The Influence of Certain Environic Factors on the Development of Fern Prothallia.

David M. Mottier.

[Abstract.]

Spores of the following ferns were used in the experiments: Onoclea struthiopteris (L.) Hoffm. Dryopteris stipularis (Willd) Maxon and "Nephrodium molle."

Prothallia of O. struthiopteris which had developed numerous antheridia, but which were much too small to bear archegonia, were transplanted to separate dishes and allowed to grow under favorable conditions. Some of these developed into large prothallia and bore archegonia. The fact that female prothallia of this fern, if kept growing for some time without the fertilization of any of the egg-cells, may develop antheridia, has already been recorded in an earlier publication (Mottier, Bot. Gaz., 50: 209-213, 1910).

Spores of all of the above named species were found to germinate poorly, or not at all, if the cultures were kept in direct sunlight in the greenhouse from the time of sowing. In cultures in which prothallia developed, nearly all plants were small and bore only antheridia, a very few only becoming large enough to produce archegonia.

Three cultures, A, B, and C, of Onocles struthiopteris were sown April 9, 1911. They were placed in a position to receive direct sunlight, but during the brighter hours of the day cheese cloth was placed over the bell jars under which the cultures were kept, to diminish somewhat the intensity of illumination. On April 30 all three cultures seemed to have made a favorable beginning, the majority of the prothallia being heart-shaped but not large enough to bear archegonia. A and B were now placed in a position in the greenhouse to receive good diffused light, but no direct sunlight save for only a short time in the early morning. Culture C was left in the original position of direct sunlight except the protection given by the cheese cloth from about 9:30 a. m. to 3:00 p. m. during days of bright sun. A and B developed into fine cultures, while in C nearly all plants remained small, bearing antheridia only.

All cultures were grown in earthern saucers upon earth which had been previously sterilized in a steam sterilizer. They were watered by means of sub-irrigation.