

October 2012 Issue | Paul Clayton, PhD

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Welcome to *Functional Medicine Update* for October 2012. We have a tremendously exciting and I think very different issue to share with you that has to do with a longstanding question, and that question is: Has our increased use of mechanized farming, and processed foods, and 21st century lifestyle—or let's even go back a century—20th century lifestyle, had a positive or negative effect on life expectancy and on morbidity and disease patterns? And of course most of us immediately, when we are asked or are thoughtful about that question, come to the conclusion (because we've heard it so many times) that mean average life expectancy has gone up dramatically over the last 100-plus years and disease morbidity has gone way down, both of which are very strong supporters of the technological developments that we've seen over the last century and a half. One might say: "Well, that's a trivially obvious question, the answer of which is so profound that why even ask it?" But fortunately, there is always another side of the story to create a robust discussion going, and that is the theme that we're going to be focusing on in this month's *Functional Medicine Update* with our extraordinary clinician/researcher/opinion leader of the month, Dr. Paul Clayton.

As you get to know Dr. Clayton a little bit more during this interview, I think you are going to be provoked, as I was the first time I met him, in having read his incredible series of articles that appeared in the *Journal of the Royal Society of Medicine* titled "An Unsuitable and Degraded Diet? Public Health: Lessons From the Mid-Victorian Working Class Diet."^{[1],[2],[3]} I think you're going to be very interested that sometimes what may be seen on the surface may have a deeper message and an opportunity for learning that's below the surface, and that is the theme of this month's *Functional Medicine Update*. So let's run right to the discussion I had the privilege of having with Dr. Clayton, and then I'll discuss some of the implications.

INTERVIEW TRANSCRIPT

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Always we look forward to our clinician/researcher/opinion leader of the month. I know I say this every month, but I think I feel fairly confident once again that we have an extraordinary personality who will bring a perspective of deep importance to all of us. I'm speaking to Dr. Paul Clayton. You're going to learn more from Paul about his background, but let me just say a few words about him.

A Student of Anthropologic Nutrition

It's a very, very rich and interesting background that ties so closely together with the topics of interest we have discussed over the last three decades in Functional Medicine Update. He's been a visiting Chair of Pharmaconutrition at University of Pecs in Hungary. He has been on the board of many different nutritionally related therapeutic companies the UK, USA, Norway, Hungary and Japan. He has been a Fellow of the Foundation for Food, Brain, and Behavior at Oxford. He has been a Scientific Director of the Albert Szent-Gyorgi Foundation of Clinical Pharmaconutrition in Budapest. He's been involved with sports medicine/sports nutrition work at the Royal College of General Practitioners, and is a former president of the Forum on Food & Health at the Royal Society of Medicine in London. He has worked with things like novel mechanisms in weight loss including the use of food derivatives to achieve up-regulation of mitochondrial uncoupling proteins and AMP-kinase; the use of natural CR-3 agonists to enhance TH1/TH2 ratios in the treatment of allergy, the classification of *Saccharomyces cerevisia* as an atypical and external symbiont, and the clinical use of stabilized lactoperoxidase as an anti-viral strategy. He has looked at things like the weight loss drugs and how they play roles in modifying physiology versus nutrition intervention. I mean, quite honestly...previously a visiting professor at the University of Amsterdam, principal lecturer at NutraMed International, plus graduate courses in London. I could go on and on and on...work in Norway. This is a student of the universe, of the globe, who has really been focusing his attention on this whole area of relationship to undernutrition and functional nutrition to human performance and relationship to the immune system, relationship to prevention of degenerative diseases, specifically cancer, cardiovascular, and connective tissue, and—as you will learn in a moment—a historian looking at anthropological nutrition in a very unique way that marries itself directly to many of the topics that we've been describing in functional medicine.

So, I am so excited to have Paul as our kind of opinion leader of the month. Dr. Clayton, welcome to Functional Medicine Update and thanks for being available to us.

PC: Thank you for the invitation, Jeff, and that's probably the longest introduction I've ever received. Thank you for that, too.

