The Eye

At this point we have a general idea of how and why we experience our environment. However, the architect must understand more specifically how the eye and brain working together affect our conceptualization of the environment in which we live, what this implies in terms of architectural design.

Our visual field is the area in which objects are visually perceived. Our visual field can be subdivided into cones of vision which represent the limits of our ability to perceive characteristics of our environment. In descending order, the cones of vision of the human eye perceive: motion, brightness, color, form. In daily life, our eyes are in continual motion expanding our visual field and directing our attention to various significant objects within that field. This movement of eye or body shifts our cones of vision quite regularly, but they remain proportionally the same; we perceive motion before brightness, etc. Information in the larger cones of vision can motivate us to shift an image to the center of all our cones of vision in order to see the object more clearly. For example, the motion of a car may draw our visual attention to it when we are crossing a street.
Form is the most dominant aspect of architecture to be perceived. In general, our cone of vision for form scans across the angle of view shown in Figure 1. We scan horizontally more than vertically because it is physically easier for us and viewing 20° above the horizon is tiring. Vision also extends twice as far below the horizon as above it.

Therefore, it is easy to ascertain what part of an architectural environment is generally in view. Typically, within this band of vision, there are nodes of interest which the eye spends more time on, the nodes being those areas in the panorama with greater content (detail, differentiation, or cultural significance). At times we may seek something which is represented by a symbol or sign. Such information is usually displayed above the horizon line and we have learned to look for it there. Signs above stores are the most common example.

Once we have spotted something of interest, the eye examines it in a somewhat random manner. The fixation points of the eye jump quickly around the object being viewed. They do not follow contour but focus on specific areas of contrast; in areas where there is stronger contrast or more numerous instances of contrast, the eye fixates more often. Meaning also
plays a significant role, and the eye fixates more often on parts of an object that are expected to convey significant information. In looking at a friend, for example, our eyes return often to the eyes and mouth to detect meaning in their expression.

The eye and brain work together to enhance our perception of the environment. Enhancement occurs where we see contrast in our field of vision. Contrast in architecture can be light/dark, color, slant (edge) or a combination of these. At the line of contrast, such as where two colors abut, enhancement occurs. The two colors set the cones in our eyes firing impulses to a nerve network in the eye that interconnects the sensors and sends information to and from them and other nerve networks that eventually lead to the brain. If a set of proximally related cones are sensing the same color, they fire less frequently. However, if the nerve network finds that the proximal cones are sensing different colors (a contrast situation), it requires them to fire more often. In this manner, we receive more information in areas where contrast occurs. Interconnected nerve networks continue to reduce information (a reduction of about 120:1) before it is sent to the brain, but contrast is
clearly transmitted. The other forms of contrast interact with the eye and brain in a similar manner. The greater the contrast, the more enhancement occurs. Enhancement cannot occur where we see smooth transitions in slant or from light to dark or color to color. This means that our perception of these changes is poorer. Contrasts can exceed our physical limits. Op Art produces color contrasts that are so great they seem to shimmer at the line of contrast, and large light/dark contrasts are not unusual in architecture, forcing our eyes to adapt to one of these conditions and to lose detail in the other. Architecture can utilize all these types of contrast to express subtle hierarchies of meaning (perception).