polymorphism of the intercaste type in the social insects suggest that the caste of any individual is set during larval development and that nutrition and the attained size of the larvae at the time of pupation are its major determinants (WILSON, 1953 *a*, 1953 *b*). BRIAN (1951, 1952) from studies of caste determination in *Myrmica rubra*, finds results indicating that larval size at pupation, along with the size and state of development of the imaginal rudiments, particularly the leg discs, are critical to determination of queen or of worker castes.

In *E. burchelli* and *E. hamatum*, queens and workers occur in distinctively different broods as SCHNEIRLA and BROWN (1952) have reported. These investigators find indications of a differentiation established very early in development, apparently on a trophic basis. SCHNEIRLA considers it very probable that polymorphic differences in the all-worker broods may depend mainly, if not altogether, on graduated differences in trophic conditions affecting different parts of the brood series. These differences in trophic conditions could possibly depend upon differences in the order of the oöcyte maturation process, egg-laying and hatching of the eggs, and upon the time at which larval feeding begins. From field observations, he estimates that a queen of *Eciton burchelli* requires a period of about ten to twelve days to lay the more than 120,000 eggs of the distinctive all-worker broods of this species, with an intermediate peak of 3 to 4 days.

In the present studies of the larval stages of development in these all-worker broods, beyond relative differences in the overall size, size of the corresponding structures and relative differences in the time of appearance of these structures in the various members of the brood series, no evidence was found of qualitative differences in external or internal structures through the polymorphic range. However, throughout the larval series at any one time, the differences in size and volume of the larvae are consistent with what would be expected from the study of brood samples from the same brood at any earlier time. That is, in all cases, the largest larvae, presumably developed from eggs first laid and first hatched in the series, are the first to develop local structures such as the leg discs and functional organs such as the labial glands, and are the first to exhibit the respective changes of further growth in these structures. From these differences it may be concluded that the largest larvae reach each further growth stage upward to and including larval maturation, as well as

FIG. 14-19. — *Fig. 14.* Longitudinal section through abdomen showing intensely basophilic-staining cells of the glanular portion of the labial gland. L--larva, 10th N. D. Harris' haemotoxylin, eosin. X 265. *Fig. 15.* Longitudinal section through abdomen of L--larva, 10th N. D. Harris' haemotoxylin, eosin. X 55. *Fig. 16.* Transverse section through posterior region of head. I--larva, 3rd N. D. Iron alum haemotoxylin. X 265. *Fig. 17.* Longitudinal section through thorax. I--larva (near large), last Statary day. Harris' haemotoxylin, eosin. X 265. *Fig. 18.* Longitudinal section through prothorax. I--larva (near small), 5th N. D. Harris' haemotoxylin, eosin. X 265. *Fig. 19.* Longitudinal section through abdomen. I--larva (near large), last statary day. Harris' haemotoxylin, eosin. X 265.