Because lunar sinuous rills look "deceptively like terrestrial meanders" and run "parallel to the regional slope," Schumm and Simons have cast aside our "ingenious mechanism" and have devised the pseudo-alternative that "parts of some of the channels" are the "coalescence of chain-crater systems." However, it is our opinion that the differences between lunar sinuous rills and coalesced chain craters are fundamental. If we consider only the examples cited by these authors, Rima Prinz I and II, the sinuous channel in Schroeter's Valley, Rima Marius, and Rima Plato II, it is obvious that their basic morphological characteristics (continuous and uniform meandering channels, mature meanders, goosenecks, distributary channels, and flood plains) cannot be imitated by coalesced chain craters. As can be seen in some straight rills, such as Hyginus, coalesced chain craters do not resemble sinuous rills nor should they be confused with them. Coalescence of craters produces depressions with irregular floors and opposing walls that are mirror images of each other, that is, like ( ), rather than the observed smooth floors and matching walls, that is, like ((, of the lunar sinuous rills.

Using the lunar astronautical charts, Schumm and Simons state that sinuous rills do not follow the local gradient and that Rima Marius and the rill at the end of Schroeter's Valley both cross ridges. However, the Lunar Orbiter photographs have shown that these charts are so inaccurate that they cannot be used as a basis for the study of sinuous rills. Even such large features as the Cobra's Head of Schroeter's Valley are grossly distorted on the charts. From a survey (*1*) of Lunar Orbiter IV photographs of about 130 sinuous rills, we find that, wherever it is possible to determine a gradient, the rills meander from higher to lower elevations. Lunar Astronautical Chart 39 shows a "ridge" crossing Rima Marius, whereas Lunar Orbiter IV photograph H150 reveals that this "ridge" is in fact two ridges offset by 10 km, which do not cross the rill but terminate on either side of it. Similarly the Schroeter's Valley rill does not cross any "ridges" but meanders between isolated hills (Lunar Orbiter IV photograph H157).

Despite the erroneous examples cited by Schumm and Simons, there is no reason to doubt that a channel eroded by surface water could not be subsequently uplifted. A possible example of this might be Rima Prinz II. Since its channel is deeper on the plains to either side of the ridge, the rill must either have been uplifted subsequent to its formation, or must have passed through a gap in the ridge depressed below the level of the surrounding plain.

Schumm and Simons' contention that the course of Rima Prinz I is "unusual" fails to recognize the fact that the course of this rill and of neighboring ones is partially controlled by a rather conspicuous regional fracture pattern, as are the courses of terrestrial rivers. Their statement that there has been no major mass movement on the walls of Schroeter's Valley is contradicted by the fact that "only half of the channel is visible." The only places where Rima Plato II appears discontinuous are those where the channel has been obliterated by obvious impact craters.

The very distinctive morphology of the lunar sinuous rills, particularly the mature meanders, goosenecks, distributary channels, flood plains, and other features similar to those of terrestrial rivers, requires that they be features of surface water erosion.

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Hierarchical Structures

The portion of the summary of the Conference on Hierarchical Structures describing the "cosmic diagram" (*1*) contains the same error in Fig. 1, the caption, and the text.

In Fig. 1, the limit parallel to the Schwarzschild limit marked $m = Sr$ should be marked $m/r = Sm_p/a_0$. In the caption, the limit $m/r = S = 10^{39.4}$ should read, $m/r = Sm_p/a_0 = 10^{23.8}$ g/cm. In the text (p. 1229, right-hand column, line 17), the phrase "or at $m = Sr$" should be similarly changed.

The maximum observed gravitational potential for stars, galaxies, and clusters of galaxies appear to have closely the same value in the neighborhood of $10^{23.5}$ g/cm. In dimensionless terms—expressing mass in units of baryon mass m_p, and lengths in units of the Bohr radius a_0—the observed potential limit takes the value $ma_0/m_pr = 10^{39}$ or fS where f is a number of the order of unity. From the definitions, $S = e^2/Gm_pm_e$ and $a_0 = e^2/\alpha^2c^2m_e$, it follows that for the observed limit $Gm/c^2r = f\alpha^2$ compared to $GM/c^2r = 1/2$ for the Schwarzschild limit. The fine structure constant thus emerges from astronomical measurements, under the assumption that all dimensionless physical numbers of the order of 10^{39} are the same (*2*).

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Granitic Rock: Properties in situ

Simmons and Nur (*1*) have reported that laboratory measurements of sound velocity and electrical resistivity of granitic rocks yielded results that were inconsistent with certain measurements *in situ*. One possibility they offered to explain this inconsistency is that the rock *in situ* lacks the small, open cracks evident in the laboratory specimen. They conclude that "the absence of small, open cracks that close due to lithostatic pressure with depth in the earth's crust holds serious implications for geophysics." I do not wish to treat here the important question of whether cracks are present in rock *in situ* but simply to suggest that the conclusions reached by Simmons and Nur may be based on doubtful evidence. My principal objections to their comparison of measurements *in situ* and in the laboratory are as follows:

1) The lithology of the Matoy well is extremely complex (*2*), with wide variations in composition, grain size, and texture. It seems highly questionable to compare a measurement made *in situ* over a wide suite of rocks with laboratory measurements for a single rock or rock type. Although half the cuttings examined by Ham *et al.* (*2*) were described as diorite or diabase rather than granite, the velocity of these cuttings *in situ* was compared with the velocity of granites.

2) I have studied in detail the electrical log for the Phillips No. 1 Matoy well. It is very difficult to obtain the