

**RUPERT SHELDRAKE
TERENCE MCKENNA
RALPH ABRAHAM**

The Evolutionary Mind

Dialogues at the Edge of the Unthinkable

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Also by Ralph Abraham, Terence McKenna and Rupert Sheldrake

Dialogues at the Edge of the West

Also by Ralph Abraham

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Dialogue Press

THE EVOLUTIONARY MIND Dialogues at the Edge of the Unthinkable

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In Memory of Father Bede Griffiths

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Father Bede Griffiths, an English Benedictine monk who lived in India, was Rupert's teacher. His letter about our book Trialogues at the Edge of the West. He found a lack of the sense of the mystical, or of ultimate unity. Terence puts this unity at the end of time. Ralph connects it with the unity of the evolutionary process. Rupert sees it in the Holy Trinity. The Judeo-Christian faith in God's action in historical time, and at the end of time. Evolutionary theology. The cosmic attractor. Indeterminacy and the structure of time. Entelechy and the time wave. Freud and Thanatos, the death principle. Birth throughout the universe.

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Preface

We have been firm friends since we first met in 1982, in California, and have been meeting at regular intervals ever since, both in the United States and in England.

We spend most of our time together talking, trying out ideas, arguing, speculating, and enjoying each others' company. Our professional interests and backgrounds are very different: Ralph is a chaos mathematician and pioneer in the field of computer graphics; Terence is a psychedelic explorer, ethnopharmacologist, and theorist of time; and Rupert is a controversial biologist, best known for his hypothesis of morphic resonance, the idea that there is an inherent memory in nature. We also share many interests and enthusiasms in common, not least our affinity for India, where we have all lived at different times.

We soon found that these three-way discussions were especially stimulating and fruitful, at least for ourselves. We had no thought of these being anything other than private meetings of friends. But after some six years of these informal conversations, we were asked by Nancy Lunney, of the Esalen Institute, in Big Sur, California, to lead a weekend workshop together. As a consequence, our dialogues emerged into the public domain in September 1989. These discussions, together with others we held at Esalen in private over the next two years, formed the basis of our book *Dialogues at the Edge of the West*, published by Bear and Co. in 1992.

This book has been translated into Dutch, French, German, Polish and Portuguese, and many people have told us that they found it stimulating, and that it has sparked off lively discussions among groups of friends. We have been encouraged to find that ideas and conversations can spread in this way, and hope that the present book will enable this process to go further.

We have continued to meet as opportunities have presented themselves, and this book, *The Evolutionary Mind*, is based on discussions at Esalen in September 1992; in June

1993 in the West of England, at Hazelwood House, in the Devon countryside; and at Terence's rainforest retreat on the slopes of the volcano Mauna Loa, on the Big Island of Hawaii, in September 1994.

We have called this book *The Evolutionary Mind* because this title best summarizes the common themes of our discussions. Most are strongly influenced by the idea of evolution— of life, science, technology, culture, and indeed the entire cosmos; and also by the prospects for a greatly enlarged understanding of minds, expansion of experience, and transformations of consciousness beyond anything we can at present conceive.

We are very grateful to Becky Luening of Wordrhythm for the accuracy of her transcriptions, and to Paul Herbert for the gift of his recordings. And once again we are indebted to Nancy Kaye Lunney and the Esalen Institute for hospitality.

Grassroots Science

Rupert: As the organization of science becomes increasingly professional and institutional, big science increases in its scope and power. More research gets directed into huge projects like particle accelerators and the human genome project. Inevitably these attract funds, prestige and researchers away from the more traditional, low expense, low prestige branches of science. The tendency toward big science and fewer "centers of excellence" is going on all the time. Access to big money is coming to dominate the whole structure of science as we know it. This is merely a carrying further of the process of professionalization and institutionalization that's overtaken mainstream science in the present century.

In the 18th and 19th centuries, the situation was very different. Charles Darwin, for example, never held an academic post in any institution. In his books, for example in my favorite one, *The Variation of Animals and Plants Under Domestication*,¹ the research base on which he was drawing was that of practical plant and animal breeders, animal trainers, pigeon fanciers, colonial administrators, and so on. In other words, there was a vast wealth of knowledge and experience that fed into Darwin's kind of science, hardly any of which came out of government-funded scientific institutions.

We now see a completely different picture, as the non-professional experience becomes increasingly marginalized. You can't do research until you've got a Ph.D., and you're in an institution, and you've got a grant, and you can write the kind of proposal that impresses a committee of professional scientists.

Organized science is moving further and further in this direction, and is becoming increasingly commercialized as well. I question whether things have to be as they are. Is a new model possible? I think a new model of science is not only possible, but desirable; and not only desirable, but necessary.

On the one hand there's been a decline in public support for science. Genetic engineering is getting very bad press, and research in biotechnology excites more public fear than admiri-

ration. The same is true of nuclear research, particle physics re-search, star wars research, and many other aspects of big science. People blame the environmental crisis, nuclear pollution, factory farming, chemicals in food and toxic wastes, fairly or unfairly, on the scientific establishment. As public support for science declines, governments seeking to make cuts find it's quite easy to reduce science budgets. It does not cause many votes to be lost, in fact it may even be popular.

This declining public esteem and reduced funding has led to a reduction in scientific morale, and the proportion of young people who want to study is falling in Britain and in many other countries. Many scientists are very demoralized, and it looks as if the golden age of ever-expanding science budgets in the '60s and '70s is over, perhaps forever. In this context, a possible new approach to science becomes more feasible. It is necessary simply for economic and political reasons.

Fortunately, holistic research is much cheaper than reductionistic research. If you study whole systems you usually need relatively small funds. Conversely, the smaller the thing you study, the bigger the apparatus and the more the funding. When you get down to the most evanescent nuclear particles, you need accelerators many miles long, costing billions of dollars.

I have come to realize that interesting and important research projects can be done on very small budgets by students, or by amateurs outside the framework of institutional science. In my recent book, *Seven Experiments that Could Change the World: A Do-It-Yourself Guide to Revolutionary Science*,² I propose seven experiments, any one of which could break our current paradigms, most of which could be done for less than \$50. One example is research with dogs or cats that know when their owner is coming home (Chapter 6).

I think the conditions are right for a new awakening, a new renaissance of research, a more democratic kind of science in which more people are empowered to take part. When you think about it, the kind of knowledge that Darwin drew on exists today, even more so. There are tens of thousands of amateur plant breeders, for example orchid growers, who lavish

care and attention on the plants with their own funding, and some are breeding new varieties of orchids. There are rose societies, bamboo societies, cactus societies, and so on, where people swap specimens and share their experience and knowledge. There are probably more pigeon enthusiasts, dog breeders, and rabbit fanciers than ever before; many millions of people worldwide. There are people who train horses and dogs, falconers who train falcons. There are old-style naturalists, such as bird-watchers, still around. There are also millions of computers, previously the preserve of big institutions, making sophisticated mathematical analysis available to almost anyone. In addition there's the whole realm of psychedelic experience, where professional research is very limited in scope but amateur research has accumulated a wealth of experience

In summary, a great body of knowledge is currently available through amateur networks and societies, at present almost completely disregarded by institutional science, and flourishing despite the lack of external funding. From this basis a new kind of grassroots science could arise, possibly through the extension of existing networks, possibly by building up regional research networks. This grassroots science need not be seen as a rival to existing science, but as complementary to it. These two systems could cross-fertilize and influence each other.

Ralph: This sounds wonderful and very promising, and if it can simply happen as you've described it, then the decline of science could be reversed. Clever young people would be attracted and more and better information and understanding could be developed. I certainly think that's desirable, although I share with many ordinary people a decline of confidence in science, for the reasons you've described. The acceptance of a new model of grassroots science by the scientific establishment seems somehow very unlikely. The population of the scientific establishment would have to be totally exchanged with new young people who had grown up in these new kinds of research groups. This would have to evolve through a series of developments difficult to envision at this time. I see a problem in the extension

of networks and the sharing of results; the function of big science provided by publication in journals with the peer review process. The very growth of population, civilization, and the scientific establishment means there's an immense amount of data, that if not shared or made available or archived in libraries, can't be accessed. I think the key to the development of a new model would be a new model of communication, for sharing the results of research. It won't be sufficient for each group of pigeon fanciers in South Burlington, Vermont to have a journal or regional newsletter. There would be too many newsletters to read. How will the regional networks be organized and

communicate with each other? The secret key to empowering the success of this new development is the communications aspect of the computer revolution—electronic bulletin boards, computer networks, central electronic libraries, and developments not yet envisioned for the archiving and sharing of research information. Until everyone can access the results of previous research and easily survey all that has been done in a certain area, the dream can't really become a reality.

It may be that the lack of this kind of successful means of communication is the very reason that big laboratories and big sciences actually evolved. The governments have tried, experimented and proved, to their own satisfaction, that the investment of big bucks in the big laboratory gives a bigger bang than granting smaller sums to a large number of small laboratories. Certainly these small groups will need grants. They'll need some support and equipment. Inexpensive science still costs.

Rupert: If you take, say, pigeon fanciers, they already have journals: in Britain, for example, there are several, such as *Racing Pigeon Weekly*. None of them get grants. They buy their own pigeons, raise and maintain them, breed them, and there's a system of competitions and prizes for successful winners of races. The whole thing is completely self-financing. Cooperation between these different communities of researchers or practitioners already exists. One could pose certain questions to them, like, "How do racing pigeons home?" This kind of question,

when formulated and put out in the racing pigeon press, might engage a certain number of people wanting to do experiments, for example, moving the lofts away from the pigeons and seeing if they can find them. The results would be fed through these existing magazines and networks and there would be a debate within and beyond the pigeon fancying community.

It's partly a question of formulating questions that are of wider interest than the nuts and bolts questions asked within existing groups, leading to a larger picture.

Ralph: If the interesting questions come from a central authority, capturing the imagination of groups worldwide, and they accumulate their data in standard form readable by other groups, then a bigger regional or global picture could be developed. In order to synthesize all this information, a really large map or computer graphic display is required; something two steps beyond the budget of these small groups. There would be a network where pigeon fanciers doing research with homing pigeons would create primary data stimulated by a certain question, and then secondary groups would access the data from other centers and other countries and test certain hypotheses about the strength of the morphogenetic field, for example. For all of this to happen would require substantial motivation. These amateur groups have the habits of the 19th century. Broadcasting their results to central labs and secondary research groups trying to develop a larger global picture isn't part of their habit. The question of global environmental problems touches on what may very well be the powerful motivation that would incline these groups to a higher level of cooperation among themselves. In the context of this idea bad news is good news; the rapidly approaching environmental problems are going to stimulate a global response.

Terence: I'm as interested as the next person in the reform of big science. However, rather than seeing Rupert's statement as a practical plan for the reform of science, I see it more as a proposal that can point out what's wrong with science and how far off the

track we've got. Grassroots science can approach rather tangible problems, but if you're interested in something like the neutrino output of the sun, instrumentalities of great cost are necessary. Science has not only moved from the easy problems to the hard problems in its evolution over the past thousand years; it's also moved from the cheap problems to the expensive problems. It's now wedded to instrumentalities of such size and cost that even nations seem to need to band together. For instance, I don't think there's any way for grassroots science to finance and execute a super-collider project or an expedition to Mars.

Science has been vastly transformed from the simple impulse to understand the natural world around us, into a kind of hellish marriage with instrumentality, technology, capitalism, and the military-industrial complex. Addressing these four areas of concern: (1) Instrumentality refers to the great cost of scientific instruments; (2) Technology refers to the fact that science as the handmaiden of advanced product research has gained overwhelming sway over most of our lives. (3) Capitalism refers to the demands of an economic system that distorts the scientific impulse to understand the natural world, so that we spend hundreds of millions of dollars discovering whether chemicals that go into a facial soap are allergenic, while we wouldn't allocate \$100 thousand to study a very basic and interesting question like how pigeons home; (4) The Military Industrial Complex refers to the largest governmental institutions which have largely appropriated major scientific research.

Science isn't done in the spirit of Greek curiosity about the order of nature, it's done to make money on a vast scale, and then to defend those

fortunes. I dare say, no funding would be forthcoming if there was no anticipated payback from that funding.

I see your proposal as not so much leading to the reform of science, as to the creation of a parallel institution. We could call it the "people's science," or "hands-on science." I've named some of the most overwhelming and monolithic forces in our society. How can we rescue Dame Science from the hands of such intractable foes of the original Greek impulse to simply

understand the world?

Rupert: Part of the answer comes from the shift in paradigm which is happening for a variety of reasons independent of politics and economics, namely the move toward a more holistic model of science. As I said earlier, holistic research, looking at whole systems, is much cheaper than analytical research, looking at smaller systems. Atomism, which is the philosophy that underlies reductionism, puts the greatest emphasis on the smallest possible things. The smaller the thing, the bigger the apparatus. The highest prestige attaches to superconducting super colliders, which are the biggest pieces of apparatus you can make, and are for studying the smallest particles of matter. If we undergo a shift of models, as we are doing, reductionist science seems somewhat less interesting, less relevant, less attractive.

You can see this happening in medicine. If the medical research system is entirely in the service of mechanistic medicine, the emphasis is on new methods of biochemical diagnosis using genetically engineered diagnostic aids and high-tech scanning equipment. Meanwhile holistic healing methods flourish successfully in small towns all around the world. There's not really much effort to compare these approaches, to see which work better than others.

It's clear that the economics of the medical system, with its escalating costs constantly spiraling upwards, is provoking a worldwide crisis in health care. If we can cut down on the cost of heart transplants and expensive scans by people doing more meditation, or acupuncture, or taking homeopathic remedies, it could lead to far cheaper medical insurance and a different kind of medical research. For example, systematic surveys could be carried out by students or local communities, who would ask people what diseases they've had, how they think they've been cured, and how they rate the effectiveness of the different systems they've used. In many cases the word-of-mouth method is in fact how one gets to know about things like acupuncture or chiropraxis; somebody tells you they've been cured that way, and so you try it. Such a survey could be

done at any level of sophistication or depth.

I think that as soon as you begin to look holistically at things, the need for large instruments is lessened. If we think differently about the need for missions to Mars, star wars technologies, human genome projects, large-scale nuclear physics projects, the need for vast instrumentalities may become less.

Terence: What you seem to be advocating is the collection, correlation and study of data as something which doesn't cost a lot of money and which can be done on home computers by self-organized networks of people. I agree that probably the forward rush of big science has ignored a lot of areas, but what do you say to the extraterrestrial planetologist or to the astrophysicist, or to the molecular biologist? It seems there are large areas of science which have become so wedded to the need for instrumentalities of great cost that there is no way to do them without large research programs and enormously expensive instruments. What you're really focusing on, is not so much a down-sizing of science, as a re-focusing of it in the biological, medical, and sociological domains. This is highly warranted, but can it be done? To tell the astrophysicist that the exploration of the galaxy will be halted, to tell the oceanographers that the exploration of the deep sea will be halted, is not entirely in the service of the original Greek impulse to understand nature.

Ralph: They're going to be told that anyway.

Rupert: They are being told already in Britain. Nuclear physicists are in shock.

Ralph: Even if popular support remained tremendous for sub-nuclear particles, the budget crisis would make it impossible to continue in that line. Meanwhile, we have new crises. Nuclear physics was a response to an urgent need in the military-industrial complex. Now we have new military problems, and the defense departments of various nations are doing an about face to reorient themselves toward new kinds of enemies.

We acknowledge that big science is going to continue to exist, but it must economize, reorient itself toward real problems in order to maintain popular support, and reintegrate with grassroots science because of economics, and because the information on that level is needed. I foresee that the new model for big science is going to be data banks, together with scientific visualization strategies based on computer graphics, which as you correctly implied, is expensive. The "Mission to Planet Earth," NASA's proposal to monitor the temperature everywhere from satellites, will actually be very inexpensive compared to ground-based methods of collecting the same data. The problem is how to visualize it. Here we see groups working at the national laboratory level with enormous super computers that are really expensive, trying to devise ways to synthesize all this data and get the total picture. Until that's figured out, I don't think we'll benefit from all this grassroots science, either what exists today or what would be delivered in the future in response to some really exciting new questions proposed from a larger view of global planetary behavior. The piece of the budget pie for science is shrinking. To get the largest results from a fixed or shrinking budget, it will continue to be necessary to have big science lab centers, where the synthesis of all the information is handled. The largest problem of science in the future will be to manage this enormous database. The fact that physical scientists, rather than social and environmental scientists, have gotten a disproportionate piece of the pie so far is because they've not had to deal with databases that are of unmanageable size to deliver a product that's adapted by business for high-tech commodities, gadgets and consumer products.

Terence: Institutions expect a payoff on the investments they make and the people they train, and big science has been the tent under which product development has led to a pay-back for the university, so that laboratories can be endowed and so forth. It's very hard to see how the small science model closes the loop and pays its own way. It reminds me of the English

squire or naturalist, who carries out observations in his local area that are very interesting, but that only his private wealth allows him the luxury of pursuing. How will grassroots science support itself? How will it be other than something in the hands of hobbyists and dilettantes?

Rupert: There are two things that can happen. Already amateurs do these things on quite a large scale. Pigeon fanciers, of whom there are about 250,000 in Britain, are mostly working class, and some are on social security. It's so cheap that you can do it on that level. This wouldn't just involve squires. We live in a far more prosperous society than ever before, so that this kind of expenditure of money on what people really enjoy, is widely available. Even if it's only at the level of gardening, one of the most popular of all hobbies, people don't need grants to buy plants for their garden, and they wouldn't need grants to graft different ones together or to breed different ones by crossing them. When it comes to the need for additional funding for things like data banks, there could be a new system of regional research councils, where a tiny fraction, less than 1% of existing science budgets, would be put into funding grassroots science. A tiny fraction of existing science or education budgets devoted to funding this grassroots network would be politically popular, and help to regenerate interest in science.

Terence: Don't you think, though, that the public support for science is based on an expectation that it will usher in new technologies which the mass of people have a great faith will deliver them into a somehow better world? If you break that chain of expectations, saying, "We're now going to do science in such a way that you can forget about new technologies," that the interest in science will decline to the level of the interest and support of tournament Chess?

Ralph: Forget the old model. We're talking about a revolution of science in the context of a major paradigm shift in which it would be one component. One of the things we're anticipating

is global environmental problems. They're already here, in fact. People thinking of the future are going to expect from science, from government, from religion, from themselves, salvation from these serious problems. Just as from medical science people want cures for cancer and AIDS. They want solutions, they don't want only products.

In order for grassroots science to participate in the solution of these problems, it isn't sufficient to develop a new and parallel scientific establishment living on its own and doing its best work on a low budget. We need to integrate that with a new model for society which would emerge under the evolutionary pressure of environmental problems. The new grassroots science would have to link up in an effective way with scientific journals and glossy magazines like Scientific American, presenting the progress they make toward solutions of major problems, alongside the results of big laboratories and everybody else. It's not enough to offer competitions and prizes. You must offer the possibility of publication, and access to the public support that nourishes amateur as well as professional scientists.

Terence: Take as a test case the depletion of the ozone. To study this requires the cooperation of several national Air Forces with massive data acquisition and analysis facilities. When you move from studying it to doing something about it, it may take a significant portion of

every dollar we all make for the rest of our lives. The fate of the planet may hang in the balance. How can a grassroots science make a contribution to that?

Ralph: The ozone hole was first observed in Federal laboratories, which was correcting old data that it had neglected to study. If amateur scientists would have had access to the data sitting in this archive, then they might have made the discovery. The hole was originally thought to be totally isolated over the poles, but now they've discovered a vortex that is gradually sucking ozone from the temperate regions. If amateur scientists had ozone observers, which are simple little telescope devices, they could measure the ozone density over their own home, then the rate at

which the ozone depletion is diffusing over population centers would be observed when it might very well be overlooked by the large laboratories who exclusively devote their research to the activity over the polar regions.

Terence: And what about doing something about it?

Ralph: I can envision a new model in which big science existed as it is today on a lower budget, grassroots science existed as it does today on a larger budget, and the two are coupled together much more tightly, through information sharing mechanisms. The National Science Foundation, for example, of the United States, might have as its main mission the storage and provision of access to this enormous data, so that people can come up with a new hypothesis, a new question. The small competition would stimulate high school students who could then actually obtain the data that no one else is looking at, about the ozone depletion or whatever, and win the prize for making a phenomenal new discovery from data.

Terence: We keep on returning to the fact that big science provides the data or else the data is accessible by non-expensive, local means; that somehow the problem is to acquire the data. For many problems, like the ozone hole, or the danger of plan-etesimal impact on the earth, or analyzing the effect of the Philippine volcanic eruption, the acquisition of this data is going to keep big science in business for a while. I absolutely agree with you that there should be no such thing as classified scientific data, but I wonder if, at least in this stage of the technological revolution, a Mac is sufficient to deal with the data collected. Perhaps it is. If not, then the small scientist remains at a disadvantage, because number crunching is an important part of the analysis of the huge data stream that is coming in. Maybe the answer is to concentrate on dropping the cost of super computing.

Ralph: Well, that's happening.

Terence: Won't that require an enormous governmental project costing billions of dollars, the very thing we're trying to get away from?

Ralph: The computer revolution is actually the answer to the main problem. The prices are spontaneously dropping. Your personal super computer on the desk is a reality today. It'll be cheaper tomorrow; we can take that for granted.

Terence: Brought to us by Microsoft, one of the largest corporate entities in the American capitalist system. It won't be done by two guys in a garage. That era is gone forever.

Rupert: In concentrating on these huge problems, like the ozone hole, what do you do about it? While I don't deny there's a problem at that level, there are problems at much lower levels, where an enormously greater amount can be done by amateur data collection without vast number crunching, and where doing something about it can come about much sooner and quicker than solving enormous climate problems. A lot more has been done, in Britain at least, by amateur groups like Green-peace and Friends of the Earth. These things don't need huge number crunchers. Fairly simple data is needed to turn doing something about it into political action through existing pressure groups. Friends of the Earth collects samples in rivers downstream from industrial firms and from drinking water supplies. For example, they find that in much of Britain the nitrate levels permitted by British and European regulations are exceeded, pesticide residue levels are far too high, etc. This kind of data, if collected at all by our government, is kept secret. When it is collected and published, requiring no great sophistication or enormous number crunching, it can lead to enormous political effects, and pressure to do something about these things. Environmental groups already use rather simple analytical techniques, and very simple data processing methods, to great effect.

Terence: I think we're left with the conclusion that there has to be a parallelism that somehow leaves room for both of these ap-proaches; that

they address different areas of concern; and when they can make common cause, that's all well and good, but they're really directed toward, in most cases, different ends.

Rupert: Not necessarily. You said that people wanted science to give a product or something useful, but that's not really true in some cases. One of the most popular things in the world of science, of interest even to three-year-olds, are dinosaurs. The interesting thing is that one of the most useless branches of science, paleontology, has enormous grassroots support.

Terence: A major paleontological project has the character of a major dam-building or excavation project. It costs millions.

Rupert: Most of these bones were collected in the last century by amateurs for virtually nothing. But it may cost millions to build huge plastic models of dinosaurs that emit roaring noises.

Terence: I'm talking about sinking a fossil shaft somewhere in the Gobi Desert and extracting in a proper scientific manner the fossils therein. This requires maintaining hundreds of people in the field, from staff scientists down to coolies, over two years, along with air transport of hundreds of tons of rock back to the museums.

Rupert: Paleontology was already a well-established science in the 19th century, on incredibly low budgets, mostly funded by amateurs. A wonderful example of low-cost, grassroots science.

Terence: I don't have that great a familiarity with paleontology, but I do know something about archeology, and it costs a fortune to do it right. Today, when you go into Guatemala or the Yucatan to excavate a Mayan site, you have to keep a team in the rainforest for six months.

Ralph: Rupert hasn't suggested slashing all budgets to zero. Presumably most of the expensive projects will continue to be funded according to the degree by which they can gain public support, provide exciting results, and solve important problems. Simultaneously, they could be influenced enormously by discoveries of the grassroots science groups, feeding into the determination of how this budget is supposed to be spent.

Terence: Sticking with archaeology for a moment, it's an interesting science in that it doesn't generate new products, or give us a sense of progress. It doesn't feed into the military industrial complex. It seems almost the model of what we're talking about, and yet for all those reasons it's absolutely famished for money, finding it very difficult to obtain funding. An enormous amount of archaeology is funded only by the patronage of wealthy enthusiasts. It's not a happy experience to spend an evening with archaeologists listening to them discuss the difficulties they're having funding projects that they can in a few minutes convince you are very worthy and interesting. Archaeology may show us problems that we can anticipate if we try to expand this model.

Rupert: At the moment, the archaeology budget, I'm sure, is a tiny fraction of the budget for the genome project or the super collider. Archaeology is actually a good case to use as a model. There's a large grassroots base, amateur participation, popular interest, and even the biggest projects are relatively cheap compared with large-scale science.

What I am proposing is not that a hundred percent of available funding should go to grassroots science and zero to existing institutional science, but rather that we change the present situation where 100 percent goes to existing institutional science. If 99 percent went to institutional science and 1 percent to grassroots science, it would turn around the situation, changing the base of science's popular appeal and I think bringing a whole new vigor and a whole new spirit into the sci-

entific endeavor.

Another case in point is in your particular realm of expertise, Terence. Psychedelic research seems to me a very important component of consciousness research. We hear a lot about the need for consciousness research because we know so little about the human mind. A lot of funding goes into cognitive psychology, particularly if it involves computer models, because it can feed the development of new generations of computers. Relatively low funding goes into research that's to do with psychotherapy, because it's mostly the province of practicing psychotherapists who are funded by the people that go to see them. A certain amount goes into official psychiatric and drug research to do with tranquilizers, and so on. But the vast majority of psychedelic research, which has a lot to say about the nature of consciousness, the range of the imagination, and the powers of the human mind, is not funded at all by official agencies. In fact every effort is made to suppress it. Yet, in spite of official discouragement and suppression, research actually continues. Here's an area where for legal and other reasons,

virtually the whole of the research effort is in the amateur domain. Here's an area where the formulation of appropriate questions could lead to interesting research being undertaken by explorers of the psychedelic realm.

Terence: I quite agree. This would be an obvious area where the simple codification and making available of data would have a tremendous impact on the models being developed within the field.

Ralph: A related area is astrology, and the so-called pseudo-sciences, altogether funded by amateur groups. If the means existed for sharing the information that already is known, it could result in various experiments that would lead psychedelic research, pseudosciences, and other theories, now totally rejected by regular science, to reemerge back into the mainstream and begin making a contribution toward the solution of our global problems.

Terence: Human sexuality is another area where data is not gathered because of institutional biases that are conscious or unconscious. It's probably one of the least organized areas of social research that exists, and yet it's central to our psychological health and our sense of equilibrium in the world. Nutrition is another.

Ralph: One of the faults of big science is associated with the reductionist perspective, which has led to a gradual, progressive, never-ending elimination, trimming, pruning off of different things that are labeled pseudoscience, amateur science, fringe science, and so on. The paranormal, nutrition, all kinds of alternative medicine—all these things that are rejected comprise a daily growing group, while the number of natural phenomena studied by big science, official science, and establishment science is always shrinking. One of the important gains of the new model for alternative science would be to open up cracks in the structure for the reintegration of all these different threads, which represent a kind of a holistic approach to the field of knowledge, especially when you include archaeology, history, and social science. What we're talking about is bigger than science really; the reintegration of the entire intellectual sphere.

Rupert: So how can all this be implemented?

Ralph: We've sort of derived a workable alternative system here, assuming that other paradigms in society will shift simultaneously. The key for the transformation into this new model would be changes in the universities and high schools. We mentioned several times high school students responding to prizes offered for solving problems. Universities have been one of the main institutions supporting the restrictive peer review, super professional, and archaic model of science. If universities were reformed so that they had departments of integration, interdisciplinary programs, and a holistic approach, they could

play a tremendous role in preparing people to be amateur scientists. The questions being proposed by the question centers should become part of the curriculum in universities.

The kind of change we want is a recognition that the full holistic range of intellectual endeavor, including what we call research, is nothing more than participation. A person who's going to participate in life, in evolution, in building the future of the planet and the species, will find that among other things, it's necessary to do research. One can be an amateur athlete and an amateur scientist and an amateur historian and so on. If universities are preparing people with a model of self-education which can be continued indefinitely, then of course they would be teaching grassroots science. They would be teaching where to find the questions, where to publish the answers, how to use the computer to, and generally how to, do it.

Rupert: In a sense, the move in science education towards students doing projects is working in this direction. The only trouble is that most of the projects they do are banal and derivative. It's assumed that a student cannot really do a truly original and interesting project. There are very few student projects that I've come across that can be seen as real research. But the system of student projects is already in place; it is mainstream. It's just that taking its potential seriously hasn't happened yet.

Ralph: Students are demanding more interesting problems, and if they aren't forthcoming, they abandon science and go to something which is more interesting; where they have real problems that students can address, like computer science. The creation of a new model for grassroots science would actually give universities the opportunity to revitalize their science curriculum, thereby attracting better students, and giving them something to aim at in their lifetime of research, without large grants and working in big laboratories for the military-industrial complex.

[Notes: 1 Charles Darwin, *The Variation of Animals and Plants Under Domestication* (London: Murray, 1875).

TWO

Psychedelics, Computers, and Mathematics

Ralph: I was sitting in my office with my secretary Nina about a year and a half ago when there was a knock on the door. Nina said, "This is a friend of a friend of mine, who wants to interview you." I was very busy with the telephone and the correspondence, so he came inside and I answered his questions without thinking. After a month or so, when a photographer arrived, I began to realize that I had given an interview for *Gentleman's Quarterly* (GQ) magazine. I called my children and asked them what was GQ magazine. They live in Hollywood and know about such things. I was in Italy when the magazine finally arrived on the stands. I was very proud, in spite of my style of dress, that I had been the first one in our circle of family and friends to actually be photographed for GQ. But I was shocked in Firenze to open the first page of the magazine, and see my picture occupying a large part of the first page, with the table of contents, with the heading: "Abraham sells drugs to mathematicians." There were some other insulting things in the interview, that as far as I can remember, was largely fiction. I didn't mention it to anybody when I came back to California, and was very pleased that nobody mentioned it. Nobody had noticed. There were one or two phone calls, and I realized that nobody after all reads GQ. If they do look at the pictures, they overlooked mine. I was safe after all at this dangerous pass.

Until suddenly, my peace was disturbed once again by 100 phone calls in a single day asking what did I think of the article about me in the *San Francisco Examiner*, or the *Chronicle*, or the *San Jose Mercury News*, and so on. All the embers in the fire left by GQ had flamed up again in the pen of a journalist. A woman who writes a computer column for the *San Francisco Examiner* had received in her mail box a copy of the *Gentleman's Quarterly* article, in which Timothy Leary is quoted as saying, "The Japanese go to Burma for teak, and they go to California for novelty and creativity. Everybody knows

that California has this resource thanks to psychedelics." Then the article quoted me as the supplier for the scientific renaissance in the 1960s. This columnist didn't believe what was asserted by Timothy Leary and others in the GQ article, that the computer revolution and the computer graphic innovations of California had been built upon a psychedelic foundation. She set out to prove this story false. She went to Siggraph, the largest gathering of computer graphic professionals in the world, where annually somewhere in the United States 30,000 who are vitally involved in the computer revolution gather. She thought she would set this heresy to rest by conducting a sample survey, beginning her interviews at the airport the minute she stepped off the plane. By the time she got back to her desk in San Francisco she'd talked to 180 important professionals of the computer graphic field, all of whom answered yes to the question, "Do you take psychedelics, and is this important in your work?" Her column, finally syndicated in a number of newspapers again, unfortunately, or kindly, remembered me. Shortly after this second incident in my story, I was in Hollyhock, the Esalen of the far north, on Cortes Island in British Columbia, with Rupert and other friends, and I had a kind of psychotic break in the night. I couldn't sleep and was consumed with a paranoid fantasy about this outage and what it would mean in my future career, the police at my door and so on. I knew that my fears had blown up unnecessarily, but I needed someone to talk to. The person I knew best there was Rupert. And he was very busy in counsel with various friends, but eventually I took Rupert aside and confided to him this secret, and all my fears. His response, within a day or two, was to repeat the story to everybody in Canada, assuring me that it's good to be outed, and it would be good to come out in a best-selling book, which John Brockman, our agent, could hawk for a huge royalty advance. I tried thinking positively about this episode, but when I came home still felt nervous about it and said "no" to many interviews from ABC News, and the United Nations, and other people who called to check out this significant story. I did not then rise to the occasion, and so I've de-

cided today, by popular request, to tell the truth.

It all began in 1967 when I was a professor of mathematics at Princeton, and one of my students turned me on to LSD. That led to my moving to California a year later, and meeting at UC Santa Cruz a chemistry graduate student who was doing his Ph.D. thesis on the synthesis of DMT. He and I smoked up a large bottle of DMT in 1969, and that resulted in a kind of secret resolve, which swerved my career toward a search for the connections between mathematics and the experience of the logos, or what Terence calls "the transcendent other." This is a hyper-dimensional space full of meaning and wisdom and beauty, which feels more real than ordinary reality, and to which we have returned many times over the years, for instruction and pleasure. In the course of the next 20 years there were various steps I took to explore the connection between mathematics and the logos. About the time that chaos theory was discovered by the scientific community, and the chaos

revolution began in 1978, I apprenticed myself to a neurophysiologist and tried to construct brain models made out of the basic objects of chaos theory. I built a vibrating fluid machine to visualize vibrations in transparent media, because I felt on the basis of direct experience that the Hindu metaphor of vibrations was important and valuable. I felt that we could learn more about consciousness, communication, resonance, and the emergence of form and pattern in the physical, biological, social and intellectual worlds, through actually watching vibrations in transparent media ordinarily invisible, and making them visible. I was inspired by Hans Jenny, an amateur scientist in Switzerland, a follower of Rudolf Steiner, who had built an ingenious gadget for rendering patterns in transparent fluids visible.

About this time we discovered computer graphics in Santa Cruz, when the first affordable computer graphic terminals had appeared on the market. I started a project of teaching mathematics with computer graphics, and eventually tried to simulate the mathematical models for neurophysiology and for vibrating fluids, in computer programs with computer graphic displays. In this way evolved a new class of mathematical mod-

els called CDs, cellular dynamata. They are an especially appropriate mathematical object for modeling and trying to understand the brain, the mind, the visionary experience and so on. At the same time other mathematicians, some of whom may have been recipients of my gifts in the 1960s, began their own experiments with computer graphics in different places, and began to make films.

Eventually, we were able to construct machines in Santa Cruz which could simulate these mathematical models I call CDs at a reasonable speed, first slowly, and then faster and faster. And in 1989, I had a fantastic experience at the NASA Goddard Space Flight Center in Maryland, where I was given access to, at that time, the world's fastest super computer, the MPP, the Massively Parallel Processor. My CD model for the visual cortex had been programmed into this machine by the only person able to program it, and I was invited to come and view the result. Looking at the color screen of this super computer was like looking through the window at the future, and seeing an excellent memory of a DMT vision, not only proceeding apace on the screen, but also going about 100 times faster than a human experience. Under the control of knobs which I could turn at the terminal, we immediately recorded a video, which lasts for 10 minutes. It was in 1989 that I took my first look through this window.

