All the Interviews

by Rudy Rucker

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All the Interviews is my compilation in chronological order of all of the interview questions I've answered by email. The questions (and matching answers) are numbered consecutively.

The first thirty-seven Q&A pairs were reprinted in my non-fiction anthology *Seek!* (Four Walls Eight Windows, 1999). I didn't happen to record the dates of those early interviews, but the later ones are dated. I've also recorded the name, town, email address and organization of my interviewers.

Included in Seek!

Tokyo

From: Nozomi Ohmori
For: *Hayakawa SF Magazine*

Q1: First of all, I'd like you to tell us something about how you group your novels. In a letter, you categorize *The Hacker and the Ants* as "transreal autobiography." So, I also want to know whether it makes an interconnected series along with former three novels (*The Secret of Life*, *White Light* and *The Sex Sphere*).

A1: My eleven or twelve novels thus far break into three groups: the *Ware* tetralogy, the Transreal series, and the Others.

As you mention, *The Hacker and the Ants* is part of the Transreal series which includes *The Secret of Life*, *Spacetime Donuts*, and *White Light*. *The Secret of Life* is about me in high school and college. I was a young beatnik freak punk and the objective correlative for this in the book is that I discover that I am in fact from a flying saucer. *Spacetime Donuts*, the first SF book I wrote, is about my days as a graduate student at Rutgers University in New Brunswick, NJ. Note that the hero, Vernor Maxwell, spends a lot of time in libraries! *White Light* is about when I was a math prof at SUCAS Geneseo in Geneseo, NY. I'll put a little table for you here. I should mention that I didn't write the Transreal books in quite the same temporal order as the periods they describe.

Transreal Series	**"My" name**	**Period of my life:**
The Secret of Life	"Conrad Bunger"	63 - 67
Spacetime Donuts	"Vernor Maxwell"	67 - 72
White Light	"Felix Rayman"	72 - 78
The Sex Sphere	"Alwin Bitter"	78 - 80
The Hacker and the Ants	"Jerzy Rugby"	86 - 92
Saucer Wisdom	"Rudy Rucker"	92 - 97

And then there's my other six novels.
Ware Tetralogy:
Software, Wetware, Freeware, Realware.
Other Novels:
Master of Space and Time, The Hollow Earth.

It's hard to use the same period of your life twice; a writer's memories are a precious resource that get used up over the course of his or her career.

The transreal novel gap from 1980 - 1986 corresponds to my years in Lynchburg, Virginia. I did set a number of transreal short stories in

Lynchburg — I usually called it "Killeville." And *The Hollow Earth* includes some scenes of Lynchburg as well.

Speaking of Lynchburg, one Lynchburg story I never got around to writing would be called "The Men in the Back Room at the Country Club," and it would be about some men who drink and play cards all day every day in the country club locker room, and each evening the black man who takes care of the locker-room puts the men in the steam bath, and all the juice runs out of their bodies, and they're just leathery skins, and he rolls each skin up and places it overnight to pickle in glass-lined golf club bags filled with whisky that's inside of that man's locker. And then in the morning the skins go back into the steam bath and swell up, and there's the platypus honking of the men's hale morning voices. The men aren't supposed to be me, mind you, they're just a Lynchburg image that I never used. If I wrote it, I'd probably tell it from the point of view of a teenage caddy. It could perhaps be a little like Phil Dick's wonderful story, "The Father Thing."

At the start of this answer, I said I'd written "eleven or twelve novels" because one might either classify *Saucer Wisdom* as a novel or as some new genre such as "fiction nonfiction." I would be most inclined to say *Saucer Wisdom* really is a transreal novel, but it's written in the form of a nonfiction book about my alleged conversations with a UFO-contactee. It's a novel in somewhat the same sense that Nabokov's *Pale Fire* is a novel. It has non-central elements that tell a story about the narrator. I got so totally transreal with *Saucer Wisdom* that I even called "my" character "Rudy Rucker" instead of making up a different name. I listed all of "my" names in the table up there, just to compare them. As you can see, there's a kind of family resemblance to them.

Q2: When you came to Japan in 1990, you mentioned about the sequel/prequel of *Wetware*, whose working title was *Hardware* or *Limpware*. What is the current situation with your *Ware* series?

A2: My feeling now is that there will only be four *Ware* books, making a tetralogy. I've just now finished writing the last one, which gives us *Software*, *Wetware*, *Freeware*, and *Realware*. It took me nineteen years from the start of *Software* to the end of *Realware*! A long time, but that's how much time it needed for me to grow to the point where I could finally resolve all of the relevant issues. I couldn't have done it any faster.

I quit drinking and smoking pot in mid-1996 and my writing speed seems to be picking up. It had been slowing down. Writing *Freeware* took me two years, from early 1994 to early 1996. *Realware* took the first eight months of 1998.

There was indeed a time when I occasionally spoke of writing a prequel called *Hardware*, but my ideas for that book ended up in *The Hacker and the Ants*. *The Hacker and the Ants* gives a fairly detailed explanation of how we might use Virtual Reality and Artificial Life

techniques to get from where we are now to the world of *Software*, with its intelligent autonomous self-reproducing robots. There also happens to be a Hollywood movie called *Hardware*, bearing no relation to my books, which is another reason why that wouldn't be a good name for me to use for a novel.

I never really had any intention of writing a book called *Limpware*, I used to just say that because I didn't want to reveal my actual title too early. In the case of both *Freeware* and *Realware*, I wanted to be sure I could actually finish the book before letting people know the title. *Limpware* is really more of a joke title. Over the years I must have heard every possible joke suggestion for a Ware title. Silverware, underwear, vaporware, nowhere, everywhere — like that. I think four of them is far enough to push it, and now I'm ready to move on. *Finis coronat opus*.

But you never know. I really like the *Ware* characters and their world, so I might someday get drawn back into it.

Q3: Can you summarize what is in the four *Ware* novels?

A3: I could talk about the characters, which is a story in itself, but this time I think I'll stick to the ideas.

There were two main ideas in *Software*. The first is that we could build some robots which are capable of "reproducing" by building copies of themselves. And if we set a bunch of these robots loose on the moon, evolution could take over, and the self-reproducing robots could evolve to become as intelligent and "conscious" as humans are. The intelligent robots are called "boppers." When I thought of this idea in 1979 it was a fairly radical notion. We're more comfortable with it than we used to be.

The second idea in *Software* is that if we had intelligent robots it might be possible to extract the "software" of a human being's personality and copy this onto a robot body.

The idea in *Wetware* was to kind of turn the two ideas from *Software* around. Instead of people building robots and putting their minds into robots, the robots build people and put their minds into people. Equality. Break down any human-chauvinistic idea that we're better. The boppers want to prove they're just as powerful as people, so they use "wetware engineering" to build people! And then the boppers find a way to encode their personalities as wetware genetic properties, so that they really can bring into existence a kind of human that has a robot's personality. *Wetware* is probably the most cyberpunk book I ever wrote, it's quite intense.

Nearly ten years of my life went by before I wrote another *Ware* book, and *Software* and *Wetware* were even reissued as a single volume called *Live Robots* (Avon, 1994).

The thing that pulled me back into the *Ware* world was that I kept thinking about something that happened at the end of *Wetware*. The humans exterminate the boppers by means of a biological "chipmold" that

ruins their silicon chips. But the boppers had this kind of intelligent plastic for their skins called flickercladding, and the flickercladding became infected with the chipmold and got smarter. I wanted to write more about that stuff.

Freeware starts out in 2053 in Santa Cruz, California. The east and west coasts of the U.S. have a lot of new citizens called moldies. These are pieces of flickercladding that have chipmold living inside them. Some of the chipmold is psychedelic so you can get severely high by hanging out with a moldie. Moldies are also great for sex, but there is the problem that they are likely to stretch out a tendril up your nose, punch through the weak spot near the eye and put a "thinking cap" in your head. Nevertheless, there's a Moldie Citizenship Act that makes them citizens.

One important thing in *Freeware* is the introduction of a universal communication device called an "uvvy." It's pronounced soft, as if to rhyme with "lovey-dovey." Every SF writer dreams of having one of his or her inventions become "real" — think of Heinlein's "waldo" or Gibson's "cyberspace." I have a certain amount of hope pinned on "uvvy." A cell-phone is something like an uvvy.

Another big idea in *Freeware* is that aliens travel from planet to planet in the form of cosmic rays. And it turns out that the moldies develop a kind of program that enables them to decrypt the alien personality waves. It's a little like downloading a compressed file from the Web and then uncompressing the file onto your computer. It doesn't cost you anything; it's "freeware." But it turns out that the alien freeware completely takes over any moldie that decrypts it. In other words, some of the moldies get turned into aliens. There's some fighting, and all but one of the aliens is killed.

So then I had to write one more *Ware* book to find out what happened to that last alien, whose name is Shimmer. Shimmer decrypts a few more of the alien personality waves, so in *Realware* there's actually seven of the aliens. They're all from the same place this time around, a world called "Metamars." They give the human race this amazing tool called an "alla." What the alla does is to make whatever object you describe to it. Like if you have a computer and you do a drawing, you can press "Print" and the drawing comes out. But if you have an alla, you specify something and you say "Actualize" and the object appears. It's realware. At this point I think I reach the ultimate abstraction of reality into information, which is a theme I've been aiming at throughout all four *Ware* books.

As well as the play of ideas, there's some emotional themes that run through the Ware books. One of the main themes has to do with how a man comes to terms with his father; and how a father comes to terms with his son. There's a transreal element to the *Ware* books — especially *Software* — in that there's a character named Cobb Anderson who's closely modeled on my father. My father had coronary bypass surgery right before I wrote *Software*, and it had a big effect on his personality —

it was almost like he'd gotten a new body. At the end of *Realware* I feel like I've finally come to terms with my father, and with our interactions, and with his death from a stroke in 1994. It's a liberating feeling to have the *Ware* tetralogy all done.

Q4: You have cooperated with various SF writers so far. Generally, how the collaboration is done? Using email or phone? For an example, please tell the story about the process of writing "Big Jelly" with Bruce Sterling.

A4: Each collaboration is different, even with the same guy. My I write something, send a printout and a copy of the file to the other guy, he adds new stuff and doesn't fuck with my part too much, and then he sends me back the new printout and a copy of the new file. In practice the other writer will tend to change my text and I change his, and we write flaming letters about hands off this and that or put this or that back. It's great fun, as usually writing is an extremely isolated activity.

One way that I organize writing with a friend is that each of us is responsible for one character who is a transreal representative of the responsible author. A role the author is playing. And then your character can challenging or running head-trips on your partner's character. That can be another element in an SF collaboration, the trying to amuse or to outrage your partner. And then they turn around and do something that really surprises you, and it's fun.

Q5: When you were young, what kind of science fiction you liked to read? Tell us your growing-up story in SF field. Do you consider yourself as a science fiction writer?

A5: When I was young my favorite science fiction writer was Robert Sheckley. When I was fifteen I was injured when the chain of a swing broke and I ruptured my spleen. I was in the hospital, and my mother brought me *Untouched By Human Hands* by Robert Sheckley. Somewhere Nabokov writes about the "initial push that set the ball rolling down these corridors of years", and for me it was Sheckley's book. I thought it was the coolest thing I'd ever seen, and I knew in my heart of hearts that the greatest thing I could ever become was a science fiction writer. For many years, it seemed like too much to dare hope for.

Q6: How do you want to be called? A writer, a programmer, a mathematician, a mathenaut ☺, or a cultural hero?

A6: A writer. Writing is far and away the most important thing that I do. Over the long run, only the written language matters. Of course "cultural hero" sounds tempting, and it would be nice if I could briefly become one. In his blurb for my memoir *All the Visions*, Lee Ballantine

said, “Novelist, scientist, and cult hero Rudy Rucker has emerged as a key figure in the cyberpunk culture that has developed at this century’s close.”

Q7: It seems that there is a strong relationship between your nonfiction and novels. For instance, *White Light* can be considered as a sort of novelization of *Infinity and the Mind*. Will you explain the relationship for us. And, do you have any plan to write a new nonfiction book?

A7: That’s exactly true about W*hite Light*. And *Infinity and the Mind* also includes the *Software* idea about self-reproducing robots evolving to become intelligent; this is in a section called “Towards Robot Consciousness.” The ideas in *The Fourth Dimension* appear in *The Sex Sphere* and again in *Realware*, which has a number of scenes in the fourth dimension. *The Hacker and the Ants* can be thought of the fiction version of the research I carried out to write my software package *Artificial Life Lab*. In the case of *Freeware* and *Realware*, I wrote a fantastic made-up nonfiction work, *Saucer Wisdom*, to introduce the science ideas used. The *Freeware* “uvvy” communication device, the *Realware* “alla” matter controller, the aliens who travel as radio waves — they’re all in *Saucer Wisdom*, presented as God’s own truth. It’s like now I’m reaching a point where even my nonfiction is speculative.

I used to like to say that SF is my laboratory for conducting thought-experiments. But maybe when I said that I was just trying to impress my academic friends. Now that I’m a tenured full professor, I’m more likely to tell the truth. I don’t write SF to help my science. If anything, I study science to help my SF! I love SF for the ideas, but more purely I love it simply for the rock’n’roll *feel* of it, the power-chords, the crunch, funk.

My agent has often urged me to write another nonfiction book, as these seem to make more money over the long term than do my novels. But I’m not quite sure if I can do another one. In my books *Infinity and the Mind* and *The Fourth Dimension*, I was laying out the vast knowledge that I had about a field that I had been obsessed with for many years, respectively, mathematical logic and higher dimensions. I absolutely *had* to write those two books — or burst. *Mind Tools* was a little different, it was more of a survey of mathematics as a whole, trying to relate everything to the notion of “information.”

Now I’ve been in Silicon Valley for thirteen years and I know a lot about computers and software engineering; my day job is teaching Software Engineering at San Jose State University. I’ve been working on successive drafts of a Software Engineering Project textbook with a CD ROM about writing *Windows* programs for simple video games. It has the working title *Software Project: Visualization and Videogames with Windows MFC*. But I don’t think of that as a “real” book; it expresses nothing that’s deeply important to me, and it’ll be totally obsolete seven

years after its published, if not sooner. It's simply a chore that I feel I need to finish because there is real short-term need for this book; there isn't any book out there that does what my *Software Project* will do. But a lot of it is just techie *Windows* gobbledy-gook.

At the low level, teaching programming is like teaching automobile repair — just having to explain these random arbitrary things like the part-numbers of the pieces inside some particular model vehicle's carburetor. And you can't just skip over that stuff because the whole point of programming is to get a nice program that works really well on some specific actual machine.

At a higher level, I've learned a lot about computer stuff like fractals, chaos, cellular automata, complexity, Virtual Reality, and Artificial Life, so it would seem like a good idea to write a book about that. But these topics are very picked over; too many people have written about them. It's like looking for a cigarette butt on the West Point parade ground. Even so, in 1997 I was trying hard to get a contract to write a book like this. I wanted to tie the computer-inspired ideas more closely to immediate perceptions of Nature and to one's own mental experiences. But somehow ended up with a contract to write *Saucer Wisdom*, a book about my fictional encounters with a man who'd been shown the future by some saucer aliens! It's not always easy to predict what book you end up writing. Certainly my work with computers has very much affected the way I see the world, and maybe someday I can figure out a marketable way to write about this.

Q8: You told me that you were considering to write a story based on your experiences visiting Japan. Is there any progress on that project?

A8: Hmm, I had in fact forgotten my reckless promise to write such a story. The thing is, William Gibson has written so much about Japan in his books, and he's done it so well. He's kind of made it his core subject matter. So I'm resisting the notion of writing about Japan. But if I were to write about Japan, I'd write about a lizard I saw in the famous Zen garden in Kyoto. A lizard living under a rock in the most famous Zen garden. How enlightened is that lizard — or *what*? I could have him be a limpware moldie construct inhabited by pay-per-view users.

Q9: Recently I bought some CD ROMS: The *Hugo/Nebula Anthology*, *Isaac Asimov's Ultimate Robots*, Robert Grudin's *BOOK* (Expanded Book version), and so on. How do you think about those multimedia titles? Any plan of making one for yourself?

A9: When I get really old, I want to take everything I've done: all the books, all the journals, all the software — take all that and put in one giant wonderdisk, or chip or S-cube or whatever. But I'm not done doing new stuff yet. And the longer I wait, the better and more together the tech

will get. Not that multimedia tech will ever be stable. As someone who's been involved in developing computer software, I've really gotten to hate the impermanence of computer platforms. It's like writing on the water, like pissing in the wind. You knock yourself out creating a CD-ROM, and five years later everyone's switched to DVD. Only writing on paper is for the ages.

Q10: As a question to a philosopher of modern age, do you still believe the Many Worlds Interpretation? In *Mind Tools*, you defined reality as a group of cellular automata, but after that you seem to have changed your opinion. What made you think that reality is more complicated than that?

A10: The Many Worlds Interpretation is a science fictional kind of quantum mechanics view of the universe, and no, I don't think it's true. I think our specific universe exists because there is some intelligence or design that carves it out. I don't think it reasonable to say that our world exists only because every other possible universe exists as well.

The Many Worlds Interpretation is a notion that comes out of quantum mechanics, and I don't have good feelings about quantum mechanics at all. I have the basic layman's response that Quantum Mechanics is a bunch of hand-waving by scientists to cover up the fact that there's something they don't understand at all. Some popular books on quantum mechanics make it sound like we're supposed to be happy and intrigued about the nonsensical aspect of quantum mechanics — about the duality and uncertainty and complementarity stuff. I'm not happy about it at all, I think it sucks. My mathematical training was as a set theorist, and I have this hope that maybe if some day physicists start using actually infinite quantities in their theories then the weirdness of quantum mechanics might be banished.

I have a tendency to think the universe is like whatever I've been recently studying. When I got interested in cellular automata, I started to think the universe is a cellular automaton (CA) — which is a kind of multidimensional grid of little cells that carry out interacting computations in parallel. Of course there's no grid in the real world, so the definition of a CA would have to be changed to make it more like a coral reef. You could have the cells themselves carry the grid, that is, each cell could carry a list of connections to its "neighbors." But granularity is still a problem, that is, why should the world divide into cells of a certain size? That sounds like quantum mechanics, which is just what we don't want! So then I thought maybe the cells could be made of smaller cells, which are made of smaller cells, ad infinitum. This could be a chance to have some infinities. Think of a pattern like a fractal. So this is why, at the end of *Mind Tools*, I said reality is "a fractal CA of inconceivable dimensions." (I use "inconceivable" here in a special technical sense to mean "larger than any finite number that people can name.")

The "inconceivable dimensions" part has to do with the fact that I think that any view of reality should include the mental element as well as physical space and time. And there's a real sense in which our minds inhabit a world of inconceivably many dimensions.

But all the science can easily miss the immediacy of how the world feels. At an immediate level, reality is very gnarly and very novelistic. It's a supreme work of art, inconceivably rich. And we'll never know any final answers.

Athens

From: Alia Skourtsi
For: ZeroOne Monthly Magazine

Q11: Are still mathematics able to help us in exploring ourselves and the universe?

A11: Of course, mathematics is the best forever. Mathematics is the science of form, and everything is form — plus the single divine content of existence.

Q12: Do you really believe that cyberspace is sterile and boring without A-Life organisms wandering in it? In a few years it is going to be overpopulated by people. Why should we fill it with more living organisms?

A12: In this context, I am thinking of graphical representations of cyberspace, such as in for instance the game *Quake* or *Half-Life*. These worlds would be more interesting if there were artificially alive things in them continually changing them. Mold, for instance, or plants, or *ants*.

Q13: Do you still want to create a second self inside a computer? Why? Would you like somebody else to lead your life or are you seeking eternity?

A13: I would still, yes, like to make an interactive multimedia hyperlinked compilation of all my writings. Interacting with the construct would be in some sense like talking to me. This construct would easily be able, for instance, to answer these interview questions.

I want to do this because it is a type of immortality, and like most people I am interested in extending my influence on the world as much as possible. I also happen to think that my information and knowledge is valuable, and that it would be an objectively good thing to have a Rudoid simmie available for the edification of future generations. In *Saucer Wisdom*, I call such a program a "life-box."

Q14: What do you think is the main disadvantage of the contemporary computers, besides being slow?

A14: They are very hard to program. You can have an idea for a program in an hour but it takes you a year to properly implement it. Of course all art is like this.

Q15: Do you think that the digital revolution will lead us to a more democratic society?

A15: I think politics in every form sucks. The more you think about politics, the more of your energy is siphoned off and turned into garbage.

Well, I'm especially full of cynicism today because I'm so tired of hearing about the idiotic Republicans. Russia got rid of the Communists, why can't the U.S. get rid of the Republicans? It'll be hard to ever get rid of them; as hard as *China* getting rid of the Communists.

But yes, in the sense that people can get better info and make input more easily it would seem that digitizing makes things more democratic. But if there is a whole lot of democratic input it's just going to be ignored the way it is now. The majority of Americans want to get rid of guns, and everyone knows this, but nevertheless the Republicans in Congress are still capable of trying to make assault weapons legal again. It is to weep.

Bottom line: fuck politics, it'll just rip you off and break your heart. Focus on getting your own life in order.

Q16: Why do you prefer the term transrealism more than cyberpunk?

A16: One very practical reason is that when people mention "cyberpunk," they always mention Gibson and Sterling and don't always mention me. I prefer a genre word that applies primarily to me! "Transreal" is my word; I made it up. It has to do with the idea of writing SF about my immediate perceptions, and using real people as models for the characters. This is the way I almost always write. Many of my books are also, of course, cyberpunk.

Q17: Does cyberpunk have an expiration day? If yes, what do you think will follow?

A17: Cyberpunk is a stage in the endless Bohemian subculture that created the beats, the hippies, the punks, and the grungers of today. This type of countercultural sensibility will never go away. But cyberpunk in the sense of writing about computers may someday not be interesting, just as writing about space-flight is not currently interesting. As long as Gibson, Sterling, Shirley and I are writing, cyberpunk will still be around;

just as beat writing was still around as long as Kerouac, Ginsberg, and Burroughs were writing. And maybe even longer. Even though Kerouac, Ginsberg, and Burroughs are all dead now, there's still certainly the possibility of others using the "beat" sensibility in their writing.

Q18: Which places in the Net do you visit more often?

A18: Well, ahem, there's my home page www.cs.sjsu.edu/faculty/rucker. Not that I myself would go look at it over and over! But if you're interested in computers, I have a lot of free software for you there.

Mostly I just read my email. That in itself uses up a fair amount of my time. I get plenty of email, and that pretty much satisfies my Net hunger. So I don't cruise the Web that much. I don't find it a pleasant way to get information. I don't like waiting for a page to download and then having it be a page I don't want to see. It's like being in a strait-jacket having an overbearing Nurse Ratched feeding you a McDonalds Happy Meal. And she's using a tiny souvenir spoon that has advertising on it.

