tion. A marked drop was observed in the testosterone level at this stage (356 ± 147)[3]. Nuclear and cytoplasmic distortion was acute at subsequent intervals after the administration of Cd. These ultrastructural changes in Leydig cells paralleled with the further drop in the concentration of serum androgens (24 h: 354 ± 63; 48 h: 104 ± 27) reported by us earlier[3].

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Values in the parantheses are *pg* testosterone/ml Mean ± SE.

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THE STATUS OF CLYPEUS AND EPISTOMAL SULCUS IN THE ANT *CAMPONOTUS COMPRESSUS* FABR. (HYMENOPTERA: FORMICIDAE)

In most hymenopterans, the free lateral edges of the clypeus are reduced, and the epistomal sulcus is arched upward like an inverted U. The interpretation of the change in the course of the epistomal sulcus in hymenopterans has been a subject of much discussion[1-5]. The present studies on *Camponotus compressus* warrant a reappraisal of the interpretation of the disposition of the epistomal sulcus.

In *C. compressus* the morphology of clypeus is the same in all castes (queen, male and worker) except for minor differences in the proportionate size. For the sake of convenience and also because the formicidan classification is based on worker caste, the head of the same is being described.

The clypeus (Fig. 2) is a large quadrangular plate. The ventral part of the clypeus extends forward as a short transverse plate beyond the level of the anterior mandibular articulation. Dorsally it is joined with frons and dorso-laterally with genae, the boundary being demarcated by the so-called " epistomal sulcus ". The anterior tentorial pits lie in the lateral parts of the sulcus between the clypeus and genae. The point of union of the frontogenal sulci with the epistomal sulcus lies fairly high, almost at the level of dorsal margin of clypeus as is found in most other hymenopterans, but the anterior tentorial pits are located further below the level of their union.

There are two major views in regard to the status of the epistomal sulcus of hymenopterans. According to Snodgrass[1,2] the epistomal sulcus attains the inverted U-shape in hymenopterans by bending dorsally; it is thus merely the frontoclypeal sulcus in a changed position.

