Reviewer's Comment

The papers by Ruskol* and Moroz† contain some interesting but speculative suggestions concerning mechanisms which might lead to a dust belt or geocentric concentration of dust particles in the vicinity of the earth. Neither author favors the lunar impact hypothesis advanced by Whipple, but their arguments against this mechanism are weakened by a serious error (discussed below) in the analysis by Moroz of the rocket and satellite data. Some of the mechanisms proposed by the two authors are somewhat contradictory. For example, Ruskol suggests that particles may form in the vicinity of the earth from vapors formed in collisional interactions of dust particles accreted from interplanetary space, whereas Moroz suggests that high flux rates along with low accretion rates may result from fragmentation and subsequent evaporation of cometary debris in the upper atmosphere. Ruskol favors capture of dust particles into long-lived geocentric orbits, but Moroz finds that this mechanism is not a satisfactory explanation for the concentration.

The validity of the analysis by Moroz would be strengthened if it could be shown that the slope of the assumed mass distribution curve is unique or that the conclusions are relatively independent of a slight change in the slope. Attention is brought to these points, because the question of what mass distribution curve should be used in normalizing the data to a single value of particle mass before testing for an altitude dependence in the flux rates is a critical one in analyses of the direct measurements. Failure to realize this may lead one to purely spurious conclusions. More could be said on this subject, but instead, the interested reader may consult the references listed here. These papers include various results of an analysis of the available direct measurements based not on an assumed mass distribution but on a mass distribution measured with the satellite Explorer VIII.

The data from Explorer VI included in the analysis by Moroz have never been placed in the open literature by the experimenters; therefore, these results should not be propagated as a valid direct measurement.

—Curtis W. McCracken
NASA Goddard
Space Flight Center

* Ruskol, E. L., "Origin of the interplanetary dust cloud around the earth," AIAA J. **1**, 2209–2212 (1963).

† Moroz, V. I., "Earth's dust envelope," AIAA J. 1, 2212–2216 (1963).

[1] McCracken, C. W., Alexander, W. M., and Dubin, M., "Direct measurements of interplanetary dust particles in the vicinity of earth," Nature **192**, No. 4801, 441–442 (1961).

[2] McCracken, C. W. and Alexander, W. M., "The distribution of small interplanetary dust particles in the vicinity of earth" (to be published in Proc. Intern. Symp. Astronomy and Physics of Meteors; also in Smithsonian Contributions to Astrophysics; presently available as NASA TN D-1349).

[3] Dubin, M. and McCracken, C. W., "Measurements of distributions of interplanetary dust," Astron. J. **67**, No. 5, 248–256 (1962).

[4] Alexander, W. M., McCracken, C. W., Secretan, L., and Berg, O. E., "Review of direct measurements of interplanetary dust from satellites and probes" (to be published in Proc. Third Intern. Space Sciences Symp.; presently available as NASA TN D-1669).

SEPTEMBER 1963 AIAA JOURNAL VOL. 1, NO. 9

Direct Measurements of Airglow in the Region $\lambda = 8640$ Å

T. M. Tarasova

In this work the results of preliminary processing of experimental data obtained on September 23, 1960 are presented. The purpose of this experiment was to investigate the distribution in height of the night sky glow in the region of the spectrum $\lambda = 8640$ Å, in which the emission of molecular oxygen is concentrated. The investigated region was outlined with the aid of an interference light filter with half-width $\lambda = 280$ Å. The photometer was launched to altitudes of 200 km by means of a rocket. During measurements it performed complex motions which may be described approximately as follows: the axis of the photometer was directed toward the zenith in the range of altitudes from 65 to 75 km; at 75 km the device began a rotation, which was attended by increase in the intensity recorded by the device. In the 110–160 km range, the axis of the device is directed downward, and at 170–200 km the axis is directed again toward the zenith. In the descending branch of the trajectory from $h =$ 200 to $h = 140$ km, the axis was directed at all times toward the earth.

The measurement results are presented in Fig. 1, in which the relative intensity recorded by the device in its measurement position is the abscissa, and the height of photometer is the ordinate. The position of the axis of the device is shown by arrows. It may be seen from Fig. 1 that the intensities measured at altitudes $h_B = 130$ km (ascent) and $h_H = 170$ km (descent) are equal (in both cases the axis of the photometer was directed vertically and downward). This indicates the absence of glow in the 130–170 km altitude range.

The portion of the curve corresponding to the altitudes $h =$ 64 to 74 km is characteristic; at these altitudes the intensity is constant and equal to the intensity measured from the ground ($h = 0$). This indicates the absence of glow in the atmospheric layer from 0 to 74 km altitude. At the same time, Fig. 1 indicates that the intensities registered at $h = 64$ km (axis directed toward the zenith) and $h = 130$ km (axis directed vertically downward) are equal. This fact and also the absence of glow at altitudes below 74 km permit the conclusion that, in the investigated region of the spectrum, all glow occurs in the layer 74 km $< h <$ 103 km. The sharp increase in intensity at 110, 165, and 180 km, caused by the rotation of the device, gives I (h = 180 km) $< I$ (h = 110 km). Such correlation must be observed at the disposition of the layer near 100 km.

In Fig. 2 we plotted the variation of relative radiation intensity with altitude over the 65–100 km and 170–190 km ranges. Curve I is plotted for the intensity without allowing for the orientation of the device, curve II for the intensity re-

Translated from *Iskustvennye Sputniki Zemli* (*Artificial Earth Satellites*) (Academy of Sciences Press, 1962), no. 13, pp. 107–109. Translated by Andre L. Brichant for NASA Headquarters, Washington, D. C.