

**Raymond Peat, Ph.D.**  
**A Self-Ordering World**  
**How Do You Know, Students, Patients and Discovery**  
Politics and Science  
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**Summary:** Dr. Peat discusses some of the issues and people featured in his 2010 newsletter, entitled "How Do You Know; Patients. Students, and Discovery".

The line up of scientists and educators include Dr. Carl Rogers, . W. J. J. Gordon (of Synectics fame), Heraclitus, Aristotle, Plato, Pavlov and his student and colleague P.K. Anokhin, Peter Kropotkin, Alfred Korzybski, Norbert Wiener, Ludwig von Bertalanffy, and Paolo Freire. More information about these and other issues are available at RayPeat.com

*I: We are going to talk about your recent newsletter. It was entitled “How Do You Know, Student, Patients and Discovery” and the scope of the newsletter I thought was pretty enormous. It ranges from discussing a unifying self-ordering principle concerning the nature of the universe which you can’t get much bigger than that and talks about how the same principles are reflected in our learning processes, in our culture and in all other functional goal directed systems in our world. You use the quote “one thought fills immensity” by William Blake, the motto of the newsletter, and I thought that’s very apt for this newsletter because it is such a profound subject you are bringing up. I thought, just as a way to bring people into this, it would be useful if you could tell us some of your personal experiences as a student and then as a teacher and how this has formed your outlook toward the world.*

**RP:** My parents had quite a few interesting books. They got some from their parents. 19<sup>th</sup> century books - like I think it was like a 2<sup>nd</sup> or 3<sup>rd</sup> edition of Darwin’s Descent of Man - and they had a little collection of the Little Blue Books that were published I think in Kansas and they were the classics in 5 and 10 cent versions and so there really was quite a variety of reading material when I was a little kid. And encyclopaedias, the older Encyclopaedia Britannica and others, were pretty objective at that time on issues like Darwin vs. Lamarck and gave the research done in the 20s and the early part of the 19<sup>th</sup> and 20<sup>th</sup> century in different countries that gave me an orientation that I began preferring the non-genetic version of the adaptation of individuals to the environment and so by the late 1940s when the genetics doctrine was being imposed politically very powerfully through the US that made me start seeing the political significance of science in general and especially biology.

*I: Can you give us some sense of time what year were you reading the Little Blue Books?*

**RP:** Oh right after I learned to read Alley Oop and such I went right to the Little Blue Books - probably 1940.

*I: Ok.*

**RP:** And then all through the 40s my parents knew about Peter Kropotkin’s political writings as well as his “Mutual Aid: A Factor of Evolution” and so that was my first political book was really Kropotkin’s biological work on evolution and from that he drew his anarchist political ideas and that fit in with the other stuff I had been reading, the true Darwin not the pseudo-Darwinism that was promoted after the 1940s. Neo-Darwinism was really, was pretty much anti-Darwin and in Darwin’s introduction to The Descent of Man he pointed out that his ideas were being distorted and that he didn’t say that the struggle for survival and natural selection

was the basic power of evolution. He named several other more Lamarckian factors in evolution.

*I: That's more in line with what Kropotkin was saying.*

**RP:** Yeah, Kropotkin emphasised co-operation within species and even between species, in symbiosis and such although I was interested in science before I went to college, even by the time I was in college I was convinced that there was really something wrong with American and British science in particular. And so I concentrated on the humanities and did my Master's thesis on William Blake and that gave me a chance to spend years reading on the history of philosophy and philosophy of science and so on and so when, years later, when I did go back to a degree in science I had sort of inoculated myself against being indoctrinated and forced to believe the various dogmatic ideas that make up American science.

*I: What gave you the clue that it was dogmatic and not based on in actuality?*

**RP:** Oh you hear the jokes about Aristotle having counted the number of teeth in a donkey or something and that thing repeated over hundreds of years. The same thing happened in American chromosome study. Even though the Germans were able to count and investigate the effect of chromosomes way back early in the earliest 20<sup>th</sup> century, they were thinking of chromosomes as the carriers of heredity and disturbances in chromosomes basing the cause of cancer and so on. A major American biologist didn't even believe that chromosomes had to do with heredity until the early 1920s and in the 1940s, well, all the way up until 1956, Americans and English were still saying that humans have 48 chromosomes and I had read enough in the 40s to know that people vary somewhat in the numbers and by far the most common number of chromosomes was 46 in normal humans and somehow this fixed idea once said with great authority and so Americans and British just kept saying it over and over for decades.

