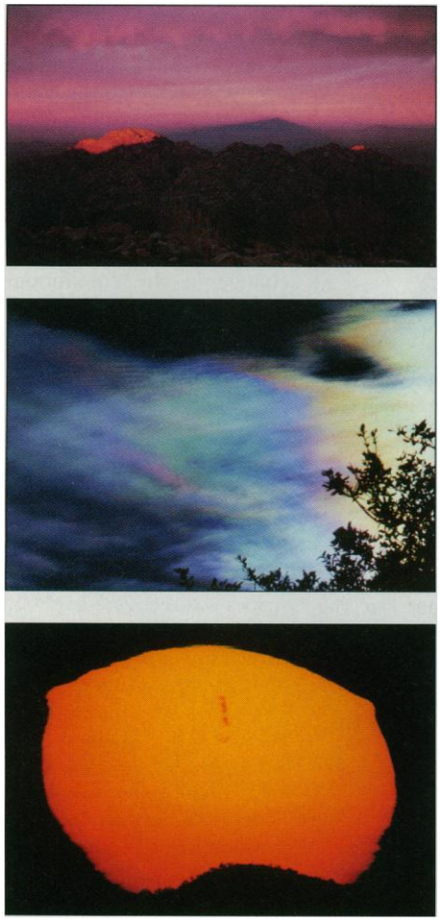
Optical Marvels

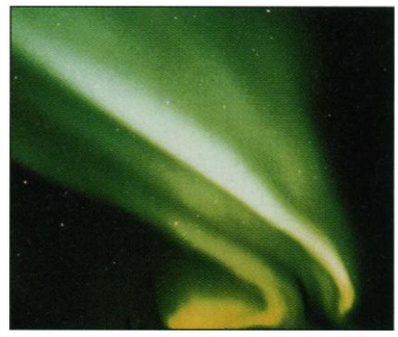
Color and Light in Nature. DAVID K. LYNCH and WILLIAM LIVINGSTON. Cambridge University Press, New York, 1995. xiv, 254 pp., illus. $69.95 or £40; paper, $29.95 or £17.95.

The sky around us is full of colorful light displays, ready for anyone who looks closely. Statistics from careful observers show that any location has some rare or wonderful phenomenon every third day on average. Most people notice only the occasional rainbow and pretty sunset, yet they could see much more if they only knew what to look for. *Color and Light in Nature* will facilitate this admirably.



Top, "Mountain shadow of Kitt Peak [Arizona] viewed from the summit appears triangular even though the mountain itself is flat-topped. Details of the mountain summit profile are collapsed into the apex of the shadow and so are not resolved." Middle, "Irisation with its metallic hues." Bottom, Distortion of the low sun. "Such irregular shapes result from refraction by localized, usually stratified density (i.e., index of refraction) variations in the lower atmosphere." [From *Color and Light in Nature*]

The book covers well-known phenomena like twilight colors, twinkling, mirages, sundogs, eclipses, green flashes, and the zodiacal light. Also discussed are many less well-known colored sky lights such as Bishop's rings, nacreous clouds, Haidinger's brushes, supernumerary bows, alpenglows, and blue moons. The author's original researches on mountain shadows, glitter from waves, sunbeams, moon circles, mountain ridge visibility, and various halos have their first popular discussion here.



Aurora borealis. [From *Color and Light in Nature*; photo by Paul J. Neiman]

A strength of the book is its many beautiful pictures, about half in color. I count 15 images that display phenomena I have never seen depicted.

Meteorological optics is a broad interdisciplinary study, and Lynch and Livingston provide 296 references to the best of the widely scattered technical literature. For the past 40 years, the classic and definitive monograph has been the excellent overview by M. Minnaert. But now the up-to-date research, new ideas, beautiful pictures, and excellent explanations make *Color and Light in Nature* the new classic.

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Voices from the Past

Science in the Making. Scientific Development as Chronicled by Historic Papers in the *Philosophical Magazine*—with Commentaries and Illustrations. Vol. 1, 1798–1850. E. A. DAVIS, Ed. Taylor and Francis, Philadelphia, 1995. xxxvi, 401 pp., illus., + plates. $115 or £59.95.

Founded in London in 1798 as a vehicle "comprehending the various branches of science, the liberal and fine arts, agriculture, manufactures, and commerce," *The Philosophical Magazine* is now nearing its 200th anniversary. To mark the occasion its publisher, Taylor and Francis, is putting out a set of four volumes photographically reprinting a selection of items that have appeared in the magazine over the years. This first volume includes some 50 papers giving a sampling of topics represented during the first quarter of the magazine's history. An opening section includes the table of contents of the first volume and papers from the years 1798 to 1800 considering the Cartwright steam engine, diving machines, instruments for tooth extraction and trepanning, and a possible meteorite. A second group is devoted to early electrical studies (1800 to 1824), "from the Voltaic pile to the electric motor." A group of communications by Humphry Davy and Michael Faraday includes an account of a meeting of the Royal Society along with comments on fire-damp in coal mines and fluid chlorine. A group designated Miscellany includes Roderick Impey Murchison's "On the Silurian System of Rocks" along with observa-tions on lightning, defense against cannonballs, and a bridge collapse. In a group on the nature of light and matter (1833 to 1846) authors represented include Faraday, David Brewster, G. B. Airy, and John Herschel. Eight contributions on electricity and magnetism, 1832 to 1846, are authored mostly by Faraday, and a final group is devoted to contributions from James Prescott Joule, including comments on heat, sound, and shooting stars. The volume contains various introductory material about the magazine and its history, including a foreword by the physicist Nevill Mott, its editor in the 1960s, and another by John Meurig Thomas of the Royal Institution, with which, as another popularizing enterprise, the magazine has many affinities. There are also brief introductions to the individual groups of papers.

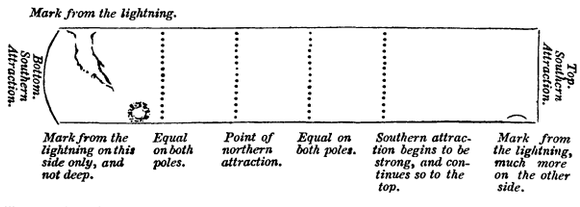

Illustration from an 1832 communication to *The Philosophical Magazine* from Benjamin Boddington, Esq., describing the interesting magnetic properties acquired by his daughter-in-law's stays when she and her husband were "struck senseless" by lightning while riding in their post-chariot. [From *Science in the Making*, vol. 1]

Katherine Livingston