

occurred in this container previously, and that the *tarsalis* population might be a self-perpetuating one located within the building.

References Cited

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INSECT ASPIRATORS MADE FROM PLASTIC OR GLASS SEROLOGICAL PIPETTES

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When glass tubing of suitable diameter is unavailable for making an insect-collecting aspirator, 5 cc. or 10 cc. plastic or glass serological pipettes can be used, instead, because they are of approximately the right length and diameter.

The plastic pipettes used were those manufactured by Falcon Plastics of Los Angeles, California. The internal diameter of the 5 cc. pipette is 7/32-inch; that of the 10 cc. pipette is 9/32-inch. The straight portion is 12 inches long. The cone or taper at the tip is cut off with a small saw, but may also be broken after being scored with a triangular file or knife. A circular score can also be made with a knife or tubing cutter, pressure applied, and the break filed smooth or touched to a hot iron or other heated metal surface. The cut collecting end may also be flared after softening it in a flame. Where it is desirable to have a small collecting aperture, the original opening at the tapered tip of the pipette can be used, or else a cut can be made along the tapered tip wherever desired. The plastic did not cloud up or become discolored after extensive use.

The hole between the mouthpiece and the pipette proper is reamed out slightly with a reamer or a heated rod. The mouthpiece can be sawed off and inserted into the distal end of the rubber tubing, or else can be left attached in the original condition. A small piece of mosquito netting, or wide-meshed silk or bolting cloth, is fitted over the end of the pipette, and is held in place with a 1/4-inch strip of tape.

The rubber tubing may be 18, 20, or 24 inches in length, and should be about 1/4-inch in internal diameter. One end is slipped over the mesh-covered pipette tip. The other end of the tubing may be left as is, or else the detached plastic mouthpiece may be inserted into it.

The usable portion of a 5 cc. or 10 cc. glass serological pipette may vary from 11 1/4 to 12 inches. The internal diameter of the 5 cc. pipette is 7/32-inch, and that of the 10 cc. pipette is 5/16-inch. The tapered tip is broken off after being scored with a triangular file or tubing cutter. The narrowed aperture at the mouthpiece end retards the suction somewhat, therefore the glass is scored at about 1/4-inch anterior to the neck and the mouthpiece is broken off. This leaves the original glass pipette as a tube of even diameter. A piece of mosquito netting or bolting cloth is applied over the distal end, and a length of rubber tubing attached, as described above. The removed glass mouthpiece can be inserted into the free end of the rubber tubing. The latter with an internal diameter or hole of 1/4-inch accommodates the 5 cc. pipette, but tubing with a slightly wider hole would be necessary to accommodate the 10 cc. pipette.

A SIMPLE INEXPENSIVE STYROFOAM CHAMBER FOR LONG-TERM HOLDING OF ADULT MOSQUITOES

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If a temperature- and humidity-regulated insectary is not available, humidity chambers for keeping infected or uninfected mosquitoes alive for up to 1 to 2 months, depending on species, can be easily constructed from styrofoam insulated boxes. These come in many sizes and shapes. They are often used for keeping liquids or foods hot or cold, or as shipping boxes or packing boxes. An advantage is that they usually cost no more than \$1 to \$2. Round or rectangular boxes may be used, but the latter will accommodate small holding cages better.

The box is lined with thin layers of wet absorbent cotton held to the inside surfaces with rustless thumb tacks or pins. If available, the best pins to use are "push pins" having an elongated plastic or aluminum head measuring about 1/2-inch long by 3/16-inch in diameter.

After being wetted, the cotton is pinched only

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at the places where the pins are to be inserted, since they hold firmly when the cotton has been tightly compressed. The box is lined with the wet cotton on 2, 3, or 4 sides, as desired, plus the inside of the cover optionally. The floor should be thickly lined. A small jar of water on the floor of the box keeps down evaporation. When in use, the lid is imperfectly placed over the top so that a ¼-inch slit is left at one end for air. The contents are therefore damp and dark. If desired, instead of absorbent cotton, sheets of 1-inch thick plastic foam can be pinned as a lining for holding water. Layers of soaked gauze may also be used. To wet the lining again, it is not necessary to remove it. The cages are removed and water is dropped on to the absorbent material directly from a hypodermic or rubber syringe.

