No orbit has been found hyperbolic except within the probable range of solution near the parabolic limit. Interstellar meteors, if such exist, must constitute less than 1 per cent of the typical meteors in the visual range.

Previous conclusions, based on the brighter meteors photographed with smaller cameras, are generally supported by the present data. A cometary origin is indicated for more than 90 per cent of the meteors. About 30 per cent of the orbits are randomly oriented and of long period while almost all of the remainder are like those of short-period comets.

Meteors from the major meteor showers are less frequent than among the brighter meteors but a few new showers and associations have been found.

*Smithsonian Astrophysical Observatory,
Cambridge, Mass.*

White, Marvin L. Oscillations of the earth's atmosphere.

The resonance theory of atmospheric oscillations on a rotating globe including a unified treatment for both a gravitational and thermal forcing function is now extended to include a source function for all heights in the atmosphere. Expressions are obtained for the oscillatory wind velocities and displacements and for the resonance magnification which are valid for all heights.

New expressions are obtained for a linear "top" and results of extensive numerical and mechanical integrations based on the Rocket Panel model for the atmospheric temperature profile are compared with previous integrations by Jacchia and Kopal. In contrast to their findings, present solutions seem quite sensitive to boundary conditions at the top.

Finally, oscillatory wind measurements at the ground level, at the 16 km level by balloon measurements, at the 90 km level by echo from meteor trails, and at the 110 km level by radio sounding, are shown to be in excellent agreement with the resonance theory and further serve to indicate the assumption that the variables are separable.

*National Bureau of Standards,
Washington, D. C.*

Whitehurst, Robert N., Mitchell, F. H. and Copeland, Jack. Solar radiation and atmospheric attenuation at 6 mm wave length.

The survey of solar radiation and atmospheric attenuation using a Dicke radiometer has been extended into the neighborhood of 6 mm wave

length. Most of the atmospheric attenuation at this wave length in clear weather is due to molecular oxygen. Since 6 mm lies on one wing of the oxygen line centered at 5 mm, measurements at this wave length help in the selection of an appropriate value for the line width. The total vertical attenuation at 6 mm is about 1.2 db, implying a line width not greater than 0.02 cm^{-1} .

The effective solar temperature at 6 mm is found to be $4500^\circ \pm 400^\circ \text{K}$, while at 7.5 mm a temperature of $6000^\circ \pm 500^\circ \text{K}$ was reported (Whitehurst and Mitchell 1956). Since the shorter wave-length radiation comes from lower in the chromosphere, these values imply that the temperature decreases in accordance with the model of the chromosphere which predicts temperatures near 4500°K near the photosphere (van de Hulst 1953). The decrease of temperature between 7.5 and 6 mm is thought to be better established than the temperatures themselves. However, the quoted temperatures are in general agreement with values at 8.5 mm reported by Hagen (1951). This work was sponsored by the Office of Ordnance Research, U. S. Army.

Hagen, J. P. 1951, *Ap. J.* **113**, 547.
van de Hulst, H. 1953, Chap. 5 in *The Sun*, ed. G. P. Kuiper (Univ. Chicago Press), p. 222.
Whitehurst, R. N. and Mitchell, F. H. 1956, *A. J.* **61**, 192.

*University of Alabama,
University, Ala.*

Wilson, Raymond H., Jr. Special considerations necessary for the finding ephemeris of a close earth-satellite.

For a satellite revolving within a tenth or so of the earth's radius from its surface, one must consider carefully certain phases of the ephemeris problem which, for the moon and other more ordinarily distant planetary objects, may be practically negligible.

One such question demanding a radically new approach is parallax. For the moon and other more distant objects it is sufficient to compute a geocentric ephemeris, which will be correct simultaneously for a full terrestrial hemisphere of visibility except that parallax corrections for individual observers, usually much less than a degree of arc, must be added. By contrast, for the very close satellite parallax approaches a full quadrant in magnitude, but the object is visible at any instant from only a small fraction of a geographical hemisphere.

Hence, for a close satellite the practical finding ephemeris must be a geographical ephemeris