This said, maybe we have this leftover hominid instinct to stare at something flickering in the evening — like a fire. So either you stare at the TV or at a computer screen, and certainly a computer screen's no worse for you than TV. A computer has the plus of being more interactive, but it has the minus of being less easy to watch with friends.

Q19: What is your wildest dream?

A19: Being able to fly; I dream about this a lot, a couple of times a month.

Q20: Have you ever been to Greece or met Greek people? What is your opinion about our mentality?

A20: I have never been to Greece, although I would like to go there. I've been around Europe a lot, but never made it that far east. I have no particular opinion about Greek mentality; the only Greeks I'm familiar with are the ancient intellectual heroes such as Plato, Euclid and Zeno. I imagine Greeks to be both passionate and logical.

Tokyo

From: Michiharu Sakurai
For: "Noise" issue of [relax]

Q21: I think people feel more relieved in some disorderliness than being in perfect order. What lead people feel so?

A21: Complete order is lifeless, and we don't feel safe in a lifeless environment. In a fanatically clean setting, you yourself feel like a piece of dirt which is perhaps going to be cleaned away.

Put differently, noise is an aspect of chaos, and chaotic processes are what we as living organisms are made of.

Q22: Can the "noise" be discussed from the standpoint of the information ideology? What is the position of "noise" in the information ideology?

A22: In the theory of communication, noise is a corruption of a signal you want to send. Noise is like static and clicks in telephone conversation. Shannon's Theorem says that you can overcome noise by repeating yourself a lot.

In practice we expect people to not correctly receive everything we say, but it is too boring to repeat oneself word for word. Instead you tend to say the same thing again, but in a different way. And perhaps there is some certain kind of noise that makes one way of expressing yourself incomprehensible, but if you express yourself in a new way, then the new way finds a clear gap in the noise spectrum.

In chaos theory, we distinguish between orderly, periodic processes from processes which appear random and noisy. The interesting thing is that certain kinds of deterministic equations can generate time sequences which superficially seem random even though they have a definite rule. The best kinds of chaotic processes will seem to spontaneously fluctuate between orderly and disorderly modes. The disorder appears when the process moves to a different region of its chaotic attractor, and then when the process settles onto a certain region of the attractor for awhile it seems somewhat orderly again.

In understanding what I am saying about a chaotic process, you might think of the branch of a tree blowing in the wind, or of a piece of paper that you are waving with your hand. Sometimes the branch or paper will flutter regularly, but then it can slip into a different mode of oscillation (into a different part of its strange attractor) and oscillate in an unsteady fashion.

In terms of noise and communication, I find it interesting that these words of mine are going to be translated into Japanese, and I will never in fact know what kind of understanding they are going to communicate to my esteemed Japanese readers. Something of my voice and message is preserved, but I have no way of knowing what this Japanese voice of mine sounds like. I hope it sounds like the Japanese voice my translators give me for my SF novels. Really I always say more or less the same thing.

Q23. People tend to find noises in artificial and technological objects, not in natural creatures. How do you see the relations between noises and artifacts?

A23: I would say that nature is also full of noises, such as the sound of rustling leaves or falling rain or chirping birds. Nature is essentially chaotic — it has underlying rules, but the working out of these rules produces patterns that are not simply predictable by a human brain.

The really objectionable noises are indeed from technological objects. As I write this answer, for instance, my neighbor's gardener is using a gasoline-powered leaf-blower to move small bits of dead leaves around this neighbor's yard. I find this noise annoying. What is annoying about the sound of an engine is that the sound is not interestingly chaotic. The sound is just the same power spectrum over and over and over. Even if I change my focus of attention or think about things in a different, the engine keeps going, and eventually it wins back my attention.

The bad kinds of noises are the ones that are not chaotic enough, but are instead very repetitive. These are the kinds of bad noises that machines are likely to make.

Q24: Generally, noises are considered something useless. What are positive elements of noises we should pay more attention?

A24: It is an interesting exercise when you are walking around to try and become fully aware of the sounds around you. If you ever happen to make a tape recording outside, you will be surprised at how many noises there are besides the sound of the voices you are perhaps trying to capture. Becoming aware of the full tapestry of noise around you is a good method to heighten your consciousness and make yourself feel more tightly woven into the undivided fabric of the One World. To get started with this awareness, it may help to close your eyes.

Q25: As seen in samplings in music and uses of ready-made products in artwork, contemporary arts are seemingly moving toward "application," apart from the traditional idea of "creation." What does this tendency reflect in terms of changes in people's consciousness and thoughts?

A25: If you play a tune on the piano you are already in some sense sewing together samples of notes. But instead of pasting in a sound file for the note C, for instance, you are generating the sound file for the note C by pressing the piano key. On the other hand, a good pianist really is doing more than assembling a series of notes. There are in fact many different ways to play the note C and many different ways to segue it from the note before to the note after. The thing is, a piano is extremely responsive to very subtle muscular cues that a person can generate. If you are just pasting in a sound file for the note C, there are only going to be a limited menu of selections about what type of C note you want. The

richness of human analog muscle expression goes far beyond any digitized program we yet have.

I think it will continue to be true for a very long time that the subtleties of sounds or colors or phrasings are going to allow a much wider palette of possibilities than will any cut-and-paste computer collaging process. So I would say the process of "creation" rather than "assemblage" will continue to be the most essential form of artistic expression.

On the other hand, in connection with the notion of noise, it is certainly true that a modern composer has the possibility to paste in a lot of interesting sound structures.

But just pasting things together isn't enough. It may superficially look like a complex work of art, but when you explore it more closely, it doesn't hold up unless the artist has a really close involvement in the work at many levels.

San Francisco

From: John Shirley
For: Introduction to HardWired edition of *White Light*

Q26: Is there, in brief, a general overall Rucker Theory of the Motif of the Transreal Books? A linking esthetic?

A26: Oh yes! It's called "A Transrealist Manifesto," and it appears in my new nonfiction anthology *Seek!* But let me try and summarize it for you.

Transrealism means writing about your immediate perceptions in a fantastic way. The characters in a transreal book should be based on actual people. This has the effect of making the characters be richer and more interesting. One inspiration for me in doing this is Jack Kerouac, who thought of his novels as a single linked chronicle. Though many would just call Kerouac's books autobiographical novels.

My transreal novels aren't exactly autobiographical: I have never really left my body, climbed an infinite mountain, met a sphere from the fourth dimension, infected television with an intelligent virus, etc. But they are autobiographical in that many of the characters are modeled on family and friends — the main person of course being modeled on me. The science fictional ideas in my transreal fiction have a special role. They stand in for essential psychic events.

The quest for infinity, for instance, is nothing other than the soul's quest for God. Or, more mundanely, it represents the individual's quest for meaning. In another sense, a White Light at the top of a transfinite mountain stands for the psychedelic experience, which loomed large in those years when *White Light* was written (1978 - 1979). But, again, the whole point of the psychedelic experience, at least from my standpoint, was to see God. Another inspiration for me in pursuing transrealism is

Philip K. Dick. His blackly hilarious book *A Scanner Darkly* was a real inspiration for me in forming my ideas about this way of writing. And in fact *Scanner* had a blurb on it describing the book as "transcendental biography," which was probably the reason I coined the word "transreal."

In a nutshell, transrealism means writing about reality in an honest and objective way, while using the tools of science fiction to stand for deep psychic constructs.

St. Paul, Minnesota

From: Patrick Clark
For: Interference On The Brain Screen

Q27: We were talking about your public image, and I think you mentioned you had something to say about drugs and alcohol?

A27: It's kind of touching how much attitude I used to have. I was pretty desperate to get noticed. To be different.

For a long time I embraced the classic notion that drinking and taking drugs is a bohemian identifier, a legitimate path to enlightenment. As I got to be older than Poe and Kerouac ever were, it became all too evident to me that their "left-hand" path is not a sustainable one. "It just ends in tears," as my mother used to say vis-à-vis almost anything.

I've been clean and sober for almost three years now, which feels like a big and joyful deal to me. I couldn't have done it without group support. The simple act of reaching beyond yourself and asking for help seems to be crucial.

I used to be scared that if I got straight I wouldn't be the same person, that the wild creative part of me would go away. Well, I'm not exactly the same person — but I still feel creative. My bizarre and millennial *Saucer Wisdom* will be out in mid-1999. And I recently finished *Realware*, which is the coda and finale of the *Ware* tetralogy. There is, I would say, as much weirdness in these books as ever.

Regarding enlightenment, it seems humorous to me that I used to think enlightenment was about getting wasted and blasting my brain into nullity. The flash, the pop, the white light. Like it never occurred to me that attaining enlightenment might have something to do with becoming a better person or being more loving to those around me. I've finally started getting some serenity now and then.

"Let go, let God." Brain-dead bumper-sticker or profound truth? Yes, yes, it's the latter, even if you write in Olde English Scripte. There's some good raps about the bumper-sticker/profound truth dichotomy in David Foster Wallace's book *Infinite Jest*. I read that book in early 1996, right before I finally got sober, and it made a real difference to me.

Some people say that *Infinite Jest* is too fat to read, but you have to know how to deal with a book that size, you can't let it boss you around, you have to just dive in there and carve out what you can use. In my case,

I tossed out all the parts about prep school tennis matches and read the stuff about recovery and halfway houses, which is still enough for a really big book. The footnotes were good too. And the wheelchair assassins. Wallace is a great man.

Q28: In closing, what book would you like to be published Ace Double "69 style" with?

A28: I already did it! The small press Ocean View put out my transreal rant-memoir *All the Visions* back to back with a book of poems *Space Baltic*, specially selected for the occasion by my favorite poet Anselm Hollo. Check it out, you can actually still order it from Ocean View, like through www.amazon.com, it's beatnik heaven, with a cover by Robert Williams yet.

London

From: Matthias Penzel
For: *Frankfurter Rundschau*

Q29: Unlike with rock'n'roll interviews, the preparation for writers' interviews is immense (weak excuse, mediocre explanation). Unfortunately I have not managed to read all your books before this interview. Which one (talking about your fiction) would you single out as your masterpiece?

A29: That's like asking a father which child he likes best. I love them all in different ways. I do feel that as time goes by I get more mastery of my writing, so in that sense I usually think my most recent book is the best. Today that would be *Realware*. As a practical matter, it is in any case better for me to believe that my latest book is my best. I would not want to think that a book I wrote a long time ago is better than a book I can write now. I feel like I am still on the upward part of my trajectory.

Q30: Although having been translated into German by Udo Breger who could probably be regarded as one of the country's leading translators, your books never quite cracked the German market — is that because they will always only appeal to a smallish cult audience anyway, or is it the matter of language?

A30: Maybe as the years go by, the mass of people will like my books more than they do now. It could be a matter of my being ahead of my time. Or it could be that my books are a little too esoteric for a true mass popularity. I write intellectual, high-literature, counter-cultural science fiction.

It could also be that my style of humor appeals more to Americans than to Germans. But at least one other country likes me: my books seem

to be quite popular in Japan, perhaps even more so than in the U.S. I think all my novels are in print in Japan, which still remains an impossible dream for me in the U.S. But I still think my day will come. The trick is to try and have it happen before you die.

I'm sure that Udo Breger did a great job in translating my books into German, he was very meticulous and sent me lists of words he wasn't sure about how to translate, which is something very few translators think of doing. I wish they all would.

In any case, it's not in my interest to take the number of copies sold as my supreme yardstick of success. I'm happy that I'm published at all, and that my books do indeed speak deeply to some individual readers.

Q31: What do you think is your most important activity?

A31: At the personal level, the most important thing I ever did was to father and help raise our three children. At the public level, my most important activity is writing, although maybe in the long run it's my *sensibility* that will have the most lasting influence: my combination of humor, anarchy and scientific engagement.

Q32: Do you listen to your rock'n'roll on vinyl or CD?

A32: CD. I have a large collection of my old vinyl records, most in bad shape from much party use. The sound system I happen to have these days isn't compatible with a turntable so I can't play my vinyl records anymore. They're in boxes in the basement. My children want to inherit them.

Q33: Who do you rate the most important writers of this century?

A33: I'll certainly vote for myself! Otherwise, not to make too long a list, let' s say Kerouac, Pynchon, Borges, Burroughs, Kafka, Poe.

Pynchon is really the best of all. He is our James Joyce. The richest language, the deepest feeling. I was so sorry when I was done reading *Mason and Dixon*.

Borges has the best ideas, the fine language also, the dryness. Borges has a phrase that's of comfort to me (he's writing of Melville and Edgar Allan Poe), "Vast populations, towering cities, erroneous and clamorous publicity have conspired to make unknown great men one of America's traditions." Sometimes I like to imagine that's a description of me.

Kerouac and Burroughs are a special case. It's hard to point to many books by them that are really impeccably great. It's more a matter of great passages and of a great vibe, the beatnik vibe that had such an influence on me growing up. Speaking of beat sensibility, I always liked Charles Bukowski a lot as well.

I like to think of cyberpunk as a new kind of beat movement. The beats had Kerouac, Ginsberg, Burroughs, Corso. The cyberpunks had Gibson, Sterling, Rucker, Shirley. Burroughs was the oldest of the beats, and I'm the oldest cyberpunk.

Poe and Kafka are a bit like the beats in that their sensibility has perhaps a greater influence than their individual works. In both cases there are not any fully successful novel-length works, although there are any number of perfect gem-like passages and stories.

Erasmus, Belgium

From: Koen Hendrickx
For: *Planet Internet* (ISP) based in Antwerp

Q34: There seems to be a central theme in your science fiction: Artificial Life forms resemble biological life forms because they both reproduce themselves and they both evolve according to the laws of the survival of the fittest?

A34: Yes, this idea was implanted in me by the mathematician Kurt Gödel, who remarked that although it is absolutely impossible to design a machine as intelligent as oneself, it is possible to bring about a situation where such a machine can evolve. Of course at this stage in history, we are still nowhere near the limits of the intelligence of the machines that we actually can design. But in some far future, it will be necessary to use artificial evolution to go beyond what we can design. I might remark that I was a little over-optimistic in setting *Software* in the year 2020, which is now just around the corner.

Q35: In your *Ware* tetralogy, Artificial Life and biological life increasingly coincide. With *Software*, you were way ahead of your time, but writers like Hans Moravec and Kevin Kelly have done much to make your ideas more acceptable in America. Do you think that people distinguish too much between human and machine?

A35: I remember when I was writing *Software*, I was wrestling with the notion of whether a machine can ever be alive like a person. How can chips have soul? But then I hit on the idea that the "soul" is a universal mystical jelly that imbues *everything*. A rock is already alive like a person. This said, of course there is a big difference between a machine and a person. But if machines became soft and wet, that would be a step toward being more like us. That's why in *Freeware* I liked having the moldies.

Q36: One of the sites in the *Ware* tetralogy is a colony on the moon, built by robots. The Dutch astronaut Wubbo Ockels works on a similar idea in the project Euromoon (http://www.estec.esa.nl/euromoon/),

but the ultimate goal of Euromoon is human settlement. Is human presence on the moon necessary?

A36: It would certainly be interesting to have a human colony on the moon. I went and looked at that the Euromoon page of Wubbo Ockels — what a wonderful name he has! The page refers to the discovery of ice at the lunar South Pole; this is indeed something which is very encouraging. As a practical matter it would be easier in the near future to have a human colony on the moon than to have a colony of self-reproducing robots. But a middle path might be the best: to have robots with fairly low level of intelligence that are instructed by the (slow) remote link to people on the Earth. Given that there's a several-second-lag in the communication with Earth, the robots have to be smart enough not to fall off a cliff, and so on. I think this could be a very popular form of entertainment, to rent time running an actual lunar robot, especially if a good Virtual Reality interface were in place.

Q37: Studly in *The Hacker and the Ants* is a speaking household robot you can relate to as a friend. Do you think there's a real chance that such a tool will be developed in the next ten or twenty years?

A37: Oh, yes, I think so for sure. Descendants of the Furby. Your robot friend would not really have to be so very intelligent. We humans anthropomorphize relentlessly and can already easily image ourselves to be having a conversation with, say a cat or a dog. Why not a machine?

After Seek!

Novara, Italy, 3/17/1999

From: Marco Mocchi
For: IntercoM, http://www.intercom.publinet.it

Q38: You often speak about infinity, paradoxes, higher dimensions, and the existence of alternative worlds. Were you influenced by M.C. Escher?

A38: I loved Escher as soon as I first saw his work, which was perhaps in a "Mathematical Games" column by Martin Gardner. Before there were any English editions of his prints, I had a Dutch edition of Escher prints that I looked at a lot. I use a lot of Escher-like constructions in *White Light.* For instance I describe a patio restaurant whose center is infinitely far away because everyone gets smaller as they approach the center; this is similar to Escher's *Smaller and Smaller I.* His *Other World* was an inspiration for a scene in my *Master of Space and Time* where there's a room in which the walls, floor and ceiling are all magic doors to

other worlds. Escher liked getting suggestions from mathematicians, he corresponded, for instance, with the higher-dimensional geometer H. S. M. Coxeter. Escher was science-fictional in that he illustrates startling mathematical effects by cleverly arranging familiar things.

Q39: If you take Escher seriously, he seems to suggest that our perceptions are limited, and that our view of reality is partial and incomplete. This notion is also found in the novels of Philip. K. Dick. Do you agree with it?

A39: It seems very likely that there is some other order to reality than what we ordinarily perceive. We are, after all, very specific kinds of biological beings, evolved to live in a specific kind of environment. A deep-sea tube-worm has no inkling of the sky, nor of the birds in the sky, nor of the stars. A creature of the desert knows nothing about rain. It would be preposterously self-centered to believe that humans are in a position to understand everything about the Cosmos. Certainly there are regions of the universe in which space, time, and matter behave differently, and it's reasonable to suppose that these regions are inhabited by various kinds of intelligent minds. What's more intriguing to think about is that there may be different levels of reality right here around us. Perhaps there really are higher dimensions of space. Time of course is a higher dimension, but I'm thinking of a spatial higher dimension here. The physicists who talk about string theory have some crappy little rolled-up higher dimensions they use, but these are curved around to be only the size of an electron. I'd like to see a real, extended higher space dimension distinct from time and from the shrunken "vermin dimensions" of string theory. Or maybe there's some kind of shrinking transformation you could do so as to get inside the vermin dimensions after all. Or maybe the whole notion of space should go out the window and we should be thinking of thoughts that live in a mindscape like fish in the sea. Maybe what I think is "me" is simply a particular "school of fish."

Q40: Do you view our inability to see the higher reality as a problem related only to human perceptions or does it involve our spiritual aspect?

A40: If you pray or meditate, you can sometimes have an experience of being in touch with a higher order of being, whom we might as well call God. Sometimes I have a sensation, for instance, that individual humans are part of a single great spacetime body, that each of us is a kind of "eye" that God uses to look at things with, and that people are like eyestalks on the Mystical Body of Humanity, if you will. Once in a while I have a feeling of timelessness, a sense of looking at the world from outside of spacetime. These sensations are fleeting, and it's hard to force them to come. One might think psychedelic drugs would help, but

they seem to help only the first couple of times you use them, and after that they hold you back, ensnaring you in selfishness, paranoia and addiction. Boring as it seems, prayer and meditation are the only long-term methods of enlightenment that I know of. Well, actually, talking and writing about this stuff is a path as well. That's one reason I find it fun to write science-fiction.

Q41: Are the cognitive limitations of present-day man technological, philosophical or epistemological?

A41: It's hard to be sure. I have a physicist friend who dreams of creating some kind of force-field that would in effect put you into a quantum resonance with the objects around you, so that everything would seem alive. But I think he'd end up with more than he bargained for. My sense of the nature of higher reality is that it's closely associated with the concept of a loving, all-powerful God. I think goodness and compassion are part and parcel of higher reality; they live there. You're not likely to get through the temple door if you're carrying a rifle. The various paths that humans take to try and achieve transcendence are perhaps all leading up different faces of the same pyramid — which I imagine as having the great White Light on the top, similar to the traditional image of a blazing eye on top of a pyramid. Science fiction is one possible tool for trying to explore the greater reality. It's a good tool because it tries to start from fresh, bringing in all sorts of new scientific concepts. And it has a irreverent open quality to it. We can forget, at least temporarily, about being serious and religious, we can just play, and ask questions like whether there might be many Gods, what it would be like in their homeland, how many dimensions of space and time they have, and so on. It's a relief sometimes not to strive for spiritual growth and simply to speculate. In the end, as the speculations become part of your worldview, they will have a spiritual meaning anyway.

New York, 7/ 5/1999

From: Mark Dery <MarkDery@aol.com>
For: Salon, www.salon.com

Q42: In _Saucer Wisdom_, you---or an alternate-universe doppelganger with the same name---find God. I, for one, was stunned to hear pearls of cosmic wisdom such as "God is love" on the lips of a man who once used pages torn from a Gideon Bible for rolling papers and nearly came to blows with Cal Thomas, then head of Jerry Falwell's Moral Majority. Can you offer any helpful hints for readers trying to reconcile the wiseass, Church of the SubGenius-style skepticism of your earlier works with the wide-eyed mysticism of _Saucer Wisdom_?

A42: I have been interested in mysticism every since I first heard the word in college. Mysticism in the sense of attaining some direct contact with God, or the One, or with the divine nature of the Universe. The eye on the top of the pyramid. The White Light. Any problems I've ever had with organized religion have been caused by political differences rather than religious or theological differences. In and of itself, there's no reason why Christianity should be associated with right-wing politics. Indeed, in the 1960s some of the most dedicated anti-Vietnam-war activists were Roman Catholic priests. So it always grates when one sees Christ used as a poster-boy for right-wing political interests. It's comparable, in a way, to how Apple has been systematically using pictures of great thinkers to promote their style of machine. There's no intrinsic connection between Einstein and the Macintosh, just as there's no connection between Jesus Christ and the Republican party. This said, I will also grant that, irregardless of anything having to do with politics, I'm more comfortable with religion than I used to be. I've always believed in a Cosmic Absolute, but only recently did I start feeling like it could make sense to pray. I would, by the way, take exception to your knee-jerk characterization of mysticism as "wide-eyed." One can in fact have a quite practical and, if you will, "narrow-eyed" reason for choosing to believe that God is everywhere and that God will help you if you ask: this kind of belief makes it easier to be alive.

Q43: On that note, do you see yourself as part of the tradition of SF mysticism that includes Olaf Stapledon (_The Star Maker_), Arthur C. Clarke (_Childhood's End_), William Gibson (_Neuromancer_'s voodoo cosmology), and, most obviously, Philip K. Dick (the _Exegesis_)?