Any type of small mosquito-holding cage can be inserted into the chamber, but a very convenient size is a 4-inch cubical cage, or one made from a plastic cylinder 4 inches in diameter and 3 to 4 inches high. The sides can be completely solid, if a nylon or cotton netting is stretched across the top. A sleeve may be inserted either at the side or bottom, and should be at least 8 inches long. Instead of a sleeve a piece of slitted rubber dam may be used to admit an aspirator, covering a small or large hole at the bottom or at one side. The cages may be staggered and tiered within the humidity chamber. Styrofoam or plastic foam blocks may be used to separate or tier the cages.

If it is desired to maintain the mosquitoes on sugar, a 25 percent solution of sucrose or dextrose is used. Small pieces of absorbent cotton are dipped into the solution and laid across the netting at the top. Water in which raisins have soaked for several days or been boiled, can be used in place of the sugar solution, or the boiled or soaked raisins themselves used by laying them across the top of the cage. Care must first be taken to test the raisins for insecticidal residues which may have been on the original grapes. Male and female mosquitoes are kept together in the cages, but the males usually begin to die off after 3 or 4 days. The females thrive inside this humidity chamber, which can be used in an airconditioned room.

If it is desired to infect the mosquitoes in the small holding cages by having them feed on a bird or animal having pathogenic microorganisms in the blood (virus, microfilariae, protozoa, etc.), the immobilized host is laid across the nylon netting at the top of the cage. If the donor is human, the forearm is laid upon the top netting.

The long-term maintenance of infected mosquitoes in this chamber has been successfully accomplished with *Anopheles quadrimaculatus*, *Anopheles stephensi*, *Aedes aegypti*, and *Culex pipiens pipiens*, which were infected with Friend murine leukemia virus. The first three of these

species feed avidly in this type of set-up. Caged *C. p. pipiens*, however, feed sporadically, and must be well-starved in order to ensure that adequate numbers of females take up a full blood meal from the donor. If *A. aegypti* eggs are desired, strips of wet filter paper or paper towel are placed at the bottom of the cage containing the males and females. Even if this is overlooked, it was found that the females, while standing upside down feeding on the sugar-soaked cotton, laid their eggs directly on the cotton through the mesh. A small water-filled receptacle must be inserted into the cage to obtain eggs of the other species.

CONVERSION OF THE NEW JERSEY LIGHT TRAP FOR COLLECTING LIVE MOSQUITOES IN DA NANG, VIETNAM¹

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Prior to 1969, the Entomology Department, Preventive Medicine Unit, Naval Hospital, Da Nang, Vietnam, conducted routine entomological surveillance and provided logistic support to the Navy and Marine Corps units of the area.

Surveillance of the mosquito population was conducted by operating standard New Jersey Light Traps. In June 1969, the junior author organized an *Anopheles* dissection laboratory in the Entomology Department. It then became necessary to develop a method of collecting live *Anopheles* mosquitoes for dissection studies. It was not possible due to combat conditions, lack of personnel and high incidence of malaria, to conduct night bite counts on a routine basis. Other established methods of live collecting proved impossible because of the lack of equipment. Since the New Jersey Light Traps were the collecting equipment available, it was necessary to adapt them to meet the authors' needs.

After some experimentation, the 5/16-inch wire mesh screen was removed from the opening of the cylinder of the trap. This was done because debris created by the great number of large insects striking the screen damaged or killed the smaller insects being drawn into the trap. The rotation of

¹The opinions or assertions contained herein are the private ones of the writers and are not to be construed as official or reflecting the views of the Navy Department or the naval service at large.