micron; oblique branches and subpial arches, 0.40; and basal branches, 0.30. Figure 1 graphically represents these values averaged at each counting station (filled circles in parts A, D, and E). It also shows the values for pyramids taken from rabbits with operative interruption of the corpus callosum at birth (filled triangles in parts A, D, and E). The difference in the means of the spine densities along the oblique branches of the apical dendrite are significant ($P < .02$) on the Student t-test. Along the apical dendrite itself and the basal dendrites, the same test was not significant. Thus, the spine density is reduced along the oblique branches (Fig. 1D) by section of the corpus callosum.

The rigorous limitation of changes in the spine count to the oblique branches of apical shafts strongly suggests that the callosal afferent system, coming largely from the homotopic locus in contralateral cortex, terminates on these branches. The fact that spine loss is partial suggests that other afferent systems may also synapse along these oblique elements.

These data, in conjunction with our previous findings which relate the terminals of the visual afferent (geniculocalcarine) radiation to the central third of the apical shafts of pyramids (*8*), emphasize the topographical specificity of presynaptic terminals along the postsynaptic surface of cortical neurons.

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Behavioral Compensation with Monocular Vision

Abstract. *If an object is arranged so that when viewed monocularly it appears centered in an aperture it is displaced from the position in which it appears binocularly centered. Before and after viewing the responding right hand with the left eye through a small aperture, observers were required manually to indicate a point in line with the center without visual guidance. Apparent displacement of the limb due to monocular viewing resulted in a change in the direction of responding. This change in response direction (termed behavioral compensation) is similar to that which occurs when the spatial properties of stimulation are modified with an optical system.*

When light from an object is refracted through a prism before entering the eye, the object's apparent position is changed. Manual pointing or reaching responses directed at the object during such spatial transformation change in direction and this change persists if, after the transformation period, responses are made without visual (or auditory) guidance (*1*). Because of the possible significance of these findings for theories of space perception and perceptual-motor coordination these compensatory changes have been extensively investigated and alternative explanations have been proposed (*2*).

In experiments involving visual transformations a common procedure for indexing and measuring the effects is to compare responses made without visual guidance before and after an exposure period in which the limb is viewed through an optical system. The effect of the intervening optics is to alter the apparent position of the limb so that there is discordant information from the visual and kinesthetic systems. So far all experiments have involved an optical, usually prismatic, system between eye and viewed object. The purpose of the experiment we report was to show that similar compensatory changes occur with monocular parallax: a change in the apparent location of an object with change in the eye used to view it. As far as we know changes in responding attributable to monocular vision have not been reported previously.

The viewing arrangement is shown in Fig. 1. If an observer views his hand resting on the surface OP through an aperture XZ with the right eye R, then, in order to appear centered in the aperture at Y, the hand must be placed at P. If, however, the right eye is occluded and the hand is viewed with the left eye L, then, to appear centered, the hand must be moved from P to O. This is an instance of parallax: a change in the direction of an object resulting from a change in the observer's viewing position. In this case the change in position is consequent upon which eye is used to view and is referred to as monocular parallax.

If with this viewing arrangement an observer is required to respond frequently by marking a point on OP so that it appears in line with the center of the aperture, changes would be expected to occur in consequence of the new visual-kinesthetic relationship, as happens with an optically modified relationship. If visually guided centering

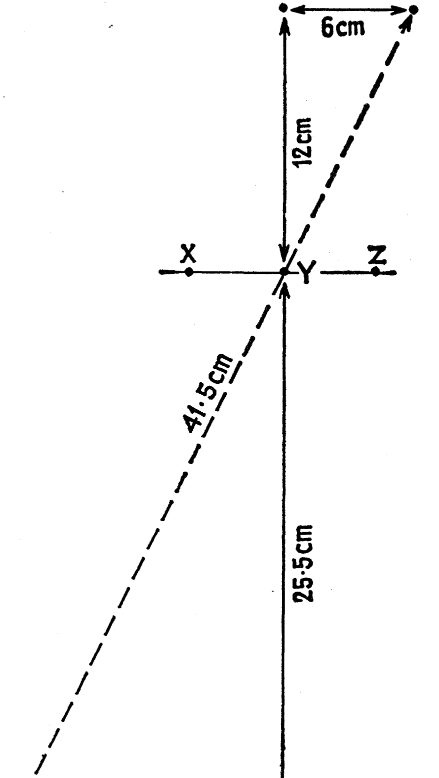

Fig. 1. Monocular viewing system used in experiment. For an object on the surface OP to be seen with the left eye (L) as centered (Y) in aperture XZ it must be located at O.

Table 1. Mean differences between responses before and after exposure and standard deviations for three experimental conditions.

