powerful factor in determining whether an activity will be sought out, and whether it will be continued once initiated. . . . Provided the uncertainty is not too great, so that the individual has little hope of handling it in any effective fashion, and provided that there appears to be some pattern of resolution of the uncertainty, it can be regarded as a critical characteristic of many activities"[3].

Much of the force of this theory turns on the interpretation of "effectively". The interpretation of this term is discussed in some detail in the original paper. It will be clear, however, from the outline just given, that Dr. Halliday's results would agree with the predictions from this theory, given certain additional stipulations about the nature of the "information" and the degree of sophistication of the rat. One would usually simply welcome a confirmation of a theory without further comment; however, there are two points which should perhaps be made at this stage of the research, particularly because Dr. Halliday's tasks are simpler, from an informational standpoint, than many others which might be used later, either for other organisms, or even for other rats:

(1) If the information processing theory is more adequate than the "novel stimuli" or "curiosity" form of explanation, then Dr. Halliday's results may not always be confirmed with experimental subjects of greater complication than rats, or with rats in a more complicated exploratory situation, or even with some of the rats in his study. This is important, because a repetition of the study by a different investigator with some changes in the subjects, the environment or the conditions might produce a less convincing result, thus weakening his primary conclusion —which in my opinion is sound.

(2) The slight and non-significant difference between the groups in the final 30 sec of the second trial may be more important than it appears at first sight, and Dr. Halliday may be doing his experiment less than justice in dismissing it as "too slight to merit much attention". In view of the bearing which it might have on the information processing activity it should be followed up with perhaps a larger number of subjects and/or a different method of statistical analysis.

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After Effects from Entoptic Movements

THE well known after effect of movement is normally generated by moving the images of external objects across the retina[1]. The present study shows that an after effect can also be generated by moving the retinal images of internal (entoptic) structures of the eye. These structures are normally invisible, because of selective retinal adaptation, until their shadows are artificially made to move across the retina.

Two such fixed structures are the retinal blood vessels and "Haidinger's brush".

The receptor cells lie at the back of the retina, behind the blood vessels and other structures. A receptor lying behind a blood vessel is always in shadow, so it is permanently adapted to a slightly more sensitive level than its neighbouring receptors. If the shadows are made to scan across adjacent receptors, a whole tree-like pattern of blood vessels becomes visible. This can be done by putting illumination through the sclera, and by oscillating the light source. The pattern dies away rapidly when the motion of light and shadows is stopped, presumably because of selective adaptation.

We were the two subjects. The head was clamped by a bite bar and the left eye shaded. The real image of a bright source of light was cast on the sclera of the right eye, near the temporal margin. The image was made to scan downwards across the sclera and fly back, being suppressed during flyback, at a rate of 1 c/s. This trans-scleral light illuminated the retina, so that the pattern of blood vessels was seen moving repetitively upwards through an estimated 5–10 min of visual arc. The visual field was made totally dark, apart from the shadows of the blood vessels, by means of half a blackened table tennis ball placed close to the eye, leaving a small area of sclera exposed to receive the scanning image. Unfortunately, it was impossible to exclude some parts of the stimulating apparatus from the peripheral visual field.

After scanning for 30 sec the image was held stationary on the sclera.

A pronounced downward after effect was observed, taking the form of a downward drift of the entire tree-like pattern. Both the pattern and the drifting after effect persisted for 2–10 sec.

If the image scanned the sclera upwards, the shadows were seen to move downwards and the after effect was upwards, as expected. If the image moved to the left, the shadows moved to the right and after effect was to the left, also as expected.

The after effect is not unexpected. The necessary condition is movement of images across the retina, and although the blood vessels themselves are stationary, their shadows do scan across the retina under these conditions. This result conflicts with that of Wohlgemuth[2], however, who found that uniform translatory movement of the entire visual field produced no after effect. It is just possible that in the present investigation the after effect would not have appeared without the apparatus visible in the extreme periphery, but this seems unlikely, as the after effect covered the entire visual field, not just the visual area near the apparatus.

Haidinger's brush[3] is a small shadowy object which subtends a visual angle of 2°–3°, shaped like a bow tie or spindle, which is seen on viewing a bright uniform field of plane polarized light. The plane of polarization must change continually, otherwise the brush fades in about 0·5 sec, presumably owing to selective adaptation. This phenomenon is the only known way in which the vertebrate eye can detect the polarization of light. It is probably due to unidentified dichroic structures in the fovea, perhaps in the cones themselves.

An aluminized screen was illuminated by blue polarized light. A piece of 'Polaroid' and a deep blue filter were held in the projection beam, mounted in a ball race and rotated at 1 r.p.s. On viewing the screen, the observer saw Haidinger's brush within the foveal visual field, rotating in the same direction as the 'Polaroid'. After 30 sec the rotation of the 'Polaroid' was stopped. A brief (less than 0·5 sec) but pronounced after effect of apparent rotation in the opposite direction was reported.

This work was carried out under a research grant from the Science Research Council.

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AGRICULTURE

Rapid Method for Saponification of Milk Fat and Subsequent Quantitative Estimation of the Lower Fatty Acids

THE quantitative estimation of the lower fatty acids of milk fat by gas-liquid chromatography has caused some difficulty in the past. The methyl esters, particularly methyl butyrate, are undesirably volatile. The free acids