*I: And did you have some good teachers yourself personally going through the school system?*

**RP:** Oh yeah, I had 3 good teachers, I think in the nineteen years in college, university - out of about 60 I guess.

*I: I don't think that's a bad average from my own personal experience; you probably did pretty well there. You've been teaching I'd say and you are still teaching at this point and you put out a newsletter and I should have said that Ray Peat is a physiologist and a science historian and also I think, also going with that, a philosophy historian. You write in this Newsletter about how do you know about teaching literature and I was just wondering if you could recount your experience trying to follow the school regulations and then finally kind of giving up on that?*

**RP:** That year I was teaching two different kinds of composition and the freshman composition Bartlett's had a little list of how we had to grade papers, for each type of grammatical or spelling mistakes or diction, you would mark off so many points and the purpose was to fail about 90% of the freshmen and that was called keeping up standards and I saw that after doing that for a few weeks that the students were writing worse and worse because they saw that that they tended to make mistakes when they didn't have everything under control so they started writing like first graders and I would read several dozen of their papers and to save myself the suffering of reading first grade papers I told them that from then on I would ignore the spelling, punctuation and the things on that list but I would grade them entirely on their ability to communicate something of interest to me. And within just a

couple of weeks, everyone was writing much better and I had my office partner who was teaching similar classes following the same rule, I had to read some of the before and after papers and grade them and he found that when I wasn't grading for errors the students were writing better according to his and the department's standards so they were supposedly keeping up standards while actually degrading the work output of the students.

*I: Yeah that sounds like a dysfunctional system and I am glad you were able to find a solution to that. Ray, we just got an email and I think it's true that saying your voice is being clipped all the time and so I think we should probably hang up and I will try to reconnect with you and get a better connection.*

**RP:** OK

*I: So I'll call you right back in about a minute. OK, sorry about that. All right. We're back and this is Politics and Science with Dr Raymond Peat.*

*You were talking about your teaching experience and how you actually let the students write about things that were important to them and suddenly their performance improved even on the grammatical criteria that the college was so worried about – is that right?*

**RP:** Yeah and when I asked them to put their emphasis on communicating something, and to not think about the mechanics of it, suddenly the mechanics improved as well as the content.

*I: And did you know about Carl Rogers at that point or is that somebody you read about later? Were you influenced by him?*

**RP:** For a while I was majoring in Psychology in the 1950s and I had read his client-centred therapy sometime in the late 50's.

*I: What was his influence on education, Carl Rogers?*

**RP:** He went from his work showing that it's the coherent personality of the therapist that makes the difference in therapy situations and not any psychiatric techniques that they might apply - simply the validity of their communication with the client and he established that that was actually the thing that made psychological therapy work and then he extended that and began popularising the idea of student-centred education.

*I: So that is actually the psychiatrist or therapist allowing the person to self-direct around their recovery, their own emotional recovery that was working?*

**RP:** Yeah. It was the process of listening deeply - that the patients in effect began hearing what they were saying themselves and by having someone understand what they were saying.

*I: And he also applied the same idea, it seemed like, to the entire world? He talked about it in terms of culture?*

**RP:** Yeah. He published a book on the philosophy of science with a co-author whose name I forget. But it's probably a good introduction to Carl Rogers' work to start on the philosophy of science but at the end of his book "Client-Centered Therapy" there's a philosophical section that makes very explicit, the philosophy behind the method.

*I: And how was he received?*

**RP:** Oh well, even other psychiatrists since he showed empirically that people recovered in proportion to the coherence of the therapist's personality and manner of communication and that it had nothing to do with whether they were a Freudian or a Behaviourist or whatever - and so all of the doctrinaire psychologists said "that isn't possible" because they really believed in their theories of therapy, and especially the medical psychiatrists just totally said "he isn't even a psychologist and much less a psychiatrist." The medical people were the most rejecting of his approach.

