that, while changes in water-content occur in all the tissues studied (the changes being especially pronounced in the skin), their character and time-relations are not the same as those which occur after œstrogenic stimulation.

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[1] Krohn, P. L., and Zuckerman, S., *J. Physiol.*, **88**, 369 (1937).
[2] Fisher, R. B., and Zuckerman, S., *J. Physiol.*, **89**, 15P. (*Proc.*, Dec. 12, 1936).
[3] Guthkelch, A. N., and Zuckerman, S., *J. Physiol.*, **91**, 269 (1937).
[4] Clarke, R. W., *Amer. J. Physiol.*, **123**, 39 (1938).
[5] Thorne, G. W., and Engel, L. L., *J. Exp. Med.*, **68**, 299 (1938).
[6] Astwood, E. B., *Endocrinology*, **23**, 25 (1938).
[7] Donaldson, H. H., "The Rat" (Philadelphia, 1924).
[8] Zuckerman, S., *J. Physiol.*, **94**, 3P. (1938).

A Humoral Transmission of Muscular Contraction in the Presence of Veratrine

THE hind limbs of a Hungarian frog are perfused with veratrine 1/50,000 in Ringer's solution. The liquid collected from the vein perfuses a second, similar Trendelenburg's preparation. Direct tetanic stimulation of the hind limbs of the first frog is followed, after a latent period of about 10 minutes, by an irregular contraction of the perfused muscles of the second frog. It is thus possible to demonstrate a humoral transmission of the contraction in the presence of veratrine.

This effect is not due to acetylcholine, because (1) veratrine has no anticholinesterase action (Bacq and Brown), and (2) the transmission is still demonstrable in the presence of curare.

We think that the substance responsible for the effect is the K ion, because (1) veratrine, even in 1×10^{-6} solution, greatly sensitizes frog's muscle to the action of K^+, and (2) the addition of a small amount of potassium chloride (0·5 mgm.) to an inactive perfusate (2·5 c.c.), collected in absence of stimulation, reproduces perfectly the action of a 'stimulation' perfusate. This quantity of potassium can actually be liberated during a tetanic contraction.

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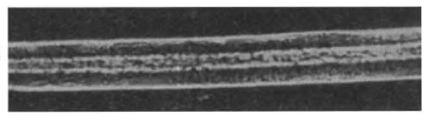
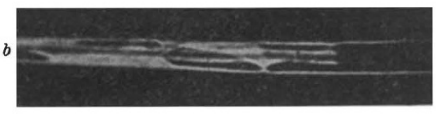
Role of Fungi and Actinomycetes in the Decomposition of Cellulose

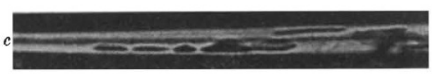
WAKSMAN[1] has recently demonstrated, by cultural methods, the important role of fungi and actinomycetes in the breakdown of plant tissues in composts and dunghills. The details of the process, however, were not directly observed. I have previously[2,3] described methods, involving the use of polarized light, for the direct microscopical observation of the cytoclastic process in the cæcum and rumen of herbivora. These methods have since been applied to the study of the decomposition of vegetable materials in animal fæces, composts and dunghills. The role of Fungi and Actinomycetes in the breakdown of cellulose thereby immediately became conspicuous. Disintegration of the cell-wall constituents was directly evidenced by loss of double-refraction and by disappearance of microchemical reaction in the affected structures.

The characteristic features which attend the excision of enzymatic cavities by fungi have been described by Bailey[4]; so that it is possible readily to distinguish the changes taking place from those produced by bacteria.

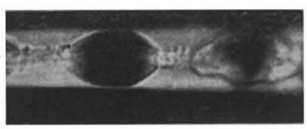


(*a*) Prosenchymatous fibre invaded by mycelium. Note destruction of secondary and persistence of primary and tertiary layers of wall. Polarized light. Crossed Nicols. × 400. Composted material.





(*b*) Plant hair, late phase of attack. Note formation of conical and biconical enzymatic cavities (cf. Bailey[2]). On right, complete dissolution of secondary wall. Primary wall still intact. Tertiary wall in process of disintegration. Crossed Nicols. × 400. Horse faeces *in vitro*. 2 months.
(*c*) Another portion of same hair. Earlier phase of attack. Excision of channels by fungus filaments. The advancing tip of a hypha can be clearly seen slightly right of centre. Crossed Nicols. × 400. Horse faeces *in vitro*. 2 months.



(*d*) Enzymatic cavity in hair. Polarized light. Note entire loss of double-refraction. × 600.
(*e*) Identical specimen plus chlorziniodine. Note absence of microchemical reaction in the enzymatic cavity. In both *d* and *e* the relative immunity of primary and tertiary layers can again be observed.

DISINTEGRATION OF CELLULOSE IN ANIMAL FÆCES AND COMPOSTS.

Details of the process of infection and attack are now under investigation. Abundant infection of the lumen can commonly be demonstrated in prosenchymatous tissues. Rigid unbranched and extremely attenuated hyphæ are there formed which from point-to-point penetrate the tertiary layer of the wall through fine rectilinear channels. In the secondary layer these hyphæ expand and branch repeatedly; their proliferation being accompanied by an active excision of enzymatic cavities. The disorganization of the tertiary layer, on the contrary, is delayed until a later phase in the process; whilst the primary layer may in some cases entirely resist destruction. This resistance is due to the impregnation of the cellulose substratum by encrusting