

In [debates](#), **Moriarty-Thims debate** is a Sep 02-19, 2009, 61-page, 15+ person, thread debate-[discussion](#) (reprinted below), originating via YouTube thread commentary in April, between Irish physicist [Philip Moriarty](#) and American chemical engineer [Libb Thims](#) on whether or not an [arrangement](#) of [students](#) has a [thermodynamic entropy](#).

“Where did [Gibbs](#) say that ‘a [society](#) is one such material [system](#)’? He didn’t – that is [Thims](#) particular (incorrect) reading of the application of [thermodynamics](#). When I talk about the ‘[entropy](#)’ of the students, it’s **\*\*really\*\*** important to note that this is just an [analogy](#). Entropy and the [second law](#) of thermodynamics are very abused concepts.

**An arrangement of the students \*does not\* have an associated thermodynamic entropy.** Thims has taken the abuse of the term entropy to an entirely new level, however, by suggesting that it—and, unbelievably, [quantum mechanics](#)—can be applied to ‘[interactions](#)’ in romantic [human](#) relationships.”

— [Philip Moriarty](#) (2009), [atheist](#) thermal physics professor; his gist view of entropy (against Thims); compare: [Gibbs](#)' friend [Joseph Klein](#)'s 1910 [proof](#), via [Planck](#), [Boltzmann](#), and [Clausius](#), that entropy applies to all “[bodies](#)” in the [universe](#), whether gas, liquid, solid, or student body

## Overview

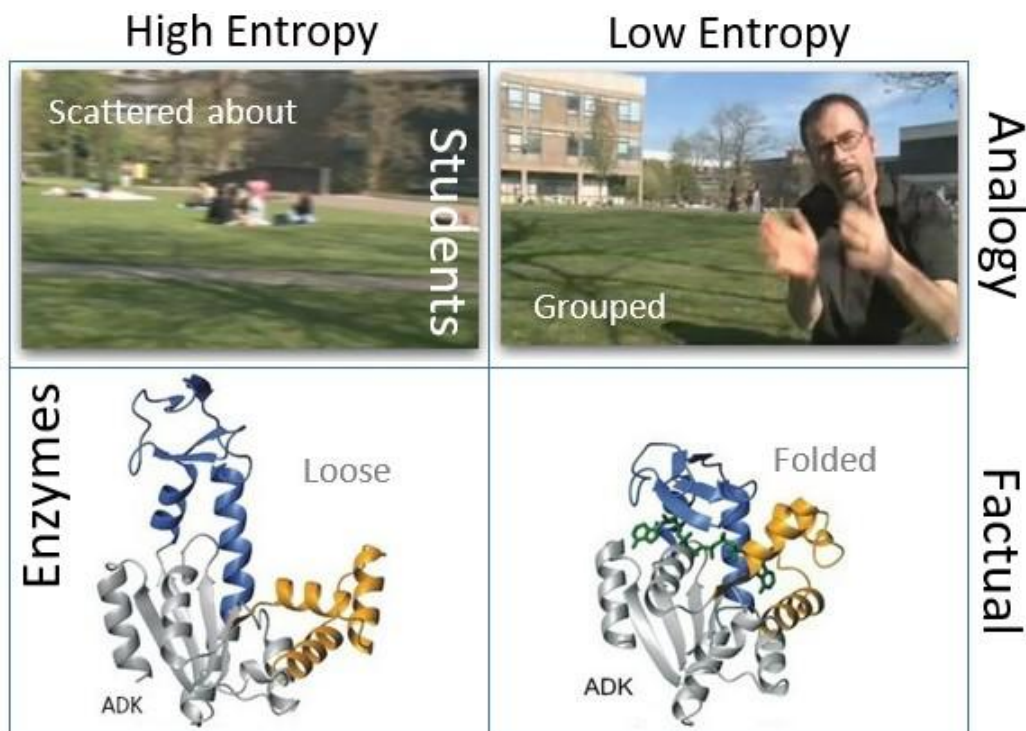
Con view: In short, Moriarty believes that it is fine to discuss the ordering of students (packed vs dispersed) in a field in lecture and video as a teaching “[analogy](#)”, but that in reality one cannot assign a value of entropy to groupings or orderings of humans.

**Moriarty's view**: “you cannot say that a particular [arrangement](#) of [students](#) has a [thermodynamic entropy](#).”

Pro view: Thims, conversely, believes that every structure in the universe can be assigned with a value of entropy:

**Thims' view**: “you can say that a particular arrangement of students has a thermodynamic entropy.”

the methodology of which was laid first by German physicist [Rudolf Clausius](#)' in his 1875 chapter [Determination of the Energy and Entropy](#) a methodology of which was taken from theory into practice in American chemist [Gilbert Lewis](#)' 1923 textbook [Thermodynamics and the Free Energy of Chemical Substances](#).



A synopsis of the **Moriarty-Thims debate**. Top: 2009 video stills of Irish physicist [Philip Moriarty](#): “we can think about the students who are milling about here and filling out this [state](#) quite well as a [high entropy state](#)” (Left); and “then we can think about bringing them into what we term a [low entropy state](#) (Right), where we pack them all nicely together, nicely [ordered](#) in the center of this lovely green.” Bottom: A 2012 depiction of the supermolecule adenylate kinase (adk) in the open (high-entropy state) and closed (low-entropy state) configurations. [1] The top description, according to Moriarty, is pure [analogy](#), whereas the bottom is [reality](#). [Libb Thims](#) argues the pro position, namely that the entropy of ADK exists just as it does for the entropy of a folded aggregate of students in a group, no analogy.

The central conflict in the debate seems to be that Moriarty is looking at the human situation using a [statistical mechanics](#) perspective, whereas Thims is looking at the human picture from a [chemical thermodynamics](#) perspective; although, more likely, there seems to be deeper issues and implications involved?

The adjacent open and closed configurations of adenylate kinase, a phosphotransferase enzyme that catalyzes the interconversion of adenine nucleotides, gives an idea of how entropy concepts scale up to the supermolecule or protein molecule level, each of which can be assigned with a thermodynamic entropy. [1]

## Quotes





The following are noted debate-related quotes:










“I looked at the **Moriarty-Thims debate**. My god: what a Babylonian cacophony! And so much innuendo! Is that the level of communication at which we have arrived? I dare say that, instead of Yes/No boxes at the end of the comments, there should be an injunction to sleep at least one night over a response. And good old [Muschik](#)—with the talent for obfuscation—[predictably](#) is putting his oar in. But yes, of course one may define an [entropy](#) for a **group of students** ‘in the [field](#)’ as well as for a battalion of marching soldiers. And for an anchor chain, and a polymer chain. And for a protein molecule and the human genome. The [question](#) is, however, what to do with such entropies and what predictions are possible—at this [time](#)—by the use of the concepts.”

— [Ingo Muller](#) (2009), “Email to Libb Thims”, 4:40AM CST Sep 9

## Debaters

Commentators in the debate include:

	Debater	Thermodynamics background
1.	 <p><a href="#">Libb Thims</a> (<a href="#">Sadi-Carnot</a>) (c.1975-) American chemical engineer, electrical engineer, and thermodynamicist</p>	<p>Founding editor of the <i>Journal of Human Thermodynamics</i>, authored the first textbook chapter on <a href="#">human thermodynamics</a> (<i>Human Chemistry</i>, ch. 16), author of the 1,600+ article <i>Encyclopedia of Human Thermodynamics</i>, world's largest <a href="#">thermodynamics book collection</a> (300+).</p>
2.	 <p><a href="#">Philip Moriarty</a> (c.1965-) English thermal physicist and nanoscientist</p>	<p>Professor of thermal physics for six years.</p>
3.	 <p><a href="#">Wolfgang Muschik</a> (<a href="#">ThermoSyst</a>) (c.1936-) German physicist and thermodynamics professor</p>	<p>Senior editor of the <i>Journal of Non-Equilibrium Thermodynamics</i>.</p>
4.	 <p><a href="#">Robert Kenoun</a> (<a href="#">Wrk003</a>) (1950-) Iranian-born American materials scientist and electrical engineer</p>	<p>Author of the 2006 <a href="#">social internal energy minimization theory</a> book <i>A Proposition to Theory of History and Social Evolution</i>.</p>

5.  [Peter Pogany](#)  
([Telosx](#))  
(c.1939-)  
Hungarian-born  
American  
economist  
Author of the 2006 book *Rethinking the World*, which includes a chapter on the thermodynamics of cultural evolution.
6.  [Bruce Bathurst](#)  
([Petrologist](#))  
(c.1945-)  
American geological  
thermodynamicist  
Completed PhD in geological thermodynamics at Princeton.
7.  [Lynn Liss](#)  
([LynnLiss](#))  
(c.1977-)  
American  
consultant and  
business  
executive  
Noted for her 2005 [JHT](#) article on thermodynamics and [business efficiency](#).
8.  [Ingo Muller](#)  
([Ingo.Mueller](#))  
(1937-)  
German physicist  
and  
thermodynamics  
professor  
Author of the 2007 *A History of Thermodynamics*, the 2005 textbook *Entropy and Energy: A Universal Competition*, and for his 2002 articles on [socio-thermodynamics](#) theory.
9.  [John Schmitz](#)  
([Waldnoces](#))  
(c.1950-)  
Danish chemist  
Author of the 2007 book *The Second Law of Life* and noted for his [human entropy](#) diagrams.
10.  [Jing Chen](#)  
([JingChen](#))  
(c.1965-)  
Chinese-born  
Canadian  
thermodynamic  
economist  
Author of the 2005 book *The Physical Foundation of Economics: an Analytical Thermodynamic Theory*.
11.  [Frank Lambert](#)  
(1918-)  
American organic  
chemist and  
humanities  
thermodynamics  
professor  
Noted for numerous second law themed websites, e.g. SecondLaw.com, 2ndLaw.com, Shakespeare2ndLaw.com, EntropySimple.com, EntropySite.com, etc., for his 1969 thermodynamic theories of [evil](#); for teaching "baby thermo" class to humanities undergraduates for several decades, and for his efforts to reform the standard American textbook chemistry definition of entropy from [disorder](#) to [dispersion](#) (supposedly getting 25 authors to make the change).
12.  [Aaron Agassi](#)  
([AaronAgassi](#))  
(c.1970-)  
American  
philosopher  
A skeptic to the idea of [human thermodynamics](#).
13.  [Ted Erikson](#)  
([SdogV](#))  
(c.1928-)  
Competed his MS in "Steady-State Thermodynamics" under American physical chemist [Ralph Tykodi](#), at the at the Illinois Institute of Technology.



American  
chemical  
engineer and physics  
professor



[Andrew Morrow](#)  
([AWMorrow](#))  
(1961-)  
American  
chemical  
engineer

14.

Noted for his 2006 philosophy people are “mosaics of atoms with a mind”, whereby, aware of this reality, one should attempt to see reality from the viewpoint of [reactions](#) of one’s fellow [human beings](#) to oneself, so to see if further insight can be found.

Others commented in on the debate via email and in side threads.

### Debate: part one

The following is thread-to-page conversion re-paste of the debate, which took place in the [general discussion](#) forum of the [eoht wiki](#) from September 02-19, and is broken up into three approximately 20-page sections, the first part of which is shown below:

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#### Comment #1



Sadi-Carnot ([Libb Thims](#))

Sep 2 2009, 10:18 PM EDT

English physicist [Philip Moriarty](#) (read above article) seems to take great issue on the application of [entropy](#) to assignment of states or configurations of humans. In his April video he said it can be done; in his August video said it can't be done? I will likely make a YouTube correction video to his last video where he stated:

"Concepts of [entropy](#) [only] apply to [gas](#) molecules; you cannot say that a particular arrangement of students has a [thermodynamic entropy](#)."

Comments would be appreciated.

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#### Comment #2



ThermoSyst ([Wolfgang Muschik](#))

Sep 3 2009, 12:04 PM EDT

Yes, you can: If you have a certain defined distribution function related to these students, you can define an entropy.

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#### Comment #3



Sadi-Carnot ([Libb Thims](#))

Sep 3 2009, 12:42 PM EDT

"Yes, you can: If you have a certain defined distribution function related to these students, you can define an entropy."

ThermoSystem, thanks for the comment. Sometimes I think that I am the only person on the planet ([alive](#)) who thinks like this. P.S. I'll be lecturing on human thermodynamics to a university bioengineering thermodynamics next semester, and will likely mention your views on the matter.

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#### Comment #4



AaronAgassi ([Aaron Agassi](#))

Sep 3 2009, 3:58 PM EDT

As you have requested of me to offer comment, I [fear](#) that I can only reiterate my standing position or suspicion that the cart is well before the horse, and no sense will come of currently half-baked [human thermodynamics](#) whatsoever, even as a [metaphor](#) quae memetics, let alone an actual science, until if ever, energy can be explicitly defined in the context of human thermodynamics.

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## Comment #5

telosx ([Peter Pogany](#))

Sep 3 2009, 4:02 PM EDT

Yes you can, if you consider the group of students a [power field](#); a system of interacting molecules or -- at a deeper level -- an assemblage of subatomic particles. Phil has accidentally extended the vast realm of misusing the [concept of entropy](#) (the usual [beaten eggs](#), [strewn around library books](#), etc.) in the wrong way.

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## Comment #6

lynnliss ([Lynn Liss](#))

Sep 3 2009, 5:17 PM EDT

After reading the background on this debate, it seems that Moriarty may simply be scared of what humans as molecules driven by entropy would mean to the mind of civilization and his own mental state! It's a common reaction by many people, scientists and layman alike, thus not surprising. There once was a time when humans we're certain our evolutionary history was most definitely NOT tied to a furry animal...and this debate still continues today. At least there are an enlightened few that continue to push our quest for human understanding further along....versus remaining status quo. Bravo Libb Thims.

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## Comment #7

Sadi-Carnot ([Libb Thims](#))

Sep 4 2009, 11:41 AM EDT

Thanks everyone for the welcome comments. To Aaron, I understand your skepticism. Energy is defined by Clausius clearly in his 1875 [mathematical introduction](#). How to apply this logic of energy determination to human systems is discussed in [overview here](#). Clausius explains how to determine the entropy of systems [here](#). There is still more work needed to be done before this can be clearly extrapolated in the form of tabulated measurements to human systems (e.g. system of students in a field). The formulation of such tables for small molecules was done by [Fritz Haber](#) in the 1890s.

Then by [Gilbert Lewis](#) and others in the 20th century. It is only a matter of extrapolation to apply this logic to systems of human molecules, which invariably were chemically synthesized, through terrestrial evolution, over the last 4.6 billion years, from the very same base atoms and molecules that Haber first began to tabulate the values of energy and entropy for in the various states in which they are found.

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## Comment #8

Anonymous ([Philip Moriarty](#))

Sep 5 2009, 3:29 AM EDT

Reply from Philip Moriarty: Of course you can define an entropy for a given distribution - I entirely agree. I guess you have in mind a [quantity](#) such as (minus) the sum of  $p_n \ln p_n$  (where  $p_n$  is a probability extracted from the [distribution function](#))? However, this quantity need not be the same as the thermodynamic entropy (and in many cases isn't). For example, a significant amount of my research over the past few years has focused on the [far-from-equilibrium self-organization](#) of nanoparticles. As discussed in "[Nanostructured Cellular Networks](#)" (2002), *Phys. Rev. Lett.*, we used a measure of the [entropy](#) of a cellular network to characterize the distribution of nanoparticles. But the value of S discussed in that paper is certainly **\*\*not\*\*** the [thermodynamic entropy](#) of the system and to confuse the two would be entirely wrong.

A very simple question: what physical units would you use to describe the entropy of a distribution of students?! J per K? If so, justify why this is an appropriate choice of units! (We spend a considerable amount of time in the first year of physics degree courses pointing out the importance of considering the correct units and dimensions for physical quantities.) Philip Moriarty.

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## Comment #9

Anonymous ([Philip Moriarty](#))

Sep 5 2009, 3:44 AM EDT

@telosx: See my comment above re. distribution functions. Moreover... A field full of students is not directly equivalent to a chamber filled with molecules at thermodynamic equilibrium - how could it be? As you appear to think otherwise, please address the following questions: \*Define\* the [equilibrium state](#) of the students. How much thermodynamic [work](#) is done \*by a student\* if (s)he is moved from one position to another? (Or if (s)he \*decides\* to move from one position to another). Can you construct the equivalent of a [Maxwell-Boltzmann distribution](#) function for

the "speeds" of the students? Are the \*velocities\* of the students Gaussian distributed? (And the same question I posed to ThermoSyst: What physical units do you use to describe the [entropy](#) (or, indeed, [enthalpy](#)) of the students?)

And please don't put words in my mouth: At what point did \*I\* ever suggest that books strewn around a library (or disordered sock drawers etc...) should be interpreted as examples of entropy in action? I am at pains in the response video to point out the difference between [analogies](#) of this type and true thermodynamic entropy. Philip Moriarty.

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#### Comment #10



Anonymous ([Philip Moriarty](#))

Sep 5 2009, 3:44 AM EDT

Libb - see my response to ThermoSyst's point below. Philip

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#### Comment #11



Anonymous ([Philip Moriarty](#))

Sep 5 2009, 3:51 AM EDT

@AaronAgassi: Very [good](#) points. Libb's response beggars belief: "It is only a matter of extrapolation to apply this logic to systems of [human molecules](#)...". No, it is not a matter of extrapolation, Libb. Just as it is not a matter of extrapolation to take fundamental [quantum mechanics](#) and apply it to "human molecules". What physical evidence do you have, Libb, for a "[human wavefunction](#)"? Have you somehow carried out the equivalent of the [double slit experiment](#) for humans?! Do you understand what is meant by [decoherence](#) or [complementarity](#) in the context of QM? I shudder to think that students are going to be exposed to this pseudoscientific nonsense next semester. Philip (Moriarty)

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#### Comment #12



Anonymous ([Philip Moriarty](#))

Sep 5 2009, 4:06 AM EDT

@Lynnliss: Oh, dear me. Why do both you and Libb seem to think that my arguments are religiously motivated? I am what [Richard Dawkins](#) would classify as a [level 6](#) "agnostic" - agnostic in the sense that although I cannot prove that there is or isn't a [god](#), there are an infinite number of possibilities I can't definitively disprove. For example, the entire [universe](#) may well have been sneezed out of the nose of the Great Green Arkleseizure (... hat tip to Douglas Adams) or, my favourite, the multiverse was created by a being whose projection into our reality is the children's book character Noddy. (Google "Noddy" if you're interested). I'm a [scientist](#). **\*\*Experiment and evidence are everything\*\***. Let's try some controlled experiments: Place a hundred students in a box and measure their positions as a [function](#) of [time](#). Will they behave just like molecules in a box? Will their speeds(velocities) be described by a Maxwell-Boltzmann (Gaussian) function? Can we take a [piston](#) and [force](#) the students into one corner and calculate the thermodynamic work done? What is the [energy](#) of [interaction](#) of two [human beings](#)? How do you write down a [free energy](#) function for the students [see: [human free energy](#)] when you can't even define what you mean by an energy of interaction? Philip Moriarty.

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#### Comment #13



Sadi-Carnot ([Libb Thims](#))

Sep 5 2009, 1:15 PM EDT

Phil all good points. Concerning entropy units, the units are the same as any other chemical system, J per K per mol. The number of particles in one mole (6E23), however, is more than the current human population (7E9). Russian physical chemist [Georgi Gladyshev](#), author of the 1997 book [Thermodynamic Theory of Evolution](#) have been discussing this issue for some years now. The [unit](#) for a [human mole](#) ([h-mol](#)) will thus not be the number of particles in a 12-gram sample of carbon 12, but will be the number of humans in average sample of some typical population or volumetric sample. We have, as of yet, reached definitive conclusions on this unit issue.

One trend that you will find with small systems (1-1000 particle range), according to recent [nanothermodynamics](#) computer simulations, is that entropy becomes nonextensive (see, e.g. Mohazzabi and Mansoori' 2005 article "Nonextensivity and Nonintensity in Nanosystems: A Molecular Dynamics Simulation in Journal of Computational and Theoretical Nanoscience), which raises possible issues on the [integrating factor](#) of the [inexact](#) heat differential. On your second set of comments, you need to move away from the [ideal gas](#) system point of view, to the particles on a [surface systems](#) point of view, where the interactions become important. Regarding how much thermodynamic work is done when one student moves from one position to another the question is answered using the [Gustave Coriolis](#)' 1829 [principle of the transmission of work](#). This is from where the modern definition of [mechanical work](#) as used by [Clausius](#) to make the science of [thermodynamics](#).

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**Comment #14**Sadi-Carnot ([Libb Thims](#))

Sep 5 2009, 1:16 PM EDT

How this is applied to people moving, using a very simplistic model, is [outlined here](#). In this calculation, to note, you get into issues of [free will](#), [readiness potential](#), and [induced movement](#). This issue of “what if a student chooses to move this way” is confusing for many people. Molecules do not \*decide\* or choose to move, neither do [human molecules](#). Regarding speed distributions and system [temperature](#), this is a huge issue. The issue revolves around the [question](#) of how one connect concepts such as [sexual temperature](#) (physical [beauty](#)) or [economic temperature](#), and so on, with [absolute temperature](#). This issue is still very puzzling. An example is the measured correlation that, determined by psychologists, that physically attractive people (e.g. supermodels) will cause a [volume expansion](#) (given more [personal space](#)) when moving through a crowd of people, as compared to more homely looking individuals ([personal space](#)).

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**Comment #15**Sadi-Carnot ([Libb Thims](#))

Sep 5 2009, 1:17 PM EDT

As to Gaussian distributions, of course there will be one in mapping the various speeds of people in a crowd. Here is one for heights ([averageness](#)). Regarding the [Maxwell-Boltzmann distribution](#) function you might like to read [Philip Ball](#)'s 2004 book [Critical Mass](#) (pgs. 65-70), wherein it is explained how Maxwell and Boltzmann derived their functions after a reading of [Henry Buckle](#)'s census statistics from his *History of Civilization*. When Maxwell obtained a copy he in fact read 160 pages in one night and wrote to [Lewis Campbell](#) about his excitement. Regarding QM, you are getting way off the point of the thread (entropy of students). I was the one that wrote the 20-page [history of quantum mechanics](#) (and the timeline table) at Wikipedia. As [Louis De Broglie](#) showed in 1923, every particle (or molecule) has a wave function associated with it. No one, as of yet, has fired a 6E23-atom human molecule through the double slits, but they have fired a 60-atom molecule Bucky ball through, with success.

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**Comment #16**Sadi-Carnot ([Libb Thims](#))

Sep 5 2009, 1:17 PM EDT

Regarding experiments: if you place a hundred students in a box, of course they will behave just like molecules in a box, because “they are molecules in a box”. If you think that you are made of something more than atoms (a [molecule](#), by definition, is a structure of two or more atoms), then science is not your subject. Regarding particles in a piston, i.e. [pressure volume work](#). You get into discussions of changes in human [personal space](#) (territories, boundaries, etc.). When the people of Germany expanded outward, i.e. pushing on its [boundary](#) (boarder), to take over Poland, during WWII, the [mechanical work](#) done by the system Germany, is exactly the same as the work done by the air molecules, on the surrounding atmosphere, in pushing the piston upward, in the [Carnot engine](#).

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**Comment #17**Sadi-Carnot ([Libb Thims](#))

Sep 5 2009, 1:18 PM EDT

Regarding the energy of interaction of two human beings, you get into discussions of [exchange forces](#) and (primary and secondary) [field particles](#). This latter point is a huge topic, requiring discussion far beyond what I have mentioned. The basic model of the free energy function for a system of humans is defined the same as for other isothermal isobaric system (with constant particle count):

$$G = U + PV - TS$$

Variations in daily entropy change will eventually cause equilibrium to set in when the variation of the [free energy](#)  $dG = 0$ . In loose talk, this is when a system stops working or producing external work. Most of the questions you have addressed have been covered in my 824-page textbook [Human Chemistry](#). People will still be working on these same questions 300 years from now.

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**Comment #18**Sadi-Carnot ([Libb Thims](#))

Sep 5 2009, 2:38 PM EDT

A few last points, regarding physical evidence the human wave function, please see ch. 8 (Human Chemistry), where I derive the Schrodinger equation, in the context of human molecular orbital theory. The first crude types of human wave functions ([turning tendencies](#)) were drawn by Ernst Mach in 1885. There is a big difference, of course, between a wave function of an electron and a molecule, but both expressions are, however, derived starting with the Lagrangian. Regarding coherence and decoherence, this is a marginal topic in that very little has been said or understood on how this applies to human activity. The few examples of application include the questionable postulates of [Rupert Sheldrake](#) (e.g. pg. 273 of Sense of Being Stared At) or David Bohm, etc., e.g. twins who remain aware of each other when a tragic injury occurs. Most of these topics, however, are far removed from human thermodynamics, let alone entropy.

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#### Comment #19



AaronAgassi ([Aaron Agassi](#))

Sep 5 2009, 5:06 PM EDT

"Yes you can, if you consider the group of students a power field; a system of interating molecules or -- at a deeper level -- an assemblage of subatomic particles. Phil has accidentaly extended the vast realm of misusing the concept of entropy (the usual beaten eggs, strewn around library books, etc.) in the wrong way. " Human beings mimicking [Brownian motion](#) seems not by itself much socially enlightening. AaronAgassi.

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#### Comment #20



AaronAgassi ([Aaron Agassi](#))

Sep 5 2009, 6:46 PM EDT

In context of Human Thermodynamics, energy means: \_\_\_\_\_ (fil in the \*\*\*\* blank.)

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#### Comment #21



AaronAgassi ([Aaron Agassi](#))

Sep 5 2009, 6:58 PM EDT

Re: "I shudder to think that students at Illinois are going to be exposed to this pseudoscientific nonsense next semester. Philip (Moriarty)"

It might have utility as a case study, for discourse upon questions of scientific value. But then, beyond simple acquisition of lab skills and the like, that's how science ought to be taught in the first place of course.

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#### Comment #22



Anonymous ([Philip Moriarty](#))

Sep 5 2009, 8:36 PM EDT

Re: "Regarding how much thermodynamic work is done when one student moves from one position to another the question is answered using the Gustave Coriolis' 1829 [principle of the transmission of work](#). This is from where the modern definition of mechanical work as used by Clausius to make the science of thermodynamics."

Oh, Libb, this is pointless. I ask you to define the \*\*thermodynamic work\*\* done by a "student molecule\*\* (sic) in a closed environment - to try to point out (in a tongue-in-cheek fashion) the deficiencies in your argument - and you respond by giving me a high school definition of work? (You might like to correct your EoHT definition, by the way, to note that work is the scalar product of two vector quantities).

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#### Comment #23



Anonymous ([Philip Moriarty](#))

Sep 5 2009, 8:48 PM EDT

Re: "The issue revolves around the question of how one connect concepts such as sexual temperature (physical beauty) or [economic temperature](#), and so on, with absolute temperature."

Libb, I've read over what you've written above a number of times now and still can't believe just how nonsensical it is. For example, the idea that you can equate a thermodynamic temperature with a so-called "sexual temperature" just...simply...beggars...belief. I am confident that the students will be smart enough to realise that what you're lecturing is nonsense. What I can't understand is why a university has invited you to deliver a course on this baloney. I'm sure that you see yourself as a pioneer battling against the flawed establishment view but you might like to bear in mind the following quote from Robert L. Park: "It is not enough to wear the mantle of Galileo: that you be persecuted by an unkind establishment. You must also be right."

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#### Comment #24



Anonymous ([Philip Moriarty](#))





Sep 5 2009, 9:08 PM EDT

Re: "You get into discussions of changes in human personal space (territories, boundaries, etc.). When the people of Germany expanded outward, i.e. pushing on its boundary (border), to take over Poland, during WWII, the mechanical work done by the system Germany, is exactly the same as the work done by the air molecules, on the surrounding atmosphere, in pushing the piston upward, in the Carnot engine:"

Oh, for crying out loud. "The mechanical work done by the system Germany is exactly the same as the work done by the air molecules..." Just read that over a few times to yourself, Libb. The mechanical work done by Germany (!) is "exactly" the same as the work done in a Carnot engine?!

#### Comment #25



Anonymous ([Philip Moriarty](#))

Sep 5 2009, 9:15 PM EDT

Re: "It might have utility as a case study, for discourse upon questions of scientific value. But then, beyond simple acquisition of lab skills and the like, that's how science ought to be taught in the first place of course. "

@AaronAgassi: I agree with you in that I would be happy for Libb's "Human Thermodynamics" to be discussed in the context of a course on the philosophy of science/the scientific method (in terms of getting students to think about what does and does not comprise good science). It would certainly have utility in that question. Where I have immense difficulties, however, is in Human Thermodynamics being presented to students as a viable scientific theory when it is simply pseudoscientific nonsense. That is unfair on the students who choose to take (or who are obliged to take) the course.

#### Comment #26



wrk003 ([Robert Kenoun](#))

Sep 6 2009, 1:44 AM EDT

I am not sure about considering humans as molecules, but I believe that laws of thermodynamic do apply to humans and their societies. In every system hierarchy, new characteristics emerge that do not apply to the subsystem levels. However, the high level system carries all the characteristics of its subsystems. Culture, economy and technology are characteristics of society, they are meaningless when applied to humans. But society is a living system and intelligent because its subsystems are living and intelligent. If society is a living system then it must have an evolutionary process of its own, similar to that of human evolutionary process. Knowing society possesses all of the characteristics of its subsystems, down to the lowest system level, then the laws governing the behavior of these subsystems, in all levels, must be part of what influences the behavior of society. Since basic constituents of humans and society are atoms and molecules and these systems are governed by the laws of nature, i.e., laws of thermodynamics, then the behavior of humans and societies are influenced by these laws.

Systems tends to adopt the lowest state of internal energy, which is a state of equilibrium and optimum stability; meaning that their process is goal oriented. However, if environmental conditions change on a system (imposing new conditions on the system), the system may then adopt a new process, sometimes, trying to achieve a new state of finality (equilibrium state) or achieve the same finality through a different process. The equilibrium state in physics and chemistry equates to achieving a state of equality in the process of social evolution. But what is, that living systems struggle to exchange in their interaction to achieve a state of equality? to be continued.

#### Comment #27



wrk003 ([Robert Kenoun](#))

Sep 6 2009, 2:17 AM EDT

That interaction is about equalization in the state of internal energy of the subsystems that puts the metasystem (society, or social organism) in the lowest state of internal energy and optimum stability. What is internal energy in our modern society? It is the accumulation of wealth and power in a small segment of society. Wealth is energy, produced by the work of many and harnessed by few that gives them unlimited access to life support systems that others do not have. Obviously, when one accumulates so much energy others suffer and the struggle is to release this energy so that others can also benefit from it, Karl Marx's class struggle. The state of equality in class struggle has never been achieved peacefully and without destruction of ordered structures, including human life (release of stored energy in ordered structures and elevation of entropy in universe). Note that society as a whole, and on a global scale, is growing continuously and becoming more and more ordered, despite self-imposed destructive processes meant for equalization. Therefore, global society's entropy keep decreasing while producing much more disorder in the universe so that the net effect remains positive and in accordance with the laws of thermodynamics. to be continued.

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**Comment #28**

wrk003 ([Robert Kenoun](#))  
Sep 6 2009, 2:42 AM EDT

let us now go back to the distribution of students in a class room and the state of entropy. I agree that many of the distributions that are random would have the same state of entropy, but certain others may produce a state of entropy that would be higher than others. For example, let us assume that students comprise of girls and boys, black and whites, rich and poor. One day the principle of the school decides to let the rich kids sit in front of the class and poor kids in the back of the class. I am sure this will create a huge problem when parents find out. the same will occur if he let white kids sit in the front and blacks in the back, or boys in the front and girls in the back. These forms of student distributions which are an indication of discriminatory policies (encouraging inequality) will produce stress in the system, (rise of entropy in the community) that may be resisted by law suites and protests to remove the principle. Therefore, yes, not every distribution would produce the same level of entropy.

More in my book " a proposition to theory of history and social evolution."

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**Comment #29**

Sadi-Carnot ([Libb Thims](#))  
Sep 7 2009, 12:45 AM EDT

Phil, it pains me to hear some of the comments coming from your mouth; especially coming from someone who has taught thermal physics for six year? Please answer this question for me: does the second law of thermodynamics apply to a group of students (yes or no)?

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**Comment #30**

AaronAgassi ([Aaron Agassi](#))  
Sep 7 2009, 2:44 AM EDT

When half baked hypotheses shed more heat than light, does peer pressure also rise as a consequence? And are any of the aforesaid indices quantifiable? I read here a great deal of: This is similar to that, and if we perform such mathematics upon these figures, the result is so. -The implications all whereof quite escape me, because quite frankly, I lack both faculty and interest. Traditional social science is openly qualitative. Quantitative Methodology is applied with care, in regard to observations that can be sampled and counted, and where meaning can then be inferred. I understand the wish for anything more like hard science in the humanities, but wishing never makes it so. I suggest instead, a return to statement of purpose, then in order to frame central questions. And if there can be no assertions as to the precise nature and identity of energy in Human Thermodynamics, then indeed, to borrow the Methodology of Physics, what can be said about it? What are the clues that can be listed?

