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DISCUSSION

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The essential point of this paper, to show the value of utilizing 90 deg or larger rim angles for heating axial specimens, has been generally neglected in the literature of solar concentrators. As the authors have pointed out, such specimens would have large temperature gradients from edge to center and in depth unless special precautions are taken to insure uniform heating.

However, I believe that the use of very large aperture furnaces would tend to become prohibitive in cost. The alternative mentioned by the authors of seeking special-shape two-mirror configurations would probably be more practical in the end. Although more precision would have to be incorporated into the surfaces in order to correct for aberrations, the distribution of flux could be made to conform much more closely to the sample configuration. It becomes increasingly evident that each solar concentrating surface must be designed for its principal use, and that no single device will satisfy all users.

Our own experience with a large furnace has demonstrated that a departure from the paraboloidal shape is not only economical but also very useful. Using preformed spherical segments of plate glass on an anastigmatic mounting, we have been able to attain a coefficient of geometrical perfection slightly larger than 0.5. Unlike the authors, we are interested in plane targets, so that the formation of a good solar image is our goal. In the case of axial specimens a strongly astigmatic image using thin radial segments might be quite feasible, and large angles could be attained without the large increase in aperture necessary with a paraboloid. Lost radiation could be refocused by a secondary mirror surrounding the rear section of the sample.

The paper under discussion presents an important and necessary view on the design of future solar concentrating devices for research. The error of creating several large instruments with similar characteristics can be avoided by designing each one for its principal field of research.

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