pneumonia-like organism similarly remains to be determined.

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Abnormal Colour Responses of the Minnow resulting from Inhibition of Movement

WHEN a minnow (*Phoxinus phoxinus* L.) is allowed to swim freely on an illuminated white or black background, it becomes correspondingly pale or dark in colour and remains so indefinitely. However, if the fish is kept stationary by confining it on a white or black background in a glass tube containing running aerated water, its colour responses become abnormal[1].

During the first hour or so of confinement, the fish struggles; but later, escape reactions cease and the fish remains quiescent on the floor of the tube. Under these conditions on either a white or a black background the fish fails to become fully white- or black-adapted; it assumes an intermediate tint and maintains this indefinitely. However, if the fish confined on black is subjected to an extraneous stimulus, for example, a movement in its field of vision, sudden alteration of the rate of flow of water in the tube or change in hydrostatic pressure, it will suddenly become fully dark in tint and then in the following 15 min. slowly revert to the intermediate colour. In other words, an extraneous stimulus momentarily converts an abnormal black background response to a normal one. No response to an extraneous stimulus in a fish confined on white has been observed; the fish remains an intermediate tint.

The minnow melanophores are under the control of both nerves and pituitary hormones, and spinal section anterior to the fifteenth vertebra eliminates central nervous control, resulting in very slow background responses effected by hormones[2]. Confinement on black does not interfere with the slow darkening of such a spinal fish, and an extraneous stimulus never results in a momentary darkening. Similarly, when central nervous control is eliminated only from the anterior region of the body by sympathectomy and the fish confined on black, this region slowly becomes fully dark, while the posterior region remains intermediate in colour. In this case an extraneous stimulus results in a momentary darkening of the posterior body region, but has no effect on the anterior region. On the other hand, hypophysectomized fish confined on black maintain an intermediate tint and show a darkening response to an extraneous stimulus. Therefore, the abnormal tint caused by confinement appears to be due to interference with the nervous rather than the hormonal chromatic mechanism.

In an unrestricted environment the minnow is an extremely active fish. Confinement thus abolishes continuous somatic motor activities, imposing a learnt inhibition on the central nervous system. It seems probable that this inhibition becomes generalized and affects the brain centres controlling colour change. An extraneous stimulus appears to remove temporarily the central inhibition, permitting for a time a normal black-background response.

The abnormal response resulting from confinement on white is less easy to explain. Under these conditions normal, spinal and hypophysectomized fish alike remain intermediate in colour and show no reaction to an extraneous stimulus. Both nervous and hormonal mechanisms appear to become abnormal under these conditions, and the absence of a sudden paling in response to an extraneous stimulus in the case of normal or hypophysectomized fish remains at present unexplained.

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Role of Ergothioneine and Catalase in Infection by Ergot Fungus (*Claviceps purpurea* Tul.)

I HAVE already shown that the activity of peroxidase and catalase in rye is altered by ergot infection[1]. It seems to be very probable that this circumstance indicates formation of peroxide in the host-plant. The present communication deals with the effect of hydrogen peroxide on germination of ergot conidia.

Ergot was cultivated on malt agar. Conidia of a culture 3–5 weeks old were germinated at 20–22° C. in hanging drops on a culture medium of the composition: KH_2PO_4 1·0 gm., $MgSO_4.7H_2O$ 0·6 gm., $CaCl_2$ 0·5 gm., asparagine 2·0 gm., saccharose 30·0 gm., distilled water 1 litre. To this culture medium was added hydrogen peroxide, ergothioneine and the centrifuged conidia-free substances of honey-dew.

We have found that hydrogen peroxide in a concentration of 5×10^{-3} *M* entirely inhibits the germination of conidia. This inhibition can be removed by 5×10^{-3} *M* ergothioneine. Ergothioneine by itself has no effect on germination. We were unable to demonstrate ergothioneine in saprophytic conidia by the Hunter diazo-reaction[2].

It is known that conidia of parasitic origin (honey-dew) are more aggressive than saprophytic ones[3]. Honey-dew was gathered from Petkus rye; it was diluted with water in the ratio of 1 : 50, then centrifuged and examined for ergothioneine. We were able to prove that the conidia do not contain ergothioneine; on the other hand, ergothioneine was present in the conidia-free substances of honey-dew. The conidia-free sap from 50 million conidia (about 0·1 ml. honey-dew) contains 0·2–0·5 mgm. ergothioneine. It should be noted that another substance present also gives the diazo-reaction; this substance shows a maximum absorption at 6300–7000 A. At the same time, we have also found that the catalase activity of washed honey-dew conidia and saprophytic conidia was weak. During 5 min., 0·27–0·85 mgm. hydrogen peroxide was decomposed *in vitro*. Honey-dew sap shows a high catalase activity; during 5 min., 4·54 mgm. hydrogen peroxide was destroyed.

When honey-dew sap was added to saprophytic conidia, a weak stimulation of germination and an