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**Comment #31**

AaronAgassi ([Aaron Agassi](#))  
Sep 7 2009, 2:59 AM EDT

Argument by analogy was the last logical fallacy to be identified. All analogies are only intended for specific illustration, and all break down at some point. The only exception is tautology. Nothing is completely like anything other than itself. So, what analogies are drawn by Human Thermodynamics, to what specific application, and where do they terminate? What then might turn out sufficiently consistent for transfer of quantitative Methodology? Otherwise, what's the point?

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**Comment #32**

Anonymous ([Philip Moriarty](#))  
Sep 7 2009, 10:01 AM EDT

Re: "Phil, it pains me to hear some of the comments coming from your mouth; especially coming from someone who has taught thermal physics for six year?

Please answer this question for me: does the second law of thermodynamics apply to a group of students (yes or no)?"

Libb, this will be the last time I reply to your questions. I find our discussion akin to arguing the existence of fairies at the bottom of my garden - a pointless waste of time. I have in the past been involved in lengthy online debates, including a discussion which ran to sixty pages on the subject of nanotechnology. In that case, however, it was a debate - not an argument - and I felt that both the person I was debating with and I gained something from the exchange.

\*Our\* argument, however, is on the basis of a nonsensical pseudoscientific abuse of thermodynamic principles. I may as

well be debating with a flat Earth society member. What do I gain from this? Nothing.

So, to answer your question (for the nth time): It doesn't matter how we arrange the students in a field (or in a box) - a change in their positions makes no difference to the \*\*\*thermodynamic\*\*\* entropy of the arrangement. (By moving the students around \*we\* will have had to do work, but that it is a very different aspect of the problem). Students do not naturally disperse because they are driven to do so by an increase in entropy.

Moreover, my suggestion that your extrapolation of quantum mechanics to "human molecules" is ludicrous is certainly not off the topic. The question of the fundamental basis of the interaction between the elements of the systems is central to a consideration of the thermodynamics - compare the ideal gas to a real gas (e.g. involving van der Waals interactions). Are you telling me that the nature of the interaction makes no difference to the thermodynamic work done? (Actually, don't bother answering that...). Philip

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#### Comment #33



Anonymous ([Philip Moriarty](#))

Sep 7 2009, 10:09 AM EDT

Coda: I thought you might be interested in these comments posted under the Sixty Symbols YouTube video which prompted your most recent missives:

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YogiToad (1 month ago)

So you used an analogy using the students as an example. Who could not understand [that] the physical differences between people sitting around in a park and gas? If someone could not grasp the analogy then they really don't have what it takes to understand the concept in a more complex fashion either.

lynchmob2000 (1 month ago)

I still don't see what the problem was with Moriarty's explanation. It sounds like those complaints were from trolls.

velocity73R (1 month ago) [in response to lynchmob2000]

Exactly, it's a bunch of know it alls that want to make an analogy = Gospel. By doing this they feel smarter since he didn't expressly say it was in fact an analogy, even though anyone with an IQ higher than room temperature should have realized just what he was saying. He's made a video to feed the trolls, he should have just told them to, 'F' OFF!

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I certainly didn't do what velocity37R suggests in the final line of his/her comment because I thought that, given you are obviously extremely well read in thermodynamics, we could have a worthwhile debate. It's a shame that this proved not to be the case. Goodbye, Philip.

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#### Comment #34



Sadi-Carnot ([Libb Thims](#))

Sep 7 2009, 10:09 AM EDT

To Aaron:

The energy U of a system is the sum of vis viva T and ergal J of the system:

$$U = T + J$$

This is the basic definition, whether for humans or for smaller molecules or atoms, no analogy. To Phil: Based on your avoidance of the above very simple question (second law applies to system of students, yes or no?), I will assume you do not know the answer.

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#### Comment #35



Anonymous ([Philip Moriarty](#))

Sep 7 2009, 10:44 AM EDT

Re: "To Phil: Based on your avoidance of the above very simple question (second law applies to system of students, yes or no?), I will assume you do not know the answer." Interesting use of the term "avoidance"! Read

my reply above. Assume what you like. However, let me word your question more appropriately: "Does the second law of thermodynamics drive a system of students from a close-packed configuration to a "dispersed" configuration?" No. Could I be more specific? Philip.

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#### Comment #36



Sadi-Carnot ([Libb Thims](#))

Sep 7 2009, 12:08 PM EDT

Yes, you are still avoiding the main question. Based on your last response, however, I will assume you believe that: "yes, the second law does apply to systems of students, but not in such a way that it acts to disperse closed packed configurations." If this is true, then we are both in agreement.

To clarify, I have never said, anywhere, that the second law drives a system of students from a close-packed configuration to a dispersed configuration. This is the simple Boltzmann-type ideal gas model. To understand entropy in human systems, which are of course far more complex than ideal gas models, one must turn to how entropy is understood in chemical thermodynamics.

I understand that chemical thermodynamics is not your main field and thus I reason that this is the source or underlying reason behind your objections or irritations with the course of this discussion. As I have mentioned before, the fact that [over 300 people](#) (including 8 Nobel Laureates), come and gone, have attempted to grapple with entropy and the second law applied to human systems, illuminates the view that just exactly how entropy applies to human systems is not answered in a simple manner.

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#### Comment #37



AaronAgassi ([Aaron Agassi](#))

Sep 7 2009, 1:09 PM EDT

Philip, you have not explicitly answered Libb yes or no, nor have you undertaken to show cause why you should not. Perhaps you made your answer implicit, but I am too lazy and pissed off to work it out for myself. I am a layperson with little patience for riddles. Never burry the lead!

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#### Comment #38



AaronAgassi ([Aaron Agassi](#))

Sep 7 2009, 1:30 PM EDT

"To Aaron: The energy  $U$  of a system is the sum of vis viva  $T$  and ergal  $J$  of the system:  $U = T + J$ . This is the basic definition, whether for humans or for smaller molecules or atoms, no analogy. To Phil: Based on your avoidance of the above very simple question (second law applies to system of students, yes or no?), I will assume you do not know the answer."

That can never make any sense until if ever energy is ever defined in sociological terms for Human Thermodynamics.

Also, you make undue assumption of ready familiarity and facility on my part with jargon.

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#### Comment #39



Anonymous ([Philip Moriarty](#))

Sep 7 2009, 2:17 PM EDT

"Philip, you have not explicitly answered Libb yes or no, nor have you undertaken to show cause why you should not. Perhaps you made your answer implicit, but I am too lazy and pissed off to work it out for myself. I am a layperson with little patience for riddles. Never burry the lead!"

@AaronAgassi: The problem with Libb's question, as he no doubt knows well, is that it is worded very vaguely. It is ill-advised to answer this type of question with a yes/no response, without taking into account the context. Applying the 2nd law of thermodynamics to life immediately raises important and complex points related to the question of open vs closed systems and equilibrium/non-equilibrium thermodynamics.

Libb's thesis is as follows: Students are "human molecules". He argues that the same physics that is used to describe the thermodynamics of gas molecules can be applied directly to these "human molecules". Libb ascribes an (ill-defined) "interaction energy" to humans and argues that we can write down a function which describes the free energy of a system

of students. He also argues that the 1st and 2nd laws of thermodynamics can be ascribed to the collection/system of students.

The first law is simply the conservation of energy. But, as you have quite correctly highlighted, the concept of energy (internal, free, or otherwise) in Libb's Human Thermodynamics is ill-defined. Why is this? Well, it's because the entire human thermodynamics concept is fundamentally flawed.

One statement of the 2nd law is: "No process is possible whose sole result is the removal of heat from reservoir at one temperature and the absorption of an equal quantity of heat by a reservoir at higher temperature". But to ascribe a quantity of thermodynamic "heat" to an assembly of students **\*\*also makes absolutely no sense\*\***.

In this context, my answer is a resounding no.

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#### Comment #40



Sadi-Carnot ([Libb Thims](#))

Sep 7 2009, 10:01 PM EDT

I'm going to (hopefully) end this dismal conversation off with a note that Moriarty gets his understanding of entropy ("as they sort of spread out or move around [from this packed state], we say that they are moving to a high entropy state ... and that's what entropy's really about ... about this dispersal of energy, about moving from a state where everything is nicely packed and close together to one where everything is spread out"), from someone who flunked out of senior level thermodynamics and was forced to switch majors from physical chemistry to organic chemistry:

<http://www.eoht.info/page/Energy+dispersal>

A good rule of thumb we can all learn from this extended debate is that if you are going to copy off someone (in a test or YouTube video), make sure it is from the one who gets an A in the class, not from the ones who eventually drop out of the class or have trouble passing.

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#### Comment #41



Aaron Agassi ([Aaron Agassi](#))

Sep 7 2009, 11:46 PM EDT

Indeed, what is student heat? Is it anything like teen spirit? Or is it, or so I gather, a factor of compression and agitation of people in crowds? And is it quantifiable? It just might be. But why would any of that be important or interesting? Perhaps it might even factor into human movement patterns for building designs in Situationist applied unitary urbanism. But any of that doesn't validate or even connect application to Sociology or Politics.

Incidentally, Americans, particularly from the open plains, tend to stand further apart in conversation, than Japanese who live under high population density. So at cocktail parties, an American chatting with a Japanese will constantly back away in order to adjust acceptable distance, while the Japanese adjusts position by closing distance. Thus the most diminutive Japanese might actually be seen chasing the largest most burly strapping American around the room! Does this then mean that Americans are made of exotic negative matter?

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#### Comment #42



Sadi-Carnot ([Libb Thims](#))

Sep 8 2009, 12:02 AM EDT

Aaron, now your getting the idea. The basic theory of heat in connection to the universal expansion of bodies (systems of students or blocks of ice) originated in the 1720 chemistry lectures of Dutch physician Herman Boerhaave, in what was known as Boerhaave's law:

"Ever body, whether solid or fluid, is augmented in all its dimensions by any increase of its sensible heat."

This quote formed the basis of French chemist Antoine Lavoisier's 1787 caloric theory (heat particle view of heat), which in turn led to German physician Rudolf Clausius' 1865 theory of the entropy function as a formula for heat (a correction to the caloric theory).

P.S. on your comment "Perhaps it might even factor into human movement patterns for building designs", I coincidentally happen to be reading this very minute Italian architect Luis Fernandez-Galiano's 1982 book *Fire and Memory: On*

## Architecture and Energy:

<http://www.eoht.info/page/Luis+Fern%C3%A1ndez-Galiano>


in which he works out some of this logic in terms of thermodynamics, although I'm only on page six at the moment.

Regarding your question "why would any of that be important or interesting?", from my point of view (similar to C.G. Darwin), is that of prediction:

<http://www.eoht.info/page/Prediction>

Someone, 200-300 years from now, will be able to predict whether or not any given human chemical reaction will occur, e.g. divorce or 50-years of happy marriage, based on calculated measures of energy and entropy, just as is done with smaller chemical reactions. In other words, in the near future (not likely in our lifetime), people will be able to choose mates intelligently (20-30% rate of divorce at the 15-year mark), rather than willy-nilly (43% divorce rate at the 15-year mark, the current rate).

### Comment #43

 Petrologist ([Bruce Bathurst](#))

Sep 8 2009, 1:43 AM EDT


The debate I found did not explain any topics of contention. Here, because I was requested to comment, are some suggestions that come to mind for a sociologist or psychologist who is scraping thermodynamics for ideas. I offer these because I don't argue. These are based upon some experience using only the Gibbs-Duhem equation to study geological processes that could be proved equilibrium within their well-defined domains of space and time. Has human thermodynamics a phase rule?

Geology, however, is a natural, objective science. Classical thermodynamics is a physical science that, we believe, imposed restrictions upon geological phenomena that involved heat and work. Because minerals are crystalline phases, without molecules, classical rather than chemical thermodynamics was my natural choice.

The most restrictions are imposed upon equilibrium processes; and it is these that can be traced backward, from final to initial states. Many geological processes can be demonstrated to have been equilibrium (to varying degrees of assuredness), their slowness and high temperatures apparently permitting the changes within a hand specimen to have proceeded so efficiently that we cannot detect any production of 'uncompensated heat'. The application of equilibrium thermodynamics, with its many conservative equations, to a natural classification of geological objects was anticipated to be a very fertile field of study. This should be the same with a valid human thermodynamics.

The above I describe in detail because the development of a theory involving efficiency to economics, societies, or personalities might well borrow ideas from the application of thermodynamics to the natural sciences. The great differences are that one is concerned little with heat & work, and these subjects are sciences in the philosophical use of that term: the objects of interest in Human Thermodynamics would appear to be subjective, not objective.

### Comment #44

 Petrologist ([Bruce Bathurst](#))

Sep 8 2009, 1:47 AM EDT

State variables, cycles, and differential equations whose integrals are conservative are all related. Thus a First Law will exist if cycles & states do, making the concept of the First Law vary with one's point of view (alluded to by Poincaré). The only real restriction on content appears imposed by one's definition of entropy, an extensive quantity.

The entropy, no matter what it measures, is itself conserved during processes sufficiently efficient to be cyclic. Its dual, temperature, must be an intensive quantity; and their product must have the units of energy. There are normally  $C + 2$  such pairs, their sum defining the energy function itself. One avoids the constants of integration by arbitrarily setting the energy of a phase of a substance to zero. (Here only two laws are used.)

Statistical thermodynamics I don't work with. However, students arranged even by the absurd process of bouncing off walls, by rotating, stretching, and flying, won't define an entropy without a consistent energy function first. The energy is required to make entropy a state variable. One typically counts the number of equivalent arrangements; 'equivalent'

meaning first sameness of volume, then energy. Their product enumerates states equivalent in both volume & energy. Ultimately,  $S(U,V)$  is created and transformed into the Gibbs equation  $G(T,p)$ . The simplicity of molecular motion is the simplicity of thermodynamics; so, whether molecules that think can produce a (simple) thermodynamic theory is, I believe, worthy of thought.

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#### Comment #44



Petrologist ([Bruce Bathurst](#))

Sep 8 2009, 1:53 AM EDT

It is very useful, when creating one's own theory, to consult original literature. 'Vis viva' may have had some qualities lost when honed into work. However, older quantities were abandoned for a good reason: one needs to know what it this reason was. Older literature by anyone other than the best of scientists is often wrong. However, papers by excellent scientists often offer much simpler but deeper explanations than current texts or treatises provide. Great care needs be taken.

Once one leaves the exactly equilibrium realm, temperature (& entropy) are no longer extant. To force useful chemical relations near equilibrium, one must assume that the Gibbs equation (or any characteristic function of extensive variables) extends smoothly into the non-equilibrium domain. This is an axiom that supplements the laws of thermodynamics, and fails far from equilibrium.

Though I have no clear (or even fuzzy) picture of what human thermodynamics is (no Flash, sorry), classical thermodynamics is a very fundamental, physical theory whose study I can see contributing many ideas to softer 'sciences'. One need always remember, of course, that objective science does not offer theories that can relate natural objects of interest in the softer 'sciences'; for these natural objects are subjective, not objective. To attempt this would, in essence, be an attempt to replace philosophy with science.

Here one replaces Bridgman's scientific definition with Pierce's philosophical one: the concept of a kiss is not a gentle touching of lips: it is, rather, subjective '... effects, that might conceivably have practical bearings ... ' :-) To replace philosophy with objective science is, ultimately, to create a new religion.

These three posts offer personal suggestions that come to mind, not criticisms of what I don't understand. They are not part of a debate, but may add some substance.

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#### Comment #45



Aaron Agassi ([Aaron Agassi](#))

Sep 8 2009, 3:13 AM EDT

I reject Quantum indeterminacy in favor of ordinary measurement uncertainty, indeed a function of Thermodynamics being an aspect of classical physics, under the physics of Fisher information. (I is the Law) Hence I can except superdeterminism at least in principle. Nevertheless, long range projection of interaction between specific particles remains unfeasible, so simply analogizing people to particles and ignoring all the differences, won't predict much either, Sociometrically.

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#### Comment #46



Anonymous ([Philip Moriarty](#))

Sep 8 2009, 4:31 AM EDT

"I'm going to (hopefully) end this dismal conversation off with a note that Moriarty gets his understanding of entropy ("as they sort of spread out or move around [from this packed state], we say that they are moving to a high entropy state ... and that's what entropy's really about ... about this dispersal of energy, about moving from a state where everything is nicely packed and close together to one where everything is spread out"), from someone who flunked out of senior level thermodynamics and was forced to switch majors from physical chemistry to organic chemistry:

<http://www.coht.info/page/Energy+dispersal>

A good rule of thumb we can all learn from this extended debate is that if you are going to copy off someone (in a test or YouTube video), make sure it is from the one who gets an A in the class, not from the ones who eventually drop out of the class or have trouble passing."

Sorry, but I couldn't let this go: What a despicable ad hominem attack on Lambert. That you have to resort to this attempt

at character assassination underscores why it's time to call an end to this "debate". Lambert has had his work published in a number of high quality peer-reviewed journals and very many text-books have already adopted his approach to explaining entropy. Why do you think this is? (Have you tried submitting your work to any of the journals in which Lambert has published?)

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#### Comment #47



Anonymous ([Philip Moriarty](#))

Sep 8 2009, 4:49 AM EDT

"Aaron, now your getting the idea. "

Aaron states "Does this then mean that Americans are made of exotic negative matter?". Your response? "Aaron, now your [sic] getting the idea".

I rest my case.  
Philip Moriarty

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#### Comment #48



Sadi-Carnot ([Libb Thims](#))

Sep 8 2009, 11:01 AM EDT

I wish Moriarty would simply admit that he doesn't know what entropy is.

To review, in his first video he tries to explain what entropy is using the 1890 Poincaré recurrence theorem (a statement from a paper on the three body problem):

<http://www.eoht.info/page/Poincar%C3%A9+recurrence+theorem>

which is not what entropy is. In his second video, he tries to explain entropy using the 2002 views of ninety-year old, basically unknown, American chemist Frank Lambert, who "never liked thermo", who throughout his first 80-years of life admitted (to me) that he never understood what entropy was, who has never read the any of the works of Clausius (as he admitted to me), and who couldn't handle physical chemistry (or his thermodynamics classes), because they were too difficult (thus switching to an easier subject). Phil, there's no shame in saying that you don't understand something. Many have:

<http://www.eoht.info/page/Entropy+quotes>

If you want to understand what entropy is you have to physically open the 1865 (or 1875) textbook The Mechanical Theory of Heat and read it. Reading is fundamental.

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#### Comment #49



Anonymous ([Philip Moriarty](#))

Sep 8 2009, 11:14 AM EDT

"...If you want to understand what entropy is you have to physically open the 1865 (or 1875) textbook The Mechanical Theory of Heat and read it. Reading is fundamental."

"I wish Moriarty would simply admit that he doesn't know what entropy is. Libb Thims"

Libb, my Thermal and Kinetic course notes are at [www.nottingham.ac.uk/~ppzpj/F1ST1](http://www.nottingham.ac.uk/~ppzpj/F1ST1). I'll let interested contributors/visitors to your Wiki judge for themselves my grip on the concept of entropy.

Philip Moriarty

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#### Comment #50



Anonymous ([Philip Moriarty](#))

Sep 8 2009, 11:21 AM EDT

"Libb, my Thermal and Kinetic course notes are at [www.nottingham.ac.uk/~ppzpj/F1ST1](http://www.nottingham.ac.uk/~ppzpj/F1ST1). I'll let interested contributors/visitors to your Wiki judge for themselves my grip on the concept of entropy.

Philip Moriarty"



Apologies - that should be [www.nottingham.ac.uk/~ppzpj/F31ST1](http://www.nottingham.ac.uk/~ppzpj/F31ST1).

Philip Moriarty

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Comment #51



telosx ([Peter Pogany](#))

Sep 8 2009, 11:24 AM EDT

Taken together, extraction of low entropy from and insertion of high entropy into the environment makes the global economy and, by extension, all human activity on the aggregate a throughput of energy, with a second-law-dictated degradation in tow. (Economic growth, of course, increases the throughput with derivable consequences.)

These are introductory level observations in ecological economics but they provide a “from the top down,” intuition-honing demonstration why interactions even among a small group of people over a very short period of time are within the purview of “human thermodynamics.” Such activities may be regarded as “formal objects” of infinitesimal size in a triple integral where the integrand is a function of time, surface in use, and contribution to entropy in the terrestrial sphere. This last operator certainly has the aura of a fix, but it cannot be ruled out and it may indeed be not more ad hoc than what physicists admit as legitimate subjects of discussion (Einstein’s “cosmological constant” comes to mind).

There are many arguments in favor of Libb’s perspective even if we start “from the bottom up.” They may be numerically only ordinal and very general, yet they are intelligible and rational – built exactly on what physics provided by being cardinal, specific, sensible, and empirical. Interdisciplinary consciousness research and cognitive neuroscience (both of which include philosophy); experimental economics, cogent reasoning in trans-subjective psychology, and scholarly parapsychology help make the contrarian standpoint, which raises nitpicking empiricism to the rank of a criterion of truth, look rather dogmatic and outdated.

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Comment #52



Anonymous ([Philip Moriarty](#))

Sep 8 2009, 11:24 AM EDT

"If you want to understand what entropy is you have to physically open the 1865 (or 1875) textbook The Mechanical Theory of Heat and read it. Reading is fundamental."

Reading is certainly fundamental. I prefer, however, to keep up to date with the current literature and use this to complement my reading of classic (and classical physics) texts. Try it, Libb - you might find it illuminating.

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Philip

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Comment #53



Anonymous ([Philip Moriarty](#))

Sep 8 2009, 11:34 AM EDT

"Taken together, extraction of low entropy from and insertion of high entropy....

....scholarly parapsychology help make the contrarian standpoint, which raises nitpicking empiricism to the rank of a criterion of truth, look rather dogmatic and outdated. "

This is exactly the type of jargon-ridden and empty language that Alan Sokal so successfully lampooned with his "Transgressing the Boundaries: Towards a Transformative Hermeneutics of Quantum Gravity" spoof paper, published in Social Text in the mid-nineties. It strikes me that Human Thermodynamics would be an ideal subject for a similar treatment.

"Such activities may be regarded as “formal objects” of infinitesimal size in a triple integral where the integrand is a function of time... "

What the heck does that mean?! Please write down this triple integral for me, putting in the appropriate limits. If the integrand is a function of time, please write down the form of that function. Any scientist will attempt to write as clearly as possible. As Sokal cleverly highlighted, obscure language is generally a very good way to hide a lack of substance in the discussion/argument.

Philip Moriarty

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## Comment #54

Anonymous ([Philip Moriarty](#))

Sep 8 2009, 11:38 AM EDT

@telosx: Might I ask what your professional background is? Are you a mathematician, a physicist, a social scientist, a chemist etc...?

Philip Moriarty

## Comment #55

Anonymous ([Philip Moriarty](#))

Sep 8 2009, 12:03 PM EDT

"I wish Moriarty would simply admit that he doesn't know what entropy is."

Libb, Further to the post above which includes a link to the lecture notes I prepared for the Thermal and Kinetic Physics course ([www.nottingham.ac.uk/~ppzpj/F31ST1](http://www.nottingham.ac.uk/~ppzpj/F31ST1)), you might find it informative to download Tutorial Problem Sheet #3. Please feel free to attempt the problems related to entropy - I'd be more than willing to grade your work.

Philip Moriarty

## Comment #56

Sadi-Carnot ([Libb Thims](#))

Sep 8 2009, 12:46 PM EDT

Regarding Petrologist's question: "Has human thermodynamics a [phase rule](#)?", the first attempt at this was done by American historian [Henry Adams](#) in his 1909 article "The Rule of Phase Applied to History", who specifically defined people as "human molecules". Some of the more recent work on this subject comes from German physicist [Ingo Muller](#) (a member of this wiki), author of the 2007 *A History of Thermodynamics*. I'll give you a sample quote from his 2005 textbook *Energy and Entropy* (pg. 208) on [socio-thermodynamics](#):

"Chemists, physicists, and engineers will recognize the construction and interpretation of the strategy diagram from metallurgy or alloys or physico-chemistry of solutions where phase diagrams are constructed ... total segregation of the constituents occurs in those fields as the phenomenon of unmixing, like the fat globules float on watery soup. Such analogies emphasize the point of view that physical or sociobiological elements are atoms and molecules or birds and maybe men. And yet the forgoing is not socio-thermodynamics. While it seems plausible that birds strive for maximum gain, a principle like that is begging the question. What we are missing so far are the analogues in sociobiology to the first and second laws of thermodynamics."

There is also phase rule logic using a human molecule perspective in the 1998 article "[Human Societies a Curious Application](#)" (a scan of the article below) by Venezuelan chemical engineer and thermodynamics professor [Erich Muller](#).

## Comment #57

Aaron Agassi ([Aaron Agassi](#))

Sep 8 2009, 1:23 PM EDT

"Aaron states "Does this then mean that Americans are made of exotic negative matter?". Your response? "Aaron, now your [sic] getting the idea". I rest my case. Philip Moriarty"

Context much? To be fair, I think that he let my jibe pass him by.

Nor, alas, did he grasp my point again pursuing the falsity or breakdown of argument by [analogy](#) because analogies are necessarily limited, by which I mean: how such modestly successful correlations quickly meet limitations. Indeed, he looks to the future for working out the little kinks in the bold new Methodology, thereby realizing the awesome potential of groundbreaking insight. Well, wouldn't that require someone, eventually, actually to grapple with the problems openly? At least the attempt might be more edifying.

## Comment #58

Anonymous ([Philip Moriarty](#))



Sep 8 2009, 4:34 PM EDT

"Context much? To be fair, I think that he let my jibe pass him by."

Aaron: The very fact that he allowed your jibe to "pass him by", as you say, speaks volumes. Indeed, your jibe is hardly any more ludicrous than the rest of Libb's Human Thermodynamics thesis.

Time and time again I have posed questions regarding the physics which supposedly underpins Human Thermodynamics and have been met with one of the following responses from Libb:

- (a) Some elementary high school physics which does not begin to address the question I posed;
- (b) evasion and/or obfuscation;
- (c) Recourse to authority - citing wikipedia entries and/or textbooks, instead of addressing the question directly;
- or (d) abuse directed either at me or others.

(I would also be keen to know the opinions of his tutors/lecturers on his Human Thermodynamics "concept".)

Philip

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Comment #59



Sadi-Carnot ([Libb Thims](#))

Sep 8 2009, 4:48 PM EDT

My thesis (that the [laws of thermodynamics](#) govern [human existence](#)) is ludicrous? Let me explain things to you through the 1928 words of English astronomer [Arthur Eddington](#):

“If someone points out to you that your pet theory of the [universe](#) is in disagreement with Maxwell’s equations — then so much the worse for Maxwell's equations. If it is found to be contradicted by observation — well, these experimentalists do bungle things sometimes. But if your theory is found to be against the second law of thermodynamics I can give you no hope; there is nothing for it but to collapse in deepest humiliation.”

In short, if you think the [second law](#) doesn’t apply to a system of students, then you are floating on a pet theory, and you (and your students) will eventually collapse in deepest humiliation.

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Comment #60



Anonymous ([Philip Moriarty](#))

Sep 8 2009, 5:00 PM EDT

"My thesis (that the laws of thermodynamics govern human existence) is ludicrous? Let me explain things to you through the 1928 words of English astronomer Arthur Eddington: “If someone points out to you that your pet theory of the universe is in disagreement with Maxwell’s equations — then so much the worse for Maxwell's equations. If it is found to be contradicted by observation — well, these experimentalists do bungle things sometimes. But if your theory is found to be against the second law of thermodynamics I can give you no hope; there is nothing for it but to collapse in deepest humiliation.” In short, if you think the second law doesn’t apply to a system of students, then you are floating on a pet theory, and you (and your students) will eventually collapse in deepest humiliation."

Libb.

See my comment above about recourse to authority. And when did I ever suggest that I had any difficulty with the 2nd law of thermodynamics?! Don't ascribe statements or opinions to me that I did not put forward - that's deeply unfair. Have you taken a look at my Thermal and Kinetic Physics notes yet? You'll find my stance on the 2nd law clearly outlined

there.

Philip Moriarty

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Comment #61



Anonymous ([Philip Moriarty](#))

Sep 8 2009, 5:24 PM EDT

@Sadi-Carnot:

To suggest that your thesis is that the laws of thermodynamics "govern human existence" is a grossly misleading understatement. Your thesis (such as it is) is that there are [quantum mechanical](#), [chemical bonds](#) between humans which can give rise to "[human reactions](#)" and that there are [enthalpic/entropic](#) contributions to a "human" free energy function (see: [human free energy](#)). I was going to walk away from this - and leave you to your delusions - until your deeply unfair [attack](#) on [Frank Lambert](#). To attempt to belittle someone in a very public forum as you did is both despicable and unforgivable.

So, let's start with your fundamental nonsensical premise, i.e. that quantum mechanical bonds exist between humans. Where do I start? Well, off the top of my head:

- (i) If humans can be described by wave mechanics then why do we not diffract when we go through obstacles (such as doorways)? Why do two humans not interfere constructively/destructively when they interact with each other? Why can we not see interference patterns for humans (just as we do for electrons of photons in the [double slit experiment](#))?
- (ii) Where is your evidence for these quantum mechanical wavefunctions? Can you plot out a probability density function for a human?
- (iii) Do you understand the most fundamental quantum mechanical relations? What is the relationship between wavelength, momentum, and Planck's constant? Why do we not see quantum mechanical effects at the macroscopic level?

This is all basic 1st year undergraduate physics. Oh, and please don't tell me I'm off topic. (See my earlier comments) I'd also appreciate it if you answered in your own words rather than citing a textbook or Wikipedia.

Philip Moriarty

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Comment #62



Anonymous ([Philip Moriarty](#))

Sep 8 2009, 5:26 PM EDT

To clarify question (iii) in my previous post (#65) - by "macroscopic" in this context, I mean on the length scale of humans.

Philip

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Comment #63



Sadi-Carnot ([Libb Thims](#))

Sep 8 2009, 5:37 PM EDT

To clarify your derogation that I gave you a "high school" definition of [work](#), the definition I gave you (the measure of a [force](#) moving an object through a distance) is the definition of [work](#) upon which all of [science](#) is built. All modern definitions of work come from French physicist [Gustave Coriolis](#)' 1829 textbook [Calculation of the Effect of Machines](#). The next method is the integration of the [volume](#) changes of the [surface](#) of the system under study. This was first done graphically by French physicist Emile Clapeyron in 1834, over 38 years after the invention of the [indicator](#) (device used to get the data) by [James Watt](#) and [John Southern](#). In the study of work done by volumes of human systems, we do not yet have an indicator, thus calculations of volumetric work still in the theoretical stages. It may be another 38 to 138 years before we can do this.

Without these instruments, attempt to express human work in joules are going to be very crude. An example is the 1930s efforts by American engineer [Howard Scott](#) (and his Technocrat group) to replace currency by [energy certificates](#) and to thus measure an hour of a day's work in foot-pounds. His failure highlights many of the issues involved in calculating human work, thermodynamically. I'll answer more of your questions later.

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#### Comment #64



Anonymous ([Philip Moriarty](#))

Sep 8 2009, 5:43 PM EDT

"To clarify your derogation that I gave you a "high school" definition of work, the definition I gave you (the measure of a force moving an object through a distance) is the definition of work upon which all of science is built. All modern definitions of work come from French physicist Gustave Coriolis' 1829 textbook Calculation of the Effect of Machines. "

Oh, dear me. If you're enrolled for an MS degree in Physics you must surely know that work is the scalar (dot) product of two vector quantities. If I hold an object a metre from the ground and walk 10 metres in a northerly direction while holding the object precisely 1 metre from the ground, how much work have I done on that object?

Philip Moriarty

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#### Comment #65



Anonymous ([Philip Moriarty](#))

Sep 8 2009, 5:47 PM EDT

Quoting Sadi-Carnot from Comment #66 above: "It may be another 38 to 138 years before we can do this..."

Erm...? Why "38 to 138" years? Why not 100 years or 10 years? Why did you choose a rather precise "38 to 138" for what is effectively only a completely groundless prediction on your part?

Philip Moriarty

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#### Comment #66



Anonymous ([Philip Moriarty](#))

Sep 8 2009, 6:00 PM EDT

@Sadi-Carnot.

You continually give me links to Wiki pages which describe basic thermodynamic processes/measurements/physics. I am very well aware of these thermodynamic principles. My argument with you is not that basic thermodynamics is flawed! What's flawed is your remarkable assertion that these principles can be applied to "human molecules".

Your laughable central premise is as follows: "Well, a human is made of lots of atoms. Therefore a human is just a big molecule. Big molecules will behave just like small molecules. Therefore I can apply all thermodynamic principles to human "molecules" ".

So, please stop citing basic physical principles which I fully understand and give me answers to the questions I've asked you in Comment #64 (and elsewhere). In your own words. Without citing your Wiki pages (or Wikipedia). Any 1st year Physics undergraduate could address my questions in a few sentences. Please try to do this.

