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Target? TARGET? We STILL don't need no stinkin' Target! The War of the Weasels is back!

Updated January 5th, 2016.

by Dave Thomas : nmsrdaveATswcp.com (Help fight SPAM! Please replace the AT with an @)

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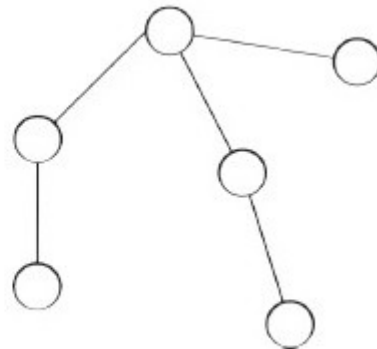


Figure 2: A depiction of a Steiner tree.

As part of the year-end Kitzmas festivities, The Discovery Institute's PR organ Evolution News and Views re-posted an earlier article titled [Following Kitzmiller v. Dover, an Excellent Decade for Intelligent Design](#).

This uncredited article from September 2015 included the following, which caught my eye:

In fact, the decade since Dover has been an excellent one for ID. Casey Luskin noted some highlights not long ago:... Theoretical peer-reviewed papers taking down alleged [computer simulations of evolution](#), showing that intelligent design is needed to produce new information.

The paper which was linked, hereafter [Ewert 2014](#), is titled "Digital Irreducible Complexity: A Survey of Irreducible Complexity in Computer Simulations", and was written by Winston Ewert of the Biologic Institute for a 2014 edition of the institute's open-access journal BIO-Complexity.

Ewert claims that Michael Behe's concept of "Irreducible Complexity" is a stumbling block for evolutionary algorithms, and that several computer models of the evolution of irreducibly complex structures all fail to falsify Behe's concept. Ewert examines five models: Lenski's Avida, Schneider's Ev, my own Steiner Trees, Sadedin's Geometric Model, and Thompson's Digital Ears program.



I won't speak for the other models, but I can say this about Ewert's discussion of Steiner solutions to network problems: it's a massive strawman fallacy, a desperate "bait and switch" in which the problem my algorithm was solving, Steiner networks, was "replaced" with a much simpler problem, Minimum Spanning Trees. This ruse enabled Ewert to launch a (straw) attack on my genetic algorithm for solving Steiner's problem.

The Steiner Genetic Algorithm was the subject of a heated blog war, the "War of the Weasels," occurring between Panda's Thumb and Uncommon Descent during the summer of 2006. It all began with my post of July 5th, 2006, [Target? TARGET? We don't need no stinkin' Target!](#) It seemed the War of the Weasels ended in the fall of 2006, after Uncommon Descent's top programmers were unable to out-design the Steiner genetic algorithm during a public design challenge. But with Ewert's 2014 article, and an earlier 2012 piece in BIO-Complexity by Ewert, Dembski and Marks, it's clear that no ceasefire exists.

The "War of the Weasels" got its start with [this post on PT](#). Why "Weasels"? Well, Richard Dawkins' 1987 book "The Blind Watchmaker" used a very simplified genetic algorithm to demonstrate that *cumulative* selection was much more powerful than *random* selection. Dawkins' demonstration involved comparing various strings to the known phrase from Shakespeare's "Hamlet," "*Methinks it is like a weasel*." Cumulative selection was demonstrated by basing the new "generation" of guesses for the phrase on the closest-matching member of the previous generation; in a few dozen generations, the target phrase was matched. By contrast, when random (e.g. no) selection was employed, the program floundered endlessly.

Even though Dawkins explicitly warned his readers that "*Life isn't like that. Evolution has no long-term goal. There is no long-distance target, no final perfection...*", Dembski, Meyer and others consistently say that *all* genetic algorithms, just like Dawkins' "Weasel", must have the answers fed into the program -- if not explicitly, then surreptitiously via supplying "active information" or "front loading."

Both young-earth creationists and ID theorists attempt to smear all genetic algorithms using the "Weasel" brush. It's been that way for decades. To truly appreciate the depths to which the leaders of the ID movement are obsessed with Dawkins and "weasel," read Ian Musgrave's PT posts ["Dembski Weasels Out"](#) and ["Weasles on Parade."](#)

The purpose of my July 2006 PT "Target" post was to discuss a genetic algorithm I'd developed that solved a difficult math conundrum, "Steiner's Problem." For any arbitrary collection of n points, the Steiner solution is the minimum-length set of straight-line segments connecting the given points to each other, and to additional variable-position "interchange" points.

