962-11-12 **Barry Mazur*** (mazur@math.harvard.edu), Department of Mathematics, Harvard University, One Oxford St., Cambridge, MA 02138-2901. *Deformations, perturbations, and near-misses in geometry, physics and number theory.*

One can learn a lot about a mathematical object by studying how it behaves under minute perturbations.

That this approach often leads to linear questions is the source of success of much analysis, most notably the Calculus of Newton and Leibniz, the Calculus of Variations in differential geometry, and the perturbative methods in partial differential equations. That this approach often does not lead to linear questions is a source of continued fascination in dynamical systems.

Whatever it leads to, *the perturbative strategy* is everywhere in mathematics, and takes many forms. Certain mathematical questions cannot be properly asked in isolation; the questions themselves insist upon being perturbed, jiggled, before their answers can be revealed. Some questions only become meaningful when they are treated as specific instances within a field of closely related questions. Often the landscape of this larger field, its peculiar features, its ravines and gullies, holds the key to an appropriate understanding of any of the individual questions.

In organizing this hour talk I want to take my cue from the spirit of a weekly seminar held at Harvard University, called the *Basic Notions Seminar.* The aim of that seminar, initiated by David Kazhdan, is to examine, each week, some central theme of mathematics – some idea that might have different manifestations as it crops up in different fields of mathematics – an idea, in short, which deserves to be contemplated by students not only in the context of its usefulness for this or that particular result, but also because of its service as a unifying thread.

We will examine illustrative instances (in diverse fields) of the "basic notions" listed in the title. (Received May 16, 2000)