

# **OutPost on the Endless Frontier<sup>TM</sup>**

*EPRI e-News on Recent Key Developments in Energy Science and Technology*  
By Paul M. Grant

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## **Retro Chautauqua**

The summer of 1877 and the shores of Lake Chautauqua in western New York state witnessed the beginning of an uniquely American experience. An Akron, Ohio industrialist combined with a Methodist minister from Illinois to initiate a training camp for Sunday school teachers whose program blended religious beliefs with popular culture, politics and entertainment. Its methods soon became immensely popular outside the confines of purely religious instruction, and evolved into what became known as the Chautauqua Movement,<sup>1</sup> and its success quickly spawned hundreds of similar organizations throughout the United States. These “Chautauquas,” as they were subsequently called, brought together elements of both evangelistic revivalism -- religious and patriotic in tone -- with the populist entertainment of a county fair. A typical “travelling assembly” appeared in 1899 which featured William Jennings Bryan, three years after his famous “Cross of Gold” speech, as its principal inspirational speaker. As time went on, however, some Chautauqua imitations degenerated into a combination of vaudeville and patent medicine shows.

Now, one hundred years later, the summer of 1999 has seen the resurrection of the worst of such fringe Chautauquas, a “retro<sup>2</sup>” version, if you will, in the form of Dennis Lee’s traveling road show, “The Declaration of American Energy Independence,” a revelation of divine origin publicly announced through a full page advertisement in the September 17<sup>th</sup> issue of USA Today<sup>3</sup>. Unlike Bryan’s Gethsemane, his contains a cross made not of mere gold, but of energy, moreover one erected by the electric utilities, upon which the potential crucifixion of the American people is averted through salvation by Free Electricity as preached by Mr. Lee, CEO of Better World Technology and the International Tesla Electric Company.<sup>4</sup>

On the evening of October 22<sup>nd</sup>, the Free Electricity tour arrived in the San Francisco Bay Area at the Veteran’s Auditorium of the Marin Civic Center in San Rafael. Rather reluctantly, your correspondent decided to trash his usual Friday evening with family and drive the 80 miles north from his home in San Jose to take in the performance, which was to begin at 7 PM.<sup>5</sup> I arrived to find 600-700 people filling about a third of the huge auditorium, rather more than I had anticipated.<sup>6</sup> The stage was arrayed from end to end with a variety of mechanical and electrical equipment – small electrical motors, pumps, volt-amp meters (digital and analog), an oscilloscope, a small Briggs & Stratton engine, even a bicycle – the sort of stuff you’d find in the average tinkerer’s garage or basement...like mine!

Stage right and left contained a neon display in red, white and blue announcing the energy independence of America to come as well as video monitors to display close-ups of the “experiments” to be performed. At center stage was placed the largest apparatus of all, an approximately one meter diameter by half-meter wide cylinder mounted on a geared horizontal axle which might be best described as vaguely reminiscent of the rotor of a “squirrel-cage” motor,<sup>7</sup> later to be revealed as the prototype “free electricity machine.”

A few minutes past seven, after a warning to the audience not to audio/video record the proceedings (ignored by at least two individuals in the front row), Dennis Lee walked on stage to mild applause.<sup>8</sup> He has a pleasant appearance, about six feet (1.8 m) tall, noticeably in excess of 200 pounds (90 kg), with reddish-brown hair and short, trimmed beard, wearing a conservative brown business suit. His opening remarks dwelt on his intention not to belittle, demean or offend anyone’s beliefs, especially those of any scientists who might be in the audience (unfortunately, this promise was soon to be broken), and upon their conclusion, the “demonstrations” of “free” or “almost-free” energy began in earnest.