Philip Moriarty

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#### Comment #67



Anonymous ([Philip Moriarty](#))

Sep 8 2009, 7:17 PM EDT

@Lynnliss: This 'anonymous' user is Philip Moriarty. Try reading the preceding comments in the debate between myself and Libb Thims (Sadi-Carnot). On a matter of principle, I refuse to "sign up" for this Wiki, based, as it is, on nonsensical pseudoscience.

Philip Moriarty

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**Comment #68**Petrologist ([Bruce Bathurst](#))

Sep 8 2009, 7:22 PM EDT

Speaking of students bouncing off walls, I thought work was substituted with 'vis viva'. In any case, a serious typo in my second post (mathematical requirements), I just corrected to show why energy (not entropy, clearly) is needed before defining entropy. (Yet another requirement to be met.)

My three tedious posts indirectly asked many questions, questions that I can't answer: (1) Is the study of equilibrium states more fertile than far-from equilibrium states? (2) Are your variables analogous to intensities, densities, extensities, and energies? (3) Are the objects represented by these variables objective or subjective?

Anything that responds, including humans, will likely obey LeChatelier's Principle. One might even find restricted circumstances under which a quantitative relationship can be useful in relating well-defined, objective statistics. This could be a very valuable theorem in sociology; but it is not an application of thermodynamics. Thermodynamics, however, may have provided some ideas for its conception.

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**Comment #69**Aaron Agassi ([Aaron Agassi](#))

Sep 8 2009, 10:48 PM EDT

So, crowds compressed into closed spaces and agitated, behave at all like unto clouds of particles, even so much that behavior thereof may howsoever be described by thermodynamics equations. All fine and good. To then jump to the optimistic conclusion that any broader sociological application of thermodynamics only waits in the wings, is like concluding that because cranberries are red and edible, therefore red fire engines must be tasty too! That is the falsehood of argument by analogy.

Indeed, the application for traffic flow for architecture is probably the best that will ever come, because that is enough of a closed system and simplified besides and because individual human qualities have such little impact in this limited application.

Sadi-Carnot gathers ever more sociological observations that can be correlated by whatever strained metaphors to thermodynamics, but has yet to make predictions, testable hypotheses with standards of refutation.

Anyone tired of this tripe is invited to my own website and forums, <http://www.FoolQuest.com> to decide if at least my madness has any better method.

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**Comment #70**Sadi-Carnot ([Libb Thims](#))

Sep 9 2009, 2:07 AM EDT

This discussion has been dragging on and we don't yet seem to have resolution on the question posed.

To recap, Moriarty (a physicist) adamantly seems to believe, as professed in his second YouTube video on entropy, that "you cannot say that a particular arrangement of students has a thermodynamic entropy". This certainly is one opinion.

To cite a differing opinion, the second person to comment in on this thread, Wolfgang Muschik (a physicist), professor of thermodynamics and statistical physics at the Technical University of Berlin, states that: "yes, you can: If you have a certain defined distribution function related to these students, you can define an entropy."

So who is correct Muschik or Moriarty? Can we or can we not define an entropy for a system of people?

My inference from comment #63 is that Moriarty believes that the laws of thermodynamics govern human existence? If this is truly his view, then I am guessing that he believes the second law governs human systems (or arrangements), but that the measure of this effect, the entropy, cannot be quantified, measured, or even verbally said to exist? Muschik, conversely, says it can be defined.

In this context, I would much like Moriarty to clearly explain why he is correct and Muschik is wrong?

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**Comment #71**Anonymous ([Philip Moriarty](#))

Sep 9 2009, 4:44 AM EDT

"This discussion has been dragging on and we don't yet seem to have resolution on the question posed. To recap, Moriarty (a physicist) adamantly seems to believe, as professed in his second YouTube video on entropy, that "you cannot say that a particular arrangement of students has a thermodynamic entropy". This certainly is one opinion. To cite a differing opinion, the second person to comment in on this thread, [Wolfgang Muschik](#) (a physicist), professor of thermodynamics and statistical physics at the Technical University of Berlin, states that: "yes, you can: If you have a certain defined distribution function related to these students, you can define an entropy." So who is correct Muschik or Moriarty? "

I addressed this question in some detail way back in [Comment #7](#). At that point, however, I believed you when you said that you were studying for an MS in Physics. You've now refused to answer a very simply question related to your claim - i.e. where are you doing your degree? - at least five times. I am led to the conclusion that you are not enrolled on an MS in Physics course and that you are, let's say, "stretching the truth".

From now on, I'll therefore take it that you are not studying for an MS in Physics (which of course brings into doubt your claims about the other degrees you are supposedly pursuing and, moreover, any of the claims in your bio). This explains your inability to answer any of my simple 1st year physics questions in the comments above.

Your simple-minded "So who is correct, Muschik or Moriarty?" question betrays just how little you understand. We're both correct! It's frustrating to have to explain this to you yet again - given your arrogance with regard to the work of Lambert, for example - but I'll do so in the next comment.

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**Comment #72**Anonymous ([Philip Moriarty](#))

Sep 9 2009, 5:06 AM EDT

"So who is correct Muschik or Moriarty? Can we or can we not define an entropy for a system of people?"

Right, let's try to clear this up once and for all. We can of course define an entropy for a distribution function. This is of the general form  $S = -(\text{Sum of}) [(p_n) \ln (p_n)]$  where  $p_n$  are probabilities extracted from the distribution function, "ln" means natural log, and (Sum of) is my attempt to write a capital sigma without the benefit of mathematical typesetting.

This of course is rather similar in form to the formula for entropy we can write down from statistical mechanics BUT **it is not the same as a thermodynamic entropy (S)**. To define S, we need to have thermodynamically **accessible** microstates (Boltzmann). This is perhaps best described using the "playing cards" analogy: we can set up very many different microscopic configurations (microstates) for the cards (and thus think about a value of entropy in a statistical sense) **but the cards don't shuffle themselves**. The microstates aren't thermodynamically accessible.

Similarly, we can **in principle** write down a **statistical measure** of entropy for a distribution of people but this is not the same as the thermodynamic entropy. The people do not move from one state to another - i.e. you don't change the occupation of microstates - by changing the thermodynamic temperature. You can make whatever childish analogy you want between "sexual" and "thermodynamic" temperature but that's all it is - an analogy (and an extremely poor one).

You're not the only one to get confused. See: von Neumann entropy ([link](#)). I'd very much like to hear Prof. Muschik's thoughts on the above and this paper: ([link](#)).

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**Comment #73**Anonymous ([Philip Moriarty](#))

Sep 9 2009, 5:10 AM EDT

Re. [Comment #77](#) above:

My apologies - the hyperlinks that I inserted (i.e. `<a href=....>`) didn't work. Please simply copy and paste the URLs into the address bar of your browser.

Thanks. Philip Moriarty

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**Comment #74**Anonymous ([Philip Moriarty](#))

Sep 9 2009, 5:43 AM EDT

"In this context, I would much like Moriarty to clearly explain why he is correct and Muschik is wrong...."

In the spirit of open debate, I thought it best to include here a copy of an e-mail I sent [Prof. Muschik](#) a few minutes ago:

Dear Prof. Muschik,

Thank you for contributing to the debate that I have been having with "[Libb Thims](#)" (I suspect that this is a [pseudonym](#)!) at his Human Thermodynamics Wiki. I have posted a couple of responses to your (and Libb's) comments – see Comments #7, #76, and #77. I'd be very interested in reading your response to these comments.

Ordinarily, I would not pursue an online debate of this type with such "vigor" but I have been disappointed and shocked by Thims' willingness to indulge in quite abusive ad hominem attacks. Note his attempt to slur the academic credentials/qualifications of Prof. [Frank Lambert](#) in Comment #39. Thims has a habit of doing this – he has an entire page dedicated to Lambert which includes more abuse along these lines.

What is particularly irritating is that it is clear that Thims has been lying about his pursuit of a masters degree in physics. It is clear from his inability to answer the simplest questions in physics that he has no understanding at all of fundamental physical principles. He is certainly very well read in [thermodynamics](#) but has absorbed very little physical intuition from what he's read – he knows the [history](#) (better than me) but not the [physics](#).

As I state in Comment #69:

Your [Thims'] laughable central premise is as follows: "Well, a human is made of lots of [atoms](#). Therefore a [human](#) is just a big [molecule](#) [see: [Eadon poll](#)]. Big molecules will behave just like small molecules. Therefore I can apply all thermodynamic principles to human "molecules" [see: [human molecule](#)]".

..contd in next comment.

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**Comment #75**Anonymous ([Philip Moriarty](#))

Sep 9 2009, 5:44 AM EDT

...contd. from Comment #74:

It's not surprising that this type of [pseudoscientific](#) nonsense is being put forward on the web. What is very surprising, however, is that [Thims](#) has (apparently) been invited by a university to present a [lecture](#) [Note: to bioengineering thermodynamics students, at University of Illinois; see: [Thims lectures](#)] on his [human thermodynamics](#) rubbish. To equate – literally (!!) – a "[sexual temperature](#)" with a "thermodynamic [temperature](#)" is so [wrong-headed](#) as to beggar [belief](#). In addition, his arguments about human "wavefunctions" [see: [human wave function](#)] (or orbitals) [see: [human molecular orbital](#)] and "[human bonds](#)" [see: [human chemical bond](#)] are what I would expect from someone with absolutely no understanding of science.

I would very much welcome hearing your thoughts on the above (or at Thims' Wiki).

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**Comment #76**Anonymous ([Philip Moriarty](#))

Sep 9 2009, 5:52 AM EDT

"To cite a differing opinion, the second person to comment in on this thread, [Wolfgang Muschik](#) (a physicist), professor of [thermodynamics](#) and statistical physics at the Technical University of Berlin, states that: "yes, you can: If you have a certain defined [distribution function](#) related to these students, you can define an entropy. So who is correct Muschik or Moriarty? Can we or can we not define an [entropy](#) for a



system of people?"

And yet again, Libb, your only response is to quote an authority figure. This has been your tactic throughout and betrays your very weak understanding of physics and [physical chemistry](#). Anybody can quote authority figures - it takes somewhat more effort to develop your own counter-arguments. You have consistently shown that you are unable to do this.

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#### Comment #77



Anonymous ([Philip Moriarty](#))

Sep 9 2009, 6:57 AM EDT

Aaron, you are entirely correct to dismiss the concept of [human thermodynamics](#), as put forward by Sadi-Carnot/Libb Thims, as tripe. Sadi-Carnot has studied the [history of thermodynamics](#) in quite some detail - and is certainly better versed in the minutiae of the historical development of certain concepts than I - but he has little or no grasp of the underlying [physics](#).

"Thims gathers ever more sociological observations that can be correlated by whatever strained metaphors to thermodynamics, but has yet to make predictions, testable hypotheses with standards of refutation".

Indeed. Moreover, instead of debating the scientific issues using reasoned counter-arguments, he continually simply [quotes](#) from experts (often entirely missing the point of the [question](#)) and arrogantly attacks those who do not share his outlandish views via nasty [ad hominem](#) attacks.

[Richard Feynman](#) once put forward an interesting single sentence definition of science: "[Science](#) is the [belief](#) in the [ignorance](#) of experts". Once an argument is \*solely\* based on, as I put it above, "[recourse to authority](#)" - Thims's preferred approach - then one appreciates the point that Feynman was trying to make. It's a question of critical thinking.

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#### Comment #78



AaronAgassi ([Aaron Agassi](#))

Sep 9 2009, 11:13 AM EDT

One reason for disagreement is indeed [misunderstanding from ignorance](#), but that isn't the only possible motivation. Perhaps it is Thims who needs to pose question in order to understand his opponent, before then attempting more pertinent rebuttal.

To wit: I would also like to press home, again, my point regarding the limits of [argument by analogy](#).

It is remarkable that both sound and light could actually be waves. If truly so, even then, waves are waves. But the [heat](#) in [human thermodynamics](#) is cleanly heat in an equivocal [sense](#), much the way the hand of a statue is a hand. After all, [human beings](#) also engage in decidedly [non particle-like behaviors](#). The heat in human thermodynamics is supposed to have formal similarities to actual [physical heat](#), enough so that thermodynamics equations might at all describe events, much less predict outcomes. It is an analogy or [metaphor](#). And the question then remains open, how far the metaphor extends before breaking down into ignominiously cretinous failed [reductionism](#). I submit, not necessarily anywhere near as far as Thims' boundless optimism. It will be novelty enough if the limited architectural application is fruitful, never mind efficient. The rest might be poetic, but only given competent [poetry](#). That, at least, might be fruitful for poetry, and ever truly to glean human insight.

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#### Comment #79



Anonymous ([Philip Moriarty](#))

Sep 9 2009, 5:33 PM EDT

"One reason for disagreement is

"The essential submission is the assertion that development is due, not to [human](#) effort, but to the automatic effect of certain external circumstances or events. It comes about in the manner in which a [flame](#) is produced when a match is struck against the side of the box. Surely, there are few who would accept this theory of culture-growth as [realistic](#). But then the whole idea of '[social heat](#)' is no more than a downright [absurdity](#)."



[Henry Carey](#)  
(1793-1879)

American sociologist

indeed misunderstanding from [ignorance](#), but that isn't the only possible motivation. Perhaps it is Thims who needs to pose [question](#) in order to understand his opponent, before then attempting more pertinent rebuttal....That, at least, might be fruitful for [poetry](#), and ever truly to glean human insight."

— Werner Stark (1962), on Henry Carey's 1858 "extreme" sociology (see: [Stark classification](#))

A comparison of [Moriarty](#) (C#79) to [Werner Stark](#) (1962) in mindset against the 1850s [social heat](#) theories of [Henry Carey](#).

I would be more than happy to address any question that Thims wishes to put to me. I've dealt with his most recent question in comments #76 and #77 and have yet to receive a response. I have been as clear as I can possibly be in answering his question. The difficulty is Thims struggles with the fundamental [physics/math](#)s underpinning [entropy](#). This makes communication with him rather tricky.

Treating sound and [light](#) as waves is much, much more than just [analogy/metaphor](#). If you're interested, some videos at the University of Nottingham's Sixty Symbols YouTube channel deal with the physics of waves - see:

- [http://www.youtube.com/watch?v=PLey7TTGXTw&feature=channel\\_page](http://www.youtube.com/watch?v=PLey7TTGXTw&feature=channel_page)
- [http://www.youtube.com/watch?v=fytJ0ZsbIoQ&feature=channel\\_page](http://www.youtube.com/watch?v=fytJ0ZsbIoQ&feature=channel_page)
- [http://www.youtube.com/watch?v=vKS3-npxgls&feature=channel\\_page](http://www.youtube.com/watch?v=vKS3-npxgls&feature=channel_page)

In contrast, not only is the concept of [heat](#) [see: [social heat](#)] in Thims' Human Thermodynamics (HT) "equivocal" as you suggest, it is simply nonsense. You might as well state that interactions between [human](#) beings are [mediated](#) by strands of invisible spaghetti, tendrils of invisible cheese, or teams of invisible pixies. There is absolutely no [evidence](#) for what Thims is proposing. If he were putting forward HT simply as an [analogy/metaphor](#) for [classical thermodynamics](#), that would be bad enough. However, his thesis is that it's not simply a metaphor - he argues that HT is a viable description of [reality](#).

Philip (Moriarty)

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Comment #80



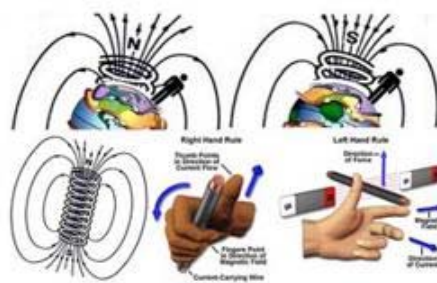
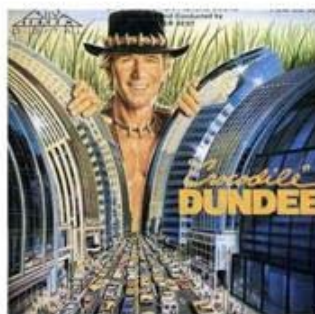
Anonymous ([Philip Moriarty](#))

Sep 9 2009, 9:41 PM EDT

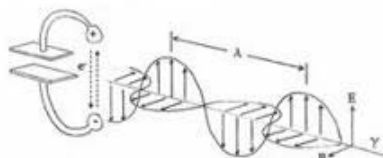
I made mention of [light](#) and sound both actually BEING waves. Again, waves are waves. Yes, that's more than [analogy](#), indeed it is tautology.

Thims strays into nonsense by pressing [argument from analogy](#) way too far. The observation of [people in crowds](#) under confined [space](#) moving at all like [particles](#) [see: [human particle](#)], is all fine and good. It could be a [true](#) observation, that most would make as a [joke](#), because it doesn't really necessarily indicate much more. The most viable application is still to architectural [traffic flow](#), but even then not exclusively, due to distinctly non thermodynamic human conduct. For example, The way to avoid

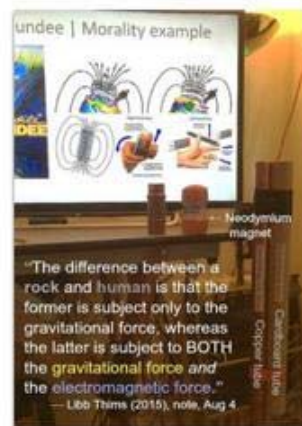
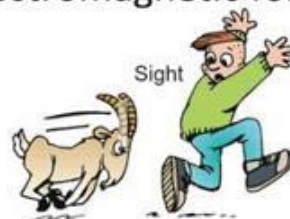
### Crocodile Dundee | Morality example



Wrong | Right



### Electromagnetic force



Social Coriolis Effect  
Gravitational force

crows at Disneyworld, is always to turn left, because crowds tend to turn [right](#).

A 2015 synopsis of a “right” and “wrong” [social Coriolis effect](#) (C#80) based example, from slides #57-58 ([Ñº](#)) of lecture #12 ([Ñº](#)), from Thims’ “Zerotheism for Kids”. [N1]

Will Thims now chalk that up to some

sort of [social coriolis effect](#)? [N1] In situationism, even aesthetics factors of as experienced inside an [environment](#) are observed to [repel](#) or to [attract](#) human [movement](#) through the streets. But such qualitative factors are difficult to quantify in order to apply [equations](#). So any possible application of [thermodynamics](#) remains [poetical](#), useful in [forcing](#) unusual inventive associations, which is more valuable than Thims' obscurantist [pseudoscience](#).

#### Comment #81



Petrologist ([Bruce Bathurst](#))

Sep 10 2009, 4:34 AM EDT

This is a very fine site, with wonderful photos. I don't mean to strike anyone on the mat. However, this 'debate' might benefit from a broader perspective.

This evening I (quite independently) offered the Wikipedia my requirements to be called a 'creationist':

1. Traditional [religions](#) & traditional [science](#) must be in conflict.
2. Objective (shared) and subjective (personal) observations are treated the same.
3. The scientific use of the word '[true](#)', which scientists strive to replace with 'false', is treated the same as the 'true' used by philosophers.
4. Hypotheses are judged by examining their explanations, not their predictions.

Here I add this:

5. Religion and art are not viewed as important irrational activities of the [mind](#): [faith](#) is treated as logical and thus blurred with scientific belief. Irrational thought is viewed as inferior to rational thought.

My thread 'Why I am not a molecule' ([Ñº](#)) created a hostile insistence that [science](#) & [religion](#) must be in conflict, IMO; it is clear that a '[thermodynamics](#) of everything' muddies the clear stream between science & religion; I failed to find '[truth](#)' defined here, though 'science' is philosophical; & 'science' here explains, it doesn't [predict](#). One may wish to search this site for 'prediction' or 'truth'.

To be continued ...

#### Comment #82



Petrologist ([Bruce Bathurst](#))

Sep 10 2009, 4:45 AM EDT

... continued from Part I

Even in [Whewell](#)'s 1858 'Novum Organon Renovatum', we can find:

'The [prediction](#) of results, even of the same kind as those which have been observed, in new cases, is a [proof](#) of real success in our inductive processes.'

Here, '[Religious Thermodynamics](#)' contains a solution to the '[creationism](#)' problem, if (ironically) one is prepared to abandon the very core principles of [physical](#) & [natural science](#):

'... The popularization of this statement and others like it have led to the wide-spread belief, for many, that the [laws of thermodynamics](#) are in conflict with [evolution](#). This, however, is not the case.

'The difficulty in clarifying the contradiction, to the appeasement of all naysayers, is, in particular, that the science of "[human chemical thermodynamics](#)" is a future branch of [knowledge](#). The conception that a [human being](#) is, in [reality](#), a "[molecule](#)", specifically, a [human molecule](#), is a little understood or used concept in [science](#).'

I'm sure it's only coincidence, but if '[creationism](#)' is America's new Messiah, '[Human Thermodynamics](#)' would appear to be its 'John, the Baptist' (if I may make an [analogy](#), Aaron :-).

This in no way lessens Thims' arguments, so long as they use operational definitions and make many testable predictions.

#### Comment #83



AaronAgassi ([Aaron Agassi](#))

Sep 10 2009, 5:06 AM EDT

What testable predictions?

#### Comment #84



AaronAgassi ([Aaron Agassi](#))

Sep 10 2009, 7:33 AM EDT

"3. The scientific use of the word '[true](#)', which scientists strive to replace with 'false', is treated the same as the 'true' used by philosophers."

[Truth](#) is correspondence to [reality](#) in assertions. Assertions are Ontological statements such as employ the verb: to be.

#### Comment #85



AaronAgassi ([Aaron Agassi](#))

Sep 10 2009, 7:37 AM EDT

"4. Hypotheses are judged by examining their explanations, not their predictions."

Both explanatory [power](#) and testability are always crucial.

#### Comment #86



AaronAgassi ([Aaron Agassi](#))

Sep 10 2009, 7:40 AM EDT

"5. [Religion](#) and art are not viewed as important irrational activities of the [mind](#): [faith](#) is treated as logical and thus blurred with [scientific belief](#). Irrational thought is viewed as inferior to rational thought."

## Notes

N1. Re: "social Coriolis effect" (#80) this was first touched in by [Ernst Mach](#), in his "[turning tendencies](#)" and expanded on by Thims in *Human Chemistry* (2007) and used in Thims' "[Zerotheism for Kids](#)" lecture, in the Crocodile Dundee morality example.

## References

1. [The Wolf-Watz NMR-lab](#) – Chemistry.umu.se.

## Continued

â— [Moriarty-Thims debate \(part two\)](#)

â— [Moriarty-Thims debate \(part three\)](#)

## See also

â— [Rossini debate](#)

θΔics

In [debates](#), the **Moriarty-Thims debate (part two)**, of three parts in total (see: [part one](#) and [part three](#)), is shown below:

## Note

Comment numbers are not exactly aligned in numerical sequence as referenced in comment, but will be in the vicinity, e.g. comment #112 (tread version) → comment #97 (webpage version), owing to thread-to-webpage conversion issues, such as deletion of non-relevant posts, etc.

## Debate: part two

The following is thread-to-page conversion re-paste of the debate, which took place in the [general discussion](#) forum of the [eoht wiki](#) from September 02-19, and is broken up into three approximately 20-page sections, the second part of which is shown below:

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### Comment #87



Anonymous ([Philip Moriarty](#))

Sep 10 2009, 7:52 AM EDT

"[Truth](#) is correspondence to [reality](#) in assertions. Assertions are Ontological statements such as employ the verb: to be. "im now going to stop posting here because it will get confusing if there are two anonymous users. Comments #95 and #96 are not from me ([Philip Moriarty](#)). Moreover, the discussion is going off topic - I do not want to get dragged into a pointless discussion on [creationism/religion vs. science](#). In any case, I can't follow or understand the vast majority of what Petrologist writes. (I refer Petrologist to Comment # 54 above).

[Libb Thims](#): I would appreciate an answer to the many unanswered questions I have posed above. \*Please\* confirm the date and host for your university [lecture](#). Feel free to respond to my criticisms of the [Journal of Human Thermodynamics](#) as well, given that you are the General Editor of the "journal".

Goodbye.

Philip Moriarty

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### Comment #88



Anonymous ([Philip Moriarty](#))

Sep 10 2009, 10:38 AM EDT

To: Sadi-Carnot/Libb Thims

In response to my e-mail to [Prof. Muschik](#) (see comments #79 and #80 above on pages 4 and 5 respectively), I received the following message:

"Dear Colleague Moriarty,

This is a ghostlike discussion. From a thermodynamical point of view, the procedure is clear: If one have a distribution (that means some items must be distributed), you can define an not necessarily [thermodynamic entropy](#) (if it is thermodynamic or not, depends on the items which are distributed). If one additionally can define an [energy](#) belonging to the set of the distributed items, one can define a [temperature](#) by differentiating the [entropy](#) to this energy. Then one can call the set of the distributed items a thermodynamical one (if you want).

Let us consider a set of students having different heights. Then one can introduce a [distribution function](#) describing the distribution of the different heights spanning the R1. The one can define an entropy ([information](#) measure). But because there no energy belonging to the considered set of students, you cannot define a [temperature](#) and this set of students does nor represent a [thermodynamical system](#) (as we knew that from the very beginning).

You can use this letter for contributing the discussion on which I will not participate anymore. Thanks for your e-mail and with my best regards W. Muschik"

So, as was pointed out in Comments #76 and #77 above, not only do Muschik and I agree but your suggestion that you can write down a [thermodynamic entropy](#) for a group of students is entirely flawed. Please stop trying to propagate your pseudoscientific [human thermodynamics nonsense](#) any further. More importantly, stop launching groundless ad hominem attacks.

Thank you. Enough,  
Philip Moriarty

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#### Comment #89



AaronAgassi ([Aaron Agassi](#))

Sep 10 2009, 1:04 PM EDT

First of all, sorry, I am used to systems warning me that I'm logged off before allowing me, if at all, to post anonymously.

Next, Phil, your application of thermodynamic [equations](#) to student height distribution is a splendid example of arbitrary and inappropriate application thereof. Of course, Sadi-Carnot applied said thermodynamic equations not to student height distribution, but to the notably [particle-like movement](#) of individuals in crowds in confined spaces. Again, this is [metaphoric](#), because actual particles only move because of readily quantifiable [physical forces](#), and people may be said to move in response to psychological forces, another metaphor and not so readily measurable. At best quantitative methods may be intelligently and approximately applied to such a qualitative problem.

My point is, that with some effort, any student could deliberately begin moving in as non particle like a manner as conceivable, simply to ruin the observations! And that will never happen with actual particles. So: apples and oranges! That the [analogy](#) goes as far as it does, is already note worthy. If Sadi-Carnot insists that it goes any further, let him propose an [experiment](#) with proper conditions of [falsification](#). But making entirely different analogies, even from the same thermodynamics, only demonstrates the facility of concocting analogy. The connection is unclear, at least to me, given that the categories are so entirely different,

And as to the scale of degrees set for measurement of the correlated analogous [heat](#), surely that would be arbitrary, considering what sort of particle each student is taken to represent, [differential](#) in scale, and so forth. Analogy allows that range of [freedom](#). It's not real heat. The real [temperature](#) in the room, is entirely another matter.

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#### Comment #90



AaronAgassi ([Aaron Agassi](#))

Sep 10 2009, 1:34 PM EDT

Once again, just because both [Hitler](#) and Stalin wore mustaches, it would be folly to conclude that only bad men wear mustaches! Plant breeding and animal breeding are extremely similar, but even so, there remain some differences. All analogies break down at some point, except for tautology, the [analogy](#) of any one thing actually with itself. Because nothing is entirely like anything else. Anything is only entirely like itself. At some point, all things are each *sui generis*. Now, [Darwin](#) actually tested to find the extent of similarity in plant and animal breeding. Will Sadi-Carnot propose proper experiments with [conditions of falsifiability](#), in order to discover the range of similar applicability of Thermodynamics? Or will he simply wait for the bold denizens of his fabulous future to buckle down on the due diligence?

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#### Comment #91



Anonymous ([Philip Moriarty](#))

Sep 10 2009, 5:55 PM EDT

"Aaron, you are entirely correct to dismiss the concept of [human thermodynamics](#), as put forward by [Libb Thims](#)Sadi-Carnot, as tripe. Sadi-Carnot has studied the [history of thermodynamics](#) in quite some detail - and is certainly better versed in the minutiae of the historical development of certain concepts than I - but he has little or no grasp of the underlying [physics](#).

"Sadi-Carnot gathers ever more sociological observations that can be correlated by whatever strained [metaphors](#) to [thermodynamics](#), but has yet to make [predictions](#), testable [hypotheses](#) with standards of refutation".

Indeed. Moreover, instead of [debating](#) the scientific issues using reasoned counter-arguments, he continually simply [quotes](#) from experts (often entirely missing the point of the question) and arrogantly [attacks](#) those who do not share his outlandish views via nasty *ad hominem* attacks. [Richard Feynman](#) once put forward an interesting single sentence definition of science: "[Science](#) is the belief in the ignorance of experts". Once an argument is \*solely\* based on, as I put it above, "recourse to authority" - Sadi-Carnot's preferred approach - then one appreciates the point that Feynman was trying to make. It's a question of critical thinking.

All the best,  
Philip (Moriarty)

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#### Comment #92



lynnliss ([Lynn Liss](#))

Sep 10 2009, 6:04 PM EDT

[Human thermodynamics](#) (or [human chemistry](#)) is an entirely radical thinking from a scientific viewpoint....how can you state Libb doesn't embrace Feynman's "ignorance of experts" approach, in this light?

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#### Comment #93



lynnliss ([Lynn Liss](#))

Sep 10 2009, 6:10 PM EDT

"I made mention of light and sound both actually BEING waves. Again, waves are waves. Yes, that's more than [analogy](#), indeed it is tautology. Sadi-Carnot strays into nonsense by pressing argument from [analogy](#) way too far. The observation of people in crowds under confined space moving at all like particles, is all fine and good. It could be a true observation, that most would make as a joke, because it doesn't really necessarily indicate much more. The most viable application is still to architectural traffic [flow](#), but even then not exclusively, due to distinctly non Thermodynamic human conduct. For example, The way to avoid crows at Disneyworld, is always to turn left, because crowds tend to turn right. Will Sadi-Carnot now chalk that up to some sort of [social coriolis effect](#) [see: [turning tendencies](#)]? In Situationism, even aesthetics factors of as experienced inside an [environment](#) are observed to [repel](#) or to [attract](#) human [movement](#) through the streets. But such qualitative factors are difficult to quantify in order to apply [equations](#). So any possible application of thermodynamics remains [poetical](#), useful in forcing unusual inventive associations, which is more valuable than Sadi-Carnot's obscurantist pseudoscience."

Just because '[qualitative factors](#) are difficult to quantify in order to apply equations' does that mean we don't attempt to? Isn't that evolutionary thinking...something we science aspire towards?

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#### Comment #94



lynnliss ([Lynn Liss](#))

Sep 10 2009, 7:42 PM EDT

"Next, Phil, your application of thermodynamic equations to student height distribution is a splendid example of arbitrary and inappropriate application thereof. Of course, Sadi-Carnot applied said Thermodynamic equations not to student height distribution, but to the notably particle like movement of individuals in crowds in confined spaces. Again, this is metaphoric, because actual particles only move because of readily quantifiable physical forces, and people may be said to move in response to psychological forces, another metaphor and not so readily measurable. At best quantitative methods may be intelligently and approximately applied to such a qualitative problem.

My point is, that with some effort, any student could deliberately begin moving in as non particle like a manner as conceivable, simply to ruin the observations! And that will never happen with actual particles. So: Apples and oranges! That the analogy goes as far as it does, is already note worthy. If Sadi-Carnot insists that it goes any further, let him propose an experiment with proper conditions of falsification. But making entirely



different analogies, even from the same Thermodynamics, only demonstrates the facility of concocting analogy. The connection is unclear, at least to me, given that the categories are so entirely different,

And as to the scale of degrees set for measurement of the correlated analogous heat, surely that would be arbitrary, considering what sort of particle each student is taken to represent, differential in scale, and so forth. Analogy allows that range of freedom. It's not real heat. The real temperature in the room, is entirely another matter. "

But you are presuming that the 'decision' of a student to move is 'deliberate' vs. [driven](#) by their innate [nature](#) or scientific structure.....thoughts?

#### Comment #95



Aaron Agassi ([Aaron Agassi](#))

Sep 10 2009, 10:26 PM EDT

Of course all events are subject to sequence of causality, one way or another. The question is of applicable [reduction](#) to thermodynamics. [Psychology](#) has yet to reduce to neurology, much less [thermodynamics](#). And even such an achievement, if ever successful, would still be complex enough seemingly to rule out reduction of [sociology](#) or sociometry directly to thermodynamics equations.

PS. I think that we are all familiar with and clear about the logical falsity relevance of [appeal to authority](#). Nevertheless, if one posts credentials, one opens the door to requests for verification. And, seriously Lynn, not even Sadi-Carnot posts degrees yet to be graduated into! I mean, doesn't that violate [entropy](#)?

