

Truth-Driven ThinkingSM

Excerpted Podcast Transcript

June 14, 2006

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Questions about Ethanol - Dr. David Pimentel of Cornell

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Truth-Driven Thinking for Wednesday, June 14th 2006. Question about Ethanol with Dr. David Pimentel.

Welcome to Truth Driven Thinking where we do focus on two main questions; what do we know that just isn't so as estimated by science, reason and evidence, and what's the harm in taking action, based upon certain emotion driven conclusions if in fact they are not true. I am Steven Gibson. I am glad you are here with the chorus of support and government investment in Production Capacity and Distribution Systems for Ethanol. Today's guest just might be telling us, "Not so fast." So stay tuned for an interview with Cornell College's Dr. David Pimentel.

Now, before we get to our interview, a couple of feedback and news items for this week. Had an email yesterday, Tuesday with a -- from a gentleman with an interesting point -- Jerry, who said, "While listening to your audio book, you made the statement that parents would be better off protecting their children with bike helmets, than by worrying about abductions. Mandatory bike helmet use has been a contention with me, because I have never seen any statistics supporting their efficacy. I feel there is more monetary motivation here, for instance, by the bike equipment manufacturers than truth. After some online research, I found my position seems to be supported, even to the point -- of hints that bike helmets may be bad, by increasing the torsional forces on the head during an accident. I would suggest, it might be helpful to investigate this matter" -- and he provides a Wikipedia link on bike helmets as well as another interesting link. So, interesting, yes, Jerry is correct that in my conversation with Dr. Barry Glassner, we were talking about relative risks and that may just be a bad example to use. But interesting, if any of you happens to have knowledge on this topic, I'd be curious. Thanks for the feedback, Jerry. Absolutely, this is what its all about. Just because we say something doesn't make it true. Unfortunately, I wish it did.

Just an article I wanted to pass along too from Reuters in London; "Hopes or Fears" by Tim Castle. This was dated May 8th, but in case you didn't see it, it turns out that UK has investigated UFOs and determined that they have been caused by natural forces, not aliens, so that if you were hoping for a confirmation from London, you have not yet gotten it, but there is always new evidence available to us tomorrow, right?

I just caught an article recently as well from, this one was from, about a book by James Doyle, a Boston Defense Attorney who wrote "True Witness: Cops, Court, Science and the Battle for Misidentification", published last year. Basically this attorney says, he has compiled the evidence in 20-25% of witnesses, ID innocent people in lineups. You know, when it comes to science and reason, this is one that's kind of always been in the back of my mind -- just as an example of real life situations. Also, critical thinking skills affect your jury if you are ever unfortunate enough to be on trial, but some interesting ways that cognitive illusions and truth play out in life.

You know, if you will forgive me a few short moments before we get to our interview too; I wanted to note again that disclaimer time here again; but that I am biased and emotion driven like the rest of us and that, as I covered in my introductory episode, this is not a forum where we are even attempting balance. Nor frankly, do I invite people on this show to hammer them. And I guess this thought's in response a little bit to a couple of other criticisms, which are valid, but I am kind of, wanting to explain a little further. Rather, our goal here is to make a point about how capable we are of self-affirming, self-validating, emotion driven conclusions that are at odds with the evidence, the science and the reason. So, I am promoting and presenting examples; just for the record here. Intellectually honest inquiry that are significantly at odds with conventional wisdom; that's kind of my usual tactic -- to make us think before we act upon conventional wisdom, assuming its true. And you know, also hopefully to make us all pause and say, "Hey is it possible that my 100% complete confidence that I know complete and total truth on this issue is at least partially influenced by my ego, by needs to rationalize what I already think I know." But again you are participating in a real, non-academic guy's journey of exploring life and realizing that everything I was so confident about is far less black and white than I thought.

So, that said, as you go back through episodes, and future episodes here, please keep in mind that I may in fact advocate a guest's position, I will not be hammering them, I am open to new information and certainly realize my guests could be totally wrong -- as could I. So, the point is, its called Truth Driven Thinking; its not, this is truth with Steve Gibson; its not, I know truth and you are wrong; its not, truth can be known if you listen to this show.

