery stock, fruit, fruit trees,
horticultural or agricultural plants or plant products
in charge shall carefully keep and hold same in as
nearly the same condition as when received as the
nature of the fruit, fruit trees, nursery stock, horticultural or agricultural plants or plant products will permit, and no inspector or person having same in charge shall be permitted to destroy said plant or product during such appeal, or if notified that such an appeal will be taken from his order or decision until such appeal has been fully determined by the Commissioner of Horticulture, and in case the decision of the Commissioner of Horticulture or his associates is not satisfactory to the appellant, he may carry the case to the Civil Courts of the State of .........

Quarantine.

Section 38. It is hereby specially provided and expected that in case the said nursery stock, fruit, fruit trees, or product shall contain some new pest or disease which is liable to become a menace to the horticultural or agricultural interests of this State, and in the opinion of the Commissioner of Horticulture it is necessary to issue a special quarantine against same to protect said horticultural and agricultural interests he may provide in said quarantine that said fruit, nursery stock, fruit trees, horticultural or agricultural plant or plant products upon which the pest or disease is found may be immediately destroyed upon finding, to prevent danger of same spreading and becoming a menace to said interests.
Oaths, Where Filed.

Section 39. All oaths and bonds provided for herein shall be filed with the State Commissioner of Horticulture, except the oath and bond of said Commissioner and Associate Commissioners, which shall be filed with the Secretary of the State.

Inspection Certificate.

Section 40. The several inspectors shall, upon the inspection of any nursery stock, fruit, agricultural or horticultural plant or plant products, trees or plants, issue and deliver to the owner or person in charge thereof, a certificate of inspection, over his signature showing the date of inspection and condition of the nursery stock, trees, or plants or fruit or other agricultural or horticultural plants, or plant products.

Fine for Wrong Use of Certificate.

Section 41. Any person to whom a certificate of inspection shall have been issued, showing condition of nursery stock, fruit, property or material inspected, who shall substitute for the said stock, fruit, horticultural or agricultural plant products, property or material so inspected any other stock, fruit, horticultural or agricultural plant products, property or material not covered by said certificate, and shall sell or dispose of the same under said certificate of inspection, shall be guilty of a misdemeanor, and, upon con-
viction theredf, shall be fined in any sum not less than $100.00, nor more than $500.00 together with the costs of action.

**Salary of State Inspector, How Paid.**

Section 42. The salaries, compensation and expense of all State Inspectors shall be paid by order drawn on the State Treasurer upon vouchers presented to the Secretary of State, signed by such inspectors under oath and countersigned by the State Commissioner of Horticulture.

**Fine for Hindering Inspection.**

Section 43. Any person offering any hindrance to the carrying out of this act or in any manner preventing or hindering any inspection herein provided for shall upon conviction be fined not less than $5.00 or more than $50.00.

**County May Employ Experts.**

Section 44. Upon the petition of fruit growers the Board of Supervisors of any County or County Court may appoint from a list of qualified candidates furnished by the state Commissioner of Horticulture, one or more county fruit inspectors who shall have jurisdiction over the horticultural inspection of said county under the direction of the State Commissioner (or associate commissioners) of Horticulture. His qualifications and duties shall be the same as provided for State Inspectors under Sections 12 and 15 of
Suit, How Instituted.

Section 45. In case of a violation of any of the provisions of this act, it shall be the duty of the State Commissioner of Horticulture and the inspector to present the evidence of the case to the (District) Attorney, whose duty it shall be to prosecute any person guilty of a violation of this act in the State of ....... whose prosecution may be brought in any court of justice.

Commissioner, Custodian of Property.

Section 46. The State Commissioner of Horticulture shall take charge and be custodian of all property of whatsoever kind now in possession of the existing State ........, and which belongs to the State of ........, and the Secretary of the said State of ........ shall carefully list all of such property and file copy with the Secretary of State at such time as this act becomes effective.

Records.

Section 47. All records, reports, data and information kept and compiled by the State Commissioner of Horticulture, shall be kept in his office and shall be a public record, open to the inspection of any person interested, during the regular office hours of each business day.

Section 48. Sections ....... be and the same are hereby repealed.
Section 49. All acts and parts of acts inconsistent with this act are hereby repealed.

Section 50. This act shall become a law and be in full force and effect from and after its approval by the Governor.

Section 51. That there be and hereby is appropriated out of any money in the treasury of the State not otherwise appropriated, the sum of $........, for the fiscal years of ........, or so much thereof as is necessary to pay for the conduct of the office of the State Commissioner of Horticulture (and Associate Commissioners.)

Distribution of Plant Diseases

Fungal diseases being either parasitic or saprophytic on higher plants, are therefore found wherever higher plants occur. Fungi are most aggressive and numerous where their hosts are placed under a disadvantage as; for instance, cultivated plants suffer more than uncultivated or wild species. The reason is that the cultivated species are usually introduced and are changed from their normal condition by excessive development of one special part at the expense of the other. Taking plants from one country to another subjects them to an entirely new environment to which they are not acclimated. In this condition the plant will suffer much more from the attacks of a disease.
The agricultural and commercial practices of our present day civilization have very materially assisted in spreading broadcast many forms of fungi and bacteria as well as harmless forms of saprophytes. As a result of the present highly developed international commerce many diseases have been carried from one country to another.

Fungus diseases are disseminated by spores, sclerotia and mycelium, the dissemination being most common by spores which are non-sexual cells for rapid reproduction. Some diseases produce a great number of spores and it often seems "wonderful" that the disease is not more of a pest than it is. It has been determined that a single "tendril" of Chestnut Blight (Endothea parasitica) fungus contain as many as 115,000,000 pycnospores. A single head of smutted oats may contain as many as 500,000,000 spores.

Many fungi are spread in the sclerotium which is dense layers of thick walled cells within which the vegetative hyphae remain dormant over winter and they are very effective structures in perpetuating the species judging by the wide dissemination of fungi which are propagated in this manner. Ergot of Rye (Claviceps purpurea) and Brown Rot of Stone Fruits (Sclerotinia fructigena) are examples.