#### Comment #96



Anonymous ([Philip Moriarty](#))

Sep 11 2009, 1:20 AM EDT

As I noted in one of the preceding comments, I was going to walk away from this argument with Sadi until he (yet again) personally and viscerally attacked the credentials of [Frank Lambert](#), somebody who has helped countless students get their heads around the very [difficult concept](#) of [entropy](#). This, not to put too fine a point on it, pissed me off immensely, particularly as Sadi/Libb clearly does not understand even the most basic concepts in thermodynamics and quantum physics. He certainly knows the history of the subject (better than I do in some cases) but does not understand the [physics](#) and [chemistry](#).

#### Comment #97



Anonymous ([Philip Moriarty](#))

Sep 11 2009, 1:43 AM EDT

"Human thermodynamics (or human chemistry) is an entirely radical thinking from a scientific viewpoint.....how can you state Libb doesn't embrace Feynman's "ignorance of experts" approach, in this light?"

...smacks face with palm of hand and starts to sob gently...Arrrgggghh. Right, here's \*my\* new radical theory:

All human [interactions](#) are based around the transfer of [energy](#) "hoops" - best thought of as "micro-bagels" in layman's language - which exist in forty-seven higher dimensions on fractions of the Planck-length and for fractions of Planck-time. These \*undetectable\* micro-bagels give rise to a [force](#) between humans which mediates all of our interactions and, moreover, ensures that the [arrow of time](#) is defined. [Love](#) is simply a manifestation of a force between fermionic micro-bagels, whereas [hate](#) is a repulsive force due to boson-like energy hoops. Loss, sorrow, and, indeed, even homesickness, are all simply due to a reduction in the rate of energy hoop production by the body.

**\*\*Definitively\*** prove me wrong. (Remember, those energy hoops are undetectable...) Oh, and by the way, stay tuned because I can generate another theory, just as "radical" as that tomorrow. And the day after. And for an infinite number of days following that. I'll quote Robert L Park again, seeing as you apparently missed it the first time 'round (in the comments above):

"It is not enough to wear the mantle of [Galileo](#) - that you be persecuted by an unkind establishment. You must also be right."

Philip Moriarty ([www.nottingham.ac.uk/physics/research/nano](http://www.nottingham.ac.uk/physics/research/nano))

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#### Comment #97



Anonymous ([Philip Moriarty](#))  
Sep 11 2009, 1:54 AM EDT

"Let students and professors make their own decisions about what they will and won't debate....open dialogue (vs. trying to shut down dialogues) only stunts innovative thinking"

Yes, fine, I entirely agree. If Libb's "[theory](#)" (for want of a better term) is being presented for discussion in terms of its scientific viability, well and [good](#). I made this point in Comment # 24 above. (Before you post in future, would you do me the courtesy of reading all of the comments in the debate thus far? It'll save us both some time).

However, it's an entirely different matter if Libb's [human thermodynamics](#) baloney is being presented as a viable scientific theory to undergraduate students. If Libb would respond and let me know who is hosting his talk then we could get to the bottom of the context in which he is presenting his lecture. After all, would you be happy for me to present my "theory" on the micro-bagel model of human interactions (outlined in comment #112 above) to undergraduates as part of a module on biochemistry?

**\*Anyone\*** can put an innovative new theory. The difficult bit is making sure that your theory agrees with the evidence/observations.

In suggesting that I am trying to stifle debate you are either being wilfully disingenuous or, as I suspect, you really don't understand the scientific method (and Libb has got it so wrong).

Philip Moriarty ([www.nottingham.ac.uk/physics/research/nano](http://www.nottingham.ac.uk/physics/research/nano))

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#### Comment #98



Anonymous ([Philip Moriarty](#))  
Sep 11 2009, 1:59 AM EDT

"Just because 'qualitative factors are difficult to quantify in order to apply equations' does that mean we don't attempt to? Isn't that evolutionary thinking...something we science aspire towards?"

Yes, you're entirely correct that we should aim to develop quantitative **\*\*predictive\*\*** models even in cases where this appears extremely difficult. What we shouldn't do, however, is dress fanciful "theories" - with no grounding in observation or experiment - up in the language of physics and/or maths in order to make them appear more valid than they are. This is precisely the approach Libb uses.

I'll refer you, yet again, to a preceding comment, Lynnliss. See my discussion of Alan Sokal's masterful expose of pseudoscientific "mumbo jumbo" in Comment # 54 above.

Philip Moriarty ([www.nottingham.ac.uk/physics/research/nano](http://www.nottingham.ac.uk/physics/research/nano))

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#### Comment #99



Anonymous ([Philip Moriarty](#))  
Sep 11 2009, 2:11 AM EDT

"But you are presuming that the 'decision' of a student to move is 'deliberate' vs. driven by their innate nature or scientific structure.....thoughts?"


Lynnliss....

Have you taken in \*any\* of the preceding debate? Please go back and read comments 77 and 99 above. It is an entire waste of your time to attempt to couch human interactions and distributions in terms of Sadi/Libb's nonsensical human thermodynamics "theory". There is, of course, the much more compelling "micro-bagel"/energy hoop theory of human interactions which you could adopt... :-)

Philip Moriarty ([www.nottingham.ac.uk/physics/research/nano](http://www.nottingham.ac.uk/physics/research/nano))

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#### Comment #101

 Petrologist ([Bruce Bathurst](#))

Sep 11 2009, 4:46 AM EDT

Mr Agassi, I think you've found the elephant squeezing through the door, but I'll answer these questions anyway.

Anonymous (Mr Agassi?) wrote yesterday at 7:33am EDT:

"3. The scientific use of the word 'true', which scientists strive to replace with 'false', is treated the same as the 'true' used by philosophers."


'Truth is correspondence to reality in assertions. Assertions are Ontological statements such as employ the verb: to be.'

Yes, that's the philosophers' definition, even in their jargon. However, it's not the scientists' definition of truth. Unless reality changes, metaphysical truth will never change. Most anything in science true today may be false tomorrow. When that happens, science has progressed (see: scientific realism ([link](#))).

' "Thin" Truth: Both Putnam and Fine assert that one can (and should) accept the well established theories of science (even about unobservable) as (probably) true, but that this should not be understood as accepting the "metaphysical realist" (Putnam's term) view that the statements which constitute those theories correspond to reality. '

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#### Comment #102

 Petrologist ([Bruce Bathurst](#))

Sep 11 2009, 4:51 AM EDT

Mr Agassi next wrote:

"4. Hypotheses are judged by examining their explanations, not their predictions."

'Both explanatory power and testability are always crucial.'

No. Thermodynamics, in fact, is almost unique in never explaining. Frustrating. Even statistical mechanics does not really help:

' Although statistical mechanics is based on the presumed reality of atoms and molecules, it does not provide, any more than does thermodynamics, a detailed description of atomic and molecular behavior and of atomic and molecular interactions. ... Thus statistical mechanics adds something very useful to thermodynamics, but it neither explains thermodynamics nor replaces it. ' Van Ness, H.C. 1969. Understanding Thermodynamics. NY: McGraw-Hill.

After an invited lecture I gave at CalTech (on a new thermodynamic theorem useful to geologists), a post-graduate student asked 'Why are only three curves needed?' My answer was 'I haven't the slightest idea.'

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#### Comment #103



Petrologist ([Bruce Bathurst](#))  
 Sep 11 2009, 4:57 AM EDT  
 Mr Agassi then wrote:

' "5. [Religion](#) and art are not viewed as important irrational activities of the mind: faith is treated as logical and thus blurred with scientific belief. Irrational thought is viewed as inferior to rational thought."

What in Hell is "scientific belief"?'

See 'thin' truth, answering your question #3 above. This statement I added because my introduction to the methodology of science came from reading D.T Suzuki's 'Outlines of Mahayana Buddhism', decades ago. Suzuki even refers to the similarity of Buddhist philosophy to the Logical Positivists of the Vienna Circle. Next was an outstanding little article by [Albert Einstein](#), which I've never found since. A good reference, however, is P.W. Bridgman, 1932. The Logic of Modern Physics. NY: Macmillan. Its purpose was to tighten the definition of science. When creating one's own theory (as opposed to using one -- as in [T.S. Kuhn's](#) 'normal' science), one needs to be extraordinarily careful.

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#### Comment #104



Petrologist ([Bruce Bathurst](#))  
 Sep 11 2009, 5:09 AM EDT  
 Anonymous ([Philip Moriarty](#)) wrote:

' In any case, I can't follow or understand the vast majority of what Petrologist writes. (I refer Petrologist to Comment # 54 above). '

The only anonymous post I offered, which I signed, was that pointing you to probably another alias of Msr Carnot. I should hope my posts were more generous than #54! You may find my posts confusing because they addressed the whole subject of 'Human Thermodynamics'. I felt focusing on its definition of [entropy](#) lets it be treated as a hard science, which is bad. My first posts focused on the requirements of a '[hard science](#)', and thermodynamics in particular.

Pseudosciences such as [creationism](#) have silently changed objective to subjective, scientific (or 'thin') [truth](#) to philosophical truth, and replaced the production of 'falsifiable' predictions with happy explanations.

You've noticed this. :-)

My last post noted that most all these substitutions are on the website, which should set off huge alarm bells. I don't mean to imply that this was done on purpose; but I wondered why people were talking about entropy when this implied the tacit acceptance of 'Human Thermodynamics' as hard science (not 'science' as in 'Wissenschaft', as defined on the website).

One could, however, turn cute relationships (and Msr Carnot knows more than I can imagine) into nice contributions to such fields as [sociology](#) or [psychology](#). These are not, however, 'hard sciences', and 'Human Thermodynamics' does not appear to be one, despite its name.

' Moreover, the discussion is going off topic - I do not want to get dragged into a pointless discussion on [creationism/religion vs. science](#). '

I fear that may be what has been happening ... and remember, the Dark Ages weren't called dark because it was cloudy.

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#### Comment #105



Aaron Agassi ([Aaron Agassi](#))



Sep 11 2009, 6:17 AM EDT

"Mr Agassi, I think you've found the elephant squeezing through the door, but I'll answer these questions anyway.

Anonymous (Mr Agassi?) wrote yesterday at 7:33am EDT:

"3. The scientific use of the word '[true](#)', which scientists strive to replace with 'false', is treated the same as the 'true' used by philosophers."

'Truth is correspondence to reality in assertions. Assertions are Ontological statements such as employ the verb: to be.'

Yes, that's the philosophers' definition, even in their jargon. However, it's not the scientists' definition of truth. Unless reality changes, metaphysical truth will never change. Most anything in science true today may be false tomorrow. When that happens, science has progressed.

<http://plato.stanford.edu/entries/scientific-realism/>

' "Thin" Truth: Both Putnam and Fine assert that one can (and should) accept the well established theories of science (even about unobservable) as (probably) true, but that this should not be understood as accepting the "metaphysical realist" (Putnam's term) view that the statements which constitute those theories correspond to reality. '

"

That's verisimilitude.

#### Comment #106



AaronAgassi ([Aaron Agassi](#))

Sep 11 2009, 6:28 AM EDT

"Mr Agassi next wrote:

"4. Hypotheses are judged by examining their explanations, not their predictions."

'Both explanatory power and testability are always crucial.'

No. Thermodynamics, in fact, is almost unique in never explaining. Frustrating. Even statistical mechanics does not really help:

' Although statistical mechanics is based on the presumed reality of atoms and molecules, it does not provide, any more than does thermodynamics, a detailed description of atomic and molecular behavior and of atomic and molecular interactions. ... Thus statistical mechanics adds something very useful to thermodynamics, but it neither explains thermodynamics nor replaces it. ' Van Ness, H.C. 1969. Understanding Thermodynamics. NY: McGraw-Hill.

After an invited lecture I gave at CalTech (on a new thermodynamic theorem useful to geologists), a post-graduate student asked 'Why are only three curves needed?' My answer was 'I haven't the slightest idea.'

"

Laws are the broadest and most consistent observations except for logic itself. Even though laws in and of themselves do call for explanation, nevertheless, consistency with laws does often offer a great measure of explanation of a system and event therein, as well as prediction.

#### Comment #107



AaronAgassi ([Aaron Agassi](#))

Sep 11 2009, 6:31 AM EDT

"Mr Agassi then wrote:

' "5. Religion and art are not viewed as important irrational activities of the mind: faith is treated as logical and thus blurred with scientific belief. Irrational thought is viewed as inferior to rational thought."

What in Hell is "scientific belief"?'

See 'thin' truth, answering your question #3 above. This statement I added because my introduction to the methodology of science came from reading D.T Suzuki's 'Outlines of Mahayana Buddhism', decades ago. Suzuki even refers to the similarity of Buddhist philosophy to the Logical Positivists of the Vienna Circle. Next was an outstanding little article by Albert Einstein, which I've never found since. A good reference, however, is P.W. Bridgman, 1932. The Logic of Modern Physics. NY: Macmillan. Its purpose was to tighten the definition of science. When creating one's own theory (as opposed to using one -- as in T.S. Kuhn's 'normal' science), one needs to be extraordinarily careful.

Again: verisimilitude.

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#### Comment #108



Anonymous ([Philip Moriarty](#))

Sep 11 2009, 8:43 AM EDT

"Anonymous (Philip Moriarty) wrote:

' In any case, I can't follow or understand the vast majority of what Petrologist writes. (I refer Petrologist to Comment # 54 above). '

The only anonymous post I offered, which I signed, was that pointing you to probably another alias of Msr Carnot. I should hope my posts were more generous than #54! "

Dear Petrologist/Bruce,

My referring you to Comment #54 was indeed rather brusque and "tetchy" of me. Please accept my apologies. The points you raise in Comment #120 are all well-made and perhaps I should have taken rather more time reading through your earlier comments. Once again, my sincere apologies.

The key points arising from this whole sorry saga are:

- (i) Those who are well-read in the history of a scientific subject can generate large amounts of pseudoscientific text which, to those who are not scientists and mathematicians, can sound convincing;
- (ii) Being well-read in the history of a subject does not necessarily mean that one understands that subject;
- (iii) If every argument (and counter-argument) is based around recourse to authority (and quotes lifted directly from textbooks and articles), there are very likely strong deficiencies in that person's understanding of the subject;
- (iv) Treat with great care the claims of someone who purports to be doing an MS in Physics, a PhD in biochem, and an MD in neuroscience **\*\*in parallel\*\***!

I am now going to contact the university directly regarding Sadi's/Libb's lecture.

Best wishes,  
Philip

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#### Comment #109



telosx ([Peter Pogany](#))

Sep 11 2009, 9:55 AM EDT

Individuals who resist grasping the physicality implicitly present in such statements as "idea is matter," "conscious unity is communication," "signs mediate shared understanding," "social history is (also) natural history" are probably not fit to be discursive partners in the multidisciplinary cultivation of "human thermodynamics."

This is not intended as a putdown. Rather, it is meant to encourage a change of perspective by recalling that the spirit of adventure expressed in the wish to broaden the hermeneutics of reality at the expense of self-contained formalisms resulted in many remarkable breakthroughs in the history of science. What important contribution the physicist Schrödinger made to biology; the chemists Soddy, Prigogine and (Michael) Polanyi to economic thought, physics, and

philosophy, respectively! And did they take some flak along the way! Not only from the fields into which they ventured but also from their own.

May Libb's lecture go well!

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#### Comment #110



Anonymous ([Philip Moriarty](#))

Sep 11 2009, 10:43 AM EDT

"Individuals who resist grasping the physicality implicitly present in such statements as "idea is matter," "conscious unity is communication," "signs mediate shared understanding," "social history is (also) natural history" are probably not fit to be discursive partners in the multidisciplinary cultivation of "human thermodynamics."

"  
...wry smile...

In this case I unapologetically refer you back to Comment #54, telosx. Obscure, jargon-ridden language in general disguises a lack of substance in an argument. (Interesting that you use that term "hermeneutics" - cf the title of Alan Sokal's paper referred to in comment #54).

Let me translate your comment into something approaching English:

"Someone who expects a theory to be based on sound physical/mathematical principles and reasoning, and to be supported by evidence and observation, is clearly not sufficiently radical in his/her thinking to contribute to the "multidisciplinary cultivation" of human thermodynamics. "

So, forget rational thinking. Forget reason. Forget logic. Forget connection with experiment/observation. The only thing that matters is that the "theory" goes against currently accepted views.

There is as little evidence for human thermodynamics as there is for my radical new theory of "micro-bagel"-mediated interactions in Comment #112. (I guess that I need to point out that I was being sarcastic when I put forward that "theory". It's a shame that I have to highlight this, but I'm beginning to wonder if some of those who embrace "human thermodynamics" actually "get" the sarcasm).

Just because a view is radical and challenges accepted wisdom, does not make it right...

Philip Moriarty ([www.nottingham.ac.uk/physics/research/nano](http://www.nottingham.ac.uk/physics/research/nano))

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#### Comment #111



jingchen ([Jing Chen](#))

Sep 11 2009, 1:21 PM EDT

Hi Libb,

It is great to read about the debate. I feel that the differences of both sides are not very big. I certainly agree with you that entropy can be used to describe human populations. There are many useful applications. For example, it has been found that the income distribution of populations largely follow Boltzmann distribution. The challenges from Moriarty are also very helpful. They push people to think more rigorously.

I don't have much to add on this debate. I wrote a paper called The Physical Foundation of Human Mind sometime ago. It was based on the concept of entropy. Maybe it is indirectly related to this debate. The link is provided for your reference. <http://web.unbc.ca/~chenj/papers/Mind.pdf>

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#### Comment #112



Anonymous ([Philip Moriarty](#))

Sep 11 2009, 3:58 PM EDT

"Hi Libb,

It is great to read about the debate. I feel that the differences of both sides are not very big. ...."

Dear Jingchen,

Given that you suggest that "the differences of both sides are not very big", and with all due respect, I strongly advise you to read back over the 126 preceding comments a little more carefully. My position is that Libb's/Sadi's human thermodynamics "theory" is nonsensical, pseudoscientific rubbish with as much viability as the theory of "micro-bagel" interactions I put forward in comment #112. Libb's viewpoint and mine could not be \*more\* different.

Best wishes,

Philip Moriarty ([www.nottingham.ac.uk/physics/research/nano](http://www.nottingham.ac.uk/physics/research/nano))

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#### Comment #113



Anonymous ([Philip Moriarty](#))

Sep 11 2009, 4:19 PM EDT

"Just because a view is radical and challenges accepted wisdom, does not make it right..."

Philip Moriarty ([www.nottingham.ac.uk/physics/research/nano](http://www.nottingham.ac.uk/physics/research/nano)) "

Moreover, for that matter, a view being obtuse and obsurantist hardly renders it radical and challenging!

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#### Comment #114



Petrologist ([Bruce Bathurst](#))

Sep 11 2009, 6:51 PM EDT

Mr Agassi,

How could a scientist who believes the mind can't capture reality possibly use 'true' to label a thought that captures reality?

You should probably send your scientific experiences to Stanford University, not me. I'm guessing (hoping) you are considering 'scientific truth' the same as 'philosophical truth' because you believe our minds can capture reality, and some day scientists will 'get it right'. This is a valid, though extremely 'realist' point of view. I suppose the rare scientist could believe his mind and his pet theory have captured reality; and when proven wrong, says, 'Rats, I was wrong again.'

Good scientists, even during the paradigm switch from the theory of geosynclines to theory of plate tectonics, didn't do this. Empiricists, many of whom believe the mind can't capture reality, and realists as well, consider the above use of 'truth' non-scientific. It inhibits the mind from remaining open to new ideas, and prohibits scientific growth. Good scientists simply qualify their use of 'truth' to agree with current theory, not reality. They hope to make it false tomorrow. This describes the usage I observed among faculty at Dartmouth College and at Princeton University, and it is proper in lexicography. It is essential in defining science and distinguishing it from metaphysics and religion.

Denying this usage forces a conflict between some extreme religious groups and science. This has forced, in some parts of the US, a requirement to teach religion as science. It is important, I believe, to distinguish these two uses of 'truth'. (Ignoring the difference between objective & subjective in this debate would have the same effect: it would expand 'hard science' to include sociology, philosophy, religions, &c, and create the conflict necessary to nurture 'creationism'.)

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#### Comment #115



AaronAgassi ([Aaron Agassi](#))

Sep 11 2009, 8:10 PM EDT

What gives you the impression that I hold that the mind can't capture reality, whatever exactly you mean by that? Truth is correspondence with reality in assertions. No single assertion encompasses the totality of being. What problem? No problem.

"Good scientists simply qualify their use of 'truth' to agree with current theory, not reality." That's not truth but validity, meaning only internal logical consistency.

A successful scientific research narrows the field of viable hypotheses. Such is enlightenment by refutation. There is no reasonable obligation to keep the mind more open than that.



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**Comment #116**Petrologist ([Bruce Bathurst](#))

Sep 11 2009, 9:38 PM EDT

My statement was that scientists who find a philosophical definition of truth acceptable (must logically) believe that the mind can (not 'can't') capture reality. You misread it.

Your 'truth' is a logical constant, mine is a logical variable.

' "Good scientists simply qualify their use of 'truth' to agree with current theory, not reality." That's not truth but validity, meaning only internal logical consistency. '

It would be if the definition were applied to mathematical theories; but scientific theories are well grounded in objective, operational measurements of nature.

My definition was formed by observation long before I read of 'thin truth'. If mine were an opinion, I would likely not have found it in Stanford's Encyclopedia of Philosophy.

You can disagree with it, but it isn't just an opinion. It is, however, my opinion that the distinction is extremely important.

---

**Comment #117**Petrologist ([Bruce Bathurst](#))

Sep 11 2009, 9:47 PM EDT

Telosx,

I, too, have no objection to Msr Carnot's lecturing on his ideas. My initial course in geology was to read a traditional text and read Velikovski's work on catastrophism (considered pseudoscience) and evaluate the validity of each. I should feel more comfortable, however, if he were lecturing to scientists rather than engineers. (Many engineers, however, practice science.)

My only disagreement with your post, in fact, is equating the methodology of social history & natural history. A food's color can be measured by everyone with a spectrometer, so they all agree upon its color: it is an objective variable. A food's taste, however, differs from person to person: it is a subjective variable. When a machine is invented that tastes, can it measure taste as everyone does? No. 'My sensation in tasting broccoli is the same as yours' logical positivists consider 'meaningless'. Meaningless simply means they don't see how natural science can address it.

Now, scientific methodology does not especially produce theories & theorems that are more accurate than, say Jung's theory of the collective unconscious. (When I needed medical help, I preferred an intuitive diagnostician in neurology to MRIs & EEGs.) Scientific methodology produces theories that everyone agrees are the best we can come up with: every step is objective, so everyone should agree what the theories mean and why we believe them.

Carl Jung's theory of the 'collective unconscious' is attractive & very fertile: it explains much in folklore, mythology, & fairy tales, whose study I once considered making my life's work.

My criticism of 'Human Thermodynamics' is simply its being sold as an objective, 'hard science', as its name implies. This comes with great dangers.

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**Comment #118**Sadi-Carnot ([Libb Thims](#))

Sep 11 2009, 10:00 PM EDT

I haven't had a chance to look at all of the debate comments since my last post (which I will do shortly), but in the mean time I decided to post up the 2006 [Rossini-Leonard-Wojcik debate](#) on the issue of whether or not one can apply entropy and enthalpy terms to the study of human freedom and security in social life. The debate, essentially, is the same discussion we are having here, which seems to highlight the fact that the issue on whether (or not) one can apply thermodynamics to the study of humanity seems to be embedded in the general scientific community, with scientists split on the issue.

Of note, I do find it humorous (based on an email that I received today) that Moriarty has tracked down the professor who invited me to lecture at the university, essentially warning him not to let me lecture on what he calls “pseudoscientific drivel”.

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#### Comment #119



Petrologist ([Bruce Bathurst](#))

Sep 11 2009, 11:26 PM EDT

Sadi, Nice to hear from you. Of the three scientists I know of here, we are all in agreement that 'Human Thermodynamics' is currently not a valid scientific theory.

Don't worry, the professor who invited you to speak is ethically bound to ignore such communications, which are considered unethical.

One needs know nothing of 'Human Thermodynamics' to offer this constructive criticism. Classical Thermodynamics is what logicians term an interpretation of the mathematical theory of affine geometry. A fundamental theorem in model theory states that any theorem valid for the mathematical theory is valid for its interpretation. Because there is a 1-to-1 correspondence between axioms & theorems in each, 'Human Thermodynamics' should be easily associated with affine geometry on the application level, and then easily traced back to its axioms and primitive definitions. I read earlier that 'Human Thermodynamics' was having problems with this 'trace back'. Because affine geometry can be axiomatized in many ways, there is no unique 'formula' for doing this.

However, thermodynamics differs from mechanics in the consideration of heat. Volume & temperature are usually the state variables one starts with. So, make sure your entropy is the correct partial derivative of an energy wrt your temperature. Though it is remotely possible to create an interpretation of affine geometry in sociology, it will not be a 'hard science', as thermodynamics is. Objective, operational definitions are needed for this.

Best of luck. Fix your site's scientific definitions. Love the photos.

Bruce

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#### Comment #120



Sadi-Carnot ([Libb Thims](#))

Sep 11 2009, 11:53 PM EDT

To Petrologist, what you and your two scientific associates consider “not a valid scientific theory”, others consider a Nobel Prize. To cite one example, in 2007 Russian physical chemist Georgi Gladyshev, author other 1998 book Thermodynamic Theory of Evolution (something he has spent 30-years working on), flew out from Moscow to Chicago, with his wife, to take me out to dinner to tell me that he had sent my work into the Nobel Prize organization for nomination. To quote from social anthropologist Max Gluckman:

“A science is any discipline in which the fool of this generation can go beyond the point reached by the genius of the last generation.”

To note for everyone, I might not be able to get back to these debates till Monday.

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#### Comment #121



AaronAgassi ([Aaron Agassi](#))

Sep 12 2009, 12:00 AM EDT

Petrologist:

"My statement was that scientists who find a philosophical definition of truth acceptable (must logically) believe that the mind can (not 'can't') capture reality. You misread it." Again: What is capturing reality?

"Your 'truth' is a logical constant, mine is a logical variable."

Huh????????????????

"" "Good scientists simply qualify their use of 'truth' to agree with current theory, not reality." That's not truth but validity, meaning only internal logical consistency. "

It would be if the definition were applied to mathematical theories; but scientific theories are well grounded in objective, operational measurements of nature."

Wrong: What you are spouting is the Coherence Theory of Truth, which indeed conflates truth with validity. If one accepts, for example, current best science as premise, then consistency thereto is merely validity. Because truth, indeed, is objective, Ontology, a separate question.

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#### Comment #122



Aaron Agassi ([Aaron Agassi](#))

Sep 12 2009, 12:01 AM EDT

(continued)

Truth remains correspondence with external reality. If one were to declare: "Really, that guy ran out into the street naked. It's true!" By the appended qualifier: "It's true" is meant that the initial statement corresponds with reality, just as the prefacing "really" signifies that an Ontological statement follows.

Now where one to declare: "It stands to reason that if someone were naked in the sun and wind for very long, that he might have suffered from exposure." -That would be a logically valid inference, even if entirely hypothetical.

"My definition was formed by observation long before I read of 'thin truth'. It mine were an opinion, I would likely not have found it in Stanford's Encyclopedia of Philosophy."

All assertions, no matter how authoritative and common place, are both opinion and claims of truth. Any can be either true or false, for all we know.

"You can disagree with it, but it isn't just an opinion."

All assertions are opinion even while at the same time claiming truth. All can be either true or false, for all we know.

"It is, however, my opinion that the distinction is extremely important."

Here we can agree. This is my opinion as well, as to the importance of the distinctions.

"A science is any discipline in which the fool of this generation can go beyond the point reached by the genius of the last generation."

But not every fool. There can be no guarantee.

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#### Comment #123



Petrologist ([Bruce Bathurst](#))

Sep 12 2009, 3:18 AM EDT

Mr Aggasi,

As I once said, I don't argue. My posts were all to help and clarify, not to change one's religious beliefs or obfuscate the truth. All were offered in good faith.

You won't find the scientists' use of 'truth' in your little logic book (though page 1, the monadic predicate calculus, will have its formal expression, devoid of substance).

I think I've explained science enough. There are three essential features that 'creationists' (whom I avoid like the plague) do their best to obscure, because these distinguish science from religion, which would allow both to coexist happily (and even compliment one another). These features are:

1. objectivity, not subjectivity
2. falsifiable predictions, not explanations
3. the attempt to make true theories false

Every scientist I have ever met knows the above to be requirements of science. This is Science 101. Every registered user but me who participated in this discussion appeared to refuse at least one of the above. What conclusion am I to reach? (Don't answer, for I'm not going to spend more time with my granddaughter instead.)

So this post contributes something of value to everyone, I refer any person interested in what science is to the two classics in this field. The second is more of a reference book, containing much new material on logic.

Whewell, W. 1858. *Novum Organon Renovatum*, 3d ed London: John Parker.

Jevons, W.S. 1877. *The Principles of Science*, 2d ed: A Treatise on Logic and Scientific Method. London: Macmillan.

Though free on Google Books, you may want your own hardbacks. 'Natural classification' is where science begins. Darwin's *Origin of Species* has some discussion of this topic, which produces the most fertile theories. There is much more. Dover has published classroom notes by R. Carnap that are very good.

#### Comment #124



Aaron Agassi ([Aaron Agassi](#))

Sep 12 2009, 4:27 AM EDT

You may need to talk to better scientists and get a new reading list. Of course falsifiability is crucial. But explanatory power is certainly a scientific value, an article of critical preference. Valid inference from verisimilitude is entirely consistent with Hypothetico Deductive Method in the scientific quest for truth which is correspondence to reality in assertions.

#### Comment #125



Anonymous ([Philip Moriarty](#))

Sep 12 2009, 5:45 PM EDT

"Sadi, Nice to hear from you. Of the three scientists I know of here, we are all in agreement that 'human thermodynamics' is currently not a valid scientific theory. Don't worry, the professor who invited you to speak is ethically bound to ignore such communications, which are considered unethical."

In response to comments #135 and #136:

Dear Petrologist and Sadi-Carnot (aka Libb Thims),

As ever, Sadi-Carnot puts his own particular "spin" on the situation. The message I sent the university is in the next comment. I ask for confirmation that Sadi-Carnot/Libb Thims is speaking and in what context. Where in that e-mail do I warn the academic not to let you lecture, Sadi-Carnot?

I resent the accusation (by Petrologist) that contacting the university regarding Sadi-Carnot/Libb Thims' lecture is unethical. I am still waiting for Sadi-Carnot/Libb Thims to provide details of where he is studying for his MS in Physics/PhD in biochem/MD in neuroscience. I therefore take all his claims with a "pinch of salt". Note in the e-mail below that I ask the university academic first to confirm that Thims is speaking (and then, if he is, in what context). In what sense is checking on Thims' claim to be speaking at the university unethical?

If the university is happy to have its undergraduate students be lectured by an individual who (i) puts forward a "theory" of human interactions based on such nonsensical notions as "sexual temperature" and quantum-mechanical human "bonds", (ii) clearly does not understand basic 1st year undergraduate physics (despite claiming to be studying for an MS in physics), (iii) cannot substantiate claims in their biog related to their pursuit of an MS in physics, a PhD in biochem, and MD in neuroscience, and (iv) has not published one peer-reviewed paper, then that's its prerogative.

Philip Moriarty ([www.nottingham.ac.uk/physics/research/nano](http://www.nottingham.ac.uk/physics/research/nano))

#### Comment #126



Anonymous ([Philip Moriarty](#))

Sep 12 2009, 5:49 PM EDT

My e-mail to the academic at the university reads as follows:

Dear Prof. \*\*\*\*,

I am a physicist at the University of Nottingham in the UK (see links and contact details below). I recently became “embroiled” in an online debate with someone who uses the pseudonym “Libb Thims” and who has set up a website and “journal” on a subject he calls “human thermodynamics”. Unfortunately, Thims’ “human thermodynamics” is pseudoscientific drivel.

The reason I am contacting you is that Thims has stated – publicly – that he is giving a lecture in bioengineering thermodynamics in the spring. I Googled the terms “bioengineering thermodynamics” and found that you are listed as the convener of this module. Could I ask you whether a formal invitation has been extended to present a lecture as part of the bioengineering thermodynamics course? If a formal invitation has been extended, could I ask in what context Thims has been asked to deliver a lecture?

Thank you and best wishes,  
Philip

#### Comment #127



Anonymous ([Philip Moriarty](#))

Sep 12 2009, 6:16 PM EDT

"To Petrologist, what you and your two scientific associates consider “not a valid scientific theory”, others consider a Nobel Prize. To cite one example, in 2007 Russian physical chemist Georgi Gladyshev, author other 1998 book *Thermodynamic Theory of Evolution* (something he has spent 30-years working on), flew out from Moscow to Chicago, with his wife, to take me out to dinner to tell me that he had sent my work into the Nobel Prize organization for nomination. To quote from social anthropologist Max Gluckman:  
“A science is any discipline in which the fool of this generation can go beyond the point reached by the genius of the last generation.”

