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LETTERS

Battling the butterfly effect

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In 2005, we all witnessed, via the international media, the devastation that hurricanes caused in property damage and loss of life. Katrina alone almost destroyed New Orleans and flooded other portions of the US Gulf Coast; other hurricanes ravaged parts of Mexico and the Caribbean.

Scientists the world over are aware of the butterfly effect: A butterfly flaps its wings in some part of the world and starts a chain of nonlinear effects that can result in a hurricane striking anywhere on the planet.

That butterfly must be found and stopped!

On the one hand, that butterfly may be unaware of the grave consequences of its actions; still, measures must be taken to ensure that it ceases its wing fluttering, or at least modifies it to avoid exciting particularly large wind modes. The butterfly should be held liable for the harm done and should probably pay punitive damages as well.

On the other hand, it is possible that the butterfly in question may be acting with evil intent; in that case the full weight of the law should be brought to bear. The butterfly should be incarcerated, have its wings forcibly restrained, and work out its punishment through forced labor.

But wait. What if the 2005 hurricanes were caused not by a single butterfly but by several? A careful study of the characteristics of each storm may disclose a different modus operandi or wing-print set for each. If a group of butterflies is indeed involved, then we may be looking at a case of outright terrorism; possible links to Al Qaeda and other terrorist organizations should be explored. Visions of *Lepidoptera* terrorist training camps spring suddenly to mind. Specially trained agents (who are surely also trained to appear as harmless as possible, and so blend in with your common garden-variety butterflies) can inflict terrible harm, so it is imperative that such camps be located and ruthlessly destroyed.

Since rock has a much higher density than air, it is debatable whether a single butterfly could also cause a large earthquake. However, the possibility cannot be dismissed that a particularly robust butterfly or a well-coordinated butterfly cell, trained to take advantage of in situ tectonic stress, could do it. The magnitude-9.2 earthquake that caused a tsunami and terrible damage in Southeast Asia might have been a heretofore unsuspected instance of the butterfly effect. Current seismic hazard estimates will have to be recalculated to account for butterfly activity.

This is a call for international police and intelligence agencies, and schoolchildren with nets, to immediately launch a cooperative effort to locate the butterfly or butterflies responsible for recent natural disasters. This task will not be easy, since the propagating mode of the butterfly effect is essentially random; but it may be facilitated if all responsible citizens (especially physicists, who

are trained to be particularly observant) help by reporting any suspicious-looking butterflies they come across.

What can be done beyond the immediate future? Government bans on nonlinearity might help reduce the incidental butterfly effect, but it would prove useless against rogue butterfly activities. The answer is this: Since the butterfly effect is a physical one, all members of the physics community should apply their knowledge and skills to devising ways to counteract the effect or, better yet, rechannel its energy into power production for peaceful uses.

Physicists of the world, unite against the butterfly effect!

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