JB: Well, it's well deserved. Let me, if I can, just quickly contextualize how we met because, you know, there is no such thing as serendipity, I'm beginning to recognize. I'm in the past-65 age group now and starting to recognize that these are guided contexts that we often have that are built around kind of receptivity to the message. So here we are, we're both in a meeting together, we meet after a talk. It's just one of those kind of chance happenings, and within a period of probably no more than 30 seconds, at least I recognize that I started at four degrees of separation and by the end of that conversation, five minutes later, I recognize that we're probably two degrees of professional separation, and we may have

been separated as twins at birth. I was very, very impressed with your ability to communicate very concisely and very eloquently the things that you have been working on, and this whole topic of pharmaconutrition and how that interrelates with your studies on Victorian nutrition, which was just fascinating. With that as a very lengthy introduction, tell us how you got down this path—this Victorian nutrition issue—and the things we’re going to talk about, which are fascinating.

PC: Of course. I just would say that, you know, sitting in my silo, which is based mostly in Oxford and in Budapest, I knew, of course, your name, and I knew a little bit about what you were doing and what functional medicine was about. But I have to say, I hadn’t taken it really onboard until I heard you talk at the meeting in Anaheim. It was just a thrill, because the way you were talking about the issues of the day felt so familiar and so right, I felt I just had to come up and talk to you afterwards and I’m very glad that I did.

I think that maybe we’ve reached an inflection point, or we are very close to reaching one, in the way in which health care is delivered. I understand now that this is due in no small measure to your own efforts and the efforts of your institute. But the problems that we’ve had in Europe in taking these ideas to the consensus—the medical heartland—has been, really, lack of data. We have the preclinical, we have epidemiology, we have biochemistry (ex vivo and in vitro data), but we don’t, as a rule, deal very effectively in the coinage that the medical profession has been taught to prioritize before all of this large scale, prospective RCTs. Those reasons are very simple—you and I know that: it’s difficult to organize the funding, and politically it is extraordinarily difficult to set these trials up, too. I have long been looking for sources of information—data that we could use from different sources—that we could use just to bolster our arguments and to force our way into the heartland of medical conventional practice.

Exploring Health Data from Victorian England to Inform Current Research

This came as...it was an accident in a way. I know that you don’t seem to believe in serendipity, but for me that’s how it seemed. I had an opportunity to meet a very eminent Victorian historian at a social gathering. We started talking about things like health prospects, life expectancy, lifestyles in the 19th century, and I very rapidly became aware during the course of this conversation that perceived wisdom was totally wrong. The 19th century—in Britain, at any rate—you have a population that is very physically active, eating an extraordinarily rich and diverse diet and there are quite well understood reasons for this. And as a result, they had a life expectancy that matches ours, but they are almost free of degenerative disease.

The importance of this is that up until now we’ve had the Neolithic arguments, put very eloquently by people like Loren Cordain and others, but the databases, the evidence, just isn’t that good. The medical records...you have to scratch around to make your case and even then it’s not very robust. In the second half of 19th century England, the databases are very extensive—very, very detailed. Medical case notes are beautifully written up, and there are literally millions and millions and millions of data points. Nobody had really looked at this area before because of political reasons. At the beginning of the 20th century the Edwardians come in, and a pre-revolutionary fervor is in the air (this is just before the Russian Revolution). And the middle classes are beginning to become very afraid of the working classes, who were getting unionized and organized. And so the Edwardians spent a lot of time creating black propaganda, and they talk about the Victorian era as if it was an era of poverty, disease, and all things evil. And that idea has permeated into 20th and 21st century history, and into medical thinking.

What we found when we went back to that period was that in fact it was a golden age, a lacuna time, if you will, when people enjoyed fantastically good health—far better than we enjoy today—and of course without the benefit of modern medicine, modern surgery, modern diagnostic techniques.

That’s the case that we’ve made, and that’s the case that we have been excoriated for by our medical

peers.