I picked Steiner's problem specifically to counter the "Weasel" charge that genetic algorithm answers were being fed into the programs. Because Steiner's problem applies to *any* configuration of points, I designed my program so that *new* configurations could be considered -- problems with no known answers. Imagine that.

The topic was the subject of a vigorous blog war in the summer of 2006, between Panda's Thumb and Uncommon Descent, culminating in the ["Design Challenge."](#) In that August 14, 2006 post, I challenged

ID theorists and the general public to derive or devise the Steiner solution for six points arranged in a 3x2 rectangle; since the creationists were saying I was "front loading" the algorithm via my fitness function, I published that function, along with the [complete program](#), and challenged them to reverse-engineer the solution. I knew it would be a good problem, because the solution my genetic algorithm came up with earlier truly surprised me. While Uncommon Descent's Salvador Cordova attempted to "design" the Steiner solution, he ended up falling short, coming up with only a "MacGyver" solution: a network that connects the given points with a short, *but not the minimal* network. It cannot be emphasized enough that so-called "MacGyver" solutions (named after the TV show "MacGyver", in which the hero would save the day using imperfect, klugy solutions to escape dangerous situations) are *not* "Steiner" solutions; they are simply imperfect networks that get close to the answer, but which do not achieve Steiner "perfection."

[Several correct Steiner solutions, along with some creative MacGyver solutions](#), were submitted in the Design Challenge by non-ID contestants; some of these were designed, while others got the answer(s) from their own versions of a Steiner Genetic Algorithm. There's a road map to the summer's "War of the Weasels" in the summary post [Genetic Algorithms for Uncommonly Dense Software Engineers](#). The upshot of it all was that Cordova and the Uncommon Descent software Team learned Leslie Orgel's aphorism the hard way: "*Evolution is smarter than you are.*" Not one ID supporter could derive the solution which was obtained by multiple independent versions of a genetic algorithm for Steiner's problem.

The affair was also described in an [article](#) I wrote for the May-June 2010 issue of Skeptical Inquirer, "*War of the Weasels: An Evolutionary Algorithm Beats Intelligent Design*", Skept Inq 43:42–46 ([PDF](#)).

As mentioned above the fold, the paper [Ewert 2014](#) caught my eye. Ewert's Figure 2 has a deceptive title, "*A depiction of a Steiner tree.*" The network shown is a connected graph, and *almost* a "minimal spanning tree" as well, but it is most definitely not a Steiner Tree!

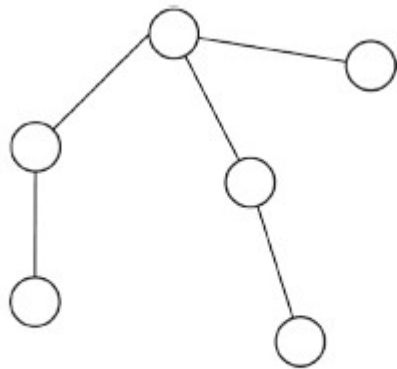


Figure 2: A depiction of a Steiner tree. The circles represent cities, and the lines, roads between the cities. [doi:10.5048/BIO-C.2014.1.f2](#)

Ewert says the following about the Steiner algorithm:

Dave Thomas presented his model as a genetic algorithm that evolves solutions to the Steiner tree problem [Skept Inq 43:42–46.], a problem that can be viewed as how to connect a number of cities by a road network using as little road as possible.

In his model Thomas penalizes excess roads and disconnected cities; the fitness function assesses a small penalty for each length of road and a large penalty for leaving any city disconnected. Thomas claims that his model can evolve an irreducibly complex system:

And finally, two pillars of ID theory, “irreducible complexity” and “complex specified information” were shown not to be beyond the capabilities of evolution. [Skept Inq 43:42–46]

He makes this claim because removal of any roads in Figure 2 disconnects the network, and makes it impossible to travel between some of the cities. According to Thomas, the roads are therefore the parts of an irreducibly complex system. It should be noted, however, that obtaining a connected road network is actually trivial—a connected network can be achieved by random chance alone. A depiction of such a network can be seen in Figure 2. The difficulty in the Steiner tree problem is in trying to minimize the amount of road used [EDM 2012], not in getting a connected network. Therefore we can say that there are no intermediate evolutionary stages in obtaining such a network.

