# S T U D I E S  O F  C E R T A I N  L I L I A C E O U S  P I S T I L S,

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By

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CONTENTS.

# STUDIES OF CERTAIN LILIACEOUS PISTILS.

## INTRODUCTION.

The pistils of the lilies are in general alike. However there exist among them certain differences of which two are in regard to the formation of the partition walls of the ovary and the development of the ovules. It is the prevailing opinion among botanists that the margins of the carpels in the Liliaceae infold to form the partition walls of the ovary and to produce the ovules. This is true of some lilies, but it is the purpose of this paper to show that it is not true of all lilies. In the investigations here recorded it has been found that certain lilies develop the partition walls of their ovaries, also their ovules, from the middle portion of their carpels. In this type of ovule-production the midribs of the carpels become thicker, push in to the central axis of the ovary, unite and produce the ovules.

Grateful acknowledgment is here made to Professor Doctor Frederic E. Clements who suggested the idea first that certain lilies might be developing their ovules from the midribs of their megasporophylls and at whose suggestion I began the investigation of this problem; to Professor Doctor Charles E. Bessey, under whose direction the work has been done, for suggestions, criticisms and encouragement; to Professor Doctor E. Mead Wilcox and his laboratory assistant, Miss Venus W. Pool, for suggestions and assistance in making the photomicrographs herein contained.

## METHODS.

COLLECTING.- Altogether I have made 134 collections of flower buds representing 83 species. These species belong to various families ranging from the Ranunculaceae to the Compositae. Of the 134 collections 39 were lilies or lily-like plants, and of the 83 species 21 were liliaceous plants. I have collected from wild plants as far as they have been available. I have grown some in the greenhouse, others in my garden, and still others were secured from florists.

The greatest difficulty I found in collecting was to get the buds young enough. This made it necessary in some cases to make a number of collections of the same species, which has retarded the progress of the work very materially. Even now in many cases I have been unable to get buds at the right stage to show conclusively the origin of their ovules. It is for this reason that I am submitting only the results of my studies of certain liliaceous plants in this paper.

KILLING.- All of the material was killed with Flemming's Solution. I got the best results by killing from 6 to 10 hours, varying with the size of the buds. Small buds were killed whole, larger ones were pierced with a fine needle or cut into blocks; the largest ones had their petals and sepals removed, the pistil cut into blocks or pierced at a number of places to allow uniform killing in all their parts. After killing, the material was washed

in water for the same length of time that it had been in the killing solution. Then it was transferred to 15 % alcohol and run up to 55 % alcohol where it was kept until it was to be worked.

IMBEDDING.- The material was taken from the 55 % alcohol and run up thru various grades of alcohol to 100 %, leaving it from 30 minutes to one or two hours in each grade. In like manner it was then run up thru 20 %, 40 %, 60 %, 80 % and 100 % Bergamot oil for clearing purposes. To the last solution was added soft paraffin and the small petri dishes were placed on top or in the paraffin bath. More soft paraffin was added from time to time, and each time that some was added part of the Bergamot oil and melted paraffin was drained off. By this procedure I was able to infiltrate the material with the paraffin and at the same time eliminate the Bergamot oil. When this was done the material was ready to be imbedded. This was accomplished by adding harder paraffin until a mixture was reached that would melt at about 50°C. Best results were had when the bath stood constantly at 56°C. The time required for infiltrating and imbedding varied with the size and texture of the pistils, from 6 to 24 hours for each, altho I have had good results in less time. However, I have infiltrated a lily pistil for six days in the bath without injury. The most important thing was to keep the temperature of the bath from rising too high. Upon removing the material from the bath if two or more pieces were in the same dish they were segregated and the