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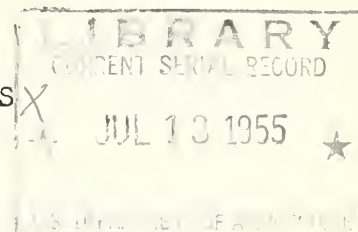
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UNITED STATES DEPARTMENT OF AGRICULTURE
Agricultural Marketing Service
Marketing Research Division

X PROTECTING STORED FURS FROM INSECTS X



Prepared by
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Requests for information regarding methods for storing furs and fur garments during the summer are often received by the Department of Agriculture. Publications containing this information have long been out of print. Therefore, it seems desirable to provide the following information on the subject, derived from earlier publications.

Cold Storage Vaults

Fur storage firms carefully inspect furs received for storage and usually treat them with compressed air and suction or comb and beat them before placing them in cold storage. This treatment removes or kills the eggs or larvae of the clothes moth that may be in the furs.

Cold storage has been utilized for the protection of furs for many years. According to Back and Cotton, ^{1/} "one of the best assets of cold storage control is that it is absolutely safe. Cold storage overrides the human tendency to carelessness. Once a valuable fur is in storage at 40° to 42° F. no insect will injure it . . . as long as such a temperature is maintained no injury can occur.

"If storage concerns aim at the destruction of clothes moths in articles entrusted to them, as well as the protection from injury of these articles during the period of storage, it is recommended that articles be exposed for a short period to a rather low temperature before they are placed permanently at 40° F. to 42° F. The maintenance of a temperature lower than 40° to 42° F. is needless and a wasteful expense.

"Clothes moth larvae can withstand prolonged storage at temperatures ranging from 24° to 45° F. for longer periods than that for which the majority of articles are refrigerated. Thus well-grown larvae of the webbing clothes moth in fur and wool were held in commercial cold storage at a temperature said to fluctuate between 24° to 48° F., but held mostly at

^{1/} Back, E. A., and Cotton, R. T. Effect of Cold Storage Upon Clothes Moths. Refrigerating Engineering 13 (12): 365. 1927.

40° F., and were found to be alive after storage for 12 months . . . This explains why patrons have at times found living, active, and robust larvae in articles several days after removal from a 4 or 5 months' period of cold storage."

Table 1 contains data relative to the effect of cold temperatures on the webbing clothes moth.

Table 1.--Temperature and time requirements for killing moths in stored clothing

Temperature of storage	All eggs dead after	All larvae dead after	All adults dead after
°F.	Days	Days	Days
0- 5.....	1	2	1
5-10.....	2	<u>1</u> / 21	1
10-15.....	4	-	1
15-20.....	-	-	1
20-25.....	21	67	4
25-30.....	21	<u>2</u> / 125	7
30-35.....	-	<u>3</u> / 283	-

1/From 50 to 95 percent of larvae may be killed in 2 days.

2/A few larvae survived this period.

3/Larvae survived this period.

Storage in Noncooled Vaults

The cost of maintaining refrigerated storage for furs led to the development of a method whereby furs could be stored at room temperature without danger from moth or carpet beetle damage.

The method includes fumigation of fur garments in small gastight cabinets as they are received for storage. The fumigated furs are then transferred to the main storage room where they are held during the storage period. At monthly intervals, or at other intervals decided on by the management, the main storage room is fumigated as a precautionary measure.

Cold storage has been used for the storage of furs for many years; however, furs can be held safely in ordinary storage if they are protected from insects. Furs are stored by museums in ordinary storage and keep perfectly if they are occasionally fumigated. According to the Fish and Wild Life Service, the oils on furs are artificial anyway and should be replaced once in a while. Skins that do dry and become brittle do so as the result of the tanning process in which certain acids are used.

Fumigation of fur storage rooms in the United States has been practiced commercially for 40 years.

According to Back and Cotton, ^{2/} "fur garments appear to be in no way affected by the vapors of the fumigants recommended, and dry storage has no deleterious effect upon the furs. A few instances of change in color of furs stored in fumigable storage have been reported, but in no case has this been clearly shown to be the result of fumigation. Thousands of dollars' worth of furs are being stored annually in fumigable storage throughout the country, to the satisfaction of all concerned.

Fumigation vaults and storage rooms

"Fumigation of the furs and fur garments is done in gastight cabinets or vaults such as are shown in figure 1 . . . These small cabinets are of metal construction and can be purchased readymade.

"The large storage rooms (figures 2 and 3) may be of any type of construction that is sufficiently tight for fumigation purposes. Usually they are of concrete or of hollow tile covered with Keen's cement. The surface should be finished with two or three coats of good paint. Large, shallow evaporating pans are fastened along the walls near the ceiling, or are suspended from the ceiling, but so placed that they are not directly over the garments suspended from the racks. These pans are connected by pipes to the storage tank (figure 4) containing the fumigant . . . The fumigant is run into the evaporating pans by gravity or by the use of a small compressor . . .