JB: So let's, if we can, make sure that all of us are on the same page. When we have heard statistics about mean average life expectancy, often we forget that those include all age groups, including neonatal death, infectious disease, war, accidents, so when you talk about life expectancy in the Victorian period, can you give us some sense as to how one rationalizes this, since our mean average life expectancy was much shorter in those periods, with what you are telling us now?

Chronic Disease was Uncommon in the Victorian Era

PC: Oh, indeed. That's because if you look at life expectancy from birth, I would be the first to admit that it doesn't look as good as it does now. What we have to do is to filter out the first five years after birth. This is a period of extraordinarily high risk. Once a child has reached the age of five, at that point many of the childhood spectrum of risk is now gone. If we look at life expectancy over the age of five in the Victorian period and compare that with an equivalent socioeconomic group in Britain today, yes, they match us year for year. What do they die of? Of course the Victorians were mortal, but they don't die of heart disease and cancer. I think it's important to make this point now. These conditions were diagnosed, and they were diagnosed without prejudice. They were diagnosed extremely carefully by the physicians who at that time are beginning to become respectable, they're beginning to become organized, they're beginning to move from being butchers, and blood-letters to being something that is rather more recognizable in terms of the kinds of doctors that we expect to see today. So they are taking enormous pains to diagnose causes of death. Each and every doctor at that period of time is doing two, three, four autopsies a week. And when I look through their medical records, it's easy to see that they are better pathological anatomists than most of my colleagues are today. They keep their records in copperplate and leather-bound ledgers rather than putting it online, but they were extremely good at pathological anatomy, and when they saw cancer at the point of death, or a heart attack at the point of death, they diagnosed it very, very effectively.

JB: Could I make a comment here just for our listeners, because historically, looking at timelines and medical technology development, people may not remember that Rudolf Virchow, who is credited as being kind of arguably the father of modern pathology, was living during the 19th century (the middle of the 19th century). So this is the epic golden-era of pathology, with Virchow coming up with his very, very detailed reviews of the pathogenesis of various diseases. Certainly the whole attention of the medical community in Europe was heightened as a consequence of this new concept of pathology.

PC: That's exactly correct, and it's manifest in the Victorian medical records of the time. As I said a moment ago, these are present in their hundreds and thousands (and millions)—a period of half a century, covering a population of some, say, 30 million—the numbers of data points are just astounding. We also had access to things like the data looking at levels of physical activity, caloric throughputs, if you will. We had access to records illustrating agricultural productivity. The amount of agricultural produce that was being brought into the cities, where the laboring masses were now concentrated, from the agricultural sector, where, thanks to the agricultural revolution, productivity had increased by order of magnitude. We looked at cookbooks, we looked at the bills of fare of the foods that were sold in stalls, and shops, and hotels, hospitals and prisons. We have a very, very comprehensive and extraordinarily detailed view now of exactly how people worked, what they ate, and the impact that it had on their health expectancy and life expectancy. And it is very different from today, and it is very much better than the patterns that we see today.

Healthy Food and Physical Activity Were the Norm for Victorians

JB: So when you start examining the food and the activity levels, I would presume that that also brought

you into examining what are the sources of the food relative to cultivars, to traditional seeds, and things of that nature prior to the Borlaug period of the Green Revolution, where hybridization became the standard of practice in agriculture?

PC: Well, at that time a significant fraction of the population is still working manually in agriculture, but the people who are in the cities are no physical slouches either, because all occupations at that time—you have a broad-based pyramid: very, very small upper class, very small middle class, most everybody else is blue collar, and these are people who are working with their hands. There is no internal combustion engine. There is no modern technology. There really aren't any very portable fuels other than coal and wood. So all the work then is done by hand, and when we look at patterns of physical activity at that time, we can see that—in contrast to today's levels of let's say two-and-a-half thousand calories a day, the Victorians are expending on average between four and (at the upper end of the laboring scale) six, or seven, or eight thousand calories a day. They are like Olympians. They don't go to the gym every once or twice a week; they're living and working in a gym. They are better muscled than we are, but that's not the most important outcome of this. The most important outcome is because they are consuming so many calories per day, they are eating more than we do—approximately twice as much as we do. And yet, when you look at the photographs of that era—because this is also the birth of photography—you can see that the Victorian phenotype is slim to thin, because they are expending. All those calories are being used up in physical activity.