*I: Considering what he was saying that's not too surprising cause it sounds like it was threatening to them?*

**RP:** Yeah - And professors in general didn't like that approach because the point of being a professor is to demonstrate that you know it all. If a person goes into, say, a physics class the assumption is that the professor is going to sort of transmit, bit by bit, his textbook in physics into the mind of the students. So it's an absolute filling up of an empty space in the mind of the student as if the professor knows everything for sure and absolutely - and back at that time when I was teaching English and Literature and studying a variety of things, I talked to quite a variety of physics people because that was one of my interests - how physics underlies biology - which underlies the way we make language and how consciousness works. So, as part of my understanding of language and consciousness, I felt that I had to have satisfaction that there was some rational physics behind it. So I talked to a lot of physics professionals and invariably they would just, when I would ask them a question, they would quote word for word right out of their textbook or physics course and simply couldn't conceive what I was asking if it was an attempt to know anything other than what it was in the physics book. Really the most dogmatic people in science seem to be in physics. One of my professors, who I thought was intelligent, said that the average physics graduate student has trouble knowing whether a ball will roll up or down an inclined plane because they have been trained so abstractly.

*I: That's a little discouraging*

**RP:** Yeah. The physicists who tend towards the mathematical side dislike applied mathematics.

And I've talked to some of those - one of the local professors who is very famous - explained some physical reactions particle, ah, nuclear particles interactions as being explainable by a particle coming from the future and meeting the nucleus at the moment that the nucleus emits a particle. Just a fundamentally confused person who thought time could run both ways at the same time.

*I: Well, is it perhaps the influence of quantum physics on the scientific culture?*

**RP:** Yeah. It's the abstract way everything is taught. Even getting someone to look at the history of where the idea of quantum thinking came from, as a historical and cultural thing. There have been a couple books treating the German physics community at that time and showing how important idealistic philosophy was in their cultural context and when you look at, for example, Einstein's photoelectric theory at that time - at the time Einstein thought of the necessity to quantize light to explain the way a certain frequency of light rather than intensity is needed to liberate electrons. At the time he thought that, he was absolutely and simply mistaken about the electronic nature of matter. Twenty or thirty years later, he learned otherwise - but at that time, he subscribed to the idea that matter is an assemblage of atomic

particles each one of which is electrically discrete and that there's no electrical blurring across the substance. When Michael Polanyi in 1915 coming from Hungary presented in Berlin a description of his work in absorption of gases under solid surfaces under pressure, Einstein was one of the people at the meeting that said "Sorry, that isn't possible. You are thinking in some kind of primitive Hungarian way, but here in Germany we know that electrons are discretely attached to atoms and you don't get these things smearing out in space». And it was that kind of thinking that background to the quantized physics that took over the world but Einstein who was very instrumental in it was simply mistaken about how matter works.

*I: I see. So even great minds can go astray. Did he try to call it back when he realised his error?*

**RP:** Oh, yeah. It was about 1930 or so when the absorption people, they never admitted that Polanyi was right, but they started creating alternative ways to explain the experimental evidence that he had demonstrated so Polanyi's evidence was vindicated. But they told a different story about how it worked and from about that time on, Einstein began saying he couldn't really accept the whole quantum approach to physical reality.

*I: I see and we are talking to Dr Raymond Peat who is a physiologist in Eugene Oregon and a science historian and it sounds like that's an example of how dogma gets legs of its own and walks off from even the people who originate the ideas. And we're also talking about learning and how it works best if it's self-organising and Carl Rogers was postulating that that's an essential trait of everything in nature, that things tend to be self-organising and they tend to try and live up to their fullest potential.*

**RP:** Well, it's in the biological idea of what a cell and an organism is where you see the greatest and the clearest demonstration of that principle in sociology and therapy and so on. People think that those aren't really very scientific anyway and in physics the dogma is so strong that that they don't - that there's is no possibility to talk sensibly to the believers.

But in biology there has been such a huge amount of data accumulated showing that things are open and flexible and trying to explain them in terms of these quantized eternal parts just doesn't work - but that's where molecular biology and the dominant theory in genetics came from - a belief in the other worldly nature of the gene that what they were doing was agreeing with the theological rejection of evolution. Mendel was a monk who gained his own professional standing by seeming to have disproved evolution by showing that traits are eternal even though the organism seemed to change. He showed that they are only changing their appearance but their essential nature is timeless. So the church people liked Mendel's work. But then English biologists found it and took it up again for the same reason that they hated some of the things that Darwin said which agreed with Lamarck which was that organisms can be changed by their experience and that has racial overtones - if you say that working class people can radically change their natures and become philosophers, that messes with the whole authoritarian social system and so the English ruling class biologists loved the Mendelian approach because it said Darwin and Lamarck were both profoundly mistaken about how evolution works.

