LETTERS TO THE EDITOR

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Letters are selected for their expected interest for our readers. Some letters are sent to reviewers for advice; some are accepted or declined by the editor without review. Letters must be brief and may be edited, subject to the author's approval of significant changes. Although some comments on published articles and notes may be appropriate as letters, most such comments are reviewed according to a special procedure and appear, if accepted, in the Notes and Discussions section. (See the "Statement of Editorial Policy" at http://www.kzoo.edu/ajp/docs/edpolicy.html.) Running controversies among letter writers will not be published.

ECLIPSE PINHOLE IMAGES

Thomas Greenslade's descriptions are always interesting, as was his description of an 1877 drawing of pinhole-camera images of the sun caused naturally by interstices through foliage (November 2013 issue, p. 814). But more obvious than the pinhole images are in this drawing are pinhole-images of a partially eclipsed sun, as my students, colleagues, and I observed in Gabon on November 3 during a solar eclipse. During such an eclipse, the non-round shape of the sun clearly makes the projected shapes *images* that have been formed rather than mere round spots. I often use a cheese grater to take advantage of its hundreds of holes to make multiple images of the sun during its partial phases (see Fig. 1)—for us a precursor to the more exciting phase, the total solar eclipse. Hundreds of millions of Americans will be able to see such effects during the August 21, 2017, total solar eclipse that will be visible from the entire continental United States and Alaska.

The non-round images from a total eclipse, viewed from holes in tents a couple of thousands of years ago, may well have led people to realize that pinhole imaging occurs, propelling us along the path to the camera obscura, movie cameras, and today's television.

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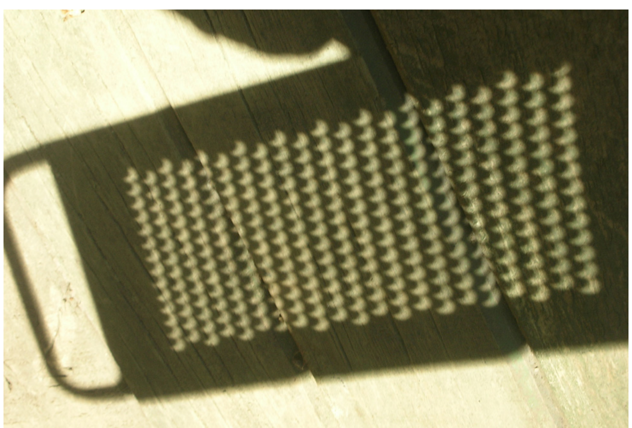

Fig. 1. A cheese grater is used to create dozens of pinhole images of a partial solar eclipse on Feb. 7, 2008, in Nelson, New Zealand. Photo by Jay M. Pasachoff.

MANY-BODY PHYSICS IN ATOMS AND MOLECULES

A recent article in this journal uses several well-known features in the photoabsorption cross-section of rare gas atoms (Rydberg series, Fano resonances, Cooper minima, and giant dipole resonances) to introduce many-body physics to undergraduates.[1] The authors use a time-dependent configuration-singles (TDCIS) approach to capture the particle-hole interactions responsible for these effects. Thirty years ago, Zachary Levine and I published a very similar article in this journal using a time-dependent local density approximation (TDLDA) that includes exactly the same particle-hole physics.[2] We discussed a giant dipole resonance in the absorption spectrum of the xenon atom and a Fano resonance in the absorption spectrum of the acetylene molecule. To capture the attention of undergraduates, we did not emphasize the many-body aspects, but instead focused on the origin of the phenomenon discussed as a microscopic version of the phenomenon of dielectric polarization familiar to students in junior/senior level courses in electromagnetism.

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[1] D. Krebs, S. Pabst, and R. Santra, "Introducing many-body physics using atomic spectroscopy," Am. J. Phys. **82**, 113–122 (2014).
[2] A. Zangwill and Z. Levine, "Individual atoms and molecules as dielectric media," Am. J. Phys. **53**, 1177–1182 (1985).