Fungi may be disseminated in the vegetative or mycelial stage which consists of a mass of hyphae or
The mycelium may live in dead organic material or within the tissue of a plant or a plant structure upon which it is parasitic. This mycelium is found in the tissues of seedlings, cuttings, trees and seeds and oftentimes at certain stages it cannot be detected by ordinary methods of inspection. This is true of White Pine Blister Rust (*Peripernium strobi*).

Fungus and bacterial diseases may be spread by infected vegetative reproductive structures as tubers, roots, rhizomes, and bulbs which are used for the production of new crops. Such tissues have much stored plant food which furnishes an excellent media for fungous diseases. Usually the disease can be detected by discoloration of the tissues or it may exist superficially. The Irish potato is preeminent among the cultivated plants. In many districts the potato industry is threatened by tuber-borne diseases as; for instance, Late Blight (*Phytophthora infestans*) with its internal mycelium. Others are Potato Scab (*Oospora scabies*), Potato Wart (*Chrysophlyctis endobiotica*).

Many of our plant diseases are disseminated by means of seeds. These diseases may be divided into two classes—those which infest seeds internally; i.e., the organism entering and existing within the seed in a dormant condition until the germination of the seed when it also starts development, and those diseases which infest the seeds externally; i.e., the organism...
or its spores attaching itself to the surface of the seed and entering the host plant at the time of germination. Diseases belonging to the first class are Anthracnose of Bean (*Colletotrichum lindemuthianum*), Blight of Peas (*Ascodyta pisi*), Loose Smut of Wheat (*Ustilago tritici*), Loose Smut of Barley (*Ustilago nuda*). Under the latter class may be included Wilt of Flax (*Fusarium lini*), Stinking Smut of Wheat (*Silletia foetens*), Loose Smut of Oats (*Ustilago avenae*), most of the rusts and a few bacterial diseases.

The above diseases can not be detected by ordinary inspection and hence shows the difficulty of inspection for some diseases. This accounts for the nearly universal distribution of the grain rusts and smuts.

**Distribution of Diseases From One Country to Another.**

Plant diseases may be carried from one country to another in a great number of ways. Some of the means of distribution are easily detected and can be checked by careful inspection of the plants, their packing and crates. However, some diseases during certain periods of their life history can not be detected by any known means even by experts. Here is where a weakness creeps into our inspection service. Such a disease is White Pine Blister Rust. The only way to determine if the disease is present is to hold
the trees in quarantine until the time has come for its development. In most cases this would be impracticable and too expensive. The best course to take with such diseases is to put a complete quarantine on them and prevent their introduction rather than take the chance.

Many dangerous diseases have been brought from foreign countries through the importation of fruits, nursery stock, bulbs and seeds. In this manner Potato-Wart, White Pine Blister Rust, Chestnut Blight and other diseases were introduced. In turn America has transported diseases to other countries.

Great care should be exercised in importing all horticultural or agricultural plants or seeds from foreign countries in an endeavor to find valuable plants for the trade or plants better suited to agriculture, and which are liable to be diseased. This would apply to commercial concerns, State Agricultural Experiment Stations, private individuals and the United States Department of Agriculture. Undoubtedly, Blackleg of Cabbage (*Plasmidoohora brassica*) was introduced in this manner.

Diseases having perennial mycelium in the host as the Black Knot of Cherries and Plums (*Plowrightia morbosa*), Orange Rust of Raspberries (*Gymnoconia peckiana*), Peach Leaf Curl (*Exoascus deformans*) may easily be transported in infested nursery stock without detection.
The packing material and packing cases may carry the diseases of the plants and for this reason should be burned after the plants are removed. Straw and hay fed to cattle on steamers may carry diseases and none of it should be taken off the ships except for immediate burning.

The ship's commissary store rooms may become infected with diseases from infested fruit and vegetables that have been used on the voyage. Because of the many ways by which a serious disease can be carried from a ship's commissary store rooms in fruit and vegetables the latter should not be permitted to be landed and the store rooms should be frequently cleaned throughout.

A very serious problem is the diseased plant products liable to be transported in the baggage, trunks, valises, etc., of foreign travellers. The customs officers pay no attention to fruits or horticultural plants contained in such baggage (except in California). In our large ports it would be difficult to maintain close inspection but there should be Horticultural Quarantine officers to search every piece of baggage and when horticultural products were found they should be rigidly inspected. California has developed a very efficient Quarantine Service. The quarantine officers with the cooperation of the customs officers have developed a very high state of perfection
and few if any diseases or insect pests slip by them.

The mails and express companies have been a
nuisance for the reason that it was impossible to trace
the packages. The Postal Service now cooperates with
the Federal Horticultural Board and requires that all
packages imported into the United States and containing
horticultural products must be listed under certain
conditions set forth in an act provided for that pur-
pose.

Where one country lies close to another there is
a possibility that floating debris such logs, trees,
and fruits may disseminate diseases and insects. This
is especially true of bark and wood boring beetles.

Birds and flying insects might also aid in the
dissemination of disease where two countries are not
too widely separated. This could happen with Pear
Blight (*Bacillus amylovorus*).

**Distribution of Diseases Within a Country.**

The opportunities for the distribution of plant
diseases within a country are greater than for their
distribution from one country to another, for the reas-
on that there are many more means for their dispersal.

The great advancement in interstate commerce by
train and boat has been responsible for the rapid and
wide distribution of some of our diseases. Passenger
and freight trains in passing through districts infest-
ed with a certain disease may catch spores or other fungal parts and carry them great distances. The spores may be fanned along by the air suction about the train. Many of our diseases have been carried along with freight on railroads and boats and have thus been disseminated. As previously explained, for dissemination of disease from one country to another, passengers travelling from one part of the country to another may aid materially in spreading disease by carrying fruit and other horticultural, as well as agricultural, products in their baggage. Throwing diseased fruit out of car windows may mean the establishment of a disease if the particular host plant for the disease is close at hand.

Below will be found an extract from the regulations sent out by the Post Office Department to all Post Offices in the United States in regard to shipments of horticultural products through the mails.

