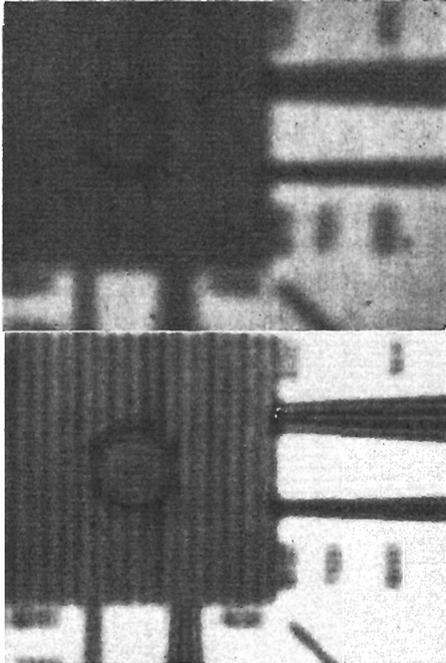


AMERICAN ASTRONOMERS REPORT

Here are some highlights of the 131st meeting of the American Astronomical Society at New York City, December 8-11, 1969. Technical abstracts will appear in the Bulletin of the society.

Sharpening Optical Images

Most astronomers at one time or another have wished for a way to sharpen a blurred photograph, that is, to undo the results of imperfect focus, trailing, optical aberrations, and atmospheric turbulence. Two ways for doing just that were described by George W. Stroke, State



George W. Stroke has transformed a low-resolution $f/240$ image (above) into the high-resolution picture below. Three sets of vertical pair apertures and three horizontal pairs were used for the synthesis. State University of New York (Stony Brook) photograph, courtesy of Dr. Stroke.

University of New York at Stony Brook. His method can also be used for combining into one picture the images taken by a multiple-aperture camera.

Dr. Stroke uses a variant of the aperture-synthesis techniques of radio astronomers. They employ high-speed computers to combine mathematically the signals from many small antennas into one signal that has the same resolution as a big antenna filling all of the space between the smaller ones. But because of the much greater amount of information contained in an optical image, one such aperture synthesis at optical wavelengths could take months of computer time. Dr. Stroke shortens the process by using photographic addition to superimpose the multiple images directly.

An important application would be the synthesis of high-resolution photographs in cases where only low-resolution optical components could be used. For example, in X-ray astronomy such an arrangement could provide considerable improvement in signal-to-noise ratio.

At the meeting was shown an X-ray photograph of the sun (wavelengths 44-70 angstroms), obtained in 1968 from an Aerobee rocket by K. Fredga, W. S. Muney, and J. H. Underwood. They had to use a single large pinhole to pass enough X-rays to form the image, which was blurred. Also shown was the same picture considerably sharpened by Dr. Stroke's new holographic deblurring technique.

Details of the optical aperture synthesis method have appeared in *Physics Letters*, Vol. 38A, No. 9 (December 29, 1969).