

The Invisible Relationships
Interview by Joanna Harcourt-Smith
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Abstract

Ralph Abraham speaks with Joanna about: a reciprocal understanding of psychedelic experience and mathematics; connecting with primordial visionary art; meditating in the Himalayas; world history through the lens of chaos theory; a miraculous, historic bifurcation; internet and the fight for democracy; Terence McKenna and 2012; everything we do matters; understanding the world through models of dynamical systems; activating the forces of good; the death track of world history; Hip Santa Cruz, the complexity of collective memory; the evolving global brain.

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Joanna Harcourt-Smith: Hi, my friends who listen to future primitive.

It's an honor and a pleasure. And I know it's fun as well, for me to be on the phone today with Ralph Abraham.

Ralph Abraham has been professor of mathematics at the University of California at Santa Cruz since 1968. He received his PhD in mathematics at the University of Michigan in 1960, and taught at Berkeley, California, at Berkeley, Columbia, and Princeton. Before moving to Santa Cruz. He has held visiting positions in Amsterdam, Paris, Warwick, Barcelona, Florence, and is the author of more than 20 texts, including eight books currently in print.

He has been active on the research frontier of dynamics in mathematics since the 1960s. And in applications and experiments since 1973. He has been consultant on chaos theory, and its application in numerous fields, medical, psychology, ecology, mathematical economics, and psychotherapy, and is an active editor of the technical journals, world futures, and the International Journal of bifurcation and chaos. There's more to say about Professor Abraham. But I'll say I'm holding one of his books in my hands. It's chaos, Gaia and arrows. A chaos. Pioneer uncovers the three great streams of history.

And his latest book is *Hip Santa Cruz*. So, welcome to our show, Ralph.

Ralph Abraham: Oh, thank you, Joanna. I also I feel very honored and blessed to be on the telephone with you at last.

JHS: You know, I wanted to start with a question that comes from the little kid me. I could not get into mathematics when I was a child. And so, I would like you to tell us. How is mathematics life? How is it something that is so precious to

you, and please awaken that to me.

RA: Well, that might be a difficult task, I can tell you. You know what it means to me. I think this is very unusual, that mathematics is revealed kind of like spiritual experience to some people who have special luck in childhood, I think not to have the natural mathematics gene turned off by the culture, by the school, the family and so on.

There are all these fields you know, mathematics of physics, biology, and so on. Mathematics is not another field of knowledge like this, where one has studied nature, with photography, with microscopes with telescopes, and so on. Mathematics is entirely another universe from which our ordinary experience and the natural world are derived, there's a primacy of mathematics. So when you take a trip, as it were, into the mathematical universe, then it's just like the visual experience of an LSD or DMT trip or something, it is wondrous, it is beautiful beyond belief. It is the awakening of a mental capacity which is beautiful in itself. And it also it aids in understanding our experience on planet earth, and human society. I cannot tell you how it does that but it does. It's a cognitive ability, it's another tool for thinking, and the history of mathematics has been a kind of tower, each layer built upon what has been done before by people who have had the courage to go out into this really different world, and bring back relics, snapshots of these structures which are beyond the space time dimensions.

JHS: Wow...

RA: And put them somehow into a literature, which builds up into the history of mathematics. So in other words, there are two things, two levels in mathematics. One is the

history, the library of the concepts which have been brought back, which are then expressed somehow in symbols, words, drawings, animations, and so on. And on the other hand, there's the direct experience of the mathematical universe itself. And these go hand in hand, for those few people who are working on the growing edge of mathematical knowledge. It's a wonderful and unique blessing that cannot be shared in words. I'm trying and failing to tell you what it's like. And I think one of my interest in psychedelics is that here's the experience, which is similar to the mathematical experience, which is accessible to most everyone.

JHS: And thank you. I'm fascinating. I'm fascinated also because my uncle Stanislaw Ulam was one of the foremost mathematicians of the 20th century.

RA: That's amazing. I had no idea you were related. Stanislaw Ulam is one of my great heroes in the history of mathematics. His works influenced me, especially his discovery of chaos theory.

