

operation with the vehicle engine much as a refrigerator unit on an automobile. Governor control of reservoir pressure is eliminated by close control of the clearance volume which causes the reservoir pressure to balance; or, in other words, the pressure is equalized between tank pressure and piston displacement. With this system of automatic, balanced pressure, there is no need to reserve space in the insecticide tank for compressed air, as in the older system where about three cubic feet was wasted for this purpose. With the present unit, the tank may be filled to capacity, which means fewer stops for refilling. Air is pumped directly into the 50-gallon tank through 5/16 inch copper tubing. Pressure is set for use at 100 psi. A pop-off valve set at 105 psi is installed on the tank as a safety feature, although, theoretically, it is not needed.

All during, and after a year's use, the spray operator repeatedly expressed his satisfaction with the unit. Although the pump was put to greater strain in the first year of testing than it would

be in ordinary use, there were no breakdowns and no maintenance operations were required, even after driving at speeds up to 60 mph.

For the 1962 season, seven more units of this type are to be installed on spray vehicles, three for urban and four for rural use.

With greater emphasis being placed on hand application of granular insecticides, the need for hoses up to 300 feet long has become unnecessary. Without this need, there is little use for high pressure, heavy duty pumps; so it is hoped these smaller units will prove to be just as useful in the rural areas as in the city.

Advantages of this unit compared to the old type compressor are listed below:

1. No PTO unit involved.
2. Cost of installation cut by more than one-half.
3. Constant pressure—automatically.
4. No operating noise (a definite advantage in city traffic).
5. Pressure tank can be filled to capacity with liquid toxicant.

SCIENTIFIC NOTES

MODIFICATION OF "ARCTIC HAMPERS" FOR THE LIVE SHIPMENT OF ADULT AND LARVAL MOSQUITOES

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The increased need for shipping mosquitoes or insecticide resistance testing, for epidemiologic studies of various kinds, and for collection of undamaged mosquito reference materials stimulated us to modify "arctic hampers" for transporting living mosquito larvae and adults to our laboratory³ from any location in the continental United States. We prepare the container in our laboratory, and forward it to the using agency together with an adult mosquito catching aspirator and instructions.

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The shipping container consists of a styrofoam insulated box (arctic hamper) measuring 12 x 13 x 13.5 inches (Fig. 1). A pre-cut insert (approximately one and one-half inches thick) of styrofoam or rubberized horse hair (A) allows a one-quart can of refrigerant (B) (Magic Cold, Carry Ice, etc.) to be placed centrally. Four 510 ml. specimen jars (C) fit snugly into the corners of the container. An additional insert (D) of cardboard with fiberglass or rubberized horse hair insulation, firmly holds the can of refrigerant and jars in position when the lid of the hamper is sealed.

The 510 ml. jars can be used for either larval or adult mosquitoes. For larvae the jar is used with a screw-cap. For adults, the mouth of the jar is covered with two pieces of neoprene rubber (obtained from surgical gloves) held in position with rubber bands and masking tape. Each of the two pieces of neoprene is slit once through the center, and placed so that the slits cross at right angles to each other. This cover allows an aspirator tube to be inserted and withdrawn without losing adult mosquitoes. A strip of blotting paper is placed in each jar to provide a resting surface for adults.

Each container is large enough to accommodate 300 adult or 250 larval mosquitoes (in 250 ml. water) for at least 48 hours. It is thus possible to transport by air express in one box, combinations of such jars to hold up to 1,200 adults or 1,000 larvae.

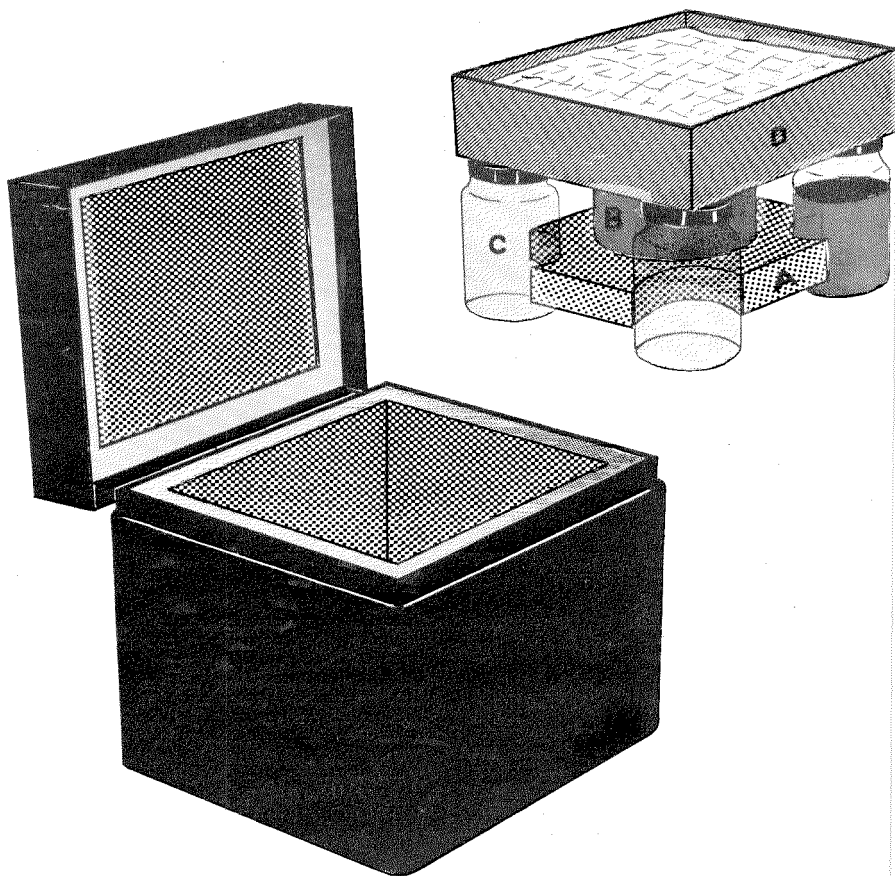


FIG. 1.—Diagram of Modified Arctic Hamper Illustrating: (A) styrofoam insert, (B) quart can of refrigerant, (C) shipping jar, (D) upper insert

TABLE 1.—Temperatures in a modified arctic hamper held for 48 hours in an 85° F. (24.4° C) environment

Hours held	Temperature
0	35° C.
2	16° C.
4	14° C.
21	13° C.
27	16° C.
36	19° C.
48	24° C.

Placing the can of refrigerant in the freezing compartment of a household refrigerator overnight prior to use yields temperatures in the container low enough to maintain reduced metabolism in both adult mosquitoes and larvae for 48 hours (Table 1).

We have successfully transported adults *A. nigromaculis*, *A. vexans*, *A. dorsalis*, *A. campestris*, *A. aegypti*, *C. tarsalis*, *C. pipiens quinquefasciatus*, *P. confinnis*, *P. ciliata*, and *signipennis* by this method. Larvae of both *A. aegypti* and *Culex pipiens quinquefasciatus* have survived 48 hours without observed adverse effects.