We've been seduced. We've been seduced by labor-saving technology, cheap energy, and of course the internal combustion engine, and I think as a species we are very easily seduced. We hark back, I think to an evolutionary time during which it made sense in an era of food insecurity not to exert more physical activity than you needed to. I think we still do that, but of course it has become entirely counterproductive now. The Victorians don't fall into that trap: very, very physically active, eating twice as much as we do. And when we look at the foods that they eat, then it gets even more interesting, because they're not eating any processed foods apart from very, very basics—bread, butter, cheese, and things like that. They are eating lots and lots of fruits and vegetables, and lots of fish, because at that time oysters and salmon are foods of the poor. In fact, we looked at contracts for laborers, in which the laborers actually said in that contract: “You must not feed us salmon more than three times a week.” Hard to imagine, but that's how it was. They are eating lots of prebiotics, because the Jerusalem artichoke is a staple at that time. Whole grains, and ten portions of fruit and vegetables a day. That's gets very interesting because this is the level of intake that the people at the USDA Human Nutrition at Tufts talk about, and the US Cancer Society also talks about.

Heirloom Varieties of Fruits and Vegetables Had Greater Nutrient Density

Now, the Victorians are not eating contemporary fruits and vegetables. They're eating heirloom varieties, and it is important to note that these are varieties that are very often more pungent. They contain more bitter or aromatic notes than many fruits and vegetables do today, because we have—through consumer demand—asked the multiple retailers for sweeter fruits and vegetables, and that demand has filtered back through to the plant growers and the plant breeders. So, for example, sugar snaps and sweet corn are a lot sweeter now than they used to be. Plants only have so much solar energy available to them, and the more they put into sugars, the less they have to put into the types of phytochemicals that we now know are anti-inflammatory, and—among other things—protect against cancer in a wide range of ways.

So the Victorians are eating twice as much fruit and vegetables as we are (at least twice as much), and it turns out that the varieties of fruits and vegetables they're eating contain about twice or three times the levels of phytonutrients that we consume today. Put that together, and they are eating levels of phytonutrients—the flavonoids, the phenolic compounds in general, the carotenoids, the xanthophylls, the

methyl group donors, cyanogens, I could go on right across the spectrum—they're consuming those types of ingredients at a level an order of magnitude higher than we eat today. And public health records show that as a result, degenerative disease in that population is reduced from the levels we see today by 90{56bf393340a09bbcd8c5d79756c8cbc94d8742c1127c19152f4230341a67fc36}. Ninety percent; that's a stunning figure. And that explains why, when the Victorians reached the ends of their lives, they don't die slowly and expensively, as we do. They carry on right to the end—almost fully functional—and then die very rapidly (morbidity compression) in their 70s, 80s, 90s or beyond, generally of an overwhelming infection. That's a much less expensive way to die, and the Victorian concept of death is very different from ours. We expect to die slowly and individually, as a rule. The Victorians expected to die very suddenly, and very often communally. You see that in the literature, for example. That's very much the common experience.

JB: I think you just said something there that I want to make a parenthetical. I've quoted, in years past in Functional Medicine Update, from the wonderful Oliver Wendell Holmes poem called "One-Hoss Shay," which was written during this period of time (actually it's the late part of the 19th century), in which the concept of the one-hoss shay is it runs fine every day (the carriage with the horse) and then one day the horse dies, and the wheels fall off, and like bubbles burst (as I recall, in the last line of the poem), it's the end of that carriage. I think that's a very interesting metaphor to the way people saw the end of life in the 19th century: the one-hoss shay.

