

SHIP INSPECTION IN THE PORT OF VANCOUVER

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Each day ships of many nations arrive at Vancouver and New Westminster to load grain and cereal products for export to the United Kingdom, India, South America, the Orient, and many other parts of the world. Each day thousands of citizens view these ships steaming majestically up the harbour to their allotted berths without giving a thought to the fact that the application of entomological knowledge is an increasing necessity before loading of these products can be commenced.

A few years ago the British Ministry of Food were very much concerned over the fact that a number of cargoes of grain were arriving in Britain badly infested with granary weevil, *Tribolium*, Cadelle, and other grain insects. Some cargoes were so badly damaged that the grain could not be used for human consumption. The shortage of grain in Europe at that time, combined with the terrific losses, prompted the Ministry to request that the Canadian Government inspect all ships' holds prior to loading, to make sure that cargo areas were insect free and in fit condition to carry wheat. The government consented to carry out this suggestion and a marked difference in the condition of grain cargoes on arrival at destination was immediately evident. Consequently, it was decided to extend this service to all ships loading cereal products for any part of the world. Inspectors of the Division of Plant Protection, Science Service, Dominion Department of Agriculture, board each vessel as soon as docking operations are complete. Vital information regarding previous cargoes, loading areas, construction details, prior fumigations, and many other facts are obtained from the captain or chief officer before actual inspection of the ship. Armed with this knowledge, each hold is entered and a thorough examination is carried out. Most of the trouble has

been found to be due to improper cleaning of holds. It is quite common for a ship to load wheat in, say, Australia, and to carry this cargo to Britain, then to proceed to Canada and carry a similar cargo back to the United Kingdom. This process may be continued for possibly two years, each time a residue of wheat being left in the holds eventually to become infested. Unless meticulous cleaning is carried out after each cargo, especially between the ribs of the ship, box beams, bilges, etc., trouble is sure to develop.

An actual inspection is carried out thus: Hold No. 1 is normally entered first and a careful examination made of bilge bays, areas between ribs of ship, fore and aft bulkheads and ceiling square in the centre of the lower hold. The tween-deck area is then entered and box beams, hatch coamings and rib areas are scrutinized. The same procedure is carried out in holds 2 and 3. Holds 4 and 5 vary considerably by virtue of the fact that the tunnel which houses the propeller shaft penetrates both these holds, necessitating a very careful inspection of both sides and top of same. The average time required to complete an examination of a ship varies from one to four hours, depending largely on the cleanliness of the ship and the prevalence of insects or grain residue in particular. In winter the operation is considerably lengthened due to the dormant condition of any insect life that may be discovered. Should very light evidence of insects be found, a good physical cleaning is ordered. Sometimes rather heavy evidence is found in one or two remote corners. This type of infestation is taken care of by spot spraying with a combination of DDT and 5 per cent pyrethrum mixture. Of course, in cases where heavy or general infestations occur, a "Detention Notice" is given to the ship's captain or chief officer and fumigation ordered. However, should the holds be found insect free a "Release Certificate" is issued. The release certificate must be presented

to the elevator operator before grain may be loaded. This procedure eliminates the danger of any ship being loaded without inspection.

Until recently hydrocyanic acid gas was used exclusively as a ship fumigant, and about a year ago methyl bromide was tested at Montreal, giving results which proved it to be superior to HCN, and thus the adoption of its use in Vancouver seemed a certainty. During September, 1948, the writer visited Montreal to view the work being conducted with methyl bromide in that port. Instruction was given by H. A. U. Monro, in charge of the Fumigation and Research Laboratory operated by the Division of Plant Protection in that city. Fortunately, eight ships were fumigated during the visit, so that ample opportunity was given to become familiar with the procedure. Test insects (granary weevil) were used on each ship and some interesting data were obtained.

Upon return to Vancouver, fumigation companies were instructed in the use of methyl bromide as a space fumigant. They were, however, rather reluctant to change to a gas 3.1 times heavier than air, in view of the aeration problem. Further to this, it meant a considerable outlay of money for expensive equipment such as blowers and fans.

But this reluctance was soon dispelled and the first ship was fumigated with methyl bromide on November 20, 1948.

Granary weevil cultures were started in Vancouver to provide test insects for most fumigations carried out. Four sets of these test insects, comprising new and old eggs, 1st, 2nd, 3rd and 4th instar larvae and adults were placed in each hold. In order to get an indication of the effectiveness of the gas at any given level, adults were inserted in small capsules which were tied at five-foot intervals to a wire forty feet in length. After fumigation, test insects were removed and mortality counts of adults completed, the immature stages and eggs, with controls, being forwarded to Montreal for incubation. The Cadelle, due to its resistance to HCN and methyl bromide, is an excellent test insect, but due to the difficulty in rearing is limited in its use. The above procedure, together with the collection of infested wheat from ships' holds prior to and after fumigation, gives a complete cross section of the entire operation and provides material on which to base future recommendations.

Before gas is released into the ships' holds, temperatures are recorded, and from 1 to 2 lb. of gas used according to the following table:

			Fan circulation
Above 60°F.	1 lb. per 1,000 cu. ft.	10 hr.	Desirable
51°F. to 60°F.	1 " " " "	10 "	Essential
32°F. to 50°F.	1½ " " " "	12 "	"
Below 32°F.	2 " " " "	12 "	"

A few statistics round out the general picture of vessel inspection at Vancouver:

Number of ships inspected for the 1948-49 fiscal year, to date.....	310
Number of ships fumigated with HCN.....	37
Number of ships fumigated with methyl bromide.....	18
Total number of ships fumigated with both gases.....	55
Number of ships spot sprayed.....	21
Number of ships requiring treatment, either spraying or fumigation.....	76
Number of ships free of infestation.....	234

Regarding insect interception, the granary weevil still appears to retain its position as the worst offender, with *Tribolium* running a close second. It is hoped that by constant instruction, ships' officers will eventually realize that

"good housekeeping" in relation to ships' holds will pay big dividends in cutting to a minimum the chances of infestation, thereby saving thousands of dollars and endless trouble to everyone concerned.