To sum up my story, there is first of all, a 20-year evolution from my first DMT vision in 1969, to my experience with the Massively Parallel Processor vision in 1989. Following this 20-year evolution, and the recording of the video, came the story with GQ and the interviews at Siggraph in the San Francisco Examiner that essentially pose the question, "Have psychedelics had an influence in the evolution of science, mathematics, the computer revolution, computer graphics, and so on?" Another event, in 1990, followed the publication of a paper in the International Journal of Bifurcations and Chaos, when an interesting article appeared in the monthly notices of the American Mathematical Society, the largest union of research mathematicians in the world. The article totally redefined mathe-

matics, dropping numbers and geometrical spaces as relics of history, and adopting a new definition of mathematics as the study of space/time patterns. Mathematics has been reborn, and this rebirth is an outcome of both the computer revolution and the psychedelic revolution which took place concurrently, concomitantly, cooperatively, in the 1960s.

Redefining this material as an art medium, I gave a concert, played in real time with a genuine super computer, in October, 1992, in the Cathedral of Saint John the Divine, the largest Gothic cathedral in the world, in New York City

We come to our subject. I want to pose one or two questions, and read here one or two excerpts from some favorite books. We have to accept, I think, mathematics either in the new definition, or the old one. In the Renaissance cosmology of John Dee, mathematics is seen as the joint therapist of Father Sky and Mother Earth, or a kind of an intellectual, spiritual, elastic medium connecting up the heavenly realms and Gaia herself. That puts mathematics on the same level as the logos, or the holy spirit. Let's consider that for the sake of discussion. Having seen mathematics as a language of space/time pattern, let me ask you this, Terence and Rupert: To what extent could the psychedelic vision of the logos be externalized, either by verbal descriptions or by computer simulations, or by drawings of inspired visionary artists? On the other hand, in what ways could mathematical vision serve the spirit, and extend the mind? Is there a role, in other words, for this kind of thing in our main concerns? To give you a fast-forward toward the answer, let me read a couple of things from your writings.

First, from Terence's Food of the Gods2: "The archaic revival is a clarion call to recover our birthright, however uncomfortable that may make us. It is a call to realize that life lived in the absence of the psychedelic experience, upon which primordial shamanism is based, is life trivialized, life denied! Life enslaved to the ego and its fear of dissolution in the mysterious matrix of feeling that is all around us. It is in the archaic revival that our transcendence of the historical dilemma actually lies. There is something more. It is now

clear that new developments in many areas, including mind machine interfacing, pharmacology of the synthetic variety, and data storage imaging and retrieval techniques; it is now clear that new developments in these areas are coalescing into the potential for a truly demonic, or an angelic self-imaging of our culture."

Our second passage is from Rupert's *The Rebirth of Nature*³: "As soon as we allow ourselves to think of the world as alive, we recognize that a part of us knew this all along. It is like emerging from winter into spring. We can begin to reconnect our mental life with our own direct, intuitive experiences of nature. We can participate in the spirits of sacred places and times. We can see that we have much to learn from traditional societies who have never lost their sense of connection with the living world around them. We can acknowledge the animistic traditions of our ancestors, and we can begin to develop a richer understanding of human nature, shaped by a tradition and collective memory, linked to the earth and the heavens, related to all forms of life, and consciously open to the creative power expressed in all evolution. We are reborn into a living world."

Terence: The nuts and bolts question posed in all of that, is "Can the psychedelic state be visualized with technologies ranging from paint and brush to super computers?" I think it can. I think it is not, in principle, mysterious. It may be fleeting, like the situation that follows upon the splitting of the atom. It may be remote. But it is in principle describable. It's a domain to be explored. It's simply a matter of paying attention, gaining inspiration, and gaining skill of technical execution.

Ralph: Any models that we can build, verbal, visual, or math'ematical, are feeble compared to the experience itself. On the other hand, this experience is within all, and without all, and we are immersed in the spiritual world, so the tiniest resonance from the most feeble model may suffice to excite, as poetry excites emotion, spirit. The essence of communication is to have a compact representation of an experience that's infinitely complex. The representations have to be really simple.

Representation restricted to verbal mode alone, might be too feeble to excite by resonance, the similar state. Not every person is going to become a cephalopod.⁴ Not every person has the time to become a shaman. We need, however, a certain number of shamans in our culture to help to reconnect human society and the play in the sky. We need some kind of amplifying and communicating device between the few people who are our real shamans, let's say sacred artists of the future, and the mass society watching MTV. The question is, can these means be of use to the clarion call that you've given in your book?

Terence: I think that what makes it confusing is when you go into these domains, the encounter is an emotionally powerful one. The situation is so novel that the experient tends to assume that this emotional power is coming from the input. It's not. It's coming from the encounter with the input. I mean it's like posing the question, "Can you make a stirring record of the Grand Canyon?" Yes, you can, with helicopter-mounted cameras and this sort of thing. But the emotion you have watching that, you bring to it. The psychedelic dimension is objective, but it's also so awesome and so different from what we know that it encourages and promotes and triggers awe in us. We bring something to it, which we can never image, or reduce to a verbal description or a piece of film. The thing itself is just more of reality, like the heart of the cell, or radar maps of the Venustian surface, or the center of the atom.

Ralph: Do we need more reality? We've already got so much.

Terence: We need more of this mental logos world. It's the logos world that we've lost the connection with. These computer programs, psychedelic drugs, dynamic modeling schemes, are the equivalent of probes, like Voyager. They're sent not to an alien planet, but to an alien phase-space of some sort, one that we need connection to.

Rupert: I agree with Terence. The problem is that the emotional intensity of a psychedelic experience is totally different

from seeing a computer graphic display. It's possible to get something a bit like that just by shaking a kaleidoscope and looking into it. In these expensive novelty shops that dot California, you can find fancy kaleidoscopes beautifully made. You look through them, and you can see a dazzling display of pattern and color, but within a few seconds you're just bored. Nobody ever really looks at them for very long. Somehow they have no meaning, and don't engage one. I think the difference between representation of the state and being in the state itself is this sense of meaning, engagement and intensity. I for one, being a botanist, am very drawn to flowers. I love looking at flowers. Sometimes you can look at a whole garden full of flowers like here in Esalen, and it's quite meaningless. At other times you can look at a single flower for a long time, you can go into it, it's like a mandala. You enter into that realm, and it takes on incredible meaning, beauty and

significance. The same with butterflies and many other natural creations. It seems to me the problem is how to enter into that engagement, intensity and sense of meaning, rather than the representation of the pattern itself. There are plenty of patterns around in the natural world.

Ralph: These are space/time patterns. Although we say the words "space/time pattern," we have no language for individual space/time patterns. As experienced by us, there is a kind of a resonance between patterns that somehow makes a resonance with different patterns of neurotransmitters in the visual cortex. Some aspects are perceived, and other aspects are not, remaining invisible to our perception. You've been speaking of flowers in the garden, or the images in the kaleidoscope. These are static patterns, and we have an extensive verbal language for that. What I'm suggesting is an expansion of our visual/linguistic capability in the direction of a universal language for space/time pattern, such that we could truly speak of our experiences, giving them names. At the mere drop of a word or a code, an I-75, Highway 1, Highway 0, we would transmit a clear image of space/time pattern along with whatever emotion

we remember from the experience. If we can awaken these feelings in the mind of the listener, we can converse, intellectualize, understand and reconnect with the space/time pattern of the spiritual world. Let's face it, we have the most extensive experience of this world through visual metaphors of, well, movies. We experience the logos as movies. We don't experience it as words, although there are sounds, and there is sometimes writing on the wall like graffiti. Basically reality is an infinite field of consciousness, of vibration, of waves moving, of intelligence. When we travel in this realm, we go somewhere we've been before and we recognize it, and that excites in us memory, which is reinforced and extended, and upon this experience we base further experiment. We three have had our many experiences, which I have great faith, are similar, even universal experiences, and yet we are absolutely speechless in verbalizing them to each other. Words fail me.

Terence: It seems to me that mind responds with an affinity for itself. If an expression is universal, then it has an affinity for the universal mind. What's interesting about the example of the kaleidoscope is that it's boring after a few minutes. If you analyze how it works, and take it apart, the base units in most kaleidoscopes are pieces of broken glass, pebbles, detritus, junk. Somehow splitting this into six sections with a mirror and putting it in heavy oil is supposed to bring you into the realm of something endlessly watchable and interesting. But it isn't. The brain machines being produced in Germany are the same way. All pattern seems to quickly lose its charm unless it's pattern that has been put through the sieve of mind. We enjoy looking at the ruins and artifacts of vanished civilizations a lot more than random arrangements of natural objects. It seems to me what we're looking for when we say the MPP [Massively Parallel Processor] data on chaos is like a DMT [Dimethyl tryptamine] trip, what we're saying is, "Here in this pattern is the footprint of meaning." It's as though an architect passed through. We're always looking for the betraying presence of an order that is more than an order of economy and pure function.

We look for an aesthetic order, and when we find that, then we have this reciprocal sense of recognition and transcendence, and this is what the psychedelic experience provides in spades. A critic of the psychedelic experience would object, "Of course it's made of mind. It's made of your mind." For the psychedelic voyager, the intuition is, it's made of mind, but not made of my mind. Either there's an identity problem, or a real frontier of communication is being crossed. When we look for living pattern, or aesthetically satisfying order, what we really look for is a sign that mind has somehow touched the stochastic processes of nature.

Rupert: The limiting factor seems to be neither the richness of display we find in nature, nor the language that we communicate with, but rather the ability to go into something with intensity of vision. I don't think language is a limiting problem. For example, music can be written down in a language. I can read music, but for me it doesn't come to life from this language. I have to hear it for it to come to life. Presumably mathematical notation is a way of notating things in the mathematical landscape, which comes alive for mathematicians. Take the realm of plants again. If you look at the incredible richness of botany, of flower forms, there is a language for this, used by botanists and florists, describing the species of plants in technical jargon. Even so, it doesn't mean that most botanists spend most of their time contemplating the beauty of flowers. They're rushing to the next committee meeting or getting their next paper ready for publication in a technical journal. Somehow there isn't much time to actually enter into these realms, even for people whose profession it is to be concerned with them. We're neither short of images nor of languages in many realms, but rather of the time, the space, and the inclination to enter.

Ralph: Music is a good metaphor. Let's just think of this for a minute. I don't propose that a mathematical model of a brain or a plant would be as wonderful as a brain or a plant. Life will not

be replaced by language. Nevertheless, the evolution of music has been greatly aided by musical notation. Because we wouldn't like music to simply end and simply be left with a library of musical scores. Nevertheless, the evolution of music has been enormously facilitated by having a graphic language that to some extent recalls the actual musical experience. This is the role that I'm proposing for mathematics, not to

replace the Earth or the heavenly realms, but to facilitate their understanding through an analog on the same level as musical staff notation, pertaining to the visual experience of space/time patterns.

Algorithmic information theory is a way of telling the difference between chaos and randomness. As Terence was saying, there is in verbal representation a kind of economy, where a simple formula calls forth a complex experience. What seems to us as random sometimes can be generated by a very small code, like a musical staff notation. When data from a scientific experiment looks random, one can test it as to whether there is or isn't a compact economical model for it. A truly random process would provide data which could not be represented by any formula shorter than the data itself. It turns out that the weirdest, most random-looking data from the natural world, for example, earthquakes, sun spots, and so on, always seems to have a very compact mathematical model. Therefore it is not truly random, it only looks random. This is what is called "deep data."

What I'm suggesting is an increase in our encyclopedia of models, extending language, so that we can name, store, retrieve, and recreate not the experience itself, but the data, for the sake of communication. This is exactly what musical staff notation did for music. It pertains not only to the spiritual experience, but also to fundamental questions on the future of human society. Can we understand the space/time nature of the planet well enough, since it's so complex, to be sensitive enough to cooperate with it? If we can't even understand what we're seeing when we look, there's not much we can do to cooperate. Biogeography, for example, is a botanical field that could be revolutionized by a staff notation for space/time pattern.

Rupert: Surely what we're looking for is meaning in terms of significance. In terms of information, even patterns, we've got libraries full. Go into any book shop, and you're overwhelmed by the quantity of stuff there. The idea of having even more models on the shelf, somehow doesn't seem very exciting to me. What would be exciting would be to see some deep meaning in all of this. Maybe mathematics is one way to find the deep meaning in things. If so, I'm not quite sure how.

Ralph: The taxonomy of plants is not full of meaning, nevertheless a vocabulary has evolved so that when words like exfoliate are put on a page, another botanist can read it and actually tell what kind of plant this is. A further development in the evolution of language is the generation of meaning. Meaning is not given in the data. We have to grok things. We have to struggle and evolve understanding by some hermeneutical process. People said when printing began, that it would be the end of memory, and when writing began, it would be the end of history.

Terence: In both cases they were correct.

Ralph: Yes, when language began we lost our connection with the natural world.

Terence: Maybe it was the kind of language. Ralph: Spoken language.

Terence: Language processed acoustically. It's not in the generation of it that you want to put your attention, but in the reception/decoding of it. When language became something acoustically processed it became the willing servant of abstraction. Whereas language processed visually is here and now stuff of great density, acoustical language permits a level of abstraction that creates a higher inclusiveness, achieved by a necessary dropping out of detail.

Ralph: I'm glad to hear you say so, since it always sounds like you think the logos itself is speech.

Terence: Speech beheld.

Ralph: I'm astonished at the resistance I'm getting here to the idea of visual language. When I travel in France, I'm riding in the train or something, and I'm really bothered by all the gossip going around, because I understand French. I realize that this couple is having trouble, and the train is not stopping in the station that I expected, and so on. When I travel in Japan, I don't understand anything, so it seems to me really very quiet there. I just don't hear anything. Where we have an oral language for certain phenomena, we then perceive it. It's like a moving van comes along and transports this stuff from the unconscious system to the conscious system, where we can deal with it. These space/time patterns for which we have no visual language, are essentially unconscious to us. Therefore we can't interact with them, and this might be a fundamental reason that the planet is dying. Either we shouldn't have verbal language, or we should have verbal language and visual language as well. Verbal language is poorly adapted to space/time patterns. For example, we describe music with staff notation, a visual rather than verbal language. I think that our intellectual relationship to the sky and to the earth would be vastly improved by developing

a larger closet of models for visual processing.

Terence: I think you're right. I regard language as some kind of project that's uncompleted as we sit here. The whole world is held together by small mouth noises, and it's only barely held together by small mouth noises. If we could have a tighter network of communication, we would in a sense be a less diffuse species. Communication, or the lack of it, is what's shoving us toward the brink of possible planetary catastrophe.

If we buy into the idea that psychedelics are somehow showing us an evolutionary path yet to be followed, then it

seems obvious this entails a further completion of the project of language. Maybe what all this technology is about is a more explicit condensation of the word. Modernity is characterized by an ever-more explicit evocation of the image. We just have to go back 100 years, and the best anyone could do was an albumin tint photograph. Now we have color lithography.

Ralph: High Definition TV.

Terence: HDTV. High-speed printing. Virtual reality. The world wide web. It's as though language is becoming flesh. Meaning condensing into the visual realm would be a kind of telepathy compared to the kind of linguistic reality we're living in now.

Ralph: Glad to hear it.

Rupert: What we may be doing is returning after a detour of centuries into the realm of literacy. In most of human history, and still today for more than half the people alive on this planet, literacy is not the big thing in languages. Most cultures are originally oral cultures. The majority of people still can't read and write. If you can't read and write, it means that the visual cortex in the left hemisphere of your brain has not been hijacked by the speech centers. As soon as you learn to read and write, the visual part of the left-hand side of the brain gets taken over by the speech centers, which have to do with the processing of sound. The brain gets into the habit of dealing with linear print, becoming adapted to reading and writing letters, and this knocks out a large part of the visual processing capacity.

Ralph: Now you're afraid I'm going to knock out the other half.

Rupert: As far as I know, there have been very few studies of the difference in thought patterns between people who can't read and write, and those who can. I'm not now talking about people in our society who can't read and write because they're

dyslexic or dropped out of school, but whole cultures, like many traditional ones, where nobody, or very few, read and write. Where language has a different role. When I lived in India, I found that for illiterate people language is an extremely powerful medium, conjuring up metaphors and images in a quite different way than it does for people who are literate. You yourself have complained that new generations of students at Santa Cruz can't read or write anymore. It may be that the process of short-circuiting literacy is already well-advanced, and that a new kind of visual language is developing.

Terence: There's actually been a huge amount of discussion about this difference between so-called print/linear cultures and oral, aboriginal cultures. This is what Marshall McLuhan was saying,⁵ that somehow the symbolic signification of language, first through writing and then through printing, has had all kinds of effects on the evolution of the Western mind, that we, until McLuhan, were totally unaware of. He believed, for example, that the linear, uniform quality of print created the intellectual preconditions for the acceptance of an idea like democracy, invented by the Greeks only after they had a phonetic alphabet. He felt that modern industrial methods of production based on interchangeable parts were inconceivable except by a print culture that had the notion of moveable type. The idea of citizen as a uniformitarian impulse laid over our individual biological diversity could never have occurred in a culture without print. The bottom line in the McLuhanist analysis is that we tend to be incredibly naive about the information-processing technologies we put in place, because all we care about is input and output. What we don't understand is that the plumbing between input and the output gives a culture its tone, its values, its implicit political assumptions, as well as its attitude toward nature. What we are is a print culture, both linear and hierarchical.

Ralph: What we are? Or what we were?

Terence: We're undergoing a transition in the 20th century. Unfortunately, the intellectuals at the top of the pyramid, are the last to get the news. They're still poring over Locke and Hegel, when what's really happening is trip hop trance dance and the Internet. Culture tends to be ruled by people who are last to get the news in terms of new technologies which are reshaping the culture. All this beefing about the death of literacy. . .we might as well beef about the passing of the high-button shoe or the beaver hat. Literacy is finished. It was a phase. It's not to be preserved by anyone other than curators. The rest of us are going to live, obviously, in a culture shaped by new forms of media.

Ralph: The reason I complain that my students are illiterate is that history is unavailable to them. There's no way to tap into it. All these fantastic books on the Middle Ages, prehistory, archaeology and so on, are never going to be translated into documentary videos. It's not enough to have a few curators who are in touch with the Library of Congress and the British Museum.

Terence: Don't you think, Ralph, that's actually a kind of amnesia? It's not that your students are illiterate. Illiterate is when you don't know the difference between Melville and Hawthorne. Amnesia is when you don't know whether the 30-Years War came before or after the War of the Roses.

Ralph: If you're literate, and you forget, you can look it up in the Encyclopedia Britannica. You can dial it up in a hypercard. These historical media, let us say, don't lose their importance just because newer media are developed.

There's a further problem, which you touch on extensively in your book, which relates to television as a drug. We had botanical drugs, and we had chemical drugs, now we have electronic drugs. The fact is that my students have watched television, according to your book, six to nine hours a day, since birth. They're unbelievably quick with images, and this is a fan-

tastic advance in human intelligence. Astonishing amounts of information can be communicated in 25 seconds by the best of television commercials. You can't show these commercials in the African bush and get a response. People have been trained up to it by doing their visual calisthenics six and a half hours a day since birth. What's not so good is that the material that's available in the video store or on television is unbelievably poor. If you make a PBS documentary on Food of the Gods, nobody will watch it, because they're busy watching Dynasty. Somehow the drug-abuse aspect of the new media has already dominated its future. This creode is already so deep that it's unlikely we can swerve the video technology into an effective cultural resource.

Rupert: That's my problem with your approach, actually. These computer graphics use basically television-style technologies.

Ralph: Super computers like the 200-megaflop Massive Parallel Processor, which cost \$13 million three years ago, can be had today for \$500,000. In five years there will be one in the kitchen keeping track of your recipes and running your microwave. I think that when these super computers are available in kitchens and kindergarten playrooms, and people are brought up with them, as an extension of life, it will mean a vast increase in the size of the playroom. These machines become almost as interesting as psychedelics when you can interact with them. What's wrong with the passive medium of television is that it's dead; some idiot programmed it and made it available, and it's distributed like a drug. People are actually addicted to the passive process of sitting there knocked out, and receiving somebody else's fantasy.

Terence: You can't underestimate the perversity of people, in terms of their tendency to prefer the passive. In 1977, when I bought my first home computer, it came bundled with a manual called Basic Basic. The intent of this manual was to teach you how to program your computer. Six months of trying to peddle that to the American public, and the manufacturer re-

alized they had to completely rethink the product, as only a vanishingly small number of people were ever going to program a computer. Once when you bought an automobile you got a toolbox with it. That's not been true since the '20s. There's a certain responsibility on the part of the consumer not to demand the prepackaged stuff. The MPP, these super computers, are, to my mind, like the psychedelic drug state, but everybody's trip is the software they bring to it. Someone who goes to the MPP machine to keep track of their recipes is trivializing the tool, because they don't know what it can do. This is probably the equivalent of taking a psychedelic drug to solve your relationship problems. The question you framed is stupid and mini-minded, and perhaps the psychedelic can help, but what a tremendous misappropriation of power.

Ralph: Every tool will be misused as well as used. The most popular books are cookbooks. Nevertheless we write books, and to some little extent, they participate in the evolution of history. The fact that most books are used for recipes doesn't destroy the value of books. So it is with the new media: whereas most people will use them to hypercard a stack of recipes, or sex postures, or something, there will still be a lot of arcane and important material available in this medium which can't be accessed any other way. Nevertheless, I must say, I became very depressed this year when I realized that not only couldn't my students read or write, but their interest in computers was much less than the

preceding class. For the last three or four years interest in computers has been on the decline, except for computer games. The most brilliant kids in high school are doing nothing but playing Nintendo. I have colleagues, brilliant professors of mathematics, who do nothing after work but play Tetris and Gameboy.

Terence: Ten years ago it would have been heroin. Now it's just Gameboy.

Ralph: It's much more dangerous! It hasn't been made illegal yet.

Rupert: One final point I want to make. The model you are suggesting takes us further into the artificial manmade world of technology, and we've still got an incredible diversity in the natural world that hardly anyone's interested in anymore. There are herbaria collections, plants and butterfly collections, geological museums with rocks and crystals of every kind, and they're deserted. There's an incredible diversity of form in the natural world, and we are becoming more and more plugged into the entirely human world of technologies and manmade patterns. How does this relate to giving us a greater sense of connection with the bigger world?

Ralph: I believe that our connection to the natural world will be enormously enhanced by the new media, in spite of the fact that most people will relate to it as a new form of drug. I think that planetaria, for example, which are artificial models of the sky, brighter and simpler and easier to understand, along with special programs that show only certain motions at one time, can have an enormous potential to turn people on to the real sky, which is after all the ultimate source of our mind, our intellect, our mathematics and language. Although the construction of planetaria in big cities around the world is an expansion of the synthetic world at the expense of the natural one, the whole idea of it is to try to turn a switch in some few people, making them aware of what was there all the time. I think a HyperCard stack with high-speed, high-quality color pictures and sound, giving all the beetles in the Amazon jungle, would enormously help me personally to understand what I'm seeing when I actually go there.

Terence: I'd like to defend Ralph. I don't think that it's really a journey deeper into artificiality. Science has been dependent on instrumentality for a long, long time. The natural world that Ralph's program would reveal is the natural world of syntax. In other words, language would become a much more accessible object for study if it were visually explicit. And I expect that this is happening. It seems to me we have reached a new fron-

tier in the natural history of this most complex and least understood of all behaviors; language. While the instrumentalities may be computers, high-speed imaging, and so forth, it's no different from using the Hubble telescope to tease data out of a very distant part of the universe, and then making it explicit. If we could understand language, we would understand something about our own place in nature that eludes us. It's clearly the most complex thing we do, and we're the most complex thing we know. The feedback from language is culture, the most anomalous phenomenon in the natural world.

Ralph: I want to end by saying this: Mathematics is part of the natural world. It's a landscape which can be explored, simply and directly, and with incredible pleasure, delight and advancement, just like the psychedelic logos, or any other aspect of the world. The mathematical landscape does not belong to the human species. It belongs not even to the earth, but to the sky. It's part of the infinite universe we live in. Whatever microscopes, telescopes, kaleidoscopes, or computer graphic tools we can devise to enhance our vision of the mathematical universe is definitely advantageous. How this will fit into society, however, is a problem. We are in an evolutionary challenge from which the human species may not survive. I feel that part of our difficulty is our culture's rejection of mathematics. Mathematics is essentially the marriage of Father Sky and Mother Earth. I've given my life work to understand this relationship between the psychedelic and the mathematical vision. So I'll leave it there.

Notes

1. Hans Jenny, *Kymatik*.
 2. Terence McKenna, *Food of the Gods*.
 3. Rupert Sheldrake, *The Rebirth of Nature*.
 4. See Terence McKenna, *The Archaic Revival*
 5. Marshall McLuhan, *The Gutenberg Galaxy* (Toronto: University of Toronto Press, 1962) and
 6. *Understanding Media: The Extensions of Man* (Toronto: McGraw Hill Book Co., 1965).
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THREE

What Hawaii Tells Us About Evolution

Terence: The subject of this particular dialogue is Hawaii, what this island tells us about evolution, and how it relates to island ecosystems and their evolutionary process generally. The task falls to me because as chance would have it, in the course of my life I have visited most of the major theaters of evolution that involve island groups considered to be exemplars of the various types of island groups on the planet.

Hawaii, where we are recording this dialogue, is a group of mid-ocean volcanic islands. The only other mid-ocean volcanic island groups in the world are the Azores, the Canaries and the Seychelles. They offer great contrast to Hawaii, particularly the Seychelles, which as a portion of the Madagascar land mass has been above water some 300 million years, perhaps longer than any other place on the planet. There the evolutionary process offers a dramatic contrast to the far more recent evolution in the Hawaiian Islands. The Hawaiian Islands represent the unique case, because of the size of the volcanic calderas and of the vents beneath the Pacific floor that have created them. In fact, these vents and volcanic conduits are the largest on the planet. What we have in Hawaii is a tectonic plate sliding slowly toward southern Russia and Japan that is crossing over a weak place in the Earth's crust, a place where the core magma of the planet lies a considerable percentage closer to the surface than anywhere else on earth. The result of this situation is a series of islands formed in the same spot that each, after its volcanic birth, is rafted away on the continental plate towards the northwest.

The life in the Hawaiian islands shows 30 to 35 million years of endemification using the ordinary rates of gene change that biologists recognize. Nevertheless, geologically speaking, no Hawaiian island is over 12 million years old. The obvious interpretation of these facts is that life arose out here on islands which no longer exist, and as islands rose and fell,

the life hopped from one island to another. Indeed, the dispersal rate of birds, tree snails, and other organisms moving eastward from Kauai across Oahu, Molokai and Maui to the Big Island, Hawaii itself, shows that this gradient is still operable. The forests of Hawaii are the most species-poor forests of the major islands. Hawaii is species poor because animals are still arriving here from the other islands. Nevertheless because these volcanoes are so huge, Hawaii has a complete range of ecological systems, from sea level to 14,000 feet, virtually the entire range on the planet in which life is able to locate itself. The volcano itself, Mauna Loa, is by volume the world's largest mountain, because it is already a 14,000 foot mountain when it breaks through to sea level, having risen from the Pacific floor, and in this part of the world the Pacific Ocean is 13,000 feet deep. This mountain was enormous before it ever broke water. It now rises 13,000 feet above sea level, and its sister mountain, Mauna Kea, is shorter by only 120 feet.

What has been created out here is a very closed ecosystem far from any continental land mass. The forms of life which arise here arise on rafted debris or tucked into the feathers of migratory birds or in some other highly improbable fashion. What we see here is a winnowing of continental species based on extreme improbability. As an example, a very common Sierra Nevada wildflower of no great distinction apparently arrived millions of years ago as a single seed on Maui, and by that crossing has created a mutated race of plants that we know as the Hawaiian Silversword, one of the most bizarre endemic plants that the island has produced.

In terms of islands within islands and the fractal adumbration of nature; it's very evident here. For example, because the island is created by a series of lava flows of varying ages, there is a constant process in which ecosystems become islanded by lava flows. And so you have a series of micro-islands of species that develop independently of each other even though they may only be some few miles apart, but separated by a landscape so toxic and desolate that there is very little intermixing of genes. This is thought to have been a formative factor in the

evolution of the Hawaiian fruitflies, *Drosophila*, which of course were very useful in early studies of genetics because the chromosomes of the Hawaiian *Drosophila* are ten thousand times larger than the ordinary *Drosophila* and in the era before electron microscopes you could actually color band these with certain dyes. Using chromosomes of these Hawaiian *Drosophila*, early chromosome studies went forward.

In terms of extrapolating all of this particular natural history data into some sort of general model, I think what life on the island brings home to us is that the earth itself is an island. I've been saying for many years that one of the most revolutionary yet totally trivial and predictable revolutions sure to come in biology is the recognition that models of island isolation or species dispersion across oceans can easily be expanded to the three-dimensional ocean of outer space. Very clearly viruses, prions, gene fragments, molecularly coded information, percolate between the stars as a statistically very low component of the general cosmic dust and debris. Indeed, there have been many attempts to establish this idea, by Fred Hoyle and others. Recently a theory of the cometary origin of life has been put forward. It seems to me perfectly obvious that in time these notions will be embraced; after all, viruses can freeze down to crystalline states that are almost minerals.

And as for a dispersion between celestial bodies, it's now generally agreed that a number of meteorites that have been recovered in the Antarctic are in fact fragments of Mars.* So the work on island dispersal patterns and the statistical mechanics of this process will eventually, I think, play a role in modeling how life is dispersed throughout the galaxy.

Some of the other islands that I've been fortunate enough to relate to are the Indonesian islands, which are the absolute other end of the spectrum of the class of tropical islands. What we have here in Hawaii, as I said, is mid-ocean islands far from continental floras and faunas, while Indonesia is in fact a submerged continent. As recently as 120,000 years ago, Indonesia, from Sumatra to New Guinea, was a single land mass which paleobiologists refer to as Sundaland. In the process of this shallow

continent's subsidence, the sea filled in the low spots, so that today there is a direct correlation between species differentiation on any two Indonesian islands and the depth of the sea between them. These correlations have been shown over and over. One of the great conundrums of 19th century biology was the so-called problem of Wallace's line. Alfred Russel Wallace, co-discoverer with Darwin of the principle of natural selection, believed that between the islands of Bali and Lombok and then going west of Celebes you could draw a line which represented the line of convergence between the Austral-Papuan biogeographical zones and the Asian-Malayan zones.

Statistical studies, Ernst Mayr's principally, have disproven this notion. However, I have collected butterflies and stood in the forests on both sides of Wallace's line in several places and I completely understand Wallace's observation and in fact wonder about Mayr's conclusion. Wallace concluded that these forests are very different; the bird calls, the butterflies, and the flora—all seemed different. But what Mayr seemed to show was that there was no distinct line. There was a gradient from Australia to Malaya in one direction and Malaya to Australia in the other direction. Island groups like this, and I haven't mentioned the Galapagos but they are another example, are such obvious laboratories of speciation that when Darwin and Wallace and Walter Henry Bates and other 19th century biologists who were grappling with the so-called species problem set out to do their fieldwork, they could not fail to be impressed by this peculiar theme and variation. They could not understand whose fingers strung the harp until they realized that similar populations separated by catastrophe such as the arrival of ocean water or a lava flow, then come under very slightly different selection pressures which cause slightly different physical characteristics to be taken on. In the Amazon Basin for example, you can move 2,000 miles and have only about a 15% replacement in butterfly species. In Indonesia you can cross a strait of water 20 miles wide and have a 17% replacement of butterfly species. Darwin and Wallace visited these places, both continental floras and faunas and the island situations, and through

careful observation they finally understood what the mechanism of speciation was. And it's a wonderful thing, you know. Take for example butterfly diversity, that is a situation where diversity itself confers adaptive advantage. Because butterflies are largely predated upon by birds, it's been shown in numerous studies that birds hunt a target image. They have an image of their prey. If through the chance recombination of genes your wing color or wing shape pushes you outside the target spectrum, you will be ignored and survive.

Ralph: Like us!

Terence: And so variety itself becomes a premium in the evolutionary game. Novelty itself then is preserved because novelty confers an adaptive advantage in this situation, for birds and butterflies. I think the implications of these things lie close to the surface. Earth is a small island, we are making great changes in its ecological parameters, we are affecting plant and animal populations. By studying how evolution has shaped island groups, we can appreciate our own small cosmic island and perhaps eventually draw politically empowering conclusions from that.

Rupert: What a wonderful overview, Terence. A real delight. There remains a major evolutionary puzzle. Islands have a tremendous role in speciation, as all evolutionists believe, and of which both Darwin and Wallace provided classic examples. Then in places where there are contacts through island chains the flora can be extremely species-rich, as in the Malaysian-Indonesian archipelago, one of the great creation centers of species in the world. That's the kind of tropical forest I know best, having lived in Malaysia. From what you've said, this evolutionary creativity arises from a combination of isolation on islands, plus mingling of two totally radically different floras, giving rise to all sorts of new possibilities and combinations.

Terence: And the process was pumped by the repetitive com-

ings and goings of the sea which repeatedly islanded populations and then reunited them.

Rupert: And presumably also pumped by the ice ages not only through changes in sea level, but also through the compression of all forms of life towards the tropics, followed by a polewards migration of species at the end of each ice age. All this makes sense for the centre of evolutionary creativity in the Malaysian-Indonesian archipelago. The problem is that it doesn't explain that other great centre of evolutionary creativity, the Amazon basin.

Terence: The answer is very simple. It has simply been above ground a very long time. In other words, the Malaysian-Austro-Papuan situation is fairly recent, probably the map has looked as it does no more than 7 or 8 million years. The Amazon on the other hand has been above water 280 to 300 million years. So simply being in the tropics with 3, 4, 5 breeding seasons a year for many organisms, and never being inundated by sea water or catastrophe allowed that incredible climatic speciation on a continental land mass. You're right, it didn't happen as far as we know in Africa, although Africa's so heavily impacted by human beings that any notion of its original natural history is impossible. But that's the short answer, that it was above water a long, long time.

Rupert: But then we have two methods of prolific evolution. One depends on being around a long time, as in the case of the Amazon. The other depends on isolation, climatic pumping, mixing of gene pools and so on.

Terence: What pumped the Amazon situation on a micro level is the meandering of rivers. You see, it's very hard in a climaxed forest situation for any new species to gain a foothold. But because rivers meander and destroy forests and create sand bars and the intermediate zone of uninhabited land, so-called pioneer species can move in there. And that's where the speciation

is taking place. Carl Sauer estimated that before the advances of human culture it was the meandering rivers that were the main force for modern plant evolution on this planet. A vast amount of shifting of boundaries goes on, and it's in that shifting boundary zone that mutants, new forms, can get hold. That's why a pioneer plant species will have the following characteristics. It will be an annual and it will be a prolific seeder. It will be herbaceous, not woody. In short, it will be a weed. And that's what a weed is, a pioneer species, a tremendously predatory species designed for open land, utterly unable to compete in the forest, but in open land able to take over very well.

Rupert: Yes, but while isolation, new environments and so on, explain one side of evolution, I think there's another side which Darwinism can't explain, because it puts too much emphasis on natural selection. J.C. Willis, the great British botanist who worked in Ceylon and knew the Asian flora well started off as a keen Darwinian, but was forced to the conclusion that much evolution took place by divergent mutation, rather than natural selection. For example, in Ceylon and India there are many species of water plants in the family Podostemaceae that live in streams with leaves that float on water, with many different leaf forms. Any attempt to account for a particular leaf form in terms of adaptation to water flow fail because leaves of quite different shape seem to do just as well, and can flourish side by side.

Terence: Well, the Hawaiian Hapu here is an excellent example. Here we have the two tree ferns, two distinct species, distributed in a ratio of 50-50. One has little black stickery stems and the other has a fuzzy brown soft stem. What selective pressure caused stickers to work for one and not to work for the other, when they're standing right next to each other? Seems to me there must be drift of genes or simply variety for its own sake.