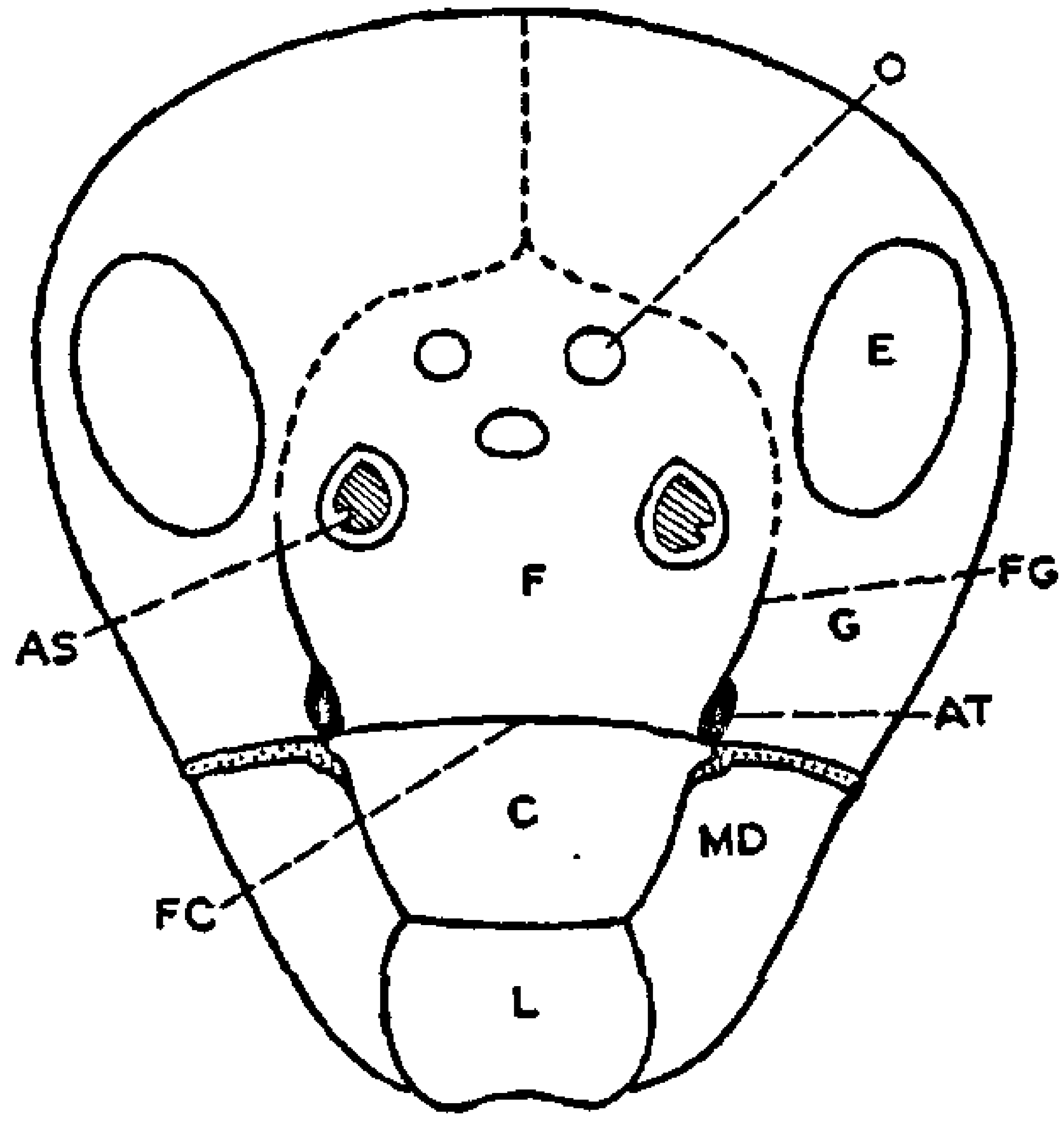

Fig. 1. Anterior view of the head capsule of primitive insect (from Snodgrass[1]).

