

Light and color in the open air: introduction to the feature issue

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This feature issue is a celebration of the joy and scientific richness of observing optical phenomena in nature. The majority of papers are adapted from presentations given at the Ninth International Meeting on Light and Color in Nature, held in Bozeman, Montana, from 25 to 29 June 2007. © 2008 Optical Society of America

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This feature issue is a celebration of the joy and scientific richness of observing optical phenomena in nature. Inspired by Minnaert's classic book [1], we devote our attention to optical phenomena in the natural world that can be observed with the naked eye, as well as technological simulations and measurements that help us better understand these phenomena. In addition to such directly visible consequences of atmospheric scattering as halos, rainbows, and coronas, we also include optical phenomena seen through simple linear polarizers such as skylight polarization. This is the kind of optics that appeals to all ages, and we consider it a privilege to share this wonderful collection of papers with you.

The majority of papers in this feature issue were presented at the Ninth International Meeting on Light and Color in Nature, held at Montana State University in Bozeman, Montana, from 25 to 29 June 2007. This was the ninth in a series of meetings, uniquely focused on natural optical phenomena, which have been held approximately every three years since being initiated by David Lynch in 1978. These conferences are the favorite scientific gathering for many regular attendees. There are

no parallel sessions, so everyone listens to everyone else. We always come away excited and motivated to perceive our optical world more clearly. One of the highlights of each meeting is a slide show (of course, mostly a digital picture show these days) where anyone is welcome to show their latest pictures of natural optical phenomena.

As feature issue editors, we are mindful that we are merely representatives of the entire community of colorful scientists who study light and color in nature. Thus we extend our gratitude to all the authors of papers in this feature issue, to all the presenters at the meeting who were unable to archive their work here, and to the many colleagues and staff at the Optical Society of America Publications Office who helped to create this issue. We gratefully acknowledge the service of the Light and Color Meeting's organizing committee, Sue Martin for her superb service to the meeting attendees, and to Montana State University for hosting a truly wonderful conference. Because some who participate in this meeting and feature issue do so with little or no research funding, we offer special thanks for generous conference and publication financial support from the National Science Foundation (via grant ATM-0731416), the Optical Society of America, and the Montana State University Optical Technology Center. We also are

pleased to thank Jari Loumanen of Finland and Claudia Hinz of Germany for sharing their outstanding photographs for use on this issue's cover.

Now we invite you to join us through the pages of this feature issue. In the future, we invite you to join us in person at our meetings and in subsequent feature issues that will continue to explore the world of optics in nature. An announcement of the next meeting will appear soon on the web page of the 2007 meeting (<http://www.optics.montana.edu/light&color2007.html>). A listing of past feature issues is given as Ref. [2], and a listing of the corresponding meetings (with the organizers' names in parentheses) is given as Ref. [3].

Finally, we offer a tribute to the memory of Marjorie Meinel, co-author of one of the landmark books in our field [4], who passed away in June 2008. It is our honor to remember her and to acknowledge the lasting influence that she and her husband Aden have had on our field by quoting a few words from Henri Poincaré [5]:

“The scientist does not study nature because it is useful; he studies it because he delights in it, and he delights in it because it is beautiful. If nature were not beautiful, it would not be worth knowing, and if na-

ture were not worth knowing, life would not be worth living.”

References

1. M. Minnaert, *Light and Color in the Outdoors*, originally published as *Light and Color in the Open Air* (Springer-Verlag, 1993).
2. Previous feature issues in this series include: *J. Opt. Soc. Am.* **69**, 1051–1198 (1979); *J. Opt. Soc. Am.* **73**, 1622–1664 (1983); *J. Opt. Soc. Am. A* **4**, 558–620 (1987); *Appl. Opt.* **30**, 3381–3552 (1991); *Appl. Opt.* **33**, 4535–4760 (1994); *Appl. Opt.* **37**, 1425–1588 (1998); *Appl. Opt.* **42**, 307–525 (2003); *Appl. Opt.* **44**, 5623–5762 (2005).
3. Meetings in this series include: *Meteorological Optics*, Keystone, Colorado, 1978 (David Lynch); *Atmospheric Optics*, Incline Village, Nevada, 1983 (William Mach and Alistair Fraser); *Meteorological Optics*, Honolulu, Hawaii, 1986 (David Lynch); *Light and Color in the Open Air*, Washington, D.C., 1990 (Robert Greenler); *Light and Color in the Open Air*, State College, Pennsylvania, 1993 (Craig Bohren); *Light and Color in the Open Air*, Santa Fe, New Mexico, 1997 (Ken Sassen); *Meteorological Optics*, Boulder, Colorado, 2001 (Stanley David Gedzelman); *Atmospheric/Meteorological Optics*, Bad Honnef, Germany, 2004 (Michael Vollmer); *Light and Color in Nature*, Bozeman, Montana, 2007 (Joseph Shaw).
4. A. Meinel and M. P. Meinel, *Sunsets, Twilights, and Evening Skies* (Cambridge U. Press, 1983).
5. H. Poincaré, *The Foundations of Science*, translated by G. B. Halsted (Science Press, 1921).