A HEAVY-DUTY POWER ASPIRATOR FOR COLLECTING LARGE NUMBERS OF ADULT MOSQUITOES

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INTRODUCTION. As part of a comprehensive mosquito survey of Clark Air Base, R. P., the 5th Epidemiological Flight operates five carabao-baited mosquito traps once a week. Mosquitoes caught in these traps are either collected live for processing for virus isolation attempts or are killed and preserved for identification in an attempt to determine seasonal variation in distribution and abundance. Considerable difficulty has been encountered in the use of conventional recovery methods (killing tubes or plugged test tubes, depending upon the purpose of collection) because of the very large numbers of mosquitoes caught in the traps. As many as 3,000 mosquitoes have been caught in one night in one trap. For this reason, an attempt was made to devise a portable, heavy-duty, power aspirator that could be used in the field with a minimum of maintenance.

MATERIALS AND METHOD. A vacuum pump (Gast Manufacturing Co., Benton Harbor, Michigan, Model 0211, 1/6 HP, 115 volt, 3.8 ampere, 1725 RPM) was connected to a skidmounted, gasoline-engine-driven generator set (Corps of Engineers, U. S. Army, Model E-1500, 0.5 kilowatt, 115 volts, 13 ampere, 60 cycle, 1800 RPM). Twenty feet of 1/2 inch inside-diameter "Tygon" tubing was connected to the vacuum pump. The bottom was cut from a polyethylene container for a 10 cc. "Monoject," disposal, syringe, and this funnel-shaped container (the head) inserted in the open end of the "Tygon" tubing. The bottoms of other "Monoject" syringe containers were perforated with a hot needle and small cotton balls inserted inside the perforated containers.

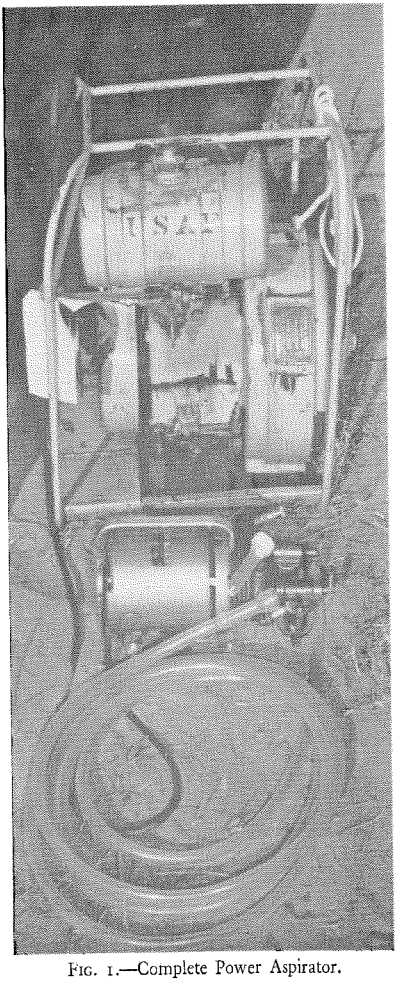

FIG. 1.—Complete Power Aspirator.

In theory, mosquitoes could be aspirated into this mosquito container inserted in the head. The mosquito container, filled with live mosquitoes, could then be capped and removed. The funnel-shape of both mosquito container and head would allow infinite adjustment of suction by moving the mosquito contaier in or out of the head. Fig. 1 shows the lightly touching the surface on which the mosquito rested. This enabled the mosquito to be caught without damaging it. Once suction was placed on the tube, it was maintained constantly, so that mosquitoes did not get under the cotton ball.

After 50–100 mosquitoes were collected, the mosquito container was capped and the cotton ball allowed to fall free inside.