A43: In very many of my books you will find characters trying to break through to the Answer. In my novel White Light, they're in fact very specifically trying to climb an infinite mountain to reach God. Science fiction allows us to try and do all sorts of counterfactual things. I used to always wish I could find a good science fiction book about what happens after you die, but I don't thing anyone yet has managed to top Dante. Of the authors you mention, certainly my philosophical views are the closest to Stapledon's. But I'd like to think my humor and realism is closer to Philip K. Dick's. Philosophy aside, I'd like my science to be as hard-core and accurate as Clarke's, and I'd like my style to be as lovely as Gibson's.

Q44: I was especially amused to find, among _Saucer Wisdom_'s premonitions of "limpware engineering," do-it-yourself transgenic tinkering, and mindfaxing, a savagely funny chronicle of a 1994 _Mondo 2000_ party in 1994, with publisher Queen Mu "inaccessible behind starry eyes and rictuslike smile, her voice breathy and brittle, *stay away*." In addition to being a _Pilgrim's Progress_ for _Zippy the Pinhead_ fans

and a head-spinning ride into the technological future, _Saucer Wisdom_ is a wisecracking eulogy for the cyberculture of the early '90s. Are we well and truly in the age of "post-cool" computer culture, ruled by .com CEO's who've never heard of _Mondo_ and who harbor no illusions about the "countercultural" promise of the Digital Revolution(tm)? If so, do you mourn the passing of the cybertopian rhetoric of the early '90s? Or are you happy to be rid of it?

A44: People sometimes talk about an accelerated "Internet time," in which a month is like a year. I had no idea in the late 80s and early 90s that we were roaring through a Golden Age. Most of the things that people hoped for from the Net have come true. Anyone can publish anything: text, images, music, or video. There's no censorship, no bottleneck, you can set up your own pirate mind-station as easy as pie. Of course speed and access still need to be improved. Web speed needs to reach a point where jumping from link to link is as easy as turning pages in a magazine. And Web access has to become truly democratic, with everyone able to log on. I think the true countercultural effects of the Web are yet to be felt. The complete disappearance of network television and the establishment press might be things one could expect.

Q45: You were a featured contributor to Bruce Sterling's canonical cyberpunk anthology, _Mirrorshades_, and critics often discuss your novels in the same breath as Gibson's and Sterling's. Even so, your fiction has always struck me as more cyberdelic than cyberpunk. For one thing, it's Day Glo rather than chrome and gunmetal, flaunting its '60s roots in a way that most '80s SF did not. For another, it's unabashedly personal, a fictionalized autobiography in the Kerouac-ian mode. Also, there's an antic playfulness to your writing that's in short supply in most SF, a Silly-Putty sense of the absurd that seems to descend from underground comix and pothead humor on one hand and the thought-experiments of physicists like Schrodinger and Feynman on the other. Bubbling underneath it all is a cartoon-y sexuality, somewhere between R. Crumb and Rabelais, that's conspicuously absent in mainstream SF. Is this a fair characterization? Who are your literary precedents---and descendents---in SF and outside it?

A45: I've often said that my work might more accurately be termed transreal than cyberpunk, "transreal" being a word that I coined to mean science-fiction based on one's immediate life and daily perceptions. But certainly I have a lot of affinity with the cyberpunks. They're my friends, they're my favorite SF writers, I collaborate with them, and so on. In self-aggrandizing moments I think of us as an 80s version of the Beats. The Beats were indeed some of my biggest literary influences, also Thomas Pynchon and Jorge Luis Borges. Growing up, my favorite SF writer was Robert Sheckley. He wrote wonderful short stories which were real and funny and had gnarly science twists. And the main characters

were often bumbling, flummoxed men whom one sensed were very much like the author himself. I eventually got to meet Sheckley; in 1982 he turned up in a camper van at my house in Lynchburg, Virginia, and lived in our driveway for a week. I can't remember exactly how he happened to come there, he'd read my White Light and he liked me. It was like a miracle to have Sheckley in my driveway, the great SF hero of my youth here in, as it were, his space cruiser. In 1987 Sheckley and I went to visit Tim Leary in L.A. A Venice, CA, screenwriter called Martin Olson had cooked up the idea that "Ruckella and the Sheck-man" (as he termed us) would start writing a TV show for Dr. Tim. Nothing came of it, but it was a wonderful day.

Q46: The shelves are groaning, these days, with books like Margaret Wertheim's _The Pearly Gates of Cyberspace_, which considers the mythologization of cyberspace as "a technological substitute for the Christian space of Heaven"; Jennifer Cobb's _Cybergrace: The Search for God in the Digital World_, a Teilhard de Chardinian sermon on the "emergent" spirituality of intelligent machines; Jeff Zaleski's _The Soul of Cyberspace: How New Technology is Changing Our Spiritual Lives_; even a Christian book called _The Soul in Cyberspace_, by Douglas Groothius. As someone who shuttles effortlessly between metaphysics and physics, spiritual epiphanies and fractal geometry, what do you make of this stuff? Ironically, your own spirituality seems to spring more from your amazement---and amusement---at the chaos and complexity of the physical universe than any revelations on the other side of the screen.

A46: My first reaction when I see these cyber books is that I wish I'd get around to writing one myself! My second reaction is to look in the index and see if they mention me. A few of them are good, but many don't have much content. Some books about ideas are what I think of as "Stations of the Cross" books. The author travels around and talks to a bunch of experts, writes down what he or she thinks they said, and then strains for an epiphany, which is normally some very familiar received idea, written in italics. But I just finished reading through Margaret Wertheim's _The Pearly Gates of Cyberspace_, and it was terrific. She, for one, does have a clear, original, provocative idea. She talks about how the invention of perspective in the Renaissance gave people a mental tool for thinking of space as an undivided unity. She points out that once we had the idea of space, it was possible to develop physics. And this had the effect, says Wertheim, of crowding God and the angels out of our physical cosmos. She feels that in modern times we have begun to think of heaven as lying not in physical space but in cyberspace. As an example of this tendency she talks, for instance, about the science-fictional notion of uploading your mind into a computer, as in my _*Ware_ books. I recently gave a talk at the Public Netbase Project in Vienna in which I extended Wertheim's thesis a bit to come up with the following analogy.

Perspective is to Physical Space as Cyberspace is to Mental Space. My point is that hyperlinked web pages may serve as a good tool for creating models of how the human mind works. Both the Web and the human mind have a fractal quality; that is, if you start out to go from A to B, you tend to end up detouring into C, and then into D, E, and on beyond Z. Maybe I should write a cyber book about this idea! _The Dimensionality of Cyberspace._ Any editors out there reading this?

Austin, Texas, 7/20/1999

From: Tom Georgoulias <tmgeorgo@cwix.com>
For: Frontwheel Drive, www.rontwheeldrive.com
July 20, 1999

Q47: I've been reading your new nonfiction collection *Seek!*, and I'd like to start with some computer science questions for you. You write about simulated evolution to develop machines that are as intelligent as their creators, yet today's AI research seems farther from reaching the goal of intelligent machines than ever. What do you see as the missing link necessary to bring AI research up to speed with your visions of intelligent machines?

A47: There's a tendency to think that maybe if we can just throw enough hardware at the AI problem, then evolution can take care of the rest. Certainly that's how God went about making us. We evolved inside a planetary-sized round-the-clock simulation over maybe a billion years.

The catch is that there is such a great disparity between a desktop computer and a billion-year planetary analog computation. Even with the biggest imaginable kinds of increases in our computing power, our machines will remain very tiny playpens.

So rather than relying on blind evolution to build our intelligent programs we get into trying to tweak the process. That's what traditional AI is all about, trying to find little top-down tricks to make a program behave more intelligently. But even in this kind of context, there are scads of program parameters that you don't really know the best values for, and this is where simulated evolution can help you.

Another point worth mentioning is that the stuff we are made of has been evolving all along as well. New kinds of organic molecules emerged, for instance. This is analogous to the fact that we are still feeling around for the best kinds of computer architectures, operating systems, and evolution frameworks. The evolution of robots is really happening at a number of levels. And it's not clear that we've really found the best kind of system to try and evolve a mind on top of. Neural nets, cellular automata, a soup of LISP strings --- we don't know. We just have to keep trying.

One final, encouraging, thought is that, as our machines become networked into a planetary Web, the collective power of our machines can

experience some synergetic increases. Evolution takes a lot of machine cycles, and when we can distribute this kind of search to lots of users, we get a terrific speedup. The trick here is getting people to run your simulation code. In my novel The *Hacker and the Ants*, the evolution code was a kind of virus that took over the chips in everyone's TV sets. What if every time someone hit a particularly juicy porno site, their machine became co-opted into working on evolving intelligent software?

Q48: In your writings about cellular automata (CA), you mention how parallel processing hardware is best suited for running CA simulations. There are many supercomputers designed with parallel architectures, but for the most part engineers keep cranking out more powerful computers based on the von Neumann architecture. What are the final challenges left in designing parallel systems and how can they be overcome so that CA programs can advance even further?

A48: Well, I too wonder what ever happened to the dream of parallel computing. About twenty years ago, the Connection Machine was supposed to be the big new paradigm, but before long they bagged it and got into making standard architecture workstations. I've never had a chance to do anything with parallel hardware. I have of course written a lot of CA code; usually the first thing you do is to set up a dual buffer system so that you can simulate the parallel updates of the arrays. And when you think about a CA rule itself, you are indeed thinking in terms of a parallel computation. If CAs ever found a really killer app, then the industry would be motivated to make parallel hardware to run them. Not that there isn't any such hardware at all, Xilinx of San Jose, for instance, makes some a field programmable gate arrays (FPGA) that are supposed to be good for running CAs. I recently read that a man named Hugo de Garis at Advanced Telecommunications Research (ATR) in Kyoto is trying to use them to evolve an intelligent robot cat called Robokoneko. We'll see what happens. A lot of times projects like this run into the wall of how much runtime it would take to actually evolve something truly interesting. The search spaces are just so superexponentially big. In any case, I've never tried using a FPGA myself. There's kind of a limit to how many new operating systems and hardware configurations you're willing to learn in one lifetime, and I'm getting awfully close to maxxed out.

Q49: The use of computers and programs like Mathematica have rapidly advanced the field of mathematics over the last 20 years, bringing topics such as complexity, chaos, and CA to the front lines. What are some of the newer areas of research in math that have sparked your interest?

A49. My favorites are chaos, fractals, cellular automata, artificial life, and higher dimensions. Anything gnarly. I love that computer science has made mathematics into something like an experimental science. I was never all that good at proving things, but I love doing computer experiments. Makes me feel competent. These days I'm wasting most of my time writing a book with the working title *Live Windows: Games and Graphics with Visual C++ and MFC*. I'd sort of like to just call it *How to Write Cool Windows Programs*, but Bill Gates has sort of uncooled the word "cool," hasn't he? In fact whenever I write a novel, I do a search on the text when I'm done to make sure I didn't slip up and use the world "cool" in it anywhere. But here I am putting down Gates, and I'm writing a book using the Microsoft Foundation Classes (MFC)? Well, you gotta live in the real world. I want to see gnarly math things on my screen, and hopefully on lots of other people's screens, and the best way to get the things out there is with MFC. After awhile you even get to like it. Kind of a Patty Hearst/Stockholm Syndrome thing, where prisoners get to be fond of their jailers. What the hey, MFC is where it's at. I just hope to God it doesn't fucking disappear before I finish my book.

Q50. Now tell me something about your other new book, *Saucer Wisdom*. Is it a novel?

A50: *Saucer Wisdom* is a cross between a transreal novel and a popular science book of speculations about the future. It's my personal contribution to Millennium madness.

Saucer Wisdom arose from three interests of mine. First of all, I have a lot of ideas about the course of future technology, and wanted to write a book about that. Secondly, I'm very dissatisfied with people's current ways of thinking about UFOs, and I thought it would be worthwhile to write a novel which treats them in a more interesting and amusing fashion. Thirdly, I like to write somewhat autobiographical books that give transreal representations of various periods of my life.

So *Saucer Wisdom* features a main character named "Rudy Rucker." Rudy is approached by a man named Frank Shook who's been frequently abducted by flying saucers. But rather than giving Frank Shook medical exams and lecturing him on world peace, the aliens have been showing Frank all sorts of things about our future. Frank gets Rudy to help work his notes up into a book, a book named *Saucer Wisdom*.

The main areas of future technology described in the book are Communication, Biotechnology, Femtotechnology, and Transhumanity. The material is presented in terms of stories about things that Frank and the aliens looked at. And I enhanced the text with fifty-seven line drawings (supposedly by Frank Shook.)

You might well wonder what "femtotechnology" is. This will be the science of transforming one kind of matter into another; for instance,

of making air into gold or chicken soup. One of my motivations in writing any kind of science book is always to develop new things to use in my science fiction, so you can expect to see femtotechnology turning up in my forthcoming SF novel *Realware* (Avon, 2000).

Frank's stories are a grab-bag of sketches and vignettes of little episodes from our future. And overarching these tales is the story of Frank and Rudy's interactions, which are none too serene. At one point Frank breaks into Rudy's house and disappears for two years. Frank and Rudy have their final meeting at . . . where else but the same Devil's Tower made famous by *Close Encounters of the Third Kind*. And after this meeting, Rudy has a dream in which he finally gains true Saucer Wisdom. Check it out.

New York, 5/22/2001

From: "Michael Tritter" <mtritter@interport.net>
For: Web Site to Promote the Movie AI. www.aimovie.com

Q51: We're positing that, at some point in the future, man will have created robots which are indistinguishable from you or me, and they'll be capable of loving their creators. Do you think that you would be able to love the robots in return, as you would a child?

A51: [Note, my original answer, as printed here, was deemed a little too mocking, and I edited it down for it's actual appearance on the *AI* promo site.]

This feels like an odd question to be answering. It's like I'm being set up to try and guess the plot of the *AI* movie your web site is promoting. There's an odor of Hollywood hokum coming off your use of the world "love" in this context. "Love" as in an ad for safe cars, for instance, or for life-insurance and family-style dining? The subtext of your question suggests that children are comparable to valued possessions. Is there a subliminal message that buying things might in some way be as rewarding as carrying out the ancient and divine imperative to physically give life to new human beings? To acquire machines instead of having children? And you're talking about "love?" You're talking about S.U.V.s, my friend, about oversize attack dogs and monster homes, about P.A. systems turned up too loud, about consumption and greed, about, in short, the zombified coast-to-coast Mall of the Amerikkkan dream.

Flame-mode off. "Can a person love a robot as much as a child?"

People fall in love with all sorts of things, so it's easy to imagine that they might love a robot. As it is, people love animal pets, and many even love their cars. So, sure people can love robots. But might a person love a robot as much as a child?

One's love for a flesh-and-blood child is a very strong kind of love, non-relative and effectively absolute in its intensity. This is no accident,

it's something wired into us by biology so that evolution will work. According to one way of looking at things, we are biomachines that our genes use for reproducing themselves. From this point of view there is nothing more precious than a child, which is not only filled with your own genes, but is also much younger than you and therefore likely to live longer. Children are the ticket to genetic survival. As such, their value is wholly incomparable to that of a robot.

Another thing that seems to make robots less valuable than children is that it seems very easy to copy a robot. If the robot using standard hardware, one would imagine that it's simple to make a hardware copy. And one might suppose that the robot's software is readily downloadable for back-ups. So if someone offers me a million dollars to kill my robot, why wouldn't I just buy a new body for, say, a hundred thousand dollars, hook up some kind of broadband cable to copy my old robot's software and parameter settings to the new robot body, and then cheerfully let the old robot get trashed. I'd have the new one, and it would presumably behave just the same as the one that just died.

Of course, I'd have to steel myself to the piteous screams of the old robot being immolated upon a mound, let's say, of free AOL CDs. But my Ed McMahon million would make up for it. Maybe the new robot would even help me through this little patch of grief, light-heartedly mocking the cries of its dying predecessor.

To make the proposed question have some bite, we'd have to suppose that there was some reason why you couldn't copy your robot. Maybe its architecture is biological or quantum-mechanical or in some other way so intricate that there is in fact no practical way to do a core-dump. In this case you might compare the robot to a laptop computer whose contents you haven't backed up, a laptop which, for whatever reason, has no ports of any kind, no web access, no Ethernet, no floppy disks, and so on. A valuable block of info that you can't copy.

To heighten the drama, suppose that your laptop holds your new screenplay for a savagely tear-jerking movie about a pet robot who's just like a real boy. You've put everything you've got into the script, it expresses the very core youniqueness of you. In addition, your laptop, which has a digital camera attached, has gigabytes of irreplaceable photos of things you find fascinating. Your financial records are on the laptop as well, your journal, the software you've been working on, the music you've been composing, all the most interesting products of your mind. A robot who's your collaborator might be comparable to such a laptop.

Imagine your terror, your horror if you were now required to install a new operating system on this laptop! OS X, say, or perhaps Windows XP or a new Java virtual machine. Your dear robot friend, your simulacrum, your other self doomed to be nibbled to death by cryptic bogosity, to die the death of a thousand incompatabilit

<Unrecoverable context error. Have a nice day.>

Paris, 6/16/2001

From: "Donatien Garnier" <d.garnier@futur-e-s.com>
For: The French magazine FUTUR(e)S.

Q52: Do you think that there is a spiritual dimension in the internet?

A52: There is a sense in which the Internet is a group mind of human society. The Internet consists of linked peer-to-peer nodes with no central controller (other than the "postmaster" Domain Name Server machines that lookup the routing for a given web address). This structure is reminiscent of the brain, which consists of linked neurons with no "boss" neuron. Does the Internet think? Maybe, after a fashion. It's a foolish and distractible as any human. The Internet is thinks a lot about money and sex.

Q53: You have been famous to be one of the first to mention the possibility of being dowloaded on the Internet. Is it still something you think about ?

A53: Please, Donatien, the correct word here is *uploaded*. You and I are down here, the Internet is up there. When we offer our data to the Net God, we elevate it and upload it. When we thankfully receive the benisons of the great Planetary Computer, we download data. Today, the only feasible way to upload my personality to the web is to write a lot of stuff and put it up there for others to get in the future. This method doesn't really need the Internet of course, it's the same process as book publication. As for actually getting the software, wetware, and hardware out of my brain and putting onto a computer, well, I don't think that's really going to happen anytime soon, and maybe never. Uploading oneself is a science fiction idea whose real function is symbolic. Like mythology, science fiction uses fatastic notions to represent archetypal human situations. To upload your mind is a symbol for writing a book, making a painting, recording a song, or even just getting someone to understand what you're talking about.

Q54: You are also famous to have spoken of cyber flesh. Could explain that concept to me ?

A54: I think you are referring to flickercladding, which is the flesh my soft robots (the moldies) are made of. Flickercladding is a computationally rich plastic with a grainy structure. Each grain acts as a processing unit that repeatedly takes in the states of its neighbors and then updates its own states. What makes this nicer than current-day computers is that the flickercladding is soft, not hard. One can readily suppose that

the plastic is actually a "piezoplastic" that can behave like a muscle, so that our flickercladding creature can crawl about. Unlike the uploading of human personalities, I think this is a technology which is actually going to come about within, I'd say, fifty years. First batteries will get soft --- right now batteries are one of the biggest things hanging up in robotics. Then wires will become plastic, the chips will become plastic, we'll get plastic muscles, and the whole thing will merge into a brilliantly colored slug oozing arond on the floor between your toes. Just don't let one crawl into your nose!

Rome, 1/25/2002

From: "Luigi Pachi" <luigi.pachi@unisys.com>
For: The Italian zine DELOS SF www.delos.fantascienza.com,

Q55: Let's talk about *Freeware*, which is about to appear from Urania books in Italy. This time we have to face a Virus that destroyed the Boppers, artificial being able to vie the Human being. What can you say more about this novel to our readers?

A55: *Freeware* is about robots made of soft plastic veined with mold and fungus like a very ripe Gorgonzola. They're called moldies.

The "Freeware" of the title is the information in the minds or souls of aliens who travel as energetic waves like radio waves or cosmic X-ray bursts. The waves carry the information that is the personality of the alien. In order to become manifest, one of these cosmic "chirps" needs a receiver. And the rich flesh of the moldies is, it so happens, just right for this.

Q56: Is it true that the Boppers is also the name of one of the CAD products you worked on in the past along with John Walker, met at the Hackers conference in 1987?

A56: Yes, that was a deliberate thing on my part, to give this early crude artificial life program of mine the same name as the robots I science-fictionally dream of evolving. The program boppers.exe was part of my book *Artificial Life Lab*, which was published by Waite Group Press, as Autodesk fired me before it was done. The program and book are available for free from my web page.

Q57: In *Freeware*, one of the main character is Randy Tucker, in love with an artificial being. His name sounds really similar to yours. Is it a case, or there is special reason in order to choose it?

A57: I once invented the name Randy Karl Tucker as an alias when a park ranger was asking me my name for bicycling in a forbidden

zone. It was a spontaneous thing, although obviously it's close to my own name.

In English "Randy" also means "wanting to have sex," which is appropriate for this character. Using his full name, with the middle name, is a thing that makes him sound Southern, sort of like a serial killer you might read about.

Note that Randy Karl is from Louisville, as am I. But in most important ways, he and I are different, I hasten to add.

Q58: What do you like most about *Freeware*?

A58: I think it's very visual and surreal, very spaced-out and trippy, loaded with funny extra little things. Like a Bosch or Bruegel painting.

Q59: In 1982 you won the very first edition of the PK Dick award with your novel *Software*. Critics underlined your role as a bridge between earlier innovation in the genre and the most recent experimentation. Do you agree with this view and do you think *Freeware* is part of this ongoing process as well? Or, instead, you picture yourself in a different manner, nowadays?

A59: Oh sure, my writing is absolutely at the cutting edge of what's possible to do in science-fiction. And it's not like a lot of younger writers are following along and doing the same thing as me. I'm still blazing new trails. The mass of science fiction is fairly unimaginative, safe, and unliterary. What I do see happening is a certain number of "straight" literary writers are starting to use science-fiction in their books and in this way are moving closer to what I do. But a "straight" writer who's not from the SF tradition will sometimes be unable to really make the science be hard and rocking.

Speaking of awards, I'd like to mention that I was in Rimini this year to get the Medal of the Italian Senate for my science-fiction writing. This was at a conference sponsored by the Pio Manzù Center. They compared me to Lewis Carroll, which is a different way to think about what I do.

Q60: About your novels, I know that *Software* was under option for 10 years from Phoenix Picture. Then I recently watched *The Sixth Day* and the central idea of taping someone's brain software loading it onto someone else seems coming out from your *Wetware*. Have you been involved in this Schwarzenegger movie, then?

