

“On the Histology of *Uredo dispersa*, Erikss., and the ‘Mycoplasm’ Hypothesis.” By H. MARSHALL WARD, Sc.D., F.R.S., Professor of Botany in the University of Cambridge. Received February 13,—Read March 12, 1903.

(Abstract.)

The paper deals with a detailed study of the histological features of the germination, infection, and growth of the mycelium of the *Uredo* in the tissue of grasses. Primarily, the figures refer especially to the *Uredo* of *Puccinia dispersa* in the tissues of *Bromus secalinus*, but comparisons are made with the behaviour of this and other Uredineæ—e.g., *Puccinia glumarum* and *P. graminis*—in the tissues of other grasses and cereals.

The research, which has been carried on over a year and a half and has involved the preparation and microscopic examination of thousands of sections, is principally based on the application of improved hardening and staining methods to preparations from tube cultures of the grasses concerned, the leaves of which were infected at definite spots. These tube-cultures were prepared according to the method previously described.* At definite intervals after sowing the spores—e.g., after 1, 2, to 6 and 8 days—the infected areas were removed and placed in fixing solutions, and the life-history of the fungus traced step by step, and controlled by reference to uninfected areas.

The full paper is illustrated by numerous figures, and deals with the behaviour of the nuclei, vacuoles, septa, branches, haustoria, and other details of the hyphæ up to the commencement of spore-formation.

The relations of the hyphæ and haustoria to the cell-contents of the host are critically examined, and the cumulative evidence not only fails to support Eriksson’s *Mycoplasm* hypothesis; but is completely subversive of it, so far as histological facts are concerned.

Eriksson’s hypothesis, which refers the epidemic outbreaks of rust to the sudden transformation into the mycelial form of a supposed infective substance, previously latent and invisible in the cytoplasm of the host, is shown to be untenable because the *corpuscules spéciaux* of this author are proved to be the cut-off haustoria of the fungus.

Eriksson supposes that these *corpuscules* (haustoria) are formed by the hitherto latent germs in the host-cells, growing up in the cells into vesicles, which then pierce the cell-walls and give rise to hyphæ in the intercellular spaces.

The present paper shows that Eriksson has entirely reversed the

* “On Pure Cultures of a Uredine, *Puccinia dispersa* (Erikss.)” ‘Roy. Soc. Proc.’ 1902, vol. 69, p. 461.

true order of events. The haustoria have been formed by the hyphæ, and figures are given showing every stage in their development. The first haustorium may be formed by the infecting tube immediately after its penetration through the stoma, and figures are given showing the remains of the germ-tube outside a stoma, the swelling of its tip over the stoma into an appressorium, the passage through the stomatal cavity, and its development into a vesicular swelling whence the true infection tube arises, which latter may at once put forth a haustorium. In some cases all these latter phenomena are visible in one and the same preparation.

The author expresses his thanks to Miss E. Dale, of Girton College, for valuable aid during the later stages of the work, in the embedding and cutting of numerous sections.

“The Œstrous Cycle and the Formation of the Corpus Luteum in the Sheep.” By FRANCIS H. A. MARSHALL, B.A. Communicated by Professor J. C. EWART, F.R.S. Received February 17,—Read March 12, 1903.

(Abstract.)

Introduction.—A preliminary account of this investigation was communicated to the Royal Society in 1901, and published in the PROCEEDINGS for that year. Subsequently the work has been carried further, and recently brought to a conclusion.

The Œstrous Cycle.—In Scotch black-faced sheep the length of the sexual season is shown to vary with the locality, both in regard to the number of diœstrous cycles in a season, and to the duration of each cycle. It is shown further that there is a perfect gradation between the monœstrous condition of some wild sheep to the extreme polyœstrum of certain Merinos.

Superficial Phenomena of Proœstrum and Œstrus.—The proœstrum is marked by a mucous or sanguineo-mucous flow. It is very rapidly succeeded by œstrus (the period of desire), the two periods frequently seeming to occur simultaneously, but this is because of the abbreviation of the process.

The Histology of the Uterus during the Diœstrous Cycle.—The changes through which the sheep's uterus passes during a single diœstrous cycle can be divided into four groups or periods, as follows:—
 (1) Period of rest; (2) Period of growth and increase of vessels; (3) Period of breaking down of vessels and extravasation of blood; (4) Period of recuperation and pigment formation. Bleeding into the uterine cavity and at the external genital aperture does not always