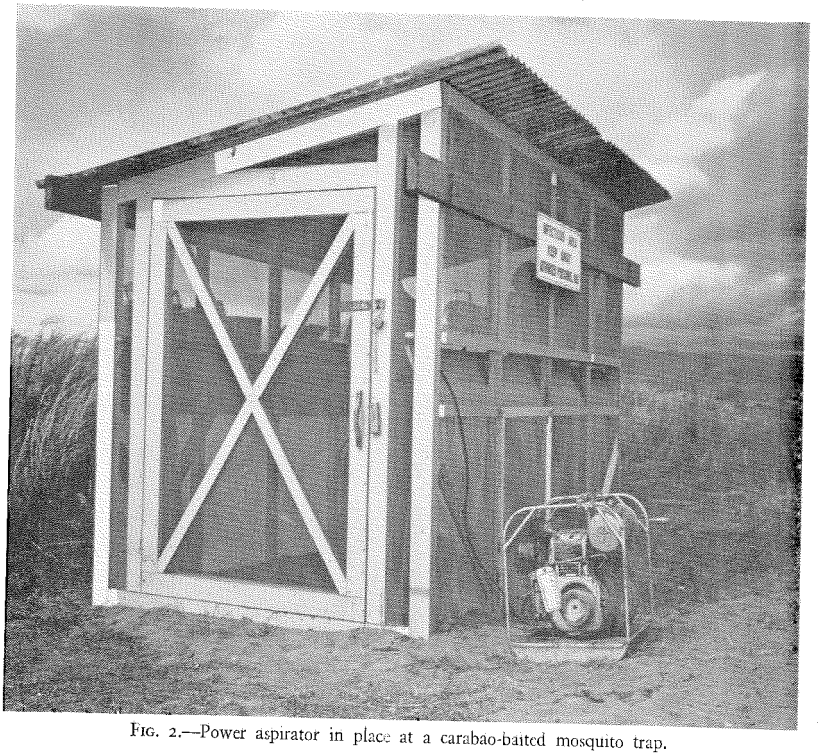

FIG. 2.—Power aspirator in place at a carabao-baited mosquito trap.

complete power aspirator. Fig. 2 shows the power aspirator in place at a carabao-baited mosquito trap. The generator set was outside the trap and the vacuum pump was inside. There was enough tygon tubing to reach any point in the trap without moving the pump. In order to avoid damage to the mosquitoes, the amount of suction was adjusted, by moving the mosquito container, until it was just sufficient to hold the mosquito in the tube. Actual collection was made with a rapid upward movement after

These containers of live mosquitoes were then taken back to the laboratory and frozen for virus isolation attempts. Alternately, carbon dioxide from a tank taken into the trap was passed into the container through the perforations and the anesthetized mosquitoes placed in a killing bottle. These dead mosquitoes were then taken to the laboratory for drying, mounting and identification. Fig. 3 shows mosquitoes being collected in the perforated containers. Note how the mosquito container, held between the thumb

FIG. 3.—Mosquitoes being aspirated into a container. Note that the thumb and forefinger are used to adjust suction by raising or lowering the container, thus permitting one-hand operation.

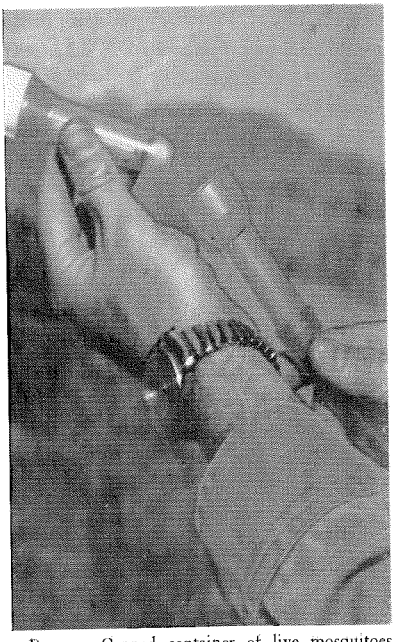

FIG. 4.—Capped container of live mosquitoes being removed from vacuum line.

and forefinger, can be raised and lowered to vary suction, while still allowing one-hand operation. Fig. 4 shows a capped container of live mosquitoes being removed from the head. The cotton ball has not yet fallen free.

RESULTS. Using the power aspirator, as many as 3,500 mosquitoes were removed from a trap by two men in 30 minutes. The specimens were not damaged, so identification was made easily. However, considerable care had to be used to keep the amount of vacuum adjusted. In particular, it was found to be very important never to remove suction once the filling of a container had begun, for movement of the cotton ball trapped and damaged mosquitoes. The ball could not be eliminated because it prevented direct contact between the mosquito and the rough perforated area. It was also found necessary to use small killing bottles to collect stray mosquitoes, for searching for a few mosquitoes took so long that those that had already been collected were subjected to suction too long, causing damage. The best combination was to use a team of two men, one collecting and one anesthetizing until about 50 mosquitoes remained in the trap. Then both men, using killing bottles, could rapidly "clean-up" the residue of mosquitoes. The power aspirator is now used routinely without difficulty.

SUMMARY. Using readily available components, a heavy-duty power aspirator was devised for collecting large numbers of mosquitoes from carabao-baited traps. Mosquitoes may either be returned live to the laboratory packaged in plastic vials, or killed in place in the trap. As many as 3,500 mosquitoes have been collected this way in 30 minutes without damage. Considerable care must be taken, however, with proper adjustment and maintenance of suction to prevent damage to the mosquitoes.