"The door of the storage room is usually of the safe or refrigerator type, well gasketed so that it will be airtight. An adequate ventilating system must be installed, so that the gas can be quickly removed after the fumigation. As in the case of small fumigation vaults, the ventilating stack should extend well outside the building.

^{2/} Back, E. A., and Cotton, R. T. Industrial Fumigation Against Insects. U. S. Dept. Agr. Circular 369, 64 pp. Rev. 1942.

"In cold climates there should be some means of heating the storage room to at least 70° F. during the fumigation.

"If it is necessary to enter the storage room while it is under fumigation, the operator should wear a gas mask equipped with a fresh canister designed for protection against the particular gas that is being used and should remain in the room only long enough to obtain the garment needed. (Where heavy concentrations of fumigant are present or the operator must stay in the room for any extended period, he should wear a self-contained oxygen mask.)

Dosages

"For the fumigation of the large storage sections a dosage of 1 1/4 pounds of the ethylene dichloride - carbon tetrachloride (3 - 1) mixture should be used per 1,000 cubic feet of space, with a week-end exposure.

"For the preliminary fumigation of fur garments in small vaults, the same dosage can be used, although an exposure of 12 to 24 hours is sufficient."

Many other fumigants are available that are suitable for use in both vaults and storage rooms. The operator should be guided by the recommendations of the manufacturer with regard to proper dosages to use and the suitability of the product for fumigating furs.



Figure 1.--Two types of metal vaults such as can be purchased or built according to space and commodity need. These vaults are used for treating the day's arrival of fur coats offered for summer storage. After an overnight fumigation in these vaults the furs are removed to large permanent storage vaults. (Figure 24 of Cir. 369.)



Figure 2.--Battery of three large fumigable fur-storage vaults constructed in a modern concrete building, equipped with devices for regulating temperature and humidity and for introducing and removing the fumigant. The building is also equipped with burglar alarms. At right, on warehouse floor, note storage for fumigant and pump for forcing fumigant to any room desired. These rooms have been operated successfully in southern California for more than 30 years. (Figure 32 of Cir. 369.)

