

## Occurrence and Description of an Embryonic Egg Burster in the Genus *Hexagenia* (Ephemeroptera) \*

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Although the occurrence of embryonic egg bursters has been reported for a number of insect groups, such a structure has not been recorded previously for mayfly species of the genus *Hexagenia*. An egg burster in the form of a sclerotized knife-like blade (fig. 1) is used by the mature embryos of *Hexagenia limbata*, *H. rigida*, and *H. affiliata* for cutting an incision in the chorion, thus initiating the rent in the egg shell through which the nymph emerges. No interspecific differences in either the form or size of the egg burster were noted in those species of *Hexagenia* studied. This small egg burster, 45-48 microns in length, is a sclerotized portion of the pronymphal membrane or embryonic cuticle covering the dorsum of the head. It is located immediately anterior to the median ocellus of the mature embryo.

Just prior to emergence the embryo moves the head slowly backward and forward in an antero-posterior direction at intervals of approximately one second and at the same time forces the knife edge of the blade against the inner wall of the chorion. After a small slit is cut through one side of the egg shell near the cephalic end, further force exerted by the emerging nymph is evidently sufficient to rend an opening large enough for com-

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plete emergence. This opening extends across the rounded anterior end and along one side for about two thirds of the length of the egg. Little variation in the size of the fissure was observed. Hunt (1953) has presented some excellent microphotographs of hatched eggs of *H. limbata* which show the form and extent of this fissure. Simultaneously with hatching most of the pronymphal cuticle is shed within the chorion. However, that portion covering the head to which the egg burster is attached may usually be found outside of the shell near the edge of the opening because the head, being pushed out first, often carries the sloughed head cuticle along with it to the outside of the egg shell. Although numerous newly-hatched nymphs were examined, none was found with the egg burster still fastened to the head. All evidence indicates that it is always shed along with the rest of the embryonic cuticle at the time of hatching and therefore it is not found on first instar nymphs.

As seen from dorsal view (fig. 1A), the basal lateral portion of the egg burster is broadest near the posterior end. The razor-sharp knife edge is smooth throughout its entire length and bears no indication of serrations. This cutting edge is slightly curved when seen in lateral view (fig. 1B) so that it conforms closely to the curvature of the internal chorionic surface. Extending laterally in a bilaterally paired arrangement from the basal portion of the egg burster are irregularly spaced, prong-like projections that seem to function both for anchoring the egg burster to the non-sclerotized pronymphal membrane and for increasing the amount of surface area in order to hold the knife firmly in position during the cutting process. The largest and broadest pair of these lateral projections is found near the posterior end. Anteriorly the embryonic cuticle of the head is attached over the frontal process of the embryonic nymphs and blunt tubercles occur on that portion covering the edge of the frontal process.

#### REFERENCE

- HUNT, B. P. 1953. Bull. Inst. Fisheries Res. Mich. Dept. Conserv., No. 4, 151 pp.

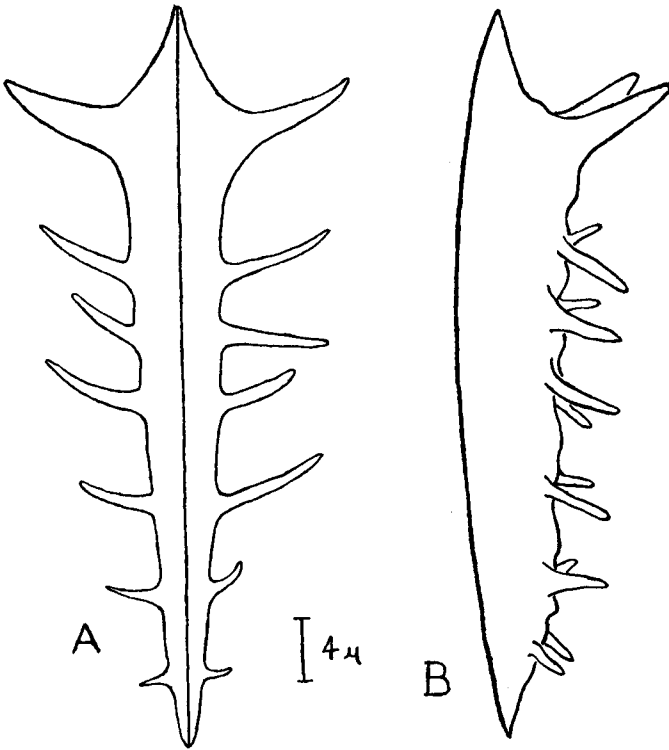


FIG. 1. Egg burster of mature *Hexagenia* embryo.  
A. Dorsal view. B. Left lateral view