A60: No, I was not consulted. I saw Schwarzenegger walk by once when I was at Phoenix Pictures in Hollywood trying to get them to keep the *Software* option alive. But Phoenix killed my option and

released *The Sixth Day*. I do feel that Phoenix ripped off some of my ideas. What really got me angry was that they went so far as to name the villain of *The Sixth Day* after me --- I think this might have been an unconscious act of confession. He's called Drucker = Dr. + Rucker. I guess I should sue them, but thinking about suing someone makes me bored and tired. So I keep putting it off.

Q61: SF can be very often the mirror of our reality. After the latest disaster in New York (I am just writing you after the new crash at Queens in NY), how do you think the entire SF community and the SF writers themselves will react to what's going on in the world?

A61: Certainly it makes you think. I prefer writing about basically sunny kinds of futures, and I don't even like to think of the world being enmeshed in endless terrorism and the filth of biological warfare. It's not the future I want to see, and it's not the future I want to write about. I think you will definitely see a wave of downbeat future terrorism books.

As for me, there are so many other things I'd rather think about. I resist having the hyenas and running dogs of the media dictate what I should or shouldn't be thinking about. I have only one life to write in, so why should I have my topics conform to the manias of political propaganda! Who's going to care about the Taliban in fifty years? We'll all be fighting other wars by then. We've always been fighting wars. War isn't a topic that interests me.

I'd rather write about love, about science, about ideas, about art, about creative programming, about the things that make life worth living and worth fighting over.

Q62: What is your view about this terrorist attacks, which strangely happened timely with the economic recession? Perhaps a great mathematician and SF writer like you has a personal theory/view about it...

A62: My impression is that the root cause of the terrorism has to do with demographic trends.

Doctrinaire religious zealots all over the world discourage birth control --- you see this in both Christianity and Islam. One of the reasons for this is, in my opinion, economic: any religion wants its adherents to have a lot of children so as to make new members of the religion. Perhaps the leaders don't even consciously realize this. But clearly there are better ways to honor life than to forbid contraception.

In a country like Italy, the women have enough economic power to simply ignore the strictures of the priests and to limit their reproduction rate. Given a choice, women tend not want to have a huge number of children.

But in less well-off countries such as the Arab nations, the women have little power, and no way to get around the religious injunctions to have a lot of children. In the Arab nations, something like half the population is under 20 years old. This makes a natural source of disaffected people prepared to die for terrorism. Young men tend not to really grasp their mortality, and to be more willing to cast their lives away.

A country that has some birth control and in which women have some power is a country unlikely to promote terrorism. Given these fairly obvious facts, it's a little unbelievable that, thanks the Fundamentalist Christian right-wing, the United States does so little to promote birth control world wide.

Q63: Any idea when *Realware* will appear in Italy? I've read that it should be the last of the *Ware* series... Can you still confirm it?

A63 : I don't know if or when *Realware* will come out in Italy, you'd have to ask my Italian agent. I have sold a lot of books in Italy of late, so the chances seem good. For now, yes, *Realware* is the last of the *Wares*. It rounds things off nicely. In terms of my career it's also not a good idea to keep piling books onto one series, its better to make fresh new books. But if I live long enough it's likely I would do another Ware some day. I do love that universe and the characters in it.

Speaking of Italian publication, I don't know if you are your readers will all be aware of a small book of my non-fiction writings called *Filosopho cyberpunk* (Di Renzo Editore, 2000). This book exists only in Italian, and has a cover painted by me.

Q64: Can you say something about *Spaceland*, your novel which should be published in the US in 2002?

A64: It comes out from Tor in June, 2002. You can read an excerpt of it online at www.infinitematrix.net

Spaceland is about a Silicon Valley manager who travels into the fourth dimension. It's somewhat comic. The title refers to the classic novel by Edwin Abbott, *Flatland*.

My non-SF novel *As Above So Below: A Novel of Peter Bruegel* will come out from Tor books in Fall, 2002.

And my textbook *Software Engineering and Computer Games* will be published by Pearson Educational in Summer, 2002.

Q65: Are you working at a new novel right now? Can you anticipate anything about it? Plan for the future?

A65: I'm working on a novel set in the year 3000 called *Frek and the Elixir*. It's about a world that's been ruined by biotechnology and a young boy's quest for an "elixir" to restore Gaia.

Q66: Will the war against Taliban will be in a certain way speculatively reflected in one of your future SF stories?

A66: I really think that chasing the news is a stupid way to write science fiction. And, as I mentioned above, I prefer not to magnify this kind of thing by writing about it.

If I did for some reason write about the Taliban, certainly I wouldn't want to write any militaristic gung-ho Sylvester Stallone kind of thing. When you see photos of Afghanistan, the heart fills with sympathy and pity. It would be reasonable to include the viewpoint of someone on the "bad" side, that is, the point of view of a young Taliban enlistee.

On the other hand, I've visited the Ground Zero in New York last month, and being there filled me with a much greater sadness than any photo could cause. And the victims there are my own people, I can so easily imagine their lives. So the story would need to include the viewpoint of a terrorist victim. Maybe to make it science fictional you could try fusing the minds of the terrorist and the victim. But that might be too simple, too cheap. The whole situation is so unutterably sad.

Another way to go about it would be to transfer it to an alien world. Sometimes there are things about our own world that we don't allow ourselves to see, but which we can see when we cast it into a fable about aliens. But this, again, might be too cheap. It's all such a bummer, that the little tricks of genre science-fiction seem unequal to the task.

Isn't science-fiction supposed to be escape literature? Maybe expecting SF to express true tragedy is to ask a butterfly to pull a hearse. I'm in no rush to try.

Q67: Finally, can you tell us which SF author, from the new generation, we should keep an eye on, as far as your opinion is concerned. Any titles to underline, in particular?

A67: Writers --- at least writers like me --- aren't good people to ask about other writers' work. We're too self-centered and too envious of the success of others. I can never give an objective, disinterested answer to a question like this. And, frankly, I don't read much other science fiction as it never seems to measure up to the impossibly high standards of being as good as mine! Among slightly younger writers, I like Marc Laidlaw's work a lot.

Mayville, North Dakota 4/5/2002

From: "Mitzi Brunsdale" <Mitzi_Brunsdale@mail.masu.nodak.edu>

For: *Publisher's Weekly*

Q68: How did you get interested in science fiction?

A68: I love science-fiction's wild play of ideas. And I've always enjoyed the home-grown, colloquial style of science fiction. It's an art form as indigenously American as rock and roll.

Q69: Your new book *Spaceland* is a kind of homage to Edwin Abbott's *Flatland*. What made you decide to do that?

A69: I first read Abbott's *Flatland* as a teenager, and I never really got over it. The book is a tale --- not really a novel --- about a two dimensional character called A Square and about his difficulties in understanding the third dimension. Our situation is similar: we're three dimensional creatures trying to understand the fourth dimension. The idea is that we can form useful analogies between A Square and ourselves. Four is to three as three is to two.

Thanks to Abbott, I ended up writing two non-fiction books about the fourth dimension. And now I thought it would be interesting to make the fourth dimension work in a realistic novel. I call my main character Joe Cube. In *Spaceland*, I was particularly interested in working out how things would look if I could travel out into the fourth dimension. Nobody's ever pushed that notion very far before.

Q70: How do you envision the typical reader of today's science fiction?

A70: Freaks, geeks, and students. My people. In *Spaceland* I'm trying to reach a bit beyond the confines of the genre. Joe Cube has a believable emotional life and some painful romance problems with his wife. The book is set in contemporary Silicon Valley.

Q71: What authors have influenced you most?

A71: Robert Sheckley, Philip K. Dick, John Updike, Jorge Luis Borges, Thomas Pynchon and David Foster Wallace.

Q72: Does the average person have the proper background to understand *Spaceland*?

A72: It's meant to be fun and easy. But a disconcertingly large number of people don't want to touch a book that bears the taint of science fiction. What if we were to call *Spaceland* a futuristic novel of ideas rather than calling it SF? A work of techno-magical realism? A fabulation?

Q73: Could you put in layman's terms the mathematical notions you're working with in *Spaceland*?

A73: I don't use "fourth dimension" to mean "time," I use it to mean an unseen direction that you might possibly learn to travel in. The idea is that our universe is embedded in a much larger four-dimensional space that contains two competing races of four-dimensional beings. They're a bit like angels and devils, but it's not quite clear who are the good guys.

Q74: *Spaceland* has some very funny satirical elements. What are the targets of your satire and why?

A74: I live and work in San Jose, California, the very heart of Silicon Valley. It's been a great opportunity for me as a writer: imagine if William Blake had worked in a textile mill. *Spaceland* has a lot of humor at the expense of the dot commers. I don't think it's giving away too much of the plot if I mention that cell phones very nearly destroy our universe.

Q75: What did you enjoy about writing *Spaceland*?

A75: I liked writing from the point of view of a character, Joe Cube, who's non-technical and somewhat clueless. A middle manager. I came to sympathize with him a lot.

Q76: Do you have a pet peeve about today's science fiction market?

A76: For sanity's sake, I can't pay too much attention to the ebb and flow of the market. It's been in crisis every since I started, nearly thirty years ago. You need your own compass if you're going to have an extended career as a professional writer. I just wish I could have all twelve of my SF novels in print at the same time, in a nice uniform edition like the works of Philip K. Dick.

Q77: What directions do you see science fiction taking in the next ten years?

A77: I think we'll see more and more overlap between the mainstream and the SF markets. It's already quite common for mainstream writers to treat SF themes in "futuristic" novels. And there's a lot of SF writers bent upon making their work more literary. Some writers use the phrase "slipstream" for the merger between SF and literature.

Strictly on the SF side, it seems like it's about time for a new literary movement within science fiction. SF was born in the Forties. In the Sixties, the excitement had died down, but then the British-inspired

New Wave movement perked things up. In the Eighties, SF had gone stale again, and the cyberpunk SF movement brought life back into the field. Perhaps the Zeroes will bring some new Young Turks.

Q78: What do you consider your strengths as a science fiction author?

A78: I know a lot about science, I have a sense of humor, and I write in a literary fashion. I take a lot of trouble in crafting my books at every scale: I try to pick or invent good words, to make lively believable dialog, to create vivid and visually striking scenes, and to get a nice archetypal flow to the plot.

Q79: Which is your favorite among your science fiction novels, and why?

A79: I always like my latest book the best. It would be depressing not to think I'm still getting better. So I like *Spaceland* the best. It was easier to write than some of my books, it was something I was totally ready to do. It practically wrote itself. I think I got the love interest working better in this one than ever before. And the four dimensional stuff is really wild. It's shows some things I've always wanted to read about, and I ended up having to write it myself.

Q80: Is there advice you might offer to young science/math buffs who want to write science fiction?

A80: For a beginning writer, I recommend using an approach I call "transrealism." This means writing SF about yourself, your friends, and your immediate surroundings --- transmuted in some science fictional way. Using real life as a model gives your work a certain literary quality, and it prevents you from falling into the use of boring clichés. Whatever you do, don't model your SF on the crud you see in movies or on TV. Model your SF on reality, not on studio hack stuff. Sometimes people think that because SF is genre literature, they can write it in a condescending style and not try very hard. Wrong. You never succeed in any kind of literature unless you are writing with everything you've got, with every fiber of your being. I have a few more tips on my web site www.rudyrucker.com.

Austin, Texas, 6/20/2002

From: Tom Georgoulias <tomg@io.com>
For: Frontwheel Drive, www.frontwheeldrive.com
June 20, 2002

Q81: What kinds of gnarly computer research (Cellular Automata, fractals, A-Life, etc.) are you actively doing these days?

A81: I'm about ready to lay down my programming tools. I pretty much shot my wad creating the Pop game framework for my textbook *Software Engineering and Computer Games*. http://www.mathcs.sjsu.edu/faculty/rucker/videogameprojects.htm I did more programming on that than I've ever done. Writing science fiction is a lot more fun. You want a frammistat in SF, then all you have to do is describe it once, and if there's a problem with it later on, you just go back and change a few words. Quick revision cycles! The "building a cathedral out of toothpicks" aspect of programming does get old.

At SJSU I'm teaching more graduate courses now and advising more Master's degree theses. http://www.mathcs.sjsu.edu/faculty/rucker/msprojects.htm This means I can try to get students to do the programming work for things I'd like to see. One interesting project I have right now, is that a student named Wyley Dai is extending my Pop game framework to use four space dimensions. He has a four-dimensional Space Invaders working pretty well, and I hope he can get a four-dimensional Pacman. One of these days I want to get a student to add cellular automata to the Pop framework, so we can have surfing on a CA wave. I'd like to see chaos in a game context as well.

Maybe I'll give a talk on some of these notions at the Game Developer's Conference in San Jose next spring. That's my favorite conference these days.

Q82: Now that Stephen Wolfram has released his long awaited book, *A New Kind of Science*, which focuses on complexity and cellular automata, what do you think the net effect of the book is going to be on the CA field?

A82: It should be a real shot in the arm. I was considering writing a jump-on-the-bandwagon book along the lines of *What Wolfram Said*. But I found out it's already too late for that. Which is kind of a relief. All I really want to do these days is write science fiction. As for CAs, I'll just settle for being one of the lesser-known "stations of the cross" for CA popularizers' Sacred Quest.

I read Wolfram's book through once, quickly, and I like it a lot. Many of the ideas are familiar to me from things he said back in the 1980s. But he pushes them a bit further, and he's really done the legwork in terms of checking out examples. I'm (very slowly) working on a longish, detailed review of the book for the Bulletin of the American Mathematical Society , and I hope to use the book as a text in a course I teach at SJSU in Spring, 2003.

To rush and say much more now would be premature. John Updike once compared critics to "pigs at a pastry cart." Here's this mammoth volume that took a genius ten or twenty years to write, and people want to rush out quick-draw sound bites on it? "Gobble, gobble, tastes like prune!"

Q83: Your computer science textbook *Software Engineering and Computer Games* is coming out from Addison Wesley this fall. Are video games a good way to teach computer science?

A83: IMHO, having students do computer games projects is absolutely *the best possible way* to teach programming, graphics, software engineering, object oriented programming, etc.

I used to be into photography, and I managed to get hold of this very nice camera, a Leica M4. And I was constantly shooting pictures with it. And then I wanted another lens, and I went to a store that carried Leica stuff, and I found out that a lot of people were into *collecting* Leicas, like keeping them in glass cases. To me, a camera is for taking pictures. And a programming tool like Visual Studio or the JDK is for writing programs. Not for collecting different versions of, or for arguing about, or for comparing to other products. It's there to *use*. Writing a game is a nice big problem that makes you program a lot.

To take pictures, you need to have something you like taking pictures of. To learn how to write, you need to have something you want to write about. And to learn programming, you need something you want to program about.

It's very easy for a student to get excited about making a game work.

A second win with teaching games programming is that the homework is very easy to grade. The game works or it doesn't; it's playable or it isn't.

I've been teaching my sections of the Software Engineering course at SJSU this way for about ten years. Over the years I built up the Pop framework so that students can build on it to make games pretty easily. I'm proud of the code, it's been used for about a hundred games now. I have some of the better ones up for download. http://www.mathcs.sjsu.edu/faculty/rucker/computergames/halloffame.htm

The Pop framework is thoroughly OO, basically you just edit one file to overload a few methods and you've got your game: Pacman, Asteroids, 3D Defender, Airhockey, Soccer, whatever. I used patterns and UML to try and get the design right. Graphically, I designed it so you can run the game inside a Windows window, instead of taking over the whole screen (which I've always considered to be morally wrong!). You can either use Windows graphics or OpenGL; switching between them is a nice example of using the Bridge pattern. It's all in the book. I don't

think I'll ever write a textbook again, though, it's been an insane amount of effort. I do hope the book sells well.

Q84: I just finished reading *Spaceland*, your latest science fiction novel, about a Silicon Valley manager who is invited into the fourth dimension. Not only does the book nail the climate of the dot com boom, the fourth dimension experience is described extremely well and the story is funny to boot. What prompted or influenced you to write *Spaceland*?

A84: The book is inspired by Edwin Abbott's 1884 book, *Flatland*. That book is a tale --- not really a novel --- about a two dimensional character called A Square and about his difficulties in understanding the third dimension. Our situation is similar: we're three dimensional creatures trying to understand the fourth dimension. The idea is that we can form useful analogies between A Square and ourselves. Four is to three as three is to two.

Thanks to Abbott, I ended up writing two non-fiction books about the fourth dimension. And now I thought it would be interesting to make the fourth dimension work in a realistic novel. I call my main character Joe Cube. In *Spaceland*, I was particularly interested in working out how things would look if I could travel out into the fourth dimension. Nobody's ever pushed that notion very far before.

Flatland is set on December 31, 1999. A Sphere from the higher (third) dimension appears, passing through Flatland. So when that day rolled around in reality, I wanted to have something amazing like that happen, I wanted a 4D creature to enter our world. That's the Y2K event I was really waiting for, and since it didn't happen in fact, I wrote it into reality.

Another thing I wanted to do in *Spaceland* was to depict my native Silicon Valley, kind of like the way I did in *The Hacker and the Ants*. So far Spaceland seems to be doing pretty well. Just for fun I went ahead and posted my working notes for it on my page for the book. http://www.mathcs.sjsu.edu/faculty/rucker/spaceland.htm

The Hacker and the Ants will be reissued by Four Walls Eight Windows this winter, by the way, complete with a cover by my daughter Georgia's New York design company, www.pinkdesign.inc.

Q85: Was *Realware* really the final **Ware* book, or can we fans begin quietly speculating on the fifth installment?

A85: Hey, a series is never over till the author dies, and even then it might not be over. I'm as curious as you are about what happens to Cobb Anderson after he leaves Earth in that flying saucer.

But, remember, there were nine years between *Wetware* and *Freeware*, so I'm not severely due for another **Ware* till 2009. And maybe by then the market for a book of that nature will be stronger.

And, no, I'm not telling anyone yet what I would call it. Jinx, you know. Make up all the silly Ware names you like, but you won't get the True Name out of me. Vaporware, Shovelware, Stoneware, Silverware, Underware, Earthenware, Senileware, Noware --- I've heard 'em all.

In the near term, I don't plan a sequel partly for reasons having to do with the publishing industry.

Harper Collins, owner of Avon, the publisher of the **Ware* books, was bought by a megacorporation called News Corporation, which is the creation, I believe, of Rupert Murdoch. If you're an author, over the years you find yourself being "bought and sold" a countless number of times. A mid-list author like me isn't exactly the juiciest part of any acquisition; I'm more like a piece of chewing-gum stuck to the bottom of a shoe, something you pick up by accident. The News Corporation is bottom-line-oriented, and I'm not viewed as a strong enough profit-generator. My books earn out, and then some, but I'm no Stephen King.

This means that Avon has been quite resistant to books by me of late; they turned down *Saucer Wisdom*, *Spaceland*, and my forthcoming *As Above, So Below*. All of these were picked up by Tor Books, whom I now consider my primary fiction publisher.

Another bad sign from Avon is that they may be letting my **Ware* books go out of print. I know *Wetware* is out of print, for instance. I find this especially galling, as a guy called Craig Nova recently published an SF novel called *Wetware* that in fact treats my pet themes. (Nova's publisher is owned by the Bertelsmann AG megacorporation, which seems to independent of the News Corporation, so I can't get totally shrill and paranoid here.)

In short, my problem with writing another **Ware* in the next few years would be that I'm not at all sure Avon would want buy another **Ware* just now, and I don't know if Tor would want to publish an "orphaned" series book. And they might both be right. When you drag a series on too long, I think the readership can drop.

Sooner or later, a movie of one of the **Ware* books may get made. And then it would certainly be easy for me to sell another sequel, assuming I'm still alive.

On the film front, Phoenix Pictures had an option on *Software* for about ten years, but that died. I was annoyed when Phoenix turned around and then released a Schwarzenegger movie, *The Sixth Day*, using some of my themes, complete with a yuppie mad scientist called Drucker (as in "Dr. Rucker")! But I'd rather not rant about that.

Even as I type this interview, I'm inking a nice option agreement for *Freeware* with a Seattle outfit called Directed Evolution Networks.

A Brooklyn-based director named Mark Mitchell just optioned *Master of Space and Time* as well.

Hope springs eternal in the human breast.

Q86: Spirituality is on the rise in your later works, while mysticism was more a focus in the earlier stuff. Is this new found relationship with God closely tied with your sobriety, or just another step in the evolution of your religious leanings?

A86: God, that's a minefield of questions.

Yeah, man, I'm a reformed alkie lay-preacher standing waist deep in a river hollering, "Ask God for help and you'll get it!" Veins standing out in my forehead, eyes popping from my head.

Not. Never fear, I'm not going to get all born-again or flakognostic on you.

I'm an Episcopalian; my father was an Episcopal priest. Since my twenties I've been a mystic as well, someone who believes the Universe is One, the One is Unknowable, and the One is right here. An additional belief that I tacked on when I turned fifty is that you can actually ask the One for help. That's a standard teaching of ordinary religion, of course, but I'd never much tried it before.

It's been my experience that, for whatever reason, asking for help seems to work. I get the help right away, not for things like winning a lottery, but for things like staying sober, being kinder, and feeling less uptight. Maybe there really isn't a God, maybe asking for help just sets off some neurochemical process in my head. Whatever; for me it works.

Some of this experience seeps into my books, but it's not something I would want to make central. I'm well aware that, for very many people, any hint of religion is a turn-off. A science fiction novel is supposed to be entertainment, not a textbook or tract.

Q87: Is there any other projects or novels underway that you want mention before we wrap this up?

A87: I've written a historical novel about the sixteenth-century Flemish painter Peter Bruegel. It's called *As Above, So Below*, and it's coming from Tor Books this fall. I think it's a masterpiece. No SF, though, I didn't want to drag this one in the gutter!

Bruegel has always fascinated me. His early paintings of Hell are somewhat science-fictional, his later paintings of peasants are wonderfully real. He often includes something vulgar, such as someone taking a dump. None of his works ever hung in churches. His landscapes show a profound sense of the cosmic divinity inherent in the world. His technical mastery is fabulous. He's deep and funny. He's one of my main men. His life isn't very well documented, so I got to make up a lot. I used reverse transrealism to deduce his life from his paintings. I'd like to write like Bruegel paints.

Currently I'm working on a longish SF novel with working title *Frek and the Elixir*. It'll take me maybe another year to finish writing it.

It's an epic, light-hearted SF novel of biotechnology, suitable for young and old. I imagine flap copy something like the following:

"The year is 3003 and the tweaked plants and animals are quite wonderful --- but there's only a few dozen species left. Nature herself has been McDonalds-ized. It's up to Frek Huggins, a lad from dull, sleepy Middleville, to venture out into the galaxy to fetch an elixir to restore Earth's biosphere. At least that's what a friendly alien cuttlefish tells him the elixir will do. But can you really trust aliens?"