*I: That's fascinating. So really - genetics grew out of - or scientists found a way to appease the church who didn't like the idea of evolution - but genes represented something eternal that God could create.*

**RP:** Yeah. One of the things in the 50s that made me think American biology was ridiculous was that they believed that genes would specify everything including the way we thought and the way each synapse, every nerve cell was supposed to be genetically determined as to location and the way it synapsed with other nerves and someone calculated how impossible – when they realised how many brain cells there were – people started rethinking that and said that it wouldn't be possible to have enough genes in a cell to specify how it works and as the genetic people learned more about DNA it turned out that the great bulk of the DNA isn't there for genetic purposes. The genes that make up a person or yeast are a very small part of the DNA that is present. Our DNA isn't very different from that of a monkey or a yeast cell but something is very different in our reality.

*I: So it sounds like it's not just a prejudice amongst educators and other therapists against the self-ordering idea but that it goes across all the professional trades?*

**RP:** Yeah – I happened to be teaching a linguistics course in the 60s just about the time that Noam Chomsky was coming out against the Vietnam War, I had been pointing out how there was absolutely no evidence in Chomsky's type of linguistics. He totally ignored evidence of the absolutely idealistic doctrine saying that we have genes that specified the way we talk and there is almost no difference in Chomsky's' idealistic genetic ideas of language and Konrad Lorenz's genetic explanation for all behaviour which Konrad Lorenz designed specifically for Hitler to justify racial extermination. Chomsky wouldn't like that comparison but in fact they are both committed to ignoring the actual evidence and believing that genes explained everything. I'm not sure where Chomsky's motives came from but Lorenz's was obviously to say that society is constituted the way it should be except for the mongrel with the bad genetic traits such as liking jazz music and things that were culturally unpopular and should be exterminated.

*I: Yes - I must admit I am a little confused because I hear the dogmatists saying that everything is laid out and determined by genes and yet they also seem like - something completely set in stone – and yet they are also proposing things like chaos theory.*

**RP:** Yeah. The idea of randomness goes way back into the 19<sup>th</sup> century. It was sort of a compromise. They said that if anything changes it changes only randomly and so when Muller started showing that he could mutate fruit flies with x-rays the change was seen to deteriorate - almost always - any mutation made the animals defective and that was because change is random and so if you are going to have change, it can't be meaningful. You can't say that if you feed poor people, that they will have healthier babies who will be more intelligent because that would say that you have a directional change being caused by the environment. The whole point of genetics is to say that environment can't change the reality of the organism and if you change it it's only going to make it worse - so don't bother trying to improve the traits of a population.

*I: I see. So it really is political - not only a theological response - but a political response.*

**RP:** Yeah. I think that the doctrine of randomness lead into this loving of chaos theory.

*I: You said that neo-Kantian philosophy has dominated US universities for than a century and it argues that our senses are limited so we cannot really know the world. Does that tie into that?*

**RP:** Yeah. Our senses are determined by our genes and even for the Chomsky point of view and a lot of the biologists - even our thoughts and behaviours are determined by our genes.

*I: You were talking about Chomsky and he is famous for theorising about languages. How do languages fit in to how we learn?*

**RP:** Chomsky says that we really don't learn our language in a structural sense. We are born with it. All we do is learn some of the minor details of vocabulary and pronunciation and such from our culture. The neo-Kantians at the extreme say that our perceptions are shaped by our genes - and many of them revive the Leibnizian idea of monads - that all of our knowledge and experience is in our genes and so we aren't really experiencing anything. George Brault who is a famous professor who investigated vision and he explained that colourisation is based on the difference of frequencies rather than an absolute colour and by testing people who had their lens removed from their eyes because of cataracts he found that they could see patterns in ultraviolet light the same way bees can and that's one of the favourite examples of the neo-Kantians that we are determined to see the world in a certain way. For example, bees see a pattern in flowers reflecting ultraviolet light that humans don't see - but when the thick lenses are removed from the eyes, the ultraviolet light gets through our retina and humans can see it. So it's just a matter of the intensity of stimulus and such that makes the difference between what a bees sees and what a human sees and very similar things apply to how we think about the senses. Some people say that bees and birds and other animals each has its genetically programmed way of thinking about what it experiences and so we can never really know what a bee or an ant is thinking because they are only following genetic rule. But people who are really willing to look at the animals in their natural settings and, in other words who are studying them in intelligent ways, see that bees and the ants are solving problems, unique original problems, that never happened before in a manner that rivals human thinking. For example, given a set of instructions and arrangements in space ants were able to learn and transmit information as competently as trained air traffic controllers in discretely defined informational situations. There are lots of demonstrations that show that animal thinking isn't genetically determined and unconscious, but behaves almost identically to the way human thinking works - perceiving the situation, analysing it and communicating it.