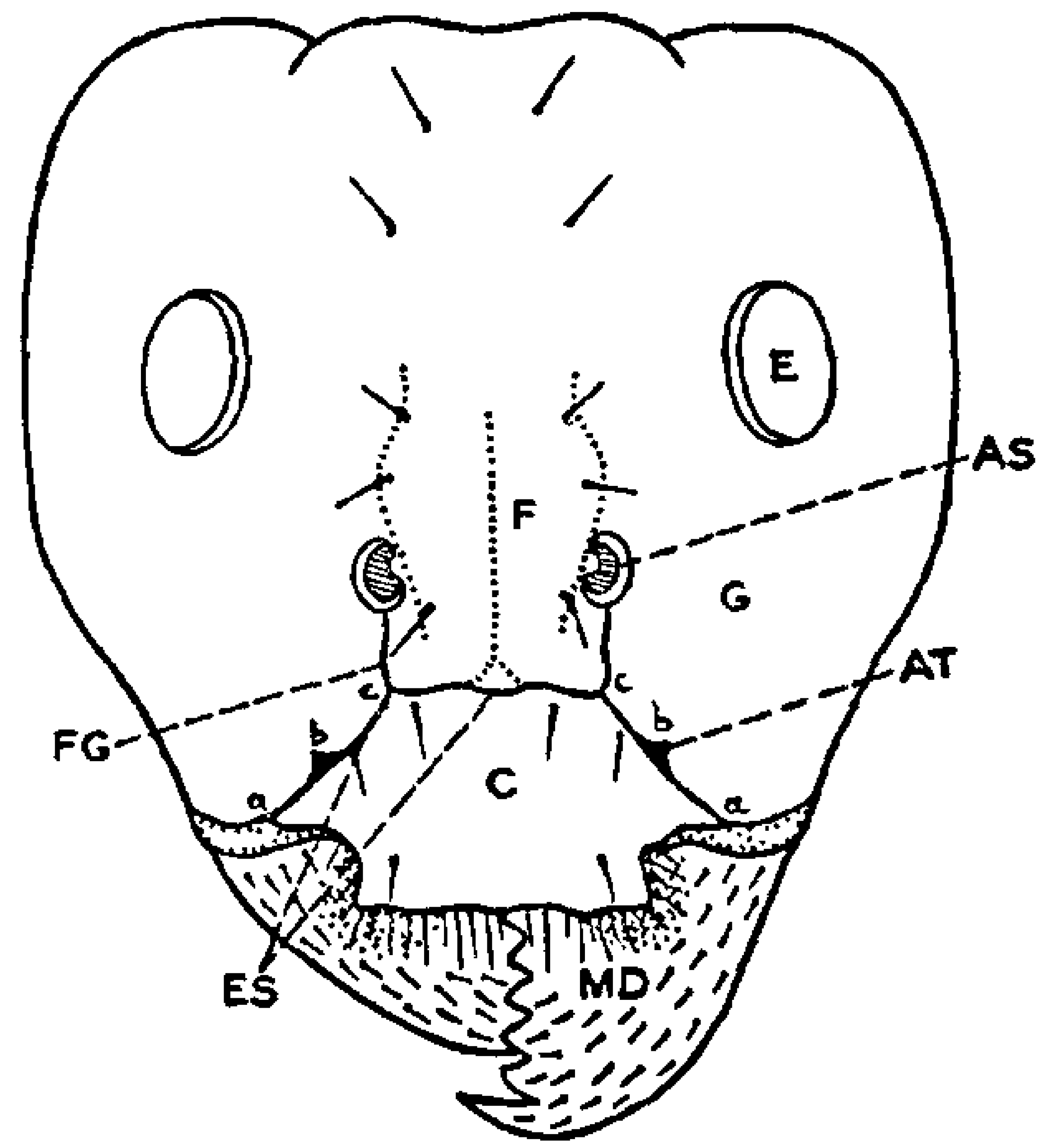

Fig. 2. Anterior view of the head capsule of *Camponotus compressus* Fabr.

The second view put forth by Duporte and Bigelow[3] contradicts Snodgrass's concept on the basis that the sulci in the head capsule have a strengthening function, and a change in the position of epistomal sulcus should not involve complex changes, such as (i) posterior migration of true mouth, (ii) change in the orientation of the tentorial arms with corresponding changes in the related internal structures of the head, and (iii) dorsal shift of the clypeal sclerite as a whole reducing the free portion of clypeus. If Snodgrass's[1,2] view of dorsal arching is accepted, all the stated concurrent modifications in other parts have to be considered. Thus, according to them such a disposition of the clypeus and epistomal sulcus is due to the ventral extension of the genae on either side of the clypeus, and the union of the mesal edges of the genae with the lateral edges of the clypeus (Fig. 3). As a result, a clypeo-genal sulcus is formed on either side between the gena and clypeus, extending from the anterior mandibular articulation to the anterior tentorial pit. The anterior tentorial pits remain in their original position at the points where the fronto-genal sulci meet the fronto-clypeal sulcus. Duporte and Bigelow[3] supported their argument on the basis that such a process involved only a continuation of the evolution of the pterygote head from the apterygote head, in the ventral extension of the genae and the fusion of these with the lateral edges of the primitive facial plate.