JHS: That's right. Ulam he was my mother's first cousin. So anyway, did you meet him?

RA: No, I never met him.

JHS: Okay, so I wanted to ask you. Does your experience with mathematics facilitate a translation of your DMT experience?

RA: Well, yes. I use mathematics to understand every part of my experience. That is my personal strategy for struggling to understand. So when I had psychedelic experience, of

course, this was my strategy. I don't know if this would work for everyone. And I can't say that this is a good way to understand or try to describe a psychedelic trip. But I did use my math knowledge and skills and way of visualizing to understand the experience of LSD and DMT trips in terms of mathematical models and space time pattern recognition. These are based on higher-dimensional visualizations of mathematical objects that come up in my professional work. In this way, I recognized structures in my spiritual experience, and I could relate them to mathematical structures that have come up in my work over the years,

JHS: Wow, this is what I received in reading your book, this one guy, arrows, and chaos is I thought about the fact that I have struggled many times to explain the psychedelic experience. I yearned to translate and to write about it. And then I was reading your book, and I realized that it can only be explained through poetry and mathematics. It needs a language of its own. And and so for you as a mathematician, there must be a way to translate it. Like a poet?

RA: Since that first experience in 1967, I think, math has helped me understand psychedelic experience. And psychedelic experience has helped me understand math, and has turned my mathematical career in new directions which would never have occurred without the psychedelic experience. So it's kind of a two way relationship. And these understandings were primarily visual, you know, Einstein said that his way of working in mathematics was primarily through imagery. So I have tried using computer graphics to create not a reproduction of the visual experience I have had, but a kind of poetic commentary that's entirely visual, space-time visual. That is, abstract animations that have a distinct relationship to

the actual experience of LSD or DMT vision.

Since I started this long ago, the hardware and software of computer graphics has evolved to unimaginable heights, and give me more and more capability to do these image poems, as it were, where I'm trying to share the experience of space-time patterns. And I'm not the only one. I think all of these works of video artists and lightshows over the years since 1965 have also been very strongly influenced by psychedelics.

JHS: So in some way, let's take the designs of the caves at Lascaux, the caves and these exquisite drawings that were left to us. Perhaps the way that we are expressing these drawings at this time is few is true mathematics and on computer design.

RA: Well, yes, I have been fascinated by these cave paintings in Europe. And, of course, I became convinced as soon as I saw them that they were drawn after psychedelic experiences of our Paleolithic ancestors.

JHS: Yes, yes. Yes. As as Terence McKenna would say, we ate the mushrooms and that made us stand up!

RA: Yes. Stand up and speak and create technology and everything.

JHS: So, you say that when you were in the caves, you felt a vibration resonance, can you talk about that?

RA: Yes, metaphor of vibration and resonance. Resonance has been my main idea in trying to communicate verbally about psychedelic and other spiritual experiences. And found this metaphor dealt with very explicitly in the literature of

ancient India. And medieval India, as the yoga and philosophy evolved over the years, there is more and more poetic expression of spiritual experience around the metaphors of vibration and resonance.

Ancient Indian Yogi's spent months and months meditating in caves. And I think that meditation in caves, in contrast to meditation under the open sky, instructs through the relationship between the mind and the planet earth. It gives an experience of vibration, which can then be extrapolated to higher realms. So the mystical, literatures of all cultures tend to speak of these different levels, particularly the demonic literature from earliest days. They referred to them as the Lower Earth and the Middle Earth, and the astral planes. So I became interested in these concepts through my actual experience meditating in caves.

JHS: In Himalayas, also

RA: In the Himalayas, where I stayed in a cave for several days, with an adequate supply of LSD. Wow, that was one of my most instructive experiences. There's also a cave in Greece. Crete where the Greek philosophers visited and left their signatures over the many years. And I believe that Plato's Allegory of the Cave of the end of the Republic, is probably a relic of his own experience in this very cave. Anyway, it was Good luck to have a kind of tourist visit to that cave and though I didn't do a psychedelic trip there, I did have a kind of an epiphany, that this is it. This is the relationship between ordinary reality and these higher realities, is as if a projection from a bright lamp, through a photographic slide or something, projected an image onto a screen.