To note for everyone, I might not be able to get back to these debates till Monday."

Every week or so, I get an e-mail from someone or other who has developed a radically new theory of "everything", claiming that Einstein/Heisenberg/Planck/Bohr/Maxwell/(insert the name of your preferred scientist) got it wrong and that the author of the e-mail has got it right. Strange that I never see any of these individuals subsequently receive a Nobel prize. I guess that the Nobel Prize committee must similarly have to sift through very many crackpot nominations.

As regards your quote from Max Gluckman, I refer you to the statement from Robert L Park I have quoted a number of times above (see comment #22, for example).

Philip Moriarty ([www.nottingham.ac.uk/physics/research/nano](http://www.nottingham.ac.uk/physics/research/nano))

P.S. Perhaps you could refer Dr./Prof. Gladyshev to my "energy hoop/micro-bagel" theory of human interactions in Comment #112? This seems to fit all the criteria he requires for a nomination to the Nobel prize committee...

#### Comment #128



Anonymous ([Philip Moriarty](#))

Sep 12 2009, 8:50 PM EDT

"I haven't had a chance to look at all of the debate comments since my last post (which I will do shortly), but in the mean time I decided to post up the 2006 [Rossini-Leonard-Wojcik debate](#).

on the issue of whether or not one can apply entropy and enthalpy terms to the study of human freedom and security in social life. The debate, essentially, is the same discussion we are having here .... with scientists split on the issue. "

Thank you for the link to that [debate](#). You are correct - the theme mirrors that of our argument. Your suggestion, however, that [scientists](#) are "split on the issue" is, as ever, a remarkable overstatement. [Silverstein](#)'s observation is that "Although

[Rossini](#)'s analogy is amusing and entertaining and makes some [political sense](#), unfortunately, its [thermodynamic](#) conclusions are flawed." Even [Leonard](#), in his closing response, appreciates the difference between drawing an *\*analogy\** between thermodynamic [functions of state](#) and features of [society](#), and the claim that one can *\*\*equate\*\** a thermodynamic [entropy/enthalpy/free energy](#) with [properties](#) of human [relationships/society](#). It is this distinction between [analogy](#) and mathematical/physical equivalence that is so important and which you seem unable to grasp.

Hence, you misinterpreted the analogy I drew in the Sixty Symbols YouTube video on entropy and argued that I was actually claiming that one could associate a [thermodynamic entropy](#) with the arrangement of students. That someone could confuse the analogy with the actual thermodynamic [quantity](#) just never occurred to me. Of the ~ 750 [physics](#) majors who took the 1st year Thermal and Kinetic Physics module I taught, not one made this fundamental error. Similarly, the [number](#) of professional scientists who have made this error is very small indeed.

Philip Moriarty ([www.nottingham.ac.uk/physics/research/nano](http://www.nottingham.ac.uk/physics/research/nano))

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#### Comment #129



Anonymous ([Philip Moriarty](#))

Sep 12 2009, 8:53 PM EDT

"Phil, if you don't want to bias the response to your perfectly legitimate inquiry, perhaps you should have used the more positively connotative term 'nom de plume' rather than the possibly pejorative word 'pseudonym.' I know it is never your intent actually to compromise freedom of speech for cranks. "

Aaron,

Very good point - thank you. Yes, "pseudonym" is rather pejorative. Thank you also for describing my inquiry as "perfectly legitimate" - I appreciate that.

All the very best.

Philip

P.S. Insomnia at least helps me keep up with e-mails and responses to comments here! 2 am in the UK...

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#### Comment #130



Petrologist ([Bruce Bathurst](#))

Sep 12 2009, 11:29 PM EDT

I've taken AaronAggasi's advice and offer here some more modern references from my shelf for natural sciences. The only proseminar I've had in the philosophy of science was in 1964. Since then, however, I've read regularly in philosophy and scientific methodology. However, I've not read much in the philosophy of science, preferring to read mathematical logicians, & scientists on this subject: Darwin, Peirce, Duhem, Mach, Einstein, Eddington, Weyl, Bridgman, &c. Popper's 'Logik der Forschung' contained nothing I could agree with.

For an original & pleasant discussion of physical chemistry, I can recommend C.N. Hinschelwood's 1951 'The Structure of Physical Chemistry' by the Clarendon Press, Oxford. On the creation of deductive theories, I can recommend A. Tarski's 1941 'Introduction to Logic' by the Clarendon Press, Oxford.

Some more moden books, no doubt considered obsolete, would be

Hempel. C.G. 1952. Fundamentals of Concept Formation in Empirical Science. Chicago: Univ Chicago Press.

Hempel. C.G. 1966. Philosophy of Natural Science. Englewood Cliffs, NJ: Prentice-Hall.

Carnap, Rudolph. 1966. An Introduction to the Philosophy of Science. NY: Dover.

Nagel, Ernest. 1960. The Structure of Science. Cambridge: Cambridge Univ Press.

Nagel's book covers the social sciences. Explanation is defined neatly by Carnap (though I've felt it is, in use, subjective). Carnap considers observations or measurements already known to be explain by a theory, observations or measurements not yet know to be predicted by a theory. This would make classical thermodynamics an explanatory theory, for those whom energy is intuitive. (This excludes me.) To be continued ...

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#### Comment #131



Petrologist ([Bruce Bathurst](#))

Sep 12 2009, 11:55 PM EDT

Unfortunately, Tarski doesn't present his most famous definition of truth in the book recommended.

To Dr Aggasi's insistence that: 'Truth is correspondence with reality in assertions', I offer that the following statement does not correspond with reality, and is false.

This sentence is false.

Concerning unsolicited communications that contain: 'Thims' "human thermodynamics" is pseudoscientific drivel.', and AA's response, I can only urge you both to consult your Deans of Faculty for ethical help. (I thought AA was a philosopher.)

I'm sorry to see my old academic mentors & friends have been blamed for my ignorance. Any ignorance of scientific methodology is solely mine, and, glancing at the books I've recommended here, I see my methodology is really my own. Parts and ideas were built from observations, cafe conversations I miss, reviews for journals, and readings from works on the subject, on physical science, and on natural science. Any fault is not those of my associates at universities.

My apologies for causing the demeaning of my friends, and tutors in thermodynamics who no longer live:

Prof Martin Kruskal, of Princeton University

<http://www.math.rutgers.edu/docs/kruskal>

Prof Walter Kauzmann, of Princeton University

<http://www.princeton.edu/main/news/archive/S23/42/01I78/index.xml>

Prof Walter Stockmayer, Dartmouth College

<http://www.dartmouth.edu/~chem/faculty/stockyobit.html>

Prof Peter Rock, University of California

[http://www.dateline.ucdavis.edu/dl\\_detail.lasso?id=8874](http://www.dateline.ucdavis.edu/dl_detail.lasso?id=8874)

and especially to my good friend of old, the late David Crerar. I could not have had better tutors & friends. Any fault is mine. With this apology, I remove myself from this whole, vile, affair.

Bruce Bathurst

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#### Comment #132



AaronAgassi ([Aaron Agassi](#))

Sep 13 2009, 2:32 AM EDT

Petrologist, how is it that you actually still manage to avoid Popper?

And as for that old chestnut, the liars paradox:

Truth is correspondence to external reality, in assertions. But the liars paradox is recursive, and does not clearly redress a separate or external reality. The conundrum is purely logical. Truth is singular, therefore to be true, an assertion must first be clear. The liars paradox is a leading question and ambiguous. The liars paradox is true in claiming to be false, and therefore false in claiming to be true. The correct answer depends which linguistic possibility is intended. Only a clearer statement could even be valid, much less true or false. So that means, that regarding the liars paradox, neither embracing the Post Modern coherence theory of truth conflating truth and validity nor conflating truth and verisimilitude, either,

would improve matters much. So raising the liars paradox is fairly irrelevant anyhow.

Moreover, an explanation is not merely subjective, because explanations are, after all, assertions, therefore valid or not, true or false. Validity is internal self consistency, logically, in assertions, and truth is correspondence to reality, in assertions. Assertions are Ontological statements such as employing the verb: to be. What is more direct, applicable and elegant?

If you are correct in attributing your views to your teachers or colleagues, then it follows that you have been misinformed. There is nothing to be so melodramatic about.

And it's my father who has the doctorate.

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#### Comment #133



Anonymous ([Philip Moriarty](#))

Sep 13 2009, 3:33 PM EDT

"Concerning unsolicited communications that contain: 'Thims' "human thermodynamics" is pseudoscientific drivel.', and AA's response, I can only urge you both to consult your Deans of Faculty for ethical help. (I thought AA was a philosopher.)"

Dear Bruce,

We have very different views regarding what constitutes unethical academic behaviour. Let me ask you this: should it be possible for any person, regardless of their training/academic track record and the validity of their "theories", to deliver a lecture to undergraduates as part of a BS/MS degree in a scientific subject? That is, is it OK for science undergraduates to be given a lecture in an entirely baseless "theory" which, for the weaker students, is likely to damage their understanding of a complicated subject, and for the best students is simply a waste of time?

You seem to think that it would be a violation of academic freedom to suggest that it is wrong to present nonsensical pseudoscience as valid science. If you are happy for Thims to present a theory based around quantum mechanical "bonds" between humans to undergraduates, would you similarly be comfortable with a scenario where I presented my radical new theory of "energy hoop" interactions (see Comment # 112)?

In the UK, a number of pseudoscientific BSc degrees have recently been closed due in no small part to the efforts of Prof. David Colquhoun at UCL (<http://www.dcsience.net/?p=1329> ). Are you suggesting that the successful campaign to shut down these ludicrous courses was somehow unethical?

What I think is unethical is the presentation of material with zero scientific validity to undergraduates as part of a BS or MS degree. This is a waste of their time and money. If Thims' lecture is being presented in the context of a debate, well and good. If, however, it is being presented as valid science then that is wrong.

Philip Moriarty

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#### Comment #134



Anonymous ([Philip Moriarty](#))

Sep 13 2009, 3:45 PM EDT

"To Petrologist, what you and your two scientific associates consider "not a valid scientific theory", others consider a [Nobel Prize](#). To cite one example, in 2007 Russian physical chemist [Georgi Gladyshev](#), author other 1998 book [Thermodynamic Theory of the Evolution of Living Beings](#) (something he has spent 30-years working on), flew out from Moscow to Chicago, with his wife, to take me out to dinner to tell me that he had sent my work into the Nobel Prize organization for nomination. To quote from social anthropologist Max Gluckman: 'A [science](#) is any discipline in which the fool of this generation can go beyond the point reached by the [genius](#) of the last generation!'"

(Another) reply to Comment #137:



I note from the "[Human Thermodynamics \(Objections to\)](#)" page at this Wiki that [Stephen Lower](#) has previously (and quite correctly) described [Libb Thims](#)' "theories" as [crackpot](#). I came across a wonderful webpage by John Baez called the "[Crackpot index](#)" - see . Congratulations, Libb, you've just scored 20 points on the Baez scale for suggesting that you deserve a Nobel Prize.

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#### Comment #135



Anonymous ([Philip Moriarty](#))  
Sep 13 2009, 3:55 PM EDT

"To quote from social anthropologist Max Gluckman: A science is any discipline in which the fool of this generation can go beyond the point reached by the genius of the last generation."

Libb, you're \*really\* racking up the points on Baez's [crackpot](#) index. You get "40 points for claiming that when your theory is finally appreciated, present-day science will be seen for the sham it truly is." (Point 36 on [Baez's list](#)). I'll leave you to tick off the other points on Baez's list...

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#### Comment #136



AaronAgassi ([Aaron Agassi](#))  
Sep 13 2009, 5:22 PM EDT

Phil, the protection for the ignorant and impressionable whereof you seek, and without abrogation of fragile freedom of speech, might best be provided via any sound autonomous reasoning capability fostered by a succinct coherent philosophy of science background. You finally begin to see, as I have all along, how such confusion accrues from failing to grasp the distinction between metaphor and simile. One should not need to be sated with scholarly wisdom and expert proficiency to glean the falsity of over extended argument by analogy, and the need to explore how far any similarity actually extends, instead of simply declaring grand unsupported application.

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#### Comment #137



Anonymous ([Philip Moriarty](#))  
Monday, 4:52 PM EDT

"I will likely make a YouTube correction video to his last video where he stated: "Concepts of entropy apply to gas molecules; you cannot say that a particular arrangement of students has a thermodynamic entropy." Comments would be appreciated...."

I've just come across the following websites:

[http://en.wikipedia.org/wiki/Wikipedia:Administrators'\\_noticeboard/Incidents/Sadi\\_Carnot](http://en.wikipedia.org/wiki/Wikipedia:Administrators'_noticeboard/Incidents/Sadi_Carnot)  
[http://en.wikipedia.org/wiki/Wikipedia:Articles\\_for\\_deletion/Human\\_chemistry](http://en.wikipedia.org/wiki/Wikipedia:Articles_for_deletion/Human_chemistry)

Wow, Libb/Sadi, you kept the fact that you've been banned from contributing to Wikipedia quiet, didn't you?! [see: [human molecule \(banned\)](#)] The articles above make for fascinating reading. A few choice quotes are as follows:

" This article is out-and-out fraud. I do not feel comfortable with the idea of Sadi Carnot continuing to contribute to Wikipedia - how can we trust him after this? "

"Trying to confound unrelated subjects is exactly what this article attempts to do. Why else would it cite a National Geographic article about neurochemistry and dopamine/oxytocin as an example of "Human chemistry", in article that actually states specifically in the introduction that "This analogy of an "interpersonal chemistry" should be distinguished from discussion of actual biochemistry involved in human bonding." I am in no mood to mince words and try to be polite about this. The article is in my opinion deliberately written to mislead and is one of the worst examples of original research posing as genuine science I have seen."

"It [Sadi-Carnot's contribution on Human Chemistry] is at best pseudoscience, and, by being at the extreme fringes of kookery, completely undeserving of five articles. Perhaps footnotes under Pseudoscience, Fraud, and Crank (person)."

..contd in next comment.

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#### Comment #138



Anonymous ([Philip Moriarty](#))

Monday, 4:57 PM EDT

"I've spend some amount of time looking through the contributions of Sadi Carnot. What I see there is a large, elaborate subtle walled garden of pseudoscience— probably for the purpose of hawking his books (or simple self agrandizement)."

". Over the past two years Sadi Carnot has undertaken a campaign to spam his personal website and push his own fringe theories across a wide variety of articles. In the process, he has subtly vandalized many articles by inserting pseudoscience and by misrepresenting sources. Numerous editors attempted to stop him along the way, to no avail. His strategy was to retreat when confronted, and move on to other articles. In light of this evidence, User:Kww proposed a community ban."

"I became aware of the problem with Sadi Carnot during the AFD discussion on Human chemistry. After reviewing his contributions, the pattern became very clear: distortion of his sources, used to prop up a pseudoscience agenda. Most of the edits I checked that did not directly support his particular form of nonsense were incorrect or strangely biased. I am left with two choices: he is either a fool or a con artist. If he is a fool, he can be morally excused, but Wikipedia still needs protected from him. If he is a con artist, he doesn't even get to be morally excused, and Wikipedia still needs to be protected from him. "

Philip Moriarty ([www.nottingham.ac.uk/physics/research/nano](http://www.nottingham.ac.uk/physics/research/nano))

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#### Comment #139



Petrologist ([Bruce Bathurst](#))

Monday, 9:29 PM EDT

Yes, there seems to be ethics problems in that many articles are plagiarized, and an educational problem in that [John von Neumann](#) & most everyone else were [chemical engineers](#). Such bogus sites have been constructed, but this one took a great deal of work to build. I think it's real.

SC: "To Petrologist, what you and your two scientific associates consider "not a valid scientific theory", others consider a Nobel Prize.

Please don't refer to them as my 'associates'. One has a theory of micro-bagels which I do like, for the assertion 'prove it wrong' is something that may help you. Each of my posts, I hope, contains observations of general, lasting value. This one offers a reference I could find only last night. (Those with grandchildren will understand.)

A copy of Wilson, which is probably the one book I should recommend every student of science have.

Wilson, E.B. 1952. An Introduction to Scientific Research. NY: McGraw-Hill.

PM: ' ... If you are happy for Thims to present a theory based around quantum mechanical "bonds" between humans to undergraduates, would you similarly be comfortable with a scenario where I presented my radical new theory of "energy hoop" interactions (see Comment # 112)? '

Of course. On this point, Mr Agassi's posts are selling pseudoscience as science, and offer no useful ideas. I've not seen any reproaches by you. He has replaced prediction with subjective explanation, replaced 'thin' truth with concordance with reality (so science can't progress), and twice insulted the dead. I meant each of my posts to complain that selling 'scientism' as science is wrong.

Mr Thims makes no attempt to hide his whacky-sounding views. If a university chooses to have him speak on them, it is no business of mine. Spend your time better. Bye.

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#### Comment #140



AaronAgassi ([Aaron Agassi](#))

Monday, 11:16 PM EDT

Petrologist, are you actually suggesting that I have somehow endorsed Phil's satiric micro-bagels theory?

"replaced 'thin' truth with concordance with reality (so science can't progress)" How so? I have explicitly stated that valid inference from verisimilitude is entirely consistent with hypothetico-deductive method. How is any of that Scientism, let alone speaking ill of the dead?

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#### Comment #141



Anonymous ([Philip Moriarty](#))

Tuesday, 4:22 AM EDT

"Mr Thims makes no attempt to hide his whacky-sounding views. If a university chooses to have him speak on them, it is no business of mine. Spend your time better. Bye."

Dear Petrologist (Bruce),

We also have very different views on what is "our business". An endorsement from a Chicago university (via an invitation to lecture) means that undergrads, who are trying to get to grips with already very tricky subjects such as thermodynamics and quantum mechanics, will be effectively told that Thims' nonsense is something they should take seriously. Moreover, Thims will of course use the endorsement from the university to support his human thermodynamics baloney in the future.

I am disappointed that you say that I should have the opportunity to lecture undergrads on my satirical "micro-bagel" theory. This means that you would be happy with BS/MS courses being filled with whatever pseudoscientific nonsense is "out there".

As someone who has spent a considerable amount of time trying to understand thermodynamics himself, and a significant amount of time dealing with undergraduates' queries and questions, I certainly consider it "my business" - indeed, my responsibility - to counter Thims' ludicrous views. That you do not agree worries me.

It seems that you would also be happy for Thims' crackpot contributions to Wikipedia to have been left in place. Is this correct? (If not, then please explain why this is different from him giving a lecture as part of a bioengineering course to undergrads).

I'm disappointed, I must admit. (I do agree with you, however, on your point that there are better uses of my time!)

Best wishes,

Philip Moriarty ([www.nottingham.ac.uk/physics/research/nano](http://www.nottingham.ac.uk/physics/research/nano))

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#### Comment #142



Anonymous ([Philip Moriarty](#))

Tuesday, 4:26 AM EDT

Petrologist states in Comment #158: "Such bogus sites have been constructed, but this one took a great deal of work to build. I think it's real."

Errmm, "real" in what sense? You seem to think that amount of effort equates directly with the level of validity of the site! Just because Thims has put a lot of work into building up his human thermodynamics nonsense does not make it correct!

Philip Moriarty ([www.nottingham.ac.uk/physics/research/nano](http://www.nottingham.ac.uk/physics/research/nano))

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## Comment #143

Petrologist ([Bruce Bathurst](#))

Tuesday, 8:21 AM EDT

Dr Moriarty,

Your message I read by accident, having come here to offer a book that might help AA understand that that the existence of an external reality is not believed by many, many who have no trouble with science. D.T. Suzuki's 'The Zen Doctrine of No Mind' is out of print, but reference 'suchness' in any book on Buddhism. A very depressed person's 'reality' differs greatly from a manic person's. 'Concordance with reality', satisfactory to Aristotole, is not a scientific concept. One has to be careful.

Why have you not corrected AA's comments, which offer no interesting ideas, as Mr Thim's zillion pages surely must? :-)  
I find the site pleasant; and people can change it!

However, I was disturbed to misread that 'Human Thermodynamics' was in the Wikipedia. It was not. Looking for Thim's contributions there I don't believe is healthy. (Geology there is terrible, but those who 'own' the articles refuse my suggestions. Check the talk page on Gibbs' [sic] Phase Rule.)

Sorry, I never said I should be happy having you lecture on micro-bagels. Look back at your query. I treated it logically.

I, too, am converting theorems into a theory. Because of the expense of journals, I've considered publishing on-line as well. My theorems are not to be compared with N.H. Abel's, from Norway; but he, too, had to publish privately. Thus, this website serves as a model to people like me. (A structural model!)

When I stated this website is 'real' (which I checked), I make no comment on the validity of the opinions expressed on it. In fact, I have not taken the time to glance at 'Human Thermodynamics'. I have my opinions, based upon threads, but I feel no need to warn the World of dangers. Msr Carnot does that for me by being perfectly open. Pick your fights and go after the insidious ones.

## Comment #144

Anonymous ([Philip Moriarty](#))

Tuesday, 10:34 AM EDT

"Why have you not corrected AA's comments, which offer no interesting ideas, as Mr Thims' zillion pages surely must? :-) I find the site pleasant; and people can change it!"

In response to Comment #162:

"Interesting", "pleasant" (!) and "correct" are not synonymous! I find it remarkable that you are perfectly happy for pseudoscientific nonsense to be presented to undergraduates - and, via this website (and Sadi-Carnot's **\*\*attempts\*\*** to vandalize Wikipedia), to the world - because you feel it's "pleasant". Moreover, you seem to suggest that the sheer volume of pages Thims has constructed must mean that there are some "interesting" ideas there! Errr, no.

Sorry, but you **\*\*did\*\*** say that you would be happy for me to present a lecture on micro-bagels. From Comment #158:

"PM: ' ... If you are happy for Thims to present a theory based around quantum mechanical "bonds" between humans to undergraduates, would you similarly be comfortable with a scenario where I presented my radical new theory of "energy hoop" interactions (see Comment # 112)? ' Of course".

You had previously said that you are happy for Thims to present a lecture on human thermodynamics at a university. How else am I meant to interpret your "Of course" response?!

My argument is not with AA or you - it's with Sadi-Carnot/Libb Thims. You and AA are having a debate in parallel with that between Sadi-Carnot and myself. My concerns lie with Sadi-Carnot's pseudoscience being presented as valid scientific theory. As you yourself suggested earlier, I have better things to do with my time than get dragged into the

debate between you and AA.

Best wishes,

Philip Moriarty ([www.nottingham.ac.uk/physics/research/nano](http://www.nottingham.ac.uk/physics/research/nano))

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#### Comment #145



Anonymous ([Philip Moriarty](#))

Tuesday, 10:38 AM EDT

In Comment #162, Petrologist stated: "I was disturbed to misread that 'Human Thermodynamics' was in the Wikipedia. It was not."

No, and the reason it's not there is because the human thermodynamics-related entries were deleted, and Sadi-Carnot banned as a contributor because of his abuse of Wikipedia - see the websites I refer to in Comment #156 above. The comments in those webpages regarding Sadi-Carnot's attempted vandalism of Wikipedia also show that "Msr Carnot" is far from "open", as you put it. I quote (again):

"Over the past two years Sadi Carnot has undertaken a campaign to spam his personal website and push his own fringe theories across a wide variety of articles. In the process, he has subtly vandalized many articles by inserting pseudoscience and by misrepresenting sources. Numerous editors attempted to stop him along the way, to no avail. His strategy was to retreat when confronted, and move on to other articles. In light of this evidence, User:Kww proposed a community ban"

Best wishes,

Philip Moriarty ([www.nottingham.ac.uk/physics/research/nano](http://www.nottingham.ac.uk/physics/research/nano))

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#### Comment #146



Petrologist ([Bruce Bathurst](#))

Tuesday, 11:02 AM EDT

Oh, sorry. I won't look back, but I'm surprised I said I was happy to have 'Human Thermodynamics' presented as science.

However, I do not think it will result in the University of Illinois moving its Religion or Philosophy Departments into the science building. This is because Thims' opinions are clear to read.

'Religion', however, is being taught to elementary- and secondary-school students in parts of the United States as science, and one can make one's choice to believe either; but not both, of course.

The trigger than identifies creationists in hiding is suggesting that religions and science are compatible. The Wikipedia is supposed to be edited by the unbiased. When I suggested this in the 'creationism' discussion, many less sophisticated editors of it responded violently; these responses were instantly deleted by their more mature 'leaders', who have ensnared even State Assemblymen. If this sound like a conspiracy by a small group, it is.

The Near East today shows the consequences of such thinking. This movement will make its way to Britain. Sometime extremists flip from one extreme to the other: Mr Thims I can't place, but his ideas seems relatively innocuous compared with the above.

If you want to really preserve the integrity of science, help keep this movement out of Britain. Speak with the campus chaplain. Make 'science' clear to your students; wait until you have tenure; and don't write any unsolicited letters. I'm too old & sick to spend much time on such people; but, you're always welcome to write.

Bruce Bathurst, PhD

BSc, AM, MA, PhD

[bathurst@alumni.princeton.edu](mailto:bathurst@alumni.princeton.edu)

geology, thermodynamics, philosophy of science

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#### Comment #147



Anonymous ([Philip Moriarty](#))

Tuesday, 11:27 AM EDT

"If you want to really preserve the integrity of [science](#), help keep this movement out of Britain. Speak with the campus chaplain. Make 'science' clear to your students; wait until you have [tenure](#); and don't write any unsolicited letters.

[Bruce Bathurst](#), PhD

BSc, AM, MA, PhD

bathurst@alumni.princeton.edu"

Petrologist/Bruce,

It's clear that you have a different "agenda" to mine. Although I appreciate the parallels between my arguments re. the lack of scientific rigor in [Thims'](#) "theories" and [creationism](#), that is a much broader argument that I don't want to get involved in at the moment.

As regards the passage from your comment quoted above: Why would I ever want to speak with the campus chaplain? See my response to Lynnliss in Comment #11 on Page 1 of this debate. Second, I have tenure (see: [link](#)). And, third, what do you mean by "don't write any unsolicited letters"?! Are you suggesting that I have to wait until someone contacts me before I can write to them?! I sent an e-mail to the academic at the university pointing out that Thims' "theories" were pseudoscientific drivel and asking the academic to confirm that Thims was speaking to undergraduates there. Given Thims' history of disingenuous behaviour, I remain of the opinion that this is an entirely valid [question](#) to ask. Moreover, if someone were to write to me to tell me that a person invited to speak at the University of Nottingham (in a module with which I was involved) was evasive about their track record and promoted nonsensical pseudoscience, I would like to know about it. That the e-mail/letter was unsolicited would not concern me a jot.

Yours sincerely,  
Philip Moriarty

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Comment #148



Petrologist ([Bruce Bathurst](#))

Tuesday, 11:53 AM EDT

Dr Moriarty,

My posts weren't very clear. My statement that I was happy with your bagel theory was because it has no testable hypotheses, and is pseudoscience. Assuming good faith, this might help Mr Thims or explain the deficiencies of his theory to others. Don't forget to read my happy faces.

I think I've made it clear than subjective variables are valid in many theories, but not scientific ones. Machines, such as 'lie detectors' or [IQ](#) questionnaires measure something, but it is not [belief](#) or 'intelligence'. Relations among other statistics observed in other certain ways (double-blind tests), however, can yield scientific theorems in non-sciences.

Mr Thims may have a bad 'record' elsewhere, but I'm speaking only of this website. See, however, my thread on ['Why I'm not a Molecule'](#). It sounds as if you're trying to persuade me to not visit this site. I'm not fond of blacklisting. [Classical thermodynamics](#) is an interpretation of a mathematical theorem. All you have to do is check the math to see whether 'Human Thermodynamics' is a thermodynamics.

It already failed the third test by having subjective variables. I think I've made it clear that such theories are pseudoscience. I'm not happy if pseudoscience that can't be fixed (which I don't know is the case) be presented blindly as good science. However, I have faith that the faculty at Illinois knows what they're doing. They have surely read some of his writings. Unsolicited communication is not uncommon. Its consequences, however, can me dire--for the writer as well as the one being written about. Please inquire with senior colleagues about this.

Lastly, I don't [debate](#). Consequently, I won't be reading this thread again.

Bruce

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#### Comment #149



AaronAgassi ([Aaron Agassi](#))

Tuesday, 12:58 PM EDT

Petrologist, actually, I do "understand that the [existence](#) of an external [reality](#) is not believed by many". Indeed, I shudder to think! So Phil, why haven't you corrected me? Don't you even see the fundamentals of Methodology and such as crucial in inoculation against pseudoscientific balderdash? For that matter, have closet Creationists actually hijacked Wikipedia?

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#### Comment #150



Sadi-Carnot ([Libb Thims](#))

Wednesday, 7:39 AM EDT

Since Moriarty (as many have in the past) seems to be more concerned with my background, name [anagram](#), etc., then with clarification of [entropy](#), I posted up the following page as to the [etymology of my name](#):

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#### Comment #151



Sadi-Carnot ([Libb Thims](#))

Wednesday, 7:40 AM EDT

The following comment (8 Sep 2009), on this discussion, was sent to me by Danish chemist [John Schmitz](#) (author of the 2007 book *The Second Law of Life*):

“In my opinion it is wrong if somebody would apply this formula [[Boltzmann](#)’s famous [H-theorem](#) that links directly [entropy](#) to the amount of [microstates](#) that forms a [macrostate](#) through  $S = k \ln W$  (as formulated indeed by [Planck](#))] to a group of students to calculate an entropy for the group as this would be meaningless from a thermodynamic point of view. But, of course all [systems](#) (including [humans](#)) are constructed out of [atoms](#) and therefore will follow [thermodynamic laws](#). But the calculation must start at atom level not at macroscopic level. Of course one could always use the [macroscopic equation](#) of [Clausius](#) but then one has to show what the [reversible](#) change in [heat](#) is. Rearranging a group of students or other macroscopic objects will not cause an heat exchange I would say and thus the entropy change would be zero. [Interaction](#) between humans will change the chemical reactions inside the body and thus the entropy of the system.”

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#### Comment #152



Sadi-Carnot ([Libb Thims](#))

Wednesday, 7:41 AM EDT

The following comment (9 Sep 2009), on this discussion, was sent to me by German physicist [Ingo Muller](#) (author of the 2007 book *A History of Thermodynamics*):

“Of course one may define an entropy for a group of students ‘in the field’ as well as for a battalion of marching soldiers. And for an anchor-chain, and polymer chain. And for a protein molecule and the human genome. The [question](#) is, however, what to do with such entropies and what [predictions](#) are possible by the use of the concept.”

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#### Comment #153



Anonymous ([Philip Moriarty](#))

Wednesday, 8:30 AM EDT

"The following comment (09/08/09) on the discussion was sent to me by Danish chemist [John Schmitz](#) (author of the 2007 book *The Second Law of Life*):

"In my opinion it is wrong if somebody would apply this formula [Boltzmann's famous H theorem that links directly entropy to the amount of microstates that forms a macrostate through  $S = k \ln W$  (as formulated indeed by Planck)] to a group of students to calculate an entropy for the group as this would be meaningless from a thermodynamic point of view."

Sadi-Carnot,

This is *\*precisely\** the point I made in Comment # 7 and that Muschik makes in Comment #99. Do you understand anything that you post here or do you simply cut-and-paste? It looks suspiciously that it's the latter.

Philip Moriarty ([www.nottingham.ac.uk/physics/research/nano](http://www.nottingham.ac.uk/physics/research/nano))

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#### Comment #154



Anonymous ([Philip Moriarty](#))

Wednesday, 8:33 AM EDT

"Since Moriarty (as many have in the past) seems to be more concerned with my background, name anagram, etc., then with clarification of entropy, I posted up the following page as to the etymology of my name:

[http://www.coht.info/page/Libb+Thims+\(etymology\)](http://www.coht.info/page/Libb+Thims+(etymology))

"

No, I'm just as concerned with your propagation of pseudoscientific baloney as I am with the etymology of your name. For the reasons discussed in a considerable number of comments above, I am also concerned about your claim to be pursuing an MS in physics, an MD in neuroscience, and a PhD in biochemistry in parallel. Perhaps you might like to publicly address that claim here?

Philip Moriarty ([www.nottingham.ac.uk/physics/research/nano](http://www.nottingham.ac.uk/physics/research/nano))

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#### Comment #155



Anonymous ([Philip Moriarty](#))

Wednesday, 8:46 AM EDT

"The following comment (09/09/09) on the discussion was sent to me by German physicist Ingo Muller (author of the 2007 book *A History of Thermodynamics*):

<http://www.coht.info/page/Ingo+M%C3%BCller>

"Of course one may define an entropy for a group of students 'in the field' as well as for a battalion of marching soldiers. And for an anchor-chain, and polymer chain. And for a protein molecule and the human genome. The question is, however, what to do with such entropies and what predictions are possible by the use of the concept."