Rupert: Life is constantly trying out new forms. Unsuccessful

novelties are weeded out by natural selection. A few are a wild success. But many novel forms may work equally well, and survive equally well, like the two species of tree ferns in your Hawaiian forest. There may just be lots of equivalent species, where you've got novelty for novelty's sake. They are not all closely shaped and sculpted by natural selection.

Ralph: Well, getting back to Hawaii here, it seems, if I understood you right, that what's unique about Hawaii is the Hawaiian Islands are young, and they're maximally oceanic islands, far from any continents. And the process of the population of a new island from a neighboring island is visible, even in the present, and then we see a certain pattern is repeated over and over again, even in the course of a century. So it seems to me that these different examples you were talking about conflate two different processes more or less projected upon the same screen. One is a purely biogeographical process which could at least be imagined to be operating the same way without any evolution. We have only the same species that were found on Maui suddenly appearing on Hawaii by a process of dispersal. Some species are successful at pioneering, and help create an ecology suitable for the second species, and their space-time patterns are developed one upon another, very interesting fractal movies that to begin with would have nothing to do with evolution.

On top of that, you have—I'm not sure about the relative time scales of this—then you have an evolutionary process involving speciation either during or after the colonization of a brand new island. Is evolutionary process essential to the population of the new island or isn't it?

Terence: I think in the short term it isn't and in the long term it is. Because many forms of life are arising in these islands, it's not home free. New arrivals must contend with this kind of islanding by volcanic flow that I mentioned, and other large-scale catastrophic events that have gone on in the Hawaiian Islands. Basically I think that what we see here are genes being

mixed and stirred at a faster rate than in most places and that's without mentioning the vast number of plants and animal introductions brought by human beings. One of the other unique things about Hawaii that I didn't enumerate is that human beings arrived late and this absence of long term human impact gives us a clearer picture of what's happening. It's almost as though Hawaii is a speeded up microcosm of the earth itself, probably eight-tenths of the big island is in the pre-archeozoic phase—in other words, almost abiotic—and then large areas are covered by lichen, with a fern or two here in the crevasses.

Ralph: You used the word pumping, and I like that. There's a sort of a forcing or coupling or a codependence between these different processes, physical ones, as for example new lava flows, the meandering of rivers, or the appearance of islands, and space/time evolutionary processes.

Terence: Really the ice ages are the pump. They raise and lower sea levels. They create deserts and drop humidity. They force change. And they are probably driven by fluctuations in the dynamics of the sun.

Rupert: I should just point out that the evolutionary process looks rather different if you take morphic resonance into account. Habit formation then becomes a much more important evolutionary process. Individual organisms adapt to new environments. You can take seeds from a given plant and grow them at different altitudes and in different climates, and in many places they survive. But in these different environments, the plants grow differently. Grow them there over several generations and they develop a new group habit, stabilized by morphic resonance, without the need for genetic change.

Terence: Well, adaptive behavior is that small margin of adjustability that is supposedly not genetically driven.

Rupert: Habit formation and the inheritance of these habits by

morphic resonance could enable evolution to occur much more rapidly than neo-Darwinians suppose possible, because they ascribe almost everything to slow statistical changes in gene frequencies. Instead of mere random mutation and natural selection, you have the positive adaptation of animals and plants themselves to a new environment. They often react and respond in a creative way, forming new habits of life appropriate to the environment. So the creative adaptation of life to new circumstances, in my view, is not a matter of minor adjustments. What we are seeing is the innate creativity of life in action. Not blind, random mutation, not just physical forces, not just natural selection, but a creativity inherent in all life. Morphic resonance would enable these new habits to be stabilized and inherited.

This theory suggests that not only can habits be passed on by morphic resonance from generation to generation, but also by morphic resonance forms and habits could jump from place to place. This could, for example, help to account for the parallel evolution of marsupials in Australia with placental mammals on other continents.

Terence: It would augment the natural selection of separated genes in general.

Rupert: Yes, these things work together. There's still natural selection of gene pools; but creative adaptation and spread of new habits take place as well. I suppose the thing about Hawaii that puzzles me most is why there haven't been more species and more forms of life in Hawaii. In the rainforest here we see only half a dozen or so species of tree, whereas in Sumatra or in the Amazon, there would be hundreds.

Terence: Again, the answer is time—200, 300 million years versus 20 million years. That's what it is.

Ralph: There's so many reasons to fail here. I personally find the environment harsh, lush as it may look to you or other people,

and I suppose that one way a new species could fail is through having bad habits. There may be habits that manifest visually to us only in terms of spatial patterns. The colonization of the black lava by the Ohia tree appears in a certain fractal pattern in which there are characteristic frequencies of distances that may have to do with the distance the seeds fly in the wind or something like that. There is a certain spatial pattern which is the necessary one for survival that has a kind of a morphic resonance. I mean there wasn't a space/time pattern in the physical substrate itself. And other species, although they would look equally strong or stronger in the sense of phylotaxis, when dispersed in the lava they can't make it because their spatial characteristic is wrong. So the change of a species that may not involve DNA could be a change of habit in terms of the spatial distribution. It could just be response to a nutrient because of the change in size and therefore characteristic distance in the space/time patterns. We seem to see that—first we see the lichen, the lichen creates just a minimum of degradation of the surface that makes it possible for the Ohia tree to grab hold. And the lichen, as the pattern is obviously fractal, sort of characteristically fractal, and the lava surface is fractal as well, and fractal means that there's a resonance across scales, then the lichen scale, which is much smaller—there may be many kinds of lichen, but only this one grows because its fractal pattern has the right basic form, something like a time wave, so that as a matter of fact it's compatible with the bare rock. And then the Ohia tree is compatible with its fractal pattern apparently on a much larger scale which nevertheless resonates harmoniously as opposed to other species that might be disharmonious. And this harmony, this capability of a certain space/time pattern, is a habit which may change and adapt in a way that requires no change in DNA at all, a nongenetic variation, just dependent on some kind of morphic field.

Rupert: You are talking about the evolution and development of whole ecosystems. I think what's interesting about this island, the Big Island of Hawaii, is that this forest ecosystem gets

established on the slopes of the volcano, but is wiped out again and again through new lava flows. When lava flows are re-colonized, an entire ecosystem has to move, not just single species. So it has to be an exceptionally portable ecosystem. Maybe that's why it has to travel light.

Terence: Good point.

Ralph: Coming back to this question of the morphogenetic field of an entire ecosystem, I just want to ask you about this. In this creation myth of the Hawaiian Islands ecosystem that you described, there are islands which have already disappeared and ecosystems have jumped from them onto Kuai and so on. But as I understand it, these islands are rafting along over this more or less stationary hot spot. Those early islands were right here where we are sitting today, also very distant from any continental land mass. So is Day One of biology on the Hawaiian Island chain a result of long-distance dispersion?

Terence: Yes.

Ralph: Nothing happened until the right lichen arrived after millions of years?

Terence: Well the lichen I suspect can probably be found in air samples above any point on the planet.

Rupert: Say you've got spores as the first colonizers.

Terence: Yes, and then the ferns come next, which also propagate by spores. The reason the nonflowering plants conquered the planet, if you think about it, is because the planet was like Hawaii. It was new lava, it was covered with lava flows, and the ferns could get hold. We think of ferns as soft, somehow spoiled plants. Actually, they're the toughest plants there are. When we study biology they teach you about Psilotum, related to the ancestors of the ferns. The forest here is full of Psilotum

plants, I can point them out to you. They're tough.

Ralph: But how do they get here? These spores are carried by birds?

Terence: Well sure, by spores. Mud on the feet of migratory birds could carry millions of spores.

Rupert: The duck's foot theory. More necessary for the transport of seeds than spores, which are so small and so light that they can be carried over long distances in the air.

Ralph: Well I think there's a startup problem. I just can't imagine that the frequency of ducks flying is enough to explain the arrival of correct species and in the correct temporal sequence. I mean they would have to be dumping literally dumptruck loads of different genetic materials on a daily basis on a brand new island in order to have a chance to get started.

Terence: No, studies with banded birds show that there's a lot of material moving around and a million years is a long time, a number of improbable things can go on in a million years.

Ralph: Well I've been here for a week. I have not seen a new species of bird arrive from the mainland.

Terence: Well stick around.

Rupert: Okay, let's accept the duck's foot hypothesis, especially in relation to migratory birds. Birds do migrate from place to place over large distances, including many species in Hawaii, which has migrants from different continents. But which is cause and which is effect? No one knows the evolutionary basis for migration.

Terence: No, I don't think it is migratory birds. I think the process is primarily one of a novelty, unusual events, catastro-

phe. The greatest storm of the century, every century. Ralph: Birds blown off course.

Terence: Birds blown off course. Now that happens. A single big storm veering off course might equal a century of ordinary dispersal.

Rupert: But there are far more regular migrants. And migratory patterns of birds evolve. For example, new ones have appeared in Europe in a matter of a few decades, as in the case of the blackcap. Birds of this species that nest in Germany and Austria traditionally migrate in the winter to the western Mediterranean. But over the last 30 years, an ever-increasing proportion migrates to England instead, where they find abundant food on garden bird tables.

But how would species of migrants find out about Hawaii in the first place? Rather than individuals being blown here by chance or whole flocks of them starting out lemming-like from the coast of California in the hope of finding an island 2,500 miles away, they may in some way have known that there were islands there to go to. Perhaps this could happen through a kind of collective map which they share with other migratory birds. Some migratory species knowing about Hawaii may enable others starting off in that direction to follow a kind of preexisting flight path, rather like airline flight paths. When we flew here to Hawaii outside the window about a hundred feet away there was a vapor trail, which we followed exactly for two hours; it was presumably from the previous jet flight to Hawaii.

Maybe in bird migrations many species follow the same path, as many northwestern European species follow the Mediterranean coast of Spain and cross over the Straits of Gibraltar into North Africa, and North American migrants tend to follow four main north-south "flyways."

Maybe when the Hawaiian Islands appeared, long-distance migrants like albatrosses or other large seabirds noticed them and started coming here. Somehow this got into a general bird

navigation map, and other species started coming. The appearance of new land channeled bird migration routes towards it. The word got around and increasing numbers of species started coming here if only to rest on the way across the Pacific. Then the ducks' foot hypothesis would be very plausible.

Ralph: A new island in the Pacific, tell the albatrosses, and the birds do their job as sort of a pack train to bring as much genetic material as rapidly as possible and dump it on the new island.

Rupert: Somewhat like an adventure of Doctor Doolittle. But the question of how migratory birds found Hawaii raises the further question of the original Polynesian people who found it. One possibility is that they were keen observers of migrant birds and noticed that birds set off from their islands in a particular direction and months later came back again. It would therefore be a fairly simple deduction that if you followed the migrant birds you'd reach land sooner or later.

Terence: That's right.

Ralph: That's what "East is a big bird" means. But following the birds is no less of a mystery than the birds themselves being able to migrate. So either the people could follow the birds, who navigate by some unknown mysterious means, or the people could have had access to similar mysterious means themselves, and when a new island comes up then the information is somehow injected into their own migration patterns in their canoe rides from one island to another.

Rupert: In terms of human migration, these islands are now the limit of the westward migration of Europeans, having gone right across North America, subjugating the natives and trying to eliminate their culture, the whole process has moved here. We can see it happening before our very eyes, and in evolutionary terms it's the opposite of everything we've been talking about so far. Now there's no separation of the islands from the

TV networks and other cultural forces of America.

Terence: One of the most frightening trends I think in modern culture is the wish to build shopping malls everywhere. There is a mentality that would like to turn the entire planet into an international airport arrival concourse. That's someone's idea of Utopia.

Ralph: There appears to be a double gradient here with the eastward migration of Asian people balancing the westward migration of European people, and this is actually the interface where the double gradient can produce an increase in novelty and new mutations, and a forward leap perhaps, of human evolution, could begin here.

Terence: A standing wave forming here as forces move both east and west.

Rupert: So can we point to any human creativity in Hawaii which exemplifies the cultural equivalent of the Malaysian Archepelego? Or is it more like a stalemate with roughly half of the island's population coming from the East and half with the West, with the native Hawaiians trapped in between?

Terence: Well, a Pacific Rim culture is hypothesized to be emerging, and Hawaii is central to all of that. It's equidistant from Sydney, Lima, Tokyo, and Vancouver.

Rupert: Have they adopted the slogan, "Hawaii, the Pacific Hub" ?

Terence: If they haven't, I'm sure they're not far behind. The presence of the world's largest telescopes here make it a center of world science, at least in astronomy. I think the world's first, second and third largest telescopes are on this island, with an identical twin of the largest being built 200 yards away from it.

Rupert: So it's a centre for linking humanity with the stars.

Terence: We're looking out from the top of Hawaii, chosen paradoxically for being the darkest place on earth.

Ralph: From here they'll see the next wave of ducks' feet departing for Biosphere II.

[* This dialogue was recorded prior to the 1996 discovery of fossil life in a meteor of Martian origin.]

FOUR

Homing Pigeons

Rupert: In my book, *Seven Experiments That Could Change The World*, I focus on areas of research that have been neglected by orthodox institutional science because they don't fit into its present view of the world. As we have already discussed (Chapter 1), this research can be done on very low budgets.

The experiment I propose with homing pigeons is one of the most expensive in the book, but even so need cost no more than about \$600. In spite of over a century of research, we really haven't a clue how homing pigeons find their way home. You can take a homing pigeon 500 miles from its loft and release it, and it will be home that evening if it's a good racing bird. Pigeon racing enthusiasts do this regularly. The birds are taken away from the homes in baskets on trains or on lorries. Then the baskets are opened, the pigeons circle around and fly home. It's a very competitive sport. Pigeon fanciers win cups and cash prizes, and good racing birds can sell for as much as \$5,000.

Pigeon homing is a phenomenon that everyone agrees is real. Moreover, many other species of birds and animals can home, including dogs and cats, and even cows. But no one knows how they do it. Charles Darwin was one of the first to put forward a theory. He proposed that they do it by remembering all the twists and turns of the outward journey. This theory was tested by putting pigeons in rotating drums, and driving them in sealed vehicles by devious routes to the point of release. They flew straight home. They could even do this if they were anesthetized for the duration of the journey. The birds could still fly straight home. So these experiments eliminate theory number one.

Another theory is that they do it by smell. This is not intrinsically very plausible, since, for example, pigeons released in Spain can home to their loft in England downwind from the point of release. There is no way the smells could blow from its loft in England, to Spain, against the wind, but the birds get home. Experimenters have blocked up pigeons' nostrils with wax, and they get home. They've severed their olfactory

nerves, poor birds; they still get home. They've anesthetized their nasal mucosa with xylocaine or other local anesthetics, and they get home just the same. So smell cannot explain their homing abilities.

The next theory is that they do it by the sun, somehow calculating latitude and longitude from the sun's position. To do this they would need a very accurate internal clock. Well, pigeons can home on cloudy days, and they can also be trained to home at night. They don't have to see the sun, or even the stars. If they can see the sun, then they use it as a kind of rough compass, but it is not necessary for homing. You can shift their time sense by switching on lights early in the morning, and covering their loft before sunset. For example you can shift their sense of time by six hours. Now if you take such birds away from home and release them on a sunny day, they set off roughly 90 degrees from the homeward direction, using the sun as a compass. However, after a few miles they realize they're going the wrong way. They change course and go home.

Then there is the landmark theory. The use of landmarks is inherently unfeasible, because if you release the birds hundreds of miles from where they've been before, landmarks can't possibly explain their finding their home, although they undoubtedly use landmarks when they're close to home, in familiar territory. In any case, this theory has been tested to destruction, by equipping the pigeons with frosted glass contact lenses, which mean they can't see anything at all, more than a few feet away. Pigeons with frosted glass contact lenses can't fly normally, and indeed many refuse to fly at all. Those that will fly do so in a rather awkward way. Nevertheless, such birds can be released up to 100 miles away or more, and although some of them get picked off by hawks, others can get within a few hundred yards of the loft. They crash into trees or telegraph wires, or flop down onto the ground, showing that they need to see the loft in order to land on it. But the amazing thing is that they can get so close when they are effectively blinded. Sometimes they overfly the loft, and then within a mile or two, realize they've gone too far, turn around and come back.

This leaves only the magnetic theory. Until the 1970s, most scientists were very reluctant to consider this possibility, because magnetism sounded too like "animal magnetism," mesmerism, and a whole range of fringe subjects they didn't want to mess with. It also seemed unlikely that pigeons could detect a field as weak as the earth's. However, it has been shown that some migratory birds can indeed detect the earth's magnetic field; they do seem to have a kind of compass. However, even in principle, a compass sense cannot explain homing. If you had a magnetic compass in your pocket, and you were parachuted into a strange place, you'd know where north and south were, but you wouldn't know where home was. You would need a map as well as a compass, and you would need to know where you were on the map.

But perhaps the pigeons have an extraordinarily sensitive magnetic sense, by which they can measure the dip of the compass needle. A compass needle points straight down at the north pole and is horizontal at the equator; the angle of dip depends on the latitude. So if pigeons not only have a compass but can measure the dip of the needle, they might be able to work out their latitude. This could, in theory, enable them to know how far north or south they had been displaced. But if they are taken due east or west of their home, the angle of the field is exactly the same as at home, and pigeons can home equally well from all points of the compass.

In spite of these inherent theoretical difficulties, the magnetic theory has been taken seriously by many scientists, not because it is particularly convincing, but because they think there must be some mechanistic explanation, and this is all that's left. Nevertheless, this theory too has

been refuted by experiment. To disrupt the magnetic sense, pigeons have been treated experimentally in two ways. Firstly, they've had magnets strapped to their wings or their heads, in order to disrupt any possible magnetic sense. Secondly, they've been degaussed by being put in extremely strong magnetic fields that will disrupt any magnetically sensitive parts within them. These demagnetized pigeons and pigeons with magnets strapped to

them can still get home. (The first experiments of this kind in the late 1970s seemed to show that magnets could reduce their ability to home on cloudy days; however, these initial results turned out to be unrepeatable, and many experiments have now shown that pigeons can home, even on cloudy days, when any possible magnetic sense is disrupted).

That's the current state of play. Every hypothesis has been tested, and tested to destruction. They've all failed. The one remaining that you occasionally hear is, "They can hear their home from hundreds of miles away, because of extremely sensitive hearing." Even this won't work, because pigeons that can't hear can still get home. All the theories have failed. Nobody has a clue how they do it, although this ignorance is often covered up by vague statements about "subtle combinations of sensory modalities," without giving any details as to what this might mean.

Pigeon homing is the tip of the iceberg. There are many other phenomena to do with migratory and homing behavior in animals which are unexplained, including the migration of cuckoos, Monarch butterflies, salmon, and so on. Human beings may also have a directional sense, probably best developed in nomadic people like Australian Aborigines, South African bushmen, and Polynesian navigators, and least developed in modern urban people. In summary, pigeons, like many other animal species, seem to have navigational powers which are inexplicable in terms of known senses and physical forces.

The experiment that I'm proposing is very simple, and I can outline it briefly. The evidence suggests there is an unknown sense, force or power, connecting the pigeons to their home. I think of it as a kind of invisible elastic band, stretched when the birds are taken away from their homes, pulling them back and giving them a directional sense. I'm not bothering at the moment to theorize about the possible physical basis of this, whether it's part of existing physics, an extension of nonlocal quantum physics, or whether it requires a new kind of field. That question is open.

Using this simple model of an invisible connection, the ex-

periment I'm proposing is the converse of those done so far. The usual experiments involve taking the pigeons from the home, and watching them return. By contrast, my experiment involves taking the home from the pigeons, using a mobile pigeon loft, which is essentially a shed mounted on a farm trailer.

I've actually done this experiment, first in Ireland and secondly in eastern England. So far, I haven't been able to carry it past the first training phase. I found, however, that it is possible to train pigeons to home to a mobile loft. They don't expect their home to move any more than we do, and the first time you take them out, you move their home just a hundred yards. When you release them they can see perfectly well that it's not where it was before. They go on for hours flying round the place where it was before, until they go into the loft in its new position. That's just how we'd behave if we went home found our house a hundred yards down the street. Most of us wouldn't just go straight in; we'd probably go round and round in circles, around the place where it was before, looking awfully puzzled. That's what pigeons do. If you keep doing this, after three or four times, they just get used to it, realizing they're nomads or gypsies now. After this kind of training, they can find their home up to 2-3 miles away within ten minutes and go straight in.

During the First World War the British Army Pigeon Corps had 200 mobile lofts in converted London buses. There's still one army that uses mobile pigeon lofts, the Swiss army, and they are doing some fascinating research. Unfortunately some of it is classified, being a military secret.

To go forward with the experiment, after you've trained the birds, you move the mobile loft 50 miles downwind from the point of release, so they can't smell it. If the pigeons find it quite quickly, flying straight there, this would suggest there's an invisible connection between them and their home. The next question would be, is it between the loft itself, or the other pigeons? To test this you leave some of their nearest and dearest in the loft, or you take the nearest and dearest somewhere else, to seeing whether they find the nearest and dearest, or whether they find the physical structure of the loft.

How the experiment will turn out, I don't know. If there's a new power force or sense involved, what might it imply? What might it tell us? Where would we go from there? This is the question I want to raise with you.

Ralph: Let me ask you for a couple of details. When they race the pigeons and these home lofts are all in different cities, different streets, and so on, how does it work? Does the wife of the pigeon racer sit at home and when the mate comes, pull out the cellular telephone and call headquarters?

Rupert: The racing pigeon has a little ring on its leg for the race, with its number and the race number. When it enters the loft, the pigeon fancier captures the bird, takes this ring off, and using a sealed time clock issued by the local racing pigeon federation, stamps the ring with the time it comes home. When they send in these tags with the time stamps they calculate from the point of release, the straight-line distance to each loft, divide the distance by the time, and get the average speed.

Ralph: Do they account for difficulties and anomalous obstacles encountered along the way?

Rupert: No. If they're killed by a sparrow hawk, they don't win the race.

Ralph.: Does the home loft that they're racing to contain family members?

Rupert: Yes.

Ralph: There's a whole bunch of pigeons in the loft, and only one or two of them are racing?

Rupert: There are several racing systems. The birds need a motive to go home fast. In the winter, they don't home very well. Races are usually held in the spring or the summer when

they've got mates, eggs and young, so they have an incentive to get back to their family. One widely practiced method is called the jealousy system, dependent on the fact that pigeons are monogamous, forming pairs that last at least for a year. The pigeon owners wait until the birds have paired up, then they take away the bird that they're racing, and let another bird approach its mate. Then the racing bird is taken away. When released it returns home really fast.

Ralph: The stronger the motivation, the tighter the morpho-genetic elastic band.

Rupert: Yes.

Ralph: Now that I'm getting the elastic band theory down I'm ready to risk speculating on the question. This is my fantasy.

First of all, accepting the premise that ordinary fields won't do as an explanation, let's assume it's a kind of ESP. I'm thinking of bats, which have been studied in a room just like this one, with wires strung through it. In the daytime the bat will fly around missing the wires and avoiding the wall, using vision primarily, we suppose. At night they do the same thing without vision, using sonar. Suppose, based on bats, that the brain and the mind are able to image the results of sonar experiments, in the same kind of image that the eyes form. In other words, instead of only hearing the sound and trying to compute where the echo's coming from, the bat actually sees the room with its ears, in the same kind of representation as the visual. Then if somebody suddenly turns the lights on, the bat wouldn't hesitate and fall to the ground because it has to switch from system A to system B. The visual representation of the room would exactly overlay the sonar image. Similarly, dolphins have this huge melon-shaped sensory organ that receives sonar waves. Both in the case of bats and dolphins, the visual/sonar representation is more three-dimensional than ours. This would give them, in a way, a kind of a higher IQ. Dolphins and whales, who also use sonar, may sense almost the entire planet as a

three-dimensional object, with its curvature and so on.

If there were a sixth sense that homing pigeons and monarch butterflies have, and maybe us to a degree, then I'd suppose it would work like that. Going back to our pigeons, after they're rotated, doped, transported 500 miles and released, with this sixth sense it would consult a very

detailed three-dimensional road map of the entire planet, orienting the holographic three-dimensional image with the visual world, rotating things around to get them aligned, and then flying in the map. Things like smells, the sun, the magnetic field, are factors, and they'll act as a kind of label on the map.

This still doesn't explain how they get home. They would have to know where home is marked on the map. Given a sixth sense with a complete road map of the world as a three-dimensional object containing smells, trees, magnetic fields, the sun and the celestial polar constellations and so on, there must be some kind of beacon where home is supposed to be. Even in this sixth sense theory, that remains a mystery. The pull of some sort of morphogenetic rubber band is one idea, if there's an obstacle between pigeon and loft, there would have to be some way to find a way around it.

I think the rubber band theory is too simple. Considering jealousy and so on, the longer the rubber band is pulled, the tighter it gets, which is the opposite of most fields that we know, where the farther you get away from home, the weaker is the pull. I would think that the rubber band is more like a beacon that's a part of this whole field. Then the question is how is the physical information of a location, especially a recently moved location, inserted into the field. This would be the final mystery to fill in the picture.

Terence: It seems to me, if I can download this into language, that the problem is not with the pigeon, but with the experimenter. We know from studying quantum mechanics that things are not simply located in space and time. This error is what Whitehead called the fallacy of misplaced concreteness. I've always felt that biology is a chemical strategy for amplifying

quantum mechanical indeterminacy into macrophysical systems called living organisms. Living organisms somehow work their magic by opening a doorway to the quantum realm through which indeterminacy can come. I imagine that all of nature works like this, with the single exception of human beings, who have been poisoned by language. Language has inculcated in us the very strong illusion of an unknown future. In fact the future is not unknowable, if you can decondition yourself from the assumption of spatial concreteness.

The answer to how the pigeon finds its way home is that a portion of the pigeon's mind is already home, and never left home. We, gazing at this, assume that pigeons, monarch butterflies, and so forth, are simpler systems than ourselves, when in fact, our assumption of the unknowability of the future creates a problem where there is no problem. It's only in the domain of language, and perhaps only the domain of certain languages, that this becomes a problem.

To put it simply, if you had the consciousness of a pigeon, you would not have a diminutive form of human consciousness, you would have a consciousness that we can barely conceive of. The consciousness of the pigeon is a continual awareness extending from birth to death, and the particular moment in space and time in which an English-speaking person confronts a pigeon is, for the pigeon, not noticeably distinct from all the other serial moments of its life. The problem is in the way the question is asked, and in the way human beings interpret the data that is deployed in front of them. After all, in the animal world, the future is always rather like the past, because novelty tends to be suppressed. Most things that happen have happened before and will happen again. My expectation would be that what we're seeing when we confront these kinds of edge phenomena in biology is a set of phenomena which, when correctly interpreted, will bring the idea of quantum mechanical biology out from the realm of charge transfer, intracellular and subcellular activity, and into the the domain of the whole organism. I'm not sure this is the solution, but it does cause the problem to disappear.

Ralph: Are you saying that the entire life history of the pigeon is more or less determined at the outset, including the trip away from the loft and the trip back?

Terence: It never went anywhere. It's only when you've laid over this a three-dimensional grid imposed by language that there appears to be a problem. In other words, there's some kind of a totality involved, but we section and deny it, and then come up with a dilemma.

Rupert: What about the pigeons that get picked off by sparrow hawks on the way home?

Terence: They doubtless see that as well. The real question I'm raising is to what degree does language create the assumption of an unknown future? To what degree does it dampen a sense of the future that I imagine to be very highly evolved in the absence of language?

Rupert: It's hard for me to grasp. Do you mean that when a pigeon is released, part of its mind is still at home, in the future, and this in some sense helps it to get back to the loft?

Terence: You and I have talked about this before. You've always implied that the morphogenetic fields drive, push from behind.

Rupert: No, I've always said they pulled from in front.

Terence: Then they're attractors. I am partly saying that, and partly that the consciousness of the organism is distributed in time in a way that makes it capable of doing miracles from our point of view. From its own point of view, there's nothing unusual going on at all.

Ralph: You wouldn't be at all surprised if, as a matter of fact, the race was won by a clever pigeon that actually vanished at the

point of release and simultaneously appeared back in the loft.

Terence: You're seeing it as some kind of virtual tunneling, as an amplified quantum mechanical effect. Perhaps this is the solution to the spontaneous combustion mystery. We pay great lip service to the idea that quantum mechanics is very important for life and so forth. Well, the mechanical nature of things at a quantum physical level suggests that if life is an application of those processes, then our apparent entrapment in three-dimensional space with an unknown temporal dimension is almost, you would say, habitual, not intrinsic. This seems very reasonable to me.

Ralph: I think your idea is good. I like it. If consciousness extends over a certain span of time, even a few days, it would explain a lot of things in the pigeon world. I still think it's important to know whether the future is totally determined, or if the consciousness of the future includes several alternatives. In the case of several alternatives, sooner or later the pigeon is presented by a fork in the road and has to decide which way to go. I think we're still missing here some kind of mechanism for the pigeon to follow the stretched rubber band of its own consciousness, occupying an extended region of space and time, so that its ordinary physical body ends up back where its consciousness ends. How does it do it?

Terence: An analogy would be when you run a cartoon or a film backwards, and there's a spectacle of wild confusion, but miraculously, everything manages to end up in the right place. It isn't that there really aren't choices for a pigeon when it comes into awareness, but that it comes into all the awareness it will ever have. It's like having your deathbed memories handed to you at the moment of birth. Essentially, for the pigeon, it's a kind of play. It knows what's going to happen, its life unfolds as anticipated, but it doesn't even know that it knows. The pigeon doesn't have the concept "anticipated." It's we who are observing that have that concept, and we alone are tor-

mented by an anxiety of the unknowable future, an artifact of culture and language. Things like monarch butterflies, pigeon homing, and some of these other phenomena are clues to us that imputing our consciousness into nature creates problems in our understanding.

Ralph: That means that except for ignorance caused by the power of language, we would have the consciousness of a pigeon and therefore see our entire lifetime. According to this view, the baby pigeon chick, upon pecking out the shell, is waking from a dream, looking around and realizing that, "Oh damn, I'm the one that's going to have to race three years from now and they're going to put this other jerk in there with my mate."

Terence: You use language to portray the state of mind of the pigeon. That immediately collapses its four-dimensional vector into three dimensions and it becomes no longer a pigeon, but a person talking like a pigeon.

Ralph: Is the pigeon then aware or unaware of its entire history from birth until death?

Terence: It's aware, but it's not aware that it's a history. Ralph: Experienced as one timeless moment.

Terence: We could go further with this and say this explains our own curious relationship to the prophetic and anticipated. Instead of, like the pigeon, having a 95% clear view of the full spectrum of our existence, by opting into language we have perhaps a 5% view of the future. We're tormented by messiahs and prophecies, and we lean toward astrology and computer modeling and all of these advanced tools that give us a very weak and wavering map of the future which we pay great credence to and worry a great deal about. I'm suggesting that if we could step away from language that we'd fall into a timeless realm where darkness holds no threat and all things are seen

with a kind of great leveling and all anxiety leaves the circuits. Perhaps this is what Zen masters do and teach.

I'm suggesting one more version of The Fall. From the fourth dimensional world of nature, complete in time, we fell into the limited world of language and an unclear future and hence into great anxiety and conundrums like how do the pigeons find their way home.

Ralph: This suggests that we should stop talking and writing books and just hum.

Terence: I've always felt that. Rather like a pigeon.

Ralph: Is this a polite way of saying that Rupert's current book and homing pigeon experiment is a total waste of time even if it only costs \$10?

Terence: I think all experiments as currently understood are futile, because all, including I assume the experiments in Rupert's book, make the assumption that time is unvarying, and I don't believe that time is unvarying. I didn't intend to open this up on a general frontal attack of the epistemic methods of modern science, but in fact the idea that time is invariant is entirely contradicted by our own experience and is merely an assumption science makes in order to do its business.

Ralph: I believe that we have a case here of multiple personality in action and now I'm going to undertake to prove it. You are now suffering from hay fever. Suppose that Rupert had in his book an eighth chapter on an experiment with homeopathic medicine, and the outcome of it was that a flower power was discovered which absolutely and instantly cures hay fever. Would you then be interested in the result?

Terence: Sure, but as a practical matter, I don't think we should confuse our ideologies with our sinuses. You see, I would like to redefine science as the study of phenomena so

crude that the time in which they are imbedded is without consequence. I suppose ball bearings rolling down slopes fall into this category. The things which really interest us; love affairs, the fall of empires, the formation of political movements, happen on a different scale, and there's no theory for much of what happens in the human world. In the human world the invariance of time forces itself upon us, so we create categories of human knowledge outside of time, like psychology or advertising or political theory, that address the variable time that we experience. Then we hypothesize a theoretical kind of time, which is invariant, and that is where we do all the science that leads us into these incredibly alienating abstractions.

This goes back to Newton, who said time is pure duration. He visualized time as an absolutely featureless surface. Now take note that Plato's effort to describe nature with perfect mathematical solids was abandoned long ago, because nowhere do we meet perfect mathematical forms in nature. The only perfect mathematical form that has been retained in modern scientific theory is the utterly unsupported belief that time, no matter at what scale you magnify it, will be found to be utterly featureless. There is absolutely no reason to assume this is true, since all experiential evidence is to the contrary. The problem is, if we ever admit that time is a variable medium, a thousand years of scientific experiments will be swept away in an instant. It's simply a house of cards that's better left where it stands.

Rupert: This seems to go a little bit beyond the problem of pigeon homing.

Terence: It addresses the problem of experiments as a notion.

Rupert: If we take what you are saying down to the level of pigeons again, it turns out to be an elaborate version of the rubber band theory; "the rubber filigree," or something like that. Let's say we perform the experiment of moving the loft; it could show us something that goes beyond anything contemporary science would expect. It might or might not fit with your all-time theory.

Terence: It does fit.

Rupert: Nevertheless, here we have an experiment, crude though it is, which would show that the existing scientific model is very inadequate. The rubber band theory involves a kind of attraction to the home and in that sense involves a pull in time, so it does raise all these questions about the nature of time.

Terence: Do you have a theory about how it works? I don't see how morphogenetic fields are particularly helpful here.

Rupert: Yes. I think the morphogenetic field would include both the pigeon and its loft. You can separate them by moving the loft or by moving the pigeon. Either way, they're part of a single system. The pigeon's world includes its loft, its home, its mate, and all the rest of it. When you move them, they're now separated parts of a single system, linked by a field. The pigeon is attracted within this field, back toward the home which functions as an attractor. This is where Ralph and I have a different view of attractors. The pigeon is pulled back toward the field, not needing a road map of the whole of Britain. A road map is irrelevant. It just feels a pull in a particular direction.

Ralph: It's like the angel theory; that when I come to a fork in the road, a guiding angel appears from behind a tree and tells me which way to go.

Rupert: Roughly speaking, it is. You just feel a pull in a particular direction. You don't even think about it. I think that's how the pigeon does it, subjectively. I don't think it necessarily needs to see the whole of its future from egg to grave. I think it feels a pull towards home by this kind of invisible rubber band, which is actually like a gradient within the field towards an attractor which is its home. That's how you'd model it mathematically. You wouldn't have to bring in the whole of the rest of Britain and a road map. If it did, however, need a road map to the whole of Britain or Europe, we'd have to ask the ques-

tion how would it get it? It might tune into the collective memory of all the other pigeons that have ever gone on homing races. If a pigeon could access the collective pigeon psyche, or the collective memory of other species; if all birds could link up to what all other birds could see, then they would indeed have access to a global map of the world. I think that's probably going further than we need in this rather limited case.

