Information theory and Physics do not admit evolution as science.

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In discussing whether there is a conflict between physics and evolution, it is worthwhile to consider the example of Erwin Schrodinger and his book, *What is Life?*, published in 1944 before the importance of DNA was understood. Schrodinger was very clear about his reason for publishing; on page 4 he says "The obvious inability of present-day physics and chemistry to account for [the events that take place within a living organism] is no reason at all for doubting that they can be accounted for by these sciences."[1] Within the course of the book, he "invented" a long complex molecule present within each cell, which is ultimately responsible for operation of the cell and for the hereditary mechanism. In his chapter on "Order, Disorder and Entropy" he again stated that his only motive for writing the book was to show that "[L]iving matter, while not eluding the 'laws of physics' as established up to date, is likely to involve 'other laws of physics' hitherto unknown, which, however, once they have been revealed, will form just as integral a part of this science as the former." Nine years later Watson and Crick discovered the structure of DNA and today the entire human genome has been decoded.

Not only has physical science proved capable of understanding the living cell, the same understanding has led to the understanding of evolution. Although "creation scientists" would have us believe that evolution somehow eludes the laws of physics, they have no evidence and can only point to processes as yet unexplained. G. Ledyard Stebbins, one of the architects of modern evolutionary theory, lists the evolution of life, humans, distinct cell nuclei, multicellular animals, arthropods, vertebrates, warm-blooded birds and mammals, woody tissue in plant stems, and flowering plants all as requiring new laws or generalizations beyond the bounds of physics [2], but there's no reason to suspect that any of these phenomena <u>violate</u> physical law.

When Charles Darwin's *The Origin of Species* was published in 1859, the atomic nature of matter was not sufficiently developed to permit explanation of the necessary hereditary mechanism. Now we understand how genetic insertions, shuffling, and mutations allow increases in information storage capacity, "irreducible complexities," new species and genera, all without the necessity for "macromutations" demanded by the creationists. Far from there being a violation, the physical sciences contribute to the rapid growth of evolutionary understanding.

Also, in Darwin's time there was no accurate way to find the age of the earth. The discovery of radioactivity at the end of the nineteenth century and the development of radioactive dating revealed that the earth was indeed old enough for evolution of species to have occurred. Again the science of physics <u>removed</u> doubts about the possibility of evolution.

Creationists have long claimed evolution to be physically impossible because it would violate the Second Law of Thermodynamics. Thus in 1975 Henry Morris wrote that "If the entropy principle is

really a universal law, then evolution must be impossible.[3]" There is indeed one way of framing the Second Law in the form of an impossibility statement, but it refers to what is impossible in a system which transfers neither energy nor matter with its environment. Since Earth receives huge quantities of energy from the sun, and radiates an equal amount into the darkness of space, the impossibility doesn't apply to biological evolution. Their reasoning has been shown to be false so many times that in recent years the creationists have moderated their impossibility claim; they now allow that small amounts of evolution are indeed possible in the form of microevolution, but evolution of new "kinds" (macroevolution) is claimed to be impossible because it would supposedly require large mutations, which are indeed almost always harmful. G. Ledyard Stebbins tells us the consensus among modern evolutionists is that higher-level organisms arise through the same kinds of processes that bring new bacteria from other bacteria [4]. Thus in granting the possibility of microevolution, the creationists have unwittingly admitted that large-scale evolution is also possible.

When CSFNM specified that Physics and Information Theory were to be discussed in the same essay, they opened the door to confusion rather than clarification. Both disciplines use the terms *information* and *entropy* but with different meanings. Thus the physical entropy of thermodynamics is measured in calories per degree of temperature (freezing one gram of water into those beautifully ordered snowflakes requires extraction of 80 calories at 273 degrees absolute for an entropy decrease of 80/273 =.293 calories/degree), but the entropy of information theory, which is mathematical and non-physical, is measured in bits per character, meaning the number of binary digits necessary to specify one symbol in a message to be communicated. There is no Second Law of Information Theory to tell us what's impossible. J. R. Pierce tells us that "[T]he literature indicates that some workers have never recovered from the confusion engendered by an early admixture of ideas concerning the entropies of physics and communication theory[5]." For an interesting picture of the confusing way creationists use the word *information*, see Dawkins[6] and an article by David Roche in the upcoming March/April issue of the *Skeptical Inquirer.* Briefly, the information of information theory can be increased by mutations and decreased by natural selection. Anything can happen. A common-sense look at the contents of the modern DNA with its nonfunctional pseudogenes, faulty duplicates, and frameshifts is obvious testimony to evolutionary origins; no information theory is required.

In summary: The physical sciences have provided an explanation of how evolution occurs, and introducing information theory into the discussion only confuses the issue.

REFERENCES (not part of word count)

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[4]. Stebbins, p.146.

[5]. Pierce, J. R., 1961. Symbols, Signals and Noise: The Nature and Process of Communication. New York, Evanston, and London; Harper and Row. p.80.

[6]. Dawkins, Richard. "The Information Challenge" <https://web.archive.org/web/20000425093806/http://www.onthenet.com.au/~stear/dawkinschallenge.htm>

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