

concerted action of numerous individuals." During the nutritive stage, the rods lie separate. Through some contagious impulse they concentrate toward central points, piling up on one another, and gradually change into spores.

As is cautiously suggested, "the resemblance (to the *Acrasieæ*) might be purely accidental," yet the general character of the corresponding periods is practically identical, except for cell differences of the organisms concerned.

If we assume that the pseudoplasmodium of the *Myxobacteriaceæ* indicates a genetic connection with that of the *Acrasieæ*, then the *Mycetozoa* have affinities with higher plants through the *Bacteria*, which are evidently derived forms of the fission-algæ. At any rate, as suggested by Thaxter, "caution is necessary in accepting the views of those who would unceremoniously relegate the *Mycetozoa* to the domain of pure zoölogy."

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#### MORPHOLOGICAL CHARACTERS OF THE SCALES OF CUSCUTA.

BY ALIDA M. CUNNINGHAM.

The work undertaken and the line of thought pursued throughout has been that of making a revision of the family *Cuscutaceæ* of North America. This work was commenced at the beginning of the present university year and has been pursued since that time with the assistance of Dr. Stanley Coulter of Purdue University. The only complete work on this family which has been given to the public is that of Dr. Engelmann, published in 1859. Since that time a few new species have been added to those named in his work, and some of these have been classified by Dr. Engelmann himself. Like all works of any magnitude, the original is imperfect and incomplete.

This family is one presenting much difficulty, because there are so few characters which can be used in determination and many of the flowers are so minute as to necessitate the constant use of the microscope in examination. For this reason much classification has been done in the past by mere comparison of the unnamed specimens with the named ones. After a study of these plants we are convinced that such a classification is misleading and extremely inaccurate. Again, the plants have such a range of variation, yet merge into each other so closely in some of their

parts that it is only by the utmost care and closest scrutiny that they may be determined, and a dissection of the flower is invariably necessary. Many of the species have also a great similarity in habit of growth and the arrangement of the inflorescence, which is confusing and liable to mislead one who attempts a mere comparison.

The sketch here presented does not cover the subject originally undertaken, but is merely one of the many interesting features in this family of plants. This study of the scales of *Cuscuta* was suggested in the course of the study by reason of the fact that the observations made thus far do not, in many respects, coincide with the statements made by Dr. Engelmann in his work. He describes the scales as being epistamineal and that they are evidently lateral dilatations of the lower part of the filaments, or a sort of stamineal crown attached at the base of the corolla, but not a duplication of the corolla.

In the study of this subject we have made constant use of the microscope, making sections of flowers in various directions, and are forced to conclusions quite different from those of Dr. Engelmann. In the course of the work it was noticed that in some species the filament of the stamen extends under the apex of the scale, in others the base of the filament is above the apex of the scale, and in still others the filament can be traced nearly to the base of the corolla, while the scale forms two lateral wings, one on each side of the filament. For this work specimens from each of the three groups were examined. Longitudinal sections were made through the corolla, with its attached stamen and scale, and a careful study showed that the scales have their origin from the corolla. The stamens also originate from the corolla, but at a different level from the scale, so that they cannot possibly be attached to each other. However, in the third section a few species showed some connection between the scale and the filament; but while there may have been a slight attachment of these parts in individual specimens, yet the examination of other sections fully demonstrated the fact that the origin of the scale is unquestionably from the corolla, and the base of the stamen is slightly above that of the scale.

The results of these examinations, so far as made, confirm us in the belief that the scales are not epistamineal, and do not form a stamineal crown, but are petaloid in their origin and are in the nature of a duplication of the petals.