common in clear and dry hot years; but when spring is wet, the finest fields of wheat run great hazard of being destroyed by the mildew, which generally appears upon the breaking out of the sun in the morning, after close and sultry weather, during which there has not been any dew."

M. Tillet ascribes mildew to a sharpness in the air in dry cloudy weather, which breaks the vascular tissue of the sterns and leaves, and makes them discharge a thick oily juice of such a natu. - as to be changed by heat into a rusty powder.

Other writers of the last century supposed it to be a thick clammy vapour which settled npon the stems C the grain and so stopping the pores as to prevent perspiration, and impeding the circulation of the sap. A modern writer, Mr. R. Somerville, in a communication to the Board of Agriculture, ascribes mildew to the attacks of insects introduced with the manuro; these insects however are found to be minute *acari*, which are almost always found upon decaying vegetable matter, and which in the case of mildew is the follower and not the cause of the disease.

The true origin of the Mildew has been found to be due to the regular parasitio growth of the Puccinia graminis, a fungous plant, belonging to the hypodermii division of the eutophyti class of coniomycetes. The name Puccinia, is derived from a Greek work which signifies "closely" or "thickly," and alludes to the crowded manner in which the minute fungi are packed in the tufts and patches in which they grow. When a stem of wheat begins to be mildewed, a number of dark coloured spots will be seen under the epidermis, some of an orange hue, and others of a dark brown tinge; in a short time the outer cuticle is ruptured, and through the openings are protruded dark clusters of spores, amassed in dense, diffuse tufts, often confluent or running into one another, so as to form long parallel lines, and commonly possessing at first a brownish



PUCCINIA GRAMINIS [Common Mildew.]

yellow colour, and changing afterwards to black. The spores or seed vessels generally grow immediately beneath the stomata, (or openings of the porcs,) of the stems, and after they burst through the epidermis, they appear, under the microscope, like dense masses of pear shaped bodies, all distinct from one another, exhibiting diversities of form and outline, and each resting on a stalk into which it gradually tapers. Two compartments or chambers exist in every spore, and are filed with sporules, or the puff-like and surpassingly minute rudiments of another race of fungi. So wonderfully small are not only the sporules but the spores, that in the opinion of Sir Joseph Banks, from 20 to 40 spores may germinate in the hollow beneath any single stoma, (or mouth of a pore); while the stoma itself cannot possibly be detected by the naked eye, and requires to be seen through a good microscope.

. The ribbed appearance presented by a stem of wheat when seen through a common magnifying glass, is caused by alternate longitudinal partitions of the epidermis or rind, the one set raised and imperforate, and the other set depressed

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