"

Sadi-Carnot,

Oh, for crying out loud, how many times to we have to address this? It's very simple:

If I have one hundred students in a field, I cannot assign a thermodynamic temperature to that group of students *\*\*based on their distribution\*\**. (See comments #99 and #170). Similarly, those students are not spontaneously rearranging and exploring different microstates as would the molecules in a gas. There is no free energy function we can write down which is associated with the *\*\*distribution\*\** of the students. Thus, we cannot define a *\*\*thermodynamic\*\** entropy for the *\*\*distribution\*\** of students. Or, as stated in Comment #170, "rearranging a group of students ...will not cause a heat exchange and thus the entropy change would be zero".

And, whether you like it or not, bringing your nonsensical and laughable notions of "human chemistry" into this discussion is not at all going off the topic (as you've suggested previously). The question of interactions between the elements of the system is central to the problem. My theory of micro-bagels (see Comment #112) is just as valid as your "human chemistry" baloney.

And, once again, instead of trying to put forward your own counter-arguments and rebuttals, you instead quote from



experts/authority. See my comments above re. "recourse to authority".

Philip Moriarty

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#### Comment #156



Sadi-Carnot ([Libb Thims](#))

Wednesday, 10:11 AM EDT

#174: Moriarty: "If I have one hundred students in a field, I cannot assign a thermodynamic temperature to that group of students \*\*based on their distribution\*\*". (See comments #99 and #170). Similarly, those students are not spontaneously rearranging and exploring different microstates as would the molecules in a gas. There is no free energy function we can write down which is associated with the \*\*distribution\*\* of the students. Thus, we cannot define a \*\*thermodynamic\*\* entropy for the \*\*distribution\*\* of students. Or, as stated in Comment #170, "rearranging a group of students ...will not cause a heat exchange and thus the entropy change would be zero"."

I think what we have here is an issue similar to not seeing the forest through the trees, in that Phil cannot see the observable phenomenon through the equations with which he is acquainted with from statistical mechanics.

Entropy is entropy. It is a formulaic way of quantifying heat flow. Heated bodies expand, cooled bodies contract. This called Boerhaave's law (1720). One expansion, followed by a contraction is called a heat cycle. During this process, the entropy of the body will increase, due to the mathematical result that some of the net heat inputs and outputs will be converted irreversibly into internal system work. These processes and law hold for every system or body in the universe. To argue against this is to argue against natural phenomena.

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#### Comment #157



Sadi-Carnot ([Libb Thims](#))

Wednesday, 10:11 AM EDT

#174 (cont): Phil seems to have a one-track statistical mechanics (the subject of attempts to explain the laws of thermodynamics on mechanical principles) mindset. When one attempts to measure the entropy of a system using statistical mechanics methods, in terms of logarithms of estimations of microstates and distributions, it assumes that the Boltzmann chaos assumption holds (particles have non-correlated velocities). Humans, of course, have correlated velocities, meaning that statistical mechanic methods are of no use here. In this case, one turns to thermochemistry methods to measure entropy, as is the case with all chemical reactions. Sixty-six percent of people believe that love is a purely chemical reaction. All chemical reactions (e.g. rearrangements of bondings of students in their distributions) release or absorb heat. Hence there will be an entropy change for changes in the positions of students and it can be measured.

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#### Comment #158



Sadi-Carnot ([Libb Thims](#))

Wednesday, 10:15 AM EDT

#153: Regarding crackpots "who claim that their work deserves a Nobel Prize", the actual comment I made, as a point noted to cite differing opinions, is that "others consider [my work to deserve] a Nobel Prize."

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#### Comment #159



Sadi-Carnot ([Libb Thims](#))

Wednesday, 10:22 AM EDT

#152: Moriarty: "is it OK for science undergraduates to be given a lecture in an entirely baseless "theory" which, for the weaker students, is likely to damage their understanding of a complicated subject, and for the best students is simply a waste of time?"

What we have here is the typical case where a person who is not acquainted with the work being presented (i.e. Moriarty has never read my Human Chemistry textbook) gives objections to imagined conceptions, based on open talk page discussions. The thermodynamics professor, who invited me to lecture, has my textbook, and in response to Moriarty's repetitive pleas to terminate the invitation, comments: "I am very glad Libb has accepted my invitation to give a talk in my BioEngineering Thermodynamics course."

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#### Comment #160



Sadi-Carnot ([Libb Thims](#))



Wednesday, 10:34 AM EDT

#128: Moriarty: "Even [Leonard](#), in his closing response, appreciates the difference between drawing an *\*analogy\** between thermodynamic [functions of state](#) and features of [society](#), and the claim that one can *\*\*equate\*\** a thermodynamic [entropy/enthalpy/free energy](#) with properties of human relationships/society. It is this distinction between [analogy](#) and mathematical/physical equivalence that is so important and which you seem unable to grasp."

To clarify, I am not the originator of the premise of the non-[metaphor](#) application of thermodynamic entropy/enthalpy/free energy functions to human society, although I arrived at this view independently. People to have pioneered this view include:

[Johann Goethe](#) (1809) – [affinity \(free energy\)](#), [human chemical reactions](#)  
[Georg Helm](#) (1887) [energy](#), [entropy](#)  
[Leon Winiarski](#) (1897) – energy, entropy  
[Wilhelm Ostwald](#) (1906) – [social energy](#)  
[Mehdi Bazargan](#) (1950) – free energy, [internal energy](#), entropy, [temperature](#)

and so on (dozens more).

So to Phil: are all of us [crackpots](#) for thinking that [state functions](#) apply to systems of humans, or am I the only crackpot?

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 Comment #161



Anonymous ([Philip Moriarty](#))

Wednesday, 10:44 AM EDT

" Sixty-six percent of people believe that love is a purely chemical reaction. All chemical reactions (e.g. rearrangements of bondings of students in their distributions) release or absorb heat. Hence there will be an entropy change for changes in the positions of students and it can be measured." Oh, dear me. I don't know whether to laugh or cry.

We're now reduced to the level of "sixty-six percent of people believe that love is a purely chemical reaction". *\*That\** is a key component of your argument?! How incredibly scientific. Let's dig out a few more statistics:

Only 53% of adults know how long it takes for the Earth to revolve around the Sun. [[http://www.scientificblogging.com/news\\_releases/science\\_literacy\\_american\\_adults\\_flunk\\_basic\\_science\\_says\\_survey](http://www.scientificblogging.com/news_releases/science_literacy_american_adults_flunk_basic_science_says_survey) ]

"One adult American in five thinks the Sun revolves around the Earth" [<http://www.nytimes.com/2005/08/30/science/30profile.html> ]

In 1992, "63% of adult Americans thought that lasers work by focusing sound waves" [Reported in Beardsley, T. "Teaching Real Science" in Scientific American, Oct. 1992, p. 98; See also <http://www.astrosociety.org/education/resources/useduc.html> ]

A Gallup survey in 1990 revealed that 25% of the adult American population believes in astrology. [<http://www.astrosociety.org/education/resources/useduc.html>] (Actually, Sadi-Carnot, in comparison to your human chemistry junk, astrology almost looks sensible...)

Do you really want me to continue?

So your argument is this: 66% of people believe love is a chemical reaction. Therefore, love is a chemical reaction. Therefore, thermodynamic principles apply to "human reactions".

Astounding.

Philip Moriarty ([www.nottingham.ac.uk/physics/research/nano](http://www.nottingham.ac.uk/physics/research/nano))

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**Comment #162**Sadi-Carnot ([Libb Thims](#))

Wednesday, 10:46 AM EDT

#143: Moriarty: "If the university is happy to have its undergraduate students be lectured by an individual who (i) puts forward a "theory" of human interactions based on such nonsensical notions as "[sexual temperature](#)" and quantum-mechanical human "[bonds](#)", [etc.], then that is its prerogative."

Again, you are picking up loose talk page discussion (e.g. [sexual temperature](#)) and assuming that it is what is presented in a very rigorous 824-page textbook.

Also regarding the [human chemical bond](#), no one before me has even attempted this gargantuan topic, of which most of the *Human Chemistry* textbook is devoted to. To give a comparison idea of my efforts: in 1917, an unknown American undergraduate chemical engineer named [Linus Pauling](#) was learning the Dalton [hook-and-eye bonding](#) method at the Oregon Agricultural College, which was the vogue description of bonds between atoms at the time. Each [atom](#) had a certain number of hooks that allowed it to attach to other atoms, and a certain number of eyes that allowed other atoms to attach to it. A [chemical bond](#) resulted when a hook and eye connected. Pauling, however, wasn't satisfied with this archaic method and looked to the newly-emerging field of quantum physics for a new method.

In terms of human attachments, we don't even have the hook-eye model. The subject is not even discussed in chemistry class, the subject is left to the psychologists: who have their "cuddle chemical" oxytocin models, Bowlby attachment theory, Klaus and Kennell Parent-Infant bonding theories. It is obvious that humans evolved from smaller chemical systems; by deduction it must also be obvious that human attachments evolved from smaller chemical bonds. I don't see how your attempts to derogate this formulation (which you have never read) can be at all worth anything?

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**Comment #163**Sadi-Carnot ([Libb Thims](#))

Wednesday, 10:48 AM EDT

#127: JingChen: "I certainly agree with you that entropy can be used to describe human populations. There are many useful applications."

Thanks for commenting. Moriarty seems to have little knowledge how prevalent the use of [entropy](#) is in [economics](#) (publications coming out at a monthly rate).

**Continued**â— [Moriarty-Thims debate](#) (part one)â— [Moriarty-Thims debate](#) (part three)**See also**â— [Rossini debate](#)

In [debates](#), the **Moriarty-Thims debate (part three)**, of three parts in total (see also: [part one](#) and [part two](#)), is shown below:

### Debate: part three

The following is thread-to-page conversion re-paste of the debate, which took place in the [general discussion](#) forum of the [eoht wiki](#) from September 02-19, and is broken up into three approximately 20-page sections, the third part of which is shown below:

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#### Comment #164



Sadi-Carnot ([Libb Thims](#))

Wednesday, 11:04 AM EDT

#101: AaronAgassi: "Will Sadi-Carnot propose proper experiments with conditions of falsifiability, in order to discover the range of similar applicability of thermodynamics? Or will he simply wait for the bold denizens of his fabulous future to buckle down on the due diligence?"

All good questions. To give you a synopsis of my overall plan. Back in 2001/2002, this was all just a lose puzzle solving sort of hobby for me (which it still is), but when in the Nov/Dec of 2001 I began to see a bit of clarity on the issue on how the application could be made, I decided to make an attempt at writing up a short 50-article on the presentation (human thermodynamics), for the sake of future generations.

Five-manuscripts, one-book, and one-textbook later, I still have not yet been able to give the rigorous presentation I envisage, being that the topic only becomes more involved the more one gets into it. Chapter 18, entitled Human Thermodynamics (pgs. 653-702), a simple overview chapter, is the only actual published product on human thermodynamics that I have made.

The human chemistry (2007) and human molecule (2008) books were precipitates of the overall effort to write a book or textbook on human thermodynamics, which I have not yet done. The human chemistry textbook, as I came to find, were needed precursor or preliminary foundation, prior to any writing on human thermodynamics could be attempted. In short, prior to these works, there had been no type of presentation of the view that people are human molecules (or chemical species, chemical entities, or whatever name you choose) and that processes such as when two people form a relationship are a purely chemical reactions, no different than when two hydrogen atoms from the dihydrogen molecule. With the EoHT wiki, I am in the process of collecting the numerous references on past work done on human thermodynamics. That is where I am at at the moment.

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#### Comment #165



Anonymous ([Philip Moriarty](#))

Wednesday, 11:06 AM EDT

"I think what we have here is an issue similar to not seeing the forest through the trees, in that Phil cannot see the observable phenomenon through the equations with which he is acquainted with from statistical mechanics.

Entropy is entropy. It is a formulaic way of quantifying heat flow. Heated bodies expand, cooled bodies contract. This called Boerhaave's law (1720). One expansion, followed by a contraction is called a heat cycle. During this process, the entropy of the body will increase, due to the mathematical result that some of the net heat inputs and outputs will be converted irreversibly into internal system work. These processes and law hold for every system or body in the universe. To argue against this is to argue against natural phenomena.

"...sigh... First, you are also stating that Muschik (comment #99) and Schmitz (#170) cannot "see the forest through the trees".

Second, let's focus on your "observable phenomenon" statement, given that you don't have the grasp of basic physics/mathematics needed to appreciate the arguments.

\*What\* observable phenomenon?

Has anyone *\*ever\** done an experiment to measure a thermodynamic entropy change caused by cycling a group of people between two arrangements? Or has anyone ever measured the thermodynamic work done by cycling a group of people through a "heat cycle" as you suggest?

Yet again, your argument is: Humans are made of atoms. Therefore they are big molecules. Therefore they behave like any molecule. Therefore all "natural phenomena" (to use your term) that are applicable to small molecules are applicable to big "human molecules". Nonsense.

Philip Moriarty ([www.nottingham.ac.uk/physics/research/nano](http://www.nottingham.ac.uk/physics/research/nano))

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#### Comment #166



Anonymous ([Philip Moriarty](#))

Wednesday, 11:16 AM EDT

"I don't see how your attempts to derogate this formulation (which you have never read) can be at all worth anything?"

I don't need to read beyond the material posted at your Wiki to realise that you have not got the slightest understanding of quantum mechanics and that your "human bonding" "model" is as ludicrous as my satirical micro-bagel model in Comment #112.

Let me quote: "In this direction, human chemical bonds can be studied and modeled from a number of perspectives, such as an "orbital perspective", i.e. tracking the spatial movements of attached people over time on the surface of the earth, an "exchange force" perspective, in which an exchange of particles, which accompanies the interaction and transmits the force, operates, from a "quantum mechanical" perspective, in which quantum inputs or outputs of energy cause jumps in hierarchy location,..."

As I've said before, *\*\*anyone\*\** can postulate junk like this. See Comment #112. Note, in particular, the issue of *\*evidence\** raised in that comment.

If you're so convinced you're correct, here's a challenge: submit your work to Nature, Science, Physical Review Letters, Journal of the American Society or any one of the very many peer-reviewed journals that exist etc... and make it open for criticism by your peers. *\*Anyone\** can do as you have done and publish a book of nonsense via a vanity-publishing organisation.

Philip Moriarty ([www.nottingham.ac.uk/physics/research/nano](http://www.nottingham.ac.uk/physics/research/nano))

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#### Comment #167



Sadi-Carnot ([Libb Thims](#))

Wednesday, 11:17 AM EDT

#77. Moriarty: "We can of course define an entropy for a distribution function (as a function of probabilities extracted from the distribution function) [and] we can *\*in principle\** write down a *\*\*statistical measure\*\** of entropy for a distribution of people but this is not the same as the thermodynamic entropy. To define S, we need to have thermodynamically *\*\*accessible\*\** microstates (Boltzmann); [but for students] the microstates aren't thermodynamically accessible."

And on this logic, you conclude, as stated in your video, that: "you cannot say that a particular arrangement of students has a thermodynamic entropy."

I guess that this is where we are not seeing eye-to-eye? When I see the above statement (you cannot say that a particular arrangement of students has a thermodynamic entropy), I assume it to be a standalone statement, as though you could put it on the back of T-shirt and it would be correct. In this sense (out the statistical mechanics scheme), your statement becomes incorrect, in that from a thermochemistry point of view, i.e. measures of heats of reactions, heat capacities, temperature, pressure, volume measurements, etc., one can calculate an entropy for any atomic arrangement. A configuration of students in a field, by definition, is an arrangement of students. This is where I think our difficulty on agreement is? Correct me if I am wrong.

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**Comment #168**Anonymous ([Philip Moriarty](#))

Wednesday, 11:18 AM EDT

#127: JingChen: "I certainly agree with you that entropy can be used to describe human populations. There are many useful applications."

Thanks for commenting. Morality seems to have little knowledge how prevalent the use of entropy is in economics (publications coming out at a monthly rate).

"

\*\*Thermodynamic\*\* entropy or \*\*information theory\*\* entropy?

Philip Moriarty

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**Comment #169**Anonymous ([Philip Moriarty](#))

Wednesday, 11:19 AM EDT

"Five-manuscripts, one-book, and one-textbook later, "  
None of which [peer-reviewed](#).Philip Moriarty ([www.nottingham.ac.uk/physics/research/nano](http://www.nottingham.ac.uk/physics/research/nano))

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**Comment #170**Sadi-Carnot ([Libb Thims](#))

Wednesday, 11:32 AM EDT

#69: Moriarty: "My argument with you is not that basic thermodynamics is flawed! What's flawed is your remarkable assertion that these principles can be applied to 'human molecules'."

As to this comment, I don't see exactly you are objecting to. If you are objecting to the term "human molecule" being applied to you then that is one thing. Petrologist has commented, for example, in his "why I am not a molecule" thread that he is not a molecule because he has a soul that is under the direction of god? I'm not saying that you have this same view, but objects to the human molecule view tend to be like this.

In 1952, physicist C.G. Darwin, the person who defined "human thermodynamics" as the statistical mechanics study of systems of human molecules', stated that he is a human molecule, but not a true molecule in that he has a free will owing to the unpredictability of human nature. Specifically: "When I compare human beings to molecules, the reader may feel that this is a bad analogy, because unlike a molecule, a man has free will, which makes his actions unpredictable."

Hence, again, it is not my "remarkable assertion these principles can be applied to 'human molecules'." Correctly, although I stand behind my statements 100%, most of these "remarkable assertions" have been made by others before me. I am simply representing, clarifying and continuing the work in an updated fashion. Thus if you call me a crackpot promoting pseudoscientific drivel, then you are also calling the great English physicist C.G. Darwin, grandson of the great Charles Darwin, a crackpot promoting the same drivel.

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**Comment #171**Sadi-Carnot ([Libb Thims](#))

Wednesday, 11:38 AM EDT

#63: Thims: "if you think the second law doesn't apply to a system of students, then you are floating on a pet theory."

Moriarty: "when did I ever suggest that I had any difficulty with the 2nd law of thermodynamics?"

I don't know what to say about this response? It seems we are running in circles. When I press you with the simple question: does the second law govern society?, you will no-doubt give me a run-around answer, e.g. by saying that it is not a simple question, and that you can't answer it, because it's too complicated, etc. Right! If this is true, why don't you quickly thrill be with you acumen as to how (or how not) the second law applies to society?

Obviously, in your opinion, state functions don't apply. Noting you like for Prigogine, at the very least you could spew

out some weak statement to the effect that humans obey the second law in the form of far-from-equilibrium dissipative structures. I know you want to jump on that bandwagon.

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Comment #172



Anonymous ([Philip Moriarty](#))

Wednesday, 11:44 AM EDT

" This is where I think our difficulty on agreement is? Correct me if I am wrong.

"

Response to Comment # 186:

Now, at last, you're starting to think instead of throwing links to Wiki pages at me. Good. Let's spend some time working through this. First, my statement "You cannot say that a particular arrangement of students has a thermodynamic entropy" must be taken in context as you say. Yes, students are made of atoms and molecules. Therefore, as bonds break and form as part of different biochemical processes in the body, there are various different reactions, with associated enthalpies and entropies, occurring. One can certainly write down a free energy associated with each of those reactions (and the arrangements of atoms and molecules involved in those reactions). (This is the point that Schmitz makes in Comment #170).

BUT... you can't then simply "[scale up](#)" these concepts to think of a human just as a large molecule interacting with other large molecules (i.e. other humans). Simply changing the arrangement of a group of people in a field \*does not change the thermodynamic entropy associated with that group of people\*. If I take 10 students in a line, move them around so that they are at random positions, and then move them back again in a line, the change in thermodynamic entropy is zero. However, rearranging the molecules within a student's body would certainly not lead to a zero change in thermodynamic entropy.

You can, however, construct a distribution function and, as noted in Comment #11, write down an "information theory" or "statistical" entropy based on that distribution. But that is not the same as a thermodynamic entropy. So, no, it's not correct to say "entropy is entropy" (as you do in a preceding comment). There are very different interpretations of entropy out there. We are focussing on thermodynamic entropy.

Philip Moriarty

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Comment #173



Anonymous ([Philip Moriarty](#))

Wednesday, 11:45 AM EDT

"#63: Thims: "if you think the second law doesn't apply to a system of students, then you are floating on a pet theory."

Moriarty: "when did I ever suggest that I had any difficulty with the 2nd law of thermodynamics?"

I don't know what to say about this response? It seems we are running in circles. When I press you with the simple question: does the second law govern society?, you will no-doubt give me a run-around answer, e.g. by saying that it is not a simple question, and that you can't answer it, because it's too complicated, etc. Right! If this is true, why don't you quickly thrill be with you acumen as to how (or how not) the second law applies to society?

Obviously, in your opinion, state functions don't apply. Noting you like for Prigogine, at the very least you could spew out some weak statement to the effect that humans obey the second law in the form of far-from-equilibrium dissipative structures. I know you want to jump on that bandwagon.

"

In response to this, see Comment #191.

I have no particular "like" for Prigogine. I'm just aware of his work.

Philip Moriarty

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Comment #174



Sadi-Carnot ([Libb Thims](#))



Wednesday, 11:47 AM EDT

#38: The problem with Libb's question (second law applies to system of students, yes or no?), as he no doubt knows well, is that it is worded very vaguely. It is ill-advised to answer this type of question with a yes/no response, without taking into account the context. Applying the 2nd law of thermodynamics to life immediately raises important and complex points related to the question of open vs closed systems and equilibrium/non-equilibrium thermodynamics.

Again, similar to my stance in the last post, you seem to be overjoyed with calling any and all applications of thermodynamics to human society by every derogatory term you can think of, but when pressed with the issue yourself, you fumble around with a big: "I Don't Know?".

I have more than aptly collected the views available:

<http://www.eoht.info/page/HT+pioneers>

Such as:

Open system thermodynamic theories (Bertalanffy)  
 Closed system thermodynamic theories (C.G. Darwin, Kenoun, etc.)  
 Equilibrium (Gladyshev)  
 Non-equilibrium (Prigogine)

Why don't you just pick one, since you can't seem to be able to think for yourself on this question.

---

Comment #175



Anonymous ([Philip Moriarty](#))

Wednesday, 12:08 PM EDT

"Again, similar to my stance in the last post, you seem to be overjoyed with calling any and all applications of thermodynamics to human society by every derogatory term you can think of, but when pressed with the issue yourself, you fumble around with a big: "I Don't Know?".

I have more than aptly collected the views available:

<http://www.eoht.info/page/HT+pioneers>

Such as:

Open system thermodynamic theories (Bertalanffy)  
 Closed system thermodynamic theories (C.G. Darwin, Kenoun, etc.)  
 Equilibrium (Gladyshev)  
 Non-equilibrium (Prigogine)

Why don't you just pick one, since you can't seem to be able to think for yourself on this question.

"

Again, see Comment #191.

Let's focus on the question of whether changing the arrangement of students in a field gives rise to a change in thermodynamic entropy first. If I haven't lost the will to live by the time we close that particular discussion, then we can get on to questions related to the non-equilibrium thermodynamics of life.

And how is stating that the physics of life "raises important and complex points related to the question of open vs closed systems and equilibrium/non-equilibrium thermodynamics", "[fumbling] around with a big "I don't know"?", as you put it? There is a big, big difference between your "human thermodynamics/human chemistry" nonsense and the field of non-equilibrium thermodynamics.

Moreover, believe me, I'm not "overjoyed" about anything related to our argument. Just as was the case for your attempts to ruin a series of Wikipedia articles (see comments above), your Wiki site is full of groundless pseudoscience which will



only confuse and mislead those who take your arguments at face-value.

Philip Moriarty

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Comment #176



Anonymous ([Philip Moriarty](#))

Wednesday, 12:11 PM EDT

"Also regarding the human chemical bond, no one before me has even attempted this gargantuan topic, " Oh, the modesty!

"...no one before me has even attempted this gargantuan topic..."

There could be a very good reason for that....

Philip Moriarty

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Comment #177



Anonymous ([Philip Moriarty](#))

Wednesday, 12:19 PM EDT

" The thermodynamics professor, who invited me to lecture, has my textbook, and in response to Moriarty's repetitive pleas to terminate the invitation, comments: "I am very glad Libb has accepted my invitation to give a talk in my BioEngineering Thermodynamics course."

There was no plea to terminate the invitation. Please stop lying. (c.f. Discussion in previous comments of your unsubstantiated claims regarding your pursuit of an MS in Physics, PhD in biochem, and MD in neuroscience).

Philip Moriarty

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Comment #178



Anonymous ([Philip Moriarty](#))

Wednesday, 12:26 PM EDT

"#174 (cont): Phil seems to have a one-track statistical mechanics (the subject of attempts to explain the laws of thermodynamics on mechanical principles) mindset. When one attempts to measure the entropy of a system using statistical mechanics methods, in terms of logarithms of estimations of microstates and distributions, it assumes that the Boltzmann chaos assumption holds (particles have non-correlated velocities). Humans, of course, have correlated velocities, meaning that statistical mechanic methods are of no use here. In this case, one turns to thermochemistry methods to measure entropy, as is the case with all chemical reactions. Sixty-six percent of people believe that love is a purely chemical reaction. All chemical reactions (e.g. rearrangements of bondings of students in their distributions) release or absorb heat. Hence there will be an entropy change for changes in the positions of students and it can be measured."

So I went back and read the comment reproduced above (#176) again.

It's hard to believe that so much nonsense can be encapsulated in so few lines. That Sadi-Carnot would include the line "Sixty-six percent of people believe that love is a purely chemical reaction" as part of his "counter-argument" would be depressing if it weren't so funny.

This is meant to be a scientific debate/discussion/argument and you use a result of a survey to back up your position?

No, enough. I'm not wasting any more time on this nonsense.

Philip Moriarty ([www.nottingham.ac.uk/physics/research/nano](http://www.nottingham.ac.uk/physics/research/nano))

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Comment #179



Sadi-Carnot ([Libb Thims](#))

Wednesday, 12:29 PM EDT

184: Philip: "Has anyone \*ever\* done an experiment to measure a thermodynamic entropy change caused by cycling a group of people between two arrangements? Or has anyone ever measured the thermodynamic work done by

cycling a group of people through a "heat cycle" as you suggest?"

Occasionally through your many attempts at putdown (e.g. given that you don't have the grasp of basic

Thims in his [16 Apr 2013 lecture](#): "Human Chemical Thermodynamics: Goethe's Elective Affinities to Human Free Energies" (see: [lectures](#)), at segment 48:30-50:39 (see: [video](#)), at Northern Illinois University College of Engineering, doing the famous 18th century [Leiden University](#) volume expansion "[ball and ring experiment](#)" to explain "social expansion" (day) and "social contraction" (night), in [Carnot cycle](#) terms, in respect to [hot body \(sun\)](#) / [cold body](#) (night sky) alternating daily contact of earth-bound [social systems \(working body\)](#), [Boerhaave's law](#), [entropy \(transformation content\)](#) increase, and [irreversible](#) changes in [Gibbs free energy](#) states of human [existence](#) and [experience](#); the [human molecule view](#) lecture notes page in the background; illuminated [rotating globe](#) to the right.

physics/mathematics needed to appreciate the arguments), you make sensible statements, such as above.

Every single one day of rotation of the earth constitutes one Carnot cycle. Expansion stroke: Heat is added (daytime) to the system (surface of the earth), the particles (human molecules) become active and expand outward, doing work in the process (occupation); contraction stroke: heat is removed (nighttime) from the system (surface of the earth), the particles (human molecules) begin to deactivate expanding inward (towards their bed), doing a reverse work in the process. This is all basic thermodynamics.

The two questions you ask above are at the core of the science of human thermodynamics. These two questions are huge puzzles. French physicist [Gustav Hirn](#), to whose work the term "human thermodynamics" was first used, did the first prototype experiments (measure the mechanical equivalent of heat of humans in action) in the 1860s. The modern experiment measurement of the mechanical work or entropy changes in heat cycles of systems of humans is where the true search is. This is where my theoretical interest is.

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#### Comment #180



Sadi-Carnot ([Libb Thims](#))

Wednesday, 12:30 PM EDT

#184 (cont): You can go on calling attempts to formulate human activity chemically or thermodynamics as crackpot, pseudoscience, or a "childish" nonsense, and so on, but the astute observer will not that people were saying the same thing to Goethe in 1810 when he was making formulations of affinity (or free energy) applied to human relationships and society, commenting that his "use of the chemical theory is nonsense and childish fooling around" (said by Goethe's fellow author and neighbor Christoph Wieland). Whereas, in retrospect, we now know that Goethe with one of the [five highest IQs](#) every assigned to someone was two centuries ahead of his fellowman. Hence, two hundred years from now, when people look back at our conversation, you will be seen in the same light as Goethe's uneducated neighbor.

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#### Comment #181



Anonymous ([Philip Moriarty](#))

Wednesday, 12:37 PM EDT

"Every single one day of rotation of the earth constitutes one Carnot cycle. Expansion stroke: Heat is added (daytime) to the system (surface of the earth), the particles (human molecules) become active and expand outward, doing work in the process (occupation); contraction stroke: heat is removed (nighttime) from the system (surface of the earth), the particles (human molecules) begin to deactivate expanding inward (towards their bed), doing a reverse work in the process. This is all basic thermodynamics."

Oh, Libb

I'm about to leave the office and, as noted above, I'm walking away from this argument in any case but I couldn't go without saying thank you for the quote above. It'll keep me smiling all the way home. I particularly like the "expanding inward (towards their bed)" line. Brilliant. Douglas Adams would be proud. The logic is on a par with the quote at the foot of this comment (which I'll leave you with).

Goodbye.

Philip Moriarty ([www.nottingham.ac.uk/physics/research/nano](http://www.nottingham.ac.uk/physics/research/nano))

"It is known that there is an infinite number of worlds, simply because there is an infinite amount of space for them to be in. However, not every one of them is inhabited. Therefore, there must be a finite number of inhabited worlds. Any finite number divided by infinity is as near to nothing as makes no odds, so the average population of all the planets in the universe can be said to be zero. From this it follows that the population of the universe is also zero, and that any people you may meet from time to time are merely the product of a deranged imagination"

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Comment #182



Sadi-Carnot ([Libb Thims](#))

Wednesday, 12:44 PM EDT

Regarding #188: Moriarty: "none of which peer-reviewed".

I have corrected your assertion as to my work having no peer-review ([Human Chemistry \(textbook\)](#))

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Comment #183



Anonymous ([Philip Moriarty](#))

Wednesday, 12:52 PM EDT

"188: Moriarty: "none of which peer-reviewed".

"I have corrected your assertion as to my work having no peer-review ([Human Chemistry \(textbook\)](#))"

...and who selected the reviewers?

Philip

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Comment #184



Sadi-Carnot ([Libb Thims](#))

Wednesday, 1:04 PM EDT

It seems that Phil is ready to call it quits, as am I. We will certainly give him credit for resiliency at lasting this long and for having thick skin. The one good comment we got out of Phil is:

"Has anyone \*ever\* done an experiment to measure a thermodynamic entropy change caused by cycling a group of people between two arrangements? Or has anyone ever measured the thermodynamic work done by cycling a group of people through a "heat cycle" as you suggest?"

It seems that Phil is leaving with the view that everything ever published, by all 230 HT pioneers, on the application of thermodynamics to the understanding of human activity, including the logic that people are molecules, is pure pseudo science. But, on the other hand, Phil seems incapable of explaining to us idiots how thermodynamics should be applied to the study of human activity?

I guess you would call this entire discussion a stalemate?

---

Comment #185



Petrologist ([Bruce Bathurst](#))

Wednesday, 1:53 PM EDT

Dr Moriarty,

You are the victim of, what we in the US call a 'bald-face lie'.

SC in post #189 that 'Petrologist has commented, for example, in his "[why I am not a molecule](#)" thread that he is not a molecule because he has a soul that is under the direction of god? I'm not saying that you have this same view, but objects to the human molecule view tend to be like this.'

Actual statement:

' "Molecule" now brings to the mind a discrete substance (floating about) made of the same number & kinds of atoms, bonded in the same manner. They differ only in the physical properties "isotopic mass" and "handedness". Geologists use instead "substance", a much more flexible term. Substances react, and classical thermodynamics studies them. Chemical formulae above represent chemical compositions of the human substance.

' My chemical composition changes from minute to minute, and bonds are continuously being broken to create, by reaction or flux, many relatively un-bonded, little objects that we traditionally call "molecules". My teeth, of course, are not made of molecules, but they are crystalline substances. '

Let me make myself crystal clear, again. People know absolutely nothing of any trace of religious belief I might have. I don't have to be religious to defend the separation of church & state, as guaranteed by the American Constitution. Were I religious, I should not have to believe in a 'soul'. Were I to believe in a 'soul', it would (in no major religion) be 'an indestructible corporeal essence'.

P: Do I have a soul? If a soul is something that only God can examine, then that's not a question science is qualified to address. No scientist I know can prod or scratch a soul. (Assuming one exists.) It is not a scientific object or a theory.

