

**SCIENCE FICTION WRITER GREGORY BENFORD ON “HIS BEST SHORT STORIES” COLLECTION**

**By John C. Tibbetts**

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*JOHN TIBBETTS: Beside us is the frontispiece to “Princess of Mars” by Frank Schoonover. Okay? The question is 2016, Kansas City, world science fiction convention. I think I mentioned in a note to you, I’m putting together a panel. John Carter, 2016? So I’ve talked to Stan, I’ve talked to Greg, now I’m talking to you, Michael Dirda of the Washington Post. Put together a panel of appreciation of the character, what happened to him in the movie and maybe where is the character going? Will you join us?*

GREGORY BENFORD: Well the character is going to Mars.

*I think I put you on the spot.*

I certainly would like to go. I haven’t planned my exact trajectory because I’m going to be in London at a family reunion earlier that month but I could just fly directly back and get there in time. It starts August 17, I think.

*Yeah.*

So, yeah, that would be fun to be on, and Stan said he would be there?

*He said he would try. Maybe he was being polite.*

Yeah, he’s always polite. He told me once

*... Very polite... he’s hiking somewhere*

Well, he usually is hiking at that time. So am I, cause I have a place in the High Sierras. He doesn’t but he goes up there and hikes. I would like to because John Carter is that seminar figure. I notice that he has a prior military career, and, which turns out to be crucial because the Martians are not expecting single-armed, or double-armed combatants

*It’s appropriate that he would know about the god of war, Mars.*

Right, right.

*Although the movie left that*

Yes, I was very sorrowful at the movie. They did enough work to have made approximately three movies. There were so many scenes that were cut short, and rendering it incoherent.

*And so many references to sequels which never came*

Right. It was tragic to see them waste so much thinking that they could ditch all the grandeur of Mars and instead of, not hold long shots so you got to take in the majesty of the scene they constructed and, instead, jump cut their way through an entire movie with short little scenes, mistaking it for some kind of exploding car movie. It's a notable failure

*Andrew Stanton seemed to have the right spirit going into the project but something happened.*

He overspent and under-thought the whole movie. A counter example, of someone who actually made something out of very little, is "Ex Machina," the film, where he deliberately shot it like a Stanley Kubrick movie in which he forces you to simply look at this scene and this strange object in the scene and think about it and see the context and look at the subtleties of movement, and that's actually, it turns out, a very inexpensive way to shoot a movie too (laughter).

*Grafting it onto the Bluebeard tale.*

Exactly. I thought "Ex Machina" was certainly the best S-F film I've seen in quite a while. Another example, not quite as fine, I think, is "Predestination," which appeared I think in February of this year, 2015, and is a complete make -- not a remake -- of "All You Zombies" by Heinlein.

*Now I remember.*

And the entire film shot, supposedly you know, on locale, in the United States, was actually shot entirely in Melbourne, Australia with Ethan Hawke and a small cast for an (inaudible) small budget. As I recall, less than a million dollars. Whereas the John Carter movie, what?, a hundred million, something like that?

*Should we be grateful it got made at all?*

No, no. You know, should we be grateful that at least we got the Titanic halfway across the Atlantic (laughter)? I don't think so. Because the ship sinks and then you don't get to do it again.

*Well, it's interesting that from Ray Bradbury to Carl Sagan, they both talk about being out there as a kid on the lawn with their arms outstretched towards Mars. Isn't that wonderful?*

It is. Of course I did the same thing. But my heroic figure in fiction were those of the Heinlein juveniles which really made me very interested in science (inaudible) career. And Tom Corbett came from that, and “Tom Corbett.” I was living in Japan at the time so I actually didn’t see any Tom Corbett. I did see a little bit afterward of Captain Video. I think Corbett came first.

*Yeah.*

Yeah.

*Captain Video was on radio but it was not a space story. He was kind of an adventurer; he went to space later.*

Right. Right. I saw it in the TV mode when my father was at Fort McPherson in Atlanta briefly.

*Isn't it interesting that small screen, that god awful-looking image, could put such a hold on our imaginations?*

Well, something is always better than nothing.