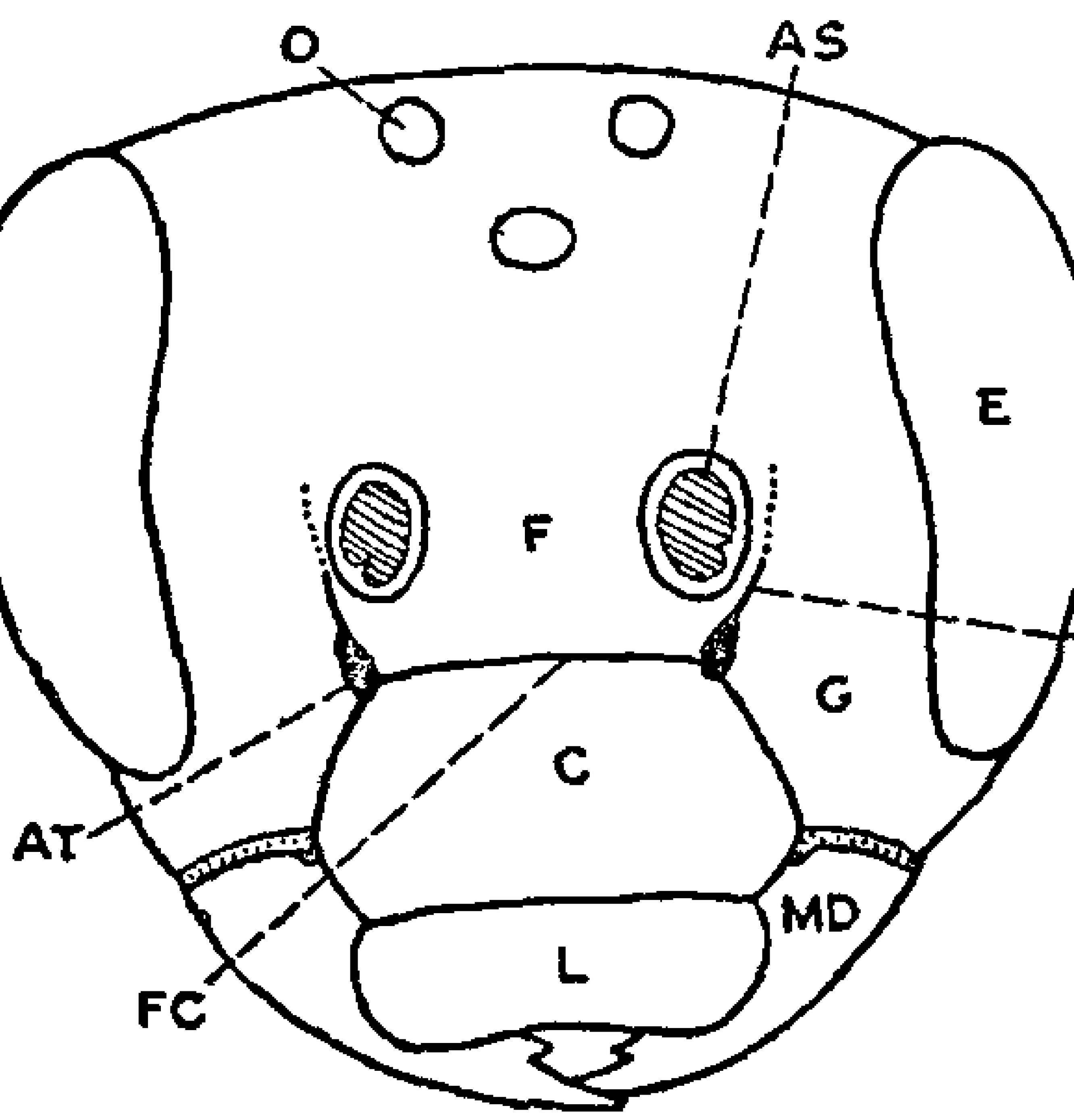

FIG. 3. Anterior view of the head capsule of a hymenopteran insect (from Duporte and Bigelow[3]). (AS, antennal socket; AT, anterior tentorial pit; C, clypeus; CG, clypeo-genal sulcus; E, eye; ES, epistomal sulcus; F, frons; FC, fronto-clypeal sulcus; FG, fronto-genal sulcus; G, gena; L, labrum; MD, mandible; O, ocellus.)

