Moon Yields Info on Near-Earth Asteroids

The otherwise excellent discussion of the search for near-Earth asteroids (PHYSICS TODAY, March, page 21) gives the impression that scientists determine the frequency of impacts by asteroids of a given size from their observed numbers. While that could be done in principle, dealing with all the dynamical intricacies of each orbital class of asteroids is very difficult. Instead, we calculate a time-averaged impact rate from the observed numbers and size-distribution of lunar impact craters. The lunar mare, smooth lava plains laid down between three and four billion years ago, provide an integrated picture of lunar (and therefore terrestrial) impacts over this time period. Thus the estimate that, for example, there is a one-in-a-million chance each year of Earth being struck by a million-megaton-energy asteroid or comet is traceable to the lunar statistics, not to the current population of such objects. Consequently, this predicted frequency of impacts is not changed if and when the estimate of the number of objects is cut in half.

The uncertainties in these numbers, both population and impact frequency, are factors of two or more. In this sense, cutting the number by half is still within the uncertainties. However, concluding that there are only half as many near-Earth asteroids has programmatic and policy implications. If the goal is to survey these objects to a given level of completeness (say, 90%), then, if there are fewer to find, we are further along toward our goal than had been thought previously.

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Archimedes Floats

Say, did you folks mean to be funny with your caption on the cover of my June PHYSICS TODAY? "Archimedes Resurfaces" . . . did Archimedes sink? I cracked up! What an interesting oxymoronic term for the guy who claimed that he would float. Who says physics is not hilarious?

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