In the case of young cuckoos migrating in the autumn from Britain to South Africa, independent of the parents that they leave a month earlier, they must be tuning in at least to a kind of collective cuckoo memory that includes features of the landscape over which they fly. The rubber band theory wouldn't necessitate even that.

Ralph: There still seems to be a mathematical or cognitive problem, when the loft is moved. The dynamical system, which extends essentially over the whole of the planet, wherever the pigeon may be released, has to receive the feeling of which direction to go. The question arises, how does the attractor, the loft, extend its field and directional instructions all over the planet? I don't think that the idea of morphic resonance helps here, because in the case of the moving loft, no other pigeon has flown to it.

Rupert: I'm not talking about morphic resonance, I'm talking about the field itself. Morphic resonance is a memory. Say you have a pile of iron filings and a magnet. The filings are drawn toward the magnet and you see lines of force between them. When you move the magnet, you see an immediate response.

Ralph: The loft itself simply functions as a magnet in another field which is not an electromagnetic field; a sort of emotional field.

Rupert: When you move the loft and it's just like moving a magnet. Automatically the iron filings or whatever respond. That's basically the model I'm suggesting.

Ralph: And the reason that I can't find my car in the parking garage is because I'm not emotionally attached to it and I've never been in love with it. I should get an Italian car.

Rupert: In the human realm it could apply to finding people. My wife Jill does an experiment in her workshop where people form pairs and they first find each other by humming with their eyes closed. After they've got that, they find their partner just by feeling where they are and heading in that direction. I've tried doing this experiment with our children on the assumption that with children this effect might be very strong, and it turned out one of them was extremely good at finding me. Then I discovered he was peeping.

Maybe bonds between pigeons and their homes are comparable to the bonds between people and other people. Indeed, they may be related to the kind of social bonds that hold society together. When we say the bonds between people, we may mean something more than a mere metaphor. Perhaps there is an actual connection. We have many examples from the human realm, as when a child falls ill miles away and its mother immediately starts worrying and rings up to find out what's happening. This may be another manifestation of the same kind of rubber band effect. It may be an aspect of social bonding. The motive of pigeons to go home is social, not merely geographical. If it hasn't got mates,

it doesn't bother. In the case of migratory birds, bees that have to forage out from their hives and then come back, there must be some way in which the social bonds extend into a geographical dimension and then become spatial, directional bonds to find the home group.

There are cases reported by naturalists that when packs of wolves go out hunting, a wolf may be injured, and stay behind in a kind of lair. The pack goes on and kills an animal, quite silently, no baying. Then the wounded wolf take the shortest line from where it was to the place of the kill and joins the rest of the pack for its meal. The tracks show that it goes in a straight line without following scents, because it can do this when the wind is blowing the wrong way. This kind of social

bond and linkage may be fundamental.

Ralph: There's a kind of agreement here that there is a sixth sense that's a field phenomenon, like the quantum field. It's a social field, involved with the flocking of birds, the schooling of fish, and with herds of animals and packs of wolves. To answer the question you posed when you started us off; what would this teach us, or mean to us in terms of our future? It could be that humans are somehow divorced from the significance of this field, so whenever their guardian angel speaks, they always do the opposite. If we want to understand the population explosion, the demise of the planet, all these wars, the manifestation of hatred and sources of evil, a candidate for the disharmony in the human species would be its disconnection with this field. Here's where Terence's idea comes in, that somehow to submit to language is to lose our connection with the field. We've all done experiments in not speaking, for example meditation and dreaming, where the antitheses of language has an opportunity to come forward and re-connect us to this field. For people like Americans, who watch television seven hours a day, there may somehow not be enough time away from language.

Terence: Notice that most prophetic episodes are dreams. This supports my point, that we've lost connection with a kind of fourth-dimensional perception that for the rest of nature is absolutely a given. Rupert: Why do you think it's a given in the rest of nature?

Terence: Because there are many, many cases of this kind of thing. Animals that are put in the pound by the owners who are moving, and then the owners move seven hundred miles and the animal escapes from the pound and it doesn't return to the ancestral home; it returns to the new apartment in a different city. The monarch butterflies, the homing pigeons, a whole host of mysterious phenomena become utterly transparent and trivial if you simply hypothesize that for them, the fu-

ture doesn't have this occluded character that it has for us as a result of our acquiescence in language behavior.

Rupert: It's not just a problem in time, it's a problem in space.

Terence: They see themselves at every point in their life, not just the high or low points.

Ralph: They're a minute ahead of where they are, so they just go that way.

Terence: In other words they can always see their goal from where they are. They navigate through time in the same way that we navigate through space. I mean, if you were a two-dimensional creature, the things that we do, navigating in three-dimensional space, would be absolutely mysterious and generate all kinds of metaphysical speculation and hypotheses. Why should nature imprison itself within a temporal domain? Clearly, for us it's an artifact of language. We talk about future tenses, past tenses that aren't descriptive of the future and the past; they create it. That's why I put in the possible exception of human languages where this is not happening and therefore they are much closer to animal perception. The "mysterious" behavior of Australian aborigines, or the Hopi. These people seem capable of things that to us are like magic, but the magic is all done by knowing what's going to happen. If they simply imbibe the animal's understanding, then to them it's trivial. This is the most elegant explanation, not requiring new, undetected fields, or any of these other somewhat cobbled-together mechanisms.

Rupert: Just another dimension.

Terence: We know it's there. There's no debate about that. I've always noticed that all the magic done by shamans in aboriginal society, especially the ones that are using psychoactive plants, suddenly becomes not so mysterious if you simply as-

sume that, by perturbing the ordinary brain states and ordinary language states, they let in this hyper-dimensional understanding. Look at what shamans do; they predict weather and they tell the tribe where the game has gone, both requiring a knowledge of the future. They rarely lose a patient, meaning they know who's going to make it and who isn't, so they can refuse all cases destined to be fatal. All these examples of shamanic magic can easily be explained by the simple assumption that they can to some degree perceive the future. Animals operate from this place to begin with. What is the shaman's strategy for attaining his special knowledge? He becomes like an animal, he is master of animals, he dresses in skins, he growls.

Ralph: He talks to pigeons.

Terence: He talks to the animals, perturbing his brain state with ordeals or drugs or other techniques. The very close association of the shaman to the animal mind suggests that it's the clue to entering this atemporal or fourth dimensional perceptual sphere.

Rupert: In the Christian tradition the principle symbol of the holy spirit—that which gives inspired prophecy, shamanic-type gifts of healing, all the gifts of the spirit, including speaking in tongues, prophecy, healing, and intuitions of various kinds—is the pigeon. The first Biblical story of the pigeon is in the story of Noah's ark, where the pigeon was sent off and came back with the olive twig. Right from the beginning the pigeon is a messenger who can find out things in distant places and return, bringing back the information. You could say that central to the whole Western tradition, this shamanic thing of becoming like an animal, in this case somehow entering the mind of a pigeon, or in some way assimilating to the state of the pigeon, is the basis of the gift of knowledge, prophecy, and spiritual power.

[Notes

1 Rupert Sheldrake, *Seven Experiments that Could Change the World* (London: Fourth Estate, 1994).]

FIVE

The World Wide Web

Ralph: I first fell in love with the World Wide Web in the winter of 1993-94, when it was about one year old. And my obsession with the Web grew so rapidly that I have written a book on it called *The Web Empowerment Book*. My motive was to wake people up to the existence of this thing before it's too late, and get them involved in order to participate in the creation of our future. But when I go around trying to tell people about it they say, "Well what is it? And how is it different from the Internet?" and so on. I'll start by trying to tell you this.

By now everybody is familiar with the Internet. It's on the cover of all the big magazines and there are about 100 books about it. From my perspective there are now four different levels of citizenship on the Internet, which is a new ground. A new territory has been discovered. It's the new world, it's frontierland. Frontier and pioneer are the words that you hear prominently in connection with the Internet. Here we are in Hawaii where it's the ideal place to study the rules of dispersion of species in the context of biogeography, and not only actual biogeography. We also have the situation of the long-range dispersion of this new medium, over the ocean, approaching Hawaii. Now it's 3,000 feet away and in a few months connections to the World Wide Web will have arrived here where we're sitting.

The four levels of citizenship in the Internet: first of all, you have acquired a connection to it, that is you have located an Internet provider, a machine that somebody owns that's highly connected to the Internet and to which you're weakly connected by having an account on that machine, a telephone number, and a modem. At the first level of citizenship on the internet, all you can do when you call your Internet provider is send and receive mail and read news bulletins that various people have posted, the front page of the New York Times or something like that. On the second level you attain the capability to do everything that the Internet was capable of about a year ago, things like gopher, where you can search for a book

that exists somewhere in the world. Almost all libraries of the world, even in very small countries, have now connected their card catalogues to the gofer system. This is itself a rather interesting self-organizational system taking place within the new frontierland. These are capabilities that characterize the Internet on citizenship level 2.

Level 3 is where you become aware of the World Wide Web and you're able to enter that level of organization. It's another self-organizing system, where people have what amounts to amateur radio broadcasting stations, and they're able to post all kind of materials that are related

to the Internet such as pictures, sounds, moving pictures, and moving pictures with sound, and most importantly, hypertext, which is the characteristic mode of the World Wide Web. Many people are familiar with hypertext from HyperCard or some other multimedia programs on personal computers. Hypertext means that you have text, with some words highlighted, so that when you move your cursor there and click, something happens. There's a terrific range of things that can happen, including getting lost in space, getting disconnected, and so on. The usual thing to happen is that you jump to another hypertext document, which is somewhere else in cyberspace, where you do not know. So it seems that these very distant pieces of text are highly interconnected, that the links between all the different pieces of text existing electronically in cyberspace have somehow multiplied through the intentional insertion in ordinary text of these jump stations where one jump will get you somewhere else. Jumps have anchors where you click to begin the jump, and where you land.

So the hypertext medium, this mode, characterizes the World Wide Web and the Internet on level 3. For World Wide Web citizenship, you need a special program called a browser, of which there are many available free on the Internet. For entry to level 3 of the Internet you need to be first on level 2, where you can log into somebody else's machine and copy their files. And these files, which are very valuable programs, like browsers, are available for free all over the Internet, and you

just grab one, put it on your hard disk, and simply by double-clicking there, that's the open sesame for entrance into level 3 on the World Wide Web.

At this level the World Wide Web is already much more interactive than television. It's got everything that television's got—it's got feature-length movies and so on, but you can deal with it more interactively. It's much more interesting than television. I would say it would be a very bad time to invest money buying stock in traditional media companies like film and television feature productions. So after browsing around for a while, your citizenship on level 3 becomes boring, because you would really like to publish your own material. That's level 4 where you are able to create a sufficiently intimate connection between your own computer and the Internet, so you can broadcast your own materials and other people can browse them.

So those are the levels. And the way I discovered the World Wide Web was through CD-ROM, a medium that most everybody is familiar with. There's a goldrush in the CD-ROM business. It's considered the great opportunity for adult entertainment and intellectual communication and so on, because on a CD-ROM, which costs about the same as a book to produce, you can put a book. You can put an entire encyclopedia. You can put a thousand volumes of text or hypertext. Or you can put one hour of video or audio. Now there are thousands of titles available, pornographic films, old movies, educational materials, encyclopedias, learning environments for mathematics. When you put the CD-ROM in your computer you're presented with some kind of menu, like the table of contents in a book, but all of the items on the front page are linked through hypertext, so clicking them gets you somewhere.

You still have to learn how to navigate all the materials and more interesting ones have literally millions of links. So to use them embeds you in a multidimensional space of information, the navigation of which is done through intuition. Some people have become very adept at navigating these higher-dimensional spaces through more interesting CD-ROMs, many of which are games. I feel that CD-ROMs are a temporary phase

and will soon be replaced by the World Wide Web. But now, since you know what CD-ROMs are, you can imagine the World Wide Web even if you've never been there. I think we will have all the CD-ROMs in the world available on the Internet. Say you're interested in biogeography, then there will be ten CD-ROMs on biogeography on the Internet. They're all available on the World Wide Web. Furthermore, at little cost you can publish your own, if you've achieved level 4 of citizenship on the Internet. You can publish your own CD-ROM, little teeny ones or great big ones, on the World Wide Web. That means that whatever is published by you is accessible to the entire world, at least this virtual world of the World Wide Web. Well what is going on? With the browser I could take you on a tour where you would see a lot of sights. What you see out there is literally tens of thousands of interesting projects in an early state of creation. And that means there are tens of thousands of people essentially devoting all of their waking hours to creative works for which there is no return except the joy of creativity. We have a region of absolutely unbridled, unrestricted creativity on a scale that boggles the mind, a scale never before seen. And what are people doing? Why are they doing this? It's all because people involved in this field feel, as I do, that there is a window of opportunity for the creation of a new future. So that brings me to my particular focus for our conversation on the World Wide Web. It seems to me and to other people who are careful observers of the scene that the miracle for which we've been waiting, the Aquarian Conspiracy, is actually happening. The Internet is the substrate, the aphysical substrate as it were, for the creation of a new future. And of all the people who have predicted this event in some detail in the past, the one that impressed me the most for his understanding of what's actually happening now is Teilhard de Chardin. His concept of the noosphere described the World Wide Web without using these terms, without any reference to an electronic aphysical substrate. Now I would use the metaphor of the neural net, an abstraction of neurophysiology concepts. The

individual souls in the picture of Teilhard

de Chardin are the interconnected nodes of a neural net.

His vision of the omega point was a prophecy of 500 years in which the quality and the number of links between the individual nodes suddenly began to grow substantially, as a paranormal phenomenon. Telepathy, intuition, sensitivity, consideration, love or something would amplify the strength of the connection between the different souls and so on. And in this neural net would be created the supermind, the noosphere. This is the process he called noogenesis.

I believe that the World Wide Web is, as a matter of fact, the noogenesis of the noosphere. This is it. What could happen? There's a spectrum of possibilities. My interest now is to try to contribute to the creation of the future by encouraging the future evolution of the World Wide Web in a certain direction, a spiritual direction.

Connecting up to the Web happens to be rather difficult at this point, and maybe that's why the kinds of people that you find on it now are not a wide spectrum of humanity. For example, women are sparse. But this situation is temporary. And after you've connected up, it doesn't require any special training to use it. It's like the Macintosh desktop. You just take the mouse and start clicking away and find everything—the Encyclopedia Britannica, the population of India, the current surf conditions. In one of these volcanoes up here there is an eight-legged robot crawling around taking video pictures. Those pictures are available in the World Wide Web. You can see them now. SimCity, one of the most popular and educational games in the PC world these days, has a multi-player version which can be played on the World Wide Web. Disparate browsers of the World Wide Web come across a SimCity in process of construction and they can ask for permission and join in the game.

So that's an idea what the World Wide Web is about, and how I see it as an opportunity to participate in spiritual evolution. Suddenly our opportunities in ordinary media pale in comparison with the new opportunities presented on the Internet in the form of this World Wide Web on level 4.

Terence: It's very interesting. I love hearing you talk about it because your enthusiasm is infectious. It's a kind of ultimate technophilia that you've embraced here, I mean God as computer. I agree completely. I think this is the presence we've been waiting for, this is the outer shell of the Omega Point that history has been moving toward. The implications are mind-boggling and difficult to discern. Is this biology preparing to shed its physicality and decamp into another dimension? Isn't it interesting that it is ultimately wires, bolts, electrons, yet it's prophets reach for the language of theology to describe what is happening. This is nothing less than a manifestation of the incorporeal body of God in human society. It is the end of history as far as I can see. We've been talking since the sixties about boundary dissolution, interconnectivity, so forth and so on, assuming these things would arrive in pharmacological potions. But it appears that global electronic connectivity is a very powerful, practical competitor for that.

It is disturbing, you put your finger on it, the absence of the feminine. I wonder if perhaps the first World Wide Web was 100% female and has existed for millennia, and that the extent of the role of the engineering mentality is to hard wire the whole thing, bringing the guys up to speed and introducing them to the reality of boundaryless communication and an intuitive sense of wholeness, completion, and so on.

Ralph: Do you think we should call it the Second Web?

Terence: Yes, women have always spun and moved in these webs and now men, in the process of being feminized, are learning this trick, but implementing it in the way they know best, which is through technology. I cannot see the edges of this. I think you're right, that the thing we have prayed for, that seemed so unlikely, that seemed in fact to require—and no pun is intended—a Deus ex machina. A Deus ex machina is now with us. And what's wonderful is that it's cut down no forests, it creates no new slums, it is in fact invisible. And so the people who might for various reasons seek to slow it down, to sub-

vert it, to manage it, are in fact unaware of it. They are perfectly in control of the land masses of the planet, of the pluto-nium, of the petroleum, but they do not understand that these are not the key to the game. The key to the game is information and connectivity. And in that domain, this thing seems to have a morphogenetic dynamic of its own. I would be interested in what you have to think about it, Rupert, as the proponent of the morphogenetic field. Irrelevant, or a shining example or metaphor of what you are talking about?

Rupert: I don't know what to make of it. I find my skepticism being activated. My own experience is that I already have access to vast amounts of information and ideas. All London's libraries are around me, I can get incredible amounts of information through newspapers, stacks of unread magazines, the huge amount of mail I receive, and so forth. My problem is having time to read what's already there. What Ralph has described, people browsing idly through the net, finding out amazing nuggets of information here and there, and creating without need of recompense, presupposes a vast amount of leisure. And somehow I can't get this picture into focus because it doesn't come from the reality I know. This may just be British cynicism surfacing, but I can't quite see how this fits into the lives of people who have to make a living. I can see it as a leisure pursuit, a hobby, like ham radio.

Terence: In the past, if you sought information, you would seek only as far as you had to, and that would be usually your local library. And the quality of your conclusions would inevitably be infected with a kind of parochialism. For instance, in the Old World, if you wanted a picture of the Mona Lisa, you would look up Leonardo da Vinci in the Encyclopedia Britannica. On the World Wide Web, if you want a picture of the Mona Lisa, you call up the camera in the gallery that is staring at the Mona Lisa. You don't call up a reproduction of the Mona Lisa, you call up the thing itself. Human beings are defined by localism. What kind of world would it be if there were no localisms? In other

words, if concepts like British, Somali, Chinese, were utterly meaningless, because everyone moved in the same cultural su-perspace? It has been said of capitalism, which also has tried to create a homogenous culture of social space, that it does it by appealing to the lowest common denominator, by forcing Bedouins and the Witoto to watch Dallas or something like that. It seems to me the argument for the Web is that it preserves diversity. It really celebrates all information without bias. And Ralph neglected to mention, although I am sure he is aware, the original Internet was constructed by the American military, as a system of communication specifically designed to survive a thermonuclear attack. Hence, it has been designed to be indestructible. There is no central control to bomb or blow up. Hence, the very people who created the Internet find it impossible to control.

Ralph: Its great appeal is that it's out of control. Terence: It's chaotic, friends.

Ralph: We always wondered what would happen if you let creativity go in an infinite sphere of resources, what would happen, and here it is. Well, the World Wide Web is not really comparable to the traditional sources of information like books and magazines. But suppose it were. Suppose that there was nothing on it but books and magazines. Still, the access to all that information has suddenly changed. Now, all those books in the British Museum are not really accessible. Access is severely restricted. There are six billion people in the world and they just won't fit. Through the Internet people can have free access to all these materials. It's true that at popular sites at the moment, you may have to wait in line. But the access is amplified by factors of hundreds of thousands. That's the most obvious thing that's changing.

Terence: The other thing I think that it's hard to predict the impact of, is that no matter how obscure your field of interest

or your self-definition, you can find the others—third world handicapped lesbian mothers will all be able to communicate with each other.

Ralph: New communities in other words.

Rupert: It seems fine if you know what you're looking for. But when I read the Guardian newspaper in the morning, although I'm particularly interested in certain kinds of things, there are a whole lot of other things that I see that I wouldn't normally look for. I would never dial up half these things.

Ralph: The Guardian newspaper is on the World Wide Web, and furthermore, it's indexed. Now you read a book. Many of us start reading a book from the back, we like to have a look at the index, see if it's a large one or a small one. I see this book on Island Ecology, it's got 60 pages of index in three columns, I think "This is a great book." Many books on the World Wide Web are indexed completely, every single word is in the index. That means it's much easier to find what you're looking for.

Rupert: Okay, let's say it is this amazing resource. The next question is, what kinds of research project or creativity do you want to do on it? I can think of several examples right now. One is Terence's chosen field, the quality of time. Terence is interested in his particular time wave, but I'm more interested in the empirical side of it, starting not from the theory but from data that show fluctuations, for example sunspot data, accident reports, suicide statistics, freak storms, and so on—all those things that could reflect changing qualities of time. I myself wouldn't be able to do much with them, because I don't have the mathematical skills to do a correlation analysis, and all the other things that you could do to compare vast data sets. A new kind of research into the quality of time would be possible through the World Wide Web. I can easily see

that possibility. I can also see that the number of people who are really inter-ested in this might be very small.

Terence: It seems clear that a general quality of the late 20th century culture is that opportunity flourishes. As some of us are moving off to access the central computers of the World Wide Web, some of us can't read the ingredients on cereal boxes. A lot of people are going to fall through the Web. They've fallen through every web in history. And so then an issue emerges, is this something being created for an elite? And what kind of an elite is it? It's certainly not an elite of wealth, it's an elite of intelligence. Now notice that throughout history the most oppressed group has not been the Jews, the Irish, the Blacks. They've all taken their hits, but the most consistently oppressed group of people throughout human history have been smart people. And now comes a tool for smart people, utterly incomprehensible to nudniks, that is essentially the equivalent of the hydrogen bomb. And if in fact consciousness expansion is to be our salvation, then this must be it—as chaotic as the Web is, it is a controlled psychedelic experience, spreading through the populace at the highest levels of intelligence.

Ralph: It's more like a one-way psychedelic experience. After one hit of LSD or something, your mind is altered permanently. After you have browsed and gotten used to this phenomenon, it's almost impossible to forget it. Or ever go back.

Rupert: Ralph, since you can speak from experience, which I certainly can't, what breakthroughs or actual benefits have you personally derived from the World Wide Web, other than the vision of what it could be in the future?

Ralph: I would say the most evident and significant aspect in my life affected by the World Wide Web is my motivation for authoring. I am ready to give up writing books or intellectual activity other than sitting in a garden speaking as we are right now. Publishing a book that's read by 1000 people or publishing an article that's read by 100 people is an awful lot of work for no result whatever, even though I love the process of mak-

ing books. I have a thousand ideas for writing books. There's just no reason to continue. Now, however, I see that I can freely self-publish all my creative energy. My World Wide Web site has been cruised by probably a hundred thousand people just in one year.

Terence: And you sell advanced mathematical software. What if you were selling dildos?

Ralph: People may be unaffected by what I write, and that's okay, but at least there will be the possibility. That somehow motivates me to do more work. Furthermore, using electronic tools, preparing material to be published electronically is very seamless. So I find I can go at a much greater rate. I'm planning to do about four volumes a year. I have a dozen ideas waiting as I always have, but for the first time I anticipate completing them all shortly and making them available to people who will actually access them, discuss them, and do something similar in response. They'll publish a book back.

Rupert: Heaven forbid. I have a dreadful prospect awaiting me when I return home next week from Hawaii, a stack of mail several feet high which I know will contain at least 20 thick envelopes containing exactly what you're talking about—people's creative work in progress. Theories of the universe, why Einstein went wrong, why evolution should be understood in a new way.

Ralph: I have a stack too. You don't have to read them all—

Rupert: But the idea of torrents of this stuff pouring into my computer is enough to put me off totally. Because the amount of creativity around already is far too much in my opinion. I don't know that we need more.

Ralph: Well out of a stack 30 feet high of manuscripts you might find one valuable one. Out of all these cranks there will be one...

Rupert: I know, but then one would be in the position of the editor of a magazine with the unenviable task of looking through mounds of unsolicited manuscripts and trying to decide which is publishable. I'm grateful to them for doing this: I would hate to have to do it myself. On the World Wide Web we each have to be our own editor.

Ralph: No, people will publish whatever they please without restraint, and then people will browse whatever they please without restraint, and what we're talking about is a thousandfold increase of creativity all over the planet, like people who have never had an opportunity to

create. They put a window into the World Wide Web in a public place in Los Angeles and who crowded around it were gang members who saw that they had the opportunity to participate in society for the first time. More creativity can't be bad.

Terence: If you view cyberspace as an informational environment, what's being said is you get much more interesting evolutionary situations out of species-dense environments than very sparsely inhabited environments, and I think what Ralph is saying is that the ideological environment of human culture is about to change to the equivalent of an Amazonian rainforest. It has been an Arctic tundra.

Rupert: Yes, I can see it leading to a great proliferation, like speciation in the Amazon. Already we have an incredible speciation of interest. Just go into any magazine store and there are hundreds of magazines on incredible specialist topics—rabbit breeding, motorbike repairs, windsurfing, model train collecting, and so on.

Ralph: It's wonderful!

Rupert: Yes. But the thing is that vast proliferation of special interest groups and speciation of subcultures doesn't have what Teilhard de Chardin has in his vision of the noosphere, which

is not just thousands and thousands of little groups with special interests communicating worldwide, but some unifying principle of humanity. I can easily see how there could be groups discussing their experiments with psychic dogs and cats—

Ralph: That's why we've got to get busy and put more out there.

Rupert: But the Web is based on endless proliferation or fragmentation or differentiation. Where are the unifying principles? Global capitalism hardly seems enough.

Terence: The Internet is a kind of super organism. It dissolves national boundaries, it dissolves class controls, religious controls, it creates a holistic organism. It may not be that it's going to make the world better for white, male intellectuals. That may not be its purpose at all. It may be that it has an emergent telos of its own and that asking what it's for would be like a beetle asking what its evolution is for. I think it will supersede us. I don't know how much monkey meat will be connected to the World Wide Web when the Web is complete. It may shed the monkey meat somewhere along the way.

Ralph: Here we diverge. It would be a huge disappointment if Rupert's fantasy turned out to be the actual future of computer evolution. What I see in the future is that somehow the exalted self-image of humanity will be corrected, that we will end up after a spiritual transformation in a better relationship with the biosphere so that we can have a future. And achieving that depends on a fantastic acceleration in the process of education so that people get information. I'm struggling to put on the World Wide Web ecological models that people can actually play, ecological games like SimCity in which you see what happens if you cut down the Amazon jungle completely, and so on. This information can become widely accessible in a form that doesn't even require literacy. And the World Wide Web itself will, I think, become extinct in a very short time. This is a transi-

tional phase in which a divine process is set in motion giving us the necessary ingredients to evolve into a species which can actually coexist sensitively with the environment.

Terence: I look forward to a day when people will live on an ecologically balanced earth: a few hundred million healthy, well-fed, intelligent people who will appear to be physically at a very aboriginal level of cultural expression, but if you could transpose yourself into the body of one of these people you would immediately notice that when they close their eyes, there are menus hanging in space, and those menus are the interface to the cultural dimension, which is not to be seen or touched anywhere but in the mind. Not my mind, but collective mind. The World Wide Web could be a seed for the creation of a global telepathic collectivity.

Research With Psychic Pets

Rupert: I've been doing research on pets as part of my grassroots science project, which we have discussed before [see Chapter 1]. It turns out

that many people have dogs and cats that seem to know when they are coming home. The animal will go to the door, window or gate to wait for them coming home, often ten minutes or more before they arrive. This happens even when they are not expected, and even if they come home at irregular times. Many people have told me that they know when their partner is on the way home because of the behavior of the animal, and often start cooking a meal accordingly. The pet's anticipation of the arrival of the absent one is often both appreciated, and taken for granted. No one seems to think about it much, beyond assuming that it must be some kind of psychic or telepathic ability.

This kind of behavior is surprisingly common. In most groups of ten or more people I've been in, there's at least one person who has a personal experience of this anticipatory behavior of pets.

Once this phenomenon is brought to consciousness, it turns out to be a widely accepted item of common sense. In Britain, stories about this research have been featured in many newspapers, magazines, ranging from the London Times to Dogs Today, and I have had hundreds of letters from people telling me of the seemingly psychic powers of their pets.

In a BBC radio discussion on this subject, I was confronted with a notoriously witty but hard-bitten panel. I was expecting a sceptical response. The most formidable of the panellists simply said, "Well, my dog's been doing it for years." and the others duly added their own stories. His conclusion was: "The only thing that puzzles me about this behavior is why Dr. Sheldrake feels he needs to prove it."

In many cases, it turns out that the pets are responding when the person sets out from the place they're leaving to go home. In some cases, at my request, people have deliberately randomized the time they set off by tossing coins. And pets can

still respond when the person comes home in an unusual way, for example by bicycle or in a taxi.

So the experiments so far have shown this is probably a real phenomenon, that it's common, and that research on it can be done very cheaply. What I would like to explore with you are the implications of this behavior by pets.

Ralph: Well, I'm really a fuzzy-minded person and I'm soft on this kind of thing. Nevertheless, I feel skeptical when you say that this is proved. I don't know the details of the experiments that you're referring to, but I have a feeling that when in a room of 30 people there are 5 or 6 who have had this experience, they're not sure that it involves an actual precognition or telepathy. They don't know, because they've had the experience in a casual setting and not in a controlled experimental setting that you're recommending. So I think although controlled experiments might be convincing later on, maybe they're not yet.

Rupert: I'm not saying that it's definitely proved, I'm jumping ahead. One possibility is so boring it's not even worth discussing. This could become another perennially disputed phenomenon like ordinary telepathy. It could be shelved along with parapsychology for another hundred years.

Ralph: Well how is this going to work then, the experiments with pets? Performed repeatedly by high school science groups and pet clubs and individuals and documented with home video tapes and so on—how are the results of these experiments going to be collected and presented in an understandable form to the public and have a chance to achieve their promise?

Rupert: Through magazines, books, radio, TV and the media in general.

Ralph: Will there be a backlash do you think?

Rupert: Well if there is, the media would love it. They love controversy, they love things about pets. The skeptics would be

forced into the position of arguing head on. And what could they say in a public debate to defend their position in the face of convincing evidence?

Terence: They'd look like fools.

Ralph: What we need in order to survive these confrontations are experiments that have been very well done.

Rupert: Yes. And in response to the criticisms of skeptics, the experiments could be improved progressively until all reasonable objections had been met. Meanwhile—

Ralph: Prizes.

Rupert: Yes, prizes for the best experiments. And then a second wave of prizes for the best theory to explain the phenomenon. There would be an open invitation for anyone to put a theory forward. I think a competition for theories would engage a lot of attention and it would mean that there was not one person trying to impose a theory on everyone else. Anyone could have a try. My guess is that most of them would be field theories of one kind or another.

Ralph: Well this is very creative. I feel certain that the World Wide Web will somehow mediate these discoveries and facilitate their dissemination more than magazines.

Rupert: Yes, very possible.

Ralph: You'd have to watch out that the scientific research program is somehow monitored so that it doesn't create an enormous wave of abuse for animals.

Rupert: I think with pets this is very unlikely. And the public nature of this research would act as a healthy restraint on any possible cruelty.

Ralph: I agree with you that this is a sphere in which experiments could be very rewarding, and let's suppose that they are, and then the question is how this could evoke a transformation of science.

Rupert: Yes.

Ralph: Well I think that—this is just a pessimistic view from an optimist—this could be established and become commonplace but not significantly change the paradigm of culture at large, because there is already a huge space for what's called superstition. An incredible variety of things that are denied by science are accepted by people at large, like astrology. But the scientific community, I think, would resist the proof, no matter how rigorous, because the scientific system is so inflexible, so closed to novelty, that it's essentially a dead end. This is pretty pessimistic, because science can't change and people don't need to change and no matter what is achieved in this most ex-emplary and promising of all possible experiments and domains, there wouldn't be any change in the world at large. However, for me personally, if I become convinced, or even without being convinced if I take seriously that pets and owners are able to exchange messages over distances, then this is really phenomenal. It moves along all my ideas. I mean, what this signifies is that everything is interconnected to a much stronger degree than anyone has been willing to admit.

Rupert: Except most people, when they talking about their pets.

Ralph: Well, even if they have convincing experiences with their own pets, they probably cannot stretch to consider the possibility that all pets and people are connected.

Terence: Ralph, I think you make a good point about flexibility of the mass mind and the margin of superstition, but I think you're making the point too strongly. In other words, science is rigid, yes, but it isn't the Kabala. In other words, presented with

sufficiently overwhelming evidence, scientists have no choice but to retreat. The word proved is tossed around—the thing is proved when one's enemy retires bloody and whimpering. Then it's proved. And we're not yet at the point where we should be so pessimistic. In other words, if 5 out of 30 ordinary people are reporting this, and then it turns out that it's actually real for 1 in 300, it could become an overwhelming argument. Quantum physics had to accept electron tunneling because the electrons kept coming through the energy barrier even though the equation said they didn't have enough umph to get through. And so science had to make a place in theory for the utterly miraculous fact that apparently particles can sometimes move through energy barriers with impunity.

But I am skeptical. There are a number of things that went through my mind listening to this. It is certainly true that human beings and the two species that were mentioned, dogs and cats, have been in association for a very long time, in the case of dogs maybe half a million years.

Not domesticated, but in the same environment, predating the same animals, and so on. In the case of dogs and humans, I would wager dogs are a better candidates for this ability than cats. Many cats barely lift their heads when you walk in the front door. But dogs do seem to have this ability. Dogs and cats are social creatures that have evolved complex signals; so are human beings. They were very similar to us for a long time, but then the signal producing capacity of human beings evolved and the dogs were not really able to follow. It seems to me that behind shamanism is the idea that human and animal consciousness can be very closely intertwined and traded off. It's unproven, but certainly a commonplace of fringe speculation, that in the prehistoric human past, human beings were telepathic with each other. This suggests that early human beings may have been telepathic with their animals, that they may have had a relationship with their animals that precedes what we view as rational.

Having said all that, then I take a different position. When Rupert described the phenomenon and you responded to it, there was a kind of implicit assumption that we understand

how this works. We think we've arrived at the new paradigm, that this phenomenon between pets and their friends is telepathy, that this is the proof of the existence of an invisible field, an influence that links everything together, that in fact if this could be proven it could be the centerpiece of our model for wholeness. And yet all of that rests on the utterly unproven assumption that we know how the phenomenon works. It could very well be that we have—I've argued this in other dialogues—we have a misapprehension of causality and that the reason the dog knows when you're going to be home is because the dog doesn't exactly live in the same now that has been created by culturally-defined human language. Nature does not exist in the Newtonian now that we exist in. It's much more a wave-mechanical field of consciousness. The past is the trailing edge of the wave, the future is the leading edge of the wave. Plasticity is in the moment. So that what we might be doing is not proving that telepathy is an invisible connecting web between everything, rather what we might be uncovering is but one more example of how language and cultural boundaries prevent us from correctly appreciating how nature works.

Ralph: We try to map experience into language, but we must admit that in mapping it into language, into a popular process, we strip it of 90% of its meaning.

Terence: For example, when I suggested that this phenomenon might be based on field theory I was suggesting that it would be found to be subject to the inverse square law. These are predictions we can make about those phenomenon if we accept a certain type of describable mechanism. So that's the way to proceed, hypothesize the mechanism, see what cases it mimics, see if those cases apply, further refine, so forth and so on. Then you'll have the outline of a model.

Rupert: My model is that these connections between pets and their owners depend on a morphic field similar to the morphic fields around flocks of birds or around packs of wolves, the fields of social groups. Dogs adopt human beings as honorary

members of the pack and form social bonds with them just as wolves do with each other. That's the biological background. These morphic fields connect things together in the present and are sustained by their memory from the past. Morphic fields also contain attractors, which draw organisms towards future states. When people are going home, the home is the at-tractor in their field. Getting home is their goal, their intention, and the dog somehow picks up this change in the field, and knows they are on the way.

