

sternite of the ninth segment is a structure of considerable interest from the fact that in the higher orders it forms the hypandrium "9" (Fig. 3) or ventral plate extending below the genital apparatus of the male insect, and its form and development offer features of some value in classification.

Behind the ninth sternite, or hypandrium "9" (Figs. 4 and 5) of the Ephemera, there occurs a plate formed by the union of the "coxites" or styligers "a" and "a," which represent the basal segments of the gonopods or styli bearing the labels "b" and "c." The plate "a" and "a" of Fig. 4 is usually interpreted as the tenth sternite by students of the Ephemera (Morgan, Eaton, et al.); but Handlirsch, 1913, (Handb. der Entomologie) figures the terminal structures of a male ephemerid *Palingenia*, in which the styligers of "coxites" (i. e., the parts labeled "a" in Fig. 4) are separate and distinct, and Walker, 1919 (l. c.) also points out that these "coxites" or styligers may unite to form the plate "a" and "a" behind the ninth sternite in the Ephemera (Fig. 4). This interpretation is apparently the correct one, and has been adopted in the present discussion.

Between the styli or gonopods labeled "b" and "c" in Figs. 4 and 5 of the Ephemera, there occurs a pair of penisvalvæ "d," through which the ejaculatory ducts open. In some insects, the common opening of the united ducts is located at or near the base of the penis valves. It is quite possible that the penis valves "d" represent the endopodites (inner branches) of a pair of abdominal limbs whose exopodites (or outer branches) are represented by the styli or gonopods labeled "b" and "c" in Figs. 2, 3, 4, etc. If this be correct, both the penis valves and the gonopods would have to be regarded as belonging to the same segment (the ninth) since they are parts of a pair of limbs borne on one segment. This interpretation has a direct bearing on the view that the inner and the dorsal valvulæ of the ovipositor of the female also represent the endopodites and exopodites of a pair of abdominal limbs, since it is quite possible that the penis valves of the male insect are homologous with the inner valvulæ of the ovipositor of the female; and the gonopods or styli of the male are homologous with the dorsal valvulæ of the ovipositor of the female insect. The penis valves of the male and the inner valvulæ of the ovipositor of the female would represent endopodites, while the styli (or gonopods) of the male and the dorsal valvulæ of the ovipositor of the female would represent exopodites of a pair of abdominal limbs borne on the ninth segment in both cases, according to this view; but Wheeler, 1893, (Jour. Morphol., VIII, p. 1) maintains that the inner valvulæ of the ovipositor, for example, are in reality styli originally borne on the tenth sternite, and are only secondarily located on the ninth sternite as the result of their migration to their final position between the dorsal valvulæ (of the ovipositor) which are located on the ninth sternite. If this be correct, the inner valvulæ of the ovipositor (and their supposed homologues, the penis valves of the male) do not originate on the same segment with the dorsal valvulæ of the ovipositor (or their supposed homologues, the gonopods or styli of the male), and therefore cannot be regarded as the endopodites of a pair of limbs whose exopodites are represented by the dorsal valvulæ (since the two branches of a biramous limb cannot originate on separate segments).

Wheeler, 1893, (l. c.) would interpret the three pairs of valvulæ composing the ovipositor of a female insect, as three pairs of modified styliform appendages