



## How to Get More Energy - Emerson & Entropy

By JOHN BICKART, Ph.D. | **Science Education and Spiritual Transformation** / Chapter 4:  
**Thermodynamics**

Wouldn't you like to have more energy on those tough days? Isn't it true that we all need a psychological boost now and then? Listen carefully to the end of this essay for an implied recommendation that Emerson made in the 1800's, as the brand-new concept of ENTROPY was introduced to science. Although Physics states that physical energy can neither be created nor destroyed, Emerson gives us a way to get more non-physical energy by the spiritual act of being creative in your own human thought.

*From an Oration delivered before the Society of the Adelpi, in Waterville College, Maine, August 11, 1841 ...*

"I do not wish to look with sour aspect at the industrious manufacturing village, or the mart of commerce. I love the music of the water-wheel; I value the railway; I feel the pride which the sight of a ship inspires; I look on trade and every mechanical craft as education also. But let me discriminate what is precious herein. There is in each of these works an act of invention, an intellectual step, or short series of steps taken; that act or step is the spiritual act; all the rest is mere repetition of the same a thousand times." - **Ralph Waldo Emerson**

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I'm a teacher. What do I know? I teach science, so I guess you could say that I am a student of science. But

does that qualify me to question science? You bet!

A real science teacher portrays the subject matter of the course being taught as living questions and the stuff of wonder. A real teacher makes the student feel like every fact is allowed to be challenged, overthrown, or updated. A classroom is a place where there could be a knocking at the door at any moment. The classroom is a courtroom, and science is on trial! Someone - maybe a student already in the room - could stand up in the next instant and shout, "I object!"

Take the 1st and 2nd Laws of Thermodynamics.

### **Does Thermodynamics need Revision?**

Come into my classroom and see how we questioned the 1st and 2nd laws of Thermodynamics ...

I started by requesting that the class, "Look for anything in need of revision regarding thermodynamics. I stressed that we, of course needed to understand it fully, if we were to challenge it." We displayed the laws on the white board as follows.

#### **The First Law of Thermodynamics:**

*When heat flows to or from a system, the system gains or loses an amount of energy equal to the amount of heat transferred.*

(in simpler terms)

**HEAT LOST = HEAT GAINED**

#### **The Second Law of Thermodynamics:**

*Heat never flows from a cold object to a hot object.*

(in slightly simpler terms)

## **HEAT NEVER FLOWS FROM COLD TO HOT**

"Is everyone with it?" So far, so good. "Now, I will get to *ENTROPY!* This is where I start to have problems. See if you like this next part or not." The students love that they sit in judgement on the world that has been given to them (thrown at them). They love to challenge the existing, established, authoritative, traditional, LAWS (especially, incarcerated individuals, wounded emerging adults, and 7th graders). Ok class, "I'll first state what the current scientific laws are. Then, I will state quite honestly where I have a problem. See if you find issue with any of this." They are intent, quiet, and already piqued. Now, we project again onto the white board.

### **Entropy ... the amount of disorder in a system.**

Entropy comes from putting Laws 1 and 2 together ...

**The 1st Law** says that all of the heat that leaves one area goes to another area. This is basically ...

### THE LAW OF CONSERVATION OF ENERGY

**["energy can neither be created nor destroyed - only converted from one form of energy to another"]**

This is like saying that the whole universe is a big mixing bowl, and you are just pushing the ingredients around. Nothing enters or leaves the bowl.

**The 2nd Law** says that heat flow is only one way: high to low.

"So, do you see, my friends, what is implied here? That, if you blend all of the heat exchange in the universe,

according to entropy, all objects just find an average temperature. But wait - there is more - entropy applies to more than heat.

Follow this train of thought (it's a logical syllogism).

- Since, according to entropy, the hot objects are getting colder...
- And since, heat is a form of energy...
- And since, all forms of energy can turn into each other...
- Then, according to entropy, ALL ENERGY in the universe is cooling off and running down!"

[dramatic pause]

"So, the point is that this thing we call entropy - *if the universe has it* - means that everything is running down, turning off, falling apart, and stopping. Entropy means less order: waterfalls falling, stars cooling, and structures failing and falling.

So here's a question. Does nothing go uphill? What about art - or dreams of beauty? Is no worldly thing singing, loving, becoming ordered, improving, or getting better? ***Is everything approaching some average?***"

I look around the room. It's quiet - almost a *stunned* kind of quiet.

**So, what's the problem?**

I take the quiet as a compliment and a license to go on. I tell the class, "I think that I understand the laws of thermodynamics and the concept of entropy when I observe the *physical world* [sarcastic inflection]." The students show acknowledgement and approval of my

sarcasm. "After all, clocks do unwind, batteries run down, and fires burn out. Heck, our entire psychological sense of time is based on watching entropy. We know time has passed when we see rocks roll downhill or a glass fall and break. Have you ever watched a video run backward?" Some chuckles. "So, my friends, I just have just one ... just a single, very large, very important - at least to me ... question. **Does everything obey ENTROPY?**" I then whip out a textbook (yes, we used to read things from these paper and cardboard devices) and read the following aloud.