PC: That's a beautiful and very precise metaphor, Jeff. I hadn't heard of that before, but it is absolutely apropos. That is how the Victorians expected it to be. They expected to live, and to live well, and to live functionally (physically, mentally, sexually) until very, very shortly before death. I don't know about you, but if I have those two options to choose from, then I know which one I'd go for. I want to remain alive and fully functional for as long as I can. I don't want to put off mortality infinitely; I'm not that egocentric. I would rather die in that way than spend the last ten percent of my life in a condition of progressive medical dependency, bankrupting my nearest and dearest in my family and using up medical resources in general. I think that we have come to accept a way of living and dying that is not natural. It's a complete artifact. Everything that we experience as a society, as aging, is not biological. It is a socioeconomic artifact, and Victorian study shows us that. It shows us—I think—that if we are eating the right kind of diet, whether you're doing that through dietary means or by supplementation I don't think matters. I'm a clinical pharmacologist by training and as far as I'm concerned it doesn't really matter how you get those compounds into your system, but if you do, the only people in that population who are manifesting with, let's say, heart disease or cancer are those who have strong genetic risk factors. Everyone else is protected. For example, if we look at the phenomenology of breast cancer at that time, the average age of onset of breast cancer (or of cancer in general, in that period) doesn't show the usual exponential age-related curve. I suppose you can derive that all the way back to Andrew's theory of gradually acquiring increasing genetic mutations, which finally culminates in increased risk of cancer. That's not the Victorians' experience. In that era, everyone is protected throughout all of their lives by a very large intake of phytonutrients. And it's only that percentage of the population who have strong genetic risk markers coming through, and they are coming through in the blood. In that population, cancer is not age-related. I think it is interesting here to note that when you talk to the breast cancer specialists and say, "How many of your patients have BRCA1, BRCA2, BRCA3, or strong genetic risk markers?" they'll say about ten percent. And if you talk to the cardiologists and say, "How many of your patients have got strong and clearly elevated risk markers?" they'll say something like ten percent. Well in the Victorian period, it's only that ten percent who present with the clinical diseases; everyone else is protected. And what has happened since then is that this protective nutritional tide has receded down the beach, exposing more and more of us to the pathologies that we have come to regard as normal, but in my

view they are anything but.

JB: I think that's beautifully stated and very, very eloquent. I want to go back and pick up two points in your previous comments that I think are kind of news-to-use for our listeners, one of which is this heirloom varieties discussion you had of the traditional cultivars of fruits and vegetables that were consumed during the Victorian period and their bitterness. These bitter compounds, as you indicated (these phytochemicals) are secondary metabolites that plants produce in response to a hostile environment. They are basically defensive substances. This is the whole concept of xenohormesis that we've heard about recently. It would seem that as we have moved our agriculture towards "safe" conditions, with herbicides, pesticides, fertilizers, making plants really have an easy life and put cultivars out there that are very responsive to fertilizer and pesticides, that what we have done is we've cooled off or silenced those genes that used to be stimulated in a less protected environment to then manifest the production of these phytochemicals. So it seems like it's a double whammy as to how we've moved towards a lower phytochemically dense food supply system, both changing the seeds and changing the environment. Is that in line with your observations?

Making Life More Convenient Has Weakened Our Foundations

PC: Jeff, I think that is beautifully and precisely observed. I think that what we have done...in an evolutionary perspective, life is a struggle, life is a dialectic. And what we have attempted to do, I think, is effectively we have interrupted the dialectic. We have wanted to make life easier and more comfortable, more consistent, more predictable for ourselves, and in so doing we have unknowingly weakened our own foundations. So I would absolutely agree one hundred percent with what you say. I think that it would be difficult to persuade people, and particularly children, to consume some of the traditional cultivars because, as I said, many of them contain a number of notes, organoleptically speaking, that today's consumers might not find very easy to assimilate. And I've often wondered whether there might be a compromise: whether it would be possible to take intensively reared, protected plant species (as you put them), and encourage them to increase their synthesis of phytoalexins (or as we call them, phytonutrients). There is a Dutch company that has started to look at this question, and what they have done—I think this is very interesting—is they take intensively grown species of food crops, which have been fed fertilizer and they've been shielded with pesticides and fungicides and whatever, and towards the end of the growing season what they do is they buy a couple of hundred locusts, they turn them into a stew and then they spray that stew onto the crops. They don't know what the active compounds are, but there is something in that stew which the plants register as being indicative of a locust invasion. There are no plant losses, obviously, but the plants do respond by ratcheting up their production of a range of phytoalexins, including many of those which are clearly important for our sustained good health. I think that this is an example of a very beautiful kind of science where we may be able to dig ourselves partly out of this pit that we've made for ourselves.