Terence: The leading edge of the probabilistic waves of happenstance.

Rupert: Something like that would be my model. But there are already phenomena that this model can't cope with—for example the precognitive powers of pets, apparently foreseeing disasters, giving warnings of earthquakes, and so on. I have received over a dozen letters from people about pets living in London during the Second World War that gave warning to air raids 10 to 20 minutes before the warning sirens went off, so their owners were always first into the air raid shelters. I have even been told of dogs that responded in advance to the approach of the supersonic V2 rockets the Germans were shooting at London. Since these were supersonic, it doesn't seem likely that dogs could have heard them, does it?

Terence: Well these things have a relationship to time, as I'm suggesting.

Rupert: They do. That's why I mention them. They fit your model better than mine.

Ralph: No, no. Terence's model is very compatible with yours. At least if you take the word resonance seriously, thinking of wave motion. The wave motion doesn't happen in instantaneous time. It requires an extended field in space and time. There's a minimum extent where wave

motion could even be

recognized by another wave motion, so an interlocking of little space-time patterns over a significant region of space and time is implied the minute you use the word resonance, and that's exactly what Terrence is talking about. All these phenomena have extension in time, that the early part of one extension in time is a wave packet that could interlock with the latter part of another wave and then together construct a kind of a model, and this is probably the simplest way to encompass precognition in the context of morphogenetic fields or morphic resonance.

Rupert: Thank you. This is a breakthrough. I haven't seen how to do that, and it's obvious in retrospect. But then a lot would depend on the frequency of the rhythm. One is a daily rhythm. Daily cycles of sleeping and waking are the basis of a day-to-day resonance, and this could lead to precognitive effects a few hours in advance, maybe a few days in advance. And indeed, most human premonitions, as in dramatic warning dreams about impending plane crashes or other disasters, appear to relate to events minutes, hours or at most a few days in advance. The same is true of premonitions by pets. But the more distant the premonition, the longer the underlying resonant wavelet, with wavelets of human generations, or of the the rise and fall of empires, and even of vast Gaian cycles like the ice ages. And I suppose these long-term resonances usually claim less attention than the short term.

Terence: That's why you only get one Nostradamus and every dog or cat can tell you what's going on ten minutes in the future.

Ralph: Well this brings up the whole question of morphic wavelets. I don't know if we've discussed morphic wavelets.

Rupert: Not yet, no.

Ralph: Wavelets are a wonderful new way of looking at vibratory phenomena in general and a way that's very compatible with the ideas of fractal geometry. Because you have a basic

wavelet that you add together to make big waves, and they differ not just in frequency but also as a matter of scale, sort of an amplitude of scale and so on. This very way of looking gives a mother morphic wavelet which, through changing its scale only, you reproduce smaller and larger morphic wavelets. The addition of these together with different amplitudes as it were makes a big wave pattern.

Rupert: A fractal wave pattern.

Ralph: Well, the very fact that vibrations might be made of wavelets in this way gives a reason why you might expect there to be similarities across scales when you look from the perspective of fractal geometry. So if we have a wave, let's say, a morphic space-time pattern characterizing a thought such as a historical event like a bomber coming, and that wave has a resonance with the mind wave of a pet, and these waves are in a resonance process. This would probably involve one or two favorite wavelets that are components of the big waves of history. A favorite wave more or less compatible and more resonant, as it were, with the mental vibratory fields of that pet. Therefore there could be some specialist of two-day precognition and another specialist of two-year precognition and so on, that has to do with your wavelet spectrum. Morphic wavelets.

Rupert: But how can there be resonance with waves yet to come?

Ralph: Well, think of a wave packet that's traveling along and it has a certain extension in time and some of them have a bigger extension in time.

Rupert: Like day waves.

Ralph: For example, today's frequency. A day wavelet would be one that an insect that lives for a day would have a great deal of difficulty in making resonance with. They would spe-

cialize in the higher frequencies.

Terence: This is essentially exactly how the time wave works.

Ralph: Exactly. That's what I'm saying. I see an overlap in your views here under which I'm now going to fan the flame.

Terence: But Rupert, I wanted to ask you, what does this say about the formative causation phenomenon?

Rupert: The morphic wavelets and so on?

Terence: Communication between animals and their owners.

Rupert: Well, morphic resonance cannot in itself explain how a pet anticipates its owner's return. Pets can respond by going to wait for their owner at the time they set off to come home from many miles away, even at a completely nonroutine time. Morphic resonance is primarily an influence from the past, and would play a general role in stabilizing the field or bond between the pet and the owner. But most of the experiments in my Seven Experiments book are primarily to do with the spatial aspects of morphic fields. I now see from the nice way Ralph has put them together that I had been separating too much in my own mind the temporal and the spatial aspects of morphic fields

Terence: Well, all traditions of transcendence and asceticism put a great deal of stock on silence, isolation, contemplation, meditation, and the payoff is supposed to be the ability to access some vast, more complete and spiritually holistic level of nature. Perhaps we have literally fallen out of time and into history. History is a kind of damming of animal time that exists underneath the aegis of language, spoken language, while the rest of nature abides in a very different dimension, and all the things that are so mysterious to us, that appear to violate causality or action at a distance, these things have to do with the fact that, far more than we realize, we are the victims of a

false perception of time created by our languages, our alphabet. I don't know exactly what is causing it, but it is obvious that in nature we are uniquely the prisoners of language.

Ralph: Do you mean that the rest of nature has more time?

Terence: The rest of nature can see its termination in the es-chaton.

Rupert: How so?

Terence: Well, Plato said time is the moving image of eternity. Let's change one word and say history is the moving image of biology. We are in history. It's all about process, it's all about where we've been, where we're going, where we are. It's this micro thin sector that's moving through space/time. Meanwhile, we access hyperspace through psychedelics and assume that nature abides outside of history. Don't we?

Rupert: No we don't. We think of nature in evolutionary development, and as having a history revealed by the fossil record.

Terence: Well by our scale it's static. Ultimately you're right. You can't feel the Earth move and yet we know it moves, and I don't think you can feel biology's historicity, even though evolution teaches us it has historicity. But what language reveals is the frantic inner dynamic of ourselves, and immersion in it has caused us to have a profound bifurcation from our interior and exterior experience of time.

Ralph: Well why should language have a function of separating us from history and eternity?

Terence: Because it lies.

Ralph: It has tenses, past, present and future.

Terence: But it's particular. And nature is not particular. You can never understand nature as long as you particularize it, and language cannot do otherwise.

Rupert: But nature is particulate. For example flowers of the lily family have petals arranged in groups of three. The petals, sepals and other parts of flowers are quantized.

Ralph: They're very particulate.

Terence: Now what we're doing here is we're talking fractals.

Ralph: I think this language should somehow be capable of imaging the extension and interconnection of all and everything, but maybe language as it evolves in our context has somehow become impoverished in those metaphors while emphasizing others.

Terence: It has. This is why we're all so attracted to visual technology. Language is an impoverished metaphor. I think we sense that the way out of the language trap is through the image.

Ralph: What about musical experience? It's an antithesis of all this language restriction. Most people listen to music on the radio or on recordings for quite a bit of time every day. And this experience transcends language. We don't have any words for the musical experience and yet we have no trouble. We can recognize songs that we've heard before and so on. And a song can't be recognized from a single note. You need the entire sequence. And that is not an eternity, but a fairly long temporal extension of a song which fits in our cognitive apparatus.

Terence: I think outside of our linguistic programming, sound is light, and light is sound. Somehow inside our linguistic and neurological programming there'd been a bifurcation of this processing,

Ralph: Maybe language was originally like music. You have the song and the lyrics, and then after the song was dropped off by accident you had the lyrics standing by themselves. The vedas were chanted rather than read. I've been reading about the pronunciation of ancient Greek, as reconstructed by classical scholars. It sounds like singing. Greek poetry was orated. Nobody read a poem. It was later on that people got in the habit of silent reading, reading a book without saying anything. So this degeneration of musical language into dumb speech is something very recent in our evolution. There is so much we've forgotten, so difficult to recover.

Terence: That's why an archaic revival is indicated.

Ralph: The song is actually prelinguistic language. A prelin-guistic history which is actually linguistic in the sense of communicative music goes way back into Homo erectus prehistory. And when we're talking about the communication between dogs and their owners, then maybe this is about a rediscovery in the deep unconscious of these prelinguistic modes which are the natural modes of the mental field.

Terence: The Australian Aborigines say that one sings the world into existence.

Rupert: Singing doesn't usually play a very explicit part in the relationship between dogs and their owners.

Terence: No, but no human has as much experience with dogs from prehistory as the Australian Aborigines. And they're very much the keepers of this gnosis of a dream time, an alternative dimension outside of history. It's all about modes of time. If you perceive time in this ahistorical mode, then what returns to you is a nature become alive, full of intent, intelligence, and information. If you don't have that view of time nature becomes dead, a resource for exploitation. Don't you think?

Ralph: Oh I think that dogs chant sometimes. They sing to music, they howl at night. Coyotes howl in choruses between different packs all through the night. And it could be with the way we're speaking with our pets it's actually the music that they're getting.

Terence: I recall that Robert Graves tried to make a case that there was a kind of Ursprach, a primary poetic language that could directly address the emotions. That human emotions could be addressed through shamanic poetry. He traced the function of language back deeper and deeper into the function of a poem, and what poetry seeks to evoke.

Rupert: Yes, quite. But what dogs and cats seem to pick up is intentions. They pick up when people are about to go away on holiday even before they've started packing. They pick up when people want to take them to the vet, and will often hide. Dogs often pick up when they're going to be taken for a walk. Dogs can be trained to respond not just to words and whistles, but even to silent, mental commands. Many dogs and cats seem to know when a person they are bonded to has died, even when this happens far away. They seem to be sensitive to changes in the field that connects them to their people. This field is affected by the activities, emotions and intentions of their people—whether they're coming back or going away, whether they've died, whether they're in pain or trouble, whether they want to play. The animals seem to be

picking up not specific messages but rather general changes in the tension of the field...

Ralph: In the mental field.

Rupert: Mental is perhaps not the right word. The field concerned is a social field, interrelating animals to each other, as in a flock of birds, or people and animals, as in the case of pets and their human families.

Terence: It's always said that shamans can talk to the animals and that animals will come to visit a shaman. I've even heard stories of contemporary ayahuasca groups where deer and racoons would practically overrun the group in the night, come to join the circus.

Ralph: I think when you begin to take these ideas seriously then I'm going to see you become a true vegetarian.

Terence: But Ralph, the most intelligent entities we know are plants.

Rupert: One thing that we haven't explored much are the evolutionary connections between people and animals. Long before animals were domesticated, people were paying close attention to wild animals, if only so they could hunt them more effectively. And long before people appeared on the scene, predator and prey in general must have had a close interrelationship. And their reponses to each other must have evolved, and must have been subject to natural selection.

Terence: Human beings occupy an interesting position in all of this because until fairly recently the evidence suggests we were vegetarians, fruit-eating, canopy-living creatures, and then we became omnivores and began to predate small animals. There is no reason why a vegetarian animal should pay any attention to the behavior of other animal species. But for a predator, it's very important to study the behavior of your prey, and that study actually represents a kind of identification with the prey. This process could have been an impulse toward the evolution of consciousness, the need to model the behavior of other animals mentally in order to obtain them for dinner. A horse, a cow, they don't do that. But certainly hunting animals exhibit what we naively call intelligence.

Ralph: I think there is a reason for vegetarians to communicate carefully with other animal species and that has to do with the

competition for resources. We have a tree full of fruit, the mongeese like to eat this fruit, and if they get it first then we won't have any. So we have to know when the mongeese are on their way to steal the fruit.

Terence: But if you were a monkey competing with mongeese for fruit, you wouldn't study the behavior of mongeese, you'd study the fruiting habits of fruit trees.

Ralph: To get there first. But you would still want to know where the competitors are, how far away are they, how much time have you got to harvest the fruit. And if you are a hungry predator, to catch an animal you want to eat, you have to know where it is even though it's not visible.

Terence: It may be that the shamanic link between humans and animals is that consciousness was at first not self-conscious. It was consciousness of others, of food. It's only later that this consciousness moved into a position of self-identity within the psychic structure. The earliest conscious creatures were not conscious that they were conscious. They were conscious that the food was conscious.

Ralph: There's no evolutionary advantage to self-consciousness, is there? What good is it, self-consciousness?

Rupert: One theory is that its origins are social. In intensely-bonded social groups, internalizing the behavior of others, and learning how to predict their moods and behaviors, is of great advantage.

Ralph: So self-consciousness is actually a degenerate form of the consciousness of a flock field.

Rupert: It's a form where you get intense individualized or personalized interactions within the group, as in small groups of eight or so. You have an internalized model of others who be-

come part of your world. They have an internalized model of you. And through modeling others, you acquire an ability that can later be used to model yourself. It's like what Terence was saying about predators modeling the prey, but it's now modeling other members of the social group, and then modeling one's self.

Terence: But a shaman is the person who has great ability to communicate with animals, even at a distance, because the shaman's chief function is to locate the game. How simple that could be if he could look at the world through the eyes of the prey. A shaman is definitely a specialist in human-animal communication, and in that sense perhaps closer to a prelinguistic state of mind. So that as the rest of the society socializes, bonds together in tight groups using ordinary speech, the shaman was intoxicated, chanting, communicating with the animals. The shaman exemplifies a more archaic style of being, he's not social. He is rather nearly an animal himself.

Ralph: A vestige.

Terence: A vestige. And a go-between, not only in the world of human beings and souls and dreamers, but between the human world and the animal world.

Rupert: This was certainly true of the only shaman that I've actually ever stayed with, in the Saora tribe in Orissa, India. The village was down in the valley, but he lived at the top of a cliff, where the jungle began. He was often out in the forest trapping animals or just observing them. He lived on the edge; beyond him was the jungle, below him was the village. He was literally at the margin between the two.

Terence: This phenomenon of animal-human interaction is bound to have deep archaic roots. I'm very interested in it as part and parcel of the archaic revival.

SEVEN

Fractals

Ralph: This is an epic in four parts called "Fractals On My Mind."

Part 1. The sandy beach.

On the map, we find a firm curve between Hawaii and the Pacific Ocean. But when we go down to the shore, we find a sandy beach. It is the boundary between land and sea, but it is not a firm curve. There is water in the sand, and sand in the water. The more closely we look at the beach, the more indistinction we see. The transition from land to sea is a fractal. It is spatially chaotic. It is Natural. The Milky Way is a sandy beach in the sky. It is Natural also. Nature teaches us fractal geometry and chaos theory.

Part 2. Two roads diverged in a yellow wood.

Dynamical systems have attractors and basins. Imagine a dynamical system with two attractors, red and green. No matter where you begin, you will be attracted to one attractor or the other. Perform an experiment by choosing a starting position, then following the rules of the system, to find which attractor is your destiny. Color the starting position red or green, depending on the outcome. After a million experiments starting from different positions, the domain is mostly colored red and green. The red region is called the basin of attraction of the red attractor, likewise with the green basin. The domain, colored red and green in this way, is called the basin portrait of the system. Between the red and the green are the basin boundaries, which might be outlined in yellow. The yellow boundaries, in a generic dynamical system, are fractals: a wide, frothy zone, of mixed red and green, like a sandy beach. Or a yellow wood.

Part 3. Fractals in my mind.

These two little math lessons are applicable to psychology. Let's imagine, like Kurt Lewin, that a person's mind has its own space. He was the founder of social psychology, and the notion

of field theory within psychology generally. The field operated in a mental space, which he called the life space. The mental process was, to him, a dynamical system (the field) working in the life space. Thus, we may regard the multiple attractors and basins of the psychological field as the stable states of the mind. I am suggesting that in a normal psyche, the basin boundaries are thick fractals, which permit a kind of porosity between these components of the psyche, and thus, integration. But in another mind, the basin boundaries may be like concrete walls or iron curtains. This is a dynamical model for multiple personality syndrome: the sandy beach model. From the perspective of this model, the pathology comes from the poverty of chaos in the basin boundaries, and thus I call it MPD, for multiple personality dischaos. If we were therapists, we could try to devise a treatment to increase the fractal dimension of basin boundaries, based on chaos theory and fractal geometry, which are new branches of post-Euclidean math.

Part 4. Fractals in the world soul.

Rather than going on with individual psychology here, I want to look at the mind of the whole enchilada from this point of view. The collective conscious and unconscious of our society is a massively complex system, which Kurt Lewin also described in the paradigm of life fields. Chaos theory suggests a sandy beach model for this massive system also. Thus, boundaries which are too firm (iron curtains) may be involved in world problems, and could be treated with therapies informed by the new math. Chaos and cosmos must be properly balanced for a healthy social system.

Rupert: I'd like to try and summarize, Ralph, what you said, and see if I can add to it.

Personalities—and of course social relationships and international relations and the behavior of different groups of pigeons—fall into different basins, and we can visualize this as a landscape containing different valleys. If something's in a particular region, the ball will roll down in a particular valley.

Each of these basins represents a different kind of subper-sonality. Within a marital relationship, each of the basins represents what we'd normally call a personality, each of which has subpersonalities within it. You pointed out that personalities are made up of different subpersonalities, which is currently a very fashionable view. Everyone's talking about sub-personalities. For example, the Jungian psychologist James Hillman says we need a polytheistic psychology, where all the different gods and goddesses not only represent the archetypes, but they are real in some sense; we're possessed by different ones at different times. We're not a single personality with different functions, but a kind of emulsion of a number of different personalities. There's a multiple personality craze in America, where people are fascinated not only by serial killers, but by multiple-personality serial killers. Everywhere we find these multiple models, of which yours is one. All of them seem to be saying that we must get away from monotheism, which is reflected in psychology by the idea of the central, dominating ego. We've got to build more democratic models where you have a kind of grassroots democracy, with all these different personalities.

A second point you seem to be making is that the boundary between these different basins is not a straight line or a rigid wall but rather a fractal boundary, namely one that has many ins and outs and curves and filigrees and patterns. With that kind of boundary, moving from one basin to another is very easy because you never quite know where you are and can cross boundaries without realizing it, whereas a rigid wall makes it difficult to get from one to the other.

I'd like to take up the idea of the plurality of models. Terence's model is monotheistic, in that he has a single Eschaton, and this takes us immediately to the polytheism versus monotheism argument. My view of polytheism is that in all its actual existing forms, it is not in fact radical polytheism. It involves a plurality with some overarching unity beyond it. My question to you is, are you advocating a radical polytheism, and denying an overarching unity?

Ralph: No. My main message has to do with the rigidity of boundaries in between things. I think that everybody would agree that there is plurality in religion, in life, in the mind, in the stream, in the sky, and so on. What's important is the rigidity of the boundaries in between these things. If you worship in the Shiva temple is it okay to go to the Rama temple? Do you have to be faithful to one god and never admit the existence of others? This is a denial of something that's obvious even to children, and it inevitably brings about a disintegration of the personality.

In this religious or mythological context it's appropriate to think of Shiva and concepts of that sort as attractors. There are multiple attractors. Considering the population of the planet through all times, there's zillions of attractors, and some people have visited one and other people have visited two or three and so on. An openness to all attractors, I guess I would say, is some kind of prerequisite for the stability and longevity of a culture, or the health of an individual. This idea is based on a cosmology in which the stream has the same morphology as the

heavens, which have the same morphology as some abstract mathematical object. Under the ambience of this idea, our experience of nature is that rigid walls are very unstable.

Rupert: They're not that unstable. Our own skin, for example, has pores in it and is not absolutely smooth. Nevertheless, it forms a clear functional boundary, and everywhere you look in biology you find functional boundaries. There's a cell membrane around each cell. It's not an infinitely permeable boundary.

Ralph: It has little holes in it with pumps which are designed for particular things in the environment. The permeability is, as it were, part of a structure that's rigidly connected with that species. If these holes were plugged up then of course the cell would instantly die.

Rupert: Of course, you're not denying the importance of boundaries. Your whole model is based on boundaries, isn't it?

Ralph: That's right. It has to do with their crookedness.

Rupert: Their crookedness is the mathematical model for their permeability.

Ralph: Yes.

Terence: It seems extraordinarily arcane. Nature is fractal. This is a new discovery, and it's a very powerful insight, but it doesn't wipe out some of our previous accomplishments; I'm thinking of all the work that was done to show that these systems are also hierarchical. Without tossing the baby out with the bath water, it might be better to say it's fractal and hierarchical. We're back to Whitehead's notion of certain stubborn facts that are, I suppose, like raisins of resistance embedded in this fractal ocean of infinite permeability. I think above all these psychoboundaries and membranes there's ultimately a frame that is all-inclusive and defined. The form of monotheism I've probably fallen under the sway of, is some kind of neoplatonic pyramid of ever-ascending abstract hypothetizations that leads into the One. If what we mean by the Eschaton is the absence of boundaries, then what we're saying is that the fractalization of reality occurs ultimately on such fine scales that from the point of view of the perceiver, the boundaries have dissolved completely. Or the boundary and the thing bound have become so homogenized that it no longer makes sense to speak of boundary and medium. I picture it as a kind of extremely mar-bleized liquid or surface where every domain can be found to be lying next to a mutually exclusive other domain, rather like the kinds of diagrams you get when you carry out four-color mapping problems to fourth and fifth stages of resolution. You have these extraordinarily complicated structures where every point lies next to the boundary that separates it from points that have been somehow defined as other. I'm not sure that we have any disagreement here.

Ralph: What we've got here in your description is a speculation

built upon a speculation built upon a speculation and coming eventually from some kind of absolute and pure faith. The One, to Plotinus, I was something that you could explore toward, but not actually arrive at. We have to understand, on the testimony of these early experts, that The One is an article of faith, and even the best traveling shaman has only been so far. The assumption of the existence of The One, beyond this, is pure faithful monotheism at its best. God is called "The One" to make sure that you don't think perhaps it's Two. I agree with your idea that cosmos is hierarchical. I don't even care if it has a finite number of layers or an infinite number. However, the wildest shaman has traveled and seen only another image, maybe more complex, of what we see in ordinary reality and nature. There are multiple basins, there are Fractal boundaries, there are many possibilities, different regions, complexity, where harmony is hierarchically organized, and we've never gotten to the top. Therefore, to say it's one, or two, or three can only be an article of faith, not an extrapolation from observation, normal or arcane. We're talking about pure faith. When you get to the top frame, I don't see any reason why it shouldn't have two basins, separated by a fractal.

Terence: My understanding of fractals is that they are a kind of homogenization of levels not present, domains distant, and that the idea is if you have a sufficient sample of the Fractal, not very large, you can in fact extrapolate the contours of the entire system. Therefore it isn't necessary to send the shaman or mathematician for a total overview. The cosmological principle can be extrapolated from local measurement and local physics.

Ralph: Without an article of faith, you can't get a cosmological principle. We don't have any evidence from the boundaries of space.

Terence: Isn't the idea that fractals are a kind of holographic plan that recurs on many levels, always following the same pattern? If you have

ten levels and you know the pattern on 2

through 7, you also know the pattern on 1, 8, 9 and 10.

Ralph: Few fractals in nature have that property, which is a special property of self-similar Fractals which are like integers within the field of all real numbers. They are exceptional. Mostly it just means you have two basins, red and green, and their boundary is kind of stirred up so wherever you are you're within one millimeter of each side, or even a tenth of a millimeter of each side.

Terence: Well, I've limited my model building to the use of self-similar fractals. My model of the Eschaton, at least on a mathematical level, is self-similar.

Ralph: Let me tell you about the Wada principle. If you have three basins fractally entwined, then wherever you are in the sandy beach, you're not only within one millimeter of the red and green, but the yellow one is there also. That means, if you travel as a shaman and you see this pattern at the end of time, and there's any blur in your vision, anything slightly human remaining in your travel, you might see it as one, even though it isn't. You would mistakenly see it as a blur of the three colors into a kind of gray Eschaton.

Rupert: In some circles this is known as the mystery of the Holy Trinity. Theological attempts to deal with this problem have led to a variety of models where you have the idea that the ultimate is not an undifferentiated unity but rather a pattern of relationships. In the Taoist model you have the Yin and the Yang with a kind of fractal boundary between them. The circle containing the two is the whole that unifies them. In the model of the Holy Trinity, the Father is the source of the Word and the Spirit. The underlying metaphor is speaking. The spirit is the breath on which the word can happen, as you breathe out. The spoken word is a pattern of vibrations and harmonics that's probably some kind of fractal pattern in time. It would be hard to say which is the breath and which is the sounds, and

how you can separate the vibration from the sounds. This would seem to be the kind of model, in another form, that you have in mind. The unity comes from the sense of interrelationship and common source.

All these models of an ultimate unity are models of a relationship which something holds together. The hidden agenda behind your fractal model is that although you can't see unity within them, the hidden unity behind it all is the mathematics governing the fractals. For most mathematicians, these mathematical structures exist in some kind of Platonic realm beyond space and time, even if it's only in the imagination of mathematicians. There's some kind of hidden unity containing the diversity, and somehow generating it. I would say the unity is implicit in any mathematical model in the hidden mathematical object behind the manifested pattern.

Ralph: It still makes a difference if you fly to the home roost where your mate is, or you fly to the mobile loft where there's just this army captain waiting to give you your food. I think my point is not so much about the multiplicity or unity. I agree that everything is unified at some level. The point is more about the boundaries. If you have a dynamical system with different basins and they have fractal boundaries then, as a matter of fact, no matter how you perceive it, no matter what experiment you do, you will perceive unity. When you don't perceive unity is in the pathological case where you've erected an iron curtain. If you have iron curtains, then unity essentially has been defeated by the disease of dischaos. Therefore, when we see this in nature, in history, in social systems, in ourselves, we have to beware of these iron curtains, because they create an unnecessarily multiple situation.

Here we've expressed a yearning for a peaceful state beyond language. If you practice chanting, meditations and so on, then you are intentionally increasing the fractality of the boundaries, and therefore the integration of the parts into a unity. If unity is your goal, then you have to examine the fractal width of all your boundaries, and guard against boundaries that are too thin.

Rupert: How do you fractalize your boundaries? Can you give

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a personal example

Ralph: In the emerging science of neural nets this is called annealing. One thing you can do is take a psychedelic. Another thing you can do is go to a culture that's really different from your own and stay there for seven years on a farm or something. If you have a mate of any gender, you're certainly in a more chaotic situation. These two-person units definitely have diseases, and few of them survive these days. I'm making a suggestion here as to what's the trouble, and I'm suggesting a strategy, a kind of a therapeutic technique. People are trying out this idea, by the way, for therapy in relationships.

Rupert: Can you give an example of how the fractalization of boundaries would work therapeutically in a relationship?

Ralph: First of all there's a diagnostic phase, in which the therapist is trained in chaos theory instead of Freudian theory. When a boundary has been detected with a pathologically low dimension or thickness, a therapy is devised especially for it, consisting of some carefully safeguarded experiments in violating the boundary, or mixing boundaries. One common strategy involves play in a sandbox. You've seen this. The therapist's office has all these toys that return the client to preverbal mode of expression. I'm not a therapist, but I think an advancing theory is helpful in devising therapies.

In the United States people are getting together in small groups for self therapy, because they feel that a therapist not having multiple personality dischaos has no idea really what's going on. These groups studying chaos theory have devised a kind of therapeutic psychodrama, which they write, direct, and perform in public, in cities around the United States. There's a network of these that base their approach on my paper on multiple personality dischaos.² I can give you a report next year on how these experiments work out. Some therapists believe that they may be fatal and that I should be imprisoned, but the pa-

tients themselves are very enthusiastic. They're really having a wonderful time. Depression is a really serious condition. If a therapy was devised that cured bipolar personality dischaos without drugs, a lot of people would be helped.

Rupert: The psychodrama is designed to break down boundaries, rigid boundaries?

Ralph: To increase their fractal dimension.

Terence: Given what you've said about the goals of this therapy, wouldn't it just be simpler to give these people psyche-delics?

Ralph: I've personally had good results with psychedelics, but I'm not sure everyone would. It would be nice if we had several alternative strategies, some of which could be done on a Sunday evening, where you still feel okay about going to work on Monday morning. Like vitamin pills.

Terence: Since you've had such good luck with psychedelics, why are you so reluctant to advocate it?

Ralph: I have been advocating, or at least if not advocating, confessing in public that for me there have been very good results with psychedelics. I've quite recently had a certain amount of hostile mail and telephone calls; even people coming to the university to hasten my demise. They seem to think that psychedelics are drugs. There's also the aspect of legality, where many people are in jail with 20, 30 and 40-year jail sentences. I think that the atmosphere of paranoia in the world today might even make psychedelics much less effective as medicine for dischaos.

Terence: If the paranoia and legal barriers were removed, it sounds like you're advocating something fairly close to what Salvador Roquet's school settled into.

Ralph: I don't know Salvador Roquet.

Terence: He was a psychotherapist who worked in Mexico for many years, who gives people psychedelics. Then he showed them Auschwitz footage and very highly charged emotional material, the idea being to reduce them to an absolutely basic jelly of dissolved boundaries.

Ralph: It sounds disgusting.

Terence: I agree. I'm trying to find out how what you're advocating is different.

Ralph: It takes only very subtle medicine to decrease rigid walls. Even the very idea of it may be enough, as a matter of fact. That's the therapy idea. Once consciousness is adjusted so that sensitivity to your own process actually observes these things and considers them undesirable, they automatically begin to disappear under the self-created action of one's own psyche. After all, nature is playing a part, and mathematical necessity reveals itself in the Milky Way, the sandy beach, and the human psyche as well. There's a tendency toward help. These diseases of rigid barriers, like other diseases, exist primarily in the rejection of the cure, and the cure can be found within. One has to realize, when people suffer this disease, which is essentially universal, it's inherited from a culture which has the disease itself. The cure consists of identifying the difficulty as essentially a cultural pattern, and then disowning it by becoming more of an expatriate of our own culture. That's why visiting another culture and living there for a few months or years is sometimes enough to liberate people from rigid patterns.

Terence: This comes very close to the 19th century prescription for most emotional difficulties of a few months at the seashore, in Italy preferably. In both cases you want to establish a new environmental attitude through distance from cultural values, either achieved through journeys with drugs or journeys

to foreign lands.

Ralph: A walk in the woods is perhaps all it takes.

Terence: It's a search for perspective, achieved by distancing.

Ralph: A kind of mathematical perspective. Our culture has suffered this particular disease over a mere span of 6,000 years. That's all we have to recover from.

Terence: The particular disease being boundary anxiety?

Ralph: Patriarchal, monotheistic, hierarchical, misunderstood...

Terence: Constipated, linear...

Rupert: Is there any culture that has managed to avoid dis-chaos?

Ralph: I think so, but I don't have direct experience of aboriginal cultures. The culture we live in has by now covered the entire globe, and the exceptions are near to extinction. Anthropologists used to study wild tribes before they were contacted by the civilizations now dominating the entire sphere. Unfortunately, civilization arrived in the form of these anthropologists, and this was the kiss of death for those cultures.

Terence: This is a theme near and dear to me. Certainly, in living Amazon cultures, one of the hardest things for a "civilized" person to put up with is the fact that there are no boundaries. Everybody lives in a grand house without walls. Defecation, sexuality, death, domestic hassling, disciplining of children, everything goes on in the presence of everyone else and no one from age 6 to 90 feels any constraint whatsoever about making comments, suggestions, and offering free advice. It's a hard thing to embrace, even with the knowledge that it's going to be good for you.

Ralph: There are degrees of boundaries. I think the permeability of boundaries is important, and our culture has devoted excess attention to the walled fortress, necessitated by the violence some people would associate with the patriarchy. For whatever reason there's been a necessity of Bauhaus concrete walls around the town, locks on the doors and houses, electronic motion detectors, video cameras at the bank card machine, and so on. Perhaps, as there's an increase of complexity in our culture, as we approach the Eschaton, there's an accompanying decrease as fractality actually vanishes at an alarming rate. This is what's meant by "the death of nature."

Rupert: Ralph, when I last visited your house in Santa Cruz, I noticed a rigid, straight fence dividing your property from your undesirable neighbors, who have motorcycle scrambles on their land and make a terrible noise.

Ralph: Boys with guns, that's right.

Rupert: What we need here is a new product, the fractal fence, which would go down very well in California, some kind of fractal boundary, instead of old style posts with barbed wire.

Ralph: Mazes where people can get lost if they try to pass.

Rupert: Except that, with the slightest gust of wind or unpre-dicted chaotic event, these motorcycles would suddenly zoom past your front door.

[Notes

1 Plotinus, *The Enneads*, trans. by S. MacKenna (London: Faber, 1956).

2 Ralph Abraham, *Erodynamics and the dischaotic personality*, in: *Chaos Theory in Psychobgy*, F.D. Abraham and A.R. Gilgen, eds. (Westport, CT: Greenwood, 1995).]

EIGHT

Time

Terence: The subject for this trialogue is near and dear to my heart, you might even say it has my initials on it. I'm very interested in time, the largest frames into which phenomena can be fitted, and the various ways in which we can view our hu-manness when we change the way we look at time. What orthodoxy teaches about time is that for reasons impossible to conceive, the universe sprang from utter nothingness in a single moment. Notice that this idea is the limit test for credulity. If you can believe this, then you can believe anything. It's impossible to conceive of something more unlikely, yet this is where science begins its so-called rational tale of the unfolding of the phenomenal universe. It's almost as if science said, "Give me one free miracle, and from there the entire thing will proceed with a seamless, causal explanation."

There's an aspect to the phenomenal universe that impinges on anyone who undertakes to examine it, that isn't given any weight whatsoever by science. When we look at the span of time that stretches from the big bang to the present moment, it's very clear that complexity has aggregated toward the nearer end of this process, the dimension in which we find ourselves. For example, the early universe was very hot, and only a kind of electron plasma could exist. By cooling, complexity appears, and each successive advance into complexity occurs much faster than the stage that precedes it. I'll move through this very quickly because what I want to concentrate on is what I call the "short epochs." The first billion years of the life of the universe was an extraordinarily boring and empty period. Atomic systems were forming, and the simplest elements were aggregating into stars. This permitted fusion, the cooking out of heavier elements, and after a long period of time, the appearance of four-valent carbon, which permits a whole new set of properties to emerge, including ultimately, life. My terminology is largely drawn from Alfred North Whitehead, a great unsung hero of British 20th century philosophy. He had a notion of a progression of epochs leading toward what he called "conrescence."

I've taken his notion of conrescence and attempted to construct a terminal cosmology that literally stands on its head the scientific explanation of the origin of the universe. I don't believe the universe is the push outward into substantial existence by primal explosion. I believe the universe is being pulled and shaped into an ever more complexified and conrescent entity that is in fact a transcendental attractor located in the future. It's transcendental in the sense of residing in a higher dimension than ordinary space, and in the feeling/tone sense in which we ordinarily use the term "transcendental."

This idea is basically Catholicism with the chrome stripped off. It restates Teilhard de Chardin's idea of the Omega Point, the Telos attracting and drawing history into itself. What I'm interested to consider is that most delicate of all questions in prophetic systems of this sort: What is the role of humanity in all of this? Science evades this issue by setting us down somewhere between the big bang and the heat death of the universe, imagined millions of years in the future. Science completely marginalizes human experience. We are told that we live on a typical planet around a typical star at the edge of a typical galaxy, and that we are animals of a complex type, easily identified with other typical forms. My notion is to take seriously the apparent vectoring in of universal intent on the human world and at the same time try to keep away from the pitfalls of religion.