Although Duporte and Bigelow's[3] view is more recent as compared to that of Snodgrass[1,2], yet the enlargement of clypeus and the corresponding modifications in the epistomal sulcus in *C. compressus* cannot be solely assigned to the downward extension of genae as reported by the former authors. On studying the morphology of head of *C. compressus*, it is observed that the enlargement of clypeus is dorsal and ventrad of the anterior tentorial pits. This is obvious from the fact that the anterior tentorial pits lie in those parts of the epistomal sulcus located between the clypeus and the genae, well below the point of union of the frontogenal sulci with the epistomal sulcus (Fig. 2). The sulcus below the anterior tentorial pits (Fig. 2, *ab*) may be formed as a result of the downward extension of genae and thus correspond to the clypeo-genal suture[3], but the status of the sulcus between the anterior tentorial pits and the point of union of frontogenal and epistomal sulci (Fig. 2, *bc*) cannot be explained by Duporte's and Bigelow's[3] view, it can only be explained by Snodgrass's[1,2] concept. The latter is further supported by the fact that in *Camponotus*, the frontal ganglion is located sufficiently distal to the uppermost middle part of the epistomal sulcus, indicating that the true mouth has migrated dorsally.

From the foregoing arguments, it is evident that the inverted U-shape of epistomal sulcus and the corresponding enlargement of clypeus in *Camponotus* are of two-fold origin. First, there has been an upward arching of the sulcus and second, a ventral growth of the genae without any shift in the position of the anterior tentorial pits. The epistomal sulcus incorporates both the clypeogenal and the frontoclypeal inflections. Matsuda[6] pointed out that the proposed prolongation of the genal region takes place during the pupal stage and is correlated with the elongation of the maxillae and labium in many species of Hymenoptera.

The incorporation of the clypeus into the cranium is associated with the formation of tube-like cibarium by the fusion of the lateral edges of epipharyngeal and hypopharyngeal walls. A similar situation has been reported in coleopterans where Bitsch[7] and Parson[8,9] have termed such a closed cibarium as "prepharynx". The main advantage of such a modification in the clypeal area in ants is to provide space for the accommodation of the enlarged muscles of the cibarium, the latter being transformed into a sucking pump.