Truth Driven Thinking is here to say, "Hey, check this out, here is a reasoned view point supported by science, data or logic that is on odds with what I thought I knew or what I used to think I knew." So, the couple of posts for instance, there are some posts that took me to task for my interview with Ron Bailey on environmental views. But let me be clear -- by the way, in response to those, and I think the transcript shows this anyway, but I think the evidence is clear that the globe is warming. I don't think anybody said it wasn't. I think the evidence substantially indicates that this is to a significant degree due to human activity including the burning of fossil fuels and I also think that it still remains a complex issue. And for those who are offended by what I think was certainly an intellectually honest approach from Ron Bailey. You know, I think sometimes you need to do a gut checking, your own on those. I wish very much to have you join the conversation and give me feedback on my sharing of this personal journey. So anytime, leave me a nice well-reasoned friendly, but factually critical voice graffiti message at 888-247-2103 and I will put it on.

House-keeping items real quickly. Transcribed reports; I apologize there are still just two on my website. It appears that the sweatshop labor that I am using for these things is not as reliable as I hoped. So, I am looking for new transcription options. Again, do appreciate even those negative comments, as well as those who have taken time to post positive comments and reviews at iTunes. Please continue to do that; visit our store at truthdriventhinking.com or you can support us with a small donation or by purchasing one of our four or five items that we have available for you to help support Truth Driven Thinking.

Now, next week, we have a very interesting guest that just when you thought I have been as controversial as I can be, even outside my own inclinations here, we have a very interesting Tom Harper from Toronto, Canada, who has been not only a long time religion editor for the Toronto Star newspaper, but a theological scholar for many years, author of a couple of books and a former Anglican priest, who has after a lifetime of scholarship and study come to the conclusion that Christ was not a real historical figure. So, just when you thought we were getting controversial -- I do hope you will maintain an open mind and listen to what is a very interesting scholarship story, and I think an

interesting personal story of courage when you come from the community and the career and the editorial staff for a religion section of a newspaper. Interesting story of courage and I hope you will join us next week for Mr. Tom Harper.

In the meantime, let's move on to today's controversial topic. Dr. David Pimentel is a Professor of Ecology and Agricultural Sciences in the College of Agriculture and Life Sciences at Cornell University. Dr. Pimentel has amassed an impressive list of publications and academic honors and has lectured around the world on economic and environmental issues, regarding energy, population and natural resources. To our topic today, Dr. Pimentel has extensively studied and written about Ethanol. And most recently published an updated report last year in Natural Resources Research with Tad Patzek of Berkeley. Now, given the current fervor and near unanimous conventional delight over this near Panacea that is Ethanol, thought it might be interesting to have Dr. Pimentel share his data with us in search of ever elusive truth on this topic. So, welcome Dr. David Pimentel.

David: Thank you very much.

Steve: Delighted to have you here. Is it fair to say that you don't think the current fervor is supported by solid reasoning in data on ethanol?

David: That is correct, yes. I wish it were true, but the data that we have accumulated and utilized does not support all of this fervor that exists.

Steve: Why don't you tell us a little about what you are saying in terms of energy required to produce a gallon of ethanol?

David: It takes about 30% more energy to produce a gallon of ethanol than you actually get out in ethanol itself.

Steve: So, the deal is a net loss in energy in a sense.

David: Yeah it's a net loss; that's right.

Steve: And forgive me I sometimes I ask ignorant questions, but how is this -- and this is the very topic of our work, so I shouldn't be surprised but if you are correct, how is it that no one is paying attention to these government lies here?

David: Big money and politics; and the thing that's driving this whole operation is the \$3 billion in subsidies that makes this Ethanol operation attractive.

Steve: So, we are currently -- I was going to ask you how much we're -- and that's just the subsidy spending?

David: That's right, that's just for Ethanol the subsidies that keep it going; so this makes a gallon of ethanol quite attractive when you include that very high subsidy.

Steve: Tell us a little bit more I guess about your research about the production elements that you say add up to this -- what did you say, 30 some percent?

David: Yes.

Steve: Okay.

David: So what we did of course, that many of the pro-ethanol people have not done, is to count all of the inputs that go in the corn production and all of the inputs that go into the fermentation processing dimension. And by that, I mean that a lot of -- well, we had 14 different inputs on average to produce an acre of corn -- and many of the other investigators leave out many of the inputs in corn production. For example, they leave out all of the energy for the production and maintenance of the farm machinery; the tractor, the harvesters, they ploughs, the disks and so forth -- and those take large quantities of energy; they leave out the energy for the hybrid corn, they leave out energy for irrigation. Now only 15% of the corn is irrigated, but it is a large factor that should be included -- and there are others too, but those -- and then in the fermentation processing they leave out all of the energy for their stainless steel tanks and so forth and so on.