Why Stress is Good for Plants

JB: I think that's really a superb example, and I know the basis of a lot of the organic agriculture movement in the world is founded on some of these principles that it's good for plants to have a little stress in their environment because it allows them to produce a full range of protective substances that has this co-evolutionary benefit in humans. So that's that kind of xenohormetic transference factor from a plant to a human: the anti-stress compound in the plant becomes an anti-stress compound in humans, which is a very, very interesting kind of emerging thought about the role that diet plays beyond that of protein, carbohydrate, fat, vitamins, and minerals in modulating human physiology.

PC: It really does demonstrate our absolute interdependence with other life species, doesn't it? I think of

it in terms of hermit crab. When the hermit crab comes across a shell that has been abandoned by some other species, it makes it its own. It becomes its own protection. When we eat plant species which have high levels of these types of phytonutrients we assume the protection that they originally generated to shield themselves from predators, from ultraviolet, from other types of stresses. And by indulging in the 20th century mass agricultural production techniques, which I accept that perhaps we needed to do to feed the increasing numbers of mouths, but I think that it has increasingly set in motion one of the pillars of the current system of bad public health.

JB: Yes, I think what you've provided to us, Dr. Clayton, is an unbelievably important foundation upon which we build the whole edifice of therapeutic nutrition, and as you said, pharmaconutrition. What is the benefit of nutrition, culturally, to a society that is burdened by preventable chronic illness? I think it's a tremendous framework upon which to build the bioscience and the mechanistic understanding, but you've got to have kind of your fundamental historical sociological background to really understand some of these more precise mechanistic understandings of roles of various phytochemicals on cell physiology. To me, this is where it all starts. Your work is just fundamentally important in understanding the bigger picture. Now, for people that want to follow up and learn more about your work, where would you direct them?

PC: At the moment I'm working in a number of other areas, which I think you might find interesting, but to go back to the dietary shift and its impact on changes in public health data, there is a series of papers that I co-authored with an historian, Dr. Judith Rowbotham, which were published in the Journal of the Royal Society of Medicine three years ago. That would be a very good place to start. And could I just say, I think one of the problems that the medical profession has is—and I'm generalizing here—its profound ignorance of history. If you don't know your history, if you don't know where you come from, you have no idea of knowing where you are, or where you're going to go next. The medical profession doesn't do history, as a rule, apart from, you know, the history of great medical figures. I think that we have been in such a hurry to forget the roots of the current hegemonic medical healthcare system, that we no longer are able to see it clearly. Let me put it this way: When we first published, the howls of the program and hatred from the medical profession in Europe were pretty much universal. The medics said to us, "Look, this is just not possible. You've got your history wrong. We've just had a century of medical [largely pharmaceutical] progress, and things are getting better and better. How is it possible that the Victorians could have had better health than we have without the benefits of today's pharmaceutical medicine?"

And we went back to our books, we checked everything, and then what happened was the historians—including the top historians in Victorian England (of that period)—wrote in to the lists on our side and said, "No, this is correct. This is the first analysis of Victorian medical history that makes sense." And at that point, the medic backed off, and I have to say that since that time, we have heard no further criticism from the medical establishment at all. They've preferred to ignore us, because I think that our work is profoundly critical and really undermines a great deal of the current pharmaceutically dominated model. It's a blind alley, because what we have done for the last century, is we have invested enormous, incalculable amounts of money and a lot of ingenuity into developing rather toxic, synthetic compounds, which we use to suppress the symptoms of disease which have emerged only because we have fallen away from the nutritional standards that our great-grandparents enjoyed. And there's the rub.