When any State provides for terminal inspection of plant products at its own expense it may submit a list of plants and plant products and the pests transmitted thereby, to the Secretary of Agriculture, who transmits it to the Postmaster-General. Thereafter all packages of such products on reaching their destination shall be forwarded by the postmaster to the proper official at the nearest place of inspection. If the plants upon inspection are free from pests they
are to be returned to the person to whom addressed, but if found infested with injurious pests and if the contents cannot be satisfactorily disinfected the sender shall be notified and they will be returned upon his request and at his expense, or otherwise destroyed.

It shall be unlawful to send through the United States mails into any state maintaining such inspection without plainly marking the package. Violations punishable by a fine of $100.

According to these regulations a state does not receive protection from the shipments of infested plants and plant products through the mails until it first establishes and maintains terminals and inspectors for conducting the inspection. States maintaining efficient quarantine and inspection services also meet the requirements of the Post Office Department for the inspection of the same materials when sent through the mails.

All horticultural products liable to carry plant diseases or insect pests must be inspected at the point of origin before they can enter inter-state commerce through the express channels. This insures almost absolute freedom from dissemination of pests in inter-state commerce through the express companies. Inspection for the same in intra-state shipments is governed entirely by the laws of the different states—in Oregon no inspection is necessary.
The shipment of nursery stock into hitherto un-infested territory is frequently responsible for the spread of diseases. It is almost impossible for a nursery to be free from disease even under the greatest care. The neglected nursery can in general be considered a pest house for plant diseases. Diseases which are accompanied by easily recognized symptoms may be guarded against by rigid inspection of all the stock before shipment. Unfortunately, many diseases cannot be detected at certain seasons of the year, as in the case of White Pine Blister Rust.

The air and wind play an important part in the dissemination of diseases and these methods are far beyond the control of man. The spores of many fungus diseases are carried by the wind from their fruiting bodies. Heteroecious rusts, those having alternate hosts, as the Eastern Cedar Rust (Gymnosporangium macropus) which has alternate stages on the cedar (Juniperus virginiana) and the apple, is a good example. Apple trees in close proximity to infested cedars show a high percentage of infection and the amount of infection decreases as the distance of the trees from the cedar increases. In many cases the dissemination of diseases by wind have been greatly overestimated. This is especially true with the cereal rusts; however, it must be conceded that it plays an important part.

In many fungi, particularly the Ascomycetes, a
division of the fungi in which the spores are borne in
a sac (ascus); and the Basidiomycetes, a division of
the fungi in which the spores are borne on stalks, the
spores are forcibly ejected into the air and carried by
the wind. However, not all spores ejected in this
manner are carried by the wind, but by other agencies
such as water, insects, etc. By this method of ejec-
tion the spores are shot into the air and are readily
carried away by air currents.

Storms, because of their wide range and extreme
force, may carry disease spores for great distances.
Even branches and leaves of the host plant may be in-
fected with some disease and they can be carried great
distances.

To water can be credited the dissemination of
some common diseases. Cranberry Gall (*Synchytrium
vaccini*), Alfalfa Crown Gall (*Urophylictis alfalfa*)
are probably disseminated in this manner. The "White
Rusts" and "downy mildews" are spread to a greater or
less degree by this method.

Two fungi belonging to the "water molds" cause
destructive plant diseases. One of these is the
Damping Off Fungus (*Pythium de boryanum*) causes the so-
called damping-off of seedlings and has gained a world
wide distribution. The motile spores of the fungus
swim readily about in the soil water and are also spread
by spattering of rain water. The other mold is the
Brown Rot of Lemons (*Phytiacystis citrophthora*) which is spread by irrigation and rain water. Before lemons are packed they are washed and cleaned mechanically in water and by this means the spores would come in contact with practically all the fruits. For some time great losses of lemons resulted from this disease but now it is entirely obviated by the use of copper sulphate in the wash water.

Rain and water currants play an important part in the dissemination of fungus diseases. Spores lodged on plants are carried down the leaves and branches to more favorable places, as wounds, where they become safely lodged. Certain forms of diseases exude spore masses which take on different forms, the spores being contained in a jelly-like substance. Such spores can only be spread by water and in most cases this is rain water. The water dissolves the jelly-like substance and carries the spores down the trunk of the tree. The Die Back of Peaches (*Valsa leucostoma*), Chestnut Blight (*Endothia parasitica*), Apple Tree Anthracnose (*Gleosporium malicorticis*) are examples.

River and lake water disseminates diseases directly and indirectly. An example of the former is where the spores or other parts of the disease are directly carried by the water and may attach themselves to host plants. In the latter case floating debris in the water may carry disease material which would
be spread in the same manner. Storms on lakes will accumulate large amounts of debris along the shores which may contain a wealth of disease of all kinds.

**Insects as Disseminators of Fungus and Bacterial Diseases.** In most cases of insect borne animal diseases the insect acts as an intermediate host but not a single instance of this kind has been found with fungi. Nevertheless, insects play an important part in the dissemination of diseases. Many references are made to insects as disseminators of disease, but in most cases without the support of experimental evidence. Experiments conducted have proved that insects are not always as important as is sometimes believed. Bees are very important in spreading Pear Blight (*Bacillus amylovorus*). This is done chiefly at blossoming time, the bacteria being carried from one flower to another. There is a possibility that Hemiptera (sucking insects) are responsible for a partial spread of the blight from old cankers. Cherry Bacteriosis (*Pseudomonas cerasus*) also is thought to be spread by Hemiptera.

Slugs are instrumental in spreading Downy Mildew (*Bremia lactucae*) of lettuce. After having crawled over a diseased surface and soon afterwards crawling over a healthy surface, they leave behind a trail of spores which soon cause mildew.

There is very little experimental data to show to what extent birds are disseminators of disease. It
is generally believed and it seems reasonable that birds do spread Chestnut Blight by carrying it on their feet.

It is the consensus of opinion that the use of cultivating tools in the fields and orchards act as disseminators of disease. A very common example is Crown Gall (Pseudomonas tumefaciens) which is common in orchards all over the country. It is a bacterial disease and it seems reasonable enough that the bacteria can be carried from a diseased root to a healthy one. In the process of pruning diseases may be spread. A positive example of this is Pear Blight. The careless practice of permitting diseased fruits or other products to remain on the ground unmolested is favorable to the spread of disease, as for instance Brown Rot of Stone Fruits (Sclerotinia fructigena). In spring a sclerotial stage is developed from which infection takes place.

