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DISTURBANCES OF VISION BY CEREBRAL LESIONS*

BY

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ABOUT 18 months ago I was able to present to this Section with my colleague, Colonel Lister, certain clinical observations on the disturbances of vision produced by gunshot injuries of the visual cortex and of the optic radiations. From these we drew certain conclusions on the cortical representation of the retina, and particularly on the segmental correspondence of different areas of the retina with separate zones of the visual cortex. Our chief conclusions were:

1. The upper half of each retina is represented in the dorsal, and the lower in the ventral part of each visual area.

2. The centre for macular or central vision lies in the posterior extremities of the visual areas, probably in the margins and the lateral surfaces of the occipital poles. The macular region has not a bilateral representation.

3. The centre for vision subserved by the periphery of the retinae is probably situated in the anterior ends of the visual areas, and the serial concentric zones of the retina from the macula to the periphery

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are probably represented in this order from behind forwards in the visual cortex.

These conclusions agree with those that were previously arrived at by Inouye from his observations on gunshot injuries of the occipital lobes inflicted in the Russo-Japanese War, and they conform with Marie and Chatelin's valuable investigations on men with wounds similar to those of our patients. They have later received support from various observers, and especially from Captain Riddoch.

Since our last communication I have had the opportunity of examining a large number of cases in which various defects or disturbances of vision were produced by local cerebral injuries. Every further individual observation has been in harmony with these conclusions, and I have not met with a single clinical fact that is in any way at variance with them. It is not my intention to place all my later observations before you, though they afford valuable confirmatory evidence of our contentions, but to select a certain number which will fill up some gaps in our previous communication.

Local Defects in the Fields of Vision

The most interesting and important of these are the central and paracentral scotomata. These are extremely common in all superficial and moderate injuries of the occipital lobes. When the poles of both hemispheres are injured central vision may be completely lost, while a unilateral wound produces homonymous scotomata in the opposite halves of the fields. In our previous communication we recorded several cases with central scotomata; since then I have seen very few of these and they have added nothing further to the facts we then presented to you. Paracentral scotomata due to unilateral occipital lesions are much more common, and especially those situated in the lower quadrants; so many of these latter have been already recorded by ourselves, by Marie and Chatelin and by others, that further examples are not necessary. One of the common types is a pure lateral paracentral scotoma, and as but few cases with this condition have been described I may put the following example forthwith:

CASE 1.—Private R—, 15104, was wounded on September 26, 1916, by a shrapnel ball which penetrated his steel helmet. He was unconscious for an hour or so, and stated that he was completely blind till the next day. He never noticed any subjective visual phenomena. He was admitted to a Base Hospital on the day following the infliction of the wound.

Wound.—There was a small penetrating wound from which softened brain extruded, immediately to the right of the middle line of the skull and 1 inch (2·5 cm.) above the inion. A radiograph revealed much depressed bone, but no foreign body. An operation was performed next day, and several fragments of bone as well as clots and pulped brain tissue were removed from the occipital pole. The recovery was rapid and uneventful. His visual fields were taken by a perimeter and a screen scotometer six days after the

infliction of the wound, and again a week later. There was then a large left homonymous paracentral scotoma to an object 7mm.[2] which reached the fixation point and extended outwards from it to about 25°. Its mesial border coincided with the vertical above the fixation point, but receded from it below this. Peripheral vision was unaffected, and the colour fields were normal in the right halves, but there was no perception of either red or green to the left of the middle line (Fig. 1).

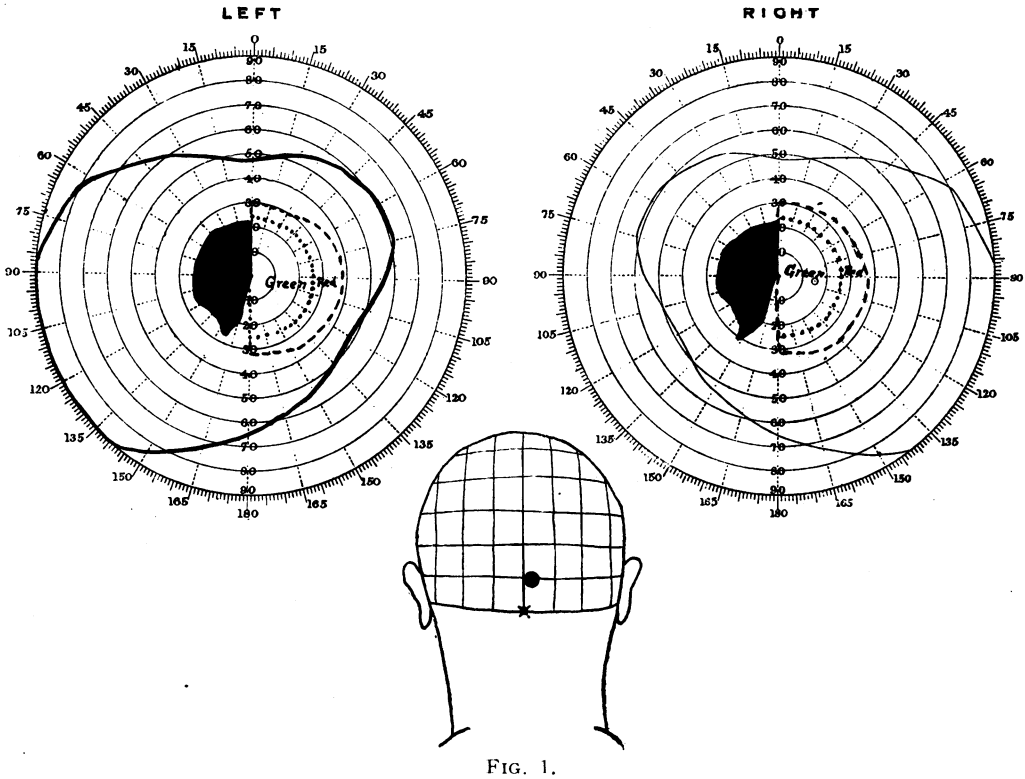

FIG. 1.

In this and the following figures the position of the wound of the skull is represented in a diagram of the head, and when missiles were retained in the brain their positions as seen in radiographic plates are also indicated. The vertical and horizontal lines in the diagrams represent distances in inches (2.5 cm.) from the inion as measured on a normal head.

In this case a lesion of considerable size in the occipital pole at the level of the posterior end of the calcarine fissure consequently produced an homonymous lateral scotoma, and the blind area extended immediately up to the fixation point.

Inferior Paracentral Scotomata

So many cases of unilateral inferior paracentral scotomata have been already recorded that it is unnecessary to describe more at present; in all these patients the injury involved the tip or posterior portion of one occipital lobe at or immediately above the level of the calcarine fissure, and the size of the scotoma generally stood in