the laboratory when held for 26 days. Higher temperatures (82°–88° F.) and a constant exposure to light also had no effect.

It is apparent that low temperature is an important factor in bringing about dormancy in *californica* eggs. However, the stimulation to bring about a resumption of their activity is more involved. It is yet to be determined whether such eggs will respond to changes in day length.

As concluded by Grant (1953), the species completes development of the immature forms and emerges, only after high outdoor temperatures have been reached. The yearly range of reported pupal incidence for *californica,* a criterion of emergence, is from May to early November in the San Joaquin Valley (Chapman, 1964). In the Sacramento Valley in 1963, these stages appeared in April and were last seen by the end of October. Adults have been recorded over a similar period. According to Freeborn and Bohart (1951), and Loomis, *et al.* (1956), males have occurred from April 3 to August 14, and females from April 3 to October 13. For the present study light traps were not used, but there was no difficulty in locating both males and females (they were never numerous) in tree-holes where the aquatic stages were present. In these collections males disappeared with the approach of fall; however, females were captured as late as December. One specimen was taken December 8, and another on the 15th from the same rot-hole (in a cottonwood tree in northern Yolo County). At the time of the collections (mid-day) the air temperatures in the tree hole were 64° F. and 55° F. respectively. Such a late occurrence of females is presumptive evidence that *californica* adults do hibernate. Experiments with laboratory-reared adults attest to their long life span. In small replicates retained at room temperature, individuals of both sexes lived well over three months. Field studies were not continued beyond December, but quite possibly additional adult hibernation records of the mosquito could be obtained if more tree-holes are searched throughout the winter.

The above findings of an overwintering potential in the adult and egg stages, when coupled with even greater such capabilities of the larvae, demonstrate that the species is well adapted for the passage of winter. It is also indicated that a low reproductive potential in *californica* is perhaps largely compensated by a strong and varied ability to survive.

Thanks are extended to Dr. S. F. Bailey, Entomology Department, U.C.D., for confirmation of the identifications of the adult specimens.

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NOTES ON THE OCCURRENCE OF ABNORMAL SCALE PATTERNS IN ADULT FEMALE *Aedes vexans* (MEIGEN) [1]

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Aedes vexans (Meigen) is a common mosquito found throughout the United States and Canada. During the late spring and summer the species frequently occurs in sufficient numbers to create substantial nuisance. In upland light trap collections, *Aedes vexans* is generally the foremost floodwater species in New Jersey.

Adult female *Aedes vexans* normally display dark scaled abdominal tergites with conspicuously indented basal white bands (Fig. 1). The indented white bands are most often used as the conclusive key character. Occasionally, the apical tergites exhibit a few scattered pale scales.

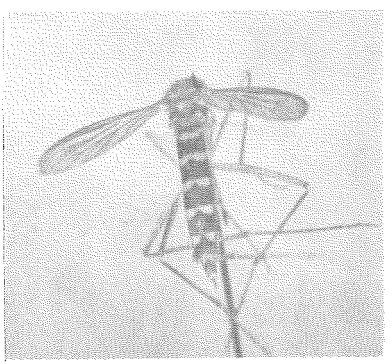

FIG. 1.—Normal Adult Female *Aedes vexans.*

Routine light trap investigations have for several years revealed occasional females with abnormal

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scale patterns. Abnormal representatives of this species, recently taken with considerable frequency, display an increase in abdominal pale scales, generally concentrated as a dorsal median line (Fig. 2). When viewed without the aid of

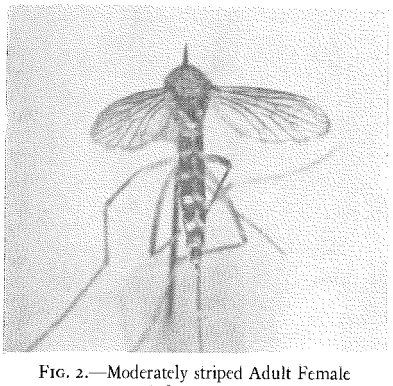

FIG. 2.—Moderately striped Adult Female *Aedes vexans.*

magnification, these scales present a clear dorsal median abdominal stripe. The extent of abdominal scaling appears to vary considerably. Occasionally, specimens may be found with white scales so heavily concentrated that the indentations associated with the abdominal bands are all but obliterated (Fig. 3).

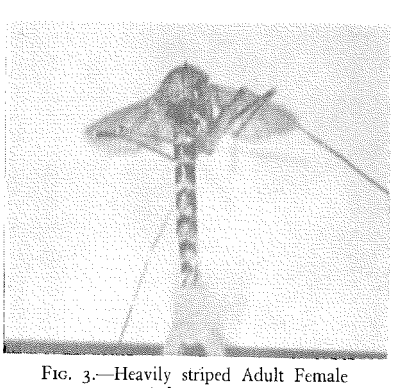

FIG. 3.—Heavily striped Adult Female *Aedes vexans.*

The increased number of pale scales is apparently not restricted to the abdomen. Many specimens displaying a median stripe exhibit wider bands on the tarsal segments. With some variation, the extent of median striping appears to be associated with the width of the tarsal bands.

Since 1966, approximately forty such specimens have been pinned and examined from New Jersey. These specimens show varying degrees of abdominal striping. Trap records show that abnormal specimens have been taken from May through September. Although the majority of specimens taken thus far have come from the southern and western districts, recent traplines established in other areas have revealed a complement of abnormal individuals.

Prior to 1966, very few abnormal *Aedes vexans* were noted in routine light trap collections. Verbal reports from New Jersey mosquito investigators and those outside of the state, however, indicated that occasional specimens had been collected. Specimens have been received from Mr. Bruce Brockway of the Toledo Area Sanitary District in Ohio. Mr. Robert Lake of the University of Delaware attests finding four New Jersey specimens and three from Delaware in the University collection, which demonstrate a median stripe.

The possibility that variations in scale patterns might be connected with variations in habits has not been explored. All specimens thus far collected have represented isolated individuals, with no concentrations of striped specimens from one particular location. The possible association of this morphological variation with that of a separate race is, therefore, open to considerable question.

A FEEDING ASSOCIATION BETWEEN *Hippelates* (DIPTERA: CHLOROPIDAE) AND TABANIDAE ON CATTLE: ITS POSSIBLE ROLE IN TRANSMISSION OF ANAPLASMOSIS[1]

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In a previous paper (Roberts, 1965), I reported that four species of the eye gnat (*Hippelates pusio* Loew, *H. pallipes* (Loew), *H. bishoppi* Sabrosky, and *H. plebejus* Loew) were collected from a steer-baited insect trap. In that initial study and in subsequent collections, I found specimens of these species that contained a reddish fluid in their digestive tracts. The source of this fluid was found to be blood ingested from wounds made by horse flies (Tabanidae). The observation that indicated the source was made when engorged horse flies were being collected for oviposition studies. Since this relationship between eye gnats and horse flies had not been reported, continued observations were made on the activity of eye gnats on a tethered bait animal. The present paper is a summary of the notes that were obtained.

When the bait animal was first tethered in the field for the observations, eye gnats could be found scattered over the body surface. However, when horse flies landed on the animal, the gnats clustered around and even on the fly as it began to

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