zero velocity disappears completely from the orbital plane and the particle can travel to the Earth unhindered in any direction.

Now, according to Varsavsky, the tektites are lunar particles, ejected from the Moon by an impact of a meteorite, which have reached the Earth in this way; but his supporting evidence of particular trajectories connecting the terrestrial and lunar surface cannot, in the light of the foregoing remarks, claim any particular significance. The impact of a large meteorite on the Moon may indeed eject some lunar matter into outer space; but its velocity-components could not help to exhibit considerable dispersion in all directions. A minute dispersion of such velocities would, however, be sufficient to scatter widely particles impinging on as distant a target as the Earth. Perhaps the most significant fact known about the terrestrial tektites is their clustering in certain localities constituting together only a tiny fraction of the total solid surface of the Earth. This fact suggests strongly that their origin must be sought much nearer to the terrestrial surface than the Moon; and the view expressed recently by Urey[2] that this origin may be connected with the impact of cometary material appears to me to be the most satisfactory hypothesis advanced so far to this end.

Gold (*op. cit.*) conjectured also that the tektites may be formed from the same material as that constituting lunar rays around certain craters of recent (and presumably impact) origin. This suggestion should lend itself to the following direct experimental test. From a recent work of Kozyrev[3] we know that such rays on the Moon (at least around the crater Aristarchos) exhibit fairly strong luminescence in the region of 4000 A. under the impact of the aurora-producing solar corpuscular radiation. Should, therefore, the terrestrial tektites fail to exhibit a similar emission under laboratory bombardment by 50–100 keV. protons, Gold's hypothesis would have to be abandoned (or strengthened in the converse case).

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[1] O'Keefe, J., Varsavsky, C. M., and Gold, T., *Nature*, **181**, 172 (1958).
[2] Urey, H. C., *Nature*, **179**, 556 (1957).
[3] Kozyrev, N. A., *Izvestia Crimean Astr. Obs.*, **16**, 148 (1957).

O'Keefe argues that tektites were thrown off the Moon by meteorite collisions and that they spiralled into the Earth during 10^7 years due to passage through the rare interplanetary gas and that they fall in an equatorial belt on the Earth at all points and continuously in time. Gold discusses the possible melting of the lunar materials due to meteorite collisions, but implies an acceptance of O'Keefe's arguments in regard to fall on the Earth.

Observations on tektites indicate that they occur in localized areas and that each group was distributed during a short time-interval. I have not worked on this aspect of the problem but have read the literature on the subject with some diligence. If data do not agree with our theories, do we arbitrarily ignore the data or state that they are different from those reported by competent observers?

The tektites have compositions in which silica and alumina are very prominent. Such compositions are consistent with those of some sedimentary rocks, but we can scarcely expect that the Moon was subjected to the processes that produced terrestrial sediments. Hence, it is necessary to assume that igneous processes on the Moon produced these very acid materials. In this case, the chemical processes on the Moon have differed from those on the Earth, because only rare terrestrial igneous rocks have compositions approaching those of tektites. (See R. A. Daly, "Igneous Rocks of the Earth", McGraw-Hill Book Co., New York, for analyses of igneous rocks and estimates of their relative abundances.) Terrestrial igneous rocks are often re-fused sediments, and thus even these may owe their chemical composition to sedimentary processes. The chemistry of silicate material is not completely known, and it is not possible to conclude that some new variations of silicate minerals will not occur somewhere, but a puzzling problem is not solved by referring it to a region in which the empirical chemical facts are not known. If material of the composition of tektites is generally present on the Moon, its igneous rocks are markedly different from those of the Earth.

Varsavsky reports machine calculations which can be assumed to be numerically correct although they cannot be checked, as is usual in such cases. However, he does not consider the near misses, which would be very numerous. Orbits of objects missing the Earth would be perturbed, and eventually the objects would collide with the Earth or the Moon or leave the system. Such objects reaching the Earth would be generally distributed on its surface. The special assumption that the lunar material is sprayed out in a cone of limited dimensions can scarcely be correct in view of the different velocities and the collision angles of the colliding meteorites which are to be expected. A much more extensive and thorough set of calculations will be required in order to establish his thesis that the distribution of tektites on the Earth can be explained by his postulated process.

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Calculations of Lunar Temperatures

The observations of the surface temperature of the Moon by Pettit and Nicholson[1] have led to attempts to deduce details of the lunar surface conditions. Observations of microwave radiation by Piddington and Minnett[2] were also used by Jaeger[3], but he concludes that there is an inherent discrepancy between the average temperatures determined by the two methods. The experimental results are given in Fig. 1. Jaeger, like the others quoted in his bibliography, makes the assumption in his calculations that the thermal properties of the materials remain constant.

This does not appear to be a satisfactory assumption, for Scott[4] gives evidence suggesting that the thermal conductivity of −80 mesh perlite *in vacuo* is proportional to the absolute temperature, and data in the International Critical Tables suggest that a similar relation could also apply to the specific heat. On the assumption that the conductivity and specific heat vary as the absolute temperature, let the thermal conductivity, the specific heat, the density, the absolute temperature, the distance from the