Your correspondent could quickly exhaust the reader’s patience and concentration by detailing the inconsistencies, errors and “tricks” committed and employed by Mr. Lee in the delivery of his free energy gospel, which lasted four hours with no break. Instead, we refer you to several very thorough reviews,<sup>9</sup> a few written within the last few days, which explore the physics and economics of Lee’s assertions more than you or I have time or energy to undertake for this issue of *OutPost*. Be forewarned, however, that “professional” skeptics tend to be as guilty of achieving the same scale of excessive ranting as pitchmen like Mr. Lee. The difference, of course, is that the conclusions and opinions of the former are overwhelmingly correct!

Having said all this, I just can’t resist a few personal observations and remarks on the events of last Friday evening.\*\* Sorry about that.

### ***Yull Brown’s Water Gas***

This is certainly an oldie, but goodie.<sup>10</sup> The late Prof. Brown’s “water” gas results from the electrolysis of water, so I guess you could call it water gas, sort of, but steam it ain’t. It’s a potentially dangerous mixture of H<sub>2</sub> and O<sub>2</sub>. Or, as Mr. Lee states, “It’s taking H<sub>2</sub>O into H-O-H” (hmm...there’s an O missing somewhere...oh well). At least he didn’t say rocket fuel. Brown’s gas can be readily used in a welding torch, and you can indeed “burn” it in an infernal (Mr. Lee’s term) combustion engine. In fact, Dennis Lee demonstrated the truth of both these facts before our very eyes. He had a little trouble with his two-cycle, one cylinder B&S engine, though. It sputtered on every occasion it was started, three or four times in a row. The last time I detected four or five explosions (sorry, implosions...again Lee’s term) before it began to die, whereupon Lee declared to his assistants, “That’s enough, boys,” saying that the difficulty was due to the engine having previously run on gasoline. Oh, I almost forgot. At many cities along the tour, he

was prevented from performing the Brown's gas demo by the local fire department, but hey, after all we were here in Marin County tonight! A little California inside joke, there.

### ***Motor With a Brain***

After cavorting about briefly in the manner of Oz' Scarecrow, Lee exclaimed that the reason electric motors were so inefficient was, that like Ray Bolger's character, they "needed a brain." You power engineers listen up, now. Upon attaching a black box to an induction motor-generator powering an incandescent lamp, it was noted the overall current drawn was less. Gee, isn't this called resonant reactive compensation of power factor lag? I sure hope all EPRI members provide this service for their large industrial customers or you might lose some business to the International Tesla Electric Company, given deregulation.

### ***Who Needs the Grid?***

Speaking of Tesla, the Serbian-American pioneer of the polyphase ac system has been adopted as Mr. Lee's hero and model inventor whose best ideas were either stolen or suppressed. Nikola Tesla was indeed a genius, but one who unfortunately did not age well.<sup>11</sup> One of the most fascinating of human beings, Tesla in his later years became convinced that he could build a wireless power transmission system (and death ray to boot) based upon high frequency combined with high power which reminds one superficially of modern experiments with microwave beaming. Tesla was always vague in describing his concepts, but most seem to have been based on variations of the "Tesla coil" linked to what he felt were huge charge reservoirs contained in the ionosphere and earth. He had always been attracted to high frequency effects, having as a younger man performed spectacular stage stunts such as subjecting his body to tens of thousands of volts at hundreds of thousands of hertz as part of his ongoing conflict with Edison over the safety of alternating current (at the very high frequencies Tesla employed, the current produced flowed harmlessly over the surface of his skin, nonetheless yielding startling Frankenstein-like arcing and hair-erection effects).

Dennis Lee performed a trick far less stupendous, but still impressive to the uninitiated, by passing miniscule high frequency currents through the air and/or floor between an assistant connected to a Tesla coil or similar device, and a circular fluorescent tube held by himself some three meters away, which became weakly illuminated when touched. In fact, I do believe there was a single wire running between the two gentlemen that would have additionally augmented the effect. Using neon glow bulbs, a spark coil and an rf oscillator, my father and I pulled off this stunt for the neighbors – no wires, either – when I was about ten or eleven years old.

