

## SCIENTIFIC NOTE

**Observations on the Life History of Bombardier Beetles: Mechanism of Egg-Hatching (Coleoptera: Carabidae).**—In 1967 Dr. George Ball and I collected live specimens of various species of *Brachinus* throughout Mexico. These were kept alive in plastic bags until we returned to the University of Alberta, Canada. Subsequently, the specimens were sorted to species and placed in refrigerator trays containing moist peat, and maintained at room temperature. The specimens were fed injured insects and various cuts of beef. The colony of *Brachinus mexicanus* Dejean subsequently began mating and ovipositing, in a manner I have described previously [Erwin, 1967. *Coleopt. Bull.*, 21(2): 41-55]. The eggs in this case were not rolled in mud as they normally would be, because the peat substrate was unnatural. This allowed me to make continuous observations on the developing embryo through the very thin-walled egg. The development of the embryos required 7-10 days.

Most carabid larvae have one or two egg-bursters or spines on the frons with which the egg membranes are rasped and broken. The frons of known *Brachinus* larvae are smooth with no evidence of egg-bursters.

The young embryo of *B. mexicanus* develops in a C-shape within the ellipsoid egg; the frons, clypeolabral area, and dorsum of the mandibles are against the side wall, rather than one end. As the young larva grows, the point of one mandible presses against the egg membrane. At the proper growth stage, the wall is pierced by this mandible, and is probably helped by some muscle contraction. In dry, mud-encased eggs (the normal condition) the amniotic fluid moistens the dry mud covering the egg and allows the first instar to struggle free. It's subsequent behavior and development has been described before (Erwin, *ibid.*).—T. L. ERWIN, *Smithsonian Institution, Washington, D. C., 20560.*