gear (Fig. 1 (6)); a transformer with a variable rheostat (as used in microscope lamps) enables the rotation of the shaft to be adjusted to the desired speed. At the extreme left end of the lid a protruding pin (Fig. 1 (7)) acts as a trip switch to one of the two microswitches (Fig. 1 (8)) positioned on the frame at either end of the lid's run.

ELECTRICAL EQUIPMENT. As either of the microswitches is triggered by the protruding pin, the microswitch activates a pole-reversing relay containing a diode which rectifies the 12-volt current of the transformer, causing the DC permanent magnet motor to change its direction of rotation by following the polarity of the relay (Figure 2).

EXPERIMENTAL

Mosquito eggs are placed on plastic strips, which are laid inside open-ended glass cylinders (2.1 cm diameter x 14.5 cm. length); each cylinder fits snugly in a well. The glass cylinders are plugged with cotton wool, which is kept damp to maintain the high humidity necessary to the dormant eggs of *Aedes caspius*.

One result from the many experiments made with this apparatus (Sinègre 1974) is produced in Figure 3.

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TOXORHYNCHITES HEADS AS *AEDES* TRAPS

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An amusing incident that occurred recently in our insectary seems worth recording, at least for its humor; the situation could also be of scientific significance and may point to something of practical value.

To provide food for the predacious larvae of *Toxorhynchites amboinensis* (a strain from Hawaii supplied by Dr. Leon Rosen), broods of *Aedes aegypti* larvae (the West African 'Liverpool strain' supplied by Dr. David Denham) are raised as required. To preclude possibilities of cannibalism among the larvae of *Tx. amboinensis*, each of these relatively large larvae is usually kept in an individual water container throughout its development to the pupal stage. The rate of consumption of prey, such as *Ae. aegypti* larvae, by *Tx. amboinensis* larvae is determined by various factors (c.f. Trpis 1972, for *T. brevipalpis*), the ambient temperature and the size of potential prey being of particular importance. At 26–28°C, for example, a 4th instar *Tx. amboinensis* can consume 2nd or 3rd instar larvae of *Ae. aegypti* at a rate of 10/day for more than a week. Given the chance, hungry 4th instar larvae of *Tx. amboinensis* attack one another and will even devour the pupae of their own species. Compulsive killing, beyond the requirement for food, is an unexplained phenomenon with fully grown *Toxorhynchites* larvae (c.f. Crans and Slaff 1977, for *T. rutilus septentrionalis*).

In order to minimize work in the insectary at Easter, 1978, it was decided to pool over 50 *Tx. amboinensis* larvae, mostly 4th instars, by putting them all in a large bowl with thousands of *Ae. aegypti* larvae (mostly 3rd and 4th instars) as prey. To limit growth of the prey, none of the usual *Ae. aegypti* larval food (desiccated liver powder) was added to the bowl of water containing the mass of larvae of both species.

After having been left for 4 days, the majority of the *Ae. aegypti* larvae remained alive and active, although the predatory larvae of *Tx. amboinensis* had consumed an appreciable number of them. Despite the abundance of suitable prey available, however, some *Tx. amboinensis* larvae had evidently become fratricidal: the bottom of the bowl was found to be littered with partly-eaten cadavers of *Tx. amboinensis* larvae and several pupae, as well as the remnants (mostly the heads) of numerous *Ae. aegypti* larvae which had been killed and largely eaten. No more than half of the original number of *Tx. amboinensis* larvae survived at that time. Subsequent observations confirmed that the remaining *Tx. amboinensis* larvae seemed as willing to attack each other as to catch the defenseless larvae of *Ae. aegypti.*

Now because they had no other food, the surviving larvae of *A. aegypti* set upon the bits and pieces of dead larvae and pupae. The large and small fragments of *Toxorhynchites* tissues were nibbled energetically by swirling droves of hungry *Aedes* larvae. Everything but the tough cuticular parts of the dead *Tx. amboinensis* was efficiently scavenged. Smaller *Ae. aegypti* specimens got right inside the sleeves of *Toxorhynchites* larval abdomen and cleaned out the nutritive contents. The most awkward part of a dead *Toxorhynchites* larva for an *Aedes* larva to chew on was the rather globular head: the neck membranes invariably disintegrated, leaving the *Toxorhynchites* head rolling freely on the substrate.

With most dead *Tx. amboinensis* heads, an *Ae. aegypti* larva managed eventually to eat its way into the posterior foramen. The relative dimensions permitted 3rd and 4th instar *Ae. aegypti* larvae, suffering somewhat from reduced growth through malnutrition, to get the whole head and thorax into a third or fourth instar larval head capsule of *Tx. amboinensis*. Having eaten the brains and cranial muscles, the *Aedes* larvae were usually unable to get out again. One week after the larvae had all been pooled, a conspicuous number of *Ae. aegypti* larvae were found to be stuck in this way, each with at least its head encapsulated by that of a dead *Tx. amboinensis* (Figure 1).

