Under this head we solicit questions of interest bearing on optics, particularly the eye, the defects of vision and their correction by glasses.

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E. T., Ont.—"Why does an object move with the motion of the hand, when looking through a concave lens and in the opposite direction with a convex lense?"

Paraliel rays of light when passing through a prism, convex or concave lens or any of their combinations, are always refracted towards the thickest part of the lens. With a prism, this would be the base, a convex lens the centre, and the concave lens, the outer portion of the lens.

Suppose we have an eye looking directly ahead at some object. There is a small picture of the object on the yellow spot in the eye. Whilst looking at the object we may also notice other objects in any direction. Objects which are located above, are pictured below the yellow spot. This rule applies equally as well to objects located on the right or on the left of direct vision.

Let us now take a convex spherical lens and look through it at a door-knob, say about a quarter of an inch below the centre of the lens. The knob will apparently be moved downward or toward the thinnest part, and so to that part of the retina lying above the centre of vision. This upper portion of the retina which always sees the lower object will when stimulated by light, give one the impression that the object is below the point of direct vision. If the eye is kept perfectly still, it will not be looking at the knob but above it. By moving the lens downward so that the thickest portion is below the pupil or line of vision, the knob will apparently move upward because when moving the lens, the light from the knob will pass from the upper to the lower portion of the retina, and when it is below the macula, the knob will be apparently located above where it formerly was.

If we look at the knob through a concave spherical lens, and move it up and down, the knob will apparently move with the motion of the lens, because when the centre of the lens, which is the thinnest part, is above the line of vision, the thickest part of the lens is below it, and therefore the light is refracted to that portion of the retina. When the centre of the lens is below the visual line, the thickest part of the lens is above it, thus refracting the picture of the knob to the upper portion of the eye and when mind or sense refers to the knob as being located below the line of vision, until the eye is turned in the direction of the knob. The moment we turn to look directly at the knob, the macula is moved until it receives the light coming from the knob.

Looking at the knob through a prism lens, and frequently removing the lens, gives us the impression that the knob is turned towards the apex of the prism, when in reality the illusion is because of the light after passing through the prism, being refracted towards the base and consequently towards that side of the eye.

D. S., Ont.—"How do you find the centre when the lens is combined with a prism?"

In a spherical prismatic lens, the prismatic element breaks a line which is looked at through the lens in such a way that it becomes impossible to locate the optical center of the lens by the ordinary method. In such cases it is necessary to neutralize the prism which can be easily done by one of equal strength being placed over it in such a way that the apex of one is directly over the base of the other, after which the lens is similar to a plain spherical, and its spherical center may be determined as such.

L. T., Ont. "Can you tell me the best way to tell the axis of a cylinder lens when it is combined with a spherical?"

The experienced optician who is accustomed to handling combination lenses can easily distinguish the spherical or cylindrical surface of a weak lens by means of light reflected from the surface when the lens is held at the desirable angles. If the lenses be strong he can more easily distinguish from the surface. The spherical surface is equally curved in all meridians while that of the cylinder is curved in but one meridian and plane at the meridian at right angles. The plane meridian is equal to the axis. The curveture of the surface may also be ascertained by placing a straight edge against the surface of the lens and rotating it over the lens.

OPTICAL REPAIRS.

Should the eye wire be broken it is a much more difficult matter to repair it if broken near the joint The joint can be cut and the eye-wire cleaned, then rivet the joint on again and solder. The eye being now smaller it will be necessary to stretch; this can be done by putting a steel plate in, holding it by the joint with the nippers, and then heating the centre of the eye-wire to a red heat, and stretching it to the size required. Care should be taken, however, to rivet the joint on at right angles to the side of the eye, otherwise the joint, when finished, will be untrue, and throw the side out, and no amount of bending will set it right. If the eye is broken in the middle it will require an entire new piece of eye-wire, which will have to be riveted and soldered both to the nose and joint; this, however, will be, I fear, rather beyond the ordinary jeweler. Should a frame be rusty, and require re-coloring straw or blue, or re-nickling, it will necessitate the frame being thoroughly cleaned; in this case it is better to take the frame to pieces, and finish the sides and front separately. To do this it is necessary to fill up the front with a very fine half-round superfine smooth file, preferably an old one. It is as well to have several pairs of oval steel plates with a hole in the centre of each, of various sizes, so as to fit any ordinary frame. Fit a pair in the front instead of the glasses, then file up, and burnish the eyes and nose in a pair of wooden clamps fixed in the leg vise; then finish off the front and the back of the spectacle front by passing two pins