Computer Simulation Defended

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Editor:

In his letter of July 13, John Baumgardner said I was able to generate a simulated protein on my computer in less than 10 minutes only because I "fed the correct answer into (the) process at each and every step." But Baumgardner himself ALSO assumed the correct answer was available at every step (June 11): "But if we are assembling new widgets randomly (but for sake of argument testing them intelligently), how many do we need to assemble (and test) before we have a reasonable chance of finding one that works?"

He criticized my model because "biological systems do not work in this manner." It is obvious, however, that my reasonably-sized model of reproduction, heredity; mutation and selection is much more realistic than Baumgardner's incredibly bizarre model of "biological systems," in which 10 billion protein sequences per second are created and tested for every atom in the universe for 30 billion years!

Baumgardner apparently doesn't know the elementary difference between random and systematic processes.

Baumgardner would have us believe that only one special amino acid arrangement out of untold billions has ANY functionality, when in fact many sequences, even shorter ones, may indeed have some function. He implies that both evolution and my genetic computer simulation cannot possibly succeed without the guidance of a higher intelligence. From personal experience, however, I can assure you that evolution theory CAN yield answers, even when the "solution" is totally unknown.

At my job, we make several separate acoustic measurements of precision manufactured parts, and use these responses to find cracked or flawed pieces. For a real factory system, we often can make only eight or 10 measurements in the short time available. Of the 40 or so measurements we start, out with on new parts, we don't know which small subset will have the

required information to find ALL of the flawed parts. And it would take literally years to test all the possible combinations of measurements. However, we can quickly assess how many correct part identifications are made with a single, specific combination. We might get 231 correct rejects with one combination, and 355 correct rejects with another. SO, EVEN THOUGH WE DON'T KNOW THE SINGLE "BEST" SOLUTION, WE CAN TELL IF SOLUTION "X" WORKS BETTER THAN SOLUTION "Y."

We routinely apply genetic, "evolutionary" algorithms to solve these difficult problems quickly. We usually start with a set of 40 random solutions. We test each one, and retain and "mutate" those showing better results. After several generations (just a few minutes), solutions that meet our requirements bubble up out of the process. These typically give excellent part identifications with as few as five to eight required measurements, and can easily be checked independently. Of course, there might be slightly better solutions that we never got around to testing. Baumgardner seems to be the type who would mindlessly check all solutions until he found the one True Answer, even if it made a two-month project take five years. Those of us who work with real-life problems can't afford such needless perfection. While creationists whine that "evolution is just a theory, not a fact," real scientists are applying the theory of evolution as a practical tool to solve difficult real-world problems. Perhaps Dr. Baumgardner should spend some time looking for "intellectual fraud" in his own cozy little ivory tower.

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