thrown from the Moon could be expected to encounter the extended atmosphere near perigee. The effect of the atmosphere will be to diminish the eccentricity and semi-major axis of the orbit of the particle around the Earth[5].

After a period of 10^7 years or the like, the orbit would become very nearly circular, and would approach the surface of the Earth. Owing to the attraction of the equatorial bulge of the Earth, the orbit would be more sharply curved where it crosses the equator. The equations of motion have been integrated for a closed, almost circular orbit which is symmetrical about the Earth's axis. It is found that the radius vector, r, can be expressed approximately as a function of the latitude φ for a meridional orbit by the relation :

$$r = r_0\left(1 + \frac{\alpha}{12}\cos 2\varphi\right)$$

where α represents the flattening of the Earth. On the other hand, the sea-level surface of the Earth can be described by the corresponding relation

$$r = r_0\left(1 + \frac{\alpha}{2}\cos 2\varphi\right)$$

It is seen that the orbital perturbations cancel only one-sixth of the effect of the Earth's ellipticity. It follows that such a satellite will be about 11 miles nearer the surface of the Earth at the equator than at the poles, and will be subjected to about fifteen times as much air resistance. It will thus nearly always come to Earth in latitudes near the equator, in accordance with the distribution found for tektites.

An example of a body describing such an orbit is provided by the meteor procession of February 9, 1913, described by C. A. Chant[6] and computed by the Rev. M. A. Davidson[7]. This group of bodies described a path 5,700 miles long from Saskatchewan to the South Atlantic at heights of the order of 40 miles. The orbit was clearly a nearly circular one about the centre of the Earth. W. J. Fisher[8] suggested that the bodies were intercepted by the equatorial bulge of the Earth.

It thus appears plausible that in the tektites we have portions of the lunar surface.

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JOHN A. O'KEEFE

3712 Thornapple Street,
Chevy Chase 15, Maryland.

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ON the basis of observations accumulated by different authors over the past few decades, I consider that an extra-terrestrial origin of tektites is more compatible with their observed physical and chemical properties. The greatest difficulty encountered by any theory invoking an extra-terrestrial origin of tektites is to explain their peculiar distribution over the surface of the Earth. One would assume that, if tektites had arrived at the Earth in swarms, each swarm would have deposited them over one terrestrial hemisphere, unless the tektites were members of relatively small clouds. Since we observe the tektite deposits to be localized in small regions, we must conclude that the second alternative must be the correct one.

However, a cloud of such particles travelling through space would not retain any degree of compactness for more than a few hours, or perhaps days, and hence the cloud must have originated very near the Earth, possibly at the Moon. To test this hypothesis, I carried out a series of calculations which determined whether material ejected from the Moon by the impact of a meteorite on the lunar surface could arrive at the Earth in such a way as to reproduce the observed distribution of tektites on our planet. The initial conditions of ejection were chosen according to a model of meteoritic impact suggested by Whipple and Rinehart (unpublished work). The computations were carried out on the *IBM* 704 digital computer of the Massachusetts Institute of Technology. The distribution of tektites ejected from a lunar crater so computed agrees remarkably well with the observed distribution of australites (tektites found in Australia), thus making the Moon a very likely source for these peculiar objects.

Details of the calculations have been included in a paper submitted for publication in *Geochimica et Cosmochimica Acta*.

CARLOS M. VARSAVSKY

Harvard College Observatory,
Cambridge 38,
Massachusetts.

THE glassy nature of tektites requires an explanation in terms of the processes of the impact explosions. The heating at a meteoritic impact is very intense, due to the great compression of the meteorite and a comparable quantity of the material of the ground. During the short duration of the event, however, not much heat can be communicated to the surrounding materials. Surfaces can be heated at most to their evaporation temperatures, and the depth to which heat conduction can then cause melting in a few seconds is limited to some millimetres in most substances. The mass ejected from craters is thought to be large compared with that of the meteorites causing them. The suggestion made by O'Keefe to account for the high reflecting power of the 'rays' around the younger lunar craters and also of their interior surfaces would require a large proportion of all this ejected material to be glassy ; and so would the idea of the lunar origin of tektites.

A process that can distribute energy more rapidly than heat conduction through the interior of an opaque solid is required for the explanation, and a large pressure pulse appears to be the only possibility. An impact explosion will no doubt be responsible for a shock wave in the solid. It will, however, be mainly a single pressure cycle, and this can be expected to cause melting only in substances that possess much hysteresis in their compression characteristics. The material must end up as a liquid after the pressure pulse if it is to form beads. Sand or powder of hard rocks would qualify, as there the application and release of high pressure can greatly increase the final density above the initial one. The volume integral of pressure around the cycle representing the work absorbed in the material will then be large. Also the great decrease in the compressibility that will occur