Steve: So, if I am hearing you correctly, if you take all these things into account, we have got to grow the corn, we have got to do all the pieces of this. Do they include the distribution infrastructure in their numbers?

David: Some do include it and I think we mentioned it, but I don't think its included in that 30% that we mentioned. That is up to the point where it has to be distributed, and as you know, the ethanol cannot be run through the pipeline, it has to be transported by tanker truck.

Steve: Right, so in essence we have got a duplicate distribution structure required.

David: That's right. Yes. And of course, this requires significant energy. I forgot, it's in our paper, but I have forgotten but it is a significant quantity of energy.

Steve: One of the things and I -- you know I got a -- again, I am always willing to admit that I can be an emotion-driven thinker like the rest of us, though truth is obviously our goal here. I gotta to tell you, intuitively, as my republican congressional rep, my democratic state senators and everyone became so united -- I happened to be in Michigan where we have an agricultural community obviously in here in the mid-west, there was something about this that started to not -- so I gotta to admit that I am a little biased in your direction and that's how I found you, was reading some of the critical... But that said, I tried to listen a bit to some of the critics, and a couple of things they have said -- and I'd like your response to, is for instance, one thing that they'll say is, well, we are not taking into account advances in technology and productivity in agriculture; you are cashing old checks here, kind of, is what they are saying.

David: Yes, well, we're using the most up to date data that is available; again most of it came from the US Department of Agriculture. And so that -- I don't know what else we could do to make it more productive. We were using the average yields of corn for the United States produced by the US department of agriculture, and in fact I think we used 2003 -- 2004 had a slight drop in yield. So we were using the latest data that are available and I don't know anything else that could be found. And the same thing goes in the processing -- well, the fermentation and processing. There isn't anything else as new, and in fact my colleague Tad Patzek suggested we were a little too optimistic.

Steve: Interesting. You know one of the other things you hit on -- and I digress a little here, but is the amount of land use that would be required to substantially impact their dependence on foreign oil?

David: Yeah, this land issue is an extremely critical one. For example, currently in the US, we are producing 4.5 billion gallons of ethanol and that's being grown on 18% of all corn acreage. Now that 4.5 billion gallon sounds like a lot of ethanol -- and it is, but then compared to the total production or use of petroleum, and it amounts to 1% -- and I want to emphasize that -- 18% of all corn is providing us

with 1% of our total petroleum. And then if you ask the question, suppose we converted 100% of all US corn -- I mean, that's not going to happen, but anyway...

Steve: Right.

David: Suppose we converted 100% of the corn, it would provide us with 6% of our petroleum use in the US -- is that making us oil independent?

Steve: Very interesting. And back to the question of why you say your answer is the age-old answer of money?

David: That's right; its money and politics without question -- and you can also understand that. When I was asked to chair a study for the US department of Energy way back in 1980 after -- in our conclusion -- and incidentally the report was reviewed by 26 top scientists in the United States, and after it was released by the Secretary of Energy, two congressmen from the corn belt didn't like what we said -- as you might expect -- and they had this investigated by GAO -- being dishonest and everything else. And GAO spent 20 times more money than we did producing the report and investigating us, and when GAO finally published their report, and it was in a normal publication, they concluded that we were 100% correct.

Steve: Interesting.

David: It just a form of harassment if I could use that term.

Steve: Interesting. So, in essence you are saying, not only at 6% if we converted all the land, not only at 6% does it not really substantially decrease our dependence on foreign oil, but it's not ecologically sound.

David: No, that's another one. If I could just kick off the environmental impacts of producing ethanol, and it is #1 -- and using corn of course, corn causes more soil erosion than any other single crop in the nation, uses more nitrogen fertilizer than any other crop grown in the nation, and about 25% of that leaks into the groundwater and surface waters according to the National Academy of Sciences, and corn production -- and then that contributes to that -- it's a major contributor to that dead zone down in the Gulf of Mexico. Corn uses more insecticides in any other crop grown in the nation, uses more herbicides than any other crop grown in the nation; and those pesticides get into our ground and surface waters and elsewhere, causing major problems. And the production of a gallon of ethanol requires 1700 gallons of water. And then the last item is that when you produce one gallon of ethanol, you produce at the same time, 12 gallons of sewage along with it.

Steve: Wow!

David: So these are enormous numbers of environmental problems associated with ethanol production using corn.

Steve: Is that in essence -- and the obvious question...

