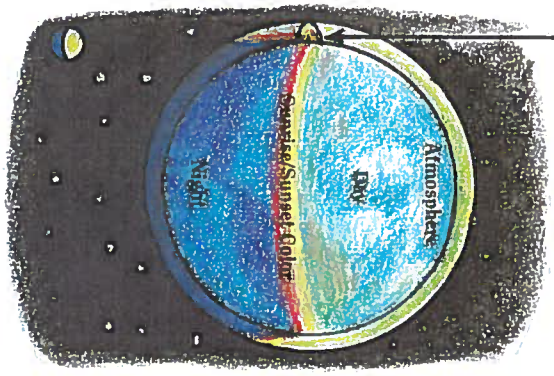
Understanding Atmosphere

If you look at a plain wall through a prism, you will not see prismatic colors, but if you look instead at a doorway, window, or any object where there is a boundary between light and dark, you will see every color of the rainbow. In the same way, atmospheric density acts like a prism, and some of the greatest displays of color we know come daily at the boundaries between night and day—sunrise and sunset. Similarly, during the day, pinkish horizons, distant blue mountains, indigo clouds, and other atmospheric phenomena can also be interpreted as a relationship of lightness and darkness—either dense atmosphere, darkening the light to form yellows, reds, and browns, or light-filled atmosphere, glowing in front of darkness as blue and violet.

Our "visual sense world"

This stylized earth shows how color forms on a border between day and night. Artists know that the "golden hour" for painting begins when the sun is 40 degrees above the horizon and, with lengthening shadows and golden light, keeps getting richer until dusk.



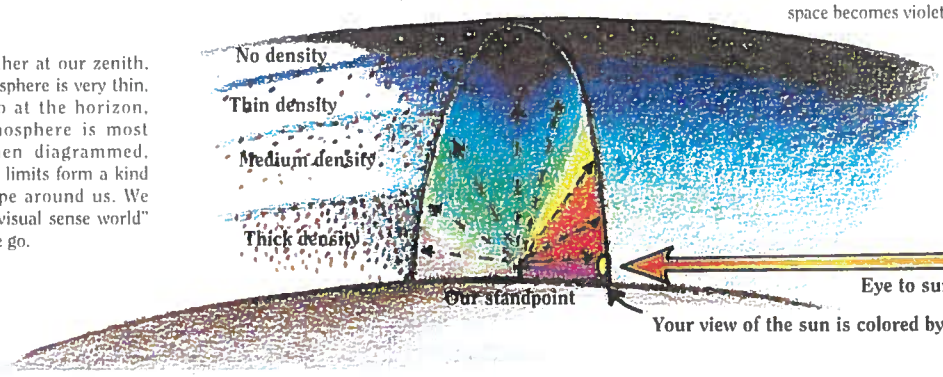
Sunlight to our "point of view"

Through 40,000 miles of atmosphere and 93 million miles of space, we see our gigantic sun with a tiny point of view—and often forget the bigger picture.

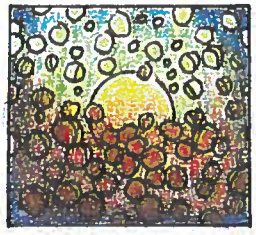
As we look toward the sun, atmospheric particles darken the light into reds and yellows while light-filled atmosphere against dark outer space becomes violet and blue.

Limits of our "visual sense world"

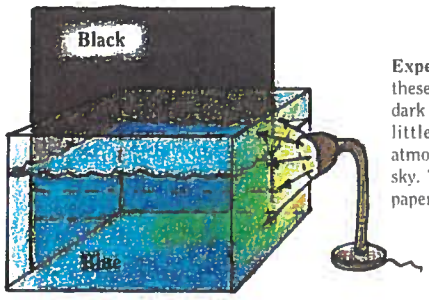
We see further at our zenith, where atmosphere is very thin, than we do at the horizon, where atmosphere is most dense. When diagrammed, these visual limits form a kind of bell shape around us. We carry this "visual sense world" wherever we go.



Things to notice: Compare the deep blue color of sky at 7,000 feet to the color of sky at sea level. Compare the sky color in dry climate to that in humid climate. Observe how the reddish earth on a mountaintop appears to be engulfed in blue when seen from afar, or how dark objects get lighter and bluer as they recede while light objects get darker as they recede into a neutral blue-gray.

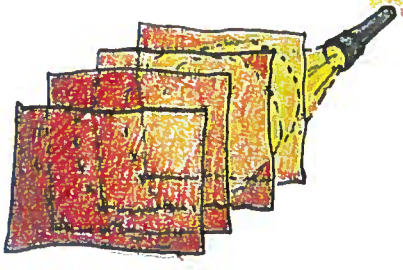


The diagram at left is a close-up view of how atmospheric particles might look while darkening towards red or lightening towards blue. The diagram at right shows how smoke looks bluish when it is seen in front of darkness but brownish as it passes in front of the light horizon; sunset colors form on the same principle.



Why the sky looks blue and indigo.

Experiments (Goethe's Color Theory): To experience these phenomena for yourself, get a tank of water and set a dark board behind it. Shining a light from the side, add a little milk or matt medium to simulate semi-opaque atmosphere, and then watch the water turn bluish, like the sky. To see how red forms, place several layers of tracing paper over a light.



Why the sunset appears yellow and reddish.

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