THE SHRINKING SUN: A CREATIONIST'S PREDICTION, ITS VERIFICATION, AND THE RESULTING IMPLICATIONS FOR THEORIES OF ORIGINS

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Received 26 September, 1979

It is shown that the question: whence comes solar energy, has a connection, which might not be suspected at first, with the question of origins: did things evolve or were they created? In view of this, the fact, noticed only recently, that the sun appears to be contracting at a measurable rate, could prove to be a major scientific embarrassment for evolutionism.

Introduction

On January 25, 1977, I wrote to the editor of this journal, suggesting that (and giving reasons why) gravitational contraction of the sun was "something for creationists to look into".[1]

On June 13, 1979, a paper was presented at the meeting of the American Astronomical Society, in which the authors—John A. Eddy (visiting scientist at the Harvard-Smithsonian Center for Astrophysics) and Aram A. Boornazian (mathematician with S. Ross & Co.)—concluded that:

> "the Sun has been shrinking for a hundred years, and perhaps at least as long as 400 years", and, "The implication is that the Sun, and presumably other similar stars, could now be deriving a significant part of their energy from gravitational contraction".[2,3]

Scientific understanding of the physical universe relies heavily upon the process of studying information gained from the natural world, constructing a theoretical framework from that information, and making predictions (based on the resulting theory) that can be tested by their comparison with data to be accumulated in the future. It is by the success or failure of such comparisons that hypotheses are validated or falsified. And the recently-discovered contraction of the sun allows for just such a comparison. In this case the competing theories are seen to be evolutionism vs. creationism, which predict quite different scenarios for the history of the cosmos. These, in turn, imply totally-different constraints on the sun's composition and behavior. But to understand the connection between solar contraction and the two different models of origins, we first need a little solar history.

History

With the realization, in recent centuries, of the magnitudes of the sun's size and radiant output, natural philosophers began asking the question, "By what means could the sun produce such a vast amount of energy?" Clearly the fireplace model (picturing the sun as a huge lump of coal) would not do; recorded history is of greater duration than would have been the glowing embers. So another explanation was sought. With the advent of Newtonian mechanics, the gravitational force made its debut. And close on its heels followed the concept of potential energy due to gravitation. Along with conservation of energy, these formulations led to some new hypotheses:

One was that meteor-type material being gravitationally attracted to the sun supplied the requisite energy. The problem here, however, was that such a process would add to the total mass of the sun. Though this would amount to an imperceptible increase in the visual appearance of Old Sol, it would cause a measurable change in the length of the year (one which is not observed).

But around the year 1850, another theory based on gravitation was proposed: gravitational contraction (the sun shrinking, under its own weight)—suggested by Hermann von Helmholtz. His calculations (which involved assumptions about the solar system's origin which contemporary creationists would reject, by the way) showed that, if contraction had supplied the sun with energy, which was radiated at the present rate, the sun itself could be no more than tens of millions of years old.

Now it so happened that, at that time in history, many of those who had gained prominence in certain fields (especially geology and biology) were of the opinion that the earth was orders of magnitude older than any such figure; hence, down the drain went gravitational contraction (solely on the basis of a supposed age of the earth in billions of years)! This made for an obvious void, leaving no explanation for the sun's energy—until, about the turn of the century, radioactivity stepped onto the stage. Nuclear reactions are said to permit mass to be converted into energy (according to the famous $E = mc^2$). Though this, too, would require a change in the sun's mass, the amount of change would be so small as to cause only one-second's worth of increase in the length of the year in 15 million years (too small to be detected).

As the years went by, specific reactions were written out, whereby it was said that hydrogen in the sun fuses to become helium (the carbon and proton-proton cycles). Strong in the memory of my undergraduate days looms the content of a course I had on the subject of solar physics. The nuclear-fusion model had by then become so refined that astrophysicists claimed to understand in considerable detail just what was going on in the solar interior. That was, until last but certainly not least, entered the neutrino!

There is Nothing ν (Nu) Under the Sun!

To attempt to ascertain the conditions and reactions characterizing the solar interior in any direct way

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seemed next to impossible, since our knowledge was based solely on radiations emanating from the opaque surface of the sun (the photosphere). According to accepted models, energy from deep inside requires millions of years just to reach the surface. (From there, in contrast, electromagnetic radiations—including light—travel all the way to the earth in about 8 minutes.) But this seemingly-insurmountable hindrance to our acquisition of direct data from inside the sun was shattered by the discovery of a new particle.