*I: I've never understood why we separated ourselves from the animals to begin with. It seems like another form of elitism. It's obvious that we are very related to all the other beings on this earth, especially mammals, and it seems like some insecure elitism that drove us to put us on a pedestal.*

**RP:** Yeah. Just a few decades ago some of the most famous professors in the country were saying that there are sub-humans and real humans and that working class people are genetically inferior and that with an improved society there won't be any exceptions to the stratifications of the working class people will all go to the bottom genetically and that the talented people will all rise to the top. People will never change status once the society sorts things out so that poor people will never try to get a college education.

*I: So it's kind of like the old European world attitude where people are kind of relegated into their careers at a very young age by how they test in schools.*

**RP:** Yeah. Wasn't The Bell Curve co-authored by Herrnstein and Murray? Herrnstein was a famous Harvard professor who said that we needed a proper meritocracy where there wasn't the confusion of trying to educate working class people.

**I:** *Yeah. Well, it sounds like the same system that you were teaching in where they wanted to eliminate a certain number of students from the student body by the time the course was done - more of a filter than an education device. Ray, I was wondering if you could address some of the other aspects of the article you recently wrote in your newsletter, "How Do You Know, Students, Patients and Discovery"? You talked about Alfred Korzybski I believe and Paulo Freire both pointing out the use of language and the use of abstraction in education and how that's a help and a hindrance.*

**RP:** Yeah. Paulo Freire was a person who had an empirical view of reality and that when people realise that they could define the words of their language it caused them to start thinking better than simply accepting what their betters wanted to impose on them. So he asked people to choose a vocabulary that they wanted to investigate and to define the terms themselves and then to test their definitions and a true empirical approach to reality. And Korzybski pretty much got stuck in the idea that there were gradients of concreteness and generality and that truth involved getting down to specific concrete facts and basically he was an enemy of the idea that there could be a critical approach on the general level and that the general perceptions and concepts were ultimately just as valid as concrete naming of individual situations. He wanted the proper scientific language. He wanted it to have a coefficient or diacritical mark indicating the particular individual and the particular time you were referring to and implying that generalities were always farther from reality. But if you realise that all of the facts are, whether you are talking about an atom here and now, an organism or a process, we are talking about patterns of experience and if a person doesn't look for a pattern on the scale of generality - naturally they are not going to find it and it's the same thing as assuming everything an ant does is stupid. People like the famous E.O. Wilson - I think his name is - who has written a famous book on ants - basically believes ants are stupid. It's simply because he has investigated them in stupid ways and failed to look at their unique response to unique circumstances and so if a person doesn't look for a general phenomenon, naturally they are not going to find it. But if you look with skill for a general behaviour, then you are going to see things that are maybe of maximum importance. For example, when people are studying cancer the genetic people don't look for field phenomenon so they can't see them but whenever someone looks for such a thing as a cancer field, they see that it's there. For example the definitive cancer cells are surrounded by a field of pre-cancerous cells and it shades off into simply inflamed or stressed cells and without seeing the field phenomenon in any process, you are going to get stuck with the reductionist jumble of the meaningless article. And the government has some amazing giant computers that they stuff with the observations of what enzymes and genes and signal substances are doing and think they will come up with something - but they are failing to simply look intelligently at the field behaviour or the way the thing is functioning as a whole through time and space. And that is sort of the difference between that the way von Bertalanffy looked at systems theory and the way P.K. Anokhin derived his more cybernetic kind of approach to systems thinking.