For that matter, can you trust me?

Madrid, 8/27/2002

From: Giulio Prisco <giulio@prisco.info>
For: Transhumanity Magazine, www.transhumanism.com
August 27, 2002

Q88: You have called your literary style "transrealism". How would you define that?

A88: Broadly speaking, transrealism is writing about your immediate perceptions in a fantastic way. Working day to day reality into your SFictional constructions. I sometimes call it a "magpie approach." You snatch up the shiny --- or stinky --- things you see and work them into your nest.

Q89: Is the Jena character of *Spaceland* a former girlfriend?

A89: No. In some of my transreal SF novels I do in fact model the characters on people I know. But in *Spaceland* I invented the characters from whole cloth. I guess they're inspired of any number of people I've casually seen around Silicon Valley. I write a lot in my local coffee shop, the Los Gatos Coffee Roasting, which is good for people-watching.

Q90: Both the uvvy in the **Ware* novels and the mophone in *Spaceland* work as part of a non-hierarchical, distributed P2P network without central servers. In *Spaceland* this network approach saves the company even after giving up the "magic" 4D phones. Could you explain the concept in more details, and are you aware of any real-world implementation?

A90: Astute of you to notice this. It's kind of a pet idea of mine. My idea is that instead of going off to some central server antenna, your cell phone signal need go only as far as the next closest cell phone, and that it can then hopscotch onwards from there. It's a little like the way a packet makes its way across the Internet, but with the smarts pushed all

the way down, so that there aren't even any high-level routers. Each individual unit acts as a router. This would assume a goodly amount of processing power in the individual phones.

Unless I'm mistaken, something like this approach was used by the now-defunct Ricochet. Around San Francisco, you can still see Ricochet repeaters mounted on many lampposts and utility poles. As I understand it, the purpose of the repeaters was to pick up the weak signals from any nearby cell phone, and amplify the signals, hoping to hit another Ricochet cell phone nearby.

My son Rudy Jr. and I are in fact working on a science fiction story called "Jenna and Me" which involves Jenna Bush and those slightly sinister repeaters.

Q91: In the "Spaceland Notes" posted on your website, you mention that one editor rejected *Spaceland*. So also established writers get rejections sometimes? What would be your advice to a beginning SF writer?

A91: Selling a book or story has never become absolutely automatic for me. I'm eternally about one editor away from being unpublishable. Thank God for enlightened minds like David Hartwell of Tor, who bought my last three novels.

The hard fact is that not everyone does get published. Advice to beginning SF writers? Write a lot, finish what you write, and when it's done, keep sending it out for quite awhile. Heinlein had a famous dictum like "Leave your material on the market till it sells," and there's a lot to that. I never give up. If all else fails, there's always print or web zines.

Q92: I recommend reading *Infinity and the Mind* for an explanation of Gödel's incompleteness theorem. But for readers who can't wait, what does it say and mean in one sentence?

A92: Suppose that M is a formalized set of axioms incorporating our mathematical knowledge. If (a) M is clearly defined enough so that we can easily tell which sentences A are indeed axioms of M and (b) M doesn't embody any internal contradictions, then (c) there will be some sentences A which we can't prove or disprove from the axioms of M and (d) we will in fact be unable to prove the (true) fact that M embodies no contradictions.

Q93: In *Infinity and the Mind* you recall your meetings with Kurt Gödel. Did he ever say anything on the implications of the incompleteness theorem for machine intelligence?

A93: I discuss this matter in some detail in *Infinity and the Mind*. As I understood him, Gödel said that his theorems prove that you can't in

fact specify a formal system whose power is equal to your mind. [Because, if you "know" your mind to be consistent, then when you write down a system M to represent your mind, you "know" that, being like your presumably consistent mind, M embodies no contradictions, but this fact is, by (d) above, something that M can't prove, which then means that you therefore "know" something M can't prove, which in turn implies that system M is weaker than you, so M isn't equivalent to you after all.]

But, added Gödel, there was no reason why we couldn't set up an environment in which robotic minds as good as ours might *evolve*. This teaching was in fact one of the main and immediate inspirations for my novel *Software* which, as well as being an early example of cyberpunk, was a thought-experiment in the philosophy of mathematics. "Y'all ever ate any live brains?"

My detailed thoughts all this can be found in the seldom-read "A Technical Note on Man-Machine Equivalence" at the end of *Infinity and the Mind*.

It's worth mentioning that in his posthumously published papers, Gödel seems to take a slightly different slant on what I'd thought he said. I'm in fact planning to reconsider the matter this fall, working with some philosophers at the University of Leuwen near Brussels.

Q94: What do you think of the notion that that consciousness might require quantum effects?

A94: My physicist friend Nick Herbert has developed a highly original theory which he describes in his essay, "Holistic Physics --- or --- An Introduction to Quantum Tantra," online at http://www.southerncrossreview.org/16/herbert.essay.htm.

Nick feels that the brain has a quantum system within it, and this system is the locus of our consciousness. Quantum systems can evolve in two fashions: (I) in a series of discrete Newtonian-style wave-collapses brought on by repeated observations or (II) in a smooth many-universes-style evolution of state according to Schrödinger's Wave Equation. The communicable, standard conscious content is all of type I, and this is the kind of thing we try and mimic with our neural nets that hopefully can be trained or evolved to display emergent intelligence. But Nick points out that type II is closer to how much of our inner mental experience feels. That is, upon introspection, one's consciousness feels smooth and analog, like the evolution of wave upon a drumhead or a lake, let us say.

Nick says that it will require a "new physics" (or perhaps it would be better to say "new psychology") to specify the details of the correspondence between mental phenomena and quantum states.

As a confirmed hylozoist (believer in the thesis that objects are alive), Nick also proposes that the type II consciousness can be found in every physical system, insofar as every system in fact has its own wave state.

He also proposes that one should be able to couple one's own state to the state of another person (or even to the state of another object), and thus attain a unique relationship that he terms "rapprochement." A caveat here is that the link between the two systems should not be of a kind that can leave memory traces, otherwise the link is functioning as an observation that collapses the quantum states of the systems, reducing the consciousness to type I. He speaks of a non-collapsing connection as an "oblivious link."

If you don't remember anything about your rapprochement with someone or something, can it be said to have affected you at all? Oh yes. Your wave state will indeed have changed from the interaction, and when you later go and "observe" your mental state (e.g. by asking yourself questions about what you believe), you will obtain a different probability spectrum of outputs than you would have before the rapprochement.

I love this idea, and it may well find its way into one or more of my works.

Q95: As the co-author of the popular Cellular Automata (CA) software simulator Cell Lab: what do you think of Wolfram's recent book *A New Kind of Science*? Do you agree the bottom layer of reality might be something like a CA?

A95: The notion of "a world made of simple computations" has been around for awhile. It could be that misses something essential that Nick expresses in his notion of type II consciousness. Being conscious and alive in the real world certainly doesn't *feel* like being an emergent will-o-the-wisp ball of marsh gas dancing upon a sea of churning neural net computations. What of the One, what of God Consciousness, what of the great Undivided Divinity within all of us?

In any case, *A New Kind of Science* is a wonderful book, and I'm still absorbing its teachings. The newer idea in the book that I find truly fascinating is Wolfram's *Principle of Computational Equivalence*, which seems to posit, loosely speaking, that a leaf shaking in the wind has all the same richness of inner experience as you or me. I'm going to spending a lot of time this fall trying to really understand this new idea.

Q96: Please give us a comment on the recent case involving the freezing of the corpse of baseball player Ted Williams. What do you think of cryonics in general?

A96: Well, I've been friends with the cryonicist Charles Platt for about twenty years so I've grown a little jaded about this. So I'll go ahead and give you a somewhat obnoxious answer along the lines of what I might say to Charles.

I'd much rather rot in the ground. What's the big problem with dying anyway? I mean, what's so frigging special about my one particular

mind? I don't want to be God, I want to be a human with my spark of God Consciousness. Think of a field of daisies: they bloom, they wither, and in the spring they grow again. Who wants to see the same stupid daisy year after year, especially with a bunch of crappy iron-lung-type equipment bolted to it? In my unhumble opinion, you can never really reach any serenity till you fully accept the fundamental fact of your mortality. It's the great Koan that life hands you: Hi, here you are, isn't this great, you're going to die. Deal with it.

This said, can cryonics work? I think dry nanotechnology is probably a dead-end. As I argue in *Saucer Wisdom*, wet nanotechnology, a.k.a. biotech, is where it's going to be at. In other words, if you want a new body five hundred years from now, the way to get one will be to have someone grow one from a clone based on a copy of your DNA, not by trying to retrofit your kilos of frozen meat. The hard part, of course, is replicating your mind --- and remember that you have somatic knowledge in your body as well as just in your brain. I have a feeling that copying a mind from one host to the next will require a totally new breakthrough, perhaps along the lines of Quantum Tantra.

One final jab at cryonics. We already have too many people, so why would any future society every put any significant energy into bringing back the dead? How much energy will the citizens of Year 3000 care to put into producing a brand new Ted Wiilliams? You can rant all you like about contracts and trust funds you set up, but God know it's a simple thing for crooks to screw a dead person out of his or her supposedly inviolate trust fund. Enron took down California for billions last spring, even with a seemingly living chief of state.

Q97: How do you explain the popularity of Luddite and anti-progress views? Perhaps the pro-progress camp does not make its point well enough?

A97: Unfortunately our nation, nay, our world, is run by evil morons. 'Twas ever thus, if that's any consolation. I've recently taken to reading Boswell's *Life of Johnson* in the morning instead of the paper. Why let the politicians' antics ruin each and every day? I do what I can to change things by thinking my own thoughts and writing my books.

Q98: How about distributing your books on the net for free? What if the bad guys scan/OCR them and distribute them on a P2P system? How can you stop them?

A98: You can in fact buy one of my books, *The Secret of Life*, as an electronic book at electricstory.com. At present, however, I don't think the Net is a very good medium for books, books should really be inexpensive lightweight paperbacks you can bang around. Electronic distribution is more of a fall-back strategy for putting out a book that isn't

deemed profitable enough to print. You hardly make any money publishing an electronic book.

There's a halfway strategy of print on demand (POD), whereby a distributor can quickly make up a paper copy of each book as it's ordered. Although I can imagine having some of my out-of-print books avaialable this way, I'm not doing it a present. It just doesn't seem worth the trouble. My impression is that people don't buy many POD books. I think you do a lot better if your book is sitting on the shelf in a bookstore and customers can just impulsively pick it up.

My current strategy for making my books available is just to try and convince publishers to put out standard reprint editions. Four Walls Eight Windows has been very good about getting some of my books back into print; my Silicon Valley classic The Hacker and the Ants will be out from them this fall.

Would I ever be willing to make, say, printable Acrobat files out of my books and post them for free download? Well, you know, I've been writing for twenty-five years, and I still have this dream of someday being able to quit my day job. Why would I start giving my books away for free? Aside from the financial considerations, giving away my work would effectively say that my work is junk, without value, not worth a cent.

Regarding your other questions, it's hard to believe anyone would go to the trouble of posting pirated editions of my books on the Net. Why? I'm not Microsoft or Metallica, not a monopoly, and not vastly overpaid. I'd like to think that anyone who's that interested in my work would be able to understand that I need to get some money for my writing to be able to continue writing more.

Not that it's at all a realistic possibility, if I were to learn of someone systematically pirating copies of my work in a big way, I would certainly want to do something about it. Legal sanctions would be the obvious route, and if that failed, I like to fantasize that some of my cryp, phreak, and hacker-type fans might do a frontier justice number on the pirate's electronic life.

Pinole, California 3/3/2003

From: "John Shirley" <taoshujs2@netscape.net>
For: The 2003 Readercon book

Q99: What are the three most important events of your life apart from your marriage and children?

A99: That's kind of an unrealistic question, like why important, why three, why should I tell you, etc. But, since you're a friend, I'll complete the exercise. How about these three.

(i) Having a vision on Memorial Day weekend in 1970, hearing God tell me He would always be there and would always love me, His voice close and warm inside my head.

(ii) Meeting Robert Sheckley in the 1980s and finding that my boyhood SF hero was a fellow human perfectly willing to be a friend, and learning that all along Sheckley's science-fiction had actually been about his real life, just like the way I wanted to write.

(iii) Going hiking in Yosemite in 1992 with my son in and realizing that the Universe is held together by Love.

It's all about God or Robert Sheckley...

Q100: What is seminal now?

A100: The last two years I've been writing an epic SF fantasy structured along the lines of the Monomyth stages in Campbell's *Hero with a Thousand Faces*. It's called *Frek and the Elixir*. The hero Frek is twelve and the book is set on a bio-collapsed Earth in 3003 --- there only about ten kinds of animals and plants left. Frek journeys to the center of our galaxy to get a kind of elixir to restore Earth's missing plants and animals.

I was working with a deeper breath in *Frek*, that is, I used longer chapters. With long chapters and fifteen monomyth stages, the novel came out to about 170,000 words, nearly twice as long as most of my others, which is what I wanted. I'd always wanted to write a long novel. I just wrote the last page of the first draft yesterday.

What I write next is totally up in the air. Lately I've been thinking a lot about how to move to a higher level of commercial success. It would be nice to get enough royalties to retire from teaching. I do realize that commercial concerns can become a will 'o the wisp, a distraction. There's no cosmic reason why I necessarily "deserve" the big bucks. I would do well to be content with the level that I've achieved. But still...

I'd dreamed that my historical Peter Bruegel novel *As Above, So Below* would be a cross-over best-seller, and that I would write a follow-up novel about Bosch, but in fact my book's had very few reviews, so I'm not so optimistic on that front anymore.

Frek represents my newest strategy for scoring big in novel market, it's my take on the *Lord of the Rings* and *Harry Potter* route. If *Frek* does well, I'd love to write a sequel. I like Frek's world. But I think I'd want to do something else before I go jump back into it.

The reviews and sales for my last year's novel *Spaceland*, are pretty good. I can easily imagine knocking out another short present-day Silicon Valley novel. I have a couple of ideas.

People sometimes advise me to write a non-fiction science book relating to mathematics or computers. I teach computer science as my day job, and I'm somewhat over-familiar with the material, a bit jaded and

lacking in the proper gee-whiz spirit. But I could get excited if I got a huge advance. "This is *important*."

I enjoy writing fiction more than non-fiction. Fiction lets me be more creative; there's a lot of discovery and surprise. And fiction lets me express deeper things than non-fiction can reach; I can put my whole self into it.

Paris, 3/6/2003

From: "Laurent Clause" <lclause@sciences-et-avenir.com>
For: *l'Ol*, a French computer magazine

Q101: How do you imagine real-life computers and digital technologies in ten years?

A101: The two things I notice about my computer compared to ten years ago are that (a) the hardware is faster and better and (b) the software is bossier and less comfortable to use. It's a shame to see our hardware advances squandered on bloatware. Like the Soviet-style Communism states, Microsoft and Apple will collapse within ten years.

One change that's still happening is the use of cyberspace. Touted as the next big thing in the 1980s, virtual reality has today taken hold in computer games. Graphics cards have reached a mind-boggling level, with more to come. In ten years, we'll have an intelligent, cooperative 3D user interface.

Two cute applications I foresee quite soon are stunglasses and lifeboxes.

Stunglasses are opaque glasses with small video cameras. The user sees video on the insides of the lenses. The video is realtime filtered and transformed version of the world around. Thus you can turn your world into bright cartoons; it's a way of getting high without drugs.

A lifebox is a device that learns your life story and can imitate you in talking to your descendants. When I retire, I can begin programming my lifebox by telling stories to it. The lifebox interrupts and asks details, I fill in more and more. Then the users can do the same, listen to the lifebox and interrupt at any time. It's a way of storing the fractal that is one's life story.

Q102: Describe some digital futures you've envisioned in your science-fiction tales.

A102: Self-reproducing robots. Intelligent flying cameras the size and shape of dragonflies. People who only have sex with robots. Robot colonies on the moon. Robots fighting wars with humans over oil, which is used to make the plastics they need.

I'm very big on computers that aren't made of silicon and metal. I foresee a time of computers make of what I call piezoplastic, which is like an intelligent plastic mollusk. As does a mollusk, my soft computers will display colors on their skins.

I often write about a universal communication device called an uvvy. It's soft and you wear it on the back of your neck. It has an interface directly to your brain via electromagnetic fields. It's like a cell phone and a wireless web browser in your head, almost like telepathy.

The border between biology and computer science will become ever more permeable. Ultimately we won't have any machines at all; every appliance or tool will be some kind of tweaked organism. Genomics is the true nanotechnology.

Rome, 4/9/2003

From: Roberto Santoro <storie@tiscali.it>

For: *Storie*, an Italian literary magazine, interview to appear with an exerpt of my journal notes regarding a trip to Rimini and Ravenna.

Q103: Your Rimini is a funfair-like place (it is suggestive of Las Vegas). On the other hand, it is also a space populated by exotic and nostalgic figures (resonances of Fellini s Grand Hotel). Which is the true Italian scenery in your perception?

A103: What is truth? I'm in no position to guess at the "true Italy." There's an Italy for each person there, a thousand Italys per person per day. I wish I could have long intense conversations with every one of the women, have big jolly shouting meals with every one of the men, and go to the carnival and play pinball with every one of the children. A thousand times a day. Not practical. So I write factified fiction and fictionalized fact.

Q104: The Romantics loved to come down to Italy. Goethe s trip is the one coming in our mind now. What are the specific techniques required in the writing of a reportage and is yours too a sort of (postmodern) Grand Tour ?

A104: I write a lot in my journal when I'm on the road, as then I typically don't have anyone to talk with. It's sort of like having a conversation, and of course, writing your journal is a terrific tool for self-knowledge. Psychoanalysis for free. My technique is be completely frank and truthful, or at least to pretend to be so. During the day I carry a folded-in-four sheet of paper in my hip pocket and jot things down on it. At night alone in my hotel room, I lie on my back with my laptop on my knees and type in what I saw and thought. And then I revise, and change what I saw and what I thought.

Q105: Your prose is rich of SF similes. Is keeping a journal (a travel one, in this case) a sort of warming-up in view of a most demanding (in terms of planning) narrative trial (i.e. a novel) and what are your writing methods?

A105: A novelist is a magpie, snatching up bright shiny bits to bring back to the nest. It often happens that things I see on my trips find their way into my stories. Reality is stranger than anything one can imagine. It would take too much space to explain my writing methods in detail here, but I have extensive notes about my process in a document called "A Writer's Toolkit" which I keep on my website http://www.cs.sjsu.edu/faculty/rucker/writersnotes.htm

Q106: A famous Twilight Zone episode is mentioned in your pages. Thinking about cinema, music and comics: what kind of stories influenced you most?

A106: It never stops.

These days I might disingenuously claim that my biggest influence was a book of paintings by Peter Bruegel which my grandmother gave me when I was thirteen. I say this because I recently achieved my lifelong dream of turning Bruegel's life into a novel, *As Above, So Below*.

While researching that novel I traveled to Naples to see "The Blind Leading the Blind" and "The Misanthrope," and in fact some of the journal notes from that trip ended up in Chapter One of my Bruegel novel.

The movie *The Incredible Shrinking Man* made a big impression on me as a boy. And I read a lot of anthologies of 1940s and early 1950s science-fiction. Robert Sheckley was very important to me, as were, a bit later, Jack Kerouac, William Burroughs, Jorge-Luis Borges and Thomas Pynchon.

Coming back to *The Incredible Shrinking Man*, I had a memorable experience in the eighth grade, Spring, 1959, when the Science teacher at Louisville Country Day let us troop down one by one to look through a 'scope at a big crowd of paramecia from a hay infusion (a hay infusion being what you get if you take some rain water and put grass or leaves in it and let it stand for a few days, producing scads of bacteria and the protozoa that feed upon them). I still remember my astonishment at seeing so many critters, and my intense desire to look at them some more.

Just the other day I finally got a good microscope, a new Leica DM E 'scope with phase contrast, and it's like the ciliates and flagellates and bacilli are my pets. My dawgs. My homies.

I bet I'll write about them soon. There's a rich genre of SF about scientists who fall through microscopes. Alternately, there's a popular pseudoscientific theory that that the atmosphere is full of "air protozoa," a fact which the establishment scientists have thus far resisted

acknowledging. Kind of a stuzzy idea. The real protists are almost mere water, slight protein sheets and skeins within the fluid, so maybe there could be the same kind of thing in the thinner fluid of air. Yaar.

Q107: Bill Joy, one of the inventors of Java, claims that the robotics, genetics and nano-technology that are fueling the global economy also contain the seeds of our self-destruction. Do you think Joy's thesis is plausible and what are the ethics of cyberpunk?

A107: Having used both C++ and Java a lot, I really dislike the way Sun distributes Java (incompatible new releases every year, refusal to make peace with Microsoft, and the write-once-debug-everywhere problem). This gives me reservations about anything Bill Joy says. My having lost a bit of money on Sun stock in the dot-com bubble does warm my heart to him either. On the other hand, Joy helped bring about Berkeley Unix and the vi editor which are Good Things. And his famous *Wired* article is in fact quite reasonable.

Joy's thesis is that rogue genomics, self-replicating robots, and out-of-control nanotechnology assemblers might wipe out our biosphere. He feels that we would do well to take it slow on radical new changes. Agreed.

I would say that Joy overestimates the effect that we can have on the world. Having worked as a computer scientist for the last twenty years, I can assure you that our machines and technologies never work as well as we expect them to. (Especially if they're based on Java!)

Mother Nature is vastly more cunning and experienced than we can possibly imagine. The bacilli and protozoa have been waging biological warfare upon each other for billions of years, and there's billions of these critters in your back yard. Gaia is *old and smart*. She can definitely defend herself. You don't think the bacteria can outsmart some cruddy Java-enabled nanotech molecule? You've got to be kidding me.

Monolithic threats never materialize. Nothing ever wins all over the board. The future is going to be an incredible maze of competing things, many of which we can't even imagine. I agree with Joy that it is well for us to be cautious. But I deride the prophetic mantle of high seriousness that he dons. The cyberpunk attitude might be: we can't control it anyway, so why not enjoy the ride? Wave with it, brother. Nice tentacles you've got growing around your mouth.

Even if the worst happens, no disaster ever manages to kill everything. If we seriously screw things up, maybe 99% of us will die, but then Gaia will heal herself in a thousand or ten thousand years, and our mutant descendants will be in a new Garden of Eden. If you take a long enough view, there's absolutely nothing to worry about. Not that I think it'll ever come to this.