I think that history is the shockwave of eschatology. This is a concept we've not sufficiently entertained, but which we will be forced to entertain as the planetary crisis created by modernity builds toward some kind of climax. What I mean by saying history is the shockwave of eschatology is something like this: If this planet were a planet of hummingbirds, woodchucks, giraffes and grasslands, then Darwinian mechanics as modified by molecular biology would be sufficient to explain what's going on. The fly in the ointment of that simple schema is ourselves. We represent some other order of existence. My notion is that out of the broad moving stream of animal evolution, a species was selected, or fell victim to—the terminology can

vary—the influence of an attractor pulling in the direction of symbolic activity. This is what we've been involved in through chant, magic, theater, dance, poetry, religion, science, politics, and cognitive pursuit of all kinds, occupying, for all practical purposes, less than 25,000 years; a blink of an eye on the cosmic scale. This is the shockwave which precedes eschatology. An analogy can be seen in the undisturbed surface of a pond. If the pond begins to churn, it indicates some protean form moving beneath the surface, about to make its presence visible. This is the appearance of history on the surface of nature, a churning anticipation of the emergence of the conrescence, or the transcendental object at the end of time. It's been anathema to discuss this in secular society, even as a part of "New Age" secularism, because it's always been the province of beastly priests and their hideously hierarchical and constipated religions. Decent people have tended to turn away from it.

In fact, this is some kind of primary intuition about our actual circumstance. The reason it's important is because we now are in a situation of planetary crisis, where you don't have to be an enthusiast for Whiteheadian metaphysics or psilocybin, or the more arcane metaphors of Terence McKenna, to realize that we are approaching our limits. It's inconceivable to speak of 500 years in the human future. History is a self-consuming process, and all we need do at this point is extrapolate any of a number of curves. Here are some of my favorites: The spread of epidemic, sexually transmitted diseases, the proliferation of thermonuclear weapons, the dissolution of atmospheric ozone, the rise in world population. When these curves are extrapolated, it's very clear that we've taken business as usual off the menu. Rather than seeing this as a situation driven by the momentum of bad historical decisions, I'd prefer to believe that what we're witnessing is something like a birth; something that's built into the laws of physics. We are literally on a collision course with an object that we cannot precisely discern, lying just below the event horizon of rational apprehendability; nevertheless, our cultural east is streaked with the blush of rosy dawn. What it portends, I think, is an end to our fall, to our so-

jour in matter, and to our separateness. It lies now so close to us in historical time, by virtue of our having collapsed our options in three-dimensional space, that you need only close your eyes, have a dream, take a shamanic hallucinogen, practice yoga, and there you will see it. It's an attractor which has been working on the species for at least a million years. I maintain that it is actually a universal attractor, and we represent a conrescence of complexity that is truly transcendental.

James Joyce said, "If you want to be phoenix, come and be parked, up ne'ant prospector, you spout all your worth, and woof your wings, the end is nearer than you might wish to be congealed." I'm carrying this same notion, because I think that otherwise we're going to be victimized by an enormous pessimism arising out of the bankruptcy of science, positivism, and ordinary politics. The ride to the end of history is going to be a white-knuckled experience. I offer this metaphor in the hope that it may make the trip to the transcendental object, glittering at the end of time, an easier ride.

Rupert: Thank you. I'd like to know what you mean by "Eschaton."

Terence: Ah yes, let me fill in the footnotes. The Greek word eschatos refers to the last things, the final things. The Eschaton is a neutral way of naming what some call the Buddha Matraiya, some people call it the UFO intervention at the end of history, and some call it the second coming. It's the last thing; the Eschaton. What I think is happening is that all boundaries are dissolving; between men and women, between society and nature, and ultimately the boundaries between life and death. We are going truly beyond ambiguity, beyond syntax. We've been trapped in a kind of demonic simulacrum for 25,000 years, created out of language. Now the accelerating process of involuted connectedness characterizing this Whiteheadian progression of epochs toward the conrescence, is in fact being fulfilled.

Ralph: This sounds a little more optimistic than I've heard you before. You've accepted the big bang fantasy of science, and then reflected it into a similar event coming in the near future, about which you're concerned with the "when." You haven't mentioned the date this time.

Terence: I thought we could undertake a sort of generalized discussion of the assumptions that come out of this kind of thinking.

Ralph: For the first time I've heard you describe this forthcoming event as a birth. This optimistic event is interpreted by you as an Eschaton. This is a myth made real, like the Christmas tree, where the events of history are kind of pasted on. As the tree shapes to a point at the top, you've drawn history around it, in an ascending spiral that ends at the point where they put the star. I think history can be wound on the form of this myth in a lot of different ways. You start with an assumption that's very symmetric and identical to the scientific myth of the birth of the universe.

This puts me in mind of the history of history, where the concept of time in different cultures suits different models, of which there are only a few. There's the bang to bang model, which you share with Teilhard de Chardin. There's the infinite linear progress model, which is pretty much discredited now by everyone. There's the reflection model, where a cycle is completed and then repeats from the beginning in a cycle of epochs which may be never ending. There's the Kurt Godel² model, in which time goes forward and encloses on itself by going around a torus and coming back. Many ancient societies shared this model, where it was understood in a way that's similar to our theory of homing pigeons, that every action we are doing today will be repeated again another day. These different models for history are essentially mythical structures; that is, no scientific evidence can be given to distinguish one from other. They start on the basis of belief.

Now that we have archeology and cultural history, we

know there are different models of time, historically, and that they fit into certain patterns. By and large it's thought that they guide us through the evolution of culture itself. In other words, if it's not true that tomorrow is already determined, then we just have to do a good job to follow our dream today. If it's possible that what we do, think, or say affects the future, then it's important which historical model we choose, because the myth itself guides action, determines evolution, and influences to a degree the outcome. I don't see, though, even accepting the Christmas tree model, why the point with the star should be a birth or a death, or anything other than a simple cultural transformation, more or less presaged by a shockwave at the end of this epoch. Why couldn't it be just a simple social transformation like the Renaissance?

Terence: Because the planet can't bring forth the birth of new societies. We've come to the end of our road in birthing new models of community. Wouldn't you agree that when we look back over the whole history of life as known to us, it appears to be some kind of strategy for the conquest of dimensionality? The earliest forms of life were fixed slimes of some sort. Then you get very early motility, but no sense organs, where organisms literally feel their way from one point of perception to another. Then comes sequestering of light-sensitive pigment upon the outer membrane, and the notion of a gradient between here and there appears. Then for a long, long time there's the coordination of backbones, skeletons, binocular vision and so forth. Then, with human beings some fundamental boundary is crossed, ending the conquest of terrestrial space, and beginning the conquest of time, first through memory and strategic triangulation of data out of memory, and then the invention of epigenetic coding, writing, and electronic databases. There's an ever more deep and thorough spreading out into time. In this Eschatonic transition that I'm talking about, the deployed world of three-dimensional space shrinks to the point where all points are cotangent. We literally enter hyperspace, and it's no longer a metaphorical hyperspace. What we're say-

ing is, this transition from one dimension of existence to another is the continuation of a universal program of self-extension and transcendence that can be traced back to the earliest and most primitive kind of protoplasm.

Ralph: Isn't this a fancy way of saying we're running out of time?

Terence: Yes. Time is speeding up. There isn't much left. Someone said time is God's way of keeping everything from happening all at once. My notion is that we are caught—the transcendental attractor is a kind of black hole, and we've fallen into its basin of attraction. Now we're circling ever faster, ever deeper, as we approach the singularity, called the Eschaton. All of this exceeds rational apprehendability. It lies outside the framework of possible description. We're on a collision course with the unspeakable. Contrasted with other animal life, we've been selected out for a very peculiar metamorphosis via information and the conquest of dimensions, to become something completely other; a new ontological order of being.

Ralph: It's too early to tell. Everything has accelerated on one hand. The population explosion, the destruction of the biosphere, the complexity and rate, the seriousness and irreversibility of all this is climaxing. Meanwhile, we have language, this 25,000, 60,000, or at most 100,000 year old artifact. We've developed such things as agriculture and the urban revolution. We have automobiles and airplanes and computers hooking us up. We have all this increase in the complexity and fractal dimension of life, more or less to our benefit. We have, as it were, a race between two processes, both of which are growing faster exponentially. We don't know for sure which one is growing more. Furthermore, the possibility of a miracle can't be ruled out, due to the fact that we wouldn't even have gotten this far without a whole series of them.

It's a subtle matter, the way in which the myth of Eschaton can interweave in this race between the two accelerating processes. What do you think, Rupe?

Rupert: I agree with you, this is a cultural pattern. The Judeo-Christian tradition takes further the tendencies already present in early civilizations. There's movement towards some end time, envisioned in apocalyptic prophecy. The last book of the Bible, the Apocalypse of St. John the Divine, speaks of things not unlike those that Terence does. As Terence is well aware, the apocalyptic nature of his thinking is a transformation of a vision which appears in Christianity and in Jewish, Messianic, and apocalyptic literature. The question is, to what extent is the pattern of acceleration you see in our culture a product of the fact that our culture is based on this particular myth of history? To what extent do these visions reflect some true perception of a cosmic process, something far beyond history? That's not easy to decide, because there's a self-fulfilling prophecy built into these cultural patterns. We're now seeing these dreams coming true in many ways. They've led our culture to emphasize novelty, innovation, and change, always moving faster and faster. We've now spread this aspect of Judeo-Christian culture to the rest of the world, and the prophecy now seems pretty global. To me, the big question regarding this prophetic vision is whether there's a real influence of something beyond humanity, beyond history. Terence thinks there is, namely the transcendental object, the attractor; or as Teilhard de Chardin put it, the Omega Point. If this is the case, how limited is it in its range of application? Are we talking, as Terence sometimes seems to do, about something just happening on Earth, or as Teilhard de Chardin talks of the noosphere around the Earth, and the growing emergence of consciousness? Or are we talking about the transformation of the entire universe? There's the same ambiguity in the New Testament, when St. Paul writes, "The whole creation groaneth in travail."

Are we talking about the future of human culture on this planet, or are we talking about the future of the solar system, the galaxy, or even the entire cosmos? If we're just talking about this planet, these accelerating changes, graphs, and extrapolations look pretty plausible. If we're talking about the so-

lar system or the galaxy, however, I don't think astronomers in the last few years or decades have suddenly noticed curves in their charts rushing off to some extreme point, where we can expect stars all over the galaxy to turn into supernovae, or planets all over the solar system to collapse, crumble, collide or otherwise undergo dramatic alteration. The history that we're preoccupied with here and now, human history and the effects of human activities, doesn't, as far as we know, seem to be mirrored in changes going on anywhere else in the solar system, the galaxy or the cosmos.

Terence: It's a difficult question. If we extend the search for a universal crisis beyond the Earth, the only evidence that has been offered by anybody is some kind of problem between nuclear theory, which has been very well established for 40 years, and the neutrino output of the sun. In trying to account for this, our choice is either that nuclear theory requires serious modification, which doesn't seem likely, since it's worked in all other cases up until now, or there is in fact something wrong with our star. Searching for pathology beyond the solar system in the cosmic environment is, I think, outside the present reach of our technical ability. I tend to think, though the time wave that I've elaborated can be extended back into the prebi-ological domain, that this is a phenomenon of biology I'm talking about. This is just one small planet, and biology is a process of conquering dimensions. Once it starts the process, as a primal slime, it accelerates and it bootstraps itself to higher and higher levels at tighter and tighter turns of the spiral, until it essentially exhausts and abandons the planet, carrying itself into another dimension.

Rupert: But the whole point about biology is that the earliest forms of life, mainly plants, are related to the light of the sun. All life on Earth is dependent not on merely terrestrial events, but on our relation to the sun and the wider cosmic environment. Even carbon and the other chemical elements on which biological life depends are a fallout from exploding stars.

Biology on Earth is rooted in a much larger ecology. I don't think the evolution of life on Earth can be regarded as merely terrestrial, merely biological, in that sense. Every human culture has recognized the importance of celestial influences of one kind or another: the sun, the moon, the planets, the stars, the sky. Influences from outside the Earth are working on us all the time. The transcendental object may be located or channeled through the sun, other stars, planets, constellations: something to do with the astronomical environment.

Terence: If it's truly a higher-dimensional object, then it's in some sense everywhere in this universe, and all routes of evolutionary progress may lead into it, as a kind of universal hologram of time and space, a galactic community or intelligence perhaps. In other words, if I understand what you were implying in the early part of your statement, spores or viruses or bacterium probably percolate and permeate through the physical universe, and wherever they come upon a planetary environment in which they can work their magic, life takes hold.

From then on it's a battle in which life attempts to modify and control the abiotic environment, keeping it at equilibrium sufficiently for the program of bios to be put into place. That program is to grow from the initial seed and return to the higher, hidden source of all, outside the pleroma of three-dimensional space. It's a Gnostic return, an idea of alchemical sublimation and rarefaction. I see the cosmos as a distillery for novelty, and the transcendental object as the novelty of novelties. When we formally refine that, we discover something like a Liebnizian planet; a monad of some sort; a tiny thing which has everything enfolded within it. This takes us to another dimension, where all points in this universe have been collapsed into cotangency. It's an apotheosis. The Earth is giving birth to a hyperdimensional being.

Ralph: Just to shock you let me take a position much more pessimistic than yours. There have been several close calls lately, with comets. Some people, William Whiston³ for example, or

Immanuel Velikovsky,⁴ felt that the beginning of our planet was a collision with a comet. It seems to me that it's quite likely we will get hit by a comet, and even pretty soon. Suppose that this happened. We'd have an extinction such as there was 65 million years back, when Jurassic Park vanished into the ocean. Then, all this biological miracle, accelerating to its own schedule, with exponential condensation toward the condescence of the Eschaton, and the shockwaves from the transcendental object at the end of time, would be rendered totally insignificant. We'd simply encounter a car crash on the highway of the solar system, totally independent of the progress of biology on the planet Earth.

Terence: It's entirely possible. I didn't want to bring it up because it's a little Halloweenish. The transcendental object at the end of time may be nothing more than a five-kilometer-wide carbonaceous asteroid, that in a single moment will send us all up to the gates of paradise.

Ralph: You're trying to destroy my argument by appropriating it!

Terence: As I've said, the dissolving of boundaries eventually means the dissolving of the boundaries between life and death itself.

Ralph: If the Eschaton is a comet rapidly approaching New York City, why is it necessary to have this increase of complexity, the population explosion, the destruction of the ozone layer?

Terence: In the million years preceding the impact that killed the dinosaurs, an enormous extinction was already underway, that we've not been able to figure out. It's as if the Earth knew what was coming. What I'm suggesting is that biology knows, returning to our discussion about homing pigeons. Biology has a complete four-dimensional, or five-dimensional map of the planet's history. The map says, "A comet's on the way; let's get these monkeys moving," leading to the production of sufficient

complexity that when the impact event occurs, it will have a transcendental relevancy.

Ralph: An opportunity to proceed into another dimension.

Terence: All of history is a curious relationship with this intuition that nobody wants to face, but that nobody can quite get rid of. We're sacrificing goats and we're doing this and we're doing that, because we have this very restless feeling that all is not well in three-dimensional space and time. History keeps bearing this out. Now it's upon us.

Jorge Luis Borges,⁵ the Argentine surrealist, had the interesting idea that a species could not enter hyperspace, whatever that means, until the last member of that species perished. What's happening is that vast numbers of souls are accumulating in another dimension, waiting for us to decently depart this moral coil so that the human family in a body can find itself at play in the fields of the Lord.

Rupert: I want to think this through a bit further. We used to think that there might be this great transformation of humanity in a kind of collective near-death experience, except it would be an actual death experience, brought about by a nuclear cataclysm. Although the bombs are still there, that model's gone out of fashion for some reason. We're now more into ecological apocalypses. We've got all these models. Let's assume there's a sudden transformation, where all of humanity is taken up into the transcendental attractor. Leaving aside the details on the Earth, what effect does this have on the rest of the universe?

Terence: I think it's not an answerable question, but it is in fact what we will then set out to understand. We are literally packing up and preparing to decamp from Newtonian space and time, for the high world of hyper-dimensional existence. We may find ourselves in the grand councils of the who knows what, or we may find something entirely unsuspected.

I have talked before about shamanism anticipating the future. If you pursue these psychedelic shamanic plants, you inevitably arrive at an apocalyptic intuition. I think shamans have always seen the end, and that the human enterprise in three-dimensional space has always been finite. In the same way that ontogeny recapitulates phylogeny as we look into the past, it seems reasonable to assume that death, which we have spent a thousand years turning into a materialist vacuum, is in fact not what we think. There's an enormous mystery hovering over our existence, that's only unraveled beyond the grave.

I would never in my life have thought that I would be pushed to this position. I spent the first half of my life getting away from this kind of thing. However, the evidence of the shamanic hallucinogens is in fact that shamans have always done what they do via ancestor magic and higher-dimensional perception, and that death is not what naive positivism in the last 300 years has attempted to say that it is. I realize it's incredible to suppose that here at the apex of materialist, positivist, scientific civilization, we're going to make an orthogonal turn into an understanding of what lies beyond the grave, but in fact, this is probably the paradigm-shattering world-condensing event that is bearing down on us.

Ralph: Conversion in progress.

Rupert: Given all that, I want to know whether this has happened somewhere else. If it can happen on our planet, perhaps it could change the entire conditions of dimensionality throughout the galaxy, or better, perhaps, the cosmos. If it's happened on planets elsewhere in the galaxy, what effect do you expect it to have had on us already?

Terence: When you explore the adumbrations of the transcendental object, you see all this transhuman, alien data, that is essentially what it has been in its past history. You see the imprint of all life finding its way back to some kind of source that's in a higher plane. That's why it has this alien presentation. It has

maybe a thousand civilizations poured into it, or ten thousand, or fifty million. Who can know? The universe is already old.

Rupert: I still can't work out whether we're talking about some planetary violence that gets hold of civilization after civilization, or planet after planet, causing them to auto-destruct in a particular way, or whether we're talking about some cosmic process.

Terence: It seems to me just the continuation of life's program of conquering whatever dimension it hasn't yet conquered. Probably that process is endless. Life is a chemical strategy for the conquest of dimensionality. It carries out its program, come hell or high water.

Ralph: Just like striking a match, biology comes to a planet, and the flame leaps up. Then pretty soon it burns out, due to exhaustion of resources and the arrival of the shockwave of the Eschaton for that particular planet. Biology is extinguished once again.

Terence: This idea provides a way of imaging what's happening without falling into the dualisms that haunt either a reductionist view or an out and out, gung-ho, no questions asked, religious conversion. There are orthodox cosmologies that support my contention of the possibility of universal collapse. Hans Alfvén, at the Swedish Academy of Sciences, who wrote *Worlds and Antiworlds*⁶ has suggested that the universe is what's called a vacuum fluctuation. This is a situation in quantum mechanics where a group of particles and antiparticles spring into existence and then annihilate each other. Because parity is conserved, this creation ex-nihilo of matter is allowed by quantum physics. An interesting aspect of these vacuum fluctuations is that quantum theory sets no upper limit on their theoretical size, merely saying that the larger they are the more improbable they are. The universe itself could be a vacuum fluctuation of some 10⁶⁸ particles, springing into being, al-

lowed by quantum physics. These have separated into a higher-dimensional space, and are in fact eventually at some point in the future going to reconnect to conserve parity. Alfvén says that in this kind of a higher-dimensional collision, all points in both systems would appear to an observer to become cotangent instantly. What that would mean is the material universe potentially could disappear in a single moment. All that would be left is light, because light doesn't have an antiparticle. No one knows what the physics of a universe made only of light would be like. I suggest to you that our many myths and intuitions that link light to the process of spiritual advancement, and talk about the generation of the light body and so forth, may anticipate something like this.

Even within the toolbox of ordinary quantum astrophysics, there are ways of tinkertoying the syntactical bits together to produce incredibly optimistic transcendental and psychedelic scenarios.

Ralph: There's no way to personally leap into the dimensions of hyperspace in the birth event of the Eschaton. Not in quantum physics. I suppose we're talking about a different kind of thing. What about the timetable, Terence? So far it seems like your idea is pretty similar to Teilhard de Chardin's, except he didn't give us a timetable.

Terence: You mean when do I think it will occur? Ralph: Yes.

TERENCE: It's sort of weird to talk about this because it rests on a formal argument where you have to look at a lot of historical data. What I did was I produced curves that I felt were reflective of the ebb and flow of novelty in time. By fitting these curves to historical data, I slowly refined down a prediction based on spiral closure, which makes it happen much faster than you would expect. I predict concrescence at the winter solstice of 2012 AD. After I had made that calculation, I dis-

covered to my amazement, that the Mayan civilization had a very complex cyclical and recursive calendar, and it also indicated that same date. I think if you take strict objective data curves and put in the fudge factor of the unexpected, it seems pretty reasonable to suppose that at least there is a nexus of prophetic intensity of some sort, causing a number of traditions for some reason to focus on the late months of 2012 AD.

When I attempted to understand objectively what could be going on, using computer simulations of the star fields, it turns out that the December 21, 2012 solstice occurs at a helical rising of the galaxy. Once every 26,000 years in the procession of the Great Year, there's a winter solstice sunrise that catches 23 degrees Sagittarius on the plane of the galactic ecliptic. What does that mean? Who knows? Certainly not me. In Hamlet's Mill, Giorgio de Santillana and Herthe von Dechend,⁷ two very well-respected historians of science, suggest that for ancient peoples, there were somehow galactic gates or way stations of some sort, through which souls had to transit to make their way back to their hidden home. I find this stuff a bit too mediumistic, but nevertheless, it is an objective fact that a rare solstitial conjunction which occurs once in 26,000 years, will occur on the date I chose, and I did not know this at the time I chose it.

Ralph: Let's look at this. We have here the coincidence of three different things. One we could fairly describe as a novel and very interesting kind of mathematical extrapolation of historical data that culminates in a point. The other two things, the Mayan calendar and the astronomical conjunction are both periodic phenomena. The Mayan calendar repeats the cycle of 26,000 years, and the great conjunction recurs every 26,000 years. They can be expected to recur at least once more before the sun gives its last gasp, and biology becomes extinct. If we weigh these things equally, your mathematical extrapolation isn't the same as the shamanic reportage of a hy-perdimensional investigation. It's more like academic scholarship, with a huge database of history and this imaginative curve used to extrapolate data. This suggests that your extrapolation

curve could actually be reversed so that you have a completely different model. It's not an ironclad extrapolation, and I think the case for this date actually being the Omega Point is weak. As far as the transition of all of us into the fifth dimension, I don't see a necessary case for it.

Terence: What it comes down to is a very fine-tuned argument looking at a particular historical curve that's a damped oscillation. The curve of history actually does run down. It isn't elegant to try to make it one cycle within a larger or extrapolated set of larger cycles because the built-in damping factor makes it pretty clear that it's a single cycle, with many cycles embedded within it, but on the highest level, actually having a beginning and an end.

Ralph: It seems to you radically implausible that there will be any future after this point.

Terence: I've thought of many, many ways of expressing this that would make it less catastrophically radical. A very simple way that makes everybody feel a little better is to suppose that what happens on December 21, 2012, is that physicists who've been laboring for some time toward the technology of time travel, actually succeed. Suddenly the timewave is fulfilled, and yet the heavens do not fall, and angels don't appear to lift us into paradise. The reason history ends at that date is because after the invention of time travel the notion of a seriality of events ceases to have any meaning. Everybody agrees history-ended yesterday. We then experience life in a post-historical atemporal bubble where you not only tell where you live, but when you live.

There are other alternatives. How about this one: On December 21, 2012 AD, I drop dead. Everyone says, "Well, how peculiar, it was only

about him. He insisted and we were all swept along for 25 years in some bizarre mathematical machination, and the irony is he was able to foist it off on us."

It may not be planitesimal impact, or the oceans boiling,

but I'm telling you, Ralph, there's something out there. I'll know it when I see it, and I'll expect you at my elbow.

I'm an unfortunate bearer of this message, because if you knew me, you would know that I'm actually not a very pleasant or nice person. Believe it or not I hate unanchored speculation! Yet I find myself in the predicament of leading the charge into the greatest unanchored speculation in the history of crackpot thinking. My method is very formal. It's very easy to predict the future, because who the hell can say you're wrong? It's a free-fire zone. Retrodiction, predicting the past, on the other hand, is very difficult, because it's already happened. If you're wrong, everyone will know. What I've done is make a career of predicting the past with a wave which proceeds right past the present moment and into the future. My argument to the skeptics is that my wave has correctly predicted any past moment that you can conceive of; therefore, there's a certain intellectual obligation to at least take seriously the contention that it predicts the part of history that has not yet undergone the formality of actually occurring, as Whitehead would say.

Rupert: I've got one final question I want to ask you. Other people who tell us the end is at hand, as in placards reading "The End is at Hand, Prepare to Meet Thy Doom," suggest that this requires some kind of moral preparation on our part. Does yours come willy-nilly, no need to get ready for it in any particular way, or does it require some special preparation?

Terence: This is a very difficult question. Much of what I was involved in many years ago was political activism, political struggle. Yet, when I go to my sources on this matter, they assure me that it's a done deal. Possibly one might spend one's time reassuring other people, but only if you felt like it. The walls are now so high, the creode8 so deep, the momentum so tremendous, that I really don't think anything could swerve or divert us from what we are being drawn into.

Rupert: I wasn't thinking in terms of more recycling and so on.

I was thinking in terms of conscious, moral preparation.

Terence: I think people should drive out and take a look at the Eschaton at the end of the road of history. What that means is psychedelic self-experimentation. I don't know of any other way to do it. If you drive out to the end of the road and you take a look at the Eschaton and kick the tires and so forth, then you will be able to come back here and take your place in this society and be a source of moral support and exemplary behavior for other people. I think that as we approach the Eschaton you will find that history is, as I said, a white-knuckle ride. There is an outlandish amount of vibration in the next 19 years. It's going to look good, then bad, then worse, then good, then bad. If you haven't driven out to the end of the road and taken a look at what's waiting the next 20 years are going to drive you nuts, because all the resonances of all past time are now in the close packing phase as the thing is squeezed down and the contradictions are rubbing up against each other. Boundaries are dissolving all around us. The Soviet Union, gone! Yugoslavia, gone! America as a great power, gone! Good taste, gone! This is going to happen faster and faster and faster. Governments are all managing a spreading wild fire of uncontrolled catastrophes, and trying to keep us in the dark about how bad things really are. It's good to go out and take a look and reassure yourself that the transcendental object is still there.

[Notes

1 James Joyce, *Finnegans Wake* (New York: Viking, 1939).

2 Kurt Godel, *The Consistency of The Axiom of Choice and the Generalized Continuum-Hypothesis with The Axioms of Set Theory* (Princeton: Princeton University Press, 1940).

3 William Whiston, *An Account of the Convocations Proceedings* (London: Baldwin, 1711). 4 Immanuel Velikovsky, *Worlds in Collision* (Garden City: Doubleday, 1950), 5 Jorges Luis Borges, *Labyrinths* (New York: New Directions, 1962).

6 Hans Alfven, *Worlds and Antiworlds* (San Francisco: W.H. Freeman, 1966).

7 G. Santillana and H. von Dechend, *Hamlet's Mill* (London: Macmillan, 1970).

8 C.H. Waddington, *The Nature of Life* (London: Allen and Unwin, 1961).]

NINE

The Heavens

Rupert: A recovery of the sense of the life of nature is going on for a variety of reasons in a variety of ways; through the archaic revival, the revival of animistic modes of thought in the shamanic revival, the Gaia hypothesis, deep ecology, and the ecology movement in general. As I have shown in my book *The Rebirth of Nature*,¹ science itself is pointing us in the direction of a recovery of the sense of the life of nature. It is happening all around us.

There's a further step I think we need to take, beyond seeing the natural world as alive, namely to see it as sacred. In the past the heavens were sacred, and so was the Earth, especially the sacred places which were the focuses of power, recognized in every land by every culture; by American Indians in America, by Europeans, both pre-Christian and Christian, by Australian Aborigines, by Africans, by Jews in the Holy Land. In all cultures people related to this sense of the sacredness of the land and the Earth through journeying to places of power, in pilgrimage. Pilgrimage was suppressed for the first time in human history by the Protestant reformers in Northern Europe at the Reformation, creating a void which led to a desacralization of nature. The sense of the sacred became focused entirely on man. Religion was centred on the drama of fall and redemption played out between man and God. Nature had nothing to do with it except as a kind of backdrop, or the means for people enriching themselves, becoming prosperous as a sign of God's grace and providence.

The English couldn't bear this void caused by the suppression of pilgrimage, and within a few generations had invented tourism, which is best seen as a form of secularized pilgrimage. I believe a paradigm shift from tourism back to pilgrimage could go a long way to help resacralize the Earth.

Another way in which the natural world was sacralized was through seasonal festivals, in which not just individuals, but the whole community participated in festivals that marked the changing seasons of the earth; the solstices, the equinoxes, and

the festivals which the Christian world has inherited from pagan routes in festivals like Christmas and Easter.

What I want to talk about now is resacralizing the heavens, and this involves going considerably further than anyone I know has yet gone.

Before the seventeenth century, when people used the word heaven, they were referring both to the sky and to the abode of God, the angels, and the blessed. Since the seventeenth century the sky has been secularized and the heavens are now considered simply the domain of astronomy. Heaven, the abode of the angels, God and the blessed, is considered some kind of psychological or spiritual state that has nothing whatever to do with the actual sky. Heaven isn't located out there, it's located in our persons in some way, or else in some spiritual realm utterly disconnected from the sky. We've grown so used to this, that if you suggest to Christians, for example, when they say "Our Father who art in heaven," that this implies that God is located in the sky, they very rapidly become embarrassed by the suggestion and brush it aside as some kind of childish naivete. Yet, when Jesus first taught that prayer, and when people prayed to God in heaven, they were not thinking that the sky was totally irrelevant, or that the abode of God was in some kind of purely subjective realm. They saw the two as related. I think it's important to recover that sense of relationship between heaven in the traditional sense and the actual sky that we see.

We now have a view of the cosmos as a kind of developing organism. I think it's perfectly possible to think of the stars and galaxies and solar systems through the rest of the universe as having a life and intelligence of their own. In this way we can recover a sense of the life of the heavens, and presumably of an intelligence within the heavens, perhaps related to the traditional view of angels in some way.

There's also the question of the heavenly state which, in various traditions, is imagined in all sorts of ways. Christians and Muslims believe in the existence of heaven; I suppose Jews do too, although they're awfully vague and elusive when it

comes to saying exactly what it is. The cartoon image of angels sitting on clouds playing harps gives us several indications: one, that it's dynamic, since clouds move; secondly, that it's not confined to normal laws of gravity—otherwise the angel would sink through them; and thirdly, that it involves some kind of musical or vibratory nature. Among the different images of heaven, I've been very struck by Terence's descriptions of the state of mind induced by DMT, dimethyl tryptamine. This and perhaps other psychoactive substances can produce a state which in many ways resembles the state of heavenly bliss portrayed in religious literature.

I reject the idea of inner and outer in its usual sense. We're the victims of a humanistic culture that tells us that the whole of the external world is mere unconscious matter in motion, the province of the natural sciences. By contrast, religion, psychology and art are to do with the inner world, which implicitly is supposed to reside somewhere inside our brains and hence to decay when our brains decay. Heaven would in that case be something that you might enter through mystical states while you're alive, or drug states, certainly not somewhere you go when you die. I think the idea that inner states are actually inside our bodies is one of the false dichotomies set up by Cartesian-type thinking. I think that when we look around us our minds are reaching out to fill the room or the place in which we are, and when we look at the stars, in some sense our mind reaches out to touch them. Although it's an inner perception, to do with our psychology, the inner is actually outer as well. Therefore I take seriously the idea that heavenly states might be located at places other than inside our cerebral cortex or inside our bodies.

The vast majority of modern people know almost nothing about the heavens. Lots of people have books showing pictures of the earth from space, and children are given fantasy books about space travel. My own children, I am sad to say, have so far learned more about the heavens from pictures of space ships than from looking at the sky. The actual sky is something of which most people are abysmally ignorant. In most traditional

cultures people could recognise the stars. Mariners, shepherds, and ordinary people knew the basic constellations in the sky, and the planets.

This awareness of stars, the phases of the moon, and the general movements and positions of the planets, is widespread in traditional cultures. Of course the information is there in our culture, but it's hard to find someone who actually can point to the constellations in the sky. We are generally ignorant of the skies. The skies are now regarded from a scientific point of view as only matter, and that's the domain of astronomy. Oddly enough, even professional astronomers often don't know that much about the sky as we actually experience it, although they've got a lot of equations about the life cycle of stars, about the nature of pulsars, and other strange mysteries in the heavens. I was having dinner a couple of years ago with a professor of astronomy in Britain. We went out after dinner. It was a beautiful starlit night. There was a group of stars I didn't know and I said, "What are those stars?" He said, "Oh I haven't a clue, don't ask me." He learned astronomy from books, from computer models, not from looking at the sky. A friend who works at the big observatory in Arizona told me his colleagues go inside and look through a big telescope at a particular star or galaxy, but if you ask them to point to it in the sky, they don't know. They just punch some figures into the computer to find it. They're not seeing the wood for the trees, or the sky for the stars. They don't see the bigger picture. Amateur astronomers and old-style celestial navigators are probably the only people who still keep alive the sense of observation and relationship to the heavens.

By contrast with the astronomers, astrologers have retained a sense of the heavens as meaningful, related to what happens on earth, but astrology has become detached from the actual sky. There's no point asking the average astrologer if you see a bright star in the sky or a planet, "What's that?" Most of them don't look at the sky any more than other people. It's all done from computer programs and books. I was particularly struck, in 1987, by the massive supernova in the southern hemisphere,

the biggest since the one observed by Galileo and Kepler in 1604, which played a major part in the scientific revolution. All through history these supernovas—exploding stars in the sky—have been regarded as major omens of the greatest importance. I asked my astrologer friends, "What do you make of this?" The answer was they didn't make anything whatever of it because it wasn't in the ephemeris or in their Macintosh computer program. Astronomers, on the other hand, took great interest, but saw it with no meaning. I think a great move forward will happen when astronomy and astrology link up again.

I think much good will come from recovering a sense of the life of the heavens. We are coming to see the Earth, Gaia, as alive. I think we also have to take seriously the idea that the sun is alive and conscious. If one wants a scientific rationale for this, it comes ready to hand through the discoveries of modern solar physics. We now know that the sun has a complex system of magnetic fields, reversing its polarity every eleven years, associated with the sunspot cycle. With this underlying rhythm of magnetic polar reversals are a whole series of resonant and harmonic patterns of magnetic and electromagnetic change—global patterns over the surface of the sun of a Fractal nature; patterns within patterns, highly turbulent, chaotic, sensitive, varied and complex. As electromagnetic patterns within our brains seem to be the interface between the mind and the nervous system, here we have a parallel in the physical behavior of the sun. It's perfectly possible that the

sun has a mind which interfaces with the complex electromagnetic activity we can observe.

The solar system itself is an organism. This is largely what astrology has concerned itself with. We also recognize that the sun is part of a galaxy, the Milky Way, which includes all the stars we see in the night sky. Like other galaxies, our own has a galactic center, a nucleus, of unknown nature which emits enormous amounts of radiation. We could think of galaxies as organisms as well. They come in clusters and these come in superclusters. These too can be thought of as organisms at higher levels of complexity and greater size. Our solar system is a tiny part of these vaster organisms within which it is embedded. If

the sun has a kind of consciousness, what about the entire galaxy, with its mysterious center? What about galactic clusters? What about the cosmos as a whole?