Fungi which primarily inhabit the soil may be carried by the transport of soil. One dangerous agricultural practice that should be abandoned on this account is the use of alfalfa soil for the inoculation of another field with the "nitrogen fixing" bacteria. If the soil selected contained European Root Disease of Alfalfa (Rhizoctonia medicaginis) it might be introduced into the new field.

Rodents may spread the root form of Pear Blight
by attacking diseased roots and later attacking a healthy root of the same or another tree. Jack rabbits and dogs in running through grain fields may carry and disseminate the diseases common to these materials.

**Dissemination of Insects.**

Insect pests are disseminated by all the ways already mentioned for plant pests but in general it may be said that the problem is not as intricate. Although in many insects the different life stages may be very minute, still through careful inspection they can be detected. In the plant diseases we have spores so small that a high power microscope is necessary to detect them. Furthermore, the mycelium may be found in the seed or wood tissues, which would make it almost impossible of detection.

**Dissemination of Insects Between Countries.** During prehistoric ages insects have spread along certain well recognized channels. Geological changes have changed some and cut off others of these channels from further aids to distribution. North America was once connected with Asia between Alaska and Siberia and Florida was connected with the West Indies. These prehistoric changes account for some of the present varied distribution of insects as, for instance, the insects of the Pacific Coast are more like those of Europe than those of the Eastern United States.
Present Day Means of Distribution--Artificial.

The most important factor in the distribution of insects between countries is by shipments of nursery stock and other horticultural and agricultural products. By this means Grape Phylloxera (Peritymbia vitifolia) was introduced into Europe from America. In America the native grape vines had developed a natural resistance towards the insect and it does little damage. When it reached Europe its spread was rapid and devastating in all grape growing sections. San Jose Scale (Aspidiotus pernicious) reached California from China and thence to New Jersey in about 1887 where its presence did not become known to entomologists until 1893, by which time it was well established in many of the large nurseries. The Pine Shoot Moth (Evètria bubliana) has been introduced into this country on pine seedlings from Europe and on the same hosts the Brown Tail Moth (Euphotis Chrysorrhoea) and the Gypsy Moth (Porthetria dispar) were introduced and at present are our most serious forest insect pests. In grains and seeds the Indian Meal Moth (Plodia interpunctella), Granary Weevil (Calandra granaria) its close relative, the Rice Weevil (Calandra oryzae) and the Clover Root Borer (Hylastis obscurus) have been spread to many countries. Hay, straw, packing materials in shipping fragile articles and ballast all serve to carry insects in their various stages from one country to another by
ships. Some of the spread of the Chaff Scale is undoubtedly due to the wide use of straw for packing purposes and for bedding of live stock in inter-country shipment. The Mediterranean Fruit Fly (Ceratitis capitata) has been spread by the medium of fresh fruit in which it spends part of its life history.

What has been previously said about ships' commissary stores, holds, passengers' baggage, and mails, apply equally well here.

Natural. The Colorado Potato Beetle (Leptinotarsa decim-lineata) and the Cotton Boll Weevil (Anthonomus grandis) has entered the United States by the mainland from South America. The Colorado Potato Beetle appeared in Colorado in 1840, from whence it has spread until at present it is found over a wide area of the United States.

Floating debris, such as logs, trees and fruit, may spread insects where the distance is not too great. It is quite probable that some of our forests insects have been carried long distances in floating logs or log rafts, and have later become established.

High winds on the sea gather up immense quantities of debris along the shore line which serves as breeding places for a great many species and may be the source of infection or infestation in injurious pests.

Insect Dissemination Within a Country. The same factors concerned in the dissemination of plant
diseases apply equally well to insect dissemination and it will not be necessary to go into so complete a discussion in this latter case; in many cases a mere mention of the factors concerned will be sufficient.

All forms of traffic by boat, railroad, wagons, automobiles, etc., serves as a means of distribution of insect pests. Passengers, freight, mail, and express are indirect carriers. Dispensing of insect infested fruit on passenger trains, as Codling Moth (*Cydia pomonella*) in apples or pears, may spread this pest.

By means of nursery stock a great many pests are widely distributed. All scale insects found on fruit trees and ornamentals are almost entirely spread on their host plants. The Eastern Peach Root Borer (*Sanancidea exitiosa*) and its close relative, the Western Peach Borer (*Sanancidea opalescens*) may be carried in the egg, larval or pupal stage on the trunk and roots. The latter two stages are easily detected.

The Potato Tuber Moth (*Phthorimaea operculella*) and the Potato Eel Worm (*Heterodera radiciola*), a nematode worm, are being spread by means of the potato tuber.

Shipments of fresh and dried fruits disseminate insect pests. I have seen much Purple Scale (*Lepidosaphes beckii*) on Florida grape fruit on the fruit stands of Portland, Ore. A great many scale insects are spread by this means.
Natural Dissemination. Wind and storm does its share in insect dissemination. The Hessian Fly (*Mayetiola destructor*) is rapidly and widely distributed by this means in the adult stage. Buffalo Gnats (*Simulium pecuarum*) breed in bayous in the southern states and cluster on vegetation. The first high winds that comes along carries them for miles. The young of San Jose Scale is carried by the wind as easily as are the dust particles.

Fresh water streams carry insects in all stages on vegetable drift. An insect becoming established at the head of a stream has all chances in its favor of sooner or later becoming established on all its host plants along that stream.

Birds and other mammals often disseminate insect pests. It is quite certain that birds disseminate San Jose Scale. Texas Fever Tick (*Margaropus annulatus*) is an animal parasite which has rapidly spread over large portions of the United States.

From the foregoing discussion on dissemination of insect pests and plant diseases it will be seen that the agents at hand are many and varied and the complexity and difficulty in any attempt at their control can be foreseen.

The natural means of the dispersal are almost invariably beyond the control of man and need not be considered any farther. The artificial means of dis-
persal are to a greater or lesser extent controllable by means of thorough quarantine and inspection in the hands of trained men. The methods of control will be considered later in this paper.

