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with payment of journal subscriptions; payment of page charges for articles authored by Latin American physicists and submitted to refereed journals in the United States; acquisition of small spare parts, pieces of equipment and maintenance items needed to keep major equipment running; and payment of *per diem* expenses for selected Latin American physicists while they were in the United States.

Many Mexican scientists benefited from the program and we gratefully acknowledge the support received. Our country has been suffering an economic crisis in the last several years, and the program briefly gave relief to the Mexican physics community. It is difficult to overestimate how this kind of program can help to keep physics research running. Fortunately, persons like Leo Falicov and Leon Lederman, who were responsible for the program, understand well the problems and limitations that the Latin American physics community suffers. We also acknowledge their understanding and interest in helping the development of physics in Latin America.

After two years of fruitful activities, the Latin American Assistance Program has ended. We feel that an extension or renewal would be most welcome. The economic situation in our countries, far from being stabilized, is worse now than it was two years ago. Any support from programs like the one mentioned would certainly not just give some breath to the Latin American physics community, but could be essential to the development and survival of physics research in the area. We therefore urge the international physics community to conceive new assistance programs in the spirit of the Latin American Assistance Program.

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4/87

Aharonov–Bohm, meet Hall

I read with interest the letter by Francisco Izaguirre (October 1986, page 15) speculating on the similarities between the Aharonov–Bohm effect and the quantized Hall effect. It was

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indeed this similarity that led me to look into the matter and to show that a close relation between the two effects does in fact exist; namely, the quantum Hall conduction in finite systems depends on the external Aharonov–Bohm magnetic flux.[1] The essential point is that the flux-averaged Hall conductivity reduces to a topological invariant (in mathematical language), which provides a precise theoretical basis for the quantized Hall effect as well as a physical picture for the structure of the wavefunction in quantum Hall systems.[2] In this sense, the A–B effect and the quantized Hall effect are inseparable. Another important point seems to be that under certain well-defined conditions, we may regard the quantized Hall effect as an example of a macroscopic quantum phenomenon in this context. This observation could lead to a novel experimental setup, involving a quantum Hall system, for demonstrating macroscopic quantum phenomena, a current example of which is provided[3] by superconducting systems in SQUIDS.

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12/86

Planetary rings: Another theory

It is interesting that people seem uniformly to regard finding two small satellites on either side of the epsilon ring of Uranus to be a "triumph" for the theory of planetary rings (PHYSICS TODAY, August 1986, page 17).

Unfortunately, some people have jumped to the uncritical assumption that almost all ring structure around Uranus (and Saturn) simply results from "shepherding." In the case of Uranus, 18 satellites, one pair shepherding each of the 9 (then) known rings, were predicted, not just 2. Worse, there are a lot more rings. Yet worse, there are also about half a dozen newly discovered satellites, of just the size expected for shepherds, that have no "sheep" in between.

The situation is even more extreme for Saturn, where it is placidly assumed that myriads of (as yet undetected) shepherding satellites account for the intricately structured rings found there. Again, only two candidate shep-