Thus there may be levels of consciousness far beyond anything we experience ourselves, of ever more inclusive natures. When we turn to ancient traditions, we find that this has always been the general belief. The entire cosmos is believed to be animate. God is seen as residing beyond the sky but also in the sky: "Our Father who art in heaven." Most modern people, including most educated Christians, assume that heaven doesn't mean the actual sky, it means a state of mind, a metaphor, a state of being. I'd like us to entertain the notion that it does mean the sky. If God is omnipresent, then he must be present throughout the heavens, and since the heavens are vastly greater than the earth—about 99.99 recurring percent of the divine presence must be in the sky.

We can take the same crudely quantitative approach to arrive at the same conclusions about the celestial Goddess, who can also be seen as being or living in the heavens. In Egyptian mythology the sky was the abode of Nut, the sky goddess, who was the womb of the heavens, and gave birth to the sun and the moon and the stars. She was the cause of space, the night skies, the womb from which all things come forth. That was the image also of Astarte, and it's been assimilated into Christianity through the image of Mary, Mother of God, Queen of Heaven. For example, in the form of Our Lady of Guadalupe she is portrayed as wearing a sky-blue robe, studded with stars.

In Christian, Jewish, and Islamic belief there are various hierarchies of angels, usually nine. We could think of these celestial hierarchies as reflected in the super clusters of galaxies, solar systems, suns and planets. The planets and the stars were traditionally believed to be the abodes of intelligent beings, and our English names for the planets are still those of gods and goddesses—Venus, Mercury, Mars, Jupiter, Saturn, and so on.

In the 16th century there was a revival of ancient star magic. In Elizabethan England, John Dee and others invoking

the spirit of particular stars, asked for guidance, help and inspiration. It was an attempt to actually contact extraterrestrial intelligences, and communicate with them.

Ralph: The star magic idea in Elizabethan England preceded the nucleation of science as we know it, and represented a transmission from the ancient world, with a lot of changes, simplifications, and additions. The central idea was the ancient notion of The Great Chain of Being. In ancient Alexandria they liked to wrap up things in a package and send them into the future, and this idea actually reached us through the world of Islam. There were concentric spheres; nine, ten, or eleven, with the earth in the center. Outside of these spheres was nothing. The topmost sphere was the unmoving sphere of God and the other ones were of the planets and the sun and the moon, and they intermediated as midstations in a kind of transmission, all the way from God down to us.

Giordano Bruno was burned at the stake in Rome on Easter Sunday, in the year 1600, because he insisted on the infinity of the universe. He believed the stars were not on one sphere but outside the sphere of Jupiter, and that they filled all of space. The reason the church objected to this was that it left no space for God. Our Father in heaven had no place to go, and that was very threatening to the entire system.

I'm seeing in this cosmology you've presented an opportunity for us to construct a new cosmology of our own. A religion of the future could have a whole pantheon of gods and goddesses, including the living and sacred sun, moon, planets, Milky Way, quasars, nearby galaxies, clusters of galaxies, and so on.

I think the overall idea of a Great Chain of Being can be salvaged in our new cosmology without reference to our Father in heaven, or even to gods, goddesses and angels. The Search For Extraterrestrial Intelligence (SETI) would be a better description, because in our own journeys out of the body, we've sometimes left Earth far behind, reaching a realm difficult to name: transcendent, other, a realm well traveled by our fore-

bears, brave travelers who have left all kind of written records of their journeys. On our own journeys we've had the experience of meeting, conversing with, and being taught by, extraterrestrial intelligences. Indeed our whole hope for the future is based somehow on these gnostic experiences of direct contact with an extraterrestrial intelligence.

There may be a physical location in space and time, somewhere in the universe, for this intelligence; and there may not. Nevertheless, it's the conversation that is most important to us, not its identification with physical matter, energy, or morphic fields. I'm not sure if I could connect an intelligent being I've encountered in out-of-the-body travel with the Milky Way or the planet Jupiter, although it makes sense to me when you say they're intelligent beings. I can imagine the sunspots tuning across the face of the sun in furious speed as a kind of Cephalopod, octopus-like communication between one sun and another.

Terence: Are you saying its reasonable to connect up the entities in the psychedelic experience to particular places in space and time?

Ralph: Yes.

Terence: It's hard for me to imagine that the sun is an intelligent organism, unless it exists on a scale that's fairly hard to relate to. In other words, I can imagine the Pacific Ocean to be intelligent, but its intelligence would be of such a nature that it and I probably wouldn't have much to do with each other. Meanwhile, out in the universe, somewhere, entities exist which we do contact in the psychedelic experience. I'm never sure if they're creatures of other levels or simply of other places. If other places, they seem to be so far away that the laws of physics are so different that it's not like the difference between Chicago and Memphis, but like the difference between Chicago and Oz.

We've talked about how the morphogenetic field is a nec-

essary hypothesis but hard to detect, the way you can detect an electromagnetic field. The creative response is to hypothesize that perhaps the imagination is the detection equipment for the morphogenetic field. The brain-mind system is a quantum mechanically delicate enough chemical system that incoming input from the morphogenetic field can push cascades of chemical activity one way or another, so that in the act of daydreaming or psychedelic tripping you're actually scanning the field. If that were the case, what we call the imagination is actually the universal library of what is real. This possibility, to me, is very empowering, and I suspect this is the truth you learn at the center of the psychedelic experience, that's so mind-boggling you can't really return to ordinary reality with it. If thinking about the heavens as organic, integrated, and animate makes this more probable, I'm all for it.

Rupert and I, and perhaps to some degree Ralph, are influenced by a school of thought called Organismic Philosophy that was put forth by Alfred North Whitehead, Joseph Needham and L.L. Whyte. Rupert makes a very eloquent case for organismic organization at every level. The reason this is unwelcome in science is because it raises questions about the signal systems which hold these organisms together.

A machine communicates mechanical force through direct contact. An organism operates through chemical systems of diffusion, or color signals, or in some cases language. It's these higher-order forms of function, when called down to explain large chunks of nature, that begin to look like a reinfusion of spirit into nature. This is of course exactly what we need, although orthodoxy fights it tooth and nail in ongoing reaction to the 19th century battle where Deism had the power to potentially frustrate Darwinian rationalism. It's time to realize that battle was won long ago, and that trying to reason upward from the laws of atomic physics to organisms is not going to work. There are what David Bohm calls "emergent properties," at every level. Think of a single molecule of water; it's absurd to call it wet. Wetness is an emergent property that comes out of millions of molecules of water. At every level in the evolu-

tion of physical complexity, complexity itself permits the emergence of new properties, with the iridescence of mind and culture emerging finally at the top of the pyramid.

It's interesting the way the culture has changed its attitude toward the heavens. One revolution in our thinking that is fairly fundamental is that no one at this point believes in the human conquest of space. This has gone from a national commitment in the '60s to the chic thing to be into in the '70s, to hardly being mentioned today, either by freaks like us, or presidential candidates, or right wingers, left wingers, middle-of-the-roaders, or anybody else. It all seems to be over. The heavy lift launch capacity that resided in the Soviet military-industrial complex and that held the keys to reaching near-earth orbit has been allowed to drift into obsolescence. I appreciate your attempt to animate the cosmos,

because apparently we're turning away from it, space flight having become a part of the past era of grandeur and glory, seeming not to be repeated.

We held a Virtual Reality conference here at Esalen a year and a half ago and Howard Reingold had a revelation in the middle of the night down on the platform in front of the Big House when he said, "My God, now I understand what virtual reality is for! It's to keep us from ever leaving the Earth!"

Rupert: It seems to me, in terms of communication with other planets, the SETI program which is now based on radio telescopes and high technology won't get very far. If we were to take another approach, possibly involving psychedelics, there seem to be three points in our favor. Firstly, if we're trying to communicate with beings on our own level, i.e., biological organisms on planets somewhere else in the universe, it may be that shamanic journeys into the heavens, which are a long part of a very long tradition going on for hundreds of thousands of years, may have contacted beings of a similar order to ourselves.

Second, there's the possibility of communication with a higher kind of mind or intelligence, like the Pacific Ocean, the Sun, the solar system, or the galaxy. I think you dismissed it too

soon. The idea that our minds are very much smaller parts of a very much larger mental system, incomprehensible to us because it's so much larger, working on different time scales, is of course a very traditional idea. We don't have to stay at our own level. Perhaps we can communicate with these higher levels of intelligence through prayer, mystical insight, or intuition. Most forms of mysticism today are extremely fuzzy because as soon as we get beyond the human level, we lack maps. When it comes to a sense of absorption into the nature of a place, or Gaia, or the solar system, or the galaxy, or the cluster of galaxies, or the cosmos, or the unifying spirit pervading the entire cosmos, most people don't quite know where one leaves off and the next begins. All they know is that all these things are bigger than them. It may be that in the past people had a better sense of just where they were going. The doctrine of hierarchies of angels was a way of recognizing that there are many different levels of intelligence or mind beyond our own.

The third point is that in order to contact extra-terrestrial intelligences, it may help to direct these efforts toward particular parts of the heavens. There are traditional beliefs about the qualities of particular stars, and these might provide a guide as to what to expect. Regulus, for example, in the constellation Leo, was considered a star of good omen. Looking at it, going into an altered state having invoked its spirit, making the appropriate prayers and preparations, could result in a form of directed mind travel that would go beyond random journeying. This would be a new frontier of space exploration that can be done on a very low budget. It could open up a great range of possibilities.

Terence: I think it's a wonderful idea. I can envision using the Keck Telescope, punching up Algol on the screen and then smoking DMT and putting your hand on the radio, as they used to say. It could work! I don't doubt it for a moment.

Ralph: I do know somebody who undertook a program like this: It was me actually. The technical equipment that made

this project possible, empowering me to travel to my destination, the stars, was my hot tub, an instrument that makes it comfortable to sit outdoors for a long time watching the sky. I explored primarily the polar constellations and the Milky Way. I found that some kind of conversation with the Milky Way is possible, as well as with the Zodiac and the zodiacal constellations. They each have a lot to say about the morphic field.

I return to John Dee and his conversations with angels. Mathematics was interpreted by Dee as being a healing art, in which the stellar influences could be used for healing human diseases. We could apply this idea on a larger scale, where our future and the biosphere's future is threatened. We could ask the Guardian Angel of the Anima Mundi, for example, to give aid in our planetary predicament by instructing us not as individual humans, but collectively as a human species. This was the program that I had in mind in my experiment. I was asking for guidance in a visual form—a vision of the kind that I've been struggling with machinery to reproduce. I've not so far received a solution to our problems, but I do think this is a program that an individual can pursue, even without psychedelics. It requires a considerable commitment of time.

Rupert: We can start nearer to home with the sun, of course. At sunrise and sunset in many traditions people have communicated with the sun. In India a traditional part of the daily ritual is to greet the sun as it rises in the morning, in order to form a conscious relationship with it. Our own civilization is based to an extraordinary degree on what's jocularly called "sun worship". Millions of people spend the winter fantasizing about which beach they're going to go to in the summer. This curious movement in our civilization toward a new relationship to

the sun is relatively recent. In the 19th century very few people lay around in the sun.

Ralph: I think we should reconsider the moon. The lunar sphere, among the nine celestial spheres, is somehow the most important to us, as it's the membrane for our kind of life. The

traditional idea was that everything inside the lunar sphere decays and dies, and everything outside the lunar sphere is eternal. The moon was somehow always seen as the boundary of mortal life. Furthermore, everyone loves to look at it, and probably love and the emotional structure of the human and mammalian system has evolved by moonlight. The moon might be our likeliest possibility for actually having a conversation and renewing our contact with the living and intelligent universe.

Rupert: I myself don't expect the moon to have a great deal of intelligence or life. It's the most inert heavenly body we know. Venus, on the other hand, is a turbulent system with plenty of scope for chaotic perturbations and shifting systems of order. Jupiter has this extraordinarily turbulent surface. Saturn has delicately poised and no doubt oscillatory rings, many of them sensitive enough to pick up fleeting changes and act as interfaces between the physical and mental realms. The moon seems rather lacking in all of these respects.

Ralph: Okay, maybe the moon is dumb. I'm not willing to concede that, but I see that some people would rather put their money on a different number. Of the brighter planets, Jupiter is probably the one that most people are familiar with. Jupiter and Saturn are visible in the sky almost like stars. They stay in the same position for a long time, so it's easy to find them without a computer. So what about contacting Jupiter or Saturn?

Terence: There's plenty of exotic chemistry on Jupiter and the current thinking is that Europa is the most likely place in the solar system other than the earth to have life, because of its very dense, deep oceans, filled with liquid water. It may be, in fact, that the entire thing is a drop of liquid water. There may be no solid form.

These other kinds of life I dare say live mostly in our fevered imaginations at this point. The evidence for them is extraordinarily underwhelming I would think. The difficulty about this whole discussion about extraterrestrial intelligence,

or non-human intelligence, is that the very nature of its non-humanness makes it either elusive, uninteresting, or horrifying. It's probably in a very narrow spectrum that we can have the experience of an I-Thou relationship. We can decide here and now that in fact the sun is alive and highly literate and so forth. It doesn't greatly change our experience in the way that an extraterrestrial with which we could exchange information would. I think the recognition of intelligence, if it's not like ours, is going to be very difficult. We can't even have Croats and Serbs getting along together.

Ralph: But we've already encountered intelligence; let's call it the Transcendent Other for the moment. Suppose it turned out that the Transcendent Other was not in hyperdimensional space; in other words beyond space and time, living on the other side of the Eschaton, but actually lived in a crater on the moon. That would not only be an interesting discovery but would completely change your whole idea about shamanic experience.

Terence: So far, the only locators we've been able to find for these things are drugs. In other words, we can say this creature lives on the other side of 15 milligrams of psilocybin, but not on the other side of 75 milliliters of ayahuasca. These may not be satisfying as locators because we're not used to thinking of molecules as standing for spatio-temporal locus.

Ralph: Morphic resonance gives us a mechanism to associate a given plant species with a particular planet.

Terence: Morphic resonance, true, or the doctrine of signatures.

Ralph: That's right. Not only plants, but minerals. In John Dee's system, everything represented a planetary intelligence.

Terence: We can build up these attractor tableaux on the day

of Venus, at the hour of Venus, burning the incense of Venus, playing the song of Venus, reciting the poem of Venus, wrapped in the garment of Venus, in the color of Venus, and then something associated with Venus will in fact come to be.

Rupert: This is a fascinating research project and can be done for next to nothing by networks of people sharing their results. This information, channeled from different stars and communicated in this way, could help to bring about a new synthesis of astrology and astronomy. A weekend workshop of astronomy for astrologers would be an elementary beginning. This is a project for the future that I think would have some relevance to the problems we're talking about. If we're looking for guidance in what happens on Earth, and we certainly need it, we must recognize how we're embedded within the heavens, the solar system, the galaxy, the cosmos. Intelligences throughout the heavens could play an important role in guiding us.

[Notes

1 Rupert Sheldrake, *The Rebirth of Nature* (Rochester, Vermont: Inner Traditions, 1994).

:2 Terence McKenna, *The Archaic Revival* (San Francisco: Harper San Francisco, 1992).]

Utopianism and Millenarianism

Ralph: Our project this morning is to try to see ourselves as a trinity, and to experiment with the idea of connecting with such traditions as are perceived by cultural historians.

There are two particular themes that I want to describe, as two possibilities for understanding ourselves in the historical tradition, and they are utopianism and millenarianism. As understood by cultural historians, utopianism is one of the major currents of the European mind, and not an old one. The concept of the ideal city in the ancient world, most especially the ideal city of Plato's Republic, could casually be called a Utopian fantasy, although Plato tried to actually realize it in the political organization of a particular city, and ended up in jail. According to historians, utopianism begins on a particular day less than 500 years ago. That was the day of publication of Thomas Moore's book *Utopia* in 1516. This word *Utopia* is a translation into Latin of the Greek, *utopos*, meaning nowhere. Its initial chief characteristic is that it was acknowledged to be nowhere. This was a dream not to be made real. It was fiction, having characters and plot and story, presenting various themes of ideal achievement for our culture.

After 1516 this book sold well, and had lots of imitators. There was a huge genre, a body of fictional works, which became the foundation of a Utopian trend. Eventually this branched into nonfiction. The idea began to materialize in actual communities that tried to live up to the Utopian ideals of some novel or nonfiction work. Riane Eisler's recent book, *The Chalice and the Blade*, is a perfect example of the nonfiction Utopian work.¹ Frank and Francie Manuel produced a book in 1979, looking back on the history of Utopianism since 1516. In this 900-page work they catalogued in order of appearance, all the authors, works, and communities that started and then failed. The last chapter in the book is entitled *Twilight of Utopia*. They saw the trend ending after 500 years, probably under the influence of our experience in the 1960s, when the hippies of California, Paris, Amsterdam, and other places tried

once again to materialize a new Utopian ideal in actual practice, even striving for a planetary society based on ideal lines. This attempt completely and totally failed, leading the Manuels to conclude that the Utopian literary current had finally dried up and ended.²

Nonetheless, since 1979 and the publication of the Manuel book, there have been surges of renewal in the literature. I've mentioned Riane Eisler's book, published in 1987. Another nonfiction work of this type is Rupert's book *The Rebirth of Nature*, first published in 1991. This year there's Terence's book *Food of the Gods*. I think certainly, if Mr. and Mrs. Manuel wrote a revised edition of their book, they would definitely include these authors in their list. My book, *Chaos, Gaia, Eros*, could be considered a kind of chaos Utopia. Rupert's book is a scientific Utopia, Terence's a psychedelic Utopia, Riane Eisler's a partnership political Utopia. Paul Tillich, writing about this trend in 1951, pointed out the Trinitarian aspect of the Utopian genre, harking back to the trinity of the prehistoric Goddesses, manifest in Christianity as the Holy Trinity—the Father, the Son and the Holy Spirit. He said that this particular Trinitarian Utopian model was presented long before Thomas Moore in 1516, in the works of Joachim di Fiore in the 12th century.³

Let me just read a few words of Tillich's understanding of the Trinitarian structure of the Utopian genre, as I think this will help us to see ourselves in history:

The overwhelming majority of these Utopias show a tri-adic movement. The original actualization, namely actualization of the essence, and then a falling away from this original actualization, namely the present condition. And third, the restoration, as an expectation that what has fallen away from its primordial condition is to be recovered. One of the distinguishing characteristics of this triadic movement is the consciousness on the part of those who use this symbolism, almost without exception, it is important that the lowest point of the falling away has been reached in their time, in the mo-

ment in which they themselves live. It is always the last period that gives birth to Utopia. Illustrative of this and perhaps also the best formula that has been given for it is Joachim di Fiore's idea that we live in the age of consummate sinfulness. Also illustrative is Augustine's idea that the world empires that have come to an end were the last ones—the Great Roman empire, which he as a Roman loved—and that their sole successor is to be the kingdom of God, which is in some measure actualized in the church. But the final actualization will take place only after the close of history. This same idea is found in India, where it is always the last period in which the theologian, speaking of a succession of ages, finds himself. It's found in Greece, where the stoics speak about the Iron Age as the last and most wicked. It's in Marxism, where the class struggle running through the whole of history reaches a point where revolutionary changes become inevitable. In the fascistic ideologies, decadence reaches its final stage when counter movement must set in. All of these instances show that the triadic progression is centered on the moment in which the reversal is immediately eminent. This is characteristic of all Utopian thought.⁴

The other line of thinking we must address is millenarianism, which has roots in the Jewish idea of the Messiah; that there will be a coming of God on earth to rescue humanity from a fatal impasse. In the Christian tradition this evolved into the Apocalypse, described in the New Testament, where there would be a third coming of Christ in a transformational period lasting a thousand years. The idea of the millennium rises not only from the year 1000 or the year 2000, but also the idea of a special period of 1000 years that's transitional to our final salvation. Salvation is an important aspect of the millennial idea.

The millennial tradition actually begins after the year 1000, when many people were disappointed that the Messiah didn't arrive. Terence has referred to this three-year period, centered on

the year 999, when everything came to a halt. After that time is the beginning of a new millennial hope, the growth of an extensive literature, and an extensive actualization in popular movements. These are always characterized by a prophet, the charismatic leader of a group of people, sometimes very extensive.

There is magisterial work on this movement by Norman Cohn, published in 1950, and revised after new discoveries in 1971: *The Pursuit of the Millennium*.⁵ This book is an incredible catalog of prophet after prophet, movement after movement, from the beginning, to the middle, to the end, including literature, analysis, and descriptions of all these movements. Like the Utopian movement, this is an artifact of the European mind. It takes place primarily within the context of Christianity, these millenarian groups being without exception heretical, departing from one or another dogmatic aspect of the organized church. Outside of this Christian heretical tendency, they tried to organize communities which epitomized a certain communitarian ideal. Almost invariably they included sexual freedom in reaction to the idea of sin and sexual repression in the Christian tradition.

In Norman Cohn's revised work, published in 1971, there's an extensive appendix, which is a translation of virtually all of the extant literature of one particular group, which in the 17th century coincided with the rise of science in England.⁶ They were very popular in England, and were called the Ranters. Reading about this group in particular brought up certain similarities with our experience in the 1960s, as well as the contemporary movement in which the prophet obviously is Terence.

The Utopian structure is triadic. What we had before was good, what we have now is the deepest depression that will ever be seen in human history, and tomorrow the virtues of yesterday will be restored, together with new enhancements, or something that will be even better.

On the other hand, millenarians are dominated by the apocalyptic idea that human history will end at a certain moment with the Eschaton, culminating in some kind of final moment. Certainly two of the most outstanding exponents of this

tendency today are Terence and Jose Arguelles, who agree not only on the Eschaton, but also on the date—the year 2012—having arrived at this time schedule following completely different approaches.

Between these two tendencies of the European mind, the Utopian and the Millenarian, there is a certain overlap as well as important differences. Somewhere in the neighborhood of this overlap I think we can see our own trinity in our ten year history of doing what we're doing now. If this isn't too egoistic, considering ourselves in the light of these historical trends, at least we can say that these trends have influenced us, perhaps unconsciously, in coming to the positions that we've taken. In case this is so we might want to consider the outcome of other people who were under the influence of these traditions, as they unconsciously responded to these deep runnels in the morphic field of our culture. Here is the context for our self-reflection.

Rupert: This model is very illuminating. It clarifies a lot of things. I can see in myself both tendencies at work. The Utopian tendency is something that's clearly expressed, for example, in socialism. I spent many years as a socialist, believing that there was this primal state of humanity living in brotherhood, followed by the alienation caused by serfdom, the feudal system, the rise of capitalism, the industrial state, imperialism, and so on, following a Marxist analysis. Then the capitalist order is overthrown and one eventually returns to a more primitive, non-alienated state of people living in communities, sharing their goods, and the state withers away. This is the Marxist Utopian model, with a millenarian aspect as the revolution ushers in a new age.

I was also influenced by scientific utopianism, having been educated as a scientist. The primary scientific Utopia is Sir Francis Bacon's book *New Atlantis*, published in 1624. In it he offers the vision of an entirely new order in the world. He portrays a Christian Utopia with a scientific priesthood based in a place called Salomon's House, which is a college that rules an island kingdom. Someone is shipwrecked on the island and

they find themselves in this ideal society. Everything is rationally ordered, and research is officially organized by the priesthood of Salomon's House: they have gardens where they breed plants, they keep animals to study in vivisection experiments, they have wave machines so they can study how to make dams and harbors properly, and they study artificial tides and storms on a small scale through models. They try to develop a universal language. This was satirized by Jonathan Swift in the third book of *Gulliver's Travels*, *Voyage to Laputa*, where there's a crazy academy whose members are engaged in preposterous projects, like making sunbeams out of cucumbers.

Anyway, scientific utopianism got built into the idea of technological and scientific progress, which was going to liberate mankind from the bondage of poverty, disease, and slavery to the elements of nature. In fact, it gave rise to the ideology of the modern world: economic development through science and technology.

Then there's the liberal political utopianism of socialists and liberals who have the idea that you bring about Utopia not just through science and technology, but through economic and political reform. I believed all this for a long time, and I think most of us still do, because it's so deeply ingrained in our culture.

Then there's the New Age movement, which believes there'll be a new Utopian age brought about through the rediscovery of ancient religious traditions, through the development of human potentials, and through holistic, harmonious ways of doing things. This is another kind of utopianism that has influenced me.

I think Ralph's right in saying that my own book, *The Rebirth of Nature*, is an example of the Utopian tradition. The essence of my argument is that in the past people treated nature as alive, and a recognition of the sacredness of nature gave a better way of relating to it than our alienated, mechanistic way of treating nature as a bunch of raw materials to exploit for profit. Restoration of this sense of the life of nature could lead to a new kind of post-mechanistic culture in which human be-

ings would be the mediator of the marriage of heaven and Earth, bringing human society into right relationship with both.

As for Terence, half of his thinking is Utopian, the other half millenarian. The Utopian side is the psychedelic revival, with its belief in an ancient society where people had a wonderful time living harmoniously on the Earth, with tremendous visions thanks to psychedelic plants, particularly mushrooms. Then it all went wrong. The climate changed, the Earth dried up, the psychedelic visions became less and less frequent, and a poor substitute took over, namely alcohol. One then plumbs the depths represented by modern society. But the original harmony can be restored by the mass consumption of mushrooms, the smoking of DMT, and other psychedelic activities. Thus dawns the psychedelic Utopia.

Ralph's version is a mathematical Utopia, where the great regulative, eternal structures of the mathematical landscape, the fundamental principles reflected in all nature, heavenly and terrestrial, become visible. Not only visible to the high priests of mathematics, but potentially

to everyone through the medium of computer modeling. There's a kind of democratization of gnosis, that direct knowledge of fundamentals, which mathematics has had as its guiding light through the centuries and the millennia. This gnostic seeing behind the scenes becomes commonly available, not only through psychedelic visions, but through computer models which can be shared and entered into by many people.

When we consider what would happen if the millennium were postponed, if it didn't all happen in 2012, we are forced out of the field of millenarianism into the field of utopianism. Millenarians usually have the end conveniently close—not too close, but close enough so that it could be in our lifetime— 2012 is a perfect date from that point of view. According to the millenarian scenario, and according to the Jewish and Christian apocalyptic books, most notably the Revelation of St John the Divine, with which the Bible ends, the end of history involves appalling plagues, earthquakes, eruptions, and other disasters. Of course it's only too easy to see all these things

coming to bear on our society, leading toward inevitable collapse and catastrophe. The only way out is total, miraculous transformation, the coming of the Messiah, the descent of angelic powers, or, in one of Terence's versions—he has many ways of imagining this end of history—some kind of collective DMT trip. The apocalypse amounts to a near-death and rebirth experience where we will pass through an appalling time of disturbance, and then emerge into a new realm of being. The apocalyptic tradition doesn't try to stop things getting worse, it regards this as inevitable. This is the conflict we all find ourselves in. We find ourselves becalmed in the area between the apocalypse and utopianism.

There's hardly anyone who's into the old-style socialist utopianism anymore. And who believes the world will be saved by more science and technology, run by technocrats? The concept of enlightened transnational government, a vision underlying the United Nations or the European Common Market, still has some vigor and is still important, but I don't meet many people who are wildly enthusiastic about either as the solution to all our ills. These Utopian visions that have guided so much of humanistic and socialistic thinking in the present century have put their trust in rational reform, education, science, technology and world government. The Rio conference on the Environment was an attempt to bring this approach to bear on problems such as global warming and environmental degradation. The results have not been impressive.

This Utopian current is still strong. An element of all of our thinking is Utopian. What becomes clear in our discussions is that utopianism is not enough. As we approach the end of the century we find ourselves in the field of millenarianism whether we like it or not. All kinds of scenarios—the AIDS plague, various toxic disasters, the changing climate, overpopulation—are upon us. The morphic field of millenarianism is growing more intense.

I'd like to ask you, Terence, how you see these two strands in your own thinking. On the one hand the archaic revival is psychedelic utopianism. On the other hand the time wave,

ending in 2012, is millenarian. Since you represent both strands so eloquently, I'd like to know how you see them connecting or linking together.

Terence: If we restrict ourselves to the realm of the rational, we only have two choices—Utopia or more history. More history is beginning to look less and less likely. At the beginning of James Joyce's *Ulysses*, Stephen Deadalus says, "History is the nightmare from which I am trying to awaken." I feel this way. I can't imagine a thousand more years of human history—more wars, more discoveries, more topless photos of Fergie, more and more and more endlessly, to no meaning. On the other hand, efforts to build Utopia have become more fierce and more horrifying. We've had in this century three serious efforts to build Utopias: the American, the Nazi, and the Soviet. All have ended very badly, I think. The National Socialist Utopia ended in the 2nd World War in an utter discrediting of fantasy fascism. The Soviet Union has dissolved in disarray. The American story is in the act of unraveling at this moment. This leaves us to face the most unlikely of all scenarios, the millenarian, which is an irrational choice. The rational path is to fashion out of human plans, dreams and institutions, some more humane order. That's the hope of utopianism.

I believe in the millennium, but I also think it's politically a disempowering idea. I see Christian fundamentalists running around who also believe in the millennium, and they're the major anti-progressive force in the most advanced societies.

How should we react to this dilemma? I think it's worth looking slightly afield for a moment. What we're really talking about here are origins and endpoints, and so far we've been looking at endpoints. What about origins? The dominant and virtually unchallenged myth of our origin is, either God created us in seven days along with all the rest of creation, or the universe was born out of nothingness in a single moment for no reason. These are the two choices on the menu. Neither is terribly compelling to rationalists, I dare say. The scientific explanation—that

the universe sprang from nothing in a single in-

stant—however we may think of it in terms of its veracity, is the limit case for credulity. If you can believe that, hell, you can believe anything! Sit down and try and think of something more improbable than that contention. Science opens up with the one-two punch, saying, "Put that in front of them, and if they can swallow it, then hydrogen bonding, gene segregation, whatever, will follow hard apace." The hard swallow comes first.

Many creation theories require a singularity. That means in order to kick-start the intellectual engine, you have to go outside the system. You get one free hypothesis, and once you've used that up, your system has to run very smoothly clear down to the end. Science uses up its one free hypothesis with the Big Bang, saying in effect, "Give me the first 10-12 nanoseconds, and if I can do smoke and mirrors in that time frame, the rest will proceed in quite an orderly fashion." I think that if you get one free singularity in your model building, a more likely place to put it would be not in a featureless, dimensionless, process-less super-vacuum at the beginning, but in a domain of many temperature regimes, many forms of energy, many languages, many chemical systems, many different levels of energy exchange, late in the life of the universe. What you have then is a picture not of a process being pushed by causality toward some heat death billions of years in the future, but one of a universe that is flowing naturally toward ever greater complexity, at the end. Organization transcends itself, produces more complex organization which transcends itself, which produces more complex organization, and conceivably, out of a process of avalanching complexity you might actually get a singularity of some sort. This singularity would have the character of an at-tractor. I grant you that this model is irrational, but our little discussion of the birth of the universe should convince you that it's ALL irrational. Irrationality doesn't get you tossed out of the game. It's the name of the game.

Being hopefully a sane person, my own inner dialogue goes back and forth between the reasonable desire to preserve rationality and hence channel energy toward Utopian hope, and thoughts about the end of time. After all, we have the money,

scientific knowledge, communication systems and so forth, to solve any of our problems—feeding the hungry, curing disease, halting the destruction of the environment. The problem is that we cannot change our minds as quickly as we can redesign harbors, flatten mountains, cut rainforests, dam rivers. Because I see this, and because I see it from a psychedelic point of view, and because I don't want to abandon myself to despair, I see then this transcendental object at the end of time. This is not part of the Utopian schema. It is part of the millenarian revelation. It's a very persistent idea, and in all times and all places, this highly unlikely concept has been kept alive.

I think that we are blinding ourselves to the intentionality present in our world. I think you have to be carrying a lot of unusual intellectual baggage to not see the last thousand years as moving toward a maximizing of some set of goals. It's not the triumphal march into God's kingdom envisioned by Christianity, but neither is it the trendless fluctuation that is taught in the academy. If you go to a university and ask them, "What is history?", they will tell you it's a trendlessly fluctuating process. What they mean is it isn't going anywhere. Now that's interesting. If history is a trendlessly fluctuating process, then it is the only such process ever observed anywhere. Processes are not trendless, this is what dynamics has secured. Processes always occur under the aegis of some set of parameters which are being maximized. If a desert is drying out, then water vapor levels are dropping. What's being maximized is dryness. To think of history—the very process in which mind is embedded and through which it expresses itself—as trendless is an existential absurdity.

Plato said that if gods did not exist, human beings would create them. We are creating God. Our cultural machinery, our dreams of integration and balance, our care for each other and for the world—these are god-like aspirations. We aspire to be God when we talk about becoming the caretakers of the world. We don't want to be Adam and Eve chewing on the fruit in the garden. We want to be the gardener. The power that we have in our possession means we will realize these

dreams. If there is not a real millennium with a real Eschaton, then there will be a virtual Eschaton, created with such care and fine attention to detail that it becomes an alternative reality of some sort.

If one were saying this will happen in a thousand years, or in 500 years, it would just be interesting table talk. But the rates of closure, the speed of acceleration toward the Omega Point, is exponential. We cannot imagine 2012 by looking backward 20 years and then saying we have that much more time to go through before we reach this moment. Cocktail party habitues bore each other by observing, "Have you noticed that time is speeding up?" Time itself is moving faster, and we are compressing more events into it. I would like to take that seriously. Time is speeding up. Not human time, but the time of physics. We can imagine ourselves colliding with an asteroid or being battered by

earthquakes or something like that, but what we cannot conceive of is that we are on a collision course with a hyperdimensional object of some sort.

People always object to the millenarian intuition with, "Well, you say a transcendental object is coming parallel or tangential to history—don't you find it a little odd that out of billions of years, it's going to occur in your lifetime? How convenient." This is not an objection at all, it's an argument in favor of my position. You see, history is the trumpet of judgment. A million years ago there were only animals and plants and rivers and glaciers on this planet. Human history is the annunciation of the Eschaton. When you open a door, first there's a crack of light that streams into the darkness. That's human history. We have cracked the door. That moment only lasts about 25,000 years, creating an order in nature never before seen, represented by a technological, language-using, loving, dreaming species. When you push the door open, you see that history is the shock wave that precedes the Eschaton. This is pretty straight Christian dogma, that there is a covenant between human beings and God Almighty and that the contract and the promise will be kept. I think it will be kept, and the challenge of science is to overcome its struggles with religion, and guide

us into the presence of the Eschaton using the tools and the descriptive approaches that it has perfected. The proper attitude toward the Eschaton is not prayer and sacrifice alone. The proper attitude is inquisitive understanding, curiosity, and delighted anticipation. The end of history is an object in nature like the electron, the spiral galaxy, and the human body; "a complex nexus," to use Whitehead's word, of temporal complexity, that accounts for our existence. Without the Eschaton, there would have been no human beings—no you, no me, no pyramids, no Stonehenge, no Catholic church, no Hassidism—none of these things would exist. They are the precursive anticipation of the perfection that lies at the end of the morpho-genetic process of self expression that is history. We are a part of it in the sense that we represent the individual atoms that are flowing together to make the transcendental object at the end of time.

I'll put myself out of business long before 2012 if other people don't start seeing things my way, because part of the prophecy, if you will, is that awareness of this impending event will spread, not simply through those who take their inspiration from Gideon or Stropharia, but among those who study particle physics, temporal matrices, and general modeling of nature. Nature cannot be made sense of without this kind of a singularity. Science has recognized this, only putting the singularity out of reach and safely in the past. This doesn't explain organism, intelligence, or history. To do that, you have to take this mysterious moment of concrescent involitional totality and put it in the end state. It's a matter of simple logical necessity. The fact that it was achieved by psychedelically driven visionary shamanizing only shows how similar these two methods are in their conclusion.