This is the bait and switch. True Steiner solutions are not only Irreducibly Complex, they have *Complex Specified Information*, as they are specific solutions of an NP-hard math problem. But Ewert simply discards the requirement that the network be minimal length, and substitutes a far easier problem, Minimum Spanning Trees. Since random chance selections can happen upon Minimal Spanning Trees fairly easily, Ewert says the solutions are thus trivial, and thus not really "irreducibly complex" as per Behe's concept.

Ewert refers to an earlier 2012 paper he wrote along with William Dembski and Robert J. Marks II, *Climbing the Steiner tree—Sources of active information in a genetic algorithm for solving the Euclidean Steiner tree problem*. *BIO-Complexity* 2012(1):1-14, hereafter [EDM 2012](#). This paper has some of the same errors as the newer one, and some additional whoppers as well. As in the later paper, EDM find ways to rationalize the Steiner Problem into the Minimum Spanning Tree problem, and attack the latter, a classic strawman fallacy. In the process, EDM omit key solutions, and misrepresent others.

One whopper occurs on the second page, when EDM deride the problem-solving capability of genetic algorithms, and say that all such programs need "assistance" with their searches. Then EDM say "*The Darwinist claim is that no such assistance is required. Rather, natural selection is innately capable of solving any biological problem that it faces.*"

As pointed out by the Skeptical Zone [in a review of EDM 2012](#), "*No 'Darwinist' (a term that reflects ID's creationist roots) claims this. Extinction is known to happen.*"

The worst flaw in EDM comes around their Figures 3 and 4, where the authors perform the switch of the actual Steiner problem with the much simpler Minimum Spanning Tree problem. Here is EDM's Figure 3, which applies to the 5-point Steiner problem discussed on PT during the summer of 2006.

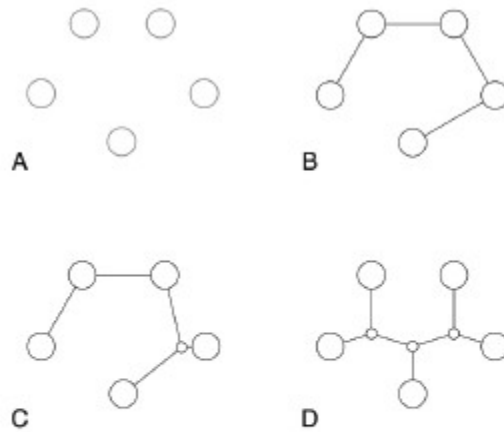
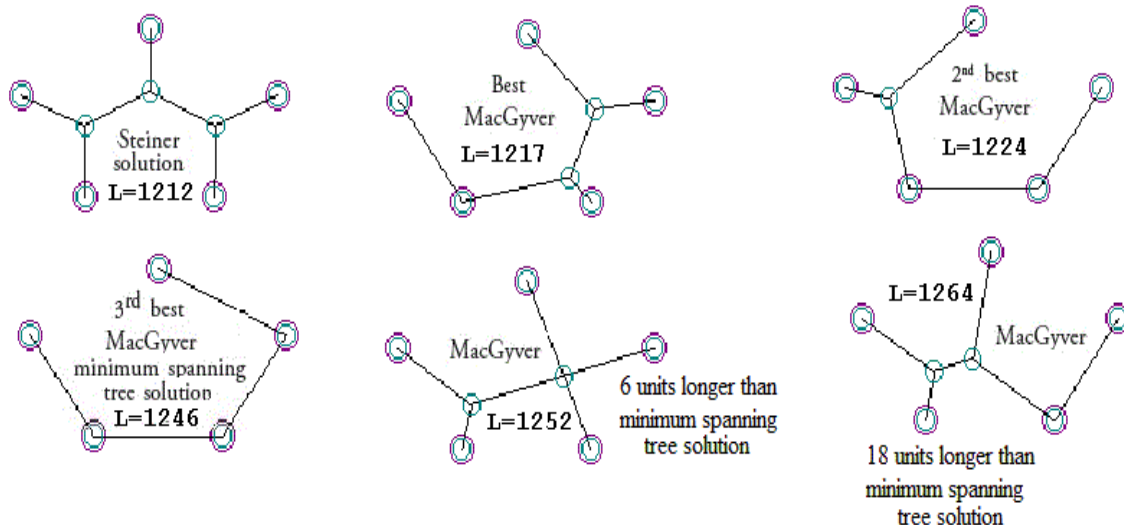