**Conditions Working to Prevent Complete Quarantine.**

The first point to be considered is the ignorance of the general public. Not realizing the absolute necessity for complete quarantine in keeping out pests it cannot be expected that the public generally will take a favorable attitude towards such an act, especially where their own products are involved in the quarantine. When the potatoes of a certain district were quarantined against potato eel worm by another state, the residents tried by all means to evade the law and ship potatoes into the state. Although they were aware of the seriousness of the eel worm from actual experience, will they would take a chance to ship potatoes which were known to be infected.

The traveling public within the country as well as between different countries will conceal fruits and plants in their baggage, often in ignorance of the law but often in the fact of full knowledge of quarantine regulations. This is experienced on every ship leaving the port of Honolulu and arriving at California ports. California quarantines against all fruits from the Hawaiian Islands except bananas and pineapples, and
although passengers are warned not to bring fruits in their baggage, they continue to do so.

The fundamental principle by which this situation can be corrected is by some means of education. Through the press would be the best expedient by which to reach the public. In restricted districts the inspectors or quarantine officers, either local or state, could conduct an educational campaign with the local newspaper as a medium. The State and Federal Governments could aid greatly by publishing bulletins for general distribution, showing the danger of certain pests with accounts of their life histories and suggested means of control. The United States would do well if it would issue such a bulletin applying to the conditions of Hawaii, such bulletin to be used for distribution among travelers and citizens of the islands. Only by some such means can we reach the desired end.

Indifference and Jealousy of States. In our system of government some of the powers are given to the Federal Government and some powers are given to the states. The states have grown very jealous of their powers and under no conditions do they want to leave any law making to the Federal Government which they themselves could do. A national quarantine law would be much more effective than the numerous and variable state laws but the states will not permit such a law, hence we must make the best of it under the circum-
stances.

The states in making the laws, too, often frame them to further their own interests without considering their fundamental purposes. As for instance, it has happened that the laws have been so constructed as to exclude outside nurserymen from selling nursery stock within the state so as to further the interests of its own nurserymen. On the very face of it this is a great injustice and will never do any quarantine. Some state laws are conceived in a spirit of retaliation which again is the wrong spirit.

Lack of a Practical and Inexpensive System. As yet there are only five or six states having a special system of quarantine and inspection and in fact there is much room for improvement in them. The remaining states having quarantine and inspection amount to little or nothing, due to poor horticultural laws, insufficient money and lack of men qualified to do the work. California unquestionably has the best system of quarantine and inspection but on the other hand it is expensive.

It will be years before the ideal system will be worked out and generally adopted. The first requisite is practical and workable laws; second, proper organization; third, a reasonable amount of money; and fourth, practical men having both a technical and a practical knowledge of entomology and plant pathology.
Before a state can hope for any success all the above requirements must be fulfilled.

**Natural Conditions Working Against the Distribution of Insect Pests, and Plant Diseases.**

Before an insect pest and plant disease can become distributed its host plant or plants must be present in the new locality. Some diseases and pests have the ability to live on a great many host plants and therefore these will spread much more rapidly and widely. Where there is but one host plant it is a simpler matter to control, although this is not always the case.

Climatic conditions are the greatest check on the distribution of insect pests and plant diseases. All other conditions may be ideal but it may be too warm or too cold for the particular insect or disease to successfully complete its life history, as the Codling Moth apparently does not exist where the nights are colder than 62° in the spring and summer because the female will not lay eggs before this temperature is reached. Humidity may be the limiting factor, in a few cases, but there is no data on hand to substantiate it.

**Natural Barriers.** It is well recognized that mountain ranges and large bodies of water act as
limiting factors in the distribution of insect pests and plant diseases. Although the Colorado Potato Beetle was first observed in Colorado as a pest it has gradually worked eastward until the Atlantic seaboard has been reached, but it has not crossed the Rocky and the Sierra Nevada Mountains. Rivers are not effective barriers because pests can be carried across by winds, and on floating debris, and many of our common insect pests can fly across most rivers.

Up to the advent of international commerce the seas were very efficient natural barriers but they are no more. Mountain ranges are not regularly so effective as barriers since previous to the development of railways and highways whereby artificial transportation affords a ready means of passing such barriers.

Deserts probably are the best barriers, especially the Sahara, it being so large and barren that but relatively few insect pests and plant diseases could subsist on the scanty vegetation. On the other hand railroads and highways across it are few and far between.

Absence of Alternate Hosts. The Eastern Cedar Rust cannot exist except where both the apple and cedar are found in close proximity. Part of the life history of this rust is spent on the cedar and part on the apple. The Woolly Apple Aphis (Erisoma lanigera) is a good example of an insect having alternate hosts. One
form of this aphis normally inhabits the elm, while another occurs on the apple and related trees. The Plum-Hop Aphis (*Phorodon humili*) alternates on the plum and the hop vine. Examples of insects alternating on host plants are only found among the aphididae.

**Natural Checks Against the Ravages of Insect Pests and Plant Diseases.**

**Predaceous Insects.** The predaceous insects prey upon many of our injurious species of insects. Both the larvae and the adults prey upon their hosts in all the stages. Some may only attack larvae and others the eggs or adults. Some are voraceous feeders and destroy large numbers of insects.

The **Ladybird Beetles** are common forms which are met with every day. The larvae and adults feed upon many scales and aphids. The **Brown Lacewing** (*Symphorobia augustus*) feed upon scales and aphids. It is a very efficient predator on the young of Citrus Mealy Bug (*Pseudococcus citri*). The **Green Lacewing** (*Chrysope californica*), the **American Syrphis Fly** (*Syrphus americanus*) feeds upon a great number of aphids and plays an important part in keeping them in check.

**Parasites.** We have a great many parasitic insects which aid greatly in reducing serious insect pests. Our common parasites belong to the orders of Diptera and Hymenoptera. A few are large specimens
but in general they are very small, due to the nature of their existence. The female parasites are provided with special ovipositors with which the eggs are oviposited in either eggs, larva pupa, or in a few cases in the adult. The parasite may complete its whole or only part of its life-history in the host.

The Codling Moth Parasite (*Calliephialtes mes-sor*) a hymenopterous parasite deposits its eggs in the cocoon of the Codling Moth in which its life-history is completed. The Black Scale Parasite (*Toniocera cali-fornica*) deposits its eggs and young of the Black Scale and do great execution to them. *Aphelinus mytilaspidis* is a hymenopterous parasite preying upon San Jose Scale, Oyster Shell Scale, Pine Scale, etc.