### *The “Why” in Y2K*

Just like you and I, Dennis Lee has his own theories and approaches to Y2K. With respect to the latter, he pointed out a table lamp with a suspiciously large base that he had lit at the start of the show. Hinting darkly at some underlying conspiracy, which was soon to be revealed, Mr. Lee predicted most assuredly the lights would indeed go off a few seconds after midnight, December 31<sup>st</sup>, next. But, not to worry, his “Y2K lamp” would remain on to illuminate your way to bed or barn for the evening milking, as an assistant promptly demonstrated by yanking the cord from an adjoining socket. One can seldom be sure without direct and unfettered examination, to my knowledge never permitted with any of Mr. Lee’s onstage apparatus, but I think it’s a safe bet to assume somewhere in the voluminous base laid a modern storage battery and ballast cell to power the kind of efficient “tungsten-hued” fluorescent lamp utilities generally make available at cost to customers under their demand-side management offerings.

What was perhaps more intriguing was Mr. Lee’s theory behind Y2K...the “why” in Y2K, if you will. It seems there should be no significant interruption of power under any circumstances because all utilities have “equivalent standby generation capacity.” Those of you operating nuclear facilities will be interested to know that. It is therefore obvious, to Mr. Lee anyway, that the utilities are conniving with the government to precipitate a crisis on 1 January and beyond that will require federalizing the various state National Guard units to keep order and prevent looting. Oh, incidentally, they’ll also confiscate your guns to be on the safe side. No, I’m not kidding.<sup>12</sup>

### *Gilbert 1, Newton 0*

A large portion of Dennis Lee’s free energy repertoire depends on tapping into the “stored energy” of a permanent magnet, of course, without reducing the magnitude of the magnetization, and the superior nature of the magnetic field over gravity.<sup>13</sup> To demonstrate his point, he dropped a magnet (a small one, probably of the “refrigerator stick-up” variety) between outstretched hands a meter apart and then through a hollow aluminum tube of roughly equivalent length. In both cases, the magnet fell as Galileo would have had it. Then one of his assistants brought out a “special” magnet, considerably bigger but still less than the 4 cm inside diameter of the aluminum (and copper) tubes employed, touted as being able to “partially” defeat gravity. Outside the tube, the magnet fell once more just as the Founder of Physics would predict, but inside it fell ever so slowly...Lee counting “one thousand, two thousand,...” until at “six” the magnet finally emerged at the bottom of the tube. The experiment was repeated several times to thunderous applause, once with a video camera observing its descent to prove “no strings were attached.”

OK. In almost every high school physics class today, this experiment is used to demonstrate simultaneously Lenz’ Law and eddy current production. The dipole field of the falling magnet, usually made from a high permeability alloy like SmCo or NdFeB such as used in your Walkman headset, induces an electric current in the wall of the

metal pipe which in turn produces a magnetic field opposite to that of the magnet itself thus slowing its fall. This effect is often called “eddy current damping” and has been used to seismically stabilize sensitive instrumentation.

But it wasn't over yet. There was a new surprise. Room temperature superconductivity, right up my alley, never before demonstrated on the tour. Lee railed against the physicists who claimed the “Meissner Effect (sic)” was necessary for magnetism to ultimately defeat gravity, and ridiculed those “silly demonstrations” of the 1980s where physicists poured liquid nitrogen over black pellets to make little magnets levitate. At this point, I admit I slunk slightly lower in my seat looking nervously around me hoping I wouldn't be recognized from several TV appearances of the past where I had engaged in just such foolishness. According to Dennis Lee, all this was totally unnecessary, one could produce “room temperature superconductivity” simply by the proper juxtaposition of two permanent magnets. Now he did admit they hadn't things quite right yet, but they were close...close enough, that he was willing to show a video of their progress and that by the time they reached Dallas or Atlanta, they'd have gotten it.