Figure 3: The Steiner tree problem used by Thomas, and various solutions. Shown are (A) the city configuration, (B) the minimum spanning tree or "trivial" solution, (C) the solution most commonly found by Thomas's algorithm with a cost of 1224, and (D) the optimal solution with a cost of 1212. [doi:10.5048/BIO-C.2012.1.f3](https://doi.org/10.5048/BIO-C.2012.1.f3)

The Fix is in with EDM's Figure 3, but it's not apparent unless you can see the actual shapes EDM are discussing, taken directly from the [We don't need no stinkin' Target!](#) opening post in the blog war. These are reproduced below. What are the errors? First, EDM's Figure 3 completely omits the "Best MacGyver" shape with a length of 1217; in fact, this key solution appears *nowhere* in EDM 2012, with the exception of an un-labeled graph point in their Figure 4. EDM's Fig. 3 does include the "2nd-Best MacGyver" shape with a length of 1224, the "Minimum Spanning Tree" solution with a length of 1246, and the Steiner Solution itself (labeled simply "optimal solution"), with a minimum path length of 1212.



Smoke and Mirrors are used to even greater lengths two pages after EDM's Fig. 3; a portion of page 6 appears below.

In his discussion, Thomas presents a number of non-Steiner solutions produced by his algorithm. These correspond to some of the bumps in Figure 4. He says,

I call the non-Steiner solutions "MacGyvers"....
The "MacGyver" solutions [the various non-optimal solutions] are not as elegant and pretty as the formal Steiner solutions, but they get the job done, and often quite efficiently. [20]

One of these solutions mentioned by Thomas [20] is the minimum spanning tree solution presented above; the other two solutions he mentions are more expensive. Such solutions should not be considered as "quite efficient" or "getting the job done" because they are either trivial or worse than the trivial solution. It is not reasonable to deem the search algorithm as successful when it settles on one of these solutions.

In the passage above, EDM make math mistakes on the order of " $1246 < 1217$; $1246 < 1224$ ". EDM say that the "MacGyver" solutions for the five-point problem are "*more expensive*" (longer) than the "minimum spanning tree solution." As the shapes from the original "Target" post show, however, EDM are so obsessed with trying to downgrade the Steiner problem into the Minimum Spanning Tree problem, they somehow convinced themselves that the Minimum Spanning Tree is *second only to the Steiner, and better (shorter) than the "MacGyvers."* This is astonishing, because in their Figure 3, EDM displayed one of these MacGyvers (2nd-best MacGyver, with a length of 1224), which is greater than the Steiner (length 1212) but *much shorter* than the Minimum Spanning Tree, with its length of 1246. Curiously, the Minimum Spanning Tree was displayed in EDM's Figure 3, but its greater length, 1246, *was omitted from the figure.* It is acknowledged elsewhere in EDM's text. Not so for the "Best MacGyver" of length 1217; this is implied in EDM's Figure 4, but not drawn or referenced explicitly anywhere in EDM 2012. When EDM say "*the other two (MacGyver) solutions... are more expensive*", they are painfully, obviously wrong. The 1st and 2nd MacGyvers were less expensive than the Minimum Spanning Tree. I also showed two MacGyver solutions that were *longer* than the Minimum Spanning Tree (1252, 1264), but that doesn't help EDM. EDM simply ignored the 1st MacGyver (length 1217) and misrepresented the 2nd MacGyver (length 1224), and declared that both were of length more than 1246.

Are EDM wrong? Of course. It's as easy as " 1217 exists, and it's less than 1246. 1224 is also less than 1246."

More smoke and mirrors are employed in EDM's Figure 4, which compares genetic algorithm results to random queries.