Condition	Difference (cm)	Standard deviation
E	+ 2.53	5.5
C_1	+ 0.56	5.6
C_2	+ .38	4.3

responses are made at *O* during the exposure of the hand when the left eye is used, then this direction of response would be expected to persist without visual guidance after the exposure period.

For this experiment the distance *RY* was 12 cm and that of *YP* was 25.5 cm. Assuming an interpupillary distance of 6 cm the distance *LO* was 41.5 cm and *OP* was 12.5 cm.

With feet in a fixed position and head immobilized in a support so that the eyes were 12 cm above the plane of an aperture 9.5 × 7 cm, 12 subjects (group E) were required to make 5 dots directly beneath the marked center without visual guidance before and after an exposure period. The right hand was used throughout. For the kinesthetically controlled centering responses before and after exposure, a cover bearing a central mark coincident with the left-right center of the aperture was placed over the opening and dots were made on the surface below so that they were judged to be in vertical alignment with the center mark. For the exposure period the cover was removed and the subject now viewed his right hand through the opening with his left eye. The right eye was covered. Thirteen dots, one every 13 seconds, were made on separate sheets of paper so that they were judged to be in vertical alignment with the center. The center was indicated by a line coincident with that on the cover used for the responses before exposure. Thus in the phases before and after exposure the position beneath the center of the aperture (which was covered) was judged kinesthetically and during the exposure period visual-kinesthetic judgments of the same position were made with only the left eye being used.

There were two control conditions. Since maintained motion of a limb in a given direction can result in a sensory spatial aftereffect (*3*), another 12 subjects (group C_1) performed the tasks before and after exposure but during the intervening period the aperture cover was left in place and the limb moved in the same manner as for the first group. Since it was also conceivable that maintenance of eye-position in one direction during the exposure period could alter apparent visual directions, a third group of 12 subjects (group C_2) merely observed their resting limb through the aperture for the same period. For all three conditions responses before and after exposure were the same.

A change in an expected direction occurred for E but no such change occured for either C_1 or C_2 (Table 1). An analysis of variance of the differences between the responses before and after exposure, the means and standard deviations of which are shown in Table 1, showed that over all groups there was a significant difference in the changes between groups ($P < .001$). Ancillary tests (*4*) indicated that compensatory change for E was significantly different from the changes for groups C_1 and C_2 ($P < .001$) but these two latter groups did not differ significantly ($P > .05$). A *t*-test applied to each of the three groups showed that only the change for group E differed significantly from zero ($P < .001$).

These results show that behavioral compensation (*3*) in manual centering responses occurs when the normal spatial relationship between visual and kinesthetic input is modified by monocular viewing. The effect is similar to the commonly reported behavioral changes which occur when the responding limb is viewed for a time through a prism or a lens. That the change in responding is not due to a sensory spatial aftereffect (*3*) or to visual muscular effects is indicated by the absence of an effect for the two control conditions.

The basis for this type of behavioral compensatory change is not yet entirely clear but we suppose that with a changed spatial relationship between vision (or hearing) and proprioceptive input new responses persist for a time after normal vision is restored (*3*).

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Alpha-Hematite: Stable Remanence and Memory

Abstract. *Experimental evidence suggests that the magnetization of* α-Fe_2O_3 *consists of a soft spin-canted moment and a hard defect moment. The former is observed in the range −20° to 675°C; the latter is maintained across the transitions that bound the temperature range of the detectable spin-canted moment and is lost at the true Neel point of* α-Fe_2O_3 *of 725°C. Both memory and the highest coercivity fraction of remanence in* α-Fe_2O_3 *are due to the defect moment.*

The remarkably high remanent coercivity of α-Fe_2O_3 ensures that the natural remanent magnetization (NRM) acquired by certain rocks during their formation is magnetically stable. Magnetization acquired by hematite in Earth's magnetic field of approximately 0.5 oersted sometimes proves stable against demagnetizing fields of thousands of oersteds. This stability is important in paleomagnetism, by which one attempts to study the history of Earth's magnetic field from the NRM of rocks. Unfortunately, not all the magnetic minerals in rocks exhibit such high stability; nor indeed is the entire remanent moment of hematite magnetically hard. Therefore the possibility arises of magnetic noise caused by remagnetization of soft phases by modern fields.

To enhance the signal-to-noise ratio, the soft fraction of remanence carried by low-coercivity phases in the rock is usually demagnetized, and the magnetically stable fraction alone is measured. Specimens are demagnetized by exposure to a slowly decreasing a-c field or by heat treatment. A simpler method of progressive demagnetization has been suggested (*1*), using the remarkable recovery phenomenon associated with such magnetic transitions as the Morin transition of hematite.