

in eight rats by injecting 10 μ l. of a 2% solution of Evans blue dissolved in 0.9% NaCl. Four hours after injection, the rats were killed and their brains were dissected out, frozen in CO₂ syrup¹⁴ and sectioned at 40 μ m intervals on a freezing microtome. The area of diffusion was in the shape of an ellipse around the point of injection, and was 7.6 mm long, 3.2 mm high and 3.4 mm wide. The dye penetrated anteriorly to the septal area and posteriorly to the neocortex above the superior colliculi. The spread in the vertical plane, at the point of injection, extended from the ventral thalamus to the top of the hippocampus. Laterally, the dye diffused across the hippocampus as far as the border of the lateral ventricle. On the basis of these findings, the percentage of RNA inhibition was determined in the hippocampus, thalamus and medial neocortex after hippocampal injections of either 10 μ g of actinomycin in 10 μ l. of 0.9% NaCl or 10 μ l. of 0.9% NaCl. Six subjects received actinomycin and six received the vehicle. 4 μ Ci of 6-¹⁴C-crotic acid was injected into the brains of these rats, 4 h after the initial injections, at a depth of 3.0 mm in both hemispheres at the coordinates A, 2.0, L, 3.0⁸. All rats were killed 4 h later and the RNA was extracted from hippocampal, thalamic and medial neocortical tissue by the method of Scherrer and Darnell¹⁵. The specific activity of the RNA was measured in Bray's solution in a liquid scintillation counter; optical density was read at 260 nm. The results are given in Table 1; they show that the greatest inhibition of RNA synthesis was in the hippocampus, with RNA synthesis in the medial neocortex being the least inhibited.

Table 1 Incorporation of 6-¹⁴C-Crotic Acid into Brain RNA

| | 0.9% NaCl specific activity mean c.p.m./A ₂₆₀ | Actinomycin specific activity mean c.p.m./A ₂₆₀ | Inhibition (%) |
|------------------|---|---|-------------------|
| Hippocampus | 553 | 255 | 54 |
| Thalamus | 530 | 345 | 35 |
| Medial neocortex | 518 | 456 | 12 |

The results of these experiments indicate that actinomycin does not affect acquisition of memory, or memory immediately following acquisition, but that it does impair memory 4 h after acquisition and at later times.

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Failure of Visual Estimation of Motion under Strobe

WEINBERGER¹ poses an interesting conjecture that the retinal image size of an object and its rate of change are the primary data used by the visual system to estimate the "time interval to juncture" (that is, when it will hit you). As one clue that the concept may be correct, I should like to offer the following observation which seems to indicate that at least some retinal measurement of rate is necessary in impact estimation.

Lately there has been a fad in this area for dances to be held under stroboscopic lighting. The powerful, intermittent flashes produce an illusion of unreality. This mental impression is partially attributable (I think) to the viewer's inability to predict the future position of other dancers from the visual appearance of a series of stationary images; each strobe flash creates an entire still picture of the dance scene in the mind of the viewer, with no retinal clues regarding motion except those calculated in the mind from a succession of still images. I can attest to the fact that mental calculations of this sort are very poor and slow, compared with the ordinary perception of velocity obtained in sustained light. In stroboscopic lighting we have tried to toss a beanbag back and forth at short range. This is normally a simple task, but under a strobe it is very difficult to make a successful catch even though the flash rate provides 5 or 10 images along the trajectory. One feels foolish but helpless observing the short flight as the beanbag arcs gracefully (in steps) over to strike the body in the vicinity of the hands. Clearly, position information alone is inadequate for motion estimation. One's ability to throw is unimpaired, as might be expected since it is based on target position.

In connexion with Weinberger's suggestion, I recall that I was aware of the beanbag's true size and distance, but apparently the trajectory was calculated too slowly to be of use in catching the bag.

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¹ Weinberger, H., *Nature*, 229, 562 (1971).

Excavation of Two Mesolithic Shell Middens on the Island of Oronsay (Inner Hebrides)

BETWEEN 1881 and 1913 three Mesolithic "shell midden" sites were excavated on the Island of Oronsay in the Inner Hebrides¹⁻⁵. These sites are important because they preserve excellent evidence for the economic and subsistence activities of human groups in the late pre-agricultural phase of British prehistory; in fact, comparable information on these aspects of life is currently available from only two or three other sites in Britain.

Unfortunately, the data obtained during the early investigations on Oronsay are now considered unsatisfactory for several reasons. The most conspicuous gaps in the evidence relate to: (1) the relative and absolute ages of the different middens; (2) the range and relative importance of the different food supplies exploited; (3) the size and composition of the social groups responsible for the middens; (4) the lengths of time and seasons of the year during which the sites were occupied; and (5) the nature of environmental conditions which prevailed during the Mesolithic occupations.

We aimed to correct the deficiencies in the existing data by excavating some samples of midden material from carefully controlled stratigraphic horizons. We water sieve the excava-