JHS: A-ha. Can you speak more about that? Now who is

projecting the image or how is the image formed?

RA: I think Plato's idea was something like this, we have four or five or so different levels of existence, and at the top is the one called the One. And that's more or less the bright lamp. Then there's the intellectual sphere, which is where mathematical ideas, and they're like photographic slides, or blueprints, are located. And when the light of the One shines through the blueprints, and the images are formed, in the ordinary reality on planet earth, and in human society, where energy and material collect around the images, so that structures are formed in this plane, which are based on models as it were in the mathematical or intellectual sphere. Plato's idea was especially developed by the neoplatonic, philosophers, like Proclus.

Because of my mathematical experience, this seemed to me a good a good model, style of explanation, People wonder, how is it that mathematical objects discovered in completely abstract studies by mathematicians over the ages, turned out to be such good models for structures that are on Earth and in human society, in ordinary life.

JHS: How is it possible that there is such a close relationship between the mental sphere and the natural world as seen by science?

RA: So, Plato gives one kind of a fanciful explanation, where maybe these structures down here are actually based on those structures up there. The forces of nature creates structures on Earth. Crystals, atomic structures, nuclear material, the microscopic and macroscopic shape of the galaxies, the planets, the harmony of the solar system, all these things have extraordinary resonance, if I can stretch

that word between the mathematical sphere and the scientific establishment.

JHS: holographic dynamics. So that takes me to chaos, Gaia, and Eros: Chaos, the creative void, Gaia, the physical existence, and arrows connecting Chaos and Gaia. And how does that apply to this particular moment that we're living in where so many? So many of us are afraid that we are going towards extinction? Is there a harmony? Is there a vibration of continuity there?

RA: Well, I'm afraid I'm not more optimistic than you are. I can't help a lot. Here is I think the only hopeful thing I know coming from mathematics, or from chaos theory in particular, as the book *Chaos, Gaia, Eros* was my attempt to view world cultural history through the lens of chaos theory. And chaos theory is the study of particular moments when the evolutionary process takes a catastrophic jump, which we call a bifurcation.

JHS: Right.

RA: So, when we look at world cultural history, we see all these bifurcations, like, for example, the Agricultural Revolution, or the Industrial Revolution, or abstract expressionism, rock and roll, the Psychedelic Revolution. There are these moments when the hinge of history swings, and we can just call them miracles. So our present situation on planet Earth, looking at it optimistically, where we have so much wealth, and despite our enormous population that many people have enough food to eat, that this blessing of life is only possible because of miracles that have happened in the past. And personally, I believe in miracles because I

experienced one in my lifetime, the psychedelic revolution. It's so important for me, that's why I've written the books on Hip Santa Cruz, because this relates personal experiences of this particular miracle that happened in the 1960s. And many of us still living, lived through it, and we know that this miracle happened. So therefore, there could be another miracle You see? I think psychedelics are so important, not only their blessing, but they show that miracles can happen.

JHS: Absolutely.

RA: Before we all get too old and silence, voices and we die. I want to pass on to the younger generations, the testimony, that such miracle could exist, which could save our human population on planet Earth from extinction.

JHS: Exactly, exactly. That's definitely what I want to do also. And you say, beautifully, you have this line that I really gives me enthusiasm. And you said, This time, we are at a hinge, not an apocalypse. So what can we do to be part of this hinge to make it to make it move smoothly without creaking and creasing? How can we be 42 this hinge at this time?

RA: Well, I think you're it. Podcast, your future primitive, you're devoting your time and energy and using these hardware and software and technology which is developed that can broadcast your voice to millions of people. This is, I guess, you could put in the category of education. This is the alternative to our defunct and corrupt educational system, which is helping drag our planet down is the alternative educational system which is provided by the World Wide Web.

JHS: Several times.

RA: I was revived, most recently, by the World Wide Web which emerged around 1992. So not very long ago. And it seemed to me that this was the hope for a new future. And it's a mixture of good and evil. But I think the good is just enormous in organizing a true democracy.

