

than the corresponding portion of the sphere. The eye consists of three chambers filled with media of perfect transparency, whose refractive powers differ somewhat among themselves, but none are greatly different from pure water. The first media which fills the anterior chamber is called the aqueous humor, and consists chiefly of pure water holding in solution a little common salt, gelatine and traces of albumen. Anteriorly the humor is bounded by the cornea, which is not spherical like the rest of the eye, but ellipsoidal, having a form calculated for preventing spherical aberration. Posteriorly is the iris, an opaque colored screen, composed of muscular fibres by which the aperture through its centre, called the pupil, is enlarged or contracted according to the intensity of the light. In the human eye the pupil is circular, but in the eyes of some animals, there is a special adaptation to the habits of the animal, the pupil being elongated horizontally for those that graze, and vertically for beasts and birds of prey. The changes in the size of the pupil are involuntary, and may be readily observed by placing one's self before a glass and observing the effect when the intensity of the light is varied. The crystalline lens is a double convex lens having a greater refractive power than the aqueous humor. It increases in its density from its edge towards the axis, which is as effectual in preventing spherical aberration as an increase of curvature near the axis. The posterior chamber, which occupies by far the greater part of the eye, is filled with the vitreous humor, differing very little from the aqueous; both of them in their consistency resemble the white of an egg. Back of the vitreous humor is the retina, a net-like expansion of nerve, on which the images are depicted for the purpose of vision. When an image is formed by a lens, as the object recedes, the image approaches, and *vice versa*; so that in order to keep a distinct image on the screen, either the screen must be moved or the convexity of the lens altered. In like manner, since we can see distinctly at various distances, there must be a power in the eye, either by changing of curvature, or length of axis, or more probably by both combined, of adapting itself to the change of distance. We are at least conscious of some muscular effort, whenever we change considerably the adjustment of the eye for different distances. The eyes of animals are adapted, in respect to their refractive power, to the medium which surrounds them. The human eye being fitted for seeing in air, is unfit for distinct vision in water, since its refractive power is nearly the same as that of water, and therefore a pencil of parallel ray from water entering the eye, would scarcely be conveyed at all.

Though we have two eyes, and two images are formed on the retinas, we have the impression of a single image; this is one of the many instances in which we have learned by experience to refer two or more sensations to one thing as the cause. In case the eye becomes turned by accident, or done as an experiment, the two images fall on different parts of the corresponding eye, which gives the appearance of a double object. There is one spot on

the retina which is entirely destitute of sensibility, and is hence called the *punctum coecum*; it is that at which the optic nerve enters the eye. In cases where persons are unable to see an image distinctly, they have to assist their sight with glasses. One form of defect is long-sightedness, which is due to the eye gradually losing its convexity, so that parallel rays are not conveyed to a focus on the retina. An object near the eyes gives an indistinct image, but objects at a distance are seen distinctly. To enable long-sighted persons to see an object at a short distance, about seven inches, or to read a book, etc., they require convex lenses, which supply the want of convexity. In short-sightedness we have the opposite condition to long-sightedness; there is too great a convexity of the eye. Short-sighted persons cannot see an object distinctly unless held close to the eyes; an object a few feet from them looks blurred and indistinct. Concave lenses are required to neutralize the excess of convexity. As a person grows old one of the many changes throughout the body occurs in the eye; the eye-ball tends to flatten, rendering it necessary for those with natural sight in time to use convex lenses in order to restore their normal sight; but the eye of the short sighted person likewise becoming flattened, brings it nearer the normal condition; and as a consequence a person who is short-sighted when young, after attaining middle age, requires less powerful glasses and some can even dispense with them entirely.

When objects are near we judge of their relative distance by the inclination of the optic axes to each other. The greater that inclination is, or, which is the same thing, the greater the change in direction of an object, as it is viewed by one eye, and then the other, the nearer it is. When objects are very near we judge of their distance by the divergence of the rays which enter one eye alone. The distances of known objects are estimated by the visual angle which they fill, we having by experience learned to associate together their distance and their apparent, that is, angular size. Yet our judgment of objects, and more so if they are distant, is influenced by their clearness or obscurity. Distant mountains look quite near when the atmosphere is clear, but when hazy they seem to be at a greater distance from the beholder. Our judgment of distances are more accurate where we have intervening objects; most people must be acquainted with the apparent difference of a given distance on the water and on the land. Similarly the moon looks larger than ordinary when on the horizon, because we judge it by the intervening object. To prove that it is no larger, make a paper tube just large enough to enable you to see the whole of the moon through it, then by examining the moon in its different altitudes, you will discover that the diameter remains the same.

J. M. D.

➤ LITERARY. ◀

THE GARDEN OF THE VILLAGE PRIEST.

A RURAL BALLAD.

I KNOW a priest in the country who owns a little garden.

In the priest's garden there are strawberries, peonies and pansies. The strawberries are fragrant, the peonies