The ethics of cyberpunk? That's an oxymoron. For me, cyberpunk was always about being noisy, getting attention, twisting

people's minds, making things weird. A protest against consensus reality. I've always felt that if most people believe something it's certainly wrong. Cyberpunk is a tool to warp comfortable pontification into hideous orgasmic pig squeals. Why? I don't know. A kind of protest, maybe. A kind of wild fun.

Q108: Among the participants at Pio Manzù Conference there were John Searle and an aide of Generale Powell. A philosopher and a serviceman. Then, in your opinion, are culture and war the instruments of American supremacy over the world and how do you judge the neoconservatism of Bush administration.

A108: Let me answer this with a question: Must the mass media's current top three topics of the hour dominate every conversation on every occasion everywhere on the planet?

Like many other Americans, I disapprove of George Bush, and even more, of the (probably) criminal puppeteer Dick Cheney, but if I think about them all the time, they're winning. If I obsess about them, and they care not one whit about my opinions, I've given away my soul for nothing.

I would prefer not to care at all about politics. If I do this, am I effete, spoiled and unworldly? I would maintain that it's a legitimate position to refuse the lockstep of mass thought. To tune out. What if they gave a war and nobody watched TV?

This said, I recognize the value of dissent, of street action, and of written propaganda. I marched in the streets of San Francisco with the others. It felt good, even if it didn't stop Bush and Cheney.

This idiosyncratic answer is my own kind of written propaganda. I do what I can, after my own fashion.

But never forget that your own life is more important than anything in politics, more important than anything on the news. Life is too short to waste your days in pondering the limited menu of topics which the media proclaims as being the only important subjects of discussion.

The media is a Spectacle to distract people from their own best interests. The media is, after all, largely driven by the interests of the ruling classes. Certainly big media aren't driven by art, by science, or by spiritual considerations. Small peer-to-peer magazines like *Storie* are excepted, of course!

One of the nicest things about the Web is that it offers people the possibility of creating and reading their own versions of the news. I find it incredible that this medium arose so completely free of the establishments fetters. It gives one hope.

In closing, I'd like to thank the staff of *Storie* for publishing my journal excerpt, and for the interesting interview. And I'd like to shout out a hello to the charming and clever Daniele Brolli, my main SF

translator in Italy. I met him in Torino six months after the Rimini trip. But that's another story.

Warsaw, 5/23/2003

From: Konrad Walewski <konradwalewski@yahoo.com>
For: *Ubik*, a Polish science-fiction magazine

Q109: You have developed successful careers both as a scientist and as a fiction writer. Do you find these activities to be fundamentally different, or do they share underlying affinities?

A109: Recently I've been looking back on my life and trying to draw some conclusions about my various activities. And I find I'm not inclined to force everything onto a monistic one-size-fits-all Procrustean bed. (The Greek bandit Procrustes was said to have a stone bed of a certain fixed length, and if you were too long for it, he'd chop off your feet or your head, and if you were too short he'd stretch you on the rack.) My thinking these days is more along the lines of William James in *A Pluralistic Universe*. Here James argues for pluralism rather than monism — that the world is fundamentally Many things rather than being a single overarching One. In other words, yes, I think doing science is quite essentially different from writing fiction. In science you wear blinders and work with one very limited set of ideas; in fiction you try and expand your heart and mind so as to fit everything in.

Q110: What has drawn you to writing SF, what was it about that genre that appealed to you?

A110: Sense of wonder, goofs and eyeball kicks, transformation of mundane reality. Very early I picked up the trick of regarding my everyday reality as science-fictional. I'd like to be amused by the daily news, by the things I see in stores, and by the fashions on the streets. Life is only tragic if you get manipulated into taking it seriously.

Q111: Which areas of contemporary mathematics and computer science do you find most stimulating both as a scientist and a SF writer?

A111: I think there's some good material in Stephen Wolfram's book *A New Kind of Science*. I just developed a website about this stuff, you can link to it from my home page www.rudyrucker.com. Certainly there still isn't enough SF about chaos and fractals.

Recently I've been putting a lot of energy into developing a course on programming computer games, see my textbook and downloadable C++ framework at www.rudyrucker.com/computergames/ I think computer games are the most interesting area of CS nowadays.

Everything comes together here: artificial intelligence, graphics, simulation, 3D modeling, virtual reality, art, sound. I'm working with some of my Master's degree students to develop games using chaos, fractals, cellular automata, artificial life and other such glorious CS gnarl of the 1990s.

As for writing an SF novel about a computer game — I almost feel like this as been done badly so many times that it's untouchable as a topic. Like painting a sunset. Yet I really did like the recent computer game novel *Lucky Wander Boy*. I guess I could maybe do a game novel some day. My friend Marc Laidlaw is working on one called *God Mode*. I'd like to maybe combine my game novel with something about the Howard Stern show, which strikes me as wonderfully science fictional. *Bug Jack Barron* come to life.

Q112: While reading your *Infinity and the Mind* one could have an impression that modern mathematics is no longer merely an analytical tool but it gravitates towards philosophy...

A112: Yes, when I was writing that book, I used to imagine that Set Theory could serve as an exact theology. Back then I thought everything was mathematics, in particular I though that everything was an infinite set. But now I'm in my pluralistic non-Procrustean phase, and I feel like there's very little connection between abstract mathematics and the funky true God that you might find glowing in the chakra just above your prayerful scalp.

Q113: You've had an opportunity to meet Kurt Gödel...

A113: The great logician. Those meetings were a big deal for me, in the early 1970s. I was lucky. Pretty much everything I remember is in *Infinity and the Mind*.

Philosophers always ask me about meeting Gödel. In the Fall of 2003, I was in Brussels for a semester, and when I gave a talk on "The Philosophy of Computer Science," I was billed as "the last man to speak with Kurt Gödel."

Q114: Your *Ware* novels deal with such issues as artificial life-forms or intelligent machines. Do you think that contemporary science is getting any closer to producing them, or combining human tissue with a microchip, nanobot or any other artificial component, and do you think that cyborgization of humans is a likely evolutionary step?

A114: Having recently taught the Artificial Intelligence course in the CS department here at San Jose State University, I currently feel that human-like machines are really quite far away. Present day AI is a random grab-bag of tricks, none of which is able to scale up well to a wide

range of large and realistic problems. We have essentially no theory about how the human mind works, not even any tentative ideas for how such a theory would look.

Cyborgian computer enhancements of humans, on the other hand, seem not so difficult. I don't think its inconceivable that in a century you could slap a patch on your neck which would act something like a web browser which overlays its display onto the contents of your retina. Indeed, I often mention such a device in my SF; I call it an "uvvy."

Q115: Unlike the New Wave writers of the 1960's and 70's, who were very pessimistic about the effects of science and technology, in your novels and stories technology and science are rather neutral (neither good nor particularly evil), they are something natural, yet difficult to control like, for instance, in *The Hacker and the Ants*... How do you perceive science and technology nowadays, and do you think that we may lose control over them one day in the future?

A115: I like how you put that, Konrad. "Difficult to control." A dry understatement.

That's the essence of complex systems. It's not so much that they resist being controlled as that it's so difficult to predict the effects of turning a given dial or flipping a certain bit. This property of complex systems is what Stephen Wolfram calls "irreducibility." He feels, probably correctly, that pretty much any system that isn't obviously simple is going to be irreducible in the sense that there's no superduper shortcut way of predicting what it'll do when you turn this little knob here. All you can do is turn the knob and watch what happens. And then if I don't like what I see and quickly turn the knob back, it's already too late, as the system has evolved into a new state, and is likely to go on and do something even more surprising even though I turned the knob back.

Almost everything interesting is complex and unpredictable: nature, society, other people, machines. We never did have control over any of it.

Q116: Your characters are frequently scientists. To what degree do you draw inspiration from your own career as a scientist when you model your protagonists?

A116: I'm not a very typical scientist. I wouldn't say that I've made much of a mark in science. I'm more of a teacher and maybe a philosopher of science. And I've had some fun tinkering with computer programs, making gnarly things for people to look at and think about. As for modeling protagonists, I do often draw on myself or on people I know. That's an aspect of what I call my "transrealist" approach. To describe immediate reality in a science fictional way. I think Stanislaw Lem did that too. He's one of my favorite SF writers by the way.

There's a tradition of great minds from Poland; I'm thinking now of such mathematicians as Banach, Tarski, Mostowski, and above all, Stanislaw Ulam, inventor of the hydrogen bomb, measurable cardinals, and cellular automata. Any chance of me getting a visiting academic position there?

Q117: On the other hand, many of your characters are very human, often weak, or even losers, having to face all sorts of crises. They remind me of Philip K. Dick's anti-heroes. Has Dick had any influence on your work?

A117: When I first discovered Phil Dick's work, I was really happy. He often has this very relaxed, unstuffy way about him. Just folks. And I like that his "folks" aren't good patriotic honest workers, no, they're neurotics. On the other hand, if I read too much Dick, I get sick of how desperately unhappy his characters are. He'll set up some really interesting world, and then have chapter after chapter of a guy arguing with his wife about nothing. It's realistic, but it's not necessarily what I want from an SF book. I want humor, sense of wonder, eyeball kicks, reality warps, conceptual breaks. Dick can do all of those, but I think sometimes his own demons took over and you're just getting page after page of purging. Dick is esteemed, I think, for his sensibility as much as for his particular works, as so few of them are fully successful.

Q118: You have written some stories in collaboration with such writers as Bruce Sterling, Paul Di Filippo, Marc Laidlaw or, more recently, with your own son. What specific advantages does working with another writer have, and have you ever been tempted to write a novel in collaboration with another writer, just like Sterling and Gibson did?

A118: I lack self-esteem when it comes to short stories. I've had so many of my short stories rejected over the years. If I write one, there's no assurance whatsoever that I can sell it, and even if I do sell it, the payment is jack. In terms of my artistic career, writing stories is a pointless activity. I tend to collaborate on them because (a) somebody wants to do it and they goad me into writing a story together, or (b) I think it would be fun to work together with someone as it can be like a long and entertaining conversation, or (c) I figure that if I link my name to someone else there maybe some hope of selling the story. I think the story "Jenna and Me" that I wrote with my son is really cool, but none of the print magazines would dare publish it, as it mocks George Bush. You can read it for free online at www.infinitematrix.net/stories/shorts/jenna_and_me.html. This said, I am right now writing a story alone, it's called "The Men in the Back Room at the Country Club."

As for writing a novel in collaboration, no, I don't think I would do that. I'm able to sell all of my novels without much trouble. Spending that much time collaborating with someone would be too much hassle, it would make it more work.

Q119: Your novel *As Above, So Below* is a fictionalized version of the life of the Flemish painter Peter Bruegel the Elder. What made a mathematician and a science fiction writer to write a historical book?

A119: [Reprised from **A87** and **A100**.] Bruegel has always fascinated me. His early paintings of Hell are somewhat science-fictional, his later paintings of peasants are wonderfully real. He often includes something vulgar, such as someone taking a shit. None of his works ever hung in churches. His landscapes show a profound sense of the cosmic divinity inherent in the world. His technical mastery is fabulous. He's deep and funny. He's one of my main men. His life isn't very well documented, so I got to make up a lot. I used reverse transrealism to deduce his life from his paintings. I'd like to think I write like Bruegel paints.

I think *As Above So Below* came out well, in fact I think it's a masterpiece. I'd dreamed that *As Above, So Below* would be a cross-over best-seller, and that I would write a follow-up novel about Hieronymus Bosch, but in fact my book's had very few reviews, so I'm not so optimistic on that front anymore.

Q120: What's your latest project?

A120: I just finished writing a long children's novel called *Frek and the Elixir*, and I've sold it to Tor Books for publication in Spring, 2003. Here's some draft for flap copy that I wrote about it for my book website www.rudyrucker.com/frek/. Forgive the hype, but I really would like to see this book do well.

Frek and the Elixir is a profound, playful SF epic. The central theme is human individuality vs. the homogeneity of monoculture.

It's 3003 and the biotech tweaked plants and animals are quite wonderful — but there are only a few dozen of the old species left. Nature has been denatured by the profiteers of NuBioCom. It's up to Frek Huggins, a lad from dull, sleepy Middleville, to venture out into the galaxy to fetch an elixir to restore Earth's lost species. At least that's what a friendly alien cuttlefish tells him the elixir will do. But can you really trust aliens?

Frek finds himself in the midst of a galactic struggle for humanity's freedom, accompanied by his talking dog Wow, the down-home mutant Gibby, and an asteroid-raised girl named Renata. The final liberation depends on freeing Frek's long-lost father from an all-seeing alien known as the Magic Pig.

Frek and the Elixir is an archetypal saga reminiscent of *The Lord of the Rings*, the *Harry Potter* books, and Phillip Pullman's *His Dark Materials* series — enlivened by my (ahem) trademark originality and wit.

In order to give *Frek and the Elixir* a truly mythic feel, I modeled the book on the "monomyth" template described in Joseph Campbell's classic *The Hero with A Thousand Faces* (as George Lucas is said to have done for *Star Wars*.) *Frek and the Elixir* was designed from the ground up to match the monomyth so as to give the book the greatest possible resonance.

Campbell's archetypal myth includes seventeen stages. By combining two pairs of stages, I ended up with fifteen chapters. Here's a little table presenting the my chapter numbers and titles with the corresponding Cambellian stages.

Chap	**Title**	**Monomyth Stage(s)**
1	Middleville, 3003	The Call
2	The Thing Under Frek's Bed	Refusal of the Call
3	In the Grulloo Woods	The Helper
4	Stun City	The Threshold
5	Professor Bumby	The Belly of the Whale
6	Yunch!	The Road of Trials
7	Renata	The Goddess
8	Unipusk	The Temptress
9	The Spaceport Bar	Atonement with the Father
10	Orpoly	Apotheosis
11	The Exaplex	The Boon
12	All Hell Breaks Loose	Refusal of the Return, and The Flight
13	The Revolution	Rescue from Without, and The Return Threshold
14	The Shuggoths	Master of Two Worlds
15	The Toons	Freedom to Live

San Jose, 7/20/2003

From: Gary Singh <gsingh@email.sjsu.edu>
For: *Metro*, a free weekly newspaper

Q121: You've said that working in Silicon Valley has been a great opportunity for you as a writer, as if William Blake had worked in a textile mill. Explain.

A121: We just went through a revolution here as big as the Industrial Revolution. It's been nice to get in on it and not be frowning at it from the outside. Nice to know it from the inside as a programmer, a teacher, a consumer, as a guy walking around seeing the Silicon Valley types. Nice to ride the wave of change, yet at the same time to feel cozy and at home in the midst of it. I think Y2K Silicon Valley is a culture that will people will always be curious about, like Paris in the Twenties or Pharaonic Egypt, and I was fortunate to be here to see it happen.

Q122: In the new updated version of *The Hacker and the Ants*, you said that you made the main character of Jerzy Rugby a "more pleasant person and gave him a more coherent emotional life." Why? Are you getting more PC in your old age, or is it just that you, yourself, are more pleasant and coherent these days? You also completely changed the ending.

A122: I thought it would be funny to change the ending. Like it's just a computer program. Walt Whitman kept changing *Leaves of Grass* for his whole life.

And yeah, I'm mellower, a bit more serene, less bitter and angry, not as much of a punk. I'm leading a cleaner life than I used to, also I've gotten a certain measure of worldly success. I really only changed one thing about the ending, I had Jerzy get back together with his wife, whereas before he was getting divorced, and was chasing after a young girl. But I want my readers to like Jerzy, and I think the idea of him dating a young girl just seems too desperate and gnarly. And I am in fact with my same wife Sylvia of 36 years, and it seems more realistic to have Jerzy end up with his wife too. Maybe fixing the ending this way is a kind of valentine to her.

Q123. There's one scene where Jerzy is in a pay phone in the Fairmont Hotel, calling a Vietnamese restaurant near the corner of Tenth Street and Taylor. Then he goes through San Jose State, south past the dorms (which are no longer there), and makes it over to where Super Taqueria is and then finds the Vietnamese restaurant. But this is Tenth & William, not Tenth & Taylor. What gives? Have you ever gotten a local street or place wrong and had someone call you on it? Or, since this is all so transreal — it's fiction, of course — does it even matter if the streets are right?

A123: Well, I'm glad you care enough to notice this. I wish I'd gotten it right. Usually I look at a map when I write this kind of scene, but as the SJSU campus area is so familiar to me, I omitted this customary step. It would be cool if someday there were like literary walking tours of San Jose and Los Gatos. Dude, I can be like Steinbeck for Monterey!

We'll tear down the Knight Ridder building and put up an aquarium! Sell inflatable Rudy Rucker dolls!

Q124. Why ants? Why not cockroaches? There's all this fuss about the fact that cockroaches can last longer than anything else--that they can supposedly survive radiation and/or gamma rays, etc. What do you think would happen if cockroaches started using computers?

A124: Ants are cute, cockroaches aren't. Also I happen to know a lot more about ants, I read these E. O. Wilson books about them. The fact that ants are so highly social is a big thing, too, and I'm not sure if cockroaches have the same kind of intricate colony thing going on. And, hey, the ants are in fact "using" the computers in *The Hacker and the Ants*, that's what the book's about!

Q125. In *Hacker and the Ants*, Bety Byte and Vanna live in one of the shoddy apartment complexes on San Salvador Street, right across from San Jose State University. You've said that the city will no doubt tear down those apartments one of these days, which brings us to the next question. Downtown San Jose is a place where things are constantly being constructed right next to things that are being torn down. Places are going out of business right next to new ones opening up. It's been that way for the last 30 years. The neighborhood is constantly changing, but never actually goes anywhere. Would you say that San Jose's redevelopment strategy for Downtown is functioning like cellular automaton?

A125: It would be fun to imagine zooming out and looking down at San Jose and watching the changes in the grid. You could assign a color to each block and then have an update rule where a block's contents next year is a function of its neighboring blocks this year. But you'd see that there isn't a local CA rule that is in fact emulating San Jose's redevelopment. The reason is that higher authorities keep reaching in and poking this or that cell. Instead of letting it evolve in organic concert with its neighbors.

We're in such a rush to have our fair city get it together. When I moved here, I read the hype, and I bought it, and I thought San Jose would soon bloom. And it's nice to go there sometimes. But usually it's so deserted. Certainly it's never going to turn into San Francisco. What's the solution? Convincing a whole lot of people to live downtown seems important. It's kind of hot and flat and loud there, though. Lots and lots of big trees and greenery might help, if we can get the water. Less low-flying planes. A lot more awnings and shaded colonnades. Narrower streets. I think turning the Cargill salt ponds back into wetlands will make a difference, make the air that much sweeter.

Q126: San Jose seems to be a place forever searching for an identity. Now that the dot-com hysteria is finally over, who or what do you think can possibly put San Jose on the map?

A126: Well, I think all we've got is the capital of Silicon Valley thing. But that's kind of diffuse. Don't forget we used to be a big Hells Angels town. And now we've got a fair number of ethnic gangs.

I've learned to enjoy our San Ho just for being what she is. I walk the streets near the SJSU campus and I dig it. Sunny, dusty, dry. An exact balance of Hispanics, Asians, and whites walking around. Palm trees. Messy yards, old cars, a certain amount of trash on the sidewalks. A few homeless people and nuts. Peace. It beats the hell out of being in a mall. I enjoy the sleepy, frayed quality. It feels free.

Q127: I recently spoke with Caroll Spinney, the guy who's played Big Bird for the last 34 years. Wherever he goes in public--without the costume--no one knows who he is. He claims to be the most famous unknown person in the world. Do you ever feel like the most famous unknown person in San Jose?

A127: Yes, I think that sometimes. I never get invited to rich people's houses or anything, no patrons of the arts. Nobody reads, nobody reads science fiction, and especially nobody read far-out literary science fiction. It doesn't bother me. I have a peaceful life. I'm in no rush. America has a tradition of unknown great men.

Q128. D.H. Lawrence infuriated several acquaintances in his hometown of Eastwood, Nottinghamshire, England by unfavorably mentioning them in his books. Have you ever pissed off anyone around here by using him or her as a character?

A128: It's important to make clear that I don't really use people I know as characters. The transrealist method is to model my characters on real people I've seen. But these are only models, who end up behaving very differently from my acquaintances. It's fiction, words on paper. This said, people usually like it if they can recognize some bit of themselves in one of my characters. It's a touch of free immortality. My officemate Jon Pearce is proud that the character Ben Brie talks like him.

The character Roger Coolidge in *The Hacker and the Ants* was inspired by my former boss at Autodesk, John Walker. And John didn't like it that "his" character dies at the end. So he wrote an alternate ending where his character not only lives, but gets to give Jerzy a lecture about how dumb he is!

Q129. Lastly, what's on tap next for Rudy Rucker? Your novel *Frek and the Elixir* is coming out next year. What's after that? Do you

want to concentrate more on writing or programming or teaching or all of the above?

A129: I'm trying to sell a proposal for a nonfiction book about computers and the mind. I keep changing the working title. Today it's *The Lifebox, the Seashell, and the Soul: Computation and Reality.*

I'm eager to write this book. I've been here in Silicon Valley for almost twenty years and its high time to try and sort out the ways in which computers have changed the way I see the world. Time for William Blake to come out of that textile mill, dust himself off, and tell us what he saw.

I might even be able to use the book in our Introduction to Computers course at SJSU. But in any case, I'll keep teaching for a few more years. This Fall, 2003, term I'll be teaching computer graphics and two sections of our new course on programming computer games.

Q130: It's been said that any real city should have a local bard who fictionalizes the place in several novels, and that sometimes a city isn't a great city *until* that happens. Do you want to do for Silicon Valley what Tennessee Williams did for New Orleans, what Paul Bowles did for Tangier, or what Naguib Mahfouz did for Cairo?

A130: That has a nice sound to it, sure. And I certainly plan to set more novels in and around San Jose. But San Jose and Silicon Valley are too big a job for any one bard. San Jose's already a real city, anyway. It's what it is, not what anyone wants it to be. Life isn't about control.

Q131: The whole, gosh-darned dot-com bubble. It's on everyone's minds these days. At least around here. How did it all start? How did the bust happen? Who do you blame it on? What can we learn from it all?

A131: The bubble was basically caused by how easy it is to make a solid-looking web page. Instead of making something, a company could get by with HTML, Java and bullshit. A web page is almost literally like a bubble. Shiny, pretty, light. But with a few bitmaps and some shading, you can make a web page look like its made of metal. Play a recording of a heavy *thunk*, and you've got the safe at Fort Knox!

Everyone could go look at the web pages for themselves. That made a big impression. People kind of confused viewing a website with going to inspect an Intel chip fab or an Arco refinery. Show me some animated graphs with a positive slope and, hey, where do I send my money?

