

immature and their relative frequency would naturally depend on the age of the culture. Treschow<sup>1</sup>, in his original description of *V. psalliotae*, recorded that the phialides of this species produced only one spore, and that this was usually convexo-concave or convexo-plane, although a few were oval.

The use of coverslips in the manner described serves also for the observation of spore production in *V. Malthousei* Ware, as well as of spore rotation in both species, which I recorded<sup>2</sup> in a previous communication. As it might also be of interest to some workers to know the relative abundance under different conditions of spore production from individual phialides of various disease-producing species of *Verticillium* and other genera such as *Fusarium*, the use of this technique might perhaps provide interesting statistical data.

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<sup>1</sup> Treschow, C., *Dansk. Botanisk Archiv.*, 11 (1941).

<sup>2</sup> La Touche, C. J., *Nature*, 160, 679 (1947).

### Regeneration of the Hypophysial Portal Vessels

THERE would seem little doubt that the nervous system controls the activity of the anterior pituitary gland, but the mechanism by which this control is exerted is debatable. Many workers have cut possible

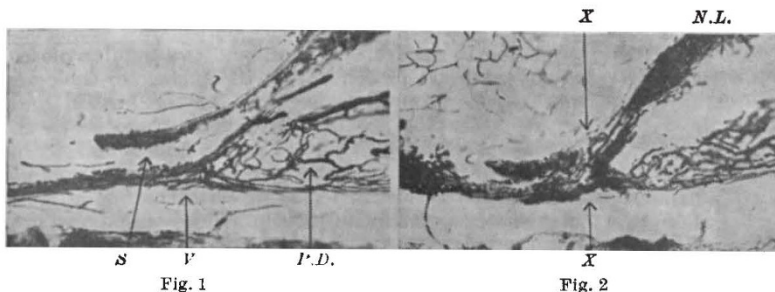


Fig. 1. Photomicrograph of a mid-sagittal section through the pituitary stalk of a control rat. Vascular system perfused with indian ink. Note the portal vessels (V) passing from the ventral surface of the pituitary stalk (S) into the pars distalis (P.D.). Magnification  $\times c. 50$   
Fig. 2. Photomicrograph of a mid-sagittal section through the pituitary stalk of a rat in which the stalk had been sectioned ten weeks previously. Vascular system perfused with indian ink. The neural lobe (N.L.) of this gland showed marked atrophy. Note the large regenerated portal trunk passing across the ventral surface of the line of section (XX) from the tuber cinereum (on the left) to the pars distalis (on the right). Magnification  $\times c. 50$

nerve pathways to the gland. Interruption or removal of the cervical sympathetic system, or the facial and petrosal nerves, has little or no effect on the normal functioning of the gland. Section of the pituitary stalk has given discordant results in the hands of different workers<sup>1</sup>, but it would seem established that some animals retain normal anterior pituitary function after this operation. This fact indicates that the nerve fibres of the pituitary stalk are not involved in the link between the nervous system and the anterior pituitary, for once cut these fibres do not regenerate.

However, little attention has been paid to the possibility that the hypothalamus may control the anterior pituitary gland by liberating a humoral excitant into the hypophysial portal vessels, which then transmit the substance along the pituitary

stalk to the gland<sup>2,3</sup>. If this is so, variable results might be expected to follow pituitary stalk section, for, as suggested<sup>3</sup>, regeneration of these vessels might occur. This possibility has been tested in the following manner.

The pituitary stalk has been sectioned in twenty-nine female rats. The operative approach was by a temporal route which gives a clear view of the stalk and surrounding structures, and allows a deliberate and precise lesion to be made in any desired site. The oestrous cycles of these animals were followed by the vaginal smear technique, and they were tested for a pseudo-pregnancy response to sterile coitus by the deciduoma reaction. Many of the animals showed a normal sexual rhythm and pseudo-pregnancy response after recovery from the operation, and these results are being reported in detail elsewhere. After observation (usually for three months) the animals were killed and the vascular systems perfused with indian ink solution. The heads were decalcified and a block of tissue containing the hypothalamus and pituitary gland serially sectioned in celloidin at 100–200  $\mu$ . On histological examination it was seen that the neural lobe was atrophic, the pars intermedia enlarged relative to the rest of the gland, and, in many cases, the pars distalis appeared slightly diminished in size. The point that has been clearly established is that in many cases the hypophysial portal vessels showed regeneration across the cut region of the stalk (Figs. 1 and 2).

The hypothesis of neurovascular transmission of stimuli from the median eminence of the tuber cinereum to the anterior pituitary finds indirect support from two sources. First, the anatomical evidence that the hypophysial portal vessels are present in a

wide variety of vertebrates though nerve fibres in the anterior pituitary gland are scarce<sup>2,4,5</sup>, and microscopic observation of these vessels in the living rat has shown the blood flow to be from the tuber cinereum to the anterior pituitary<sup>6</sup>. Secondly, the experimental evidence that (a) electrical stimulation of the tuber cinereum in rabbits (for three minutes) may produce ovulation, whereas similar stimuli applied to the anterior pituitary directly (for seven and a half hours) does not produce this result, indicating a lack of secretomotor nerve fibres in this gland and probably a humoral transmission of stimuli<sup>7</sup>, and similar evidence<sup>8</sup>; and (b) section of the pituitary stalk results in variable degrees of dysfunction of the anterior pituitary, which it would seem likely may be correlated with varying degrees of regeneration of the portal vessels.

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<sup>1</sup> Harris, G. W., *Physiol. Rev.*, 28, 139 (1948).

<sup>2</sup> Green, J. D., and Harris, G. W., *J. Endocrinol.*, 5, 136 (1947).

<sup>3</sup> Harris, G. W., thesis for M.D. degree, Univ. of Cambridge (1944).

<sup>4</sup> Green, J. D., *Alexander Blain Hosp. Bull.*, 6, 128 (1947).

<sup>5</sup> Harris, G. W., *Nature*, 159, 874 (1947).

<sup>6</sup> Green, J. D., and Harris, G. W., *J. Physiol.* (in the press).

<sup>7</sup> Harris, G. W., *J. Physiol.*, 107, 418 (1948).

<sup>8</sup> Markee, J. E., Sawyer, C. H., and Hollinshead, W. H., *Endocrin.*, 38, 345 (1946).