(00:20:00)

Steve: ...that comes to mind is, well what do we do -- I mean is that...

David: What we do -- what should we do, if we are not going to use ethanol?

Steve: Yeah, and is ethanol worse than oil, at this point in time?

David: Oh yeah. Significantly worse than oil, significantly worse than coal -- oh! and I should -- I forgot to mention the global warming; of course, because you are using more fossil fuel to produce that ethanol, you are contributing to the global warming problem, you are also, during the fermentation process, contributing even more carbon dioxide, so you get a double whamming of -- contributing to the global warming issue.

Steve: To the green house gases that....

David: To the greenhouse gases, yeah.

Steve: Okay. Boy! that is interesting.

David: Oh, I know what I was going to say to -- you were asking what we should do? We should have conservation -- real conservation and reduce our oil consumption in vehicles and so forth, at least 30% -- and of course, I would like to see it go all the way to 50%.

Steve: Interesting. How would you accomplish that?

David: Well, I'd put a significant tax on motor fuels as the Europeans had done; and this would significantly reduce consumption to a benefit of the United States -- and we are going to have to go there eventually; as you know, that there are lot of reports now that we have hit peak oil and we're on the down side....

Steve: Matter of fact, we had a show on this about two weeks ago with Reason Magazine Environmental Reporter, Ron Bailey joined us. He was not buying the peak oil argument, but interestingly, he said one thing he would consider an addition to let the markets figure this out over the next 30 to 50 years was a tax on consumption.

David: Very good. Yeah, I would agree with that. Well certainly, we shouldn't be subsidizing oil and ethanol. They should go on their own and make it in a marketplace -- and if they are so great -- I am talking about ethanol -- if ethanol is so great, why are we subsidizing the three billion dollars annually?

Steve: Great question. You know, when we talk about markets -- that's a great question, why is this not so insanely profitable that everybody is clamoring to do it?

David: That's right. When I've asked that one to ethanol -- the pro-ethanol, their mouth opens, but I haven't heard much yet.

Steve: Well now, just let me revisit a couple of statistics that I am sorry I skipped earlier, but -- and I believe it was from the American Coalition for Ethanol. So, we know where this is coming from, but they were citing US department of Agriculture numbers that said ethanol produces a 167% of the fossil energy used to grow harvest and refine, plus transport and distribute -- and to your point earlier, you have already answered that, right? They're missing elements?

David: They are leaving out a lot of elements; and they are taking credit -- excessive credit for the bi-products. And incidentally, it's also interesting to watch the USD -- study the USDA reports. In 2002, they reported that we got 1.37% positive return; and then 2 years later, in the 2004 report, without any change in inputs, they automatically almost double -- or maybe it was 1.3 -- well, one anyway, it's either

1.3 or 1.7. And then in 2 years, without changing any of the inputs, they have doubled their output -- and with no explanation of how they achieved this doubling.

Steve: That's interesting.

David: Yes it is, and I would like to know how they achieved that doubling.

Steve: Yeah, Boy! That's Noble Prize material there, isn't it?

David: That's true.

Steve: Interesting. Well....

David: They are good people and I like them, but I don't agree with them.

Steve: Fair enough; it's an honest approach and I have to ask you too, by the way, they point out -- they try to point that your co-author has some prejudice of his own?

David: Oh, yes. He did work for Shell Oil, well, before he came to University of California at Berkley. And he is not using however, or at least he assures me, no funds from oil are going into our joint study. Well, I know in my case it's zero; my research is supported but small amount of money from Cornell and my personal fund. I am putting my money where my mouth is.

Steve: Fair enough. You know, and it seems like a lot of the complex issues that we discussed -- this one seems like it ought be computable. You know this one doesn't seem -- it seems like science ought to be able to get it's mind around this one, is that?

David: Yes. You would think so. And as I say, I've been involved in it more than 20 years, including being reviewed by GAO -- and you know why can't science, why can't we do this in a scientific manner? I would like to see the National Academy of Sciences put together a committee and really investigate this issue.

Steve: Very interesting indeed. Now I have to ask before we wrap up too, and I so appreciate your time -- we are talking with Dr. David Pimentel from Cornell University. Biodiesel -- tell me what it is and is that the same deal?

