a dust, with 0.5 pound of the gamma isomer of benzene hexachloride applied as a wettable powder (6 per cent gamma), when applied with hand equipment. Similar control was obtained with 0.5 pound of DDT in fuel oil and in emulsion, when applied by airplane in the spring. DDT was more effective in fuel-oil solution and in emulsions than in dusts or wettable powders. There was no significant difference between fall and spring treatments, but there was a large difference in effectiveness in the various environments. The treatments were least effective in marshes containing the shrub *Myrica,* and most effective in grassy depressions.

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A METHOD FOR ARTIFICIALLY FEEDING MOSQUITOES

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There are several reasons for feeding mosquitoes and other blood-sucking insects on whole blood or other fluids off the host. Bishop and Gilchrist (1) used the artificial feeding technique to obtain malaria sporozoites in a medium of known composition. The author, following Woke (2), has used the method to determine food factors essential for oviposition by *Aedes aegypti.*

One of the fundamental considerations in any artificial feeding tehnique is to attract the insects to the proffered fluid. It is well known that some mosquitoes are positively thermotropic and this phenomenon can be used to attract them to the fluid which is offered. To do this, a warming apparatus was designed employing electrically heated resistance wires as a source of heat. The apparatus was made to accommodate six lantern globe cages, each having its own heating element to warm the feeding tube.

The heating element (Figure 1) consisted of 28-gauge nichrome wire strung between two asbestos rings which were held 50 mm. apart by three brass rods. Nuts on these rods allowed for tightening the wire after it had been strung. The inside diameter of the asbestos rings was

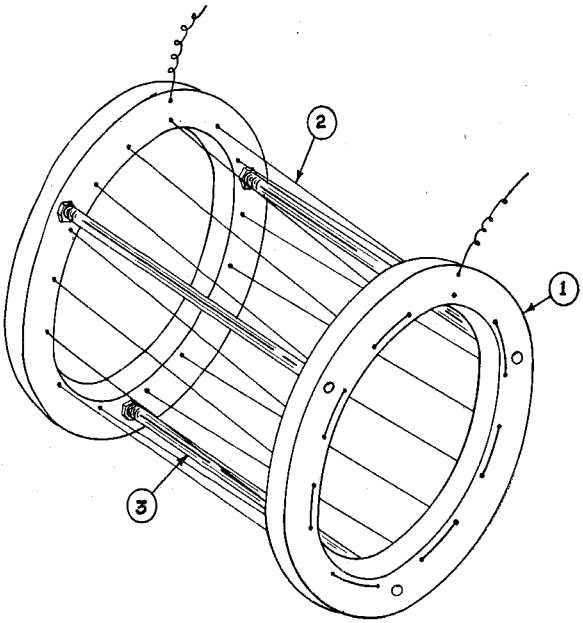

FIG. 1. Heating Element—(1) Asbestos ring; (2) Nichrome wire; (3) Brass supporting rod.

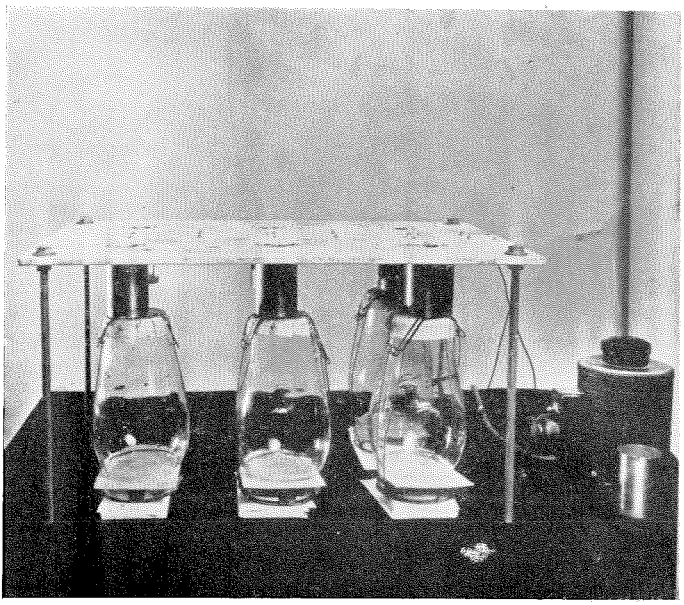

FIG. 2. Feeding apparatus with lantern globe cages and variable transformer.

30 mm. which was large enough to accommodate the glass feeding tube. Each unit had 16 turns of wire, the entire coil being enclosed in a brass cylinder 65 mm. long and 35 mm. inside diameter. Six such units were mounted in an inverted position, 180 mm. apart, on an asbestos insulating board mounted on metal legs. These legs were adjustable in height. Holes were bored through the insulation board at the position of the heating units so that the feeding vials could be inserted from above. All the heating elements were connected in parallel with insulated wire and two brass conductors on the under side of the insulating board. The current passed from an AC lead through a variable transformer to the heating elements. The variable transformer regulated the current passing through the wires and hence the amount of heat generated. It was important to heat the nutrient fluids up to but not exceeding body temperature.

The feeding vials were made of ordinary glass tubing 22 mm. inside diameter cut so that they were about 65 mm. long. One end of the tubing was covered with a membrane through which the mosquitoes could feed. The Baudruche membrane, manufactured and distributed by Mrs. Elizabeth Troeder, Belleville, New Jersey, was suggested by Dr. Dwight DeLong and has worked quite well. A small piece of this membrane was wetted with distilled water, stretched across the mouth of the feeding tube and allowed to dry. It was then thin and water tight, retaining all the fluids tested including physiological saline and whole blood. The mosquitoes were able to probe and feed through it.

Artificial membranes such as cellophane have been unsuccessful. Animal skins variously prepared from different sources have been used with success, but they are not easily prepared in large numbers.

Up to 50 mosquitoes were kept in cages made from lantern globes with bobbinet tops. One such cage was placed under each heating element (Figure 2). Minor adjustments were necessary to make the bobbinet top just reach the heating elements. A feeding vial containing 2 to 3 ml. of test fluid was introduced into the heating element so that the membrane rested on the netting of the cage. A thermometer was placed inside each vial and regulation of the temperature through the variable transformer was made at ten-minute intervals.

The apparatus and method described have been used to feed large numbers of *Aedes aegypti* on a wide variety of artificial fluids. The procedure may be adapted for the feeding of other thermotropic blood-sucking insects.

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PLEASE MARK YOUR CALENDAR

For the 1950 Annual Convention of the AMCA to be held jointly with the Virginia Mosquito Control Association at the famous Cavalier Hotel, Virginia Beach, Va., February 23 and 24. A program of outstanding speakers and entertainment of exceptional interest is being planned. ATTENTION IS CALLED to the contemplated motorcade which will leave after the meetings and terminate the next week in New Jersey in time for all to enjoy the annual convention of the New Jersey Mosquito Extermination Association. CONSULT "Mosquito News" from time to time for details.