field. We have obtained mature seed from winter wheat 100 days after planting by growing the plants in an 8-hour day and at 50° and 60° F. during the first 54 days of growth, followed by days ranging from 17½ to 18½ hours in length and temperatures fluctuating above and below 70° F. On this basis two, and under ideal conditions, three successive crops may be grown in 12 months. This is a distinct advantage in connection with genetic, physiological and pathological studies. Conditions favoring early heading and maturity, however, do not necessarily favor high yields of grain.

The plant culture chambers in which the tests were conducted were glazed with Libbey Owens flat-drawn single strength window glass. The chambers were located out of doors. They will be described more fully in another paper.

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## THE CYTOLOGY OF CILIA FORMATION IN THE SWARM-SPORES OF MYXOMYCETES

THE swarm-spores of the myxomycetes have been studied in some detail by Jahn.[1] In this study the cilium is shown to develop directly from the centrosome. Wilson and Cadman[2] have referred to this body as the centroblepharoplast. During the mitosis immediately preceding the formation of swarm-spores, the poles of the spindle are occupied by centrosomes which give rise directly to the cilia of the resulting swarm-spores. As pointed out by Jahn, the time is very brief between the initiation of cilia-formation during the last phases of the division of the mother cell and the development of the cilium of each daughter cell. It is then apparent that, in order to be able to kill and fix favorable material for the study of all stages in this very rapid process of cilia-formation, it is necessary to be able to control accurately the stimuli which initiate this process and the conditions which make its completion possible. When this is accomplished, one may kill spores and prepare them for study at any stage of development desired. The methods which the writer[3] has used in his studies of the zoospores of various species of the lower fungi have been found to be applicable to the study of the swarm-spores of the myxomycetes.

In the study of *Reticularia lycoperdon* Bull. the writer has found that the cilia-forming organ in the swarm-spore is composed of several granules, instead of a single centrosome granule as described by Jahn. The basal apparatus is similar in many respects to those of the uniciliate spores of the species of Blastocladia and of Allomyces described by the writer (*loc. cit.*). There are, however, several very significant differences. The first phase when the basal granule or granules, as the case may be, tend to migrate away from the nucleus or its pole seems to take place more rapidly in the case of the developing cilium of *Reticularia lycoperdon* than in the uniciliate spores of species of Blastocladia and Allomyces. As the cilium matures these granules migrate back toward the nucleus in both cases, but in the case of the myxomycete swarm-spore they move quickly and completely back to the pole of the nucleus. In the uniciliate spores of the species of fungi studied the basal granule (blepharoplast) usually remains at the base of the cilium. This complex of granules, which appears as a single large granule at the base of the cilium of the mature myxomycete swarm-spore, is then of considerably more importance than a simple centrosome in the sense of Jahn's description. This structure may even be comparable to the entire basal apparatus of the uniciliate spores of species of Blastocladia and Allomyces.

A more detailed account of the physiology and cytology of the active stages of the swarm-spores of this and several other species of Myxomycetes will appear in a botanical periodical at an early date.

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[1] "Kerntielung und Geisselbildung bei den Schwärmern von *Stemomtis flaccida* Lister," *Ber. Deutsch. Bot. Gesellsch.*, 22: 84–92, 1904.

[2] M. Wilson and E. G. Cadman. "The Life History and Cytology of *Reticularia lycoperdon* Bull.," *Trans. Roy. Soc. Edinburgh*, 55: 555–608, 1928.

[3] "A Cytological Study of the Zoospores of the Genus Blastocladia," *Bot. Gaz.* (in press); "The Development of the Zoospores in the Oomycetes and the Cytology of their Active Stages," *Am. Jour. Bot.* (in press).

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