

later in autumn the experiments were carried out the more the reducing power was diminishing. In November the reducing power has become very small but, at all times, the cambium showed the highest activity.

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Developmental Forms of the Virus of Lymphogranuloma Inguinale (Climatic Bubo)

It is now generally agreed that in lesions produced by the virus of lymphogranuloma inguinale (climatic bubo) there can be seen small elementary granules which by staining and by differential filtration appear to be 100–175 μ in size. These granules almost certainly represent the etiologic agent of the disease. In smears from infected mouse brains these granules may occur (1) diffusely scattered outside the cell, in the form of colony-like masses; (2) within the cell cytoplasm, when they may be surrounded by a definite membrane; or (3) closely adherent to ruptured cells. The granules are stained blue by Castaneda's stain, blue with Victoria B, and reddish-violet by Giemsa's method.

In addition to the small forms, though less numerous, we have been able to find, in lesions produced by three strains of the virus, large bodies three to four times the size of the small forms. These large forms are present especially in very early lesions, and are somewhat irregular in shape, often suggesting division by fission: intermediate bodies between the large and small forms also occur. Very occasionally small masses of large forms only are seen occurring in plaques; more commonly collections of small granules are found containing a few large forms.

The evidence at present available suggests that the small granules are derived by division from the large forms. These large forms stain a bluish-violet by Giemsa and a reddish-purple by Castaneda's method. The various forms of the virus of lymphogranuloma inguinale present many analogies to those exhibited by the causal agent of psittacosis.

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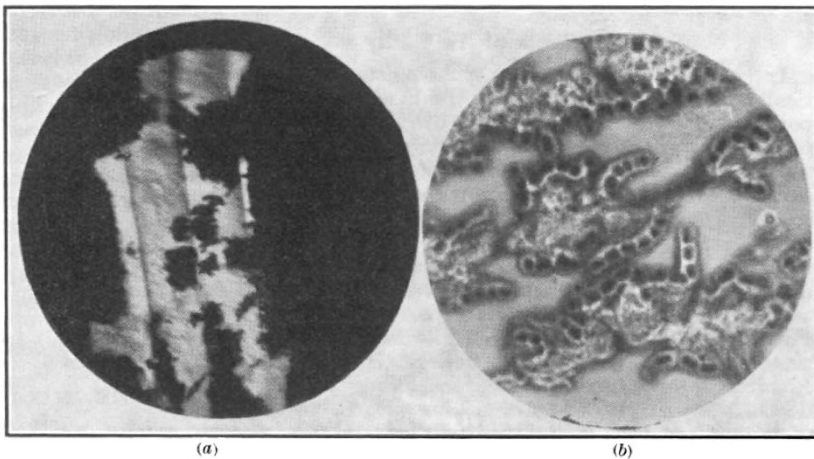
Wellcome Bureau of Scientific Research,
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Disintegration of Cell-Wall Substances in the Gastro-Intestinal Tract of Herbivora

THE process of cellulose digestion in herbivora, in addition to its economic importance, throws considerable light on a number of cognate biological

topics. Biochemical aspects of the problem have received considerable attention. Pure cultural investigations have been attempted though it is questionable whether the species isolated *in vitro* are those primarily concerned with the process taking place *in vivo*. It is therefore remarkable that so few attempts have been made to study the changes occurring *in situ* by direct microscopical observation. This method has been successfully applied by us to material derived from the cæcum of non-ruminant herbivora.

Disintegration is evidenced by the formation of clearly defined zones of erosion termed *lacunæ*. In the affected regions loss of double refraction corresponds precisely to changes in microchemical and staining reactions. Stages in micellar disorganization are indicated by diminution or loss of dichroic intensification. Pectic substances are dissolved (ruthenium red). Cutin entirely resists attack (Sudan III). Heavily lignified structures are immune. By the use of appropriate reagents and stains, the cytostatic micro-organism can be demonstrated in the interior of *lacunæ*.



PLANT STRUCTURES FROM CÆCUM OF THE HORSE.

- (a) Epidermal tissue. Polarized light. Crossed nicols. Localized disappearance of double-refraction in the zones of erosion or *lacunæ* (black). $\times 400$ approx.
(b) Stained Congo-red and iodine. *Lacunæ* situated in pink substratum which shows dichroic intensification with a single nicol (Ambronn effect). At the edges of the *lacunæ* the cytostatic micro-organisms can be seen (blue, with iodine). The staining at the margins of the *lacunæ* is intensified. $\times 1,200$ approx.

The above methods when applied to material from the cæcum of the guinea pig^{2,4}, rabbit³ and horse (in the press) yield strictly comparable results. The cytostatic micro-organisms include vibronic, coccoid and giant forms^{2,4}. It appears that they are stages in the life-cycle of some polyphasic species. The coccoid and giant forms give a blue (amylo-dextrin) reaction with iodine. Their shapes correspond with precision to the contours of the excised *lacunæ*.

These investigations have recently been extended to the stomach of ruminant herbivora. In the sheep, disintegration of the optically birefringent substances of the wall has been demonstrated by the application of the methods outlined. The primary agents are iodophile micro-organisms very similar to those observed in the cæcum of the species mentioned. To the indigenous protozoa of the paunch only a subordinate role can be assigned. The size of the plant fragments originally present is such as absolutely to