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Comment #186



Petrologist ([Bruce Bathurst](#))

Wednesday, 1:57 PM EDT

Any profile you find is not mine. I deleted mine so it can not again be edited in my absence to state my career began in 1964 with an NSF grant to study 'Human Thermodynamics'.

Unfortunately, the biochemist Linus Pauling is dead; so he will have to remain a chemical engineer who studied fish hooks or something.

Bruce Bathurst, PhD

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Comment #187



Anonymous ([Philip Moriarty](#))

Wednesday, 3:28 PM EDT

"I guess you would call this entire discussion a stalemate?"

Oh, yeah, a "stalemate"! That's the word I was searching for...

Let's ignore all the pseudoscientific nonsense on your website; let's ignore all the comments and unanswered questions above - your complete lack of understanding of thermodynamics is given by a single sentence in Comment #198:

"Every single [one] day of rotation of the Earth constitutes one Carnot cycle...." [Comments #198 and 200].

Leaving aside the rest of the nonsense in that paragraph, a Carnot cycle is an **\*\*idealisation\*\*** (as I was at pains to explain to my 1st year undergraduate students each year). A Carnot cycle can never exist in the real world. Try reading a 1st year Physics or 1st year Physical Chemistry textbook to find out why.

Yep, a stalemate indeed...

Philip Moriarty ([www.nottingham.ac.uk/physics/research/nano](http://www.nottingham.ac.uk/physics/research/nano))

P.S Oh, and yes, I took the bait...


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Comment #188



Anonymous ([Philip Moriarty](#))

Wednesday, 4:10 PM EDT

 "Dr Moriarty,

You are the victim of, what we in the US call a 'bald-face lie'."

Petrologist,

I'm truly shocked. You mean that Sadi-Carnot may not ...always...be...honest?! ...gasp... That Sadi-Carnot might sometimes tell the odd "porkie pie"\* or two? Surely not. Who woulda thunk it...? :-)

All the very best,

Philip

\* Check out <http://www.bbc.co.uk/dna/h2g2/alabaster/A649> for a translation.

Comment #189



Petrologist ([Bruce Bathurst](#))



Wednesday, 6:36 PM EDT

Yes, that stretched Msr Carnot's rubber band of good faith until it snapped. It now lies on my desk, its Carnot cycle spent.

However, I'll offer some more good faith.

Carnot was very well educated in mathematics, though he wrote his only work as simply as possible. He continued the work of his father and hoped to help the new France as he had in the Army Engineers.

Carnot abstracted the steam engine until the steam was no longer needed; in fact, his engine used air. What is hypothetical is not the substance used, which can be anything, but the engine itself--the cycles of processes; isothermal heating, adiabatic expansion, isothermal cooling, adiabatic compression. Substances don't naturally take these exact paths. If one did, no engine could be more efficient than it.

So, the sun rises, the radiation heats the air (its temperature rises), alarms clocks sound, people scatter, doing work. As the sun sets, the air cools by radiation to space (its temperature drops), factory alarms sound, people crawl into bed together as the pressure of work was too much.

No other but this cycle can cause people to work more efficiently. (Sounds more like Fritz Lang's Metropolis to me.) Where, exactly, does Carnot fit in?

Bruce Bathurst  
Tired & Retired

Comment #190



Sadi-Carnot ([Libb Thims](#))

Wednesday, 7:48 PM EDT

Re: Moriarty's question: whoever said that state functions (U, S, G) apply to systems of human molecules, the answer seems to have been English-born American chemical engineer [William Fairburn](#) in 1914. Fairburn, in addition to stating that human chemical elements could be classified by their relative affinities (or Gibbs free energy, modern sense), seems to be the first to have stated that an interactive system of humans, e.g. a group of factory workers, is system of reactive chemical entities (humans), and on this basis speculates on how one would go about classifying reactive humans modeled as elements or chemicals. He reasons:

“A classification based on their relative electricity or relative energy or enthusiasm would not of itself help us much, for misapplied energy and wasteful application of human forces are common. The classification of entropy, referring to temperature changes which can be likened to coolness, passion, explosiveness and frigidity, are all interesting but of themselves prove little.”

In 1894, Polish political scientist [Leon Winiarski](#), a student of French-Italian engineer Vilfredo Pareto, one of the first to conceive of people as "human molecules", was also one of the first to defined human social systems explicitly in terms of "energy" and "entropy":

Prior to this, certainly Goethe, in 1809 ([Goethe's human chemistry](#)) was the first to state that humans were reactive chemical entities and that people's movements or reactions to each other were governed by elective affinities, which equates to enthalpy and entropy governance,  $H - TS$ , in a modern 1882 formulation sense. Goethe's entire presentation is simply genius.

#### Comment #191



Sadi-Carnot ([Libb Thims](#))

Wednesday, 8:01 PM EDT

To represent telosx, i.e. thermodynamic economist Peter Pogany, I just received his 2006 thermodynamics-based economics book Rethinking the World, wherein he defines society via energy and entropy determinants, on Monday. One of his excellent opening quotes is:

"Accumulated knowledge suggests that humans are billions of highly evolved, overgrown super-molecules (or 'intensely conscious mice'?) that swarm in ever larger numbers on a piece of rock that wobbles, spins, revolves, and soars into nothingness at break-neck speed with an agitated, burning furnace in its interior."

Here we see that Pogany is an intelligent person as compared to hypocrites such as Moriarty, who deny that the science they teach applies to them.

#### Comment #192



Petrologist ([Bruce Bathurst](#))

Wednesday, 8:20 PM EDT

"Accumulated knowledge suggests that humans are billions of highly evolved, overgrown super-molecules (or 'intensely conscious mice'?) that swarm in ever larger numbers on a piece of rock that wobbles, spins, revolves, and soars into nothingness at break-neck speed with an agitated, burning furnace in its interior."

'Moderately conscious mice, I think. Unfortunately, this also proves there is no external reality, on which [Immanuel Kant](#) could place his feet.

Well, I'm not a hypocrite, and the most important theorem in my doctoral dissertation was proved using only determinant theory. It was even declared wrong by the USGS (much to M. Kruskal's roaring laughter.)

Objects as determinants usually arise from using old-fashioned determinant theory to symbolically solve an underdetermined, homogeneous system of linear equations. In my case, it was the easiest way. I'd be pleased to help interpret them for people.

What about the Fritz cycle?

#### Comment #193



Sadi-Carnot ([Libb Thims](#))

Wednesday, 8:27 PM EDT

As to the origin or inspiration behind Pogany's excellent quote, and his bracketed mention of mice, the quote seems to come from American physical chemist [Martin Goldstein](#) and his 1993 section "The Entropy of a Mouse" from his book The Refrigerator and the Universe (listed in Pogany's bibliography), in which Goldstein explains how to calculate the entropy of a mouse. Goldstein's basic premise is that to determine the entropy of larger living entities, such as people or mice, one must "be able to determine the energies and entropies of everything present initially and of everything present in the final state", i.e. of each "before" and "after" reaction step starting with simple chemical substances, through evolution, upward to the formation of larger organisms. He states that approximations will be needed

to estimate the energies and entropies of the states in the “assembly of these larger molecules”, but that this should not deter attempts at estimation.

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#### Comment #194



Sadi-Carnot ([Libb Thims](#))

Wednesday, 8:28 PM EDT

The basic methodology, according to Goldstein, as established in physical chemistry, is to determine the entropies of structures relative to a reference state (92 naturally occurring elements, at STP), and to measure the heat released or absorbed, at a measured temperature, in approximately reversible reactions steps, where by the change in entropy  $\Delta S$  for the process is simply the heat absorbed (or released) divided by the absolute temperature at which the process is carried out:  $\Delta S = Q/T$ , which equates to  $S_{\text{final}} - S_{\text{initial}}$  of the two reaction states.

Hence, given a hypothetical human reaction, such as a group of students released (initial state) into a playground for one hour (final state), it is simply a matter to measure the heat released or absorbed in the process of the reaction at the ambient temperature of the day. The heat of two kids fighting on the playground is one such heat. Anyone who denies this logic is an idiot. The measurement of these heats is the difficult part. Heat in a modern sense is quantified in terms of movements of the particles of the system, humans in this case, and their valence shell photon-electron interactions.

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#### Comment #195



Sadi-Carnot ([Libb Thims](#))

Wednesday, 8:54 PM EDT

In case anyone missed American chemical engineer Andrew Morrow's thread: [A proper dichotomy](#), he states that “as of 2006, I now engage my fellow human being as thus: You are a mosaic of atoms with a mind.” Here's his Sept 06, 2009 [video](#) on his new molecular philosophy:

I'm glad to see that someone in this site has a sensible view and is confident enough to grasp and embrace the logic of modern science. I'm guessing that his ability to grasp the logic of molecular philosophy, is something that only, primarily, chemical engineers and physical chemists can see, being that both professions are well-schooled in chemical thermodynamics?

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#### Comment #196



Sadi-Carnot ([Libb Thims](#))

Wednesday, 9:03 PM EDT

To Lambert and Moriarty: if the two of you would spend less time doing background checks on my education and where I've been invited to give presentations (e.g. Russian Academy of Sciences, MIT, Harvard, Joint European Thermodynamics Conference, UIC, etc.) and more time thinking about the content of the discussion, you might actually learn something?

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#### Comment #197



Aaron Agassi ([Aaron Agassi](#))

Wednesday, 9:24 PM EDT

"#101: Aaron Agassi: “Will Sadi-Carnot propose proper experiments with conditions of falsifiability, in order to discover the range of similar applicability of Thermodynamics? Or will he simply wait for the bold denizens of his fabulous future to buckle down on the due diligence?”

All good questions. To give you a synopsis of my overall plan. Back in 2001/2002, this was all just a lose puzzle solving sort of hobby for me (which it still is), but when in the Nov/Dec of 2001 I began to see a bit of clarity on the issue on how the application could be made, I decided to make an attempt at writing up a short 50-article on the presentation (human thermodynamics), for the sake of future generations.

Five-manuscripts, one-book, and one-textbook later, I still have not yet been able to give the rigorous presentation I envisage, being that the topic only becomes more involved the more one gets into it. Chapter 18, entitled Human Thermodynamics (pgs. 653-702), a simple overview chapter, is the only actual published product on human thermodynamics that I have made.

The human chemistry (2007) and human molecule (2008) books were precipitates of the overall effort to write a book or textbook on human thermodynamics, which I have not yet done. The human chemistry textbook, as I came to find, were

needed precursor or preliminary foundation, prior to any writing on human thermodynamics could be attempted. In short, prior to these works, there had been no type of presentation of the view that people are human molecules (or chemical species, chemical entities, or whatever name you choose) and that processes such as when two people form a relationship are a purely chemical reactions, no different than when two hydrogen atoms from the dihydrogen molecule. With the EoHT wiki, I am in the process of collecting the numerous references on past work done on human thermodynamics. That is where I am at at the moment.

"

Where's the falsifiability?

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#### Comment #198



Sadi-Carnot ([Libb Thims](#))

Wednesday, 9:28 PM EDT

To Moriarty, regarding your wholesome savior Frank Lambert, what have you to say about Lambert's 1968 article on the thermodynamic ontology of evil, wherein he argues that there are two thermodynamic aspects of evil: one involving an unwarranted disruption or disordering of an individual's dynamic pattern of life and thought and the other involving a crystallizing or excessive ordering of life, which Lambert exemplifies by the Nazi organization and ordering of prisoners in death camps. Lambert, supposedly, thermodynamically views human activity as "a plateau of high free energy maintained between the two opposing tendencies of order and disorder" (section: 12-3: Entropy and Evil, pg. 327-28, of G. Tyler Miller's 1971 *Energetics, Kinetics, and Life*).

So, it seems that your favorite entropy reference, Frank Lambert, also believes that state functions, such as free energy and entropy, apply to human society. Is he going to be spared the rod or is he now, in your view, a pseudoscientific driveling idiot like me?

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#### Comment #199



Petrologist ([Bruce Bathurst](#))

Wednesday, 9:31 PM EDT

Sorry, the above post was by me. (I keep forgetting my registration was canceled.)

Though I thought I was a geologist, not an idiot, I'm having trouble with 'their valence shell photon-electron interactions'. I think 'valence' was before my time. Is that the old-fashioned term for a sunburn?

Bruce Bathurst (biological machine, sans soul)

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#### Comment #200



Petrologist ([Bruce Bathurst](#))

Wednesday, 9:39 PM EDT

' I'm glad to see that someone in this site has a sensible view and is confident enough to grasp and embrace the logic of modern science.'

Thank you.

' I'm guessing that his ability to grasp the logic of molecular philosophy, is something that only, primarily, chemical engineers and physical chemists can see, being that both professions are well-schooled in chemical thermodynamics? '

Yes. That is undoubtedly the problem. However, Princeton taught me graduate chemical engineering thermodynamics: why wasn't I schooled in the logic of molecular philosophy? Was it my low-quality tutors, as AA tells me?

Bruce Bathurst

Who doesn't like fibs told about him

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#### Comment #201



Sadi-Carnot ([Libb Thims](#))

Wednesday, 9:46 PM EDT

Valence is short for outer orbital electrons, the ones that are weakly bonded to an atom and molecule, and can thus change positions, up or down in orbital. According to Feynman, and his 1985 view of QED (quantum electrodynamics), the theory of the interaction of light and (valence) electrons: "describes all the phenomena of the physical world except



the gravitational effect". In his view, life or biology is moving towards a chemical interpretation, and the theory behind chemistry is quantum electrodynamics. (pg. 8, QED, Feynman). In short, it is relatively easy to explain all human movement in terms of the interactions of valence shell electrons with the surrounding photon fields of the environment.

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#### Comment #202



Sadi-Carnot ([Libb Thims](#))

Wednesday, 9:51 PM EDT

To BB, that comment regarding sensible view, was more directed at PM, not you. At least you had the initiative enough to start a "Why I am not a molecule thread" and to make sensible objections to the human molecular view.

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#### Comment #203



Petrologist ([Bruce Bathurst](#))

Wednesday, 10:35 PM EDT

Thank you. Because I never learned quantum electrodynamics, I shall (of course) take your word for everything about it. I knew that use of 'valence' couldn't have anything to do with Lewis's 1912 valence-bond theory.

Bruce Bathurst

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#### Comment #204



Petrologist ([Bruce Bathurst](#))

Wednesday, 10:47 PM EDT

'At least you had the initiative enough to start a "Why I am not a molecule thread" and to make sensible objections to the human molecular view.'

Please, you needn't be so effusive in your apology, which I humbly accept. Glad you liked my apparently extreme religious, Church of the Iron Apocalypse, view; the one you believe I proselytized.

Bruce Bathurst, PhD

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#### Comment #205



Petrologist ([Bruce Bathurst](#))

Wednesday, 11:17 PM EDT

Unfortunately this debate has turned into character assassination instead of focusing on the subject of debate. In my view, the subject of this debate is difficult; if it was easy a consensus would have been reached earlier. Let us not forget that early thinkers started explaining the world around them by speculating and engaging in philosophical debates. Later scientific methods replaced the old methods but never stopped the scientists and thinkers from engaging in philosophical debates, particularly when they found themselves at the boundaries of existing knowledge. Should we abandon some of the fields of human knowledge like psychology, social science because we cannot write equations to prove or disprove our hypothesis in these fields? Do we know on the circuit level what happens in the brain when it receives stimuli and why a particular output is produced? Not yet. But we can learn something about its operation, simply, by observing its outputs and its relation to its inputs. We take that even if we lack the knowledge to tackle the problem at neuron and circuit level. Today, such debates exist at the highest level of our scientific communities. There are communities of physicists who are determinists (like

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#### Comment #206




Petrologist ([Bruce Bathurst](#))

Wednesday, 11:18 PM EDT

Einstein) who have doubts about quantum mechanics and the principle of uncertainty. Is M-Theory all correct? It may just be a mathematical adventure built on a wrong premise and certainly not measurable by humans that their cognitive ability cannot surpass three dimensional world much less eleven dimensional world. Why science ends up in philosophical debates, is exactly this: When measurement becomes impossible, when new technologies are not matured enough to build sophisticated equipment to put our hypothesis to test and terminate the debates once and for all. When scientists and thinkers find themselves at the boundaries of knowledge pertaining to their time, the insatiable hunger to know more forces them to turn to philosophy and express their views even if they know they cannot back their claims. Should we stop them from philosophizing? Of course not. Any idea should be welcomed. Isn't it that through the accumulation of all and variety of ideas that eventually a


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**Comment #207** Petrologist ([Bruce Bathurst](#))

Wednesday, 11:20 PM EDT

genius opens the door to the reality and the true science? Remember Boltzmann, no one believed in him. He was humiliated to a point that he could not stand it and committed suicide. Today, he is placed on the top of the list of geniuses. One of the qualities of a good scientist is to have doubts and to reexamine his scientific views and pursue what he believes that would lead him to the truth and let others do the same in their own way. If the foundation of a theory is wrong, sooner or later, it will hit the wall, produce nothing, and believe it or not, proving a hypothesis wrong, in itself, is a scientific achievement. Again, I am not taking side with anyone in this debate only trying to help make it more constructive and less personal.

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**Comment #208** AaronAgassi ([Aaron Agassi](#))

Wednesday, 11:30 PM EDT


"To Moriarty, regarding your wholesome savior Frank Lambert, what have you to say about Lambert's 1968 article on the thermodynamic ontology of evil, wherein he argues that there are two thermodynamic aspects of evil: one involving an unwarranted disruption or disordering of an individual's dynamic pattern of life and thought and the other involving a crystallizing or excessive ordering of life, which Lambert exemplifies by the Nazi organization and ordering of prisoners in death camps. Lambert, supposedly, thermodynamically views human activity as "a plateau of high free energy maintained between the two opposing tendencies of order and disorder" (section: 12-3: Entropy and Evil, pg. 327-28, of G. Tyler Miller's 1971 Energetics, Kinetics, and Life).

So, it seems that your favorite entropy reference, Frank Lambert, also believes that state functions, such as free energy and entropy, apply to human society. Is he going to be spared the rod or is he now, in your view, a pseudoscientific driveling idiot like me?

"

He was, no doubt, speaking colloquially, and I'd be surprised if he actually attempted quantification.


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**Comment #209** AaronAgassi ([Aaron Agassi](#))

Thursday, 3:57 AM EDT

Disregard previous. A normal person would speak so of Bazi evil, roughly, metaphorically, A crank would beat it to death.

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**Comment #210** Petrologist ([Bruce Bathurst](#))


Thursday, 10:06 AM EDT

Unfortunately this debate has turned into character assassination instead of focusing on the subject of debate. In my view,

Yes. Please stop it. I've had to write many posts making it clear that I don't believe 'molecule' is a good term for the Earth or for people because this gives them properties they don't possess. You, out of the blue, have attributed it to my being a religious fanatic; and you have refused to apologize. I'm not part of your debate, just a victim of circumstances. I have not accused you of believing something you don't; but your write of my worship of the Sun god 'Ra' blinding me to the truth. Please stop assassinating my character.

Bruce Bathurst, PhD

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**Comment #211** Petrologist ([Bruce Bathurst](#))

Thursday, 10:32 AM EDT

' Should we abandon some of the fields of human knowledge like psychology, social science because we cannot write equations to prove or disprove our hypothesis in these fields? '

Many of my friends, even after my Master's in geology, were shocked that I going to pursue a science. They were philosophers, psychologists, & sociologists, and they were sure I was going to integrate theology with these fields, mythology, parables, fairy tales, and folklore in general. Some didn't know I was a scientist.

C.P. Snow's division of academia into two camps does not apply to everyone. However, I noticed you earlier had a speech that similarly sounded prepared earlier, in which you force-fit me into a simplistic generality. I was just a pawn for your speech, as I am this one. People are not rational: logicians are rational. To live a healthy, balanced life, perhaps one should distinguish each: hot have science eat all or religion eat all. Bilingual people move between countries, and speak one language at a time; mixing the two, as must be done in Switzerland or the Alsace, damages both.

Neither pseudoscience nor scientism benefits a science or any humanity. A respect for why we distinguish between them, and the belief that neither is superior to the other, does. IMHO.

Bruce

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#### Comment #212



Sadi-Carnot ([Libb Thims](#))

Thursday, 11:42 AM EDT

Bruce, it is not my intention to offend you (or for that matter anyone in this discussion). A well-known rule of polite conversation: is to never talk about religion, politics, or money, we are talking about all three here, thus many are going to be offended.

I very much appreciate your points about soul in the context of people being made of atoms. To state the facts, approximately 72% of people adhere to this theory. Likewise, approximately 57% of people adhere to the theory that they are a giant molecule. The two theories, at the moment, are not congruent. This is a huge project from someone in the future.

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#### Comment #213



Sadi-Carnot ([Libb Thims](#))

Thursday, 11:43 AM EDT

Regarding name and properties, even in the context of Lehn's 1995 supramolecular chemistry, one gets into naming issues. Grunwald's chapter "Thermodynamic Components and Molecular Species, of his 1997 book Thermodynamics of Molecular Species, spends a good deal of time discussing naming issues. He defines a molecular species as "a macroscopic or near-macroscopic ensemble of molecules that are characterized by a definite molecular formula, a definite and distinctive equilibrium geometry, and a distinctive set of molecular modes of motion and spectral properties." This is one good definition, among others.

When an atomic structure gets to a certain size, in the protein-to-virus range, structural atomic turnover rates become a factor in what to call such a structure. To put the human scenario in context, the sun can also be defined as a "molecule" ([sun molecule](#)) as can the milky-way, and so on. There are certain factors to be worked out on this point of view, but it leads to interesting conclusions, such as that the attachment between the sun molecule and the earth molecule, as to the earth molecule to the human molecule, as to the human molecule to human molecules, are pure chemical bonds, meaning that gravity is function of chemistry (or an modified type of chemical bond).

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#### Comment #214



Anonymous ([Philip Moriarty](#))

Thursday, 11:45 AM EDT

You drew me back one last time with your "stalemate" bait, but no more.

It's interesting just how many parallels there are between your position and that of a creationist arguing that their nonsensical pseudoscience should also be taken seriously. Re. your recent comment:- It is not up to me to explain the non-equilibrium thermodynamics of life to you. It is up to you to defend your "theories" and your position. You have singularly failed to do so. So, no, it's not a stalemate. Arguing that I haven't explained the non-equilibrium thermodynamics of life to you, entirely misses the point and is, as I say, nothing less than what I'd expect a creationist to say under similar circumstances. Ironic that you don't appreciate this when you've put unwarranted allegations re. a supposed religious bias to me in the past. (Incidentally, to say that that particular allegation irritated me would be understating the case immensely. I'm Irish so I tend to pepper my conversation with a large number of expletives. I'll not

write down what I said to myself when you made that particular unfounded allegation.)

And given that you even don't understand what a Carnot cycle is (Thermodynamics 101), it'd be a monumental task to explain non-equilibrium thermodynamics to you in any case, wouldn't it?

And on the subject of Petrologist's recent comment at the website: either leave the pages you've put together on me alone or remove them now. I'll check back periodically because I don't trust you. (I've downloaded and archived the pages of our debate/argument, by the way, because I also don't trust you not to modify that).

From now on I'll leave it up to readers of your website (of which I hope there'll be very few) to ascertain whether our argument ended in a stalemate.

Good bye.

Philip Moriarty,

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#### Comment #215



Anonymous ([Philip Moriarty](#))

Thursday, 11:53 AM EDT

"You drew me back one last time with your "stalemate" bait, but no more....

....From now on I'll leave it up to readers of your website (of which I hope there'll be very few) to ascertain whether our argument ended in a stalemate.

Good bye.

Philip Moriarty,

"

Thank you for posting this e-mail which was sent to your personal e-mail account. If I had wanted to post it here, I would have done so. I have not posted a single one of the e-mails you have sent me (to my personal e-mail account) to a public forum and would not do so without asking you first. Why do you not show me the same courtesy? (Not that I don;t stand behind everything I've written in that message).

Note the penultimate line regarding trust. Your are entirely untrustworthy, dishonest, and disingenuous.

Despicable behaviour.

Philip Moriarty ([www.nottingham.ac.uk/physics/research/nano](http://www.nottingham.ac.uk/physics/research/nano))

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#### Comment #216



Sadi-Carnot ([Libb Thims](#))

Thursday, 11:58 AM EDT

At long last, Moriarty has shown us his weakness. In his last email (above), he states: "Arguing that I haven't explained the non-equilibrium thermodynamics of life to you, entirely misses the point." I, however, only asked him to explain how thermodynamics governs human society or existence. His insertion of the sub-field "non-equilibrium", signifies (for those who don't know), that he is an adherent to the anthropomorphic doctrines of [Prigoginean thermodynamics](#):

In short, Moriarty believes that he is an evolved type of [Benard's cell](#), formed after several bifurcations. Oh how many-a-physicist will open a paper with the statement: "life as a far-from-equilibrium dissipative structure ..."

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#### Comment #217



Sadi-Carnot ([Libb Thims](#))

Thursday, 12:00 PM EDT

Moriarty, in case you didn't know, rule #1 in life is: "You can't trust anyone!"

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#### Comment #218



Anonymous ([Philip Moriarty](#))

Thursday, 12:02 PM EDT

"Thank you for posting this e-mail which was sent to your personal e-mail account. If I had wanted to post it here, I would have done so. I have not posted a single one of the e-mails you have sent me (to my personal e-mail account) to a public forum and would not do so without asking you first. Why do you not show me the same courtesy? (Not that I don;t stand behind everything I've written in that message).

Note the penultimate line regarding trust. You are entirely untrustworthy, dishonest, and disingenuous.

Despicable behaviour.

Philip Moriarty ([www.nottingham.ac.uk/physics/research/nano](http://www.nottingham.ac.uk/physics/research/nano))

"

Apologies. That should of course be "You are entirely untrustworthy, dishonest, and disingenuous" in the previous comment (rather than "Your are..."

Philip Moriarty ([www.nottingham.ac.uk/physics/research/nano](http://www.nottingham.ac.uk/physics/research/nano))

P.S. Did you ask any of the other people whose e-mails you have reproduced here whether it was OK to do so...?

#### Comment #219



Anonymous ([Philip Moriarty](#))

Thursday, 12:05 PM EDT

"Moriarty, in case you didn't know, rule #1 in life is: "You can't trust anyone!""

No, I can trust many people. In fact, without trust, my life would be terribly and awfully barren.

Your "You can't trust anyone!" comment, and your story at your "Eytymology of Libb Thims" web page actually make me feel rather sorry for you.

Goodbye.

Philip (Moriarty)

#### Comment #220



Anonymous ([Philip Moriarty](#))

Thursday, 12:45 PM EDT

"No, I can trust many people. In fact, without trust, my life would be terribly and awfully barren.

Your "You can't trust anyone!" comment, and your story at your "Eytymology of Libb Thims" web page actually make me feel rather sorry for you.

Goodbye.

Philip (Moriarty)"

So struck by your dishonesty, Libb/Sadi, I'm putting typographical errors everywhere.

That should, of course, be "Etymology of Libb Thims" in Comment #240.

Philip Moriarty

P.S. Could someone please explain the difference between equilibrium and non-equilibrium to Sadi/Libb in my absence?

Thanks.

#### Comment #221



Petrologist ([Bruce Bathurst](#))

Thursday, 1:03 PM EDT

Thank you for finally addressing 'Why I am not a Molecule'. One of the advantages of writing your own books is

that you can select your vocabulary, so long as it makes sense. My personal classification of sciences differs from the traditional; but this difference is inconsequential.

My personal definition of physical science is one in which the objects of study are identical. Gravity, light, quarks, electrons, isotopes of elements, & molecules are identical. A 'molecular species' is a homogeneous molecule, as H<sub>2</sub>O (liquid) or NaCl (xtal). The only physical sciences are physics & chemistry.

Natural science studies natural objects that are not equal, but equivalent: they have some properties in common, but not all: seas, continents, birds, people (studied biologically), stars, fossils.

Suns differ in many properties. Sol's many properties change continuously, in a chaotic manner. It is, in my definition, a natural object.

Though my classification differs from others, the meaning of its objects are consistent with current scientific theory.


No suns are molecules or molecular species. Their compositions change among one another, and Sol's properties change internally too much, in a continuously chaotic manner.


You may call a sun a molecule; but then you cannot apply current theories of molecules to one. This is a fact, not a theory or opinion.

Bruce Bathurst, PhD

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#### Comment #222

 Petrologist ([Bruce Bathurst](#))

 Thursday, 1:39 PM EDT

SC: 'A well-known rule of polite conversation: is to never talk about religion, politics, or money, we are talking about all three here, thus many are going to be offended.'

Please speak for yourself. Religion is all over your website, which is why I asked if you were referring to a 'soul', earlier (since yours can be weighed & scratched). Also, I didn't know Christians, Jews, Muslims, and many Hindus worship the Sun god 'Ra'.

SC 'I very much appreciate your points about soul in the context of people being made of atoms. To state the facts, approximately 72% of people adhere to this theory.'

Excuse me? I'm sorry, but I truly don't understand. What theory? My only point I've made about the soul is that, in major religions, it is incorporeal, not observable by everyone, and thus not a scientific object. Is anyone else offended by this?

P: 'Let me make myself crystal clear, again. People know absolutely nothing of any trace of religious belief I might have. I don't have to be religious to defend the separation of church & state, as guaranteed by the American Constitution. Were I religious, I should not have to believe in a 'soul'. Were I to believe in a 'soul', it would (in no major religion) be 'an indestructible corporeal essence'.


Remember, the Buddha lectured that there is a soul to those who did not believe in one; and lectured that there is no soul to those who did believe in one. This is just a fact.


Bruce

PS. There is no religious opinion here, so where is the politics and money?

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#### Comment #223

 Petrologist ([Bruce Bathurst](#))

 Thursday, 2:13 PM EDT

My view is that one's writing about his views long enough does not make them worthy of discussion.

You are apparently wanting to change a paradigm, as Newtonian mechanics was changed by Einstein. Einstein didn't set

out to do this: it came as a result of normal science discovering & exploring paradoxes. All I can suggest is that you study a branch of science extremely well, then attack the most difficult, scientific problems.

It is likely you will discover new theorems in the present theory (as I did in thermodynamics). You would be very lucky to create a new theory. (What I'm working on is a recasting of an old one.) Granites have been measured to be very viscous, yet paper-thin layers are found in schists & gneisses. I do have an hypothesis that explains this and many other unexplained phenomena in granites; but I've yet to test it, which may take years. I expect it to fail.

Each theorem of thermodynamics I proved in three different ways\*, then tested at least three different predictions. Finally I model each mathematically, calculating my models to 15 decimal places. Only when my predictions proved accurate to 15 decimal places did I mention I had a theorem to anyone. This is the care some scientists take in offering new ideas.


You can't set out to revolutionize science. It is usually a fortuitous accident.

Bruce

\*When writing a Masters thesis, I would perform mathematical calculations all day. The second day, I would repeat these, without looking at the first. If they didn't agree, I would repeat the calculations on the third day, see which it agreed with, then find the error in the spurious set of sheets.

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#### Comment #224

 Petrologist ([Bruce Bathurst](#))  
Friday, 6:00 AM EDT  
Equilibrium. WARNING: This is a personal explanation, which avoids any mention of 'reversible paths'. Hence, anyone is welcome to fix it.


Dr Moriarty wrote that he wished there were some comments, probably on Carnot's cycle, that explained equilibrium. My post had necessary conditions of a Carnot cycle, but not sufficient. I have a problem with reversible paths and equilibrium that has alienated me from other geologists. However, I'm in good company, with Fermi, Reiss, Katchalsky & Curran.

Pippard takes a very abstract view, and first proves the existence of adiabatic surfaces. Carnot is much more beautiful, I feel; and proves this existence by 'interpretation': building a thermally insulated cylinder & piston, with the 'valves' end either open or closed, at constant, hot temperature  $T_2$ . Fermi best illustrates the cycle of isothermal expansion, adiabatic expansion, isothermal compression, then adiabatic compression.

It's important to remember that the operation used to measure heat flow is conductivity times a temperature gradient. So, when the closed cylinder at  $T_2$  is placed on a reservoir at  $T_2$ , & the piston slowly moves outward to do work, we mean this: the piston is moved slowly enough that the heat it extracts from the  $T_2$  reservoir creates a  $T$ -gradient in it that we can't observe. It's traditional to specify no thermal gradient in the reservoir, slowing the piston to quasi-static (zero speed). Clearly this has conceptual problems: the gradient  $T_2 - T_1$  must just be very measurable compared to the thermal gradient in the reservoir. Now the cylinder is placed on a thermal insulator and expanded until the temperature drops to  $T_1$ . To be continued ...

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#### Comment #225

 Petrologist ([Bruce Bathurst](#))  
Friday, 6:02 AM EDT  
Equilibrium, continued ...

The heat absorbed by the cylinder has been  $Q_{in}$ . As it slowly compresses isothermally at  $T_2$ , then adiabatically to  $T_1$  (a cycle), heat  $Q_{out}$  diffuses out the bottom slowly enough to not create a measurable gradient in the reservoir  $T_2$ . The net heat absorbed during the cycle was  $Q_{in} - Q_{out} = W$ , so  $Q_{in} - Q_{out} / Q_{in} = 1 - \text{heat lost}$ , ranges from 1 to 0. Any faster movement of the piston will reduce  $T_2$ , reducing  $T_2 - T_1$ , reducing  $Q_{in}$ ,  $W$ , and the efficiency.

