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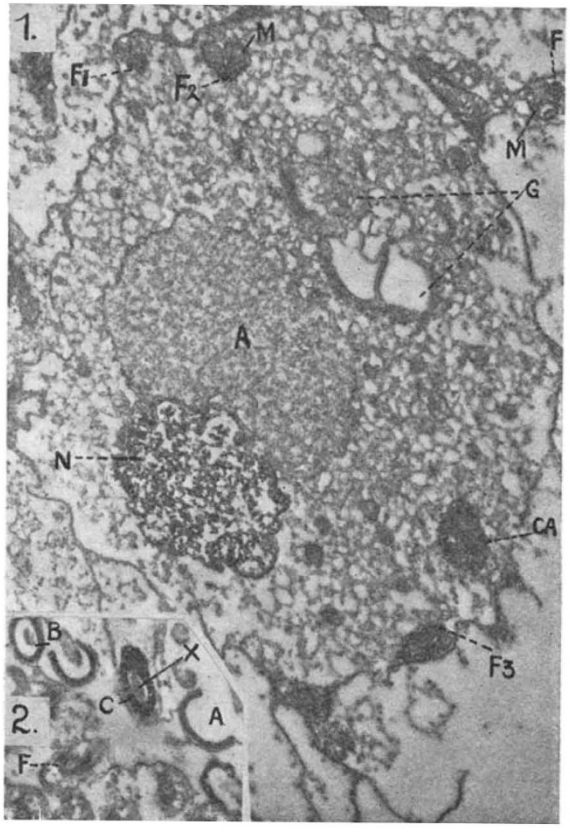
[1] Sharman, G. B., *Aust. J. Zool.*, **3**, 56 (1955).

Electron Microscopy of Thysanuran Spermiogenesis

In a recent discussion[1,2] on the position of the acrosome and centriole in the thysanuran spermatozoon, the necessity for electron microscopy was stressed. In Fig. 1, the Golgi body (acroblast; *G*) is lying to one side of the very large acrosome (*A*). Below is the nucleus (*N*). The flagellum has grown out inside the cell and is cut across in three places (*F*1–3). On the right is a constantly occurring body (*CA*), which at present is considered to be a centriole adjunct, as in other micrographs it is found near the centriole. Cross-sections of the ripe or nearly ripe sperms are shown in Fig. 2. The anteriorly situated acrosome has become a scoop-shaped body (*A*), which passes back to form a tube (*B*), which joins the nucleus (*C*), which passes back to join the flagellum (*F*). No adnuclear thread or flagellum is found on the tubular nucleus, but there is an intra-nuclear body (*X*), which projects up into the funnel of the acrosome. This is probably what is seen with the light microscope in the form of an intra-nuclear flagellum. This body, however, does not possess the flagellar ultrastructures.



Figs. 1 and 2

A fuller account of this spermiogenesis, and that of *Lepisma*, will be published elsewhere. I thank M. Jean André of the Electron Microscopy Department of the Institut de Recherches sur le Cancer, Villejuif (Seine), for taking the micrographs.

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[1] Nath, V., Gupta, B. L., and Mittal, L. C., *Nature*, **186**, 899 (1960).
[2] Gatenby, J. B., and Mathur, R. S., *Nature*, **186**, 900 (1960).

Influence of Amino Triazole on the Chloroplast Pigments of Wheat Seedlings

3-Amino-1,2,4-triazole is a chemical which has several effects on higher plants. It is a growth inhibitor, and has been used on cotton plants as a defoliant[1]. Hall *et al.* demonstrated that tissues formed subsequent to application of this chemical have a decreased chlorophyll content, while the chlorophyll-level of already mature tissues is unaffected. It was not entirely clear to these investigators whether the observed effect of amino triazole on chlorophyll content is due to chlorophyll destruction or to interference with chlorophyll synthesis. The structural similarity of the triazole ring to the pyrrole rings of chlorophyll prompted the suggestion that amino triazole brings about a block in chlorophyll synthesis prior to the protochlorophyll stage by a competitive inhibitory mechanism[1]. This concept was somewhat strengthened when it was found that levels of catalase, which has a similar structure, were also decreased in both plants and animals by treatment with amino triazole[2,3].

Experiments with *Elodea canadensis* further served to localize the effect of amino triazole as influencing chlorophyll synthesis rather than chlorophyll destruction, but microscopic observations clearly indicated interference with plastid development[4]. This suggested the possibility that the influence of amino triazole on chlorophyll content might be secondary to an effect on the development of the plastid as a whole. According to Pyfrom *et al.*[3], "a small amount of amino triazole interferes with the plastids during leaf formation or differentiation, and chlorophyll *as well as other plastid pigments* are always low in these leaves".

In an effort to secure further insight into this situation, wheat grains were germinated and seedlings were grown in Petri dishes containing filter paper, moistened with water or with various concentrations of amino triazole. The conditions of growth were identical with those described by Haber and Luippold[5] with 400–500 ft.-candles of white light during a 16-hr. day. Analyses for chlorophyll *a*, chlorophyll *b*, and total carotenoids were performed according to the technique of Röbbelen[6]. After preliminary trials with various concentrations of amino triazole, a concentration of 10^{-4} *M* was selected, which permitted about 70 per cent of normal growth during a 12-day period, yet reduced the chlorophyll content to a value approximating 5 per cent of normal.

Wheat seedlings were germinated in darkness, in either 10^{-4} *M* amino triazole or in water. After 6 days, the etiolated seedlings were placed under a light source of the type described by Withrow and