JB: I think you have just basically, in a very eloquent short statement, given the elevator speech for what Functional Medicine Update has been about for the last three decades. There are a lot of details under the surface, here, below the water line, but I think this is kind of the mandate of what we've been really speaking to over all these many decades. I can't tell you how much we appreciate this. We're going to cite your specific articles for those people that want follow up on them, and we want to follow your future

because I think you're blazing a very important trail, here, and I can't tell you how much we appreciate—on every level—the scholarship you've brought into this discussion and the rigor of your thinking. I think it is a very seminal perspective for us all.

PC: Jeff, may I raise just two more very small points, which you may find interesting?

JB: Absolutely. Please.

The Economics of Shifting Away From a Chronic Disease Paradigm

PC: I'm currently working with a team of med-economists, because if you want to affect healthcare policy you have to have the med-economists on your side. We have started to do back-of-the-envelope calculations based on the Victorian findings as to what kinds of healthcare savings we could make if we were to shift from this current crisis management model of medicine—this ruinously expensive and terribly ineffective model that we have now—to a genuinely preventative and dietary program based on Victorian profiles. What we have found...I mean, the figures are truly staggering. Based on this idea that approximately 90{56bf393340a09bbcd8c5d79756c8cbc94d8742c1127c19152f4230341a67fc36} of degenerative disease is preventable in this way, let's say we only capture half or two-thirds of that, you end up making savings that are equivalent of between ten and twelve percent of GDP. That's how big the figures are. In other words, the types of savings to be made here would be enough to solve America's macroeconomic problems. It would resolve your budget deficit, and ours too. What we need now is a politician with the brain and the backbone...I was going to use another more anglo-saxon term...to actually understand this concept and do something about it, because of course we're up against some extraordinarily powerful vested interests who will do everything in their powers to prevent this type of approach.

I suppose the other point I would like to make, if you'll give me another minute, is to tell you the type of work that we're involved in now, that—again—you might find interesting. One of the great turf wars at the moment in medicine is taking place on and around the concept of vitamin D. On the one hand you've got the dermatologists and the skin cancer people who have been telling us for 20 or 30 years or so, cover up—the American or the Australian model, slip, slap, slop, or just stay out of the sun. And then you have got an increasingly vocal group of people who are saying, “Well, hang on. High insufficiency of vitamin D is prevalent, particularly in the higher latitudes and is associated with a whole range of diseases, including cancer, autoimmune disease, type 2 diabetes, and depression, and heaven knows what else.” How do you resolve that? How do you square that circle? You might be interested to know that I've been working with a multinational team, where what we have done is to develop a food extract which we were able to get into the skin through a spray, and we've shown that it activates the melanocytes, and tells them to produce more melanin, tells them to distribute it to the neighboring fibroblasts, and actually creates a genuine tan. We've put vitamin D3 into the product as well, so this is a product that captures exactly the cosmetic and the endocrinological benefits of sunlight without any of the problems associated with exposure to ultraviolet. I just thought that might tickle you.

JB: Oh, absolutely. What a wonderful application of technology. That's your basic, humanistic technology. Wow. Well, it sounds like you're not suffering from any lack of things to keep you intellectually and physically and emotionally interested and committed. We need to follow back up with you, Dr. Clayton. I think that this is just the first of hopefully a number of visits with you because you're leading the pulse here. We really appreciate it.

PC: Could I just say that meeting you in Anaheim was the high point of my American tour so far.

JB: Well, I take that as a great compliment because I can tell you that's how I felt about our meeting as well. The best to you and let's keep in touch. There are going to be many thousands of practitioners that are going to be very influenced by what they hear from this discussion between us. Thank you so much.

PC: It's been a pleasure. Thank you so much, Jeff.

Always we look forward to our clinician/researcher/opinion leader of the month. I know I say this every month, but I think I feel fairly confident once again that we have an extraordinary personality who will bring a perspective of deep importance to all of us. I'm speaking to Dr. Paul Clayton. You're going to learn more from Paul about his background, but let me just say a few words about him.

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