When I saw what they had done, I could hardly contain myself. The video showed a short cylindrical magnet “hovering” above what appeared to be two considerably longer bar magnets. The difficulty they encountered was that the “levitated” magnet tended to slip off the side and fall away. It is well known that you cannot achieve a stable static positional state between two magnetic dipoles in repulsive superposition. This is called the “Earnshaw instability.”<sup>14</sup> There are some clever ways around it. For example, one can connect as the bottom magnet an electromagnetic coil fed by a servo loop controlled by a magnetic field sensor placed between it and the to be levitated magnet, but it's clear Mr. Lee and his associates haven't figured it out yet. Maybe someone should send him a copy of this *OutPost*.

### ***The Free Electricity Republic***

I will forego anything substantial to say about operation of the Free Electricity Machine, Lee's “Fourth Law of Motion,” the use of “reaction” and what appeared to be the prospect of 400% (!) efficiency, except to mention it wasn't demonstrated, only promised, and for a price. Nor will I talk about his “shadow” billion dollar investor, and the Israeli offer to electrify that country for free electricity, the 10 MW “Powerwagons” on 18-wheeler flatbeds (Mr. Lee cracked, “The utilities always talk about wheeling power. We're really going to do it.” I don't think the audience got it.). I mean, talk about distributed generation...and for free! The reader can refer to the hyperlinks of Ref. 9 for all the gory details.

However, it was quite interesting that his buy-in conditions are slightly different for California than the rest of the nation inasmuch as Mr. Lee suffered two years incarceration in a state institution here in the early 90s for alleged questionable business practices and the experience seems to have made him more cautious on this visit. What you are given is the opportunity to sign a \$200 dollar pledge which reads as follows:

The offeree of this Pledge, through a community cooperative effort, *may* (italics mine) be entitled to receive free energy up to 15 kilowatts per hour & be a partaker in proclaiming the love of God to the ends of the earth, for as long as revenues are generated by selling energy as a commodity. Twenty percent 20 % of the total income will be used to restore family values in America; to feed the hungry, clothe the naked, take care of widows and orphans; to finance the restoration of a Constitutional government in these united states (*sic*), and to administrate this Pledge Program.<sup>15</sup>

By now I had some difficulty figuring out how you could generate revenue from a “free” commodity, but after four hours my eyes were glazed over, my cognitive senses dulled and my bladder full.<sup>16</sup> Next week the Declaration of American Energy Independence tour will swing back east with thirteen more cities to visit before the grand finale in Philadelphia on November 10<sup>th</sup>. Maybe one of them will be your burg. If so, please drop in (you’ll need an admission slip obtainable from the International Tesla Electric Company web site), take notes on this point, and then give me a call and explain it.

Lastly, we should note that Mr. Lee announced his first Free Electricity Machine will be installed in the house of one of his community cooperative members next March and that anyone who wants can visit, switch lights on and off, and observe which way the utility electric meter is spinning. That is, if any of us can leave home given that by that time we will no longer have any guns to fight off the National Guard sentry on our doorstep.

### ***Denouement***

Godliness and suspicion of government and large institutions are admirable American qualities when exercised in moderation. When combined with pseudoscience, intolerance and demagoguery, they become self-defeating and a threat to intelligent decision-making within our democracy. Yet we are a free people with universal suffrage, so we must stand by our beliefs and take our chances. Mr. Lee likes to remind his audience that by offering the energy deliverance of man, he intends taking back the government of these United States “for and by the people.” He would do well to recall another of Abraham Lincoln’s most wise admonitions, one which will most assuredly lead to his eventual downfall, “...you cannot fool all of the people all of the time.”

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### ***References and Footnotes***

\*\**Late Breaking News*: Check out Leander Kahney’s article, “One Man’s Power Game,” on the Wired Wire Service website, <http://www.wired.com/news/technology/0,1282,32085-1,00.html>. See also the article in

The Commercial Appeal, Memphis, on the temporary injunction request by the State of Tennessee enjoining sales of cooperative memberships by the International Tesla Electric Company available for \$1.95 at <http://www.gomemphis.com>.

