with mites attached to the membranous areas between the head and thorax, as well as between the thorax and abdomen.

Blood engorgement of parasitized *A. ventrovittis*, on the observer in the field, seemed unaffected by the presence of mites. The average time to completion of blood feeding of 6 unparasitized *A. ventrovittis* was 130 seconds, and of 6 parasitized specimens, 105 seconds. Blood volume, however, could not be measured and compared.

Although *A. ventrovittis* had been collected biting hourly throughout the day, between 7 a.m. and 8 p.m., 5 of the 6 parasitized specimens were collected between the hours of 6 p.m. and 8 p.m. on both days.

Host seeking of parasitized *A. ventrovittis*, seemingly restricted to dusk (6 p.m. to 8 p.m.) may suggest a limitation of flight activity and host seeking of parasitized *A. ventrovittis* to hours of optimal conditions of light, temperature and humidity, whereas, unparasitized *A. ventrovittis* fed throughout the day. Furthermore, the absence of mites from three other *Aedes* species (*A. fitchii*, *A. hexodontus* and *A. increpitus*), collected from the same area, could be the result of host specificity for this species of *Panisopsis*.

Identification of *A. ventrovittis* specimens was verified by G. Grodhaus, Bureau of Vector Control, California State Department of Public Health.

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GYNANDROMORPHISM IN *Culex tarsalis* (COQUILLETT)

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A gynandromorph of *Culex tarsalis* was taken in a mosquito light trap at Yuma Proving Ground, Arizona on 28 August 1966. The specimen has typical male palpi and proboscis and typical female genitalia. The antennae are missing.

In 1964 Rigby and Blakeslee reported gynandromorphism in *Culex tarsalis* taken in light trap at Yuma Proving Ground, Arizona with characteristics such as "typical female antennae, palpi and proboscis, and typical male genitalia." In 1965, Blakeslee and Rigby reported these same characteristics in *Culex erythrothorax*. In 1966 Taylor, Meadows and Branch commented that the majority of specimens in their study had this combination of characteristics.

While the combination of characteristics found on the mosquito collected on 28 August 1966 is unusual in *Culex*, as pointed out by Taylor *et al.*, this same combination was found in *Aedes dorsalis* by Blakeslee, Rigby and Bomotti in February 1966 (to be described in California Vector Views).

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A PITFALL TRAP FOR MOSQUITO LARVAE

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An adaptation of the simple pitfall trap to an aquatic environment was found to be useful in catching larvae of *Aedes* spp. Modifications of the trap might be of practical control value in areas where the collection and storage of rainwater for household use is commonly practiced and where treatment with insecticides might be objectionable.

In its simplest form the trap was made from an 11 cm polyethylene funnel with a 60° taper. The stem of the funnel was inserted into a hole in the cover of a plastic dish which was 9.5 cm in diameter and 7 cm deep.

When the larvae filter down through the water to feed or to escape from surface enemies they enter the funnel, slide along its sloping sides and eventually find themselves in the bottom of the trap. A funnel angle of more than 60° restricts the effective catching area of the trap while an angle of less than 60° permits the larvae to settle on the sides of the funnel so that few are trapped. When larvae attempt to surface while in the trap their characteristic angle of rise (40–80 degrees) precludes their escape in all but a few instances. Because there is no free air in the trap the larvae eventually suffocate.

Different combinations of black or white funnels and black or transparent containers were compared for efficiency. A black funnel and a black container with a clear cover caught 3–4 times more larvae than any other combination. Crushed dog chow as an attractant in the trap further increased the catches by 2.5 times more than the controls. Under ideal field conditions these small traps caught as many as 48 larvae per minute. This was exceptional. The overall average for a 24-hour period was 0.5 per minute, with water temperatures ranging from 1.1° C. to 10° C. during the study period. In addition to mosquito larvae, mosquito pupae, frog, salamander, and dytiscid larvae were caught in small numbers.

A SUCTION-TYPE COLLECTING APPARATUS FOR MOSQUITOES

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Many entomologists are aware of the health hazard of aspirating by mouth large numbers of insects. Marking-release-recapture experiments with *Anopheles freeborni* Aitken necessitated collecting large numbers of adults from resting sites. This mosquito cannot be collected in numbers by means of CO_2 traps as was done in flight studies of *Culex tarsalis* Coq. (Bailey, *et al.* 1965 [2]). Small suction devices such as those operated with flashlight batteries were inefficient for our purpose and enabled too many mosquitoes to evade capture. Therefore, to avoid bronchial and lung irritation from aspirating wing scales, dust, fungi, etc., a more powerful mechanical and portable apparatus was needed.

A surplus 12 volt motor and fan unit such as employed to ventilate the pilot's compartment in military aircraft was adapted to our purpose. A section of lightweight steel tubing 6 inches in length by 4.25 inches in diameter was brazed onto the fan housing. The handle, including the switch, such as used on portable power tools, was bolted onto a bracket attached to the base of the fan housing. A liner was added to the tube to prevent air leakage and allow the replaceable air collecting receptacle to fit snugly.

A standard cardboard mailing tube was employed as the collecting unit. The bottom was cut off and bobbinet cloth taped over the opening. The cloth allowed sufficient air to pass through it and resulted in minimal injury to the mosquitoes in comparison with a wire screen. If a large composite collection was made for marking and later release, the adults were shaken or blown into a holding cage. When the collection at a preselected site was completed in recapture experiments the cap was placed on the tube, the motor shut off, the tube labeled, and the mosquitoes chloroformed.

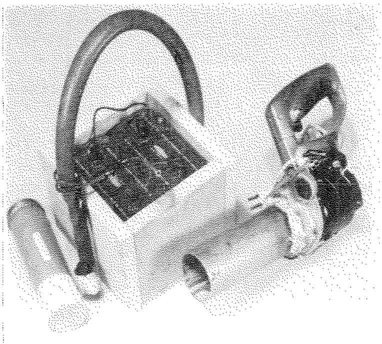

FIG. 1.—12 volt suction apparatus for collecting large numbers of mosquitoes.

The power source used was two 6-volt, flasher type, dry cell batteries (Fig.1), such as Eveready No. 731, NEDA918, or a 12-volt lightweight motorcycle wet cell battery transported in a tool box. If the collecting site could be reached with a 25 to 30 ft. extension cord clamped to the poles of an automobile battery, or plugged in the cigarette lighter, the portable batteries were not needed. In the majority of cases, however, collecting sites were not accessible by auto. The dry cell batteries last about 10 hours when operated for short intervals of about 3 to 5 minutes. The wet cell battery, if recharged, will last through two seasons of collecting. The total cost of the dry cell collection unit as illustrated was about $11.00. The original pilot model was constructed in 1963 by D. A. Eliason.

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[2] BAILEY, S. F., ELIASON, D. A. and HOFFMAN, B. L. Flight and dispersal of the mosquito *Culex tarsalis* Coq. in the Sacramento Valley of California. Hilgardia 37:73–113.

MODIFICATION OF A GRASS SEEDER FOR GRANULE DISPERSAL

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During the past eight years 184,000 applications were made to 174,900 acres with 1,266,000 pounds of granular larvicide in the Metropolitan Mosquito Control District. Most of the applications to these small sites were made with the "Cyclone" brand grass seeder. This machine generally performed satisfactorily but replacement and repair costs were high. Cattails, grasses, and other vegetation got caught in the gears between the slinger plate and the bottom of the granule hopper. This forced the gears to separate, lose alignment, or to break. The loss of operator time in removing this vegetation was considerable.