**I:** *You said Anokhin came up with the concept of feedback, something we all use today?*

**RP:** Yeah - in English it became popularised by Norbert Wiener but all of the concepts were developed about 50 years before that by P. K. Anokhin who was one of Pavlov's colleagues. Anokhin thought that what was able to explain the development of on an embryo meaningfully instead of the embryo being guided by genetic reactions - each of the cells and system was responding to the situation it found itself in in any moment and adjusting itself and changing its metabolism and



restructuring itself every time the situation changed, the particles change to suit the situation. Where the genetic theory has this infinitely complex idea that all of these constantly changing developmental processes have to be spelled out in the genes somehow and somehow read at the proper time. It just is impossible when you try to guide it like clockwork from the inside but when it's a matter of responsiveness to the presently perceived situation, it will explain how an embryo develops and Anokhin has been applied for many years for many years to all of the aspects of learning, brain development and physiology in general.

51.02

*I: We're running out of time so we should probably sum up - my interest is piqued by one thing you wrote which was, that Anokhin found principles that would explain the origin of organs and their functions and that would also apply to the interaction between individuals - so he saw the micro and the macro of organizing?*

**RP:** Yeah. Some of his works are available in English and one of the interesting things about his understanding of brain function was that he argued that it's impossible to explain the basic processes of hearing and seeing and learning in terms of on or off, all and none function of nerve communication. He said that each nerve basically has an intelligent awareness of what's happening - much more just being a switch that goes on and off. He said that each nerve is receiving complex signals to its center and adjusting the way the developing organism does at other levels.

*I: So everything is self-organising from the whole right down to the cells?*

**RP:** Yeah, and one of my professors of biochemistry Sidney Bernhard – I took reading in conference courses with him and I would bring in a book from Albert Szent-Gyorgi, for example, and he would read it and say “Not scientific enough” and he would suggest I read something. And he was a very bright but sceptical person. He published a series of papers showing that all of the basic assumptions of biochemistry –the ideas of if you squash up a cell and enzymes in a solution of water and salt and by diffusion the particles will meet the enzymes and react and so on. He showed that in the glycolidical metabolism in which glucose enters and lactase or pyruvate or carbon dioxide comes out - he showed the enzymes outnumber the substrate molecules and the reaction involved one enzyme handing off the product of its reaction to the next enzyme. So it isn't a random diffusion of material through water randomly finding an enzyme but it's a totally organised enzyme to enzyme handoff of the material that they're working on and he did that simply by counting molecules which anyone could have done - but they were so committed to the idea of randomness in a watery solution that they totally missed the point of what was happening in the cell.

*I: We have a number of questions that have come in by email. Two of them are pretty similar. One is 'What would you recommend to a young person who is studying biology? He has a degree in English. And the other is 'What research can we trust?'*

**RP:** Oh well, don't trust anything! Read it carefully and think about what they are doing and even think about who they are and what they are trying to do. For example, I recently saw some discussion of the anti-cancer drug called Bucain and some English researchers offered to give it an objective test and the producer enthusiastically agreed. But then when he learned what they were going to do he said, “Well, no I want some independent evaluation” and they wrote articles in Lancet saying that the producer was unwilling to submit it to an objective test. But when I looked at their 200 previous publications they were absolutely aligned with the cell toxic chemotherapy industry and they were going to test his substance in

violation of the standard research procedures for the European Union and that got into the literature as the producer of the substance being unwilling to have an objective test—where they were the ones trying to put it through a non-objective situation. Reading about the history of the person making the claim is part of the process of finding out what they doing and looking at the nature of their work and nine times out of ten will show that they had some ulterior motive. Probably Gilbert Ling is a good place to reorient to how the biological community works and how they have ignored Ling for almost 60 years now and I have looked at the literature citing Ling and see that someone misquoted and totally misstated what Ling said, his misquotation went down through about a dozen repetitions in which people claiming to have read Ling were simply quoting a misstatement about Gilbert Ling so that one error led to deliberate misrepresentations of Gilbert Ling's work so when you really pay attention to Gilbert Ling what you are doing is seeing a lot of corruption in the biological community.

*I: We'll have to leave it there, Ray. We're out of time and another person asks if you will put a book out with all your dietary recommendations laid out in one place so people get a clearer understanding of what to eat and what not to eat.*

**RP:** Ah- not really, it's coming out gradually in my newsletters.

*I: OK – we're out of time. Thanks very much Ray.*