*Teeny, tiny little postage stamp screen.*

I know. When I see people, as I did recently on a subway in some city, looking at a movie on a, on a phone, I think, you know, you’re kind of abusing the medium here. I mean, I did that because it was the only thing possible but it’s like reading “War and Peace” on your phone. What?

*Try to explain that to students.*

You mean the short attention spans, students who are waiting for the end of the sentence (laughter).

*And the limited grasp or need or ambition to look at an image beyond this.*

Right.

*It's ridiculous. Or to look at an image where it's all stretched and nobody has thought to change the aspect ratio.*

That’s true, that’s true. “2001,” to me, was the first great spectacle movie that I thought knocked you over. Course there was always “Lawrence of Arabia” too.

*Before we leave the Mars thing, “The Martian Race.” Talk to me about that book now, and*

*about “The Martian” which has yet to. Now I’ve seen it already; you probably have not.*

I have not.

*But you read the book and know about it?*

Yes, I read it.

*So “The Martian Race,” John Carter, “The Martian Race,” “The Martian.” Connective tissues here?*

I co-wrote “The Martian Race,” actually with Elisabeth Malartre who is now my wife, but I collaborated with her on that because she was very interested in Martian biology and she actually is a biologist, and so we co-invented a subsurface form of Martian life that’s very interesting and the striking thing to me is that the outstanding question on Mars now is is that actually possible, because otherwise it’s very hard to explain the methane emissions we have now measured directly on the surface but were detected from orbit about eight years ago, because the only known mechanism that tends to explain it is subsurface life. That’s the major source of the methane in our atmosphere which converts on the scale of a year over to CO<sub>2</sub>. But in the Martian atmosphere, it both appears in bursty waves; it’ll go up and down at a given location in a matter of just weeks, and it’s not compatible with our understanding of the Martian atmosphere in the first place, that is the rate of processes, rate of breakdown of methane is faster than our models say it should occur, and so something’s off. My suspicion is that there’s some absorption in the perchlorites (?) in the soil which we still don’t understand but we do know it’s there.

*So many of your stories depend upon something is off (laughter).*

Yeah, well it’s been my, my experience in science is that science seen in films typically is focused on the Eureka moment but in real science discoveries typically are moments when you say, “Hey, that’s funny.” (laughter)

*(inaudible)*

It’s not “Eureka, I have solved it!” but “That’s really odd, that’s out of place. What’s going on?” That’s it’s, it’s the suspicion that something is akliter that more often heralds a discovery.

*But back to “Martian Race.”*

“Martian Race.” But the point is, “Martian Race” attacked two things. One, I thought the issue of life on Mars had been swept aside by the Viking experiments; an unjustified sweep, I thought, mostly due to one guy at Cal Tech and his interpretation of the data, but the second is no one really expected even then surface life if only because the high UV rate but subsurface life made

sense because by then, and now, and we knew that the origins of surface water on Mars were much earlier than they were on the Earth because the cooling off time is faster, Earth is bigger, cools off slower, but Earth was also hit by a Mars-sized object shortly after its origins which rekindled all the heating and blew off whatever volatiles were on the surface. So we know that Mars had probably several hundred million years head start on the Earth and if life evolves fairly spontaneously in the right conditions, then Mars certainly had a good chance to begin life, and then over a period of another few hundred million years, a hundred million years, the atmosphere slowly bled away because the Martian magnetic field began to fail and stop screening out solar storms which hit the water in an atmosphere and break it into hydrogen and oxygen, the hydrogen escapes, the oxygen gets locked up in the iron in the sand and that's why Mars is red. What you're seeing on a red Mars is the death of the Martian atmosphere. It has painted the surface. (laughter) Nobody ever seems to want to mention this; why is Mars red?

*A certain elegiac quality to the beautiful*

That's right. It's kind of a dying swan metaphor. But I always thought, "So Martian life might well be there," and people talk about things like, "Let's go drill into Europa and see if there's life in that ocean." Well, honey, you can walk into a cave on Mars and get a good look at the subsurface but, by the way, you can only do that with a human, plausibly.