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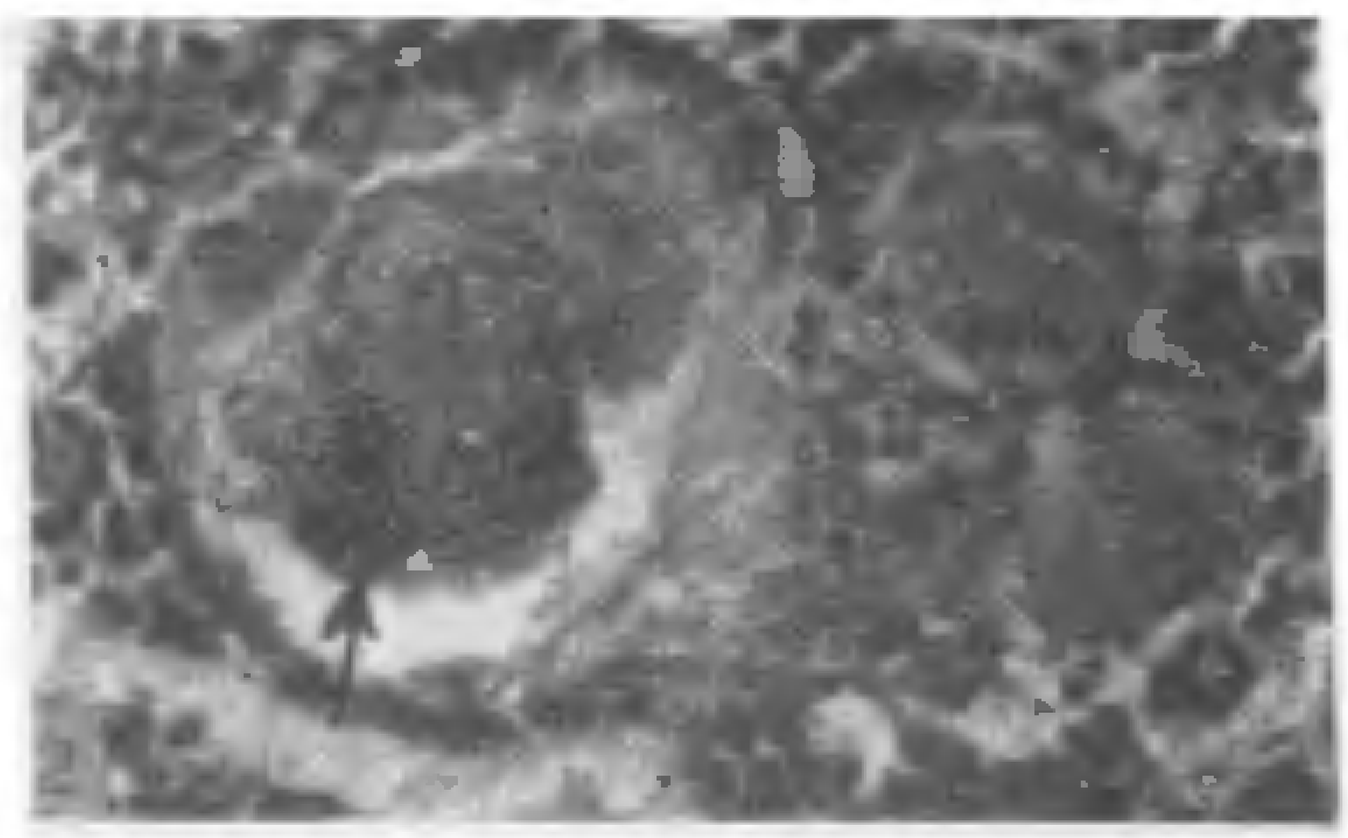
COLLOID CONCRETIONS IN THE PARS ANTERIOR OF THE PITUITARY OF *MEGADERMA LYRA LYRA* (GEOFFROY)

Megaderma lyra lyra is the Indian false vampire bat inhabiting old deserted houses. During our studies correlating the cytological picture of the anterior pituitary with the different phases of the reproductive cycle, colloid concretions were observed in the pars anterior adjacent with the hypophyseal cleft. Such concretions were observed in the specimens collected in the months of September and October. The incidence of colloid concretions in the pars anterior of human hypophyses has been reported[1,3,5]. The concretions were of varying sizes and each contained a PAS-positive and aniline blue positive homogeneous material. Such concretions had a distinct lining of low cuboidal cells and each containing a distinct nucleus. According to Rasmussen[2,3] and Romeis[4] there is a high incidence of colloid in rat and man, and the accumulation of colloid was considered by these authors as a pathological condition or a symptom of abnormality. Wolfe and Eaton[6] observed that the accumulation of colloid in the pars anterior is a manifestation of the advanced age. Further they noted that the colloid arises from the disintegration of some of the anterior lobe cells located in the centre of the alveoli. Although the nature, origin and significance of the colloid droplets are not known with certainty, their high incidence at advanced age is noted in many mammals[6]. The presence of concretions with a definite cuboidal cell lining appears to be a feature observed only in two male specimens of *Megaderma lyra lyra* collected in the months of September and October, *i.e.*, just prior to the onset of the breeding season in this species. Reports regarding correlation of colloid with sex cycle are not available in Chiroptera.



FIGS. 1–2. Fig. 1. Part of the sagittal section of the pituitary of *Megaderma lyra lyra* with neural lobe, pars intermedia, and pars anterior. Note the presence of colloid filled vesicles (arrow) in the pars anterior. The specimen was collected in September, *i.e.*, just before the onset of the breeding season. × 60 (H.E.). Fig. 2. Part of the figure magnified to show colloid filled vesicles. Note the presence of a distinct cuboidal lining with darkly staining nuclei and nearly completely filled homogeneous mass. × 360 (H.E.).

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