

who have been weaned. The occasional use of a moderate quantity of salted meat is advised by Dr. Rush. In children who have not been weaned, healthy breast milk must constitute the chief nourishment.

Other important prophylactic remedies will now be enumerated, as necessary to guard the infant against the ill effects of *dentition*. The preventive measures are:—1st. Exercise in the open air. 2d. Daily cold sponging, followed by friction. 3d. Particular attention to produce coolness of the head; washing the head, daily, with cold water. 4th. Proper regulation of the diet. The nurse should avoid stimulants in her food and drinks. The child should take the breast often, but not long at a time, to prevent overfeeding. 5th. Attention to the state of the gums. Painful tension should be relieved by a free incision of the gum and capsule; and if the advancing tooth be double, a crucial incision should be preferred. 6th. Gentle laxatives, when plethora exists, or where the customary salivation is not present. 7th. Blisters, or the occasional application of one or two leeches behind the ears, if there be determination of blood to the head. 8th. Avoid premature weaning, as within the year, or weaning at an improper season, as between the months of May and October.

ON THE INDISTINCTNESS OF IMAGES FORMED FROM OBLIQUE RAYS OF LIGHT.

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It is well known that only those rays of light proceeding from objects to which our attention is turned, strike the cornea in directions parallel, or very nearly so, to the axis of vision; and that such rays are consequently concentrated upon that portion of the retina which immediately surrounds the point where the axis passes through it. Images formed by rays thus transmitted, are the only ones which can be called truly distinct.

It must have fallen under the observation of every one, that to whatever object the eye is turned, it is that alone of which we have a distinct impression; and that the images of those objects which surround it are indistinct in proportion to their distance from it. For example—let the eye be directed to a word in the middle of a line; of that we have a distinct impression; of the words on either side, the images will not be quite so well defined; but of those at either end of the line, they are so confused that it is impossible to distinguish even the different letters.

This indistinctness of images which fall on portions of the retina not situated in the axis of vision, has been explained in various ways. Some physiologists* suppose that point of the retina most sensible which corresponds to the axis of vision; while those portions which are at a greater or less distance from it, have their sensibility diminished in proportion as their distance from the central point is greater. The whole may be more satisfactorily explained as follows:—

* Vide Bostock's *Physiology*, Vol. III. Article, *Vision*.

1. Images formed from rays which are oblique to the axis of vision, have a degree of illumination inferior to that which results from direct light. If we hold a card, in which there is a circular aperture, so that the light, coming from a candle, shall strike it at right angles, the image formed on the wall will be exactly like the card; but if the card be turned obliquely to the light, the image becomes altered in its shape, and instead of a circular spot in its centre, it will have an oval one; and of course less light will be transmitted through the aperture in the card, since in the first case the image was round, whereas in the last it was oval, consequently covering less space. It is obvious that the aperture of the iris will transmit the greatest quantity of light, when the rays have a direction perpendicular to its plane, and that the quantity will be less in proportion as the obliquity of that plane to the rays is greater. So that the images of those objects to which the eye is directed, or, in other words, whose rays are perpendicular to the plane of the iris, will have the greatest degree of illumination; while those, the direction of whose light is more or less oblique, will have their degree of illumination diminished in proportion to the magnitude of that obliquity.

2. Those rays which are situated nearer to the lens than the focal distance, have a corresponding indistinctness. If in a darkened room we place a convex lens in the hole of a window shutter, and receive the images of external objects, as of a landscape, or a plane surface, or a screen, we find that those images are not equally defined in all parts; that while the centre of the picture is well defined, the circumference is not so; but by varying the distance a little, the one becomes distinct and the other in its turn indistinct. But if instead of a plane we substitute a screen whose surface is a portion of a sphere, the radius of which is equal to the focal distance of the lens, and place the last in a position corresponding to the centre of the sphere, then we shall have a picture at the same time equally distinct throughout. The reason of this is obvious; the same lens must have the same focal distance for all the rays which pass through it, direct as well as oblique; consequently, in order that light transmitted should form distinct images, the surface on which they are received should be equally distant, in all its parts, from the centre of the lens. This condition evidently cannot exist when a plane surface is used, for only one point can at the same time be situated at a distance equal to the focal distance; but, as we have seen, the concave spherical surface gives us the necessary conditions.

How is it with the eye? We find that the retina or screen on which the images are received is a spherical surface; the lens, however, is not situated in its centre. We know that its situation is anterior to the vitreous humor, and that the latter occupies about two thirds of the cavity of the ball; consequently the lens cannot be equally distant from all parts of the retina, inasmuch as it does not correspond with its centre, which is situated somewhere in the vitreous humor. Now that point of the retina which corresponds to the axis of vision is the only one on which distinct images are formed, and this, of course, corresponds to the focal distance, and at the same time is situated at the greatest distance from the lens. As all other parts of the retina must be at a less dis-

tance from the lens, there will necessarily exist a deficiency in the convergence of the rays, and in proportion as this deficiency is greater, or the distance of the illuminated point from the lens is less, the picture formed on the retina will be less distinctly marked.

From these results it appears that images formed by direct light are alone truly distinct, for they are the only ones whose distance from the centre of the lens is equal to its focal distance; their degree of illumination also is greater than that of images resulting from oblique rays, because, as we have seen, more light is transmitted through the aperture of the iris, when it is at right angles to the direction of rays, than when there exists any variation from this condition. Moreover, we can have a distinct impression of only one portion of a picture at the same time, and that in all cases is the one to which the eye is directly turned; from this results that constant change of direction in the eye, that "constant searching," as it is called, when we look at a picture, landscape, or any number of objects, or parts of objects; since they cannot all be seen equally distinct at the same time, the direction of the organ of vision is changed, that all the oblique rays may in turn become direct.

A curious fact has been observed by astronomers, especially by Mr. Herschel and Sir James South, which would seem to contradict what has been advanced above, viz., that in looking at very small stars, these were only visible when the eye was turned to another part of the field of the telescope, so that the stars were seen by oblique instead of direct rays; their images falling consequently on portions of the retina more or less distant from the axis of vision. This seems to be satisfactorily accounted for by Dr. Brewster as follows; objects seen indirectly are represented by images, which from the want of convergency in the rays are more diffused, and consequently occupy a larger space on the retina. Although in this case the image would be less distinct, yet from experiments recorded on page 249 of Brewster's treatise on optics, it would seem that the retina is not sensible to very small luminous points; these are perfectly distinct, however, when the position of the image is so varied, as in the case of the astronomers, as to occupy a larger portion of the retina—and this last condition is attained by causing the image to fall on a portion of the retina where the degree of convergence is more or less deficient.

J. W.

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AMATIVENESS VS. PHRENOLOGY.

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THE case of Nymphomania in a late No. of the Journal, must be acknowledged to weigh heavy against such evidence as is produced by Phrenologists to support their system. It comes as near the character of a positive fact, as the nature of pathological investigations allows us to hope for. When to this is added the case of a young idiotic female addicted to masturbation, published by Cruvelhier some years since, in