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Abstract: Speculates about the possibility of perpetual motion, as of 2000. The first and second laws of thermodynamics, and their impact on the mechanical possibility of perpetual motion.

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WILL SOMEONE BUILD A PERPETUAL MOTION MACHINE?**Getting something for nothing may violate fundamental laws of physics--but that won't keep inventors from trying**

Human nature stays constant enough that it's easy to answer this one. Yes, someone will build a perpetual-motion machine in the next few years. Or, more likely, dozens of perpetual-motion machines, as starry-eyed inventors have been doing since medieval times. Not a single one will work, but they'll keep trying. Nothing is more seductive, after all, than the idea of a free lunch.

That, in essence, is all a perpetual-motion machine amounts to: a device that operates without any external power source. Or, rather, doesn't operate--for perpetual-motion devices are mechanical impossibilities--and unless someone finds a way to repeal two fundamental laws of physics, they always will be. The regulations in question are the first and second laws of thermodynamics. They say, respectively, that energy can be neither created nor destroyed but only changed in form and that it's impossible to make a machine that doesn't waste at least a little energy. In short, you can't win, and you can't even break even where energy is concerned.

Physicists didn't figure this out until the 1800s, so at least the early advocates of perpetual motion had the excuse of ignorance. In 1618, for example, a London doctor named Robert Fludd invented a waterwheel that needed no river to drive it. Water poured into his system would, in theory, turn a wheel that would power a pump that would cause the water to flow back over the wheel that would power the pump, and so on. But the second law means that any friction created by wheel and pump would turn into heat and noise; reconverting that into mechanical energy would take an external power source. Even if the machine were friction-free, the wheel couldn't grind grain. That would require energy beyond what it took to keep the wheel itself going. No good, says the first law, and Fludd's invention was a dud.

Once thermodynamics was codified, it was clear that Fludd and the hundreds who followed him had been doomed to failure before they began. Yet if anything, learning that their task was impossible spurred perpetual-motion fanatics on to even greater efforts. So many hopefuls continued to apply for perpetual-motion patents that in 1911 the U.S. Patent Office decreed it would henceforth accept working models only--and they had to work for a year to qualify. No one has pulled it off so far.

Instead, the perpetuums have become more sophisticated. Most (though not all) now admit their machines are using outside energy--usually via new theories of physics that physicists don't grasp yet. Joseph Newman, for example, a Mississippi inventor, promoted an "Energy Machine" in the 1980s that operated via "gyroscopic particles." More recently, New Jersey inventor Randell Mills has been pushing power from "hydrinos." Still others claim they're tapping the "zero-point energy" that fills all space. The first two are considered nonsensical, and while zero-point energy has a basis in science, using it to run a machine does not.

Denied a fair hearing by other scientists (so they always insist), these outsiders promote their work as best they can--through press releases, lectures and, in one gutsy case, a full-page ad in the journal *Physics Today*. Maybe someday a latter-day Einstein will overrule the energy laws we know. Until then, perpetual motion will be an impossible dream that's impossible to resist.

PHOTO (COLOR)

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By Michael D. Lemonick

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