Advantage is being taken of parasites and predaceous insects in the control of insect pests. The United States Government has men searching for these insects in foreign countries in hopes of finding some which may control such pests as Brown Tail Moth, Gypsy Moth, Tent Caterpillars, Scale insects, aphids, etc. California each year collects large numbers of Ladybird Beetles in the mountains where they hibernate over winter and distribute them among the melon growers in the Imperial Valley, the bean growers in Santa Barbara and Orange counties, and among the citrus growers, to control the aphids and scales attacking these plants.

Parasitic and predaceous insects are of great
economic value in keeping down the ravages of many of our injurious insects. They can never exterminate any pest because when their host becomes very scarce they themselves die for want of food. They are sporadic with their hosts. Take, for instance, the Black Scale Parasite. When the Black Scale is very prevalent the parasite has a great opportunity to multiply itself and rapidly increases in numbers until the scale commences to decrease in numbers. Because of fewer Black Scale the parasite finds it more difficult to find the scale to parasitize it and they also decrease in numbers. In this manner one keeps a check on the other.

Birds and Mammals prey upon injurious insects. It is a known fact that birds are very efficient in keeping many injurious insects in check. Lizards, frogs, toads, moles, skunks, raccoons and others are more or less insectivorous and play an important part in checking many injurious insects. Toads can always be found in the garden hunting for insects and although it is an unsightly animal it is the farmer's best friend.

Most all insects are attacked by entomological fungi. This is most common in the larval stage. Empusa aphidias is very common on plant lice and is an important check upon their multiplication. Empusa grylli attacks crickets, grasshoppers, caterpillars and other forms. The termination in 1869 of a serious
outbreak of the Chinch Bug (Blissus leucopterus) in Illinois was apparently due chiefly to parasitism by fungi.

Bacteria cause epidemic diseases among insects which often are important checks on injurious insects. Sudden changes in temperature may check or aid in more rapid development of insect pests. Aphids are while checked by a sudden change to a hot spell/red spiders develop much more rapidly. The Red Spider is seldom found as long as it is cool.

Plant Diseases. Fire Blight develops much more rapidly during wet and moist seasons. Last year the season in Rogue River was dry with the result that there was only a little Pear Blight. The previous year the season was very wet, accompanied by a very bad outbreak of the Pear Blight.

Brown Rot and Apple Scab is favored by moist conditions. Dry weather in the early stages of the Peach Leaf Curl (Exoascus deformans) acts as a check in its development. Western Potato Blight (Fusarium sp.) will not develop unless the temperature is above 90°F.

Soils sometimes act as checks against plant diseases. A soil containing much lime is unfavorable to the development of Club Root of Cabbage. Theoretically a scarcity of insects would check Pear Blight and other bacterial diseases spread by insects but it would
probably not work out.

Methods of Quarantine and Inspection.

At present each state has its own system of inspection and quarantine and these vary in efficiency and effectiveness from very good to the other extreme. In general, states having good horticultural laws have also good inspection. The fundamental principles underlying quarantine and inspection are the same in all parts of the country and will hold equally in foreign countries, so that there is no excuse for such diversity. However, it is to be hoped that these conditions will be better in the future.

Quarantine and inspection is generally conducted for the purpose of protecting the agricultural interests and saving one from unnecessary losses rather than for the special benefit of a few individuals, as sometimes happens. A nurseryman for his own good desires to keep his stock clean and free from pests. If an insect or a plant disease is found on a few trees there is no reason for holding up the nurserymen or condemning their stock, because it is practically impossible to always keep the nursery entirely free from pests.

State Versus National Quarantine and Inspection.

Nurserymen desire a centralized authority to inspect nursery stock. They want one inspection and certification, preferably at the point of origin of inter-
state and inter-county shipments. Nearly all nurserymen realize the necessity for inspecting foreign shipments even though they may carry certificates of inspection, as it has been proven that such certificates can not always be depended upon.

The administrative advantages of having horticultural quarantine and inspection work under a centralized head are plain to see. The objection to a centralized system having inspection and certification at the point of origin gives a chance for less vigilant scrutiny of inspected stock. Under the system of re-inspection at the point of delivery there is considerably less chance for the importation of diseased stock. Under the single inspection system there might only be a mild interest in shipping clean stock from one state to another.

The greatest problem under the state system is the matter of establishing the proper quarantine as it cannot be made effective by state boundaries. Quarantine can only be effectively established against a whole section of country which has some natural barriers such as mountain ranges, lakes, rivers, etc. As long as quarantine was left to the states there was little hope for any beneficial results. However, now that the Federal Quarantine Law is operative there is every reason to believe that in time it will prove efficient, as the Federal authorities are given power to
quarantine against any foreign country and any part of the United States in order to prevent the introduction and spread of pests.

Methods Employed by States. The most economical and convenient place to inspect nursery stock is before it is ready to be packed for shipment. This is better for the customer and also for the nurseryman. If pests are present, by a careful inspection superficial forms can readily be detected and in all probability they will only be found on a few scattered trees. If, however, these few infested trees are packed with pest-free trees the whole lot may become infested, which will necessitate the disinfection or destruction of all. Inspection at origin would eliminate traveling expenses, which is necessary at the point of delivery and there would be no disappointment to customers or to nurserymen. Large nurseries would require the services of one man during the time of inspection while in the case of smaller nurseries one man might divide his time between several.

A System for the Control of Pests in Nurseries. As a fundamental, it should be borne in mind that no inspection can be too careful or too painstaking to accomplish the best results. First of all, inspect all surrounding orchards, trees, shrubs, and clean them up as it is impossible to have a clean nursery if the immediate vicinity is not entirely clean. In
budding and grafting always use clean cions and wood. It has been found that cions from nursery stock is cleaner than cions from bearing wood.

During spring and early summer the nursery should be inspected at intervals for pests and if found present the trees or other plants should be treated or destroyed as seems necessary. If pests, such as San Jose Scale, are found occasionally and more or less scattered a thorough spraying will be the cheapest and most effective method of eradication. If the pests are detected and destroyed in the early part of the season later infestations should be slight. In every nursery a thorough inspection should be made in the late summer.

