

A more likely explanation for the absence of moons about the innermost planet is the action of solid-body tides as proposed by Burns (*Nature* 242, (1973), 23-25) and Ward and Reid (*Month Not. Roy. Astron. Soc.* 164 (1973), 21-32). Since Mercury is spinning slowly, having a period of about 58 days, most hypothetical satellites that could orbit it would move more rapidly than the surface. Due to energy dissipation, the tidal response of Mercury lags the position of the satellite, and this produces a transverse drag on the satellite, pulling it inward toward its demise on the surface. All satellites larger than a few kilometers in radius can be shown to be eliminated over the age of the solar system by such a process. Since this mechanism operates on the satellites of any slowly spinning planet, it is interesting to note that neither Venus nor Pluto, the other two planets with long spin records, have satellites.

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... The Roche limit is calculated for a fluid body; and a solid moon within the Roche limit could be held together by the cohesive strength of the material composing it. A satellite smaller than several hundred kilometers in diameter will be rigid in the sense that the solid forces can resist gravitational forces; and it could, in principle, orbit Mercury. Such a small satellite would probably be irregular in shape, since the spherical shape of larger bodies is caused by their failure to resist gravity. Thus, Asimov has not shown that Mercury could have no moon, but only that it can't have a big round one!

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THE AUTHOR COMMENTS: My original article on the subject was published some time ago; I discovered the error in my analysis. When the letter appeared in PHYSICS TODAY I wrote to Bruce Bushman promptly and told him I was wrong.

I am also willing to admit to the readers of PHYSICS TODAY that I was wrong. May it be the only time that I am to find myself egregiously wrong, but I strongly suspect it won't be.

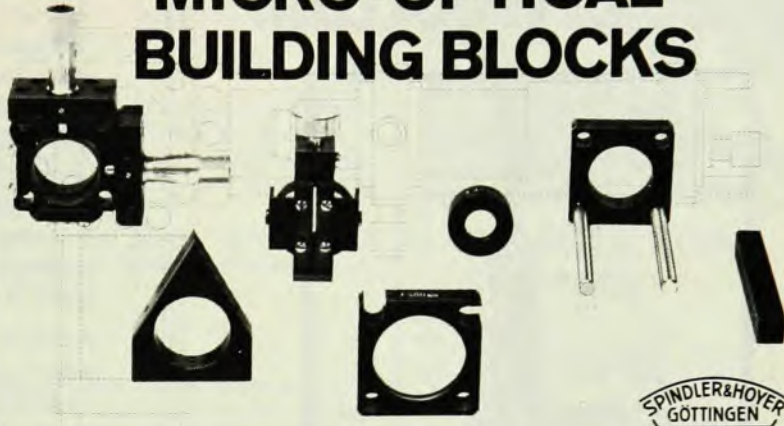
ISAAC ASIMOV
New York, N.Y.

Correction

September, page 5: The material shown in the September cover photograph is Type 304 stainless steel, no Inconel 600 as we reported in the cover note. □

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