JHS: People listen to the difference. How on earth would it be possible, as it is today that this little podcast reaches 76 countries?

RA: Yes. It gives us a little bit of hope. Although the forces of evil are so powerful, so strong, so global. We are all watching as this battle of life and death plays out for our whole history. So I'm just a tiny bit optimistic. I think young people give me hope. And I don't think we're at the end of history yet.

JHS: Oh, like Terence said, The End of History was supposed to happen in 2012. Do you think it has happened in some ways? And maybe there's there's new way emerging? Or what do you think of that story?

RA: Well, I think that what Terence McKenna regarded as the end of history, the entelechy at the end of time, is actually a bifurcation.

JHS: Right...

RA: And I think that this bifurcation is not confined to a single incident. I think it takes a little time, like the Industrial Revolution, Maybe give it 50 years or a century, we are in it. Now we are in a bifurcation, and how it ends up, it could be

this, or it could be that. There's a wonderful teaching of chaos theory, called sensitivity to initial conditions, aka the butterfly effect. A butterfly flaps a wing in Brazil, and a tornado happens in Mississippi, this is a fact, in the mathematical model for the climate, Earth's atmosphere. So every thing, every little thing that we do, has the possibility of having a huge effect in the long run.

JHS: Yeah, everything counts. So in that enters love I mean, the fact that everything counts is so beautiful. I mean, at the beginning, and at the end of the day, everything is included. Do you? Do you work with that team mathematics?

RA: Well, we try to understand the mathematics of this kind of process, through the microscopic study of models, mathematical models, that exhibit chaotic behavior. And these models are not like permanent pieces of furniture, that we can move around and build things. The just to kind of aid understanding. So the experience of mathematical models is training us to understand better the working of complex dynamical systems such as we live in.

JHS: Would you speak to us about the orphic tradition?
The Trinity?

RA: Yes, well, I think the Orphic tradition is a cultural derivative of psychedelic rituals that occurred in ancient Egypt, in ancient Greece, and elsewhere in the ancient world, that provided people with an experience at least once in their lifetime, that helped them understand love, to understand the ways in which everything in the world is connected across space, and across time. So, Orphism, as a religion of ancient Greece, was an outgrowth of this psychedelic experience,

probably with a form of LSD. Ancient chemical knowledge was able to produce a psychedelic experience for a large number of people in the form of incense perhaps.

JHS: Yes.

RA: So I think that this is the model for what we're going through now. And we have incense being inhaled by people at a rave, it creates a kind of religious feeling, which might be not universal, but enough people have the experience and gain new understanding of love and interconnection, and what could be what could be the destination for our evolution for human culture evolving.

JHS: Tools to move the assemblage point, tools to move the from this unique radio station, this unique station moved to other stations of consciousness.

RA: Right? With which to die.

JHS: Oh, how grateful I am for that. Oh, how unbelievably grateful. Do you feel that this explosion of creativity that happened in the 60s/70s is bringing fruit at this time?

RA: Well, yes, I think it's kind of a race of good versus evil, because the evil or let's say the criminal empire, also is extremely creative, always making new forms, bad habits and diseases. Like genetically modified foods, for example. And so we don't know the outcome of this race. But it's so exciting to watch. And in any case, that duality is not really the way to understand what's happening in the world. But it's a nice metaphor, if we can think of the war on drugs as being the tool of evil forces to slow down the evolution of the good and

to give the devil the advantage in the long run.

JHS: Wow, I just you just gave me your thoughts in the in the wide in the wide picture opposing climate change and so going for the possible destruction of the planet is the is a way for the patriarchy the dying patriarchy to eradicate those plants, those natural substances that come from Gaia that help us move our consciousness increase our consciousness.

RA: Yes.

JHS: Wow. I mean, that may be a big motive without even them knowing for trying to eradicate the planet.

RA: Something like nuclear winter

JHS: Nuclear winter so plants that increase consciousness can't grow anymore. Wow, no more mushrooms. No more. I was gonna that's just kill Gaia?