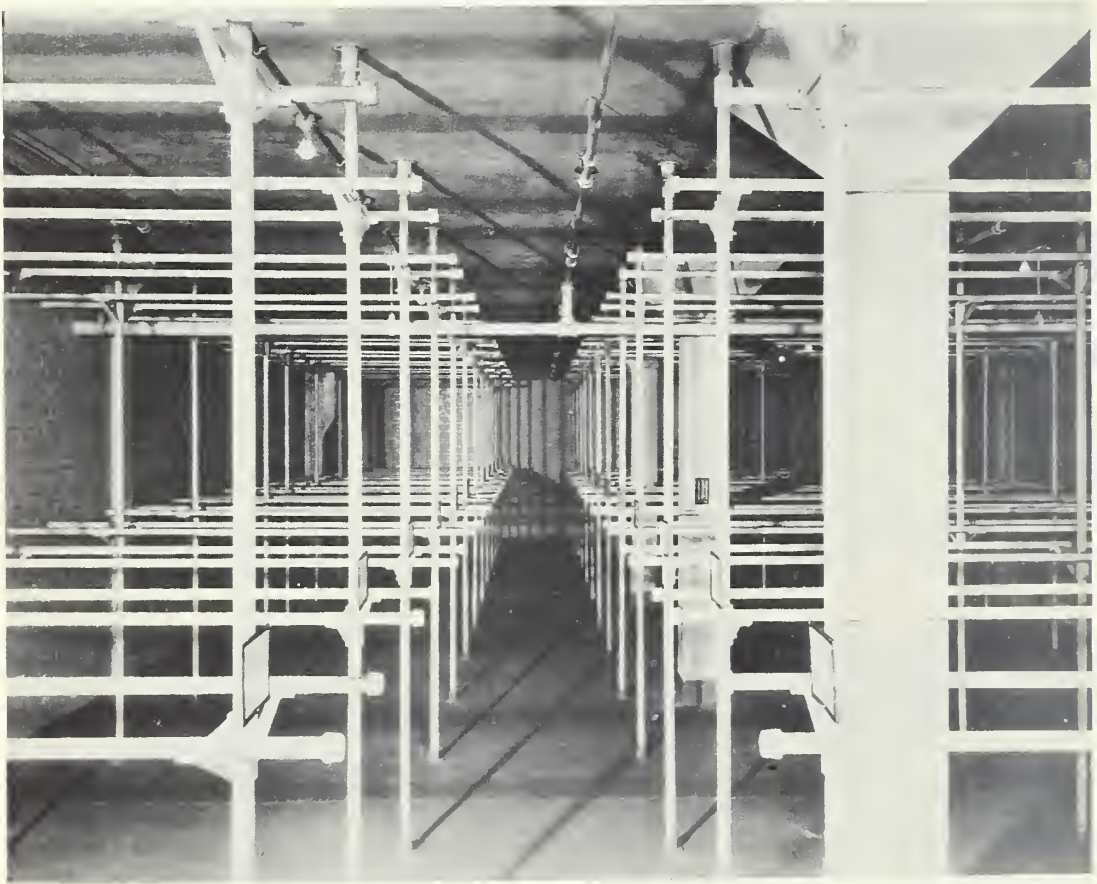


Figure 3.--Interior of fur-storage vault with racks installed for holding garments in best position for ready access and effective fumigation. (Figure 33 of Cir. 369.)

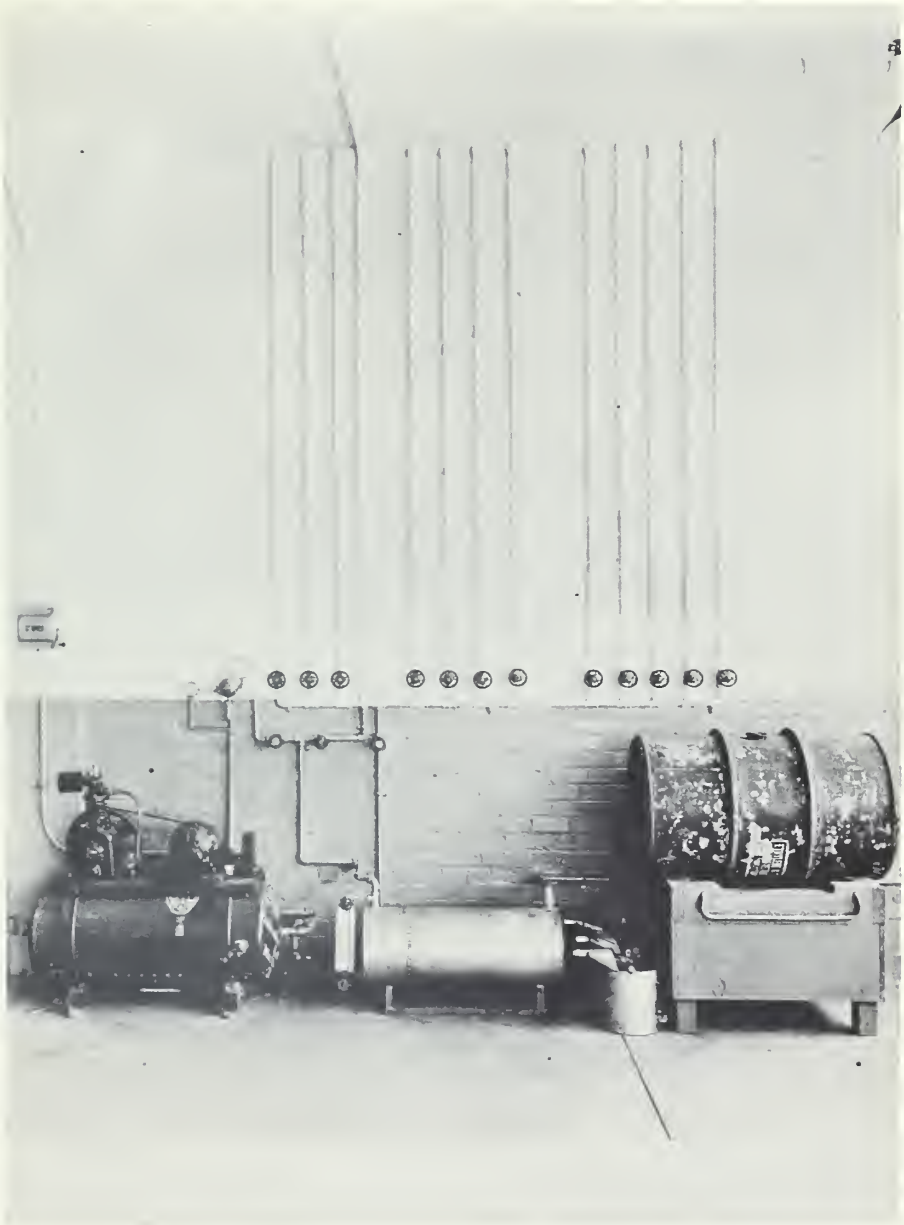


Figure 4.--Exterior view of commercial fur-storage vault equipped for fumigation with the ethylene dichloride--carbon tetrachloride (3 - 1) mixture. Note storage drums at right, pump at left, and pressure tank in center connected with various fumigation vaults, not shown, by pipe lines on wall. (Figure 34 of Cir. 369.)