*So for people who have not read it, what kinds of conclusions do you reach in "Martian Race?"*

Well the frame of the story is that NASA finally commits to a human expedition and then some astronauts in a big booster in the late twenty-teens, that is, coming up close now, blows up on the launch pad, kills the astronauts and NASA stands down. Meanwhile, they've developed a whole lot of this infrastructure and so an entrepreneur oh, notices in the background to support the American program, there is a system that the Europeans actually used in the 1700s. It is the contractual theory of exploration. You say, "We hear there's this place called Thailand. Well, if you go out there and you find it, and you bring us back a ship full of local goods, we'll pay you so many thousand pounds." The British did that in order to push exploration and trade. Well, the nations of the world get together, five or six of them and say, "Here's the Mars prize. It's \$30 billion. You go to a manned expedition to Mars. You grab a bunch of rocks. You do some studies, X, Y, Z, and you come back, we'll give you \$30 billion." And a figure that I've actually based on several billionaires I know simply says, you know, "Here's this prize. Why don't I put together a program AND I sell all the advertising and other rights while we're building the ship and going to Mars, AND we have daily TV broadcasts from the crew." Yeah, I was way ahead of my time. It was published in 1999. "And we make enough money out of just the video rights to probably earn back our investment, and then we get the \$30 billion when we come back." And that's the beginning of the novel. And they actually manage to discover life, and I've written actually several stories set in that same situation since. Indeed, I wrote one this year. It will come out in FNSF in about two months; a story called "Vortex" which Gordon Van Gelder asked me to write on the basis of a Bob Eggleton painting, which shows some space-suited figures in

the middle of what looks like a tornado on the surface of Mars, so I wrote a story about (inaudible) doing that old kind of style of stuff

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## Track 2 Sub Surface Life

*JOHN TIBBETTS: You love dealing with alien life forms, so what did you find in those?*

GREGORY BENFORD: Subsurface life that has sat and evolved without the competition from the surface that our subsurface life has for billions of years, so it has evolved into a different strange kind of sentience and therefore can sense changes around it but it's not an individual species in the way that we divide up evolution, and so the main Darwinian views of natural selection don't quite operate the same way. There is selection for parts of it but by definition the thing has moved all the way around the planet. It's inhabited the subterranean -- well, wrong word really. Sub, uh, what would it be? On Mars. I'll think of it in a minute. Eris (?), sub-eris (?) -- not a good word.

*Well, the Tarkovsky film, "Solaris," or the book's film came to mind -- a sentient planet.*

Yeah, that's right. Actually his was an ocean. This is a subsurface life form. The salient thing is that it came from the surface long, long ago, still have a connection to the surface. It's fed by hotter fluids from below which we know are on Mars, particular sulfur dioxide, and methane is a waste product of, for life like this as it is for our subsurface life, running off internal heat and chemicals, so what does it look like and can you actually get it to recognize you or to understand that here's another thing from the surface, and what does it think about the surface, and so forth. So I got involved with that, and I still find it intriguing because I think there's very good chance there is subsurface life on Mars, but I served on a committee at NASA in the mid-90s to look into exploration -- subsurface -- on Mars and we decided that it would cost over a billion dollars to do one drilling on the surface of Mars. You got to pick your spot and you get one drill and that's it. So we then, this is under Bruce Murray

*... a dowsing rod, I guess*

No. Well, you can have a dowsing rod but somebody's got to hold it (laughter). So Bruce Murray was in charge of this and we started a sub-group to explore robotics and decided that the best way to look for subsurface life was to run a caterpillar type robot with power feed into one of the many caves we know and have seen from orbit on Mars. There are over a hundred known caves on Mars. Some of them very large; most of them lava tubes from the old volcano Olympus Mons and other areas around Gusev Crater too.

*How do you spell the name of the crater?*

Gusev, G-u-s-e-v. It's the name of a Russian astronomer in the nineteenth century who spotted it reasonably well. So the robot runs in and you get subsurface for free because you're in a cave and you just go as far back in the cave as you can and see if you can find life forms or drill in the wall of the cave. This is based on work done by Penelope Boston who is an old friend and has done a lot of cave exploration for anaerobic, that is non-oxygen breathing life in places like Mexico. There are deep caves that are totally functioning without oxygen in various parts of the world; Mexico just seems to be the closest one that we can readily get to.