What to learn? I don't know if we really can learn. We're dogs, lemmings, gnats. I'd always remembered that story about the financier in 1929 saying that he knew it was time to get out of the market when a shoeshine boy asked him for stock tips. But when everybody was talking

about stock in early 2001, even though I remembered the shoeshine boy, I went ahead I bought into the top of the bubble. Got some Sun right before it set. It was just so hard to resist seeing those numbers going up, with my boring savings account pulling in like one percent.

I think the Y2K mania played into the dot-com bubble too. We had this feeling that the world was fundamentally going to change when all those nines rolled over. Thinks weren't going to be the same. We were free of history. I remember having that same feeling in 1969, not about finance, but about society. That we'd somehow come free of all the old rules. Remember *Wired* magazine's cover story on "The Long Boom"? And then *Wired* themselves started marketing a mutual fund? So much hype, so much con. Maybe Metro should start a fund. Be sure to include pho parlors. One of these days pho is going to be so big.

As for blame, I'm not sure there really has to be blame. Dot com gave the Valley more visibility, and ramped up the electronic infrastructure.

Certainly a lot of us lost some money. Where the heck *did* that money go? Who got it? Who actually made money off the bubble? That's a question for the journalists to figure out. If I had to blame anyone for California's downturn, I'd certainly want to point a finger at Enron. They took our whole surplus in like three weeks. And of course you can't forget 9-11 and all the terrible things spinning out of that.

Q132: What is the future wave of Silicon Valley, now that the hysteria has subsided and the traffic has dwindled somewhat? Will there be more people walking around with Ruckeresque notions of the world?

A132: Silicon Valley has a bright future. We make interesting stuff that everyone wants. Nobody knows how to get as crazy as Californians. Nobody knows as much about computers as we do, they'll never catch us. In another year or two, everyone's nice new machines are finally going to start wearing out. Downloadable movies are a huge killer app just over the bandwidth horizon. Computer games are huge, and growing. Wireless interactive movies/games could be big.

As for Ruckeresque notions, my next project is to write that nonfiction book to explain exactly what these are. And there's a couple of movie options for my books that could spread the word far and wide. But you never know with movie options. Sometimes it takes a really long time to finally hit.

One important thing about computers is to realize that at some point you can let go of them. The actual world is more interesting than any machine can ever be. Nature, face-to-face conversations with real people, enjoying the sensations of your physical body. My feeling is that the real value of computers is in giving you a bunch of metaphors for better appreciating daily life. Turn off the buzz and go outside. It's a nice day. It's always a nice day here. Even when it rains.

San Jose, 10/31/2003

From: <shubin@math.sjsu.edu> Tatiana Shubin
For: *Math Horizons* magazine.

Q 133. To me, mathematics and SF have one essential thing in common: they both grow from the big "What if?" question. What's your take on this?

A 133. One thing we do in mathematics is to investigate the consequences of constraints or assumptions. You might, for instance, add a new axiom of set theory and then see if any nice theorems come out of this. Or you might make a definition, such as "an Archimedean solid has regular polygons for its faces (not necessarily all the same) and has the same arrangement of polygons meeting at each vertex," and then carry out a search, partly empirical and partly theoretical, to characterize the objects satisfying your definition.

Science-fiction can be carried out in this vein. Thus I might ask what would happen if people had "femtotechnolgy" wands that would turn dirt or air into whatever kinds of objects they wanted. Or what would happen if people could make hundreds of copies of themselves. Or what it would be like if we had a mountain as tall as all the transfinite ordinals.

Science fiction can be thought of as a laboratory for carrying out thought experiments. The bare idea of a femtotechnolgy wand doesn't tell you much. You need to do some work to investigate the consequences. In effect, you have to carry out a simulation of a society with your additional assumption. This is in some ways similar to what we do in mathematics.

Note that just *thinking* about a question often isn't enough. You need to write something down. The paper does part of the work, that is, the act of writing elicits further ideas and fills in details, regardless of whether you're writing literature or math.

Something I learned from mathematics was to never turn back from an idea just because it seems too counterintuitive. Logic can take you to some very strange places.

All this said, I need to point out that science-fiction is also quite different from mathematics. SF is a form of literature, after all, and literature involves creating realistic human characters and using words to capture one's sensations and emotions. Personal human experience isn't something that mathematics directly deals with.

Q 134. In your short story "A New Golden Age" you speak of mathematics being translated into music in order to make its beauty apparent to non-mathematicians. Isn't this defeating the purpose of mathematics? Could it be that the beauty of math appeals to special "taste buds", to a special sense that needs and deserves special cultivation?

A 134. Most people do indeed have mathematical taste buds, if only in an untrained form. But of course they'll run screaming from the room if you show them an equation. So how do you get them to appreciate math? If you look at "A New Golden Age" again, you'll see that my idea was not at all to turn mathematics into music. My idea was to tape or simulate the brain activity of some mathematicians and project these thought patterns into people's brains so that they would feel what it's like to do math.

The punch-line of my story is that, just as people tend not to like the most intellectual music, they might tend not to like the most elegant math. The public at large could prefer a somewhat shallow and self-important work to a profound and modest one. They might like, say, G. Spencer Brown's *Laws of Form* better than Paul J. Cohen's *Set Theory and the Continuum Hypothesis*.

Q 135. Speaking of the beauty of math, I distinctly remember the very first moment when it struck me with an intensity that was almost painful. It happened in an undergraduate linear algebra lecture on the Cayley-Hamilton theorem, which asserts that a linear operator satisfies its own characteristic polynomial. What are your favorite examples of beautiful theorems?

A 135. There are different kinds of mathematical beauty. The result you mention is maybe a kind of "fixed point" situation where you find the answer inside the question. A higher-order language wraps around to the standard level of discourse. Gödel's wonderful incompleteness theorem is like this in that it's based on a sentence G which means "G is not provable."

It's also nice when mathematics establishes objective truths about external reality, such as Plato's proof that there are only five regular solids. In this context, I also think of the Frenet formulas using curvature and torsion to express the derivatives of the moving trihedron of a space curve.

Still another form of mathematical beauty involves discovering that two seemingly quite distinct concepts turn out to be the same. A classic example is the proof using Taylor series that e to the i pi plus one is zero.

It's also beautiful to discover interesting features in previously unheard-of territory. Here I think of Cantor's proof of the uncountability of the continuum and Mandelbrot's work on the gorgeously gnarly Mandelbrot set.

Q 136. Your mathematical training was as a set theorist. Do you have a favorite set theory SF story?

A 136. My novel *White Light* is my favorite tale about set theory. It's subtitle is in fact taken from the title of a paper by Kurt Gödel: "What is Cantor's Continuum Problem?" In my novel, a disgruntled math professor with a bad job at a state college in upstate New York leaves his body and visits an afterworld where all of the infinities of set theory are real.

As chance would have it, I wrote this novel after losing my job at SUCAS Geneseo. But Mother Mathematics provided for me, I obtained a Humboldt fellowship to visit the University of Heidelberg. (I might mention as an aside that I didn't manage to get tenure until I was fifty, so take heart, all you unemployed young mathematicians.)

In Heidelberg I'd hoped to make some formal, mathematical progress on the continuum problem, but instead I wrote a novel about an unsuccessful math professor who meets Cantor and discovers that continuous objects in our physical world have aleph-two "aether" particles each.

In other words, my novel became a thought experiment demonstrating that the continuum hypothesis is false! For me, writing science fiction is a lot easier than proving results in set theory.

Q 137. To quote from a blurb on the back of *Spaceland*, "Rucker gives us a tour of higher mathematics". Could you elaborate on this statement: what particular sort of mathematics, and how much of it?

A 137. *Spaceland* is primarily about four-dimensional space, and it's an exaggeration to say it's a tour of higher mathematics. I don't have much control over what my publishers put on my covers.

If you read Edwin Abbott Abbott's *Flatland* closely, you'll notice that it's set on December 31, 1999. So I thought I should write a one-dimension-higher version of the book set in my present-day Silicon Valley. My character, Joe Cube, travels into a four-dimensional space called the All, and visits two lands there called Klupdom and Dronia.

Of course there are a number of standard things one expects in a story of this type: getting past a wall by hopping over it in a higher dimension, reaching into a person's body without crossing their skin, flipping over and becoming one's own mirror image, unexpected attacks from unseen higher-dimensional beings, and so on. Abbott and the SF writers of the 1950s treated all of these.

A fresh topic that intrigued me was what I would actually see if I were in four-dimensional space. Using analogies to Abbott's hero A Square, I convinced myself that the only way to see properly in hyperspace is to be equipped with a four-dimensional eye. So I gave Joe Cube an eyestalk sticking out into hyperspace from the center of his brain.

Q 138. Did you use any computer simulations to help you to visualize the All, four-dimensional space, and its three-dimensional cross-sections as seen by Joe Cube?

A 138. The first hyperspace simulation I used was in the 1970s. It was a set of eighty-one colored paper cubes which I made, following the instructions of the 19th century mathematician Charles Howard Hinton. These cubes were a kind of "Rubik's" version of a hypercube (because $3^4=81$). I edited a Dover collection of Hinton's writings. He was quite a character. He was convicted of bigamy, fled to Japan with his two wives, then ended up on the faculty at Princeton, where he invented a baseball gun so the Princeton players could experience really fast pitches during their practices. He wrote some science fiction, too.

In the 1980s I met Tom Banchoff of Brown University. He showed me the first computer simulations of four-dimensional space. They made a powerful impression on me.

When I worked at the graphics company Autodesk in the 1990s, we were building a virtual reality platform, and I wrote some code so that I could look at tumbling solid hypercubes through the VR goggles.

Here at San Jose State in the 2000s, I've had some computer science Master's degree students do thesis projects involving creating programs to display four-dimensional polytopes.

By now, I don't find these programs all that useful. Certainly they're suggestive, and they get the mental ball rolling. But they don't show you a full four-dimensional world, which is what I was trying to visualize in *Spaceland*. They only show a few simple polytopes.

I would very much like to see a good four-dimensional virtual reality simulation. It's a problem that hasn't been properly attacked. Most efforts in virtual reality are, quite reasonably, focused on building computer games, so I think what's needed is a good four-dimensional computer game. My student Wyley Dai did create a good four-dimensional Space Invaders game. But what I want is a whole reality with naturalistic forms resembling hyperdimensional plants, animals, and geological formations.

Q 139. You once said: "To take pictures, you need to have something you like taking pictures of. To learn how to write, you need to have something you want to write about. And to learn programming, you need something you want to program about". What about applying this principle to learning mathematics? What does it sound like?

A 139. You only learn mathematics by applying it to something that matters to you. Learning based on drill has a very short half-life. Each person has to find things that catch their fancy, say, squaring numbers on a calculator and looking at the digit patterns, or maybe trying out possible arrangements of regular tiles.

I remember once I was riding in a car with a friend and he wondered how many ways there are to fold a map. And I told him there's a little branch of mathematics devoted to that problem. He thought I was kidding.

The good teachers come up with intriguing problems that students really want to know the answer to.

Q 140. In one of your interviews you said that you want to be called a writer since "writing is far and away the most important thing that I do. Over the long run, only the written language matters". Isn't mathematics a highly evolved language?

A 140. Certainly my books are more important than whatever I've done in mathematics or computer science. Of course this says more about my relative abilities as a mathematician and as a writer than about the absolute significance of mathematics.

It's not a contest, anyway. One thing doesn't have to be more important than another.

I do believe that the language of mathematics is less widely applicable than, say, English. Certainly there are things you can say in English that are much clearer in mathematics. But mathematics doesn't talk about how it feels to be alive. Yes, we can contrive clever chains of reasoning to try and quantify sensations and emotions --- but these models come far after the fact. Ordinarily language, on the other hand, can capture human experience on the fly.

Q 141. Once you said: "My work with computers has very much affected the way I see the world". Could you explain what you meant? Also, has your work in math had a comparable effect?

A 141. My background in math and computer science has a tremendous influence on the way I see the world and on how I write.

For instance I think about the writing process itself as a fractal. I have the big arc of plot, the short-story-like chapters, the scenes within the chapter, the actions that make up the scenes, the nicely formed sentences to describe the actions, the carefully chosen words in the sentence. And hidden beneath each word is another fractal, the entire language with all my ramifying mental associations.

I see computer science as experimental mathematics. Of course people can use computers for other kinds of things, but what I've been doing for the last twenty years or so is exploring ways of bringing mathematics to life.

Over the years, I've adopted a variety of mathematics-influenced views about the nature of reality. As a series of personal thought experiments, I've thought of the world as made of infinite sets, of curved space, of fractals, of cellular automata, and of computations.

These days I just think reality is a whole lot of things at once, and that there aren't any simple answers. I'm accepting —and savoring —the fact that the world is rich and complicated. Mathematics and computer science have taught me something about the range of possibilities.

The waving of the branches of a tree in the wind, for instance --- it's wonderful to think of them in terms of chaotic oscillations, and then you have the coupling of the branches to think about as well. Or the air around us --- it's mind-boggling to think of the complexity of the flow fields. If we could see the air, we'd be amazed. Though, come to think of it, we can see clouds, which also happen to be, of course, fractals.

If there were only one spot on Earth where clouds formed, people would be unbelievably excited about traveling there to see them. It would be like whale watching. Lying on your back looking at clouds is a deeply satisfying experience.

Q 142. Are you familiar with two recent papers by John H. Conway and Juan Pablo Rossetti, "Describing the Platycosms," and "Hearing the Platycosms"? Conway explains that they proposed the term platycosm for the 3-dimensional analogues of the torus and Klein bottle, and in these papers they discuss, in particular, what you'd see if you lived in one of these "flat 3-manifolds without boundary". Sounds rather science fictional, doesn't it?

A 142. This sounds like a nice mathematical SF idea, I'll have to look into it. Platycosm is a wonderful word. John Conway is a great man.

I'm proud to say that I've occasionally exchanged email with him. When I was working on my novel *Freeware*, I was interested in higher-dimensional non-repeating tilings of hyperspace, similar to Penrose's Perplexing Poultry. And Conway helped me a little. *Freeware* ended up including some devices I called "stunglasses." You wear them for fun; they tessellate the images of your surroundings into three-dimensional Perplexing Poultry. Peck!

Another contact I had with Conway was when, after carrying out some computer experiments, I formulated the notion that the stitch on a baseball matches the space curve defined by saying it has constant curvature and torsion that varies as the sine of its arc length. It's a closed curve that at least *looks* like the baseball stitch.

And Conway wrote me, "I have a principle that whenever someone thinks they've discovered the formula for the baseball stitch curve, they're wrong." Eventually my colleague Roger Alperin proved my curve doesn't actually lie on a sphere. And then some further research revealed the actual baseball stitch curve to be based on some hand-made trial-and-error drawings!

Q 143. Would you agree with the proposition that mathematics is to all other intellectual endeavors as poetry is to the rest of literature?

A 143. I think poetry tries to capture emotional states by unexpected juxtapositions of words. There is nothing at all scientific about it. We don't understand ourselves well enough to turn our poetry into science, and I don't think we ever will. At the highest levels of human creativity, we're doing something more complicated than anything that we can roll up into an algorithm. You can't simulate yourself writing poetry.

In the early stages of creation, a mathematician tries to capture some aspect of the world's structure by an unexpected juxtaposition of concepts. Mathematics starts with images, and once the mathematician has formed some interesting sequence of associations, the images can be converted into compact mathematical notation. This process also transcends any humanly conceivable algorithm.

You might say that poetry and mathematics resemble each other in their conciseness. I used to write poetry, and then I learned to write novels. If you're writing well, a novel has poetic passages in it. There's also novel-length mathematics; we have a lot of long math books. The poetic parts of a math book are the definitions and the surprising results. The story part is perhaps the applications.

I could go on trying to make comparisons, but really I do think literature is very different from mathematics. I love them both. I've been fortunate to be able to work in both fields. I'm a Sunday painter, too, and that's different from both math and from writing. The world is big and beautiful.

San Francisco, 3/17/2004

From: <lorenmea@pacbell.net> Loren Means
For: *Ylem*, Journal of Artists Using Scientists and Technology.

Q 144. I ran across the interview Charles Platt did with you in Lynchburg in 1984 for *Fantasy & Science Fiction* (actually, I got the magazine out of the free bin in front of Green Apple Books, where it had been placed by a black guy with dreadlocks and a priest's collar). I felt sympathetic toward the old you — you'd lost your teaching job and obviously hated Lynchburg. Do you still feel as alienated as you did back in Lynchburg?

A 144. I've been here in California for eighteen years now. It's felt like home from the start. Today at the supermarket, I was thinking how back in Lynchburg the men would talk about it for a week if they saw anyone like the blonde, buffed, shades-wearing women we got all over the place out here. It's a good deal.

In February my wife and I were up in the Sierras near Carson Pass, man, there was seven, eight feet of snow. Beautiful back-country skiing, alone in the woods, the snow-capped knobs like giant mounds of whipped

cream. And if I'm sore from the skiing today, and I go to yoga class down in the village where I live. California.

I have an interesting job teaching computer science at San Jose State, and the locals here respect me for working at their city's university — that's another thing about the Lynchburg days, I was unemployed. I'm the opposite of alienated anymore. I looked up Kit Carson of Carson Pass on the Web today, he was born in Kentucky, just like me. We made it to the coast.

This said, I occasionally miss the dawdling small-town pace of Lynchburg. Linoleum. Space heaters. Oddly enough, my social life there was richer than it is out here. Everyone lived only a few blocks away. It was kind of fun being as wild as I was back then, too — at least it seems that way in rosy retrospect — though in fact I know it was often a living hell. But I had some good times with the bad. The day Platt came to interview me was fun. It made me feel like I'd finally arrived.

Q 145.. Last Monday I saw an interview with Dr. Cynthia Brezeal, the head of the Robotics Project at MIT. She says that robots can't make viable decisions without emotions, but that robot emotions might not be the same as human emotions, any more than dolphin emotions would be. Your reaction?

A 145 One of the ideas in AI is that emotions can be viewed as weights that you assign to certain situations. In the simplest model, you'd just have a single I_LIKE function that returns values ranging from, say, minus ten to plus ten. And then when you're planning what to do next, you might simulate a half dozen alternative courses of action, evaluate the I_LIKE function on each of the possible scenarios' outcomes, and then pick the course of action that leads to the situation with the highest "I_LIKE" rating. You execute that course of action — clik, whirr, buzz — then look ahead your new situation and simulate a half dozen follow-up scenarios and so on. The catch is that although we can call the I_LIKE function an "emotion," it seems like a dry computation without all the visceral hormonal gut feel that goes with a human being's liking something.

I_LIKE(You), but do YOU_LIKE(Me)?

I sometimes think that whole logical way of trying to do AI is hopelessly wrong. AI never really seems to get anywhere, and the actually existing robots can't do much. There's a persistent tendency for us to very seriously underestimate how much design has gone into our brains in the course of our beloved Gaia's yottaflop parallel computation running on a quintillion processors for several billion years.

Q 146. Creativity is induced in computers through the use of randomness, which you discuss in your Wolfram review. But humans have an unconscious which contributes to creativity, and I don't think

that's quite the same thing as randomness. Dreams, for instance, probably have a random neuronal component, but then they are associated with the dreamer's unconscious memories and desires and fantasies. Is the unconscious an element of your conception of robots?

A 146. Why do you keep asking about robots?

Frankly I'm a lot more interested in mollusks from the fourth dimension. That was a theme in last year's *Spaceland*, and there's a space cuttlefish in my new galaxy-spanning epic, *Frek and the Elixir*, just coming out from Tor Books.

But, all right, these days I actually have been pondering that hoary old chestnut, that road apple, that war horse, that battle axe, that turd in a punchbowl, that zit on the butt, that oxymoronic category mistake, that glistering gallstone, viz., can computers think? I'm back in this picked-over union hall sweeping together a non-fiction book on computers and reality, *The Lifebox, the Seashell, and the Soul*. The mighty fruit of my decades of labor in the dark satanic mills of Silicon Valley.

Yes, I think any machine intelligence would have what you might call an unconscious component. But what is the unconscious? You might think of it as the endless spinning out of computational variants from your known data. Like a cellular automaton rule scrolling down the brain-screen.

What seems random in your mind isn't really random, it's merely complex. Computers have access to the same kinds of computational complexity, so in principle a machine could be acting like a person.

But I don't think we can build such a machine. Programs are writ by fools like me, but only God can make a tree.

Q 147. John Searle says that we can't simulate consciousness in computers because we don't know what consciousness is. What do you think?

A 147. John Searle is a likable fellow, but his classic Chinese Room argument against computational consciousness is dead wrong. It's just wishful thinking to prop up a foregone and fondly held conclusion — it's like he's imagining Earth to be the center of the universe, or denying that humans evolved from the apes, or pretending he's not gonna die.

Two years ago I spent a few days with John Searle in Fellini's home town of Rimini, on the Adriatic coast in northern Italy. We were there to get awards from the Italian government, which was amazing and wonderful. I never got around to arguing with John about his pet ideas. He's a hard guy to interrupt.

I have to admit that the remark you quote has a certain kick to it. We really don't have any theory of consciousness, not even a bad one, so there's some point in saying we can't simulate it.

My natural inclination is to say that, dude, everything is conscious, even a rock, so if you get a nice complex program that imitates people, it'll be conscious for free, just because it's a process in the physical world. But not everyone's going to satisfied with that kind of view — which is technically known as hylozoism.

My mad scientist friend Nick Herbert has a more sophisticated way of saying something like the same thing. (See his brilliant piece on "Quantum Tantra," www.southerncrossreview.org/16/herbert.essay.htm) Following this sage at a respectful distance, I shovel up some elephant poop and form it into a dialectic triad thus:

(Thesis) Upon introspection we feel there is a mental residue that isn't captured by any scientific system; we feel ourselves to be quite unlike machines. This is the sense of having a soul.

(Antithesis) But the slowly advancing work in AI, the prospect of using genetic algorithms, and considerations of degrees of computability seem to indicate that any clearly described human behavior can be emulated by a machine — if not by an actually constructible machine, then at least by a theoretically possible machine. Where is, then, the missing soul?

(Herbert's Synthesis) The "soul" can be given a scientific meaning as one's immediate perception of one's uncollapsed wave function, particularly as it is entangled with the uncollapsed universal wave function of the cosmos.

(Two possible conclusions) Either (a) machines, *qua* physical objects, have uncollapsed wave functions as well, so they too have the same kind of "soul" that we have or (b) there is something so far unique about how we manage to couple our wave functional experiences with our logical reasoning.

Being a hylozoist automatist, I believe in option (a). Roger Penrose, on the other hand, likes to argue for option (b), suggesting that microtubules in the cytoskeleton might be carrying out quantum computations.

And now, really, that's enough science. Let's talk about writing.

Q 148. One way that Science Fiction tends to differ from the Mystery genre is that Mystery writers often tend to write about the same protagonist from novel to novel (and sometimes have recurring villains). Science Fiction writers tend not to do this. Why is that? I'm thinking about Chandler's Philip Marlowe, Robert Parker's Spenser and Hawk, etc.