Ralph: I fully expect we'll be meeting for another Dialogue in 2012. I'll be 76. That's not too old to get it on. I'll keep trying to challenge you both to leap to another level of discussion in the hermeneutical circle by considering ourselves in these larger traditions. Terence, I'd like to consider this millennial

obsession of yours in the context of a deep habit, a tunnel in the morphic field of our civilization. We have habits of thinking about time. We have philosophies of time, and consideration of time according to certain models. The idea of time having a singularity at the beginning and a singularity at the end is one model of time, and, as Rupert has observed in the past, when you believe in the Big Bang, it's easier to believe that there's a singularity at the end.

Terence: There's more evidence there's a singularity at the end.

Ralph: It seems to me that the situation is quite symmetrical, and neither the singularity at the end, nor the singularity at the beginning makes any difference. There's another model of time, the cyclical one, where we have the cycle of the four ages repeated indefinitely, with not only a Golden Age in the past, but a Golden Age in the future as well. The Utopian trinitarian model is a version of this laid down by Joachim di Fiore when he changed the classical four epoch model into a three epoch model to agree with the Christian trinity. These two habits, which account basically for the Utopian and the millennial obsessions of the human species over this historical period of 6000 years, were enabled by certain mathematical models of time coming into consciousness. First we must understand a line, then we think of a linear model of time, then we understand circles as our mathematical consciousness grows. Recently we have had a proliferation of new models for time. You, for example, have contributed enormously to the history of the philosophy of time by creating a fractal model of time. Chaos theory, likewise, has given many new models for transformation which transcend the singularity concepts. Our mathematical capability has evolved to a certain point where we can recognize many other forms of transformation in nature occurring through time. The New Age expectation is for a social transformation, a future history which is not boring. The dream of a social transformation has historical support. You said that history is the trumpet of the human experience.

Compare our fantasy of what's going on with the historical record, we find that the historical record does not support the Eschaton. This is a particular interpretation based on a very archaic model, the oldest model of time in the history of consciousness.

Terence: At the beginning you said that the two possibilities— a singularity at the beginning, or at the end of the process of universal becoming—these seem...

Ralph: Equally improbable, as you pointed out.

Terence: I didn't say that. I said I think it's much more probable to find it at the end of a process, when you have great complexity, than to believe it would spring from a state of utter nothingness.

Ralph: The historical record is compatible with the idea of an upcoming, amazing, difficult, and creative social transformation in our immediate future. The future will not be boring. Transformation will be a chaotic transient from one attractor to another, a period of destabilization when all constraint of history is lifted, novelty is empowered to actually do something instead of being constantly frustrated, and then we wake up one morning and read in the paper that the sun is rising in a different way. This has happened in the past. It's in the historical record of people who wrote of history by whatever model, whether it's the cyclic model or the linear progressive model or whatever. History goes along boringly the same for a while, eventually there's a destabilization, then you have rapid change to a new equilibrium. Among these different equilibria there is perhaps a kind of progression in the long run. In this model, catastrophic transformations are announced by plagues and disasters, and the dissolution of established structures, out of which, like a Phoenix from the ashes, comes a new organization which might be glorious. The longest view in this trans-formational model of history, is given in a history of our living

Earth by Jim Lovelock, called *The Ages of Gaia*. In that book he describes the whole history of life on the planet as a series of equilibria punctuated by catastrophic transformations, eight really major transformations, the last one 65 million years ago.

Terence: This shows the kind of attention he gives to human history.

Ralph: In this view, even the human species could disappear and life may be boring for microbes, but they will go on, the biosphere will not end, life is not over. Maybe the Eschaton is only for the human species.

Terence: The reason I don't buy the idea that this is simply one more renaissance, or one more gothic revival, is because these breakthroughs to novelty are occurring faster and faster. It's not just that they happen, it's that they happen faster and with more frequency. Whatever James Lovelock's affinity for something happening 65 million years ago, a few things of high interest have happened since, like everything in the human world. When you look at human history and technology and the spread of peoples and genes and so forth, it's clear that we've reached some kind of limit. Maybe you get one more renaissance before you slam into the wall, but not a dozen, not a hundred. This is not the Renaissance, this is not the rise of Rome, this is the final global crisis. The objective data support me on this.

Rupert: But it's so provincial, Terence. There's a sense in which the millenarian vision is a product of the historical model that grew up within one branch of human consciousness; the Judaic-Christian-Islamic branch. There's a sense in which you could argue that all this is a kind of self-fulfilling prophecy. Having unleashed these millenarian visions, our history's been driven by millenarian visions, which actually empowered and directed the discovery of America, the opening up of the New World, the rise of science and technology, the

development of the atom bomb. Most of the things that are actually creating the crisis are man-made. Even if we collide into this wall of history here on Earth, I find it quite incredible that the rest of the solar system is just going to shut up shop and go out of business, let alone the galaxy, let alone the clusters of galaxies —

Terence: Here's a man who thinks the sun is alive!

Rupert: The sun could undergo tremendous transformation. I'll concede the entire solar system to you. That leaves an awful lot else, like the rest of the galaxy.

Terence: I'll take it...The galaxy can take care of itself.

Rupert: The question is whether we're talking about human destiny on Earth, or the destiny of Earth, or the destiny of the solar system? Or is this about the entire cosmos, countless trillions of galaxies, stars everywhere? I can't believe that the kind of transformation you're talking about, or even the implosion of the entire solar system, is going to set out more than the most minute ripples throughout even our own galaxy.

Terence: Implicit in that objection is that you really believe that there are millions of light years of space and time filled with spiral galaxies. It could all be a screen. The true size of the cosmic stage is a hotly debated subject, even among the experts. When you say it's too local, then you attack the univer-salist position. We only have two choices—either what you disdainfully call provincialism, or what you disdainfully call universalism. It's got to be one or the other. I'm uncomfortable with the universal thing myself. However, I'm also uncomfortable with the idea that the universe as described by Newtonian astronomers should go absolutely unchallenged. This Anthropic Principle that astronomers have begun to allow into their deliberations suggests that maybe the stars aren't as fixed in their courses as we imagine, and that somehow events on

the earth could have a kind of cosmic significance.

Rupert: The apocalyptic tradition is more like Ralph's version. It's not everything suddenly disappearing in a blinding light. It's a period of transformation followed by the Millennium, a period in which the kingdom of heaven is realized on Earth. That is something that's lacking from your vision. You don't think beyond the year 2012.

I, like Ralph, am more inclined to traditional millenarian-ism, a transitional period followed by the kingdom of heaven on Earth. What I think this could involve is: first of all, psy-chedelics; secondly, the revival of animism; thirdly, mathematical objects visible to all through computers; and fourthly, communication with the stars. Through conscious communication a network of consciousness begins to link up, far beyond the Earth, to other stars, other galaxies. A thousand years to effect this linking up of consciousness throughout the entire cosmos, at the end of which, the true and absolute Eschaton might be possible. Right now it would be confined to Earth, or at most the solar system.

Terence: I think that the thousand years should be scaled back by orders of magnitude. It will be more like ten years. By 2002 we'll have psychedelic legality, cured AIDS, virtual reality, food for everyone, and the millennium will dawn, I think, sometime around 2002 or 2003. The thousand years prophecy was naive by virtue of being made in a different era with less compression of time. We will then build quite naturally toward the revelation of the Eschaton sometime around 2012.

[Notes

1 Riane Eisler, *The Chalice and the Blade: Our History, Our Future* (New York: Harper & Row, 1987).

2 Frank E. Manuel and Fritzie P. Manuel, *Utopian Thought in the Western World* (Cambridge, Mass.:

Belknap Press, 1979). 3 Delno C. West and Sandra Zimdars-Swartz, *Joachim of Fiore: A Study in Spiritual Perception and History*

(Bloomington: Indiana University Press, 1983).

4 Paul Tillich, *Political Expectation* (New York: Harper & Row, 1971), p. 134. 5 Norman Cohn, *The Pursuit of the Millennium* (Fairlawn: Essential Books, 1957). 6 Norman Cohn, *The Pursuit of the Millennium: Revolutionary Millenarianism and Mystical Anarchists of the*

Middle Ages (New York: Oxford University Press, 1970).]

Father Bede's Letter

Rupert: I'd like to read a part of the last letter I received from my teacher, Father Bede Griffiths. You will recall that he was an English Benedictine monk who lived for nearly forty years in India, where he died in 1993, at the age of 86, in his ashram on the bank of the Cauvery river in Tamil Nadu, South India. This is the community in which I lived for two years, and where I wrote my first book, *A New Science of Life*,¹ which is dedicated to Father Bede.

This letter was written on All Soul's Day, November 2, 1992, in response to our book *Dialogues at the Edge of the West*. I'd like us to reflect on it.

My Dear Rupert,

I've just finished reading your *Dialogues* with Ralph and Terence. You are certainly three young revolutionaries (you all look very youthful). It is as near a map to the future that I have ever encountered, embracing every aspect of life as it is understood today. The only thing I find lacking in it is a sense of the mystical, of the unity which transcends all dualities. Your view of apocalypse is very impressive, but one must remember that all time and space is contained in the transcendent unity which embraces all the multiplicity. The Tibetans see this very clearly. All the multiplicity of forms is a manifestation of the one formless reality. I think that David Bohm's idea of the implicate order is very meaningful. [David Bohm, the quantum physicist, proposed that behind the world we experience, the explicate order, is an invisible, unmanifested source, the implicate order, which undergoes evolution as a result of feedback from the explicate order.²] Chaos is the original undifferentiated unity, the prime matter of Aristotle, in which all forms are implicated. As consciousness emerges from the primal unity the different forms of being are gradually explicated. You can think of it as the emergence of form from the original chaos or the descent of form from the original spirit. Matter is form emerging from chaos, spirit is form in its original unity. In other

words, matter is form emerging from the unconscious, spirit is form communicating itself to matter. Matter is the mother, the receptive principle (the yin), form is the father, the active principle (the yang). But all these principles are expressions of the differentiating consciousness, which itself is beyond differentiation. So from an undifferentiated consciousness we pass to a differentiated consciousness. Consciousness divides, but only to reunite. The danger is that we get stuck in the differentiated consciousness, which is where we are now. But all differentiation leads back to a unity which transcends differences. This is the final state of nirvana, sunyata, or nirguna Brahma, Brahma without qualities. In the Trinity everything comes from its original source in the Father beyond differentiation, and comes forth in the Son in all the multiplicity of the universe, and returns in the Spirit to the original transcendent unity—but now in full consciousness.

This is how I see it, but you bring an abundance of new insights from science which are new to me. In regard to education I think that it's important to be based on traditional religion, whether Hindu, Christian, or American Indian. A tradition links you vitally with the past and enables you to grow. Of course, it can also prevent growth, but our call is precisely to allow the tradition to grow, and to be open to all the new insights which are offered us. But to start without roots in tradition I feel would be frustrating.

Rupert: One point Father Bede is making is that, in our first book we didn't speak much about the transcendent source, although in the course of our discussions over the years we refer to it repeatedly, particularly in what Terence says about the cosmic attractor. This unity which Father Bede refers to contains all multiplicity, because it contains all the variety of forms in creation. When he talks about the unity which transcends all dualities, this transcendent unity which embraces all multiplicity, it sounds to me very like what Terence is talking about.

Terence: I agree. It's absolutely the same thing. I think, since

the publication of *Dialogues at the Edge of the West*, we've more and more tended to address this precise issue. I don't have any problem with any of it. It certainly is part of the picture.

Ralph: I'm not sure we'll ever get finished discussing this point. My own views of the mystical and the unity of phenomena in the world is still evolving. Actually, our interaction in the context of our discussions continues to present different views about the details of this picture of the connectedness of all and everything. More specifically, I think our recent discussions have had the function of decreasing dualism somehow, especially in our discussions about the heavens. When we talked about the location of heaven from a real estate perspective, we arrived at a kind of integration into a unity of all and everything. As I listened to our discussion, I imagined a unity of the dualism of form and matter and energy, not only unified in a primal cause, or primal Eschaton, but through all time. In the present moment as well, there is the interaction of matter and spirit within the integrity of a single phenomenon or trans-temporal object. Even now, the entelechy, or causal phenomenon, has a concept of time in it which I think is more specific and special than, for example Brahma, the unity of all and everything which is the spirit and the world in one.

We tried to integrate heaven and Earth in our discussion by locating a door to the paranormal dimensions at each and every point in ordinary space and time. This is a kind of timeless integration in which the whole of time becomes a kind of slice in this trans-temporal causal object. This is a little bit different, as I see it, from the idea of the Eschaton, the attractor at the end of time.

Rupert: This is the holographic matrix, all-in-everything model.

Terence: It assumes that the higher, trans-temporal dimension can be accessed from anywhere in space and time. I suppose this is like the difference between individual and collec-

tive salvation, as one must believe that the individual at any point can truncate the process and cut to the chase, although clearly the species is locked in a larger drama that has to unfold according to its own dynamics before it's completed.

Ralph: I agree that ordinary reality lives in space and time, and the individual subjective experience of time is exactly what it seems to be. From the individual perspective, the model, the master form, chaos, can be visualized within ordinary reality either at the beginning of time or the end of time. A truly transcendental vision sees time as a kind of lower-dimensional phenomenon in the all-embracing picture of the overall unity of reality.

Rupert: Time is the moving image of eternity,' in Plato's well-known words.

Ralph: And eternity is not at the end of time.

Rupert: I think we've run into a problem, because all the Platonic formulations are based on a cyclical view of the universe. Whereas, the evolutionary view, which is Whitehead's³ view and Terence's view and my own view, are based on a different model of time, namely time as a development or movement towards an end or a goal. Because of evolutionary theory, the attempts in this century of theologians and metaphysicians and philosophers to grapple with the problem of the eternity and unity of time have been different from the problems faced by their predecessors. Teilhard de Chardin⁴ tried to adapt traditional theology to the evolutionary view, and in India Sri Aurobindo⁵ put forth a similar evolutionary idea.

It's one thing to have the image of a transcendent reality which generates endless cycles of recurrence: the great breath of Brahma, the Great Year, and that kind of thing. It's another thing to have a model where the whole thing is developing toward a Telos, an end goal or cosmic attractor. This evolutionary view, which is fundamental to my own work and to the idea of

morphic resonance, depends on the asymmetry in time. Evolution depends on an asymmetry in time, an increasing diversity of forms, and the appearance of novelty as well. All these things are slightly difficult to square with traditional theologies.

If you have the idea of cycles, then the transcendent and the temporal exist in some kind of ongoing, more or less eternal relationship. Time, as the moving image of eternity, goes round and round in circles, which is the closest approximation of eternal movement that the Greeks or anyone else could come up with. This is not the evolutionary version, where time moves ever increasingly faster and faster, as Terence tells us, towards some kind of cosmic culmination.

This has been a problem in Christian theology right from the beginning, because on the one hand the Christians inherited Greek neo-Platonic philosophy, and on the other hand, deep within the Judeo-Christian tradition is the idea of a process in time, moving towards a culmination, an apocalypse, the Eschaton, the Messiah, the Second Coming, the Millennium. This tension has become exacerbated in this century because we've taken so seriously the evolutionary view, with its implication of a movement of things towards an end, a culmination, a goal. We've now got the whole of the universe and life and human development under the aspect of this evolutionary developmental process. Previously, the idea was that the universe is more or less static once created, cycling endlessly, with human beings engaged in this eternal and endless process.

Ralph: I wish that Father Bede were here to instruct us. I interpret his words to mean that the evolutionary, or linear-progressive model is actually a denial of the mystical vision that he presents. Eric Voegelin described history, the past and the future, as radiating symmetrically from the present. Rather than locating the Eschaton in the present and considering evolution both ways, I would think it's possible to envision time as an endless line. If time is thus regarded asymmetrically, where the past is considered to be more determined than the future, then today's efforts will matter in the long run.

The space-time model of ordinary reality can still be seen in its entirety as an arena for the morphogenetic process, which stretches over all and gives us the asymmetry of ordinary perception of the process. This reconciles the model of evolution with the growth of the morphogenetic field and so on.

Nevertheless, there's an interconnectedness between the past, the present and the future, as part of a morphogenetic process stretching over the entire space-time continuum. It's possible that pattern formation in the past is still taking place as we perceive it from the present. When we do archaeology we reconstruct the past, much as when we try to remember what we did or said yesterday, remembering selectively, introducing errors, which progress each day to different errors and so on. As far as consciousness is concerned, there's a morphogenesis over the whole space-time continuum. In this context, we can unify the mystical view of the all and everything with the concept of linear evolution.

Terence: However, I don't think Father Bede would abandon orthodoxy, and the distinguishing characteristic of Western orthodoxy, whether Judaism, Christianity or Islam, is the absolute and uncompromised assurance that God will enter history at a certain moment. That's the distinguishing characteristic of Western, as opposed to Eastern religion.

Rupert: Not will, but has entered history.

TERENCE: And will again. It's a promise that must be redeemed, and it's completely counter-intuitive, completely anti-rational. It makes far less sense than the endless cycling of Hinduism or the quietism of Taoism. There is an irrational insistence at the heart of Western religion, and I don't think it will ever be traded away.

Rupert: There's a fundamental asymmetry in our conception of time, built into the system from which Father Bede is speaking.

Terence: Exactly. People forget, for example, that as recently as the early twentieth century Arnold Toynbee wrote a study of history in which he states that the culmination of history is the entry of God into three-dimensional space. This is considered modern historiography done in the Western tradition.

Rupert: There are two things one can say to that. First, in most esoteric formulations of the Christian view there is the entry of God at the end of time. In the more mystical view you have the idea of the entry of God all the time, in the lives of all believers. In this view, people are always potentially open to the spirit, because the spirit is that which is inspiring, dynamical, moving; it's the novelty wave, if you like, because it's that which causes change. The Christian view is not that God is non-differentiated; there's always a trinity of Spirit, and Father, and the Logos or the Son, existing in relationship. The part of the trinity that's a moving principle, the spirit, is always conceived of in moving images; as the breath, the wind, the fire, the flame, the flight of the bird. These movements are not predictable, at least in any ordinary sense. Jesus says to Nicodemus in John's Gospel, "The wind bloweth where it listeth, and thou hearest the sound thereof, but canst not tell whence it cometh, and whither it goeth: so is everyone that is born of the Spirit."⁶ The idea is that the spirit is inherently unpredictable, a moving principle, present in all people and all nature, and containing the element of surprise. There's also the formal principle, the Logos, which gives things their form. The Logos evolves as creation evolves, and there's always this dynamical Spirit within it.

There's a sense in which the Christian view has never been particularly compatible with the Platonic view, or with an extreme monotheism, which has an undifferentiated, changeless, eternal unity, outside time. The Trinity has process within it, the Spirit being the breath, the Word being the spoken word.

Alfred North Whitehead, of whom you often speak, Terence, was not only a great philosopher, but he also founded one of the most interesting schools of twentieth-century theol-

ogy. His father was an Anglican vicar, and he himself was extremely preoccupied with questions of theology. His view of reality as process led him to a new interpretation of the divine process, and to the establishment of a school of evolutionary theology, called Process Theology. It leads to the idea of the evolutionary process as some kind of divine process, a manifestation of the divine process working itself out through creation. Therefore there is a sense in which God evolves. Process theologians talk of two poles of the divine: one an eternal pole, which is changeless; the other an evolutionary pole, always changing. Somehow these poles come together in a final culmination.

With this view we get a much greater sense of the evolutionary process on Earth and in the whole cosmos as part of the divine process, not somehow external to it. Actually, the speaking of the Word, the vibratory coming forth of things in time can be seen as the very essence of the divine nature. This is partly what Matthew Fox⁷ means by the Cosmic Christ. When St. John, in his gospel says, "In the beginning was

the Word," he doesn't mean in the beginning was Jesus of Nazareth. He means that in the beginning was the cosmic creative process with consciousness, meaning, and a vibratory nature. "Word" implies a process in time, with a beginning, middle and end. The whole universe is, in a sense, the Cosmic Christ, a divine, creative cosmos.

Ralph: That's what I meant by the space-time model of reality: The space-time continuum with all phenomena attached, including individual consciousness, the morphogenetic field, the wave functions of quantum mechanics, and the extra dimensions of the image, and so on. We could just call it the Logos and avoid the word "Word," because of its habitual association with sound and the lower-dimensional languages.

Rupert: I think it's better to keep that association, because sound and Word have the same sense of beginning and end as Logos. Having borrowed from Greek philosophy we can easily collapse back into some unintended Platonic view.

Ralph: As you like. This sensorium of God is very compatible with the view of general relativity and of quantum mechanics, where the functions describing ordinary reality and perceptions are distributed over the whole of space and time, and vibrations in the past are still ringing into the future and vice versa. From this perspective you have what can be viewed as an evolutionary equation in which not only the curvature of space, but also the very topology of space; including black holes, worm holes, and so on, is evolving in time. On the other hand, if you impress any kind of boundary condition, like an hypothesis of the future, or an hypothesis of the past, onto the picture, then the possible topology in this evolution is severely restricted.

What you're suggesting is very consistent with the modern scientific view of the universe. This could be interpreted as an evolution of cosmology as well, but we do have a different picture of the mystical unity now than previously. Still, there seems to me to remain a tension between the idea of linear progress and the asymmetry of time on the one hand, and the mystical view of the union of things. Even the entry of God into the model, can be thought of as a zipper that's unzipped and connected only at the ends. God intervenes here and there; meanwhile, humans and other creatures are free to screw up as much as they want.

On the other hand, the idea of the perpetual intervention of God suggests a knitting together of things in a more holistic way. The zipper is zipped, and consciousness is totally interconnected at all times. I think these are two entirely different views. The idea that you described under the name Process Theology seems particularly consistent with the modern view.

From the perspective of chaos theory, I think that the emergence of form from chaos in the morphogenetic process can be viewed either within the linear progression of time, or outside of it. I prefer to think of it as being connected throughout time, and that the linear progress of time is some kind of illusion that's normal for biological life.

Rupert: It's not exactly linear; it's developmental. One way of representing this is through the idea of entelechy, which draws a living organism toward an end or goal. As Aristotle said, the entelechy of the oak tree draws the acorn toward the mature form of the oak. This process can be disturbed—insects eat the leaves, lightning strikes it, branches are blown off in a storm, there may be a long drought—all these accidents can happen. The exact course of its development is not exactly predictable, but the entelechy continues to draw it toward its mature form, enabling it to regenerate after damage. Unless it's killed off, it inexorably continues its development.

Another way of representing the evolutionary process is through the idea of an attraction which lures creation toward some kind of completion or culmination, as some process theologians would express it. This cosmic end or goal is what Teilhard de Chardin called the Omega Point. Terence calls it the cosmic attractor. Freedom, diversions, digressions, and all sorts of things can happen on the way, but there's some kind of attractor towards which it's all being pulled. This seems to me entirely consistent with the traditional Christian view, although Terence puts it across more forcibly than most of the professional proponents of Christianity. And more persuasively.

Ralph: Naturally I like these dynamical metaphors referring to the lure of attractors and so on; but in the perspective of the developmental aspect of time, there are in the dynamics of process and history certain moments of bifurcation. In a dynamical metaphor, bifurcation can be the time when the lure of the entelechy passes a moment of indeterminacy. In such a moment the intervention of God may be most appropriately attached to these dynamical events. A bifurcation in history such as the Renaissance is a time when anything can happen, and we don't know exactly what's going to evolve.

In chaotic dynamical systems, bifurcations can come in fractal clusters, which are called fractal bifurcation events, and that means you have something that, like a Cantor set of bifurcation moments, creates zones of indeterminacy that fill up

a fairly large amount of time. In other words, the moments when the intervention of God or even of human will can affect history, occur very frequently, even during a single day.

Terence: It sounds like the time wave.

Ralph: Exactly. This is a punctuation of the whole entelechy concept, where Aristotle fails and Plato succeeds. There's so much flexibility in this process, as viewed in the content of the dynamical metaphor, that the acorn that Aristotle refers to, could become a tree with five limbs or a tree with three limbs. There are a lot of variations that occur even within the microstructure of time, as in the microsecond timing of cellular events and so on. This variability permeates, fractally, the entire structure of time and the divine regulation of events. It actually liberates us from the simple notion of entelechy, the lure of a final destiny of the process.

Rupert: There's a great deal of freedom in terms of bifurcation along the way. In the oak tree, you see, which is Aristotle's chosen analogy, the vein pattern in every leaf is different.

Ralph: But it's still an oak tree.

Rupert: And each leaf is still an oak leaf; but if you look at the pattern of veins in a leaf, this is literally a primordial image of bifurcation. In the branching of the veins you have a different pattern in every leaf, while the overall general structure is similar. You can tell it's an oak tree and not a beech tree at a glance.

Ralph: If the morphogenetic field is thought of as stretched over the whole of time, with some special spotlight on the present movement which is moving along, then the development of a mature oak tree with an indeterminate number of leaves is already projected onto the future in a sort of a probabilistic way. The oak tree forms the successive concretization of this probability wave, as the spotlight of time moves along. From

the point of the view of the mystical unity, these fields do extend over the whole of time, even if it's infinitely in the past and in the future.

Terence: The important thing to keep in mind is that the whole of time is probably not the same thing as forever.

Rupert: That would follow from the idea of entelechy, which is a culmination towards which animate beings move. The only way to get to forever is to link on a new cycle at the end.

Ralph: Right.

Rupert: Let's say the oak tree has acorns and it starts all over again; the universe gives rise to a baby universe and it begins again. This is not a question within our own universe, which by definition is a unity; a uni-verse, rather than a multi-verse. If our universe has an attractor, a universal process, then we can leave open the question as to whether there's another one after it. There's a culmination, the universe comes to flower, to maturity; but in the details of evolution, we get galaxies, stars, plants, molecules, crystals, fish, camels, and so on, a vast variety of forms. There's a lot of freedom in the evolutionary process, including the human evolutionary process. Things could be otherwise.

Despite all Terence's efforts, human beings may not make it. The year 2012 may be the human moment of truth; but it may not be the cosmic moment of truth, or even the moment of truth for life on this Earth. Terence's map is based on human history, and it may be that if humans blow it, then 2012 will simply mark the collapse of civilization, mass catastrophes, famines, civil wars in epidemic proportions, human beings reduced to a few scattered bands of survivors ...

Ralph: And microbes will begin again.

Rupert: Or the whales, or the dolphins, or whatever. They may

have their own version of the time wave and of evolution. Terence's evidence refers only to human history. Apart from a few asides about the

sun and neutrinos, it leaves out most of the cosmos. It may be that the time wave leads to a culmination of our species, while another kind of time wave would apply to the evolution of other species. There may also be a time wave that applies to the entire cosmos. For this reason it's worth looking at astronomical indicators like variations in sun spot cycles or the occurrence of supernovae, exploding stars, which are presumably intense vortices of novelty. We could look at the occurrence of supernovae through the universe and derive some index of the distribution of novelty in time and space on a cosmological scale.

Terence: The clustering of galaxies themselves in deep wells of space represents aggregations of novelty that are orders of magnitude more complex than the empty space between them. Since the discovery of the great attractor, it can be reasonably said that every phenomenon observable in the universe is furiously moving toward something, under the attraction of some larger system. There are whole groups of galaxies bound together by attractive forces, and planetary systems, human social systems, atomic sub-systems, all bound to their local attractor and being pumped through the whole, as a subset of these larger attractive processes.

Ralph: This means that rather than thinking of the Eschaton as a big bang, or the culmination of all of the consciousness of the universe or something, we can see the entelechy as distributed in time, so that the human species can have its Omega Point at a particular moment in the time scale of the universe, while the nuclear process of the sun has its Omega Point and the solar system has its Omega Point. Considering all the different scales of the perceived universe, these could be distributed in time and space, so we can say that there's entelechy everywhere, each comprising its own space-time continuum of extraordinary reality. This distributed model of entelechy itself

would be a kind of a wave function, with its own time and novelty waves and its own probability functions and morpho-genetic fields and so on. In this way we can get away from the particle view of entelechy and into the wave spectrum, a new kind of model of the universe.

This strange fascination with entelechy and the Eschaton was described by Freud as a manifestation of Thanatos. We are fascinated by our own death, although we deny it and transfer it onto larger spheres. Now that we've achieved more or less the largest sphere in our search for the eventual death of the all and everything, perhaps we could extend the same consideration to creativity and birth and see the acorn, growing into the mature tree, as the ultimate principle of life. In these seeds, birth moments are distributed everywhere in space and time and throughout the reality of the universe.

[Notes

- 1 Rupert Sheldrake, *A New Science of Life* (London: Blond and Briggs, 1981).
- 2 D. Bohm, *Wholeness and the Implicate Order* (London: Routledge and Kegan Paul, 1980).
- 3' A.N. Whitehead, *Process and Reality* (New York: Macmillan, 1929).
- 4 P. Teilhard de Chardin, *The Phenomenon of Man* (London: Collins, 1959).
- 5 Aurobindo, Sri, *The Life Divine* (New York: Sri Aurobindo Libtary, 1951).
- 6 The Gospel according to St. John, chapter 3, verse 8.
- 7 M. Fox, *The Coming of the Cosmic Christ* (San Francisco: Harper and Row, 1988).]

Biographies

Terence McKenna

Born in 1946, author and explorer Terence McKenna has spent the last 25 years in the study of the ontological foundations of shamanism and the ethno-pharmacology of spiritual transformation. He graduated from the University of California at Berkeley with a distributed major in Ecology, Resource Conservation and Shamanism. After graduation he traveled extensively in the Asian and New World Tropics, becoming specialized in the shamanism and ethno-medicine of the Amazon Basin. With his brother Dennis, he is the author of *The Invisible Landscape* and *Psilocybin: The Magic Mushroom Growers' Guide*. His own titles include a study of the impact of psychotropic plants on human culture

and evolution *Food of the Gods*, and a book of essays and conversations, *The Archaic Revival*, and *True Hallucinations*, an autobiographical adventure tale. Most recently a group of discursive chats, *Dialogues at the Edge of the West*, with mathematician Ralph Abraham and British biologist Rupert Sheldrake, has been published in English, German, French and Spanish editions. McKenna has appeared on a number of CDs and in live performances with musical groups such as *The Shamen* and *Zuvuya* in England and *Space/Time Continuum* in San Francisco. Other titles and CD releases are also being planned. He is the father of two children, a girl and a boy. Currently he lives in paradisaical seclusion in Hawaii where he divides his time between writing and crawling the World Wide Web. His most recent interests include rave culture, multimedia, and fractal modeling of historical processes. His Web presence may be found at <http://www.levity.com/eschaton/>

Rupert Sheldrake

Rupert Sheldrake was born in Newark-on-Trent, England in 1942. He studied natural sciences at Cambridge and philosophy at Harvard, where he was a Frank Knox Fellow. He took a Ph.D. in biochemistry at Cambridge in 1967 and in the same year became a Fellow of Clare College, Cambridge, where he was Director of Studies in biochemistry and cell biology until 1973. As a Research Fellow of the Royal Society, he carried out research at Cambridge on the development of plants and the ageing of cells. From 1974 to 1978 he was Principal Plant Physiologist at the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) in Hyderabad, India, where he worked on the physiology of tropical legume crops, and remained Consultant Physiologist until 1985. He lived for a year and a half at the ashram of Father Bede Griffiths in South India, where he wrote *A New Science of Life* (Tarcher, 1981; Inner Traditions, 1995). He is also the author of *The Presence of the Past* (Times Books 1988; Inner Traditions, 1995), *The Rebirth of Nature* (Bantam, 1991; Inner Traditions, 1994), and, with Ralph Abraham and Terence McKenna, *Dialogues at the Edge of the West* (Bear and Co., 1992). His most recent book is *Seven Experiments that Could Change the World* (Fourth Estate, London, 1994; Putnam's, New York, 1995). He is currently a Fellow of the Institute of Noetic Sciences, San Francisco. He is married to Jill Puree, has two sons, and lives in London. A website devoted to his current work is found at <http://www.shel-drake.org>

Ralph Abraham

Ralph Abraham was born alongside the campus of the University of Vermont in 1936, where he fell in love with mathematics at age 15. After an engineering career at the University of Michigan, where he worked on the construction of the first large bubble chamber, he migrated to dynamical systems theory (chaos theory) at the University of California at Berkeley in 1960. During the 1960s he also taught at Columbia and Princeton Universities, and wrote three texts of higher mathematics, including the *Foundations of Mechanics*, still in print after 28 years. Moving to the University of California at Santa Cruz in 1968, he converted from pure to applied mathematics, established a graduate program in applied and computational mathematics, and published a largely visual text, *Dynamics the Geometry of Behavior*, still in print after 13 years. During the 1980s, he began a hobby of cultural history, and wrote *Chaos, Gaia, Eros*, on mathematics and the long line of Orphism, as well as dialoguing with Rupert Sheldrake and Terence McKenna. In the 1990s, retired from teaching, he continues writing books, CD-ROMs, and educational environments for the World Wide Web. He is the author of *The Web Empowerment Book*, and can be browsed on the World Wide Web at <http://www.vismath.org>

Some Comments on

Dialogues At The Edge of the West

Ralph Abraham, Terence McKenna and Rupert Sheldrake are among the brightest and most thoughtful men alive on the planet today. These thinkers quicken in each other a remembrance of things future as well as things past. They evoke from one another a new treasure trove of ideas that could keep us all thinking for the next hundred years ... They have figured out how to achieve one of the best of all possible worlds: the sharing of mental space and cosmic terrains over many years of deep friendship and profound dialogue. —Jean Houston

Three fine thinkers take us plunging into the universe of the chaos, mind, and spirit. Instead of leaving us lost, they bring us back with startling insights and more wonder than we had and we knew we had. — Matthew Fox, author of *Original Blessing* and *Sheer Joy*.

Dialogues records the exciting intellectual friendship of three amazing minds pushing to the edge of history in search of new consciousness, blending scientific observation, mythical imagination and visionary speculation.

— Riane Eisler, author of *The Chalice And The Blade*

Dialogues should be required reading for anyone who believes that science and spirituality cannot and should not interact. Do something daring: read this book, join the play, and go to the edge with them.

— Larry Dossey, M.D., author of *Recovering The Soul*

The gentlemen in Dialogues give us permission to clutch after grand patterns as we slide down the shoot, to grapple with the increasingly pervasive intuition that, for better or worse, something mutant this way comes.

— The Village Voice

Rarely beyond the tavern discussions of undergraduate school do people seem to have the combination of intellectual passion and absolute abandon that yields whole evenings of conversation driven solely by fascination. These authors, however, have retained this ability to the peak of their careers ... We owe a debt of thanks to these three highly original individuals for allowing us to eavesdrop in this fertile stage of the creation of ideas.

—World Futures

The Evolutionary



MIND

Rupert Sheldrake Terence McKenna Ralph Abraham

Dialogues are a unique form of intellectual performance in which three people, optimally very different, discuss (or debate) a set topic for a fixed period of time. Sheldrake, McKenna, and Abraham have been in dialogue as friends since 1982, in public since since 1989, and in print together since 1992, in Dialogues at the Edge of the West, available in French, German, Portuguese, and Dutch, as well as English.

The Evolutionary Mind, Dialogues at the Edge of the Unthinkable is their second set of dialogues to be published, and cover new topics: grassroots sciences, visual math, biogeography, homing pigeons, the world wide web, psychic pets, fractals, the structure of time, the celestial sphere, the millennium, and the holistic vision.