The backbone of physics has been the conservation laws, of which energy, linear momentum, and angular momentum are notable varieties. Well, a certain type of radioactive disintegration, beta decay (β),[4] seemed, about 1930, to defy all three of these conservation laws. (An example of beta decay is that by which the unstable nucleus of ^{14}C changes into ^{14}N, an electron being emitted. This reaction is the one involved in carbon dating.) These observations demanded a choice: either the most basic of the conservation laws were violated by beta decay, or else an additional particle was being emitted —one with just the right properties to balance the equations. These properties included a net electrical charge of zero, and a rest mass also essentially zero (but energy and momentum not zero). For this reason, the new particle was dubbed "neutrino" (ν), which means "little neutral one". (Do not confuse this with the neutron, which, though also electrically neutral, is one of the massive components of nuclei.) An extensive theory developed for the neutrino, from which it was calculated that this particle was nearly beyond hopes of detection. For example, a neutrino has a 50-50 chance of passing through one-light-year's thickness (6 trillion miles) of lead, without reacting! Or, considering passage all the way through the earth, only one neutrino in 10 billion would fail to make it; the rest wouldn't even know the earth was there!

Such results led people to wonder whether neutrinos might forever elude efforts aimed at their detection. Detection is a formidable task, to be sure; but this worry was eliminated by 1956, when the existence of neutrino-type particles was experimentally demonstrated. In fact, it has by now been concluded that there are various types in the neutrino family, not just a singular "breed".

To get back to the question of what's happening inside the sun, neutrinos are the heroes of the plot, because the great majority of them barge right out unaffected. That they should be produced inside the sun was a requirement of the nuclear-fusion theory (which involved β-decay). So scientists constructed neutrino counters, with the expectation of chiseling in stone (i.e. proving once and for all) the validity of the nuclear fusion model, which had become by this time the universally-accepted explanation for solar energy.

Before ushering in the punch line, I should take the reader on a side excursion to deep, abandoned mines—for the sake of anyone who has read the literature, and wondered why in the world neutrino detectors should be located in such places. Given the great unlikelihood of neutrinos reacting with any detecting material (even 100,000 gallons of it), it is apparent that the number of neutrino events recorded will be very small. This means that stray background interference (such as that due to cosmic rays) would be a serious cause of error in counting neutrinos from the sun. That is, unless one's counter were shielded from these other radiations. And what better shield than a mile or more of earth? Remember that the neutrinos themselves pass through the earth like a mouse through a cat-family reunion—without stopping to say hello—so the encounter with terra firma leaves their numbers, for all practical purposes, undiminished.

The Experimental Results

So we are now caught up to the late 1960's, sitting in an underground mine, along with 600 tons of cleaning fluid for a neutrino net; and the crucial question is, "How many are we snagging?" Ah (GULP), not nearly enough![5] A number of about 4 per month (which is barely above the limit of uncertainty for the experiment) sounds scanty; but, since we expected very few reactions in the first place, the telling tale is the comparison of this rate with that predicted from the accepted model of the sun. Even so, the number falls far short (at most, 1/10 the expected number). And these could as well be coming from other cosmic sources (The counter can't be "aimed" to determine the direction of origin.). So we have facing us the experimental fact that hardly any neutrinos at all appear to be coming from the sun.

What does a scientist do when confronted by such a dilemma? First he double-checks every detail of the theory—the assumptions made, the parameters inserted —to see if something was overlooked. For more than a decade, now, the formulas have been turned upside-down (with even some attempts at bending them—as in the postulation of an unknown energy level in ^{6}Be), but still the paradox of the "missing neutrinos" remains.[6]

Call in the Shrink

What does all of this have to do with the shrinkage of the sun, anyway? To be blunt, solar contraction is the refreshing breeze that simply blows away the foggy dilemma. For, if a major part of the sun's energy does after all derive from gravitational contraction, then there need be no appreciable amount of nuclear fusions taking place within the blazing orb—hence not nearly so many neutrinos (if any at all) would be expected to come from it. That so many of the "experts" were blinded to this simple solution is itself a paradox—one which betrays a bias to be dealt with shortly. But even after a decade of confrontations with the neutrino puzzle (all of which ended in failure), solar theorists still clung to the fusion model. For example, in April, 1978, Melvin Freedman of Argonne National Laboratory stated that, "The Sun is a main-sequence star that almost certainly derives its energy from the fusion of hydrogen to produce helium and energy".[7] The rationale which Dr. Freedman gave for this conclusion (namely, the age of the sun) leads us to the heart of this discussion, which involves the report of how I, personally, came to "tune in" to the neutrino mystery.

