be Hb-Tu-IV ($\bar{M}_w \simeq 1{\cdot}16 \times 10^6$), but in freshly dialysed preparations dissolved in distilled water, or in 0·1 M phosphate buffer, *p*H 6·3, Hb-Tu-I ($\bar{M}_w = 14{\cdot}29 \times 10^6$) and Hb-Tu-III ($\bar{M}_w = 3{\cdot}63 \times 10^6$) is present in roughly equal proportions. The Hb-Tu, system, in solutions of low ionic strength, shows protein–protein interactions which are reversible and ionic in origin. The absence of any fraction corresponding to a dimer may mean that it exists only as an unstable intermediate between the monomer and the tetramer.

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Proposal for Some Eye–Brain Experiments

Ditchburn[1] pointed out that objects appear stationary in spite of the saccadic movements of the eyes, which occur several times every second and involve angular movements of the order of a minute of arc up to half a degree. The images on the retinae must shift appreciably, so there must be some mechanism by which the muscles or the nerves which produce the saccadic movements feed information to the brain; and this information must enable the brain to make the requisite corrections.

The alpha rhythm is greatly enhanced when the eyes are held in the extreme upward position[2,3], and one of the explanations suggested is that the alpha rhythm is related to the activity of the eye muscles. When the eyes are held in the uncomfortable upward position the muscles might well vibrate with a roughly constant frequency.

Accordingly, it would be interesting to correlate the saccadic movements with the EEG amplitude and also with the instantaneous frequency spectrum of the EEG, especially with the alpha rhythm.

The eyeball has two degrees of freedom and these might be related to the spatially two-dimensional EEG. The EEG is measured by means of the voltage differences between pairs of points on the cerebral cortex, but in principle the voltage could be measured at each point of the cortex, and it would then have two dimensions in space and one in time. In this sense the EEG is a three-dimensional stochastic process, one of the dimensions being time. At each instant of time there is an instantaneous two-dimensional EEG and an associated set of instantaneous frequencies.

It is plausible that somewhere in the visual system there is a representation of the two-dimensional spatial Fourier transform, $f^*(u,v)$, of the momentary retinal images, $f(x,y)$, as in optical systems. This would facilitate the cerebral computation of lagged covariance functions as required, for example, by Gabor's form of Longuet-Higgins's proposal for temporal recall[4,5]. If then there were a sudden vector displacement (ξ,η) of the direction of the eyes, the Fourier transform would be multiplied by $e^{-i(\xi u + \eta v)}$ if there were no correction mechanism. The correction mechanism must exist and might well be represented in the two-dimensional EEG by means of amplitudes or frequencies depending on ξ and η. One would expect the direction of maximum effect on the visual cortex to be correlated with the direction of the vector (ξ,η).

Evans suggests that it would be useful to include a control in which the image is stabilized on the retinae. Then, if the experiment were successful, we could discover whether the correlation of the EEG was essentially with the eye muscles or with the retinal image position. Evans has described a convenient method of image stabilization[6].

I hope that someone who has access to the requisite apparatus will try experiments along these lines.

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Tensile Properties of Articular Cartilage

Articular cartilage consists principally of collagen fibres embedded in a mucopolysaccharide ground substance. Electron microscopy studies[1] show that the collagen fibres near the articular surface are predominantly parallel to the surface; viewed perpendicularly to the surface, they also show a dominant orientation which varies systematically over the whole joint surface. In contrast, the fibres in the deeper zones have a more random distribution with a tendency to be perpendicular to the surface. The fibre diameter and distance between adjacent fibres appear to increase with depth from the articular surface. Chemical and physico-chemical studies (unpublished results of H. Muir and A. Maroudas) confirm that the collagen density decreases with depth from the articular surface.

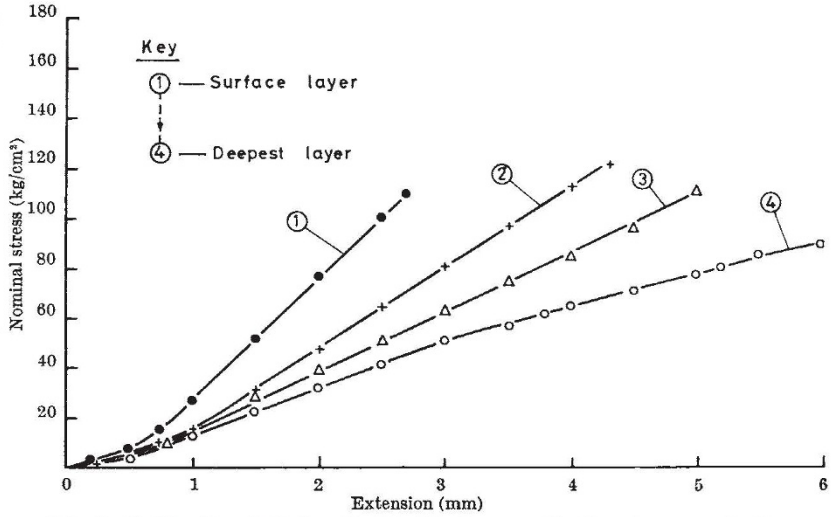

Fig. 1. Curves of nominal stress (load ÷ original cross-sectional area) versus extension for all four layers of a specimen taken from a 60 year old male. The prick lines were parallel to the load axis.

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