During the entire cyclic path of the piston, at maximal efficiency, the entire fluid in the cylinder has been (at any moment) at equilibrium. :-)

Warning: No chemist, physicist, or other geologist is responsible for (or would likely touch) this definition.

Bruce Bathurst, PhD

Refs

Carnot, S. 1824. *Réflexions sur la puissance motrice du feu et sur les machines propres a développer cette puissance*. Paris: Chez Bachelier, Libraire, Quai des Augustins, No 55. (Engl. trans. R.H. Thurston, 1960, London: Constable & Co, Ltd.

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Comment #225

 Petrologist ([Bruce Bathurst](#))


 Friday, 6:06 AM EDT


It's very late, so I take no responsibility whatever for any horrible blunders in the above (except avoiding reversible and 'quasi-static'. It simply sounded good in my head. :-)

Bruce

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Comment #226

 AaronAgassi ([Aaron Agassi](#))

 Friday, 10:16 AM EDT

"Thank you for finally addressing 'Why I am not a Molecule'. One of the advantages of writing your own books is that you can select your vocabulary, so long as it makes sense. My personal classification of sciences differs from the traditional; but this difference is inconsequential.

My personal definition of physical science is one in which the objects of study are identical. Gravity, light, quarks, electrons, isotopes of elements, & molecules are identical. A 'molecular species' is a homogeneous molecule, as H<sub>2</sub>O (liquid) or NaCl (xtal). The only physical sciences are physics & chemistry.

Natural science studies natural objects that are not equal, but equivalent: they have some properties in common, but not all: seas, continents, birds, people (studied biologically), stars, fossils.

Suns differ in many properties. Sol's many properties change continuously, in a chaotic manner. It is, in my definition, a natural object. Though my classification differs from others, the meaning of its objects are consistent with current scientific theory. No suns are molecules or molecular species. Their compositions change among one another, and Sol's properties change internally too much, in a continuously chaotic manner. You may call a sun a molecule; but then you cannot apply current theories of molecules to one. This is a fact, not a theory or opinion.


What is a fact? What does the word even mean? When I realized that I actually do not know, I stopped using the word: 'fact.' More at: [http://www.FoolQuest.com/metaphysics\\_for\\_dummies.htm#fact](http://www.FoolQuest.com/metaphysics_for_dummies.htm#fact) Therefore, I would classify your closing remark: "You may call a sun a molecule; but then you cannot apply current theories of molecules to one." -as an uncontroversial assertion, extremely well supported by massive invariantly consistent corroborating observation and the body of current science. I would even venture that what you say is all true, meaning correspondent to reality. Any doubt is surly as small as it ever becomes.



And Bruce, when you say that current theories of molecules cannot be applied in describing a star (though made of molecules, of course), you mean that theories of molecules cannot be applied directly and wholesale. -That only analogy is possible, and the question will be, when metaphor begins to break down. Indeed, you have named specific non molecular behaviors of stars. And bearing that in mind, it is then incumbent upon Sadi-Carnot to qualify his hypotheses, and explain application of molecular theories to macro-objects such as stars, let alone humanity.

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#### Comment #227

 Petrologist ([Bruce Bathurst](#))

Friday, 11:49 AM EDT

In the positivist spirit, the 'stuff' of science are 'operations': one observes a property or phenomenon objectively, so everyone (who isn't hallucinating) will agree. That quartz & orthoclase touch one another in granite is an observation and a fact.

Facts are accepted by everyone (during a scientific investigation) without dispute. However, facts are more than physical observations.

In statistical mechanics, the motion of molecules can be classed as either translations, rotations, or vibrations. This is a fact to those who have studied this subject. (No plasma flows.) Everyone agrees the theory uses this requirement, which is why:


'You may call a sun a molecule; but then you cannot apply current theories of molecules to one. This is a fact, not a theory or opinion.

No analogies here, I think; just properties.

Bruce Bathurst

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#### Comment #228

 Petrologist ([Bruce Bathurst](#))

Friday, 12:22 PM EDT

What is of more interest (to me) is restating theorems in terms of real operations (no isolated systems--which no one can observe, no ideal gasses, no internal energy, no reservoirs, &c). By requiring that the hypothetical reservoir be a real reservoir, it requires a temperature gradient & thermal conduction. By juggling these two quantities of the reservoir and those in the material of the engine, I appear to have slithered past reversibility when defining 'equilibrium'. (There is a very good reason for wanting to do this: the Carnot cycle can be the traditional mathematical concept: a hypothetical cycle (that occurs 'infinitely' slowly), as presented in Pippard; or it can be more (a real concept for which I was exiled).

Carnot's cycle, by the way, defines both the Kelvin & Clausius concepts of entropy, and can be used to create the concept of absolute temperature. (I didn't have time.) Fermi's is the simplest treatment, and is also the most carefully phrased.


Should you find a mistake, remember that one Yale professor began each of his courses in thermodynamics with the Carnot cycle, got it wrong each time, and reportedly always had to repeat his lecture correctly on the second day. That would be Willard Gibbs. (Carnot's simple-appearing paper was true genius. :-)

Also note that Carnot's paper had errors, but these were easily fixed. Mr Thims' errors would be inconsequential, if they could be easily fixed.

Bruce Bathurst

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#### Comment #229

 AaronAgassi ([Aaron Agassi](#))

Friday, 1:03 PM EDT

As in my entry for 'fact' in my 'Metaphysics for Dummies,' at [http://www.FoolQuest.com/metaphysics\\_for\\_dummies.htm#fact](http://www.FoolQuest.com/metaphysics_for_dummies.htm#fact), in science "facts" are indeed, repeatable observations or claims thereto. But then you bring in the problem of personalities and multiple observers, drawing upon, as if complementary or consistent, an

entirely different usage of the word 'fact,' as articles of consensus, as within a scientific community. And these are simply not the same things. And if you have troubled to read my entry for 'fact' in my 'Metaphysics for Dummies,' then you know how it only gets worse.

Ultimately, you have demonstrated my point that there is neither consistent observation nor consensus upon the meaning in usage of the very word: 'fact.' And so, in blithe unawares confusion, even self contradiction and denial, you continue in bypassing, exchange which is not genuine communication because it lacks sufficient intersubjectivity and does not carry at all the same meanings or even purpose, intention or point at all between participants.

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#### Comment #230



AaronAgassi ([Aaron Agassi](#))

Friday, 1:06 PM EDT

(continued)

I conjecture, etiologically, that all the above is symptomatic of Justificationism on your part. It can be cured.

That one cannot directly or literally apply current theories of molecules to macro objects such as suns or people, is, indeed, an assertion. Assertions are Ontological statements concerning objective reality, such as employ the verb: to be. Tautologically, all assertions are both opinion and claim to truth. The assertion of your in question, Bruce, is, however, utterly and unassailably valid inference from current science, indeed both extremely non controversial and extremely well Empirically supported.

Again, Sadi-Carnot's crank error here is the logical falsity of unrestrained argument from analogy, as if to assert that because cranberries are red and edible, red fire engines must be yummy too! -For example, with the perfectly allowable observation of Brownian motion in crowds of students in confined space, to the confident hope of who knows what more in prediction, indeed ignoring all of the complex non particle like human behavior. From observed similarities, better defined conjecture of unobserved similarities, ought to be followed up far more cautiously.

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#### Comment #231



Petrologist ([Bruce Bathurst](#))

Friday, 3:33 PM EDT

Why are you writing here? Is it to help me remedy my poor 'communication skills', as you claim? Are you such an authority on classical thermodynamics that your 'conjecture' is of value?

I use simple language, and an 'assertion' I use as a statement that I'm yet to provide justification for. I felt the simple motion necessary to be a molecule, a necessary axiom in statistical mechanics, already justified my statement. Because 'true' is thin truth, it is true that stars will not obey the behavior that current chemical theory predicts of molecules; but it is a fact that stars fail the definition of a molecule given in these theories.

Why are you writing? Why are you using metaphysical jargon? This is a website about chemical engineering. Drawing upon operationalism and logical positivism, I choose my words more carefully than many. In fact, I collect dictionaries & study clarity of expression. My words, should I publish a monograph, will first be defined in standard English, not metaphysical jargon.

Though I have studied the logical positivists, I consider their early opinion of metaphysics extreme. It is possible, however, I could change my mind.

Fortunately, deriving equilibrium from Carnot's cycle completes my obligation here.

Bruce Bathurst

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#### Comment #232



Sadi-Carnot ([Libb Thims](#))

Friday, 4:00 PM EDT

In case any random person happens to read to the end of this discussion, I will recap: On August 04, 2009, Irish physicist Philip Moriarty, a professor of thermal physics for six years, made the following statement on video, supposedly in efforts to teach people what entropy is:

“You cannot say that a particular arrangement of students has a thermodynamic entropy.”

Certainly we commend people in their aims to educate the world. If, however, what one teaches is incorrect, then it is possible that one is doing more harm than good. The above statement is an example of incorrect teaching. The only structures (or arrangements) in the universe that do not have a thermodynamic entropy, are pure solids or a pure liquids at 0 K. Baring an absence of temperature, one can define a thermodynamic entropy for any arrangement in the universe. The logic behind this is what is called the third law of thermodynamics.

I started this thread to see exactly just how many people think the above statement (by Moriarty) is true. Somehow the thread veered far off topic. Whatever the case, some of the discussion certainly was food for thought.

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#### Comment #233



Anonymous ([Philip Moriarty](#))

Friday, 5:14 PM EDT

"You cannot say that a particular arrangement of students has a thermodynamic entropy."

Yes, Libb, you're correct - I do say that. But you've taken the statement entirely out of context. Check out the video at

[http://www.youtube.com/watch?v=av8aDFFtSs0&feature=channel\\_page](http://www.youtube.com/watch?v=av8aDFFtSs0&feature=channel_page)

to see the statement in its correct context.

See also Comments #7, #99, and #206. Before attempting to lecture on the 3rd law, Libb, let's get the 2nd law sorted out. Have you worked out yet why the Carnot cycle can only ever be an idealisation?

In addition, why don't you explain to us why you think Muschik (Comment #99) has got it wrong?

Philip Moriarty

[www.nottingham.ac.uk/physics/research/nano](http://www.nottingham.ac.uk/physics/research/nano)

[www.youtube.com/sixtysymbols](http://www.youtube.com/sixtysymbols)

P.S. As I've explained to you before, I'm not a professor of thermal physics. However, given that trustworthiness - and, by extension, honesty - are not qualities you value in scientific debate, it's not surprising that you'd assert this again. You provide a link to my staff page at the University of Nottingham elsewhere at this site. Do me the courtesy of reading that page. Thank you.

PPS It becomes clearer and clearer why Wikipedia banned you from editing articles because of your habit of "misrepresenting sources".

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#### Comment #234



Anonymous ([Frank Lambert](#))

Friday, 5:46 PM EDT

Thims, you probably have a copy of the gen chem text you used at Michigan in 1994. Check it. I'll send \$20 to your account if it has any conceptual definition of entropy other than something to do with "disorder". Kistiakowsky never dealt with a qualitative concept for entropy. He taught about entropy as did most physical chemists of the 20th century: "Do enough problems and you will understand entropy."

This is not true. You will be able to do problems, but you will NOT understand entropy. I sweated on a myriad of problems and got a B in the course – which was not at all bad I considering that only three of us in the class of some 24 were undergrads. But neither I in 1942 or brilliant Thims in '94 or later \_understood what entropy WAS\_. That's why I wrote some articles that were foolish up until about 1970; they were based on ANALOGY to the meaning of entropy as an increase in "disorder" of ANY kind.

Frank L. Lambert  
Professor Emeritus

Occidental College  
Los Angeles, CA 90041

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#### Comment #235



Anonymous ([Frank Lambert](#))

Friday, 5:56 PM EDT

But, lucky to live long – that Thims appears to consider a defect in my character – I also spent months in thinking deeply (not just superficially reading masses of material as does Thims), and writing peer-reviewed articles in first-rank journals. That is why I have been successful in developing an approach for any level of chemists. It has been accepted by so many chemistry texts (with 45 authors) because of its merit alone . (entropysite.oxy.edu).

Thims, sadly, is stuck in the 20th century foolishness of endless analogies of entropy with “disorder” -- and the impossibility of converting that to math certainty. Feggedabout it!

Entropy is the concept in science that traditionally has been most frequently misused and misinterpreted -- primarily because of its supposed connection with "disorder" of every type imaginable. Nonsense. Check entropysite.oxy.edu

Frank L. Lambert  
Professor Emeritus  
Occidental College  
Los Angeles, CA 90041

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#### Comment #236



AaronAgassi ([Aaron Agassi](#))

Friday, 6:07 PM EDT

All hypothesis begins from unfounded conjecture, only then followed if at all, by critical preference and only then with Empirical evidentiary support. Bruce, you poor thing, there is no such thing as prior justification, nor need thereof. You ask me why I apply terminology from the philosophy of science in the Epistemological Methodological examination of matters of scientific method. Isn't that somewhat like demanding why algebra is referenced in Mathematics? And haven't I already gone into all of this on my 'Metaphysics for Dummies,' at [http://www.FoolQuest.com/metaphysics\\_for\\_dummies.htm](http://www.FoolQuest.com/metaphysics_for_dummies.htm) ? And lastly, what in Hell has logical positivism got to do with anything?

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#### Comment #237



AaronAgassi ([Aaron Agassi](#))

Friday, 7:39 PM EDT

<http://plato.stanford.edu/about.html>

Welcome to the Stanford Encyclopedia of Philosophy (SEP). From its inception, the SEP was designed so that each entry is maintained and kept up to date by an expert or group of experts in the field. All entries and substantive updates are refereed by the members of a distinguished Editorial Board before they are made public.

<http://plato.stanford.edu/entries/vienna-circle/>

The Vienna Circle was a group of early twentieth-century philosophers who sought to reconceptualize empiricism by means of their interpretation of then recent advances in the physical and formal sciences. Their radically anti-metaphysical stance was supported by an empiricist criterion of meaning and a broadly logicist conception of mathematics. They denied that any principle or claim was synthetic a priori.

<http://plato.stanford.edu/entries/metaphysics/>

Let us briefly examine an example of the strong form of the thesis that metaphysics is impossible. The logical positivists maintained that the meaning of a (non-analytic) statement consisted entirely in the predictions it made about possible experience. They maintained, further, that metaphysical statements (which were obviously not put forward as analytic truths) made no predictions about experience. Therefore, they concluded, metaphysical statements are meaningless—or, better, the ‘statements’ we classify as metaphysical are not really statements at all: they are things that look like statements but aren't, rather as mannequins are things that look like human beings but aren't.

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## Comment #238

AaronAgassi ([Aaron Agassi](#))

Friday, 8:57 PM EDT

Straw.

## Comment #239

Sadi-Carnot ([Libb Thims](#))

Friday, 9:02 PM EDT

[Frank](#), why don't you give us a photo for your article? Either email it to me ([libbthims@gmail.com](mailto:libbthims@gmail.com)), and I will format it, or edit your article and add it using the upload button? All of these articles are for future generations. I would ask the same of Phil, but I guess he doesn't want his photo in his article, as he removed the last one I put there?

## Comment #240

Anonymous ([Frank Lambert](#))

Yesterday, 1:33 AM EDT

I'll send one instantly – and not a fake photo – if you let me edit your calumnious page of me and of energy dispersal.

I have no concern about "future generations" noting or remembering your material, but it would be nice if your writing about me were a bit more in touch with reality.. I play with you only because of occasional boredom -- but I am genuinely curious: What was your gen chem text in 1994? Did you use Atkins in phys chem? Didn't you ever wonder why they connected entropy with "disorder"?

Frank L. Lambert  
Professor Emeritus  
Occidental College  
Los Angeles, CA 90041

## Comment #241

Petrologist ([Bruce Bathurst](#))

Yesterday, 4:06 AM EDT

"Equilibrium, continued ...

The heat absorbed by the cylinder has been  $Q_{in}$ . As it slowly compresses isothermally at  $T_2$ , then adiabatically to  $T_1$  (a cycle), heat  $Q_{out}$  diffuses out the bottom slowly enough to not create a measurable gradient in the reservoir  $T_2$ . The net heat absorbed during the cycle was  $Q_{in} - Q_{out} = W$ , so  $Q_{in} - Q_{out} / Q_{in} = 1 - \text{heat lost}$ , ranges from 1 to 0. Any faster movement of the piston will reduce  $T_2$ , reducing  $T_2 - T_1$ , reducing  $Q_{in}$ ,  $W$ , and the efficiency.

During the entire cyclic path of the piston, at maximal efficiency, the entire fluid in the cylinder has been (at any moment) at equilibrium. :-) Warning: No chemist, physicist, or other geologist is responsible for (or would likely touch) this definition.

Bruce Bathurst, PhD

## Refs

- Carnot, S. 1824. *Réflexions sur la puissance motrice du feu et sur les machines propres a développer cette puissance*. Paris: Chez Bachelier, Libraire, Quai des Augustins, No 55. (Engl. trans. R.H. Thurston, 1960, London: Constable & Co, Ltd.
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- Reiss, H. 1965. *Methods of Thermodynamics*. London: Constable & Co, Ltd.

Katchalsky, A. & P.F. Curran, 1975. Nonequilibrium Thermodynamics in Biophysics. Cambridge, Mass: Harvard Univ Press.

"

You should have a look into more modern literature: A reversible process is defined as trajectory in the equilibrium subspace. They do not exist in nature. They are not connected to so-called quasi-static processes. Equilibrium is defined by the equilibrium variables spanning the equilibrium subspace

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#### Comment #242



Petrologist ([Bruce Bathurst](#))

Yesterday, 5:32 AM EDT

Dr Moriarty, I presume. (You should identify yourself.)

This derivation was Carnot's, with ideas borrowed from Fermi & Bridgman. I should appreciate your fixing it! I was unaware that old ideas were necessarily wrong, sorry. (I though Carnot's only errors were, ironically, the use of the earlier caloric theory.)

This derivation I made my own, so (comparing two different cycles between equal temperatures) the cycle with an efficiency of 1 would contain a material that is always at equilibrium. I thought you requested equilibrium.

You may, if you wish, call the section on, say, a  $p, V$ -plane a reversible path. This takes little extra effort. For reasons that are irrelevant, I choose not to. In my obsolete library, 'reversible process', 'quasi-static process', and 'equilibrium process' (mainly Russian) are almost always synonymous. (Paths, not processes, are important to you.)

Please offer correct references. What space contains an equilibrium subspace? That is out of my league. I'm comfortable, however, with differential geometry.

Unfortunately, I have been bedridden for a decade and am poverty stricken. However, My goal is to walk to a research library, only four blocks away. Sorry I confused the explanation, but it was a late, first draft. :-) Thank you very much for the better references!

Bruce Bathurst, PhD  
Geologist

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#### Comment #243



Anonymous ([Philip Moriarty](#))

Yesterday, 10:25 AM EDT

Re. #265: No, Comment #264 is not mine. I usually identify myself - I think I've only forgotten to do so once or twice. [By the way, the terms quasi-static and reversible are certainly not synonymous].

Re. #262: No, Libb, I didn't remove a photo of myself at any point from your website.

And finally, to Libb/Sadi-Carnot: I've stated a few times before that I was going to leave this debate/argument and then got drawn back in. It's the start of the new academic year here next week so I really am going to draw a line under this. It's a shame that the debate descended into acrimony and I regret my "hot-headedness" at times but, to be fair, it's difficult to debate with someone who can be so blatantly disingenuous. (You've admitted above that trustworthiness is not a quality for which you have any time).

There is no question that your knowledge of the historical development of the field of thermodynamics is better than mine. Your human thermodynamics "theory" is, however, pure pseudoscience. I know that sounds harsh but the best way to counter my (and many others') criticisms is not to spend your time on this website but rather to **submit your work to peer-reviewed journals**. (And I mean proper **anonymous** peer-review.) That is what any scientist has to do today. It's no longer the 18th/19th Century.

Subject your work to rigorous peer-review. Let experts in the field of thermodynamics (and I'm certainly not one) comment in detail on your work. Any scientist welcomes rigorous and intelligent peer-review. Although it can be frustrating at times(!), it helps us to strengthen our work against criticism. Instead of ignoring the issues raised above (e.g. comment #99, the Carnot cycle question, comment #64, #112 etc...), tackle them head on.

Best wishes,

Philip Moriarty ([www.nottingham.ac.uk/physics/research/nano](http://www.nottingham.ac.uk/physics/research/nano))

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#### Comment #244



Petrologist ([Bruce Bathurst](#))

Yesterday, 10:39 AM EDT

"Dr Moriarty, I presume. (You should identify yourself.)

This derivation was Carnot's, with ideas borrowed from Fermi & Bridgman. I should appreciate your fixing it! I was unaware that old ideas were necessarily wrong, sorry. (I though Carnot's only errors were, ironically, the use of the earlier caloric theory.)

This derivation I made my own, so (comparing two different cycles between equal temperatures) the cycle with an efficiency of 1 would contain a material that is always at equilibrium. I thought you requested equilibrium.

You may, if you wish, call the section on, say, a p,V-plane a reversible path. This takes little extra effort. For reasons that are irrelevant, I choose not to. In my obsolete library, 'reversible process', 'quasi-static process', and 'equilibrium process' (mainly Russian) are almost always synonymous. (Paths, not processes, are important to you.)

Please offer correct references. What space contains an equilibrium subspace? That is out of my league. I'm comfortable, however, with differential geometry.

Unfortunately, I have been bedridden for a decade and am poverty stricken. However, My goal is to walk to a research library, only four blocks away. Sorry I confused the explanation, but it was a late, first draft. :-) Thank you very much for the better references!

Bruce Bathurst, PhD

Geologist "

You will receive better references the middle next week. ThermoSyst.

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#### Comment #245



Sadi-Carnot ([Libb Thims](#))

Yesterday, 12:51 PM EDT

Yes, do send a photo. To note, there are no fake photos on this site. And yes feel free to edit your articles (please, however, don't delete the historical background to how you came about your theory, etc.). We would be glad to have you join the site, as I'm sure you will have references (unknown to me) that you could add to articles.

Re: chemistry textbooks, although I'm sure we've been through this before at Wikipedia, my 1990 Ebbing General Chemistry and 1998 Chang Chemistry both define entropy as a measure of randomness or disorder. The entropy disorder definition comes predominantly from Planck (1901): [principle of elementary disorder](#). Planck needed Boltzmann's views on disorder to substantiate his quantum hypothesis.

Another chemistry textbook in my 1,100+ book personal science library, Pauling's 1969 General Chemistry, however, defines entropy via  $S = k \ln W$ , I started the article for the symbol [W](#).

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#### Comment #246



Sadi-Carnot ([Libb Thims](#))

Yesterday, 12:51 PM EDT

Noting your penchant for entropy definitions, you might like to help us make a chronological table (year-by-year) of entropy definitions. I can set up the page and table if you want and you can past in the definitions and references? It might end up looking like the [symbols](#) table. The following [entropy etymology](#) page is a prototype example. Myself, I am slowly building a thermodynamics (chronology) definition table, to see how the definitions of thermodynamics have changed over the last 160-years.

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#### Comment #247



Sadi-Carnot ([Libb Thims](#))

Yesterday, 12:52 PM EDT

Regarding Muschik's comments: "From a thermodynamical point of view, the procedure is clear: If one has a distribution (that means some items must be distributed), you can define a not necessarily thermodynamic entropy (if it is thermodynamic or not, depends on the items which are distributed).

If one additionally can define an energy belonging to the set of the distributed items, one can define a temperature by differentiating the entropy to this energy. Then one can call the set of the distributed items a thermodynamical one (if you want).

Let us consider a set of students having different heights. Then one can introduce a distribution function describing the distribution of the different heights spanning the R1. The one can define an entropy (information measure). But because there no energy belonging to the considered set of students, you cannot define a temperature and this set of students does not represent a thermodynamical system (as we knew that from the very beginning)."

Moriarty requests that I explain this statement. Muschik is mixing together apples (student heights) and oranges (heat flow) together in efforts to make a vegetable conclusion.

Statistical mechanics (a mechanical principles view of the first two laws) is a subfield of thermodynamics. Talking about distribution is simply an ideal gas way of looking at entropy. The true way to discuss entropy is in talking about the equivalence value of all uncompensated transformations, which applies to all systems.

#### Comment #248



Sadi-Carnot ([Libb Thims](#))

Yesterday, 12:52 PM EDT

Moriarty: "Have you worked out yet why the Carnot cycle can only ever be an idealisation?"

I really don't know why he is asking this question, but I suppose reversibility is puzzling issue for many who are thrust through a thermodynamics class without really getting the inside scoop.

The short answer is that Carnot borrowed the Lavoisier heat model in presenting his theoretical heat cycle. Hence to understand Carnot's cycle, you actually have read the first 20-pages of Lavoisier's 1787 Elements of Chemistry, to understand Carnot's mindset, wherein Lavoisier explains his geometric understanding of equilibrio in the caloric. Part of this is explained [here](#).

In short, in explaining his cycle, Carnot assumed (in an unwritten manner) a [Papin engine](#) cycle in conjunction with the Lavoisier heat particle model, whereby in the expansion phase (stroke) you would put in, say, 10 caloric particles, and in the contraction phase (stroke) you would remove the exact same 10 caloric particles, after which the 'working body', typically steam, would return to the exact same atomic configuration. This was the central issue that Clausius had with Carnot, a result of which was thermodynamics.

#### Comment #249



Sadi-Carnot ([Libb Thims](#))

Yesterday, 12:53 PM EDT

To Bruce Bathurst: regarding your eoht user page, there's no conspiracy here, people joint this site monthly, and to help me keep track of who they are (e.g. Bruce Bathurst, PhD work in thermodynamics, = Petrologist), I tend to add a note or two on their user page (if they don't). On yours I simple pasted parts of what were on your public Wikipedia page, which I linked to. In the future, I suppose, I will try to be clear about this to new joiners.

To Philip Moriarty: regarding assertions of mis-trust, general protocol suggests that scientific correspondence tends to be open for discussion. The famous demon of thermodynamics, for example, came from the letters of correspondence of James Maxwell and Peter Tait in 1867.

#### Comment #250



Sadi-Carnot ([Libb Thims](#))

Yesterday, 12:54 PM EDT

Here's a 2006 article/study that came to mind today, regarding actual distributions of students in various high



school cafeterias, sage grouse distributions in leks (mating fields), rats in connected but bounded fields, in the context of Van der Waals 1910 discussions on the connection between degree of associations of gas molecules when transitioning into the liquid and solid states and state functions:

<http://www.humanthermodynamics.com/RP/Cafeteria-Densities.html>

Specifically, in conclusion of his 1910 Nobel Lecture he reasons that the connection between the Gibbs free energy equation, the degree of association between molecules, and the development of a state equation needed to exactly define the state of a molecular system exists, and suggests that 'perhaps there is a direct way'.

#### Comment #251



Sadi-Carnot ([Libb Thims](#))

Yesterday, 12:54 PM EDT

It seems that both Moriarty and myself are ready to end this discussion, as he has classes starting, and I have other matters to attend to. I think, from the statements in #255 and #256, that we are all in agreement that every structure or arrangement in the universe (including a group of students), above absolute zero, has a thermodynamic entropy. Hence, if anyone else has off-topic questions or concerns, please start a new thread, on a different page (or in the discussion forum) as this one is getting too long to follow and keep track of. Thanks, Libb.

#### Comment #252



Petrologist ([Bruce Bathurst](#))

Yesterday, 1:46 PM EDT

That's very kind. Books, treatises, & papers before 1990 I've likely consumed. Then all stopped. Write [bathurst@alumni.princeton.edu](mailto:bathurst@alumni.princeton.edu) should I not be here. Could you give me an initial idea why this sketchy definition of equilibrium is wrong. It's on that point I differed with other geologists, who confused it with, well, absolute zero.

My own research uses historical papers in geology to motivate axioms, defns, & theorems in a thermodynamic interpretation of linear geometries. Linear subspaces & their annihilators play major roles. Equilibrium is both local and 'moving' (as in the Carnot cycle)--its this that offends geologists. Was that your objection as well? Only Fermi, Riess, & Katchalsky & Curran (& Rice, in a monograph) take me unacceptable view. So, what linear space are you referring to? Thanks!

Bruce

#### Comment #253



Petrologist ([Bruce Bathurst](#))

Yesterday, 3:28 PM EDT

Msr Carnot,

Sorry, but I thought your comparing the diurnal cycle with Carnot's was just accident. I left out many important things in my posts, for reasons of space, but it wasn't incorrect (well ... I didn't proof-read them :-).

Though my father was an iron-worker, an engine is not a metal device but a thermodynamic cycle, one that converts heat to work or work to heat (refrigerator). The Carnot cycle is very efficient, usually converting all heat to work. This violates the second law of thermodynamics. To do this, it takes forever. Its efficiency makes it hypothetical. (Note I'm avoiding the word 'reversible' again. Bridgman, at least, would appreciate this.)

The Carnot cycle is made of four paths; the diurnal cycle isn't. The Carnot cycle is hypothetical: if real, it would violate the 2d Law of Thermodynamics. The Carnot cycle takes forever, not one day. For any of these reasons, a diurnal cycle can't be a Carnot cycle.

We should note some other errors. 'Caloric' was just a corporeal heat; but it was 'vaporous', not particulate. Carnot's cylinder was closed at all times. Carnot's engine could produce more work than any other, both acting between the same two temperatures. In the 'contraction stroke', the 10 heat units would expand the piston, doing the equivalent of 10 heat units of work (and dropping toward the lower temperature). Your engine has efficiency 0.



Your last paragraph, the one of substance, is a great problem for you. What is the 'exact same atomic configuration'?

(Even Carnot suggested that heat was the movement of atomic or molecular particles.) His working substances (air, then steam) would return to the same temperature. Even violating the 2d Law, the the same temperature would be an uncountable number of changing molecular configurations, never 'the exact same'.

Bruce Bathurst, PhD

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**Comment #254**



 Petrologist ([Bruce Bathurst](#))  
 Yesterday, 3:34 PM EDT  
 Msr Carnot,

You'll be pleased to know your views on sociological entropy, with reference to Human Thermodynamics, is well represented in the 'Entropy' article in the Wikipedia.

Bruce B.

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**Comment #255**



 Petrologist ([Bruce Bathurst](#))  
 Yesterday, 3:38 PM EDT  
 Msr Carnot,

Thank you. However, I checked the Wikipedia. It doesn't state there that I studied 'Human Thermodynamics' in the 1960s. Admittedly, what you initially wrote & told me of didn't contain this. It was only by accident later that I checked my profile and found this had been added later without telling me.

Bruce

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**Comment #256**

 Petrologist ([Bruce Bathurst](#))  
 Yesterday, 4:17 PM EDT  
 Everyone,

I'll end my participation here with one of the consequences of the similarity between Human Thermodynamics and creationism that I noted. (Similarity in their consequences to society.) It is hopeless to convince someone that their scientific theory or field of study is wrong if they have confused 'truth' and 'thin truth', confusing science, philosophy, and religion. I'm not arguing here, just reminding everyone that the good scientist welcomes kind correction. New, important theories sometimes follow a realization of ignorance. Thermodynamics, about every ten year, I realize I don't understand at all. I then totally rebuild it in my mind, resulting in a better understanding. (About three months ago I had such an epiphany. Is 'my' classical thermodynamics, at its deepest level, a physical theory or an interpretation of a mathematical theory? Physical is winning, so far.) The point of this post is that a change of viewpoint can only occur when both people debating maintain a good, scientific philosophy.



Goodbye.

Bruce Bathurst, PhD

PS. Personal integrity, to me, means that one's conscious mind is integrated with one's ethical, unconscious mind.

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**Comment #257**

 Petrologist ([Bruce Bathurst](#))  
 Yesterday, 4:30 PM EDT  
 PM: [By the way, the terms quasi-static and reversible are certainly not synonymous].

Indeed, thanks. Such terminology has not always been presented well. Reversible paths are not possible, but reversible processes are (for we can externally guide these back). Quasi-static can move or not. Bridgman believed one could use only efficiency in classical thermodynamics, and avoid all these terms. I tried that on Carnot's cycle.

Bruce Bathurst

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#### Comment #258



Sadi-Carnot ([Libb Thims](#))

17 minutes ago

To end this discussion on a positive note, here's a nice article, which I found today, by Indian chemist [Surya Pati](#) about two weeks ago entitled "The Thermodynamics of Human Bond", wherein he uses [entropy](#) to explain human [relationships](#) as chemical reactions:

I will know **lock the thread**, so that we can all move on to something else. Enjoy!

#### Continued

â— [Moriarty-Thims debate](#) (part one)

â— [Moriarty-Thims debate](#) (part two)

#### See also

â— [Rossini debate](#)

â— [What is entropy debate](#)

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