phase, beginning only after 3 days shows the reverse: the older memories are more susceptible to effects of the drug. The memory process may have two biochemical phases which are differentially sensitive to disruption.

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Extraterrestrial Dust as a Source of Atmospheric Argon

Tilles (*1*) points out that solar-wind bombardment may emplace small amounts of noble gases on the surfaces of extraterrestrial dust particles. Heating of the particles during entry into the earth's atmosphere would release the volatiles. Tilles suggests, on the basis of an estimate of the influx of black spherules to the earth (*2*), that as much as 20 percent of the argon-36 and argon-38 in the atmosphere could be contributed by this mechanism. The strength of this source thus depends directly on the influx of extraterrestrial material to the earth.

The influx rate assumed by Tilles (Table 1) was based on black spherules collected from snows of the Greenland ice cap. Probably not all the spherules recovered from polar snows are of extraterrestrial origin. Giovinetto and Schmidt (*3*) found black spherules to be concentrated in snow layers deposited at the South Pole during years when paroxysmal volcanic eruptions took place. The spherule concentration was especially great in the snow layer representing 1883, when the famous eruption of Krakatoa occurred. The earlier suggestion by Schmidt (*4*) that volcanic dust could not be transported great distances to the polar regions is not supported by the newer data. Occurrence of volcanic dust in polar snows is consistent with the work of Flowers and Viebrock (*5*), who attributed a decrease in solar radiation at the South Pole to dust carried to Antarctica from the eruption of Mount Agung in Bali. It therefore appears likely that estimates of "cosmic" spherule flux, based on particle collections from either Greenland or Antarctic snows, are too great by some unknown amount. Even if it is assumed that all the spherules collected from polar snows are of extraterrestrial origin, the Greenland value is not characteristic of the spherule influx at other polar sites. It is about an order of magnitude greater than the mean influx rate determined for black spherules occurring in the Antarctic ice cap (Table 1). If the Antarctic influx value is used in the equations, only about 2 percent of atmospheric argon-36 and -38 could be accounted for by the mechanism proposed by Tilles.

Spherules of probable meteoritic composition were recovered from deep-sea sediments by Pettersson and Fredriksson (*6*). Assuming for the moment that these spherules entered the atmosphere as discrete particles and thus satisfied the criteria of Tilles' mechanism, the influx rate yields a negligible amount of argon-36 and argon-38 (Table 1). However, it is more likely that the value derived from Pettersson and Fredriksson's influx rate represents an upper limit to the amount of noble gases contributed by the spherules, which appear to be droplets resulting from atmospheric ablation of larger meteorites.

Table 1. Comparison of amounts of argon introduced into the atmosphere under different assumed rates of influx of extraterrestrial spherules. The amount of argon-36 and argon-38 is based on the calculation presented by Tilles. The only parameter changed is the influx of extraterrestrial spherules.

Influx rate of extraterrestrial dust (g cm^{-2} year^{-1})	Volume of argon per square centimeter over Earth's surface (cm^3)	Percentage of total Ar^{36} and Ar^{38} due to extraterrestrial dust
	Greenland snow (2)	
2×10^{-7}	4.6	~20.0
	Antarctic snow (4)	
2×10^{-8}	0.5	~2.0
	Deep-sea sediments (6)	
1×10^{-9}	0.03	~0.002

While the influx data for probable extraterrestrial spherules indicate only a negligible contribution of noble gases, other varieties of extraterrestrial dust may be present in sufficient quantity to fulfill the requirements of Tilles' ingenious mechanism. Investigation of this possibility should be provided for in future collections of dust particles of extraterrestrial origin.

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Old Faithful

I find myself concerned with J. S. Rinehart's hypothesis [*Science* **150**, 494 (1965)] of a dual cavity to explain the bimodal nature of Old Faithful's period. It would seem wise to search for a simpler model first, and indeed the data seem to suggest one. If, in the previous eruption, the cavity was incompletely emptied, then one might expect new activity to build up more quickly and the period to be briefer. The evidence that during short periods seismic activity starts immediately, whereas during long periods there is a 20- to 30-minute quiet, supports this alternative hypothesis. It might be tested by comparing the duration, or better the volume, of eruption with the time interval preceding the next eruption.

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