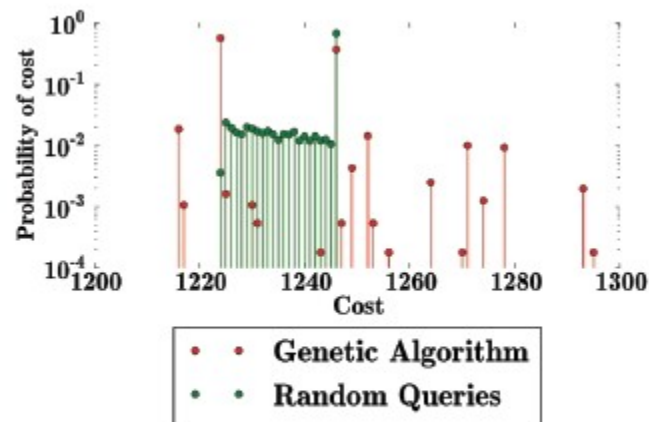
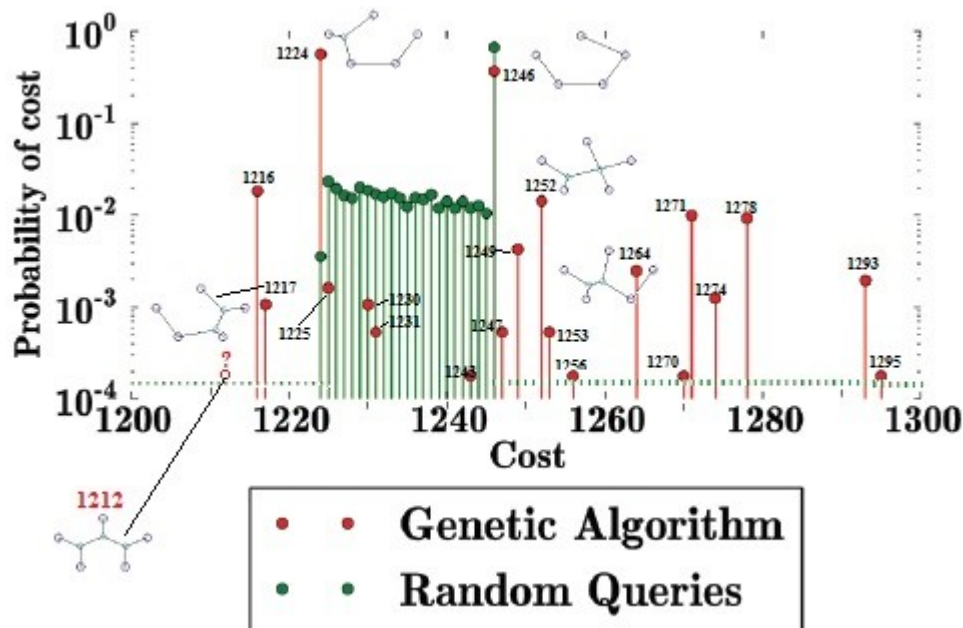


Figure 4: Performance of the genetic algorithm compared to that of random queries. doi:10.5048/BIO-C.2012.1.f4

I have annotated their diagram with stick figures showing the horizontal coordinates (lengths, with 1212 being the Steiner solution) and MacGyver (NON-STEINER) solutions they are discussing, as well as the elephant in the Room: the actual Steiner Solution *itself*, which was omitted completely from EDM's Figure 4! (Lower left in the annotated figure.)



EDM spend most of their efforts justifying switching the actual problem with a much simpler one. While the actual Steiner Solution for the 5-points-in-a-pentagon problem requires three additional "interchange" points, EDM dismiss the importance of interchanges. Perhaps they think that if there is one fixed interchange in the 5-point problem, then that can be treated as finding the minimum spanning tree for a six-point problem? Don't they realize that the positions of interchanges is as critical as the number of such interchanges? Why did they pick the one position for their "interchange" point which was *shown to be successful by my genetic algorithm*? EDM's confusing and tortured arguments fill the air with smoke, which, as it dissipates, reveals only one conclusion:

