

jungle area known as the Iron Triangle. This jungle consists primarily of indigenous hardwoods which constitute the initial canopy. A secondary canopy is formed by tall shrubs, bamboo, and trees similar to scrub pines. During the two-week period prior to exploration of the area, only .07 inch of precipitation had been recorded. Hence, no ground pools or other water sources were found in the immediate vicinity of the tunnel. The Saigon River, however, with its bordering rice paddies, was within 1,000 meters of the jungle area.

Within the tunnel the humidity was very high, as shown by the data presented above, and although no actual pools of water were found, the tunnel floor was muddy in places and the walls were damp. Pottery jars containing water or other liquids were found throughout the tunnel complex.

Blood meals for these tunnel-dwelling insects were apparently obtained from Viet Cong soldiers who lived in the tunnels, and/or from the rodents and bats which flourished there. Although the Viet Cong had recently occupied the tunnel (as evidenced by cooked food and fresh feces), the mosquitoes apparently had not had their fill, since they attacked and fed on the search party with great vigor and persistency.

Mansonia uniformis breeds in swamps and ponds and slow moving streams containing various types of vegetation (1, 2, 3). Adults rest in the vegetation bordering these breeding habitats. The present observations demonstrate that *Mansonia uniformis* will readily exploit a subterranean shelter with a proper microclimate. Normally the mosquitoes probably seek dry season shelters on the forest floor and beneath vegetation where suitable meteorological conditions occur. Invasion of the tunnel would be an important supplemental mechanism of surviving unfavorable weather. It would be interesting to determine whether the mosquitoes were attracted to the tunnel because of favorable resting conditions, or because of the presence of a source of blood. Perhaps both factors were responsible.

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A PORTABLE ASPIRATOR FOR COLLECTING MOSQUITOES

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An apparatus that was designed and manufactured to be used as a portable, hand-held, vacuum cleaner¹ has been adopted for the purpose of collecting adult mosquitoes from hibernating and resting stations. This aspirator has been researched and developed as a replacement for the mouth aspirator in this department. The health hazards of collecting mosquitoes by mouth aspirating are great. This aspirator does away with the intake of wing scales, wings, legs, fungi, dust, and other foreign agents that might cause irritations and infections in the respiratory system. This article will describe and illustrate the apparatus as used by the Insect Vector Division of the Memphis-Shelby County Health Department, Memphis, Tennessee.

DESCRIPTION OF APPARATUS. The vacuum aspirator is approximately 20 cm. long and the head portion extends out about 17 cm. The unit, which operates on two regular flashlight batteries size "D", is shown, complete, in Fig. 1. Steps to use in constructing the mosquito aspirator from the vacuum brush are as follows:

1. Clip the brush bristles from around the air-intake to allow the funnel to fit snugly against the head.
2. Obtain small funnel with the same diameter (approximately 7 cm. in diameter) as the vacuum brush air-intake, and a small piece of nylon mosquito netting.
3. Stretch the nylon netting tightly over the air-intake opening of the vacuum and secure with two or three very strong rubber bands.
4. Secure the funnel to the air-intake of the aspirator with masking tape.
5. Trim the edges of the nylon net.
6. The mosquitoes are voided from the area inside the funnel by gently blowing the air back through the air outlet. (Arrow in photograph)

APPLICATIONS. 1. Sampling in a specific area to determine the density of various species of mosquitoes. During the regular mosquito surveillance program, adult mosquito hibernating and resting stations are inspected on a routine basis in order to determine the population of individual species present. These shelters are located under bridges, inside culverts, sewers, storm inlets, and in many cases are nearly inaccessible. The small size of the aspirator makes it useful for the collection of mosquitoes in these

¹Manufactured by the Chadwick Co. under Pat. No. 468693.

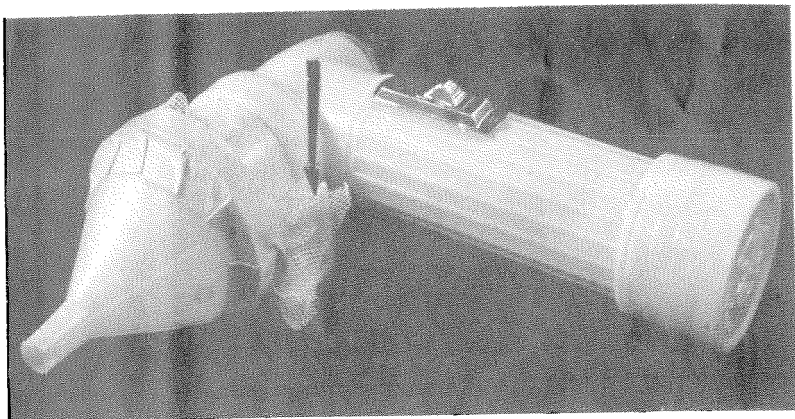


FIG. 1.—Portable aspirator, assembled; arrow indicates air outlet.

small areas. The larger volume of mosquitoes that it is possible to collect with this unit also gives a more comprehensive picture of the concentrations of various species.

2. Adult mosquito biting collections. During the mosquito season biting counts are taken to aid in the establishment of an adult mosquito density index and to supplement the data derived from adult mosquito light traps and resting/hibernating stations. This small self-contained device is also useful for this type survey. In making these particular counts and collections an insect repellent cannot be used for obvious reasons. Therefore a suitable net or veil must be worn to protect the head and neck region. The mouth aspirator is an unhandy and inconvenient device to operate while wearing a net. The

battery powered apparatus is excellent for these collections due to its mobility and ease of operation.

3. Mass mosquito collections for arbovirus studies. Each year the Insect Vector Division collects hundreds of mosquitoes for arbovirus studies. In this program it is necessary to collect large volumes of mosquitoes in as short a time as possible. The aspirator has proved invaluable for this particular program. For these arbovirus determinations it is necessary that the specimens not be damaged, and they must also remain alive until they are frozen with carbon dioxide ice. This apparatus has proved to be extremely satisfactory in these aspects because our experience has shown a 100 percent survival of specimens collected.

THE OCCURRENCE OF *Phlebotomus californicus*
FAIRCHILD AND HERTIG AND *Phlebotomus*
oppidanus DAMPF IN TEXAS

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Stone *et al.*, (1965) have reported the occurrence of *Phlebotomus californicus* in Washington and California and *Phlebotomus oppidanus* in Mexico and Washington. One specimen of *P. californicus* collected July 31, 1966 and one male of *P. oppidanus* collected August 1, 1966 in a Malaise trap are new records for the State of Texas according to Hanson (personal communication, 1966). Both species were collected in a

thicket of willow trees below the San Estaban Dam, 11 mi. S. of Marfa, Texas. The Malaise trap used in this study was a model adapted from Townes (1962).

Along a running portion of Cibolo Creek at Shafter, Texas, two *P. oppidanus* females were collected in a Malaise trap on August 20, 1966.

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