

James Jeans (1877–1946) was an English astronomer and physicist and a Fellow of the Royal Society. He studied at Cambridge University (Trinity College) and taught applied mathematics there until 1912. He spent his later years conducting research on star structure. Although he was a scholar and a researcher, he wrote many books on astronomy for the general public, including *The Universe Around Us* (1929) and *The New Background of Science* (1933). "Why the Sky Is Blue" is taken from *The Stars in their Courses*, a radio program series that was later made into a book.



Why the Sky Is Blue

Sir James Jeans

Imagine that we stand on any ordinary seaside pier, and watch the waves rolling in and striking against the iron columns of the pier. Large waves pay very little attention to the columns—they divide right and left and re-unite after passing each column, much as a regiment of soldiers would if a tree stood in their road; it is almost as though the columns had not been there. But the short waves and ripples find the columns of the pier a much more formidable obstacle. When the short waves impinge on the columns, they are reflected back and spread as new ripples in all directions. To use the technical term, they are "scattered." The obstacle provided by the iron columns hardly affects the long waves at all, but scatters the short ripples. 1

We have been watching a sort of working model of the way in which sunlight struggles through the earth's atmosphere. Between us on earth and outer space the atmosphere interposes innumerable obstacles in the form of molecules of air, tiny droplets of water, and small particles of dust. These are represented by the columns of the pier. 2

The waves of the sea represent the sunlight. We know that sunlight is a blend of lights of many colors—as we can prove for ourselves by passing it through a prism, or even through a jug of water, or as Nature demonstrates to us when she passes it through the raindrops of a summer shower and produces a rainbow. We also know that light consists of waves, and that the different colors of light are produced by waves of different lengths, red light by long waves and blue light by short waves. The mixture of waves which constitutes sunlight has to struggle through the obstacles it meets in the atmosphere, just as the mixture of waves at the seaside has to struggle past the columns of the pier. And these obstacles treat the light-waves much as the columns of the pier treat the sea-waves. The long waves which constitute red light are hardly affected, but the short waves which constitute blue light are scattered in all directions. 3

Thus, the different constituents of sunlight are treated in different ways as they struggle through the earth's atmosphere. A wave of blue light may be scattered by a dust particle, and turned out of its course. After a time a second dust particle again turns it out of its course, and so on, until finally it enters our eyes by a path as zigzag as that of a flash of lightning. Consequently the blue waves of the sunlight enter our eyes from all directions. And that is why the sky looks blue. 4

Questions for Discussion

1. Why is the sky blue? Summarize Jeans's explanation.
2. This was originally done as a radio performance. How does the medium determine the format, language, and sentence structure? What about this piece indicates that it is a radio show?
3. How does the opening example help to explain why the sky is blue? How is the scene described analogous to the sky?
4. Why is this piece so short? Why is it unnecessary that it be any longer than four paragraphs?
5. Who is the audience for this piece?
6. Why does personification (assigning human traits to inanimate objects) help to make this piece interesting? Where does Jeans use personification?
7. What elements of nature become "characters" in this piece? How do they interact with each other?

Questions for Reflection and Writing

1. Write an explanation of a scientific concept for yourself, in order to understand the concept.
2. Rewrite the explanation of this concept for a young or uninformed audience, similar to what Jeans has done. Pretend you are on a radio show or giving a talk to a classroom of young children.
3. Rewrite the explanation again, this time for an older or more technically informed audience, such as teachers or scientists. In this version include research, documenting your sources.