Ae. aegypti larvae in this condition were transferred to another bowl of clean water, free of predators, and kept to see their fate: only 2/16 individuals extricated themselves successfully. The hooded larvae became increasingly languid, although they swam strongly when stimulated. Their deaths were eventually caused by a growth of epiphytic algae, after 5 weeks. Towards the end, they tended to lie at the bottom of the water, being apparently too disoriented to swim up to the surface for siphonal

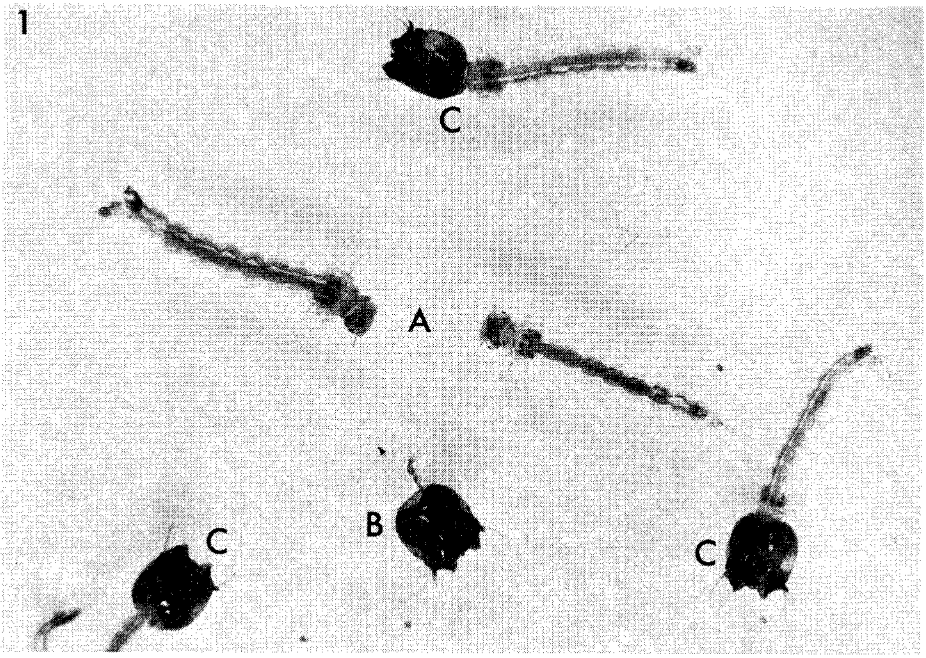

Figure 1: A. free living *A. aegypti* larvae; B. fresh *T.amboinensis* head with internal tissues intact; C. trapped *A.aegypti* larvae with their heads stuck in *T.amboinensis* head capsules.

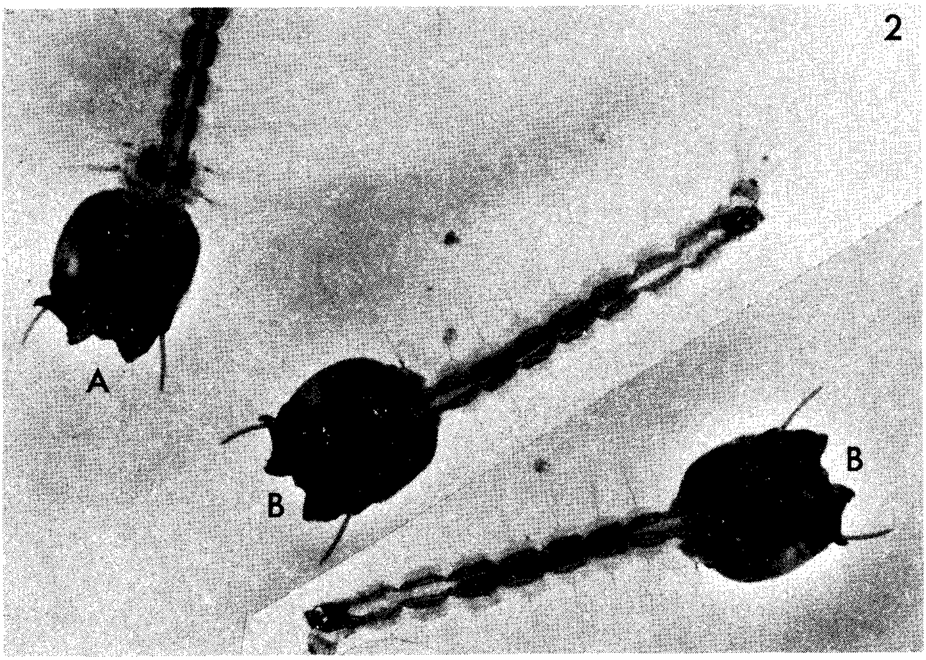

Figure 2: living *A.aegypti* larvae stuck in *T. amboinensis* head capsules, A. head only trapped; B. head plus thorax trapped.

breathing. They seemed capable of enduring for a very long time without food and reduced to cutaneous respiration.

Wild *Aedes* larvae would seldom be likely to get stuck in dead *Toxorhynchites* heads under natural circumstances, although representatives of both genera share breeding sites throughout the tropics. Living *Toxorhynchites* are the real danger. Moreover, the cranial contents of a freshly killed *Toxorhynchites* head become unsuitable for *Aedes* to eat after just a few days: bacterial decay inevitably spoils the bait in the trap.

Like monkeys caught by the hand when clutching fruit (Gask 1927), *Ae. aegypti* larvae can be too greedy for their own good. Two levels of encapsulation ensnared the mosquito larvae: either the head was held by a ball-and-socket effect, or the head and thorax were hooked by the barbed function of the mesopleural and metapleural spines and setae (Figure 2). For practical control purposes, it might be possible to devise ways of exploiting these mechanisms.

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