tion of time lag yields a prominent peak at a lag of about $4\frac{1}{2}$ days, which is approximately equal to the transit time of the solar wind from the sun to the earth. Comparison of the (approximately 27-day) recurrence period of the interplanetary field with observations of the differential rotation of the photospheric field suggests that the latitude of the solar source of the interplanetary field was within 10 or 15 deg of the center of the visible disk.

The Differences between Meteoritic and Volcanic Spherules. F. W. WRIGHT, P. W. HODGE, AND F. A. FRANKLIN, *Smithsonian Astrophysical Observatory*.—We have acquired dust deposits from five Pacific Coast extinct volcanoes and from three recently or currently active volcanoes in order to search for and analyze microscopic volcanic spherules that might possibly be similar to the meteoritic spherules found in polar ice deposits and at other remote sites.

Electron-beam microanalysis shows a difference in composition for the volcanic particles and for the arctic ice spherules. The majority of the latter are similar to magnetite in composition, with 50–75% Fe (by weight), no Al, and little or no Si, while the volcanic spherules show a composition more like 20–30% Fe in the mean, 8% Al, and 19% Si. In addition we find the concentration of spherules, relative to irregular particles, to be very much higher for the arctic samples than for the volcanic samples. These results support our conclusion that a volcanic origin is impossible for the majority of the meteoritic spherules recovered in ice deposits and in other remote regions. For a third possible criterion, we have measured the densities of a few individual spherules of both types.

A Detailed Interferometric Investigation of Cygnus A and Cassiopeia A at 9.8 cm Wave-

length. S. H. ZISK, *Stanford University* (present address: *MIT*).—The two-dimensional brightness distributions of several discrete radio sources were investigated by tracking them with a variable spacing north–south interferometer. The amplitude of the visibility function was mapped within a roughly rectangular area with half-dimensions of 900 wavelengths east–west and 1300 wavelengths north–south.

The position angle of the axis of Cygnus A was measured to be 109.0 ± 1.0 at the higher resolutions, but decreases to $104^\circ \pm 3^\circ$ at about 400 wavelengths. If the brightness temperature of the source increases toward the ends of the major axis as has been proposed by several investigators (Lequeux, J., *Ann. Astrophys.* **25**, 221, 1962; Swarup, G., Thompson, A. R., and Bracewell, R. N., *Astrophys. J.* **138**, 305, 1963; Moffet, A. T., *Science*, **146**, 764, 1964) the present work suggests that not only the apparent spacing of the components but also the position angle of the axis is a function of wavelength. This is consistent with early meter-wavelength measurements (Jennison, R. C., and Latham, V., *Monthly Notices Roy. Astron. Soc.* **119**, 174, 1959).

The known negative curvature of the spectrum of the integrated flux from the source contradicts the simple picture of outer, bright condensations with relatively flat spectra in combination with extended inner regions with steep spectra. It is suggested that the inner regions have a constant spectral index at low frequencies, with a sharp downward break at the low decimeter range.

Cassiopeia A exhibits a visibility function that suggests peaks in the two-dimensional brightness distribution in a range from -30° to -42° and/or from 138° to 150° . If symmetry is assumed on the basis of other investigations (Thompson, A. R., and Krishnan, T., *Astrophys. J.*, to be published), an appropriate three-dimensional model would be an axially symmetric source similar to a spherical shell with gaps at the poles. The axis of symmetry is at an apparent position angle of $+54^\circ$.