A 148. You're right, I can't think of many science fiction series about the same character. Unless you count the Star Trek novelizations? In Germany there's a series called Perry Rhodan, they say that every possible SF idea eventually appears in a Perry Rhodan novel. Spider Robinson has his Callahan's Bar series.

One reason it's hard to continue a series of adventures about science fiction is that very often the result of a novel is that the world at the end is quite different from the world at the beginning. So it's hard to do a reset.

Certainly my *Ware* novels are a series but, horrors, the characters change and age and grow, so it's not quite what you have in mind.

Generally I like to avoid repeating myself, although once in a while, it feels good to redo a theme just to try and bring it to a new level.

I have written a certain number of transreal novels about characters something like me, though I tend to always give my heroes different names. I haven't done a transreal book since *Saucer Wisdom* — where the main character was called Rudy Rucker. Nick Herbert was in *Saucer Wisdom*, too, he was one-third of Frank Shook.

I could maybe do something transreal next time out, I'm thinking of a novel inspired by my experiences among mathematicians and computer scientists, both in grad school, and then out in the teaching world. A kind of life story of two characters who keep ending up together. Give it an SF spin — which is the "trans" part of transrealism. Set part one at Rutgers in New Jersey in the 1970s, part two in the far future with aliens, and maybe in part three one of them is an aging computer science professor in Y2K Silicon Valley.

Q 149. I love the way Berenice and Emul address each other in *Wetware*, and I'm taken with the way you float between tenses in the first chapter of *White Light*. Do you intend to continue with such language experiments?

A 149. I always have fun with the language. People don't always realize how great Jack Kerouac was at playing with words — I learned a lot of that from his work. Often as not, my aliens sound like beatniks. But not in a gauche kind of way, you don't want to just ape a few obvious mannerisms. To make it wild and fun, you have to channel some outré spirit, get yourself into a whole different frame of mind.

When I was writing Emul's speeches, I'd in fact flip through a copy of like *Visions of Cody* by Kerouac, getting that rhythm going. I enjoy the style of high academic parlance as well, that's fun to do. And old-fashioned literary style. When I was writing Berenice's lines I was flipping through the works of Edgar Allen Poe.

Some of my computer science students don't speak English very well, and that's another great input for making characters talk in novel ways. I love any new kind of youth slang that I can pick up on, though that's harder now with the kids grown and moved out. When I'm out on the sidewalks, I'm all ears.

Picking the person and tense to write a book in is always a big decision. The easiest default option is first person past tense, which is easy to write and to read. I wanted to write my Bruegel novel third person

in the present tense, like narrating a movie, but my editors didn't like the idea. Pynchon's *Mason and Dixon* uses that mode, he gets away with it, in the supreme master's hands an odd style doesn't obtrude. I may still try and do it myself.

Q 150. Speaking of style, I sometimes think of you as your writing as "degree zero." It's transparent, almost artless.

A 150. That's an effect I try for. It might relate to the fact that I write non-fiction as well; I like to explain things as simply as possible. I like for my writing to be absolutely clear. I rewrite a lot, sometimes it's like a programmer cleaning up his code.

Not that I don't like to go for the occasional purple patch or deranged farrago. As you will have noticed in the course of this interview!

Q 151. In your new *Frek and the Elixir*, you postulate a universal dark matter throughout the universe called "kenner" that can be crafted by certain individuals by persuading the dark matter to manifest itself and assume certain characteristics. I find this conception fascinating. Could you elaborate on it?

A 151. In SF there's a tradition of drawing on little-known new physical phenomena for special effects. In the 1940s it was radiation and radio. In the 1980s I myself used quarks a lot. These days dark matter is what's strange. While I was writing *Frek*, I read an article in *Science* saying that only about five percent of the mass in our universe is garden-variety matter, and all the rest is the so-called dark matter and dark energy. I was talking this over with my man Nick Herbert, and he said, "Maybe the dark matter is consciousness." And then it hit me that, yeah, I could use dark matter to provide a parascientific justification for giving my characters the useful ability to make something out of nothing.

I used the name "kenner" because I have an old friend called Kenny Turan, and I automatically smile whenever I think of his name. He was my roommate in college, he was the first Kenny I'd met. Actually, in high-school, my friends and I for some reason thought of Kenny as a very strange name, it was a word we'd to shout out of car windows when we were, like, mooning people. "Kennah!" or "Kennah Bone!" The longer version came from a Little Richard song where he yells "skin and bone," and it sounds like "Kennah Bone!" There's the Ken and Barbie vibe too — you might remember that in *Wetware* I had this evil robot-controlled human character called Ken Doll. Also, of course, Kenner is the name of a toy manufacturer, which fits in with cosmic superstuff that you can playfully craft into anything you want.

Face it, dark matter kenner sets off a richer chain of associations than does a phallic magic wand — although, come to think of it, I have

wand-like things called “allas” in my books *Saucer Wisdom* and *Realware*. The alla-wands work via something I call femtotechnology. By turning neutrons into protons or vice-versa, they can transmute matter and turn, like, straw into gold. But crafting kenner is better — you don’t even need any regular matter to start with. Instead you’re rotating the invisible dark matter though a higher dimension to make it real.

I’m an SF writer, and part of my game is to always have some kind of cock-eyed science explanation, no matter what I do. And always remember that B.S., M.S., and Ph. D. stand for “bullsh*t,” “more sh*t,” and “piled high and deep!”

You know, it’s funny how I keep quoting Nick Herbert in this interview — I guess he’s one of the few people I know who says unexpected things. How rare that is, really. We imagine that we’re creative and original, but most of the time we’re just picking, like, Opinion (K) on Issue (3) from the media-mediated monocultural menu. If I don’t watch myself, I do it too. The deadness of monoculture is one of my big themes in *Frek and the Elixir*. I’m hoping that young people will read the book and love it and maybe absorb a little of that message.

Q 152. In his *Trillion Year Spree* (1986), Brian Aldiss calls you “a former cartoonist.” Is there any truth in that?

A 152. I’m surprised he would have mentioned me, so that’s nice to hear. I’ve been an outsider for so long that I always imagine nobody’s heard of me.

In the 1970s, I thought being an underground cartoonist was the coolest thing anyone could ever be. I couldn’t believe how great the Zap Comix were, they were simply the funniest, most relevant, most liberating literature I’d ever seen. I read them over and over, memorizing every frame.

And when I couldn’t get my hands on new comix fast enough, I was inspired to get some Rapidograph pens and begin drawing an occasional strip of my own called “Wheelie Willie”. It used to appear in the student newspaper at Rutgers, *The Daily Targum*. Sex, politics, drugs, and infinity. Some of the staff didn’t want to print it, but I wouldn’t let up until they did. My career in a nutshell.

Wheelie Willie has a cameo appearance as a character in my novel *The Sex Sphere*¸ and he even works as a science popularizer in two full-page spreads I put into my non-fiction book *Infinity and the Mind*.

One of these days I might scan all those old strips and make a zine — or maybe just put them on-line. No wait, one of these days someone should *pay* me to do that. The web is a black hole where I end up doing too much work for free.

Q 153. In your recent interview for the *San Jose Metro*, you say “I'm trying to sell a proposal for a nonfiction book about computers and

the mind...Today it's *The Lifebox, the Seashell, and the Soul*." How is that project going?

A 153. I'm almost half done writing *The Lifebox, the Seashell and the Soul*, and it's going very well. I'm folding in a lot of my older ideas, but also I keep coming up with interesting new stuff that surprises me — which is what I always hope for when I write non-fiction book. To have the feeling that I'm finally figuring out how things work.

The book is under contract to Four Walls Eight Windows, a medium-sized press who published my essay and story collections *Seek!* and *Gnarl!* I got a fairly nice deal with them, although it wasn't anything like the kind of deal I'd been dreaming of.

In my vanity, I'd figured that since (a) I'm such an expert on computation and reality, and (b) Everyone loves my writing, and (c) The notion of reality as a computation is such a vitally important topic, that (d) I would pull in a huge advance and I'd be able to pay off my mortgage and retire from teaching. I even switched to a new agent, John Brockman, to make the deal. He's like a specialist at getting big advances for science books.

But none of the big houses wanted to publish my book at all, let alone drop a couple of hundred K on me. I still don't fully understand that — it doesn't fit at all with my model of how the world is supposed to be!

Maybe my proposal was too complicated. Maybe I'm like this robot running out of a hole in the wall and my voice is a scary high chirp like the sound of a furious bird or a hysterical insect, and meanwhile I'm imagining that I'm coming on all reassuring and philosophical. Waving my byte-stained pincers and feelers. Proffering filthy pictures of cellular automata. And the thirty-something English-major yuppie-hipster corporate publishing types are, like, backing out the door. "He's *old*, isn't he? And *crazy*. What the hell was that even *about*?"

Four Walls Eight Windows has the great virtue of not being part of a conglomerate. It's owned and run by one guy, John Oakes, who, long may he prosper, thinks I'm an important writer.

And I do think *The Lifebox, the Seashell and the Soul* is going to be an important book. Maybe the proposal was hard to understand, but that's because of my working methods. In all honesty, I have a lot of trouble figuring out in advance what I'm going to say. My books gestate, they grow, they emerge. I'll be done with *Lifebox* in about a year. It's probably going to be the last non-fiction science book I write, and I'm trying to make it really fun and interesting and full of amazing ideas. Putting in all the wild stuff I learned and saw over these last twenty years in Californee.

And when that's done, I'm going to write another SF book, maybe that transreal thing about crazy mathematicians and computer scientists with time travel and intergalactic aliens thrown in to crunk up the mix.

And if *Frek* sells well I could do a sequel to it. We'll see. I'm hoping to keep writing until I can't remember any more, um, you know — words.

Genoa, 11/1/2004

From: <aridag@nomads.it> Arianna Dagnino

For: *L'Espresso* magazine.

Q 154. I'm interested in the notion of recording a person's lifelong sensory impressions on an implanted chip. Let's also suppose that the chip is equipped with a program that interviews the individual and records their internal monologue about these recorded events. Do you think this is a possible technology?

A 154. This is a good topic to ask me about, as I've often written about this concept in my science-fiction --- I first presented the idea in my 1986 short story, "Soft Death." I use the word "lifebox" to describe the kind of life-recording device you're talking about. It's a notion I'm still thinking about; in fact, I just finished writing a long nonfiction book called *The Lifebox, the Seashell, and the Soul*. I also have quite a bit about lifeboxes in my 1999 futurological novel *Saucer Wisdom*.

To begin with, I think we need to be clear that using implanted chip technology for a lifebox is out of the question. The implanted chip is a metaphor, a visual symbol that a director might use to represent a lifebox in a movie. But in practice, there will never be a successful industry based on putting brittle hardware into people's bodies. A chip in your body would lead to computer virus attacks, a complete loss of privacy, and endless breakdowns and upgrades. Nobody is that stupid. This said, I do very strongly feel that we will soon see non-invasive lifebox technology.

A feasible near-term realization of an image-oriented lifebox would be to wear a tiny head-mounted video camera capable of uploading sounds and images to a high-volume database. The camera could be in, for instance, the frame of your glasses. A less intense approach is to use the camera in your cell phone, and to take photographs that are uploaded to a database.

Images alone don't tell your eventual audience enough. A lifebox needs to preserve some of your words, as words are so good at expressing your thoughts. As well as comments on images, you'd want to record long blocks of independent text describing your memories, ideas and fantasies.

One approach for preserving text is to record voice messages. But written messages are easier to absorb; a reader can scan through text very quickly. In either case, a cell-phone or computer-based lifebox device could assist you with this by using some rudimentary AI to ask you relevant questions. Such as this email interview.

Q 155. When do you foresee the lifebox to become a mass phenomenon, with hundreds of thousands of digital personalities? Who will care about them?

A 155. I think it's already happening in the form of blogs. Blogging is a mass phenomenon. A blog is a kind of lifebox: a digital model of the author's actions and thoughts.

Note that blogs contain both images and words --- which are carefully arranged. People might like to imagine that they could create a lifebox model of themselves just by taking a hundred pictures a day or by wearing a video camera. But they'd be wrong. The pen is as mighty as the camera. And editing is essential. Without editing, the Venus de Milo is a block of marble.

The blog or the lifebox is a form of art, a kind of self-expression. Most of us aren't blessed with the ability to create art with broad appeal. Nearly everybody writes and photographs a little, but only a few get published or appear on museum walls. Why would it be any different with the lifeboxes?

If you don't analyze the situation very deeply, you might imagine that a lifeboxing tool could be so well-automated that it produces a gripping biography of anyone's life. But the production of art is an unsolvable programming program!

Part of the problem is that art is a moving target. As soon as something becomes easy, we expect more. We only have the time and energy to look at a very limited number of works by other people. This leads us to your second question, "Who will care about these lifeboxes?" Hardly anyone.

Most lifeboxes are going to be viewed only by the authors' friends and family. But this is still enough to produce a mass market for lifeboxing software and hardware. If your grandchildren can know a little more about you, then maybe you've accomplished enough.

After all, it's very common for retired people to want to write a little memoir so that their family can remember them better. Having a little cell-phone-sized device which asks you questions would be a pleasant way to carry out such a project.

Q 156. Will the use of the lifebox affect the way we make experiences so as to have memories to cherish? And what about the bad experiences, the ones we desperately want to forget?

Q 156. Let me invent a very short story.

A guy on a business trip goes to a prostitute. He uses his cell phone to take a picture of them having sex. She charges him a little extra for that, but otherwise she doesn't care. For her it's free advertising. Now the guy is originally planning to save the picture just for himself, to gloat over, but he can't resist forwarding a copy of the file to his best friend

Luigi back home. But Luigi forwards the picture to the guy's wife! And then Luigi goes to visit the wife in person. The wife is so mad at her husband that she has sex with Luigi, and cell-phones her husband a photo of them in action.

This cautionary tale gives you an idea of why nobody would want an implanted lifebox. You could never be a hundred percent sure that it wasn't recording something you'd rather not publicize. It's best to keep your most personal memories in one place only: the intimate tangles of your neurons.

Q 157. The next obvious step will be to try to recreate on a digital support all our personality to have a cyber self that could live and interact with the living even after our death. Is this the first step to reach our quest for immortality through digital technology?

A 157. Part of the appeal of a lifebox model of yourself is indeed that it can survive indefinitely. This is a project I actually think about carrying out during my declining years.

My idea would be to create a website with a large data base containing the full text of all my books, all my journals, and a connective guide/memoir --- with the whole thing annotated and hyperlinked. And I'd throw in a bunch of photographs --- I've taken thousands over the years.

The tricky part is to endow the lifebox with interactive abilities so that people can ask it questions and have it answer with appropriate links and words. But this doesn't seem impossibly difficult; a first approximation would simply to be use a search engine. And if the answers aren't always quite relevant --- well, talking to a person is like that.

The result could be a construct that's within hailing distance of being a simulacrum of the lifebox's author. So, yes, the lifebox is a form of immortality.

Q 158. Then the final leap: uploading all our mind on a digital support. What about consciousness? Shall we still be able to recognize ourselves even if we will be nothing more than bits, perhaps encapsulated into a robot body, as you wrote in *Software*?

A 158. We have two related issues here. The first is whether a computer program or a robot will ever be conscious in the same sense that a person is. And the second is whether a conscious copy of me would be in some sense the same as me.

Regarding the first question, I think robots could indeed become conscious in the usual sense of the word, but that this won't happen for at least a hundred years. Building hardware that's roughly as powerful as a human brain isn't so hard, but designing the architecture and software for

a thinking brain is very difficult. Our own brains arose only as the result of millions of years of evolution. It may be that the only way to design conscious machines is to simulate a race's evolution, and this will take awhile.

As for the second question, if pressed, I feel that the essential core of each human is the same, a droplet of God, a spark of White Light, the ability to say "I am." So in this sense, yes, a robot copy of me would be the same as me. I might not find this news very comforting if some friendly robot doctors were about to extract my software by running my brain through a food processor.

And it may also be that to talk about a software copy is overlooking something. First of all, a person is a complex flesh and blood body as well as a brain. And secondly, it could be that a person does have a specific immortal soul. Nothing is out of the question. Our conception of reality is always subject to change.

Q 159. There's a branch of science looking at developments that nowadays might look as futuristic as the uploading option in the direction of a biological life-extension, towards quasi-immortality. Would achievements in this field overcome the longing for a transfer of minds on a chip?

A 159. Biological life extension is much more likely in the near term than digital immortality. Computer science might in fact be a red herring, a false trail. Biology is in many ways more attractive. Who wants, after all, to be bits on a chip? I much prefer the wet funky flow of Mother Nature. A fluttering leaf is more interesting than a video game. The emphasis of computers and nanotechnology over biology is the result, I'd say, of a fear of the female principle.

Another point regarding life extension: why would anyone want to live so very long? At some point, enough's enough. The old trees need to fall down and rot so that the fresh young saplings can grow into the light.

Q 160. We humans used to think of ourselves as the key players on stage. And we want to stay at the centre of it: we've been using children and/or works of art and science to grasp a sense of immortality, of life that still goes on after our death. But maybe one day the human race will simply disappear to be replaced by more intelligent beings (robots?). Is there any hope for us in the long run --- at least as a race, if not as individuals? What is a human being going to look like a hundred or a thousand years down the line?

A 160. As you say, even if an individual achieve personal immortality, there's social sorts of immortality. Your genes may survive in your descendants, and your ideas may survive in the minds of others. A

society has a kind of hive mind which we all participate in, and the hive mind is potentially immortal.

I think it's very unlikely that we would be replaced by purely mechanical robots. Biology is vastly superior to mechanics --- for instance, unlike machines, biological organisms have homeostasis, that is, an ability to repair themselves. But what could happen is that, on the one hand, we begin to tinker with the genome, altering our biological make up and, on the other hand, we create mechanical devices to augment our bodies. Certainly in a thousand years we can expect to be cyborgs, that is, genomically tailored biological beings with mechanical add-ons.

Amputees are already using very high-tech artificial limbs. And I don't think a brain prosthesis is out of the question. I often write of a device that I call an "uvvy" for "universal viewer." It's a soft wireless computing device that rests on the nape of your neck and gives you instant cell phone abilities, internet browsing, and access to your lifebox database. At some point a person without an uvvy might not be considered a whole person at all.

But even though our bodies will be upgraded in various ways, I don't think human nature won't change very much. When I wrote my novel about the age of Peter Brueghel, it was borne in upon me how similar the people I see on the street are to the people in Bruegel's paintings. My prediction is that people won't change very much, and the overarching hive-mind of human society will also remain much the same.

We are close to having the uvvy, what with our increasingly powerful wireless devices. Cell phones have already greatly changed the details, if not the essence, of social dynamics.

What's still missing is a seamless user interface. Actually inserting wires into one's brain is something that people will, quite correctly, never be willing to do. But perhaps we might be able to create tightly focused magnetic fields capable of interacting with the neurons in the brain stem. More realistically, we might wear what I call "stunglasses," which combine a heads-up display with the user's surroundings. Lightweight sensor-equipped fingerless gloves might allow someone to "type" simply by twitching their fingers. Everyone will have an uvvy within a hundred years. Cyberspace will ooze out of the machines to permeate every aspect of daily life.

But, even so, we'll still be the same kinds of people: lustful and greedy, noble and inspired.

Milano, 11/8/2004

From: <ebrocardo@condenast.it> Enrica Brocardo
For: Italian edition of *Vanity Fair* magazine.

Q 161. Uploading our mind, are we able to reach a sort of immortality?

A 161. Uploading your mind into any kind of more permanent form would be a kind of immortality. The big questions about this is how much of my mind can I actually upload. Sights, memories, feelings, thoughts, personality, soul...?

The memories are like a data base, while the feelings and personality is more like the operating system. But I don't think the operating system is very complicated. So I think that, if we could upload enough memories and (big if) we could build a "human consciousness operating system," then the upload would be a good model of your mind.

The feelings and personality are quite closely related to the physical connections and biochemistry of the brain. You might think you'd almost need to make a model of the actual brain. But my guess is that in fact there are only a few basic kinds of personality types, akin to the phlegmatic, sanguine, bilious, and choleric categories of the Middle Ages. So then, you just add a person's memories to, say, a standard choleric operating system, and they're back. A lot of what we view as our "self" really just has to do with the brain observing a model of itself observing itself. And this can be emulated.

Q 162. Do you think it will be possible? In this case, when?

A 162. To a limited degree its already possible to upload your ideas to society's information network --- this is what we do in creating books or paintings. In the next ten years it will be possible for even non-artistic people to record fairly exhaustive memoirs about themselves by using a little device that I call a lifebox. The lifebox is like a cell phone that asks you lots of questions.

Q 163. Which are the most interesting experiments in this field?

A 163. This is a time-relative answer.

As of Fall, 2004. Microsoft has conducted an experiment called MyLifeBits
http://research.microsoft.com/barc/mediapresence/MyLifeBits.aspx
in which a researcher named Gordon Bell has digitally stored all of the paper memoirs accumulated during his life.

The cell phone company Nokia is preparing to market a system called Lifeblog
http://www.nokia.com/nokia/0,1522,,00.html?orig=/lifeblog
in which a person can link and record all of their daily activities by using a cell phone. This is quite similar to what I call a lifebox.

A student named Tripp Millican at USC is writing a thesis about an interface for a filmed life blog.
http://interactive.usc.edu/members/tripp/

Q 164. If our mind could be uploaded, what could happen? We could store it forever (but, why?) or transplant it into another body. Or what?

A 164. I like that you ask "why?" Why indeed! There's enough people anyway!

But, still, most people would enjoy being able to talk to some kind of simulacrum of their ancestors. This would be a useful thing for ones sense of personal identity and continuity.

And, yes, the ultimate dream is that someone might provide your stored mind with a fresh robot body to use. You'd be back in action then.

I think this can happen. I would suggest, however, that machines are going to vanish and that biotechnology will take over, as in my novel *Frek and the Elixir*. So you would be copying your stored mind not onto a brittle robot, but onto a tank-grown clone of your (or perhaps of someone else's) body. This could happen in about a hundred years. It'll be like getting new clothes. Fashion magazines can market new-body styles.

Q 165. Maybe, could we learn a lot of things just downloading files like a computer?

A 165. I think you're suggesting that it might be nice to reverse the flow and simply download files directly into the brain without having to laboriously read them. Like the old dream of learning something by putting the book under your pillow. Or by playing a recording of the book while you sleep.

Once we understand the biochemical basis of memory it could be possible to implant memories. The bad thing is that some powerful person might become a disease that other people catch. Like, a Republican sneezes on me, and I start thinking I'm George Bush?!?