of tissue was necessary to give a satisfactory positive result.

These findings indicate that the rhodopsin type of visual pigment occurs in many insects. This being the case, the experiments[1,5–7] in which insects have been raised on diets devoid of vitamin A and carotenoids are difficult to understand. Perhaps there is some other insect visual system that does not involve retinene, or alternatively, and more likely, perhaps the insects raised in these nutritional experiments were visually defective.

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PHYSIOLOGY

Oscillatory Flow in an Air-filled Elastic System

A REPORT has been published by me[1] of the study of oscillatory flow in a fluid-filled elastic system, using an 'oscillator'. It has now been discovered that the same device (Fig. 1) will oscillate, in stationary wave motion, when there passes through it a stream of air, instead of water or blood.

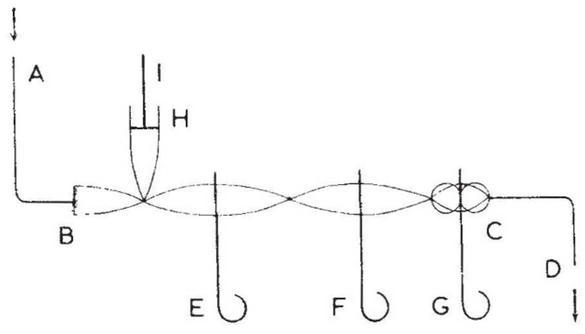

Fig. 1. Diagram to show the component parts of the 'oscillator'

Air compressed to a pressure of about 0·7 kgm./cm.^{2} is delivered from a tank of which the outlet is controlled by a screw valve. The air is led by the rigid tube (A) to the elastic tube (BC), which is composed of latex rubber, 0·7 cm. in diameter and 97 cm. long. The other end of BC is connected to the rigid outlet tube (D). Extensions of the torsion springs (E) and (F) compress the elastic tube at the sites of antinodes, the extension of the torsion spring (G), at the site of a pseudo-stationary node, the loops being as shown. The waves are both transverse and longitudinal, belonging to two systems of differing length, namely, 1–2 cm. and approximately 75 cm. As the wavelength approaches the diameter of the tube, the particles of air describe more or less circular orbits. The correct position of the springs may be determined previously, by running water through the model from a reservoir, as already described. At this stage, the quarter-wave matching stub (H) is useful in suppressing stationary waves at the proximal end of BC : one end of the stub is connected to a node, as shown, the other closed by the piston (I).

Using compressed air, the model can be made to produce a great variety of noises and sounds, including musical notes. Oscillations of low frequencies resemble purring noises : at high frequencies, squealing noises result. Harsh sounds occur, resembling those made by parrots or chirruping sounds such as those of other birds.

Tuning is effected by altering the pressure of the springs on the elastic tube. In the case of the spring (G), however, tuning is also effected by moving the point of application with relation to the junction of BC and D. Tuning is particularly sensitive at this site. The effect of transverse compression appears to be analogous to the application of a 'shunted inductance' : the greater the pressure, the higher the frequency and conversely. Movement of the point of the spring, in relation to the end of the tube, alters the length of the system of short stationary waves. The segment of elastic tube involved can be regarded as a cavity resonator, so that the effect is analogous to that of altering the 'capacitance'. The shorter the wave-length, the higher the frequency and conversely. Increase of 'resistance', brought about by closing the screw valve which controls delivery of air, causes the pitch of the note, or noise, to rise and conversely.

The spring (G), pressing on the elastic tube, produces a shape closely resembling that of one vocal cord. It may be assumed that, in the larynx, the wave-lengths of the vibrating expired air approach the dimensions of this structure and of the related cavities. The system of long waves of the tube (BC) is then related to the vibrating columns of air in the trachea and bronchi during speech and the apparatus can be regarded as an analogue for study of the mechanism of phonation.

The model suggests that, in addition to approximation of the vocal cords, elevation and depression of the larynx when the pitch of the voice rises and falls, respectively, are also of significance in tuning. In phonation, moreover, the action of the thorax and lungs is that of velocity modulation of the expelled air, whereas that of the larynx is to effect density modulation of this air.

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Hormonal Control of the Development of the Thymus of the Fœtal Rabbit

THAT the fœtal adrenal is physiologically active has been firmly established; for example, Jost and Jacquot have shown its importance in the development of fœtal liver glycogen[1–3]. That the adrenal itself is influenced in its development by a structure or structures within the skull—generally assumed