

MATERIALS AND METHODS

THE BROOD SAMPLES.—The *E. burchelli* larvae studied were from the collections of colony samples of the American Museum of Natural History. These samples were collected and preserved by T. C. SCHNEIRLA and R. Z. BROWN on Barro Colorado Island, Canal Zone, Panama, during various field expeditions. The age of the larvae was initially designated upon the basis of specific characteristics noted in colony behavior at the time of collections. All larvae were fixed in Bouin's fixative or 95 per cent alcohol at the time of collection and then stored in 70 per cent alcohol containing two per cent glycerine.

Each day's sample consists of all individuals captured from an all-worker larval brood and preserved on a given day of the statary or nomadic phase. The samples were collected by a procedure intended to give the best obtainable representation of the polymorphic brood range. Because the bivouacs of *burchelli* colonies are at times unapproachable for the collection of any brood sample at all, or may be so situated in the bivouac that the collection of the brood sample is limited to one part of the polymorphic range, no colony in this study is represented by samples at regular intervals throughout development. Therefore, the broad interval from late embryonic to mature larval development had to be represented by samples from different colonies, and thus forms a 'synthetic series' of all-worker *burchelli* brood development. The samples studied, which collectively represent *burchelli* brood development were: '52 B-I, last statary day; '47 B-II, third, eighth and tenth nomadic days; '46 B-IV, fifth and seventh nomadic days; and '46 B-I, twelfth nomadic day. Additional studies of *burchelli* larvae were carried out on samples of '53 B-II, third nomadic day; '53 B-I, ninth nomadic day; and '46 B-I, last nomadic day.

Each colony number designates the particular colony on which detailed field observations of colony behavior were made by SCHNEIRLA (SCHNEIRLA, 1949, and SCHNEIRLA and BROWN, 1952). For example, '46 B-IV signifies the fourth *E. burchelli* colony studied in 1946.

Since at each successive time throughout the activity cycle of the terrestrial Ecitons, characteristic changes are noted in the developmental condition of the brood (SCHNEIRLA, 1934, 1944 b and 1953 a; SCHNEIRLA and BROWN, 1950), each further day's sample may be considered to represent an advance in development. This correspondence has been found to hold in all colonies. However, in the present study of the synthetic series assembled from different colonies for the study of all-worker brood development of *burchelli*, secondary variants appear which may modify, to a limited extent, the relationship of the 'phase-day' age to the developmental stage which would be expected in the brood of a single colony. These may be the results not only of limited inter-colony differences, but also of deviations in the intervals due to the impossibility of collecting the samples at the same time of day.

SELECTION OF SPECIMENS IN THE POLYMORPHIC RANGE.—The number of *burchelli* larvae in each day's sample varied from approximately 150 to 3,000-4,000, with the usual number about 300-400. To insure a study of the complete range of polymorphic larval forms present in each sample, eight of the largest specimens, eight of the smallest and 24 of sizes graded between the extremes were selected to represent each sample. A dissecting microscope was used in selecting specimens of the early developmental stages. Half of these larvae (four large, four small and twelve of graded sizes) thus taken from each day's sample were measured in detail and a study was made of their external and internal morphology. The remaining 20 were used for dissections and for whole mount preparations.

STUDY OF EXTERNAL AND INTERNAL MORPHOLOGY.—The *burchelli* larvae selected for study of their external morphology were examined under a dissection microscope and the following data were recorded: The shape of the larva and its state of preservation; the condition of the cuticle; the presence, quantity and distribution of cuticular hairs; the transparency of the cuticle; the presence and extent of development of the imaginal