<sup>1</sup>The Chautauqua Movement is credited with bringing culture and the arts to the American hinterland as the Frontier closed at the end of the 19<sup>th</sup> Century. The travelling component pretty much died out by the 1920s as a result of improved transportation, communication and entertainment technology. A number of Chautauqua centers still exist, and seven sitting Presidents have addressed their assemblies, beginning with Ulysses S. Grant (a distant relative) and most recently Bill Clinton who used one to rehearse for the debates of the 1996 Presidential Campaign. Visit <http://www.infoplease.com/ce5/CE010374.html>. On a more personal note, the Chautauquas were the inspiration for the sales and marketing recognition events initiated by Thomas J. Watson in 1914 when he founded IBM. I was fortunate to have been invited to address several of these gatherings on the topic of superconductivity. Wherever they are held, the meeting room is still referred to as The Main Tent, even if the setting is in the most plush auditorium provided by a five-star luxury hotel in Cancun.

<sup>2</sup>Retro – a term defining a fashion and design trend of recent years attempt to revive classic creations of the past, for example, “retro” was the inspiration for the shape of the new Volkswagen Beetle. Often, as is the case with respect to the Chautauqua Movement and Dennis Lee’s tour, the imitation is but a vulgarization of the past.

<sup>3</sup>USA Today, Friday, September 17<sup>th</sup>, 1999, p. 15A.

<sup>4</sup>Relavent web sites: <http://www.ucsofa.com/>; <http://www.teslaelectric.com/>.

<sup>5</sup>If truth be known, I have an older daughter, Deborah, a member of an interior design firm with offices in Sausalito, a few miles from San Rafael, whom I had not seen for several months. I called up Debbie, who’s single, and coerced her into a date with her father with the promise of an unusual evening’s entertainment followed by dinner. We didn’t get to dinner until half past midnight in San Francisco.

<sup>6</sup>Debbie, because she’s an artist, naturally has a much deeper perception of people’s “body language,” clothes style and behavior patterns than her physicist father, remarked immediately on entering the lobby of the Marin Veteran’s Center, “Dad, half this crowd are RV-ers, and the other half Marin/Berkeley refugees from the 60s. Some of them look like they just took a bus from Telegraph Ave.” That wasn’t all. After the sales pitch some four hours later, she said, “He’s got to be nuts. He’d make more money selling Free Electricity tee shirts.” Now, there’s an idea.

<sup>7</sup>I believe my description of the Free Electricity Machine is somewhat more charitable than that of a reporter for the Akron Beacon Journal who wrote, “It resembled a portable toilet on a trailer on a hitch.” A pdf copy of the Beacon Journal article is available from *OutPost* on request.

<sup>8</sup>The applause grew more pervasive as the evening proceeded, especially when Mr. Lee referred to the supernatural inspiration for his agenda and/or exposed the sinister motives of the electric utilities and the oil companies. It was clear some of the audience around us were Dennis Lee groupies from their comments on the show the night before in Reno and their expectations of the one to come Saturday in Fresno. Remember the “perpetual automobile” in the opening of *OutPost 10*, “*Too Good to Be True?*” Before Lee began to speak, almost the same story was being told by the guy in front of me to his neighbor, only this time it was General Motors and just the carburetor needed to be returned, not the whole car. Some things never change.