When I first ran across a report of the missing neutrinos (shortly after Davis's discovery), the subject immediately attracted my attention—because of the contradiction it posed to the detailed, and supposedly-accurate story I had been told (in the solar physics course) about the sun. Then, in the spring of 1976, I became aware of something that I had been exposed to years before, but to which I had never quite paid attention. At the time I wasn't in search of ideas about the sun; I was just filling in the minutes between sessions of a faculty workshop at Argonne Lab, by browsing through a periodical published by their staff. It happened to contain an article about the neutrino paradox, which itself contained a brief history of theories of solar energy. And just a few words—words that I had read before, words that appear in most every basic text on astronomy—those few words in that article nearly sent me jumping out of my chair! "If gravitational contraction were the power source, the sun could only last about 50 million years: the sun's age is over 100 times that."[7] I thought to myself, "Hogwash! Is that the *only* reason why they discounted gravitational contraction??" For by this time I had done considerable study on the scientific evidence bearing on the age of the earth, solar system, etc.; and I had come to realize that the compelling force for the acceptance of vast ages was merely a faith in evolutionism, which itself has no evidential leg to stand on. (I assume that the readers of this journal are not so naive as to think that radiometric dating proves the earth to be billions of years old.[8-11]) To me, the answer to the paradox was obvious: The scientific measurements discredited the nuclear-fusion model of the sun; but that was no problem, because its predecessor had been scrapped because of a scientifically-unsupportable predisposition to believe in what I call the "billion-year myth". As far as data are concerned, gravitational contraction has been alive and well since the time of Helmholtz. And it was that conclusion which I communicated to Professor Armstrong in January, 1977.

At the time, I had no hopes at all of any contraction being measured directly. I supposed that the amount of shrinkage would be too small to be detectable during, say, an entire human lifetime. But I did wonder whether some indirect link might be found that could decide whether contraction might be the key to the sun's energy after all. Needless to say, my reading (in the summer of 1979) of Dr. Eddy's data and conclusions set me to talking to myself (in elated bewilderment) for an entire afternoon.

Summary

There are still other surprises to be told about the sun; but in conclusion of this article, an important point must not be passed over. First of all, theories of origins, by their very nature, cannot be labelled as "scientific";[12] but conclusions drawn from them can be tested against scientific data. Thus the credibility of a theory of origins depends crucially upon the success or failure of the predictions which derive from it. In the case at hand, evolutionism demanded a vast age for the sun, which in turn caused gravitational contraction to be ruled out as a major source of the sun's energy. On the other hand, creationism had no commitment to vast ages, hence it posed no objection to gravititational contraction. As it turns out, the contraction has actually been *observed* (the amount and character of same will be a future topic of discussion)—so, although it is a certainty that this measured contraction will be interpreted, molded, and generally tailored to fit into the vast-ages scenario (after the fact), it is clear that we have witnessed a *major scientific defeat for evolutionism*—as we have seen its vital organ (the billion-year myth) persuading astrophysicists to reject the possibility of solar contraction, even after scientific measurements (namely the neutrino count) suggested that the nuclear-fusion route was a blind alley. To sum it up: this is just one more situation in which the belief in evolutionism has proved a mental roadblock to true scientific progress!

References

[1]Personal communication to Prof. Harold Armstrong, January 25, 1977.
[2]Eddy, John A., and Aram A. Boornazian, 1979. Secular decrease in the solar diameter, 1836-1953. *Bulletin of the American Astronomical Society* 11, 437.
[3]See also GBL, 1979. Analyses of historical data suggest Sun is shrinking. *Physics Today* 32(9):17-19.
[4]Davis, Raymond, 1967. A neutrino search. *Science News* 92:332.
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[6]Kazmann, Raphael G., 1978. It's about time: 4.5 billion years. *Geotimes* 23(9):18-20.
[7]1975-76. *Spectrum* 2(1):39.
[8]Slusher, Harold S., 1973. Critique of radiometric dating. Creation-Life Publishers, San Diego.
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[10]Morris, Henry M., 1974. Scientific creationism. Creation-Life Publishers. Chapter 6.
[11]Funkhouser, John G., and John J. Naughton, 1968. Radiogenic helium and argon in ultramafic inclusions from Hawaii. *Journal of Geophysical Research* 73(14):4601-4607.
[12]Morris, *op. cit.*, p. 4.

Defence Against Thermodynamics Disproved

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Thus even the receipt of energy in the form of heat, and its subsequent giving out, cause no change in entropy, provided they be done reversibly. And, in particular, they certainly cause no decrease. Thus any appeal to open systems, as a way around the second law, is clearly useless.

References

[6]*Ibid.* pp. 210 and 211. The name "heat pump" is not used there; but the principle involved is stated: that of heating by refrigeration.
[7]*Ibid.*, pp. 141-143.

ELECTION RESULTS

In the annual election, held earlier this year, the following persons were elected to the Board of Directors for a term of three years, 1980-1982.

Harold L. Armstrong
Thomas G. Barnes
D. R. Boylan
Duane T. Gish
Emmett L. Williams
Paul A. Zimmerman