RA: Well, well, yes, it is. It is the death track. That component of the world cultural history is a death track. The population explosion itself is the worst that we have, or religions devoted to the death track of population explosion. The population bomb is more dangerous than the nuclear bomb.

JHS: Well, how fascinating that von Neumann is credited with being the father of the H bomb, as well as coming up with chaos theory and or the beginnings of chaos theory. And computer dynamics, means talking about both sides of the coin?

RA: Yes, well, World War Two was the epitome of this dualistic battle of good and evil. I hate this bomb. But it could be that it was critical that the Allies should get the nuclear bomb before the Axis Powers before Hitler, and Hitler was close to an atomic bomb. They felt that this was crucial to have any future at all was to prevent killers winning like Man in the High Castle.

JHS: Yeah, yeah, exactly. And Philip K Dick is a saint.

RA: Absolutely.

JHS: Always saw the bomb as a deterrent. I mean, he absolutely died with that with that thought that he and he and the gang had created a deterrence, the ultimate deterrent actually.

RA: But unfortunately the genie is out of the bottle now. And people on all sides have access to this deterrent. I don't think that's the biggest danger now. But it is a model for what's happening now. Now the destructive forces are so mysterious and covert and complex, not a monolithic thing like nuclear energy.

JHS: Also, when I was reading you, I received this thought, which is, the story of history does not include the feelings and emotions of the people at the time the story is developing.

RA: Right, so difficult to understand the real data of history. With our own history, we try. You have your personal history, in the 1960s, and so on. It's so hard to remember the feelings of the time because we don't have the language to record them, we don't have the poetic skill.

And memories even go off track and get reinforced by other people's memories, and they're off track, too. My new book, *Hip Santa Cruz*, is a collection of memoirs, written by the pioneers of that movement, the hip culture, and sometimes they contradict each other. My own memories are sometimes contradicted by people who lived in the house with me. We cannot save a perfect simulacrum of a historical moment. So everything in front of me is reduced to stories, myths and understandings and misunderstandings of what has taken place, and even what is taking place right now.

JHS: Right, as you say, our view of the past radiates from the present. I love that.

RA: Yes. And in the present, is always being supplanted by a new present, for which there is completely different and greatly enriched images to project over the past.

JHS: Well, that encapsulates memory for you.

RA: Yes.

JHS: The music, the music of memory. And then, so that's the music of memory. What's the truth? Ralph Abraham, what's the truth?

RA: Will the real truth, please stand up.

JHS: Yeah, exactly. Never sit down again. Well, it's already changed, the truth has changed from then to now.

RA: New things arrive which are completely unimagined. Who would have thought the World Wide Web would happen,

ort the world of applications of smartphones. Smartphones, covering the planet, companies that can manufacture and sell a billion smartphones in a year. I mean, this is mind boggling. Nobody ever predicted such a thing. Where the interconnectivity of the individuals the nodes, the ultimate atomic elements of human society would be connected. It's incredible, how we are interconnected from the perspective of the mathematics of neural networks,

JHS: Uhmm

RA: The all important thing is the bandwidth of the channel that connects all of the nodes in the network, like a beehive. The human population of the planet, now interconnected for the first time.

JHS: Yes, yes, yes. We're coming close to ending our conversation and I want to ask you this question. How has the use of LSD and other psychedelics deepened your feelings for other living beings, sentient beings?

RA: Yes. Well, I think that before my first psychedelic trip, I don't know if I was even aware of the feelings of other sentient beings. That was just undeveloped in me. And if I had not had a psychedelic trip, I may have evolved into the person I am today anyway, I don't know. But it seemed to me at the time, that a huge door had been opened into a richer experience of life, in which I did feel I had synergy with living beings,

All the invisible connections had suddenly become real for me. And the real connections never disappeared, but only continued to nourish one another, and to grow into a stronger connection and feeling of oneness with the whole apparatus of life in the universe.

JHS: You are so kind, thank you very much for being with us.

RA: Thank you, Joanne. I'm so happy to know you.

JHS: Yes, me too. Me too.