Paul G. Hewitt, author of the Physics textbook, *Conceptual Physics*, writes ... "Interestingly enough, the American writer Ralph Waldo Emerson, who lived during the time the second law of thermodynamics was the new science topic of the day, philosophically speculated that not everything becomes more disordered with time and cited the example of human thought. Ideas about the nature of things grow increasingly refined and better organized as they pass through the minds of succeeding generations. Human thought is evolving toward order." (Hewitt, 2002, p. 356)

"By the permanence of Nature, minds are trained alike, and made intelligible to each other. In our condition are the roots of language and communication, and these instructions we never exhaust." (Emerson, 1909, *Education. An Essay*)

"So, class, this got me to thinking ... When Emerson mentions human thought and ideas, he is talking about things that are *not physical* [inflection again, but not sarcastic ... more like mysterious]. They come from consciousness. And science has not addressed consciousness almost at all, historically. So, I put it to you

class - you be the judge and jury. If the laws of thermodynamics and the concept of entropy only apply to the physical world, then what of the non-physical world? What about non-physical entities like ideas and thought and beauty and love? Is there a science of that world? Are these spiritual things? Do they have a science?"

I'm on a roll. There is palpable momentum in the air. I slightly increase both the pace and the volume of my voice, "Science right now keeps these worlds separate. But some are saying that quantum research may be suggesting that human consciousness can overlap - affect - influence - change - the physical world. If this is true, then I have some questions.

**QUESTION 1:**

*If the ideas Emerson speaks of do 'pass through the minds of succeeding generations', could they pass indirectly, through what he has called in other writings 'a universal mind'?*

*... and another question is ...*

**QUESTION 2:**

*Does any quantum research imply that I could do a quantum physical experiment where I could affect some object using only my consciousness?*

*... and lastly ...*

**QUESTION 3:**

*If there is a universal mind, and if it is non-physical, and if it can cause order in the physical world, then can energy come into the physical world from the non-physical world - in other words ...*

***can ingredients get into or out of that mixing***

***bowl that current science calls 'the universe'?"***

I have seen many classes over the last fifty years - from 3rd grade to adults in the US prisons - stopped in their tracks by such a courtroom trial. One time, a supervisor evaluating me as a new teacher to his school, found himself running to the internet to research what I was talking about. He queried relationships among thermodynamics, entropy, and quantum mechanics (with very profitable results). As for me, whether the physical universe is an open or closed system is a living question I have had all of my life. Long before I read about thermodynamics, or even heard about quantum research, I wondered about these questions.

Passing living questions and real wonder on to students is one the best parts of my job.

So, I end the class with an even grander dramatic flair. "I hope you realize my friends, that I am the prosecuting attorney and the defending attorney, but I am also the judge and jury. My closing argument therefore is ... for now, **THE JURY IS OUT!**" I mimic slamming a gavel onto the bench, which is what the judge would do, but I have apparently switched characters back to the prosecution and I quietly start, "Therefore, may it please the court - *or even if it may not please the court,*" and finally I raise my voice to a shout, "**I object to the 1st and 2nd Laws of Thermodynamics and the resulting concept of Entropy!**" I smile, lift my shoulders, and raise my hands with my palms up and softly admit to the class, "I need more evidence. I am simply not convinced."

And with this drama the students smile and enjoy and perhaps even relish the study of science. It becomes meaningful, exciting, and completely wide open. And I

ferverently hope that it entices some of them to become  
searchers of truth.

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*“Hold fast to your dreams, for without them life is a broken  
winged bird that cannot fly.” - Langston Hughes*

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### **Entropy 1**

a dream of beauty  
may be enough  
halting entropy  
ordering stuff

a sense of awe  
might bring some near  
allowing attention  
lingering here

and fixing thought  
on a worldly thing  
directing matter  
letting it sing

adoration  
must cause art  
which otherwise  
might fall apart

and love, sweet love  
powers plan  
that evolution  
pulls from man



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## #7 *The Robin and the Girl*



*A mother robin flew onto the shoulder of a young girl and exclaimed that her nest was ready for Spring. "We robins build nests in the way it has been done for generations as far back as our stories remember. But alas, it will come apart in Winter as all things eventually come apart in time and must start over at the beginning." "Not all things," said the girl. "Although nests and objects fall apart, if we learn from our mistakes, our understanding does not have to go back to the beginning."*

**IDEAS COME TOGETHER WHILE MATTER FALLS APART**

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### References

- Hewitt, P. G. (2002). *Practicing physics : conceptual physics, ninth edition*. San Francisco: Addison-Wesley.
- Emerson, Ralph Waldo (1909). *Education. (An Essay)*. Kindle Edition.