ever, *C. nanus, C. paraensis* and *C. hinmani* emerged in greater numbers from samples with a pH range above 8.7. Greater numbers of *C. arboricola, C. guttipennis,* and *C. debilipalpis* were obtained from samples having pH's less than 8.7.

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AEHA CARTRIDGE-TYPE ASPIRATORS

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Collecting adult mosquitoes for virus isolations, malaria studies and insecticidal resistance determinations has long been accomplished by many different types of aspirators, depending largely upon the particular investigator and under what conditions he might be collecting. The two designs discussed herein resulted from a requirement for a small, lightweight, unbreakable aspirator to be used by U. S. Forces in South East Asia while conducting epidemiological investigations of mosquito-borne diseases. The aspirators which evolved have been field-tested upon many species of mosquitoes while making landing rate and diurnal resting place collections and have demonstrated their efficiency and adaptability to all who have used them.

The majority of mouth-operated aspirators in common use consist of a straight glass or plastic tube to which a flexible rubber or plastic tube mouthpiece is attached. A retaining screen is affixed between the rigid tube and the flexible mouthpiece to trap the mosquitoes. The small diameter of most such aspirators damage specimens as they are aspirated, particularly when several specimens accumulate during a collection. Such damaged mosquitoes tend to yield invalid results when used in insecticidal resistance tests using the WHO test kits.

The cartridge-type aspirators offer a rapid, easy method to collect adult mosquitoes, blackflies and other biting Diptera without undue damage to specimens. Specimens may be collected for virus pool isolations, oocyst or sporozoite counts and routine identifications with a minimum amount of handling. The cartridges may be used for a number of purposes, i.e., collecting eggs from gravid females, holding cages for malaria studies and for insecticide resistance determinations. WHO test papers may be cut to fit any size cartridge desired and mosquitoes are readily aspirated directly into the lined vials, exposed for one hour and held in clean vials for 24-hour mortality counts. Results obtained in small vials are comparable to those obtained using standard

WHO test kits, while handling time is cut approximately tenfold.

The first cartridge aspirator (Figure 1)

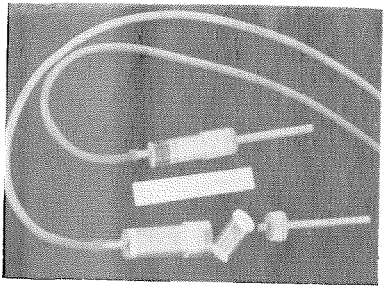

FIG. 1.—First design of AEHA cartridge aspirator

involved modifying the main body of the aspirator to receive a plastic cartridge. The cartridge has holes perforated in the bottom to allow air to flow directly through it, straining insects from the incoming air. When the nozzle assembly is removed the cartridge is easily separated and another can be replaced in its stead. The cartridge drops into the chamber stopping when the wider cap rests upon the edge of the smaller diameter tube. When the nozzle cork is inserted into the larger tube the system is closed securely.

The hole in the cartridge that receives the nozzle can be stoppered with cotton wadding or it may have a bivalve rubber dam that snaps back over the hole. Another method is to cut a 16-pointed star in the plastic lid. The nozzle pushes through the star while aspirating, then the star springs back into place when the nozzle is removed.

The second aspirator (Figure 2) is simply a plastic tee with nylon netting covering the hole at the junction of the tee. The plastic cartridge fits airtight on the

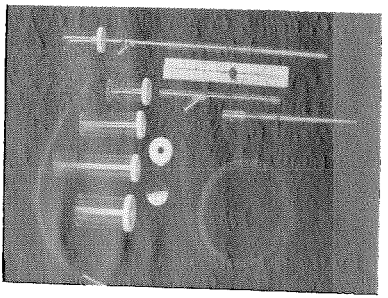

FIG. 2.—AEHA "tee-design" cartridge aspirator

short arm of the tee. When one draws a mosquito into the nozzle it passes down the long arm with the air to the tee junction, then continues down the short arm by its own inertia with an air-cushioned landing into the cartridge.

Advantages of this aspirator over the previous model include simplicity, ability to accept cartridges of any diameter, no holes are required in the end of cartridges permitting them to float in water, and "air-cushion" protection of mosquitoes. This aspirator is easily adapted to mechanical suction devices, making laboratory manipulation of mosquitoes easier and less time consuming.

Only the imagination limits the cartridge design and application. Plastic vials seem to be the most convenient, but glass bottles, test tubes and flasks may also be used. The most simple cartridge can be prepared by punching a hole in the cap of a pill vial with a cork borer. The hole may be stoppered with cotton, or an acetate star-valve insert may be placed inside the cap. In any case a near airtight fit is desired. The versatility, compactness and convenience of the cartridge-type aspirator affords field and laboratory workers another efficient collection method.