David: Yeah, Bio-diesel is using oils -- plant oils from various crops -- there's actually some corn oil that is produced. Of course, Soybean is one of the dominant ones; and then canola oil -- and canola oil like was one of the most valuable, but at least if I look in the agricultural statistics, I see that canola oil sells for wholesale, \$7 and 50 cents a gallon. Obviously, that would be a tough one to put in your automobile and compete. Even Soybean -- we have looked at Soybean, and the reason we selected Soybean for the study is that Soybean -- well, none of these oil crops produce very much per hectare or per acre. I mean, where corn we get 9 tons per hectare, with Soybeans, we get about 3 tons. So, in other words, about -- the yields are about a third, but what we can do with Soya bean in particular, is that it's a legume, and so, if you hold back on the Nitrogen fertilizer, Soybeans will produce their own Nitrogen. Now, it's a bit of a cost associated but it is not a large one. And so, that's an advantage, and one of the advantages of our using Soybeans for the assessment. But I must say that it turned out to be negative -- not as negative as ethanol, but it still is slightly negative. And so, again -- and I understand that when you are burning these plant oils in the diesel engine, at least the exhaust smells better. I am told that it smells like popcorn cooking. I haven't smelled it, but this is what I am told.

Steve: Interesting. I just saw a television program on that same topic, so...

David: Did they mention that?

Steve: They did, they did.

David: Good. Well, I mean, I guess it's true.

Steve: But you are saying it's still probably a net negative?

David: Net negative, yes.

Steve: Okay.

David: Yes. The real problem -- and I guess I can put this all under perspective, is that we are burning so much oil, natural gas and coal and to put that one into perspective, we are burning a 102 quad, as you know a quad is 10¹⁵ BTU's. And then you ask the question, how much solar energy is being captured by all the green plants in the United States annually, to compare it to that 102 quads -- and it works out to be 50 quads. So we are burning more fossil energy; almost twice as much than the total energy captured by all green plants in the United States annually. And that includes Agriculture, Forestry, lawns and what have you.

Steve: That is perspective -- and that probably answers my next question which was, is there any chance that this can become viable, that efficiency or productivity or technology will make ethanol viable in the future?

David: Unfortunately no. Again, I wish it would because we need a liquid fuel and it would be nice if ethanol from agriculture, or anything else from agriculture was our savior, but green plants just -- you know it took 400 million years to get our oil and natural gas together, and you are just not going to do it in one year from harvesting corn or any other bio-mass material.

Steve: When you talk about the three billion we are spending to subsidize ethanol, is there additional -- is that the total tax payer hit or other additional expenditures?

David: Well, in general it is, but of course, that's not counting the subsidies that go into oil and natural gas, that agriculture is benefiting from.

Steve: Okay.

David: I am not for any subsidies.

Steve: Yeah. Fair enough; and we hear a lot of free market, you know?

David: It is right. And I am for the -- definitely a free market without all these subsidies manipulating the system.

Steve: Yeah, very interesting. Well, I guess my last question for Dr. David Pimentel is, is there -- this train seems to be rolling down the tracks in the Mid-West rather aggressively and abundantly here is there any promise of getting this side of the argument out there -- are you getting media attention at all or?

David: We are getting some media attention, but people are very helpful; and I must say that I wish that I could -- to join them, that this is the solution to our oil problem, but unfortunately despite my wishes, I am a scientist first.

Steve: Fair enough. Well, that's what we have to do. We have to take action based upon science, reason and evidence, wherever it's possible for us I think to create the greater good if you will. Hey! David Doc -- I can't even speak now. (Laughs). Dr. David Pimentel, thank you so much for joining us from Cornell and keep up the good work and articulating your view of the science.

David: Well, thank you; enjoyed talking with you, and it's you and the other people who are getting the word out. And eventually, people are going to see that this is not solving our problem. I mean that's a clear evidence, if you are only getting 1% from 18% of all corn -- what are we doing? Anyway, nice talking with you.

Steve: Fair enough. Well, I thank you again for your time.

David: Okay. Righto, bye!

Steve: Well, that wraps up another baby step down the road to ever-elusive truth. Thank you again to Dr. David Pimentel of Cornell University for joining us today. Please don't forget to vote for our podcast or place comments at the iTunes' music store -- podcastalleepodcast.NET or wherever your favorite podcast search engine may be. Also, please make any iTunes' store hardware or music purchases only after clicking to them through our website, truthdriventhinking.com, if you wish us to help us a little in our efforts to bring you this free programming; same also from Netflix the DVD-by-Mail Service, of which I am quite a fan. So, you can get at both of those through our website at truthdriventhinking.com first. That'll do it; have a great week; we will see you next time on the road to Truth-Driven Thinking.

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