Having given an account of the potential effects of colors in their seven contrasts, I shall attempt to provide a clear and complete map of the world of color. In Fig. 3, we developed a 12-hue color circle from the three primaries yellow, red, blue. However, this circular array is not adequate for a complete classification. Instead of a circle, we shall need a sphere, the solid adopted by Philipp Otto Runge as the most convenient for plotting the characteristic and manifold properties of the color universe. The sphere is the elementary shape of universal symmetry. It serves to visualize the rule of complementaries, illustrates all fundamental relationships among colors, and between chromatic colors and black and white. If we imagine the color sphere to be a transparent body, each point within which corresponds to a particular value, then all conceivable colors have a place.

Each point on the sphere can be located by its meridian and parallel. For an adequate color classification, we require only six parallels and 12 meridians.
On the surface of the sphere, we draw six equally spaced parallel circles, forming seven zones. Perpendicular to these zones, we draw 12 meridians from pole to pole. On the equatorial zone, in the 12 uniform quadrilaterals obtained, we place the pure colors of our 12-hue color circle. The two polar zones are occupied by white at the top and black at the bottom. In the two zones between white and the equatorial zone, we interpolate two evenly spaced tints of each hue. Between the equatorial zone and the black zone, we interpolate two evenly spaced shades of each hue. Since the 12 pure colors have unequal brilliances, the degrees towards white and black must be adjusted for each color separately. The pure color yellow is very light; and its two tints are therefore close together, whereas its two degrees of shade are far apart. Violet is the darkest of the pure colors, and its tints are widely spaced, whereas its shades are close together. Each of the 12 hues must be heightened and darkened beginning from its normal brilliance, so that we have two zones of tints and two zones of shades of the 12 hues, in each of which zones the tonality varies. Thus the yellow in the zone of first tints is lighter than the violet in that zone. The zones are not belts of uniform brilliance of the twelve hues.

Since we cannot reproduce the color sphere in three dimensions here, we project the spherical surface on a plane. If we view the color sphere from above, we see the white zone in the center, then the two zones of tints, and then half of the equatorial zone of pure colors. Viewing the sphere from below, we have the black zone in the center, then the two zones of shades, and then the other half of the equatorial zone.

In order to see the entire surface of the sphere at once, we may imagine the darker hemisphere to be slit at the meridians and developed in the same plane as the lighter hemisphere. The result is the 12-pointed star of Fig 48. White is in the center. Reading outward, we have the zones of tints, the zone of the pure hues, and the two zones of shades, with black at the extreme points of the star.
Fig. 49 shows an equatorial view of the color sphere. The equatorial zone contains the pure colors, lightened with white in two degrees of brilliance towards the white pole. Towards the black pole, the pure colors are shaded with black in two degrees of darkness. In the same way, Fig. 50 shows the sphere viewed from the other side. So we have taken in the whole surface of the sphere.

In order to find out what is going on inside the sphere, we must take sections.

Fig. 51 shows a horizontal section of the color sphere at the equator. We note the neutral gray region in the center, and the ring of pure hues on the outside. The two strata between the pure colors and the gray are the mixed tones of the corresponding complementary colors.

Such a cross section might of course be taken through any of the brilliance zones of the sphere.

In the center of the sphere, the series of grays extends along the axis between the white and black poles. Our diagram, as has been mentioned, has only seven degrees of brilliance. The fourth degree must therefore correspond to the middle gray between white and black, and that middle gray is the center of the sphere.

The same gray is obtained by mixing any two complementsaries. Therefore if we take two opposite hues of the equatorial zone, we get a complete set of gradations, as we did in Figs. 23–28 and in the section on complementsary colors. In the horizontal cross sections of the color sphere, we confine ourselves to five intermediates between opposite extremes, the central mixture being neutral gray.

Fig. 52 shows a vertical section of the color sphere, taken in the red-orange/blue-green sector. Looking at the equatorial zone of this section, we find blue-green at the left and red-orange at the right in maximum saturation. Towards the axis, we find two mixed degrees of each of the two saturated hues. The resulting seven equatorial chromas are tinted towards white and shaded towards black. Such vertical sections may be passed through any pair of complementary colors and the black and white poles. The several tonalities of any level of lightness or darkness should in this case be equal, and match the gray of that level.

By painting all the horizontal and vertical sections of the sphere in this manner, we complete our color catalogue. Horizontal sections contain the degrees of saturation of the hues, and vertical sections contain the tints and shades of a given pair of complementsaries, pure and diluted. Such exercises heighten color sensitivity to light-dark values and to degrees of saturation.

The following, then, are the colors we can construct by means of the color sphere:

1) The pure prismatic hues, located on the equator of the spherical surface;
2) All mixtures of the prismatic hues with white and black, in the brilliance zones of the surface;
3) The mixtures of each complementary pair, as exhibited in a horizontal section;
4) The mixtures of any complementary pair, tinted and shaded towards white and black, as represented in the corresponding vertical section.

Suppose we have a double-pointed needle universally pivoted at the center of the color sphere. Let one point of the needle be directed at any spot on the sphere; then the other point will indicate the symmetrical spot, or complementary color value. If one end points at the second tint of red, namely pink, then the other end will point at the second shade of the complementary green. If we point one end at the second shade of orange, namely brown, then the other end will point at the second tint of blue. Thus not only the opposite hues but also all their degrees of brilliance are in complementary relation to each other.

Fig. 53 shows the five principal paths of transition between two contrasting colors. If we begin with a complementary pair, say orange and blue-green, and try to find intermediates between the two, we first locate the two colors on the color sphere. Orange, which lies on the equator, may be modified towards blue.
along the equator by way of red and violet or else by way of yellow and green. These are the two horizontal paths. Alternatively, the same orange can be connected with blue along the meridian, either by way of light orange, white, and light blue, or else by way of dark orange, black, and dark blue. These are the two vertical paths.

By following the diameter of the color sphere from orange to blue, the two complementaries may be joined by way of gray and other mixtures of orange and blue, in the order of orange-gray, gray, and blue-gray. This is the diagonal path.

These five principal paths are the shortest and simplest lines of transition between the two contrasting hues.

If it be imagined that this systematic classification of colors and contrasts banishes all difficulties, I should add that the kingdom of colors has within it multidimensional possibilities only partly to be reduced to simple order. Each individual color is a universe in itself. We must therefore content ourselves with an exposition of fundamentals.