The inspection at the time of digging can be done to better advantage under cover. The nurseryman puts a force of men to work in a clean place trimming the stock and removing all old leaves. The inspectors teach these men how and where to look for pests, and with some experience they should become quite competent. Finally the inspector himself inspects the stock. By this method two men will handle each plant and if the working men do their part conscientiously there is every reason to believe that the stock will be as clean as is possible to leave it. The workmen should throw out all poor and infected stock. All trees found infested with the Peach Root Borer should be destroyed as there may be unhatched eggs which cannot be detected
and would also escape fumigation. It has been found that stock can readily be cleaned from Woolly Aphids by placing it in a trough and spraying with a fine spray nozzle under a pressure of 100 pounds or more.

After inspecting foreign and inter-state shipments all the packing material should be burned. Straw being a common packing material, it may carry in addition to horticultural pests, pests of grains and grasses which is a two-fold reason why it should be destroyed. The matter of reinspection is a disputed question. After a nursery has been inspected and certified as free from pests such nursery usually expects other states to accept its stock without reinspection at the point of destination. It certainly would be convenient to all concerned if one inspection could be entirely depended upon. However, there is always the possibility that some form of the pest has been overlooked or has not been killed by fumigation. Especially is this true of some stages of certain diseases as mentioned beforehand. If only one female insect or a small portion of a disease escapes detection, there is grave danger of its introduction into uninfested territory. When this shipment of stock is reinspected at the point of delivery these forms may possibly have gone through another stage so that they can be readily detected. Another argument for reinspection is that other states will exercise greater
care in inspecting stock to be shipped out of that state.

**Inspection of Orchards.** A few states make a general inspection of all orchards every year, other states only as they find time after having inspected the nurseries and still other states inspect only upon the demand or request of the owner. After the fruit grower has received clean stock from the nurseryman it certainly should be up to him to keep his commercial or home orchard and shrubbery clean. Where fruit growing is practiced on a commercial scale the growers realize the importance of clean fruits and trees and very seldom tolerate pests as far as they are able to control them. However, there are individuals who will not do it unless forced to under pressure of the law. Sometimes communities hire their own inspectors to look after the welfare of their fruit industry. This has been done in the Rogue River Valley where a specialist has been employed to fight the Fire Blight for the past five or six years.

**Inspection of Foreign and Interstate Shipments,** as brought out before the inspection of foreign and inter-state shipments at the point of destination, is expensive. This could be overcome by establishing State quarantine stations in each state at convenient places and requiring that all nursery stock be shipped to the nearest quarantine station for inspection. This
system would be much more efficient and cheaper than the one now in use in some states where inspection is made at the point of delivery. Further, special provision can be made for inspection so as to facilitate the work.

California has quarantine and inspection officers located at San Francisco, San Diego, Los Angeles, and Eureka. The officers at these ports keep check on all ships coming from or stopping in countries where serious pests are present, as the Mediterranean Fruit Fly. The officers have the cooperation of the steamship companies and the Revenue officers which aids them greatly. Upon arrival of a ship which is subject to inspection the Revenue Officers first board it and inspect the ships, stores, baggage, and cargo. If they find any horticultural products in baggage, ships' stores or in cargo they hold it for the quarantine officers for further inspection. A law was passed by Congress last year giving the Horticultural Quarantine Officers power to search baggage and cargo of ships plying between domestic ports. Previous to this, such inspection could not be lawfully made and was the source of much worry on the part of the quarantine service.

Upon reaching the three mile limit all fruits and vegetables not used up on board the vessel during the voyage are thrown overboard. Any infested fruits
or nursery stock is destroyed if it cannot be cleaned of pests by fumigation.

There are only three horticultural officers at San Francisco, but they have systematized their work to such a point that they know every port touched by every ship entering that port and hence know what pests are liable to be introduced by them. For 30 years that quarantine officers have been maintained at San Francisco no serious pest has been able to enter the State through that port, which certainly proves the value of such work. On the Atlantic seaboard in the meantime the Gypsy Moth, Brown Tail Moth, Potato Wart, Pine Shoot Moth, Powdery Scab of Potato, and White Pine Blister Rust, have gained entrance through the ports and have become established. Had a national quarantine service been in effect during previous years it is very probable that we would not have these pests now.

Methods Employed by the Counties or Communities. The arguments already advanced in favor of federal over state quarantine and inspection will hold equally well for state over county supervision. Good argument can be brought forward to support county inspection, but there is more system and better uniformity if it is left with the state or federal government.

California has a highly developed type of county quarantine and inspection entirely separate from any state authority. There is always much confusion,
lack of uniformity and feeling of antagonism amongst the counties; still, the people support and demand this system and as long as it does not conflict with the State Horticultural laws its operation is not unconstitutional. If the State Horticultural Commission was given authority over the county work the people would receive a great deal better service.

**National Quarantine and Inspection.** The National Quarantine Act limits the importation of nursery stock only to countries which maintain nursery stock inspection and further only after such stock has been inspected and certified. From countries not maintaining any inspection service importations can only be made for experimental purposes. When any nurseryman desires to import nursery stock he must notify the proper authorities so that provision can be made for inspection upon its arrival. When the nursery stock arrives the proper state authorities are notified and the inspection made by state officers at the point of destination.

The quarantine system is quite satisfactory but the method of inspection is inefficient and expensive. Some states may have a very good system while others may do little or nothing. For this reason there should be quarantine stations at every port of entry or nursery stock should only be permitted to enter the country through such ports as maintain inspection. When a foreign quarantine and inspection service similar to
that of California is established by the Federal government we can expect proper protection from foreign insect pests and plant diseases, but not before then, C. L. Marlatt has estimated that it would cost about $25,000 yearly to maintain proper quarantine and inspection officers at ports of entry which certainly is a reasonable figure.

**Cost of Quarantine and Inspection.**

The cost of quarantine and inspection in the United States varies greatly. In many states the cost is below $2000 per year, while California in 1914 spent $195,000 for State and County Quarantine and Inspection.

The efficiency and value of the quarantine and inspection varies closely with the amount of money spent. Exception to this would be states having but a small horticultural industry, hence a small amount of money may still provide very good results.