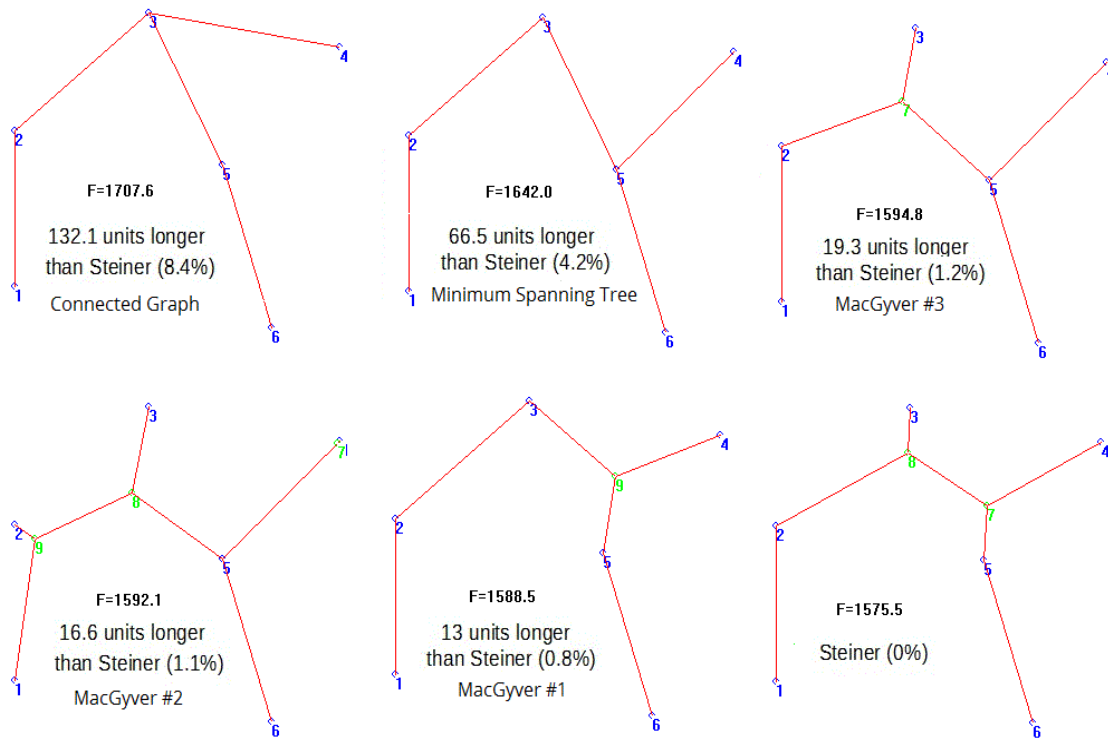
Repeated random queries will quickly find the minimum spanning tree with high probability. As a result, having a search algorithm find it is no great success.

The smoke and mirrors are revealed! This is the subtle "bait and switch" whereby EDM turn the truly difficult Steiner Problem into the boringly trivial Minimum Spanning Tree problem.

EDM 2012 has pages and pages of "[cargo-cult science](#)" charts and equations, but falls short on actual substance. They make a big point of how my algorithm pre-located interchanges more in the center, and that this was introducing "active information." What they overlooked, however, was that this was a feature of the slow FORTRAN version only, and was removed (as quite un-necessary) in the much faster C++ version. If anything, EDM inadvertently showed genetic algorithms can get by with *less* active information!

Upon looking at the 6-point figure used in both Ewert 2014 and EDM 2012, I realized that EDM were clueless about the nature of Steiner solutions, and so I set out to find out what the real Steiner Tree looked like for the connected graph used by Ewert et.al. I digitized the points in Ewert's tree, and fed them into my Steiner genetic algorithm, and sat back awaiting the results. After a few minutes, my suspicions were proved correct: the EDM 6-point "minimal spanning tree" wasn't even a minimal spanning tree, but rather just a lowly connected graph. And, the other MacGyvers that came out of the algorithm were all "less expensive" than the EDM figure.

Steiner Algorithm results appear below. Starting at the upper left, EDM's supposed "Steiner" is 132 units longer than the actual Steiner Solution (bottom right, length of 1575 units), and over 60 units longer than the actual "Minimum Spanning Tree" (middle top, length = 1642 units). The remaining three MacGyver solutions are all less expensive than the Minimum Spanning Tree (lengths of ~1595, 1592, and 1588). The supposed "Steiner Tree" iconically displayed in both Ewert 2014 and EDM 2012 is *not* a Steiner tree; it isn't even the "Minimum Spanning Tree" for those 6 points! This is truly a pathetic spectacle.



In the end, EDM have only wisps of smoke to show for all their efforts. The Steiner Genetic Algorithm remains an effective demonstration that genetic algorithms can produce irreducibly-complex, specified-information solutions of problems with no known answers.

We *STILL* don't need no stinkin' Target!

