

Re: Lizard engines and rat engines

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- *From:* Tim Tyler <tim@xxxxxxxxxxxx>
 - *Date:* Wed, 13 Jul 2005 01:02:26 -0400 (EDT)
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Guy Hoelzer <hoelzer@xxxxxxx> wrote or quoted:

> The revolution in the paradigm here requires a restatement of
> the second law, although there are also many proponents of articulating a
> fourth law. The difference is subtle in my estimation, but also profound.
> Rather than having a second law that merely limits the scope of potential
> outcome of a dynamic process to those that do not decrease the entropy of a
> closed system (IMHO this is code for the universe as a whole), many
> physicists are coming to appreciate a law that favors the emergence of
> systems that increase the RATE of entropy gain in closed systems through
> self-organization.

It sounds like you favour "more laws" over meddling with the existing laws.

I don't see any particular problem with the second law, I don't see how to usefully extend it, and making changes would be fighting an awful lot of history.

Consequently, I also favour any characterisation of the "thermodynamics of complex systems" take the form of new rules.

I'm not sure whether the attempt will produce additional numbered laws of thermodynamics.

Kauffman seemed to like that idea – however the details of his proposals don't look very coherent to me – and I'm not sure whether "fourth" and "fifth" laws of thermodynamics are the best way to go.

The nearest I can get to a simple and neat thermodynamic law is that the universe seems to gets better at dissipating entropy as time passes.

That "law" is a consequence of the evolution of living systems, an the "technology accumulation ratchet" that they represent, in combination with a relatively benign universe – in which organisms seem likely to thrive in the long term.

There is another candidate law, along the lines of saying that if there are several ways of doing things, thermodynamics often seems

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to favour the one that dissipates the most entropy. It is kind-of like the thermodynamic opposite of the principle of least action.

As I've described it, that "law" is in desperate need of cleaning up and making presentable. However, that task looks like a challenging one to me – and I'm not sure something neat, clean and law-like will emerge from the idea at the end of the day.

There are some more candidate laws on the horizon, though their outlines are perhaps less distinct.

Assuming for the moment, that we wind up with two more "laws" – roughly along those lines. Should they be "marketed" as laws four and five? Or are these laws one and two of the thermodynamics of complex systems? I'm not sure scientists will stomach more laws of thermodynamics. These kind of ideas may be best presented differently.

The whole area still seems to me like a fertile one to me, though:

Thermodynamics is a basic area – and it's rather frustrating to see the outline of grand principles on this sort of scale – without there being much sign of most scientists recognising the issues – or trying to pin the phenomena down.

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◇ From: Perplexed in Peoria

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