The State Quarantine Service of California costs about $15200 yearly. This includes the salaries and expenses of quarantine officers at three ports and a station on the boundary line between Mexico and California. Besides this, each county has its own quarantine and inspection system conducted by a horticultural Commission and deputies, when necessary. Below is the cost for each county:
The cost by states is:

**Arizona.** For the calendar year 1912-1913, $11,000 was available for the Inspection Service. The state is divided into seven districts having about ten first grade inspectors at $2.50 per day. For the calendar year 1913-1914, $12,000 was available for Inspection service. In all, there were 22 inspectors.

**Georgia.** Georgia appropriates about $38,000 per year for the State Entomologist. Five permanent research assistants at $2,000 each and four assistants at $2,600 each and four assistants at $1800 each are employed. Also, there are three office assistants.

**Illinois.** The expenses for field and office work of the State Entomologist is approximately $25,000.

(This includes $2500 for chinch bug work.)
Indiana. The State Entomology Department has on an average five permanent and three temporary field assistants at $100 per month and one office assistant at $100. The annual appropriation is $15,000, including bee inspection.

Massachusetts. The appropriations for four years are:

<table>
<thead>
<tr>
<th>Year</th>
<th>Amount</th>
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<tbody>
<tr>
<td>1910</td>
<td>$2,100</td>
</tr>
<tr>
<td>1911</td>
<td>10,000</td>
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<tr>
<td>1912</td>
<td>12,000</td>
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<tr>
<td>1913</td>
<td>15,000</td>
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The state is divided into two districts with an inspector in charge of each. Coming and outgoing nursery stock is inspected. The chief inspector gets a salary of $500 out of the inspection fund.

Michigan. There is no definite appropriation. The expenses are paid out of the general fund of the state, which amounts to about $3,000 annually, of which 50 per cent goes for salaries. Only $800 is paid out of the fund to the State Inspector, as he only gives part of his time to the work. The Deputy Inspectors are allowed $3.00 per day and expenses. One deputy devotes more than one-half his time to the work. Three other deputies are employed from one to three months each year.

Minnesota. The appropriation from state funds for nursery inspection amounts to $3,000 yearly. This covers the salary and expenses of the deputy inspector.
and assistants as needed. In addition, $1,000 is yearly used from the Entomologists' fund, making a total cost of $4,000 yearly, exclusive of the Entomologists' salary.

**New York.** The average yearly appropriation is about $50,000. The inspection work is conducted by a force of thirty men, located in different parts of the state.

**Ohio.** Ohio spends about $25,000 annually upon this work. There are nine permanent field assistants, one at $1500, one at $1400, four at $1200, and three at $1080 per year.

**Pennsylvania.** $40,000 is appropriated per year for nursery inspection. There are two permanent research assistants at $1500 each, and about twenty-five permanent field assistants at $125 per month. The assistant entomologist receives $2,000 per year.

**Wisconsin.** There is no appropriation. From $1650 to $1700 is collected in fees from the nurseries for certificates. Traveling expenses amount to $900, and the remainder of the fund is forwarded to the Agricultural College. The Chief Inspector receives no salary. Deputy Inspectors, if working beyond their period of regular college employment, receive a per diem salary.
Inspector's Qualifications

Whether we have good or bad horticultural laws, their effectiveness will depend upon the personnel of those who ultimately enforce them. Too often these men lack the fundamental basic knowledge of entomology and plant pathology. Often there is a reason for this, namely, too small salaries to attract trained men.

In order to have thorough inspection we must first have competent, responsible and fair-minded men. These men should have a thorough working knowledge of entomology and plant pathology which would necessitate a college education. Further, since their work brings them into contact with people in all walks of life they must have the ability to serve people by tactfulness and gaining their confidence. An excellently trained man may utterly fail because of lacking the latter qualification. These men should be paid good salaries and should be entirely free from politics, because just as soon as politics creeps in their efficiency is lowered.

To determine their fitness some form of examination should be required. At present only a few states have any provision for adequate qualification requirements of inspectors. California and New York get their inspectors through civil service examinations.

In some states it is required that the inspectors and also all other officers connected with the quarantine and inspection work put up bonds to guarantee
the faithful performance of their duties. This is a very good thing as it fixes responsibility and will cause the officers to exercise greater care in their work.

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Summary.

A Federal law is favored together with uniform state laws.

Politics should be entirely eliminated from all quarantine and inspection work.

Horticultural commissioners, inspectors, and other quarantine and inspection officers should be broad minded and practical men having practical and technical training in entomology, plant pathology and general agriculture.

Every means possible should be utilized in educating fruit growers, vegetable growers, nurserymen and employees of transportation companies as to how they can prevent the introduction and dissemination of insect pests and plant diseases.

A very important factor is to get the necessary financial aid from the States and the National Government. At present every state receives far too little money to properly protect the agricultural and horticultural interests thereof from the ravages of pests.

A few figures of the State Fish and Game Commissions of Oregon and California will be of interest.
For California.

Fish and Game Service          Horticultural Quarantine and Inspection Service

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<tr>
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<tbody>
<tr>
<td>Game Wardens</td>
<td>73</td>
<td>Quarantine Officers</td>
<td>9</td>
</tr>
<tr>
<td>Special Deputies</td>
<td>400</td>
<td>Quarantine Guardians</td>
<td>44</td>
</tr>
<tr>
<td>Rangers</td>
<td>300</td>
<td>County Inspectors</td>
<td>144</td>
</tr>
<tr>
<td>Total</td>
<td>773</td>
<td>Total</td>
<td>197</td>
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</table>

For Oregon.

Money expended from May 1911 to Dec. 1912 was $168,435.
Salaries and expenses of deputy wardens 83,844.

California has 773 men employed in the protection if its fish and game and only 197 to protect its great agricultural and horticultural interests. Oregon in one year expended over $168,000 to protect its fish and game while only a few thousand dollars was spent in protecting the agricultural interests. This is a peculiar state of affairs but it is undoubtedly due to the interest favoring fish and game work by sportsmen so that it gets support in the state legislatures. The agricultural class as a rule does not take the initiative in any new schemes even though it may be to their own advantage, or at least until it is forced upon them.
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