<sup>9</sup>Perhaps the most thorough and complete website chronicling the escapades of Dennis Lee is that maintained by Eric Krieg (<http://www.voicenet.com/~eric/dennis.html>), whose “day job” is as a self-employed electrical engineering software consultant. His personal web page is at <http://www.syc.org/e/> (see also <http://www.syc.org/e/skeptic/>). One of the refreshing aspects of Eric (whom I’ve not yet met personally) is that he does not seem to take himself as seriously as some other skeptics I have run into. The web site containing the most recent review of the “physics” of Dennis Lee, by a retired high school physics teacher (and one which saves me a lot of personal effort otherwise), is at <http://www.phact.org/e/z/leelee.htm>. One very pertinent enclosure on this page is a reprint of an article in the Yakima Herald Republic from Lee’s hometown on October 15<sup>th</sup>. It can be found near the end of this site or at [http://www.yakima-herald.com/cgi-bin/liveique.acgi\\$rec=7745?home](http://www.yakima-herald.com/cgi-bin/liveique.acgi$rec=7745?home). ***It is the only report I’m aware of to date that includes an interview with two former Lee acolytes, one an engineer who worked for him and the other a Better World Technology dealer, containing their respective recantations.***

<sup>10</sup>Go to <http://www.phact.org/e/bgases.htm>.

<sup>11</sup>It is difficult to find an unbiased account of Tesla’s life and work. The best I’ve run across is “Prodigal Genius: The Life of Nikola Tesla, Inventor Extraordinary,” by John J. O’Neill, first printed privately but now available from Brotherhood of Life publishers, ISBN 0-914732-33-1 (I got my copy at a little shop in the Haight-Ashbury). The author is obviously a great fan of the Serb engineer and explores deeply the esthete nature of the man, at the same reserving the appropriate caution about Tesla’s more extreme scientific claims. A good read.

<sup>12</sup>Those of you who bought EPRI’s Y2K target I’m sure will not be amused. Before I forget, Mr. Lee went on to explain the argument of the anti-gun lobby that you don’t need an AK-47 to kill deer, albeit jokingly admitting he knew some hunters who did. No, the reason one needed an AK-47 was that the First Amendment guaranteed the populace the right to outgun the military, this being the only way to assure freedom throughout the Republic. Let’s see...I don’t think he’s sought to purchase a nuclear weapon...yet. If the reader is interested in such issues, I recommend a thoughtful article published this past September on the “keep and bear arms” aspect of the First Amendment in the British magazine, *The Economist* (but of course no view from the Brits on Yank guns can ever

be trusted due to 1776 and all that). The article, “Guns in America: Arms and the Man,” appeared in the July 3<sup>rd</sup> issue, v. 352, p. 17.

<sup>13</sup>On several occasions Mr. Lee remarked, “No physicist understands gravity. Just ask one.” True, we have not yet unified the gravitational field with those derived from the strong and electro-weak forces. Notwithstanding that, I think we have a pretty good handle on the statics and dynamics of gravity in the realm of engineering and even astrophysical usefulness, so this physicist is not too concerned about his current ignorance.

<sup>14</sup>Earnshaw’s Theorem and its consequences are well described in a delightful little book I reviewed for Nature several years ago. It’s called “Driving Force: The Natural Magic of Magnets,” by James D. Livingston, ISBN 0-674-21544-X. My review, “Fields of Influence,” can be found in Nature, Vol. 380, 25 April 1996, p. 679 and on Amazon.com. Incidentally, the reason you can stably levitate a permanent magnet over a high temperature superconductor, or any type II superconductor, has little to do with the Meissner Effect. It occurs because the field from the magnet becomes “trapped” in the superconductor and cannot move without application of force, a unique property of a superconductor in the mixed state.

<sup>15</sup>A pdf copy of this pledge and other contractual material may be obtained from *OutPost* on request.

<sup>16</sup>As my daughter and I left with Dennis Lee still carrying forth answering questions from potential prospects, we ran into a camera crew sent over by a local TV station. The two ladies comprising it seemed a little concerned about the demonstrated animosity by Lee’s supporters to their presence. I wanted to stay and observe their attempted interview of Lee, but Debbie would have none of it. Anyway, by this time the two reporters were in the presence of a couple of Lawrence Livermore National Laboratory physicists much larger and younger than I. The following day one of them called me saying they had been unsuccessful in getting Lee on camera.

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