*Has there been data gathered since your book that in any way confutes or affirms what you...*

Well the number one datum from Mars is the repeating bursts of methane which we can't explain by any geological mechanism. And it is very odd. And there was a lot of hostility to this view, a lot of skepticism. Chris McKay, an old friend at NASA Ames said to me about six years ago that he was dead certain that these measurements would be proved wrong. Well he was proved wrong. And they're definitely there; we got them from the latest rover, and we're waiting to see if we see more too. They're local and sporadic which suggests something; that is, that occasionally there are venting from a biosphere below. We're not talking about a great deal of methane but there's not a great deal of anything on Mars. The atmospheric pressure is one hundredth of what it is right here. That is one of the problems with "The Martian," the movie and the book, that in the first chapter there's a big windstorm but we already know that the pressures from that windstorm are not enough to blow over a landing craft, particularly one that was carrying humans, it doesn't make any sense, so that's kind of a false note. The other one is that there is no assigned purpose for that manned expedition at all.

*I kept waiting for what the agenda was supposed to be.*

The author, a well-meaning sort, really great on details, doesn't seem to notice that the manned expedition doesn't have anything to do. The only measurement he's carrying out throughout the whole novel is to measure the pH, that is, the acidity of the soil, but we measured that in 1977! And we've measured it repeatedly since. We know what it is; it's somewhat acidic. About a pH of 5 or so, 5.5. Duh!

*I'm wondering about the landing tipping over; because wouldn't somebody have figured that that was a possibility if those kinds of winds were possible?*

Well, look at it this way. The power of the wind is proportional to the density of the air and the temperature gradient that drives the pressure, right? Well, temperature gradients are about the same, actually a bit more than they are on Earth, but the atmosphere is a hundred times less dense! There's not a storm that can blow over a landing craft, it doesn't make any sense. Or if there were enough atmosphere to do that job, it would be much easier to land there.

*To me, it's a great irony about this book and film because here we are growing up yearning to go to Mars; John Carter (inaudible) to go to Mars, and in this movie they're yearning to come back to Earth.*

Right.

*The trajectory is reversed (inaudible).*

Well remember the great exploratory tale which inspired, by the way, apparently, both "The Tempest" and "Robinson Crusoe," was the story of shipwrecked mariners who try to get back to England at all costs. Instead of saying, "Hey, we're in Tahiti; we don't want to go back to England!" (laughter) You ever think about that? Why were they desperate to get back to England? Well, it can't be, you know, the play's the thing. That doesn't make any sense. But even at the time of Shakespeare, which was a really long time ago folks, the tales of returning mariners were spellbinding to the English, you see, because the sailing ship was their rocket.

*Well, I wonder if there's something going on in our culture, though, that's fastening on upon a story of coming back rather than going. The movie opens with them there already.*

Well right, because, unlike John Carter, we can't plausibly make up anybody to fight on Mars so what you've got to fight is Mars itself, to survive.

*Hmmm. Well, that was Stan's (inaudible).*

Exactly. Why don't you turn it off; I want to get some coffee.

*Yep.*

You know, we have our old kerfuffle over his latest novel but that was, that's another issue, that's starships.

*Okay. I'm about to forget where we were exactly. Well the idea of the whole*

*"The Tempest."*

*... come back rather than go there.*

Right.

*Does that represent a shift in our global consciousness of Mars at all?*

It's an important one in that if you look at the earlier Martian site movies, at least, it was either

elegiac, Bradbury “Illustrated Man” sort of thing or it was “Rocketship X-M” where you go there and you find out that they had a nuclear war and they descended into savagery and they don’t like us. I was, I was very pleased with it.

*(inaudible at 8:43)*

I loved that too. Yeah, it’s cruel. Did you know that they actually threw that movie together and shot it in a matter of just a few weeks, on a low budget, in order to try to scoop “Destination Moon?”

*And it’s much better than “Destination Moon” as far as I’m concerned.*

And it is!

*And did you know that Dalton Trumbo wrote that script?*

I didn’t know Dalton Trumbo wrote the script.

*(inaudible at 9:07...) have the rights to that film.*

Really? It makes complete sense that it was. I

*It’s amazing that a film made on a buck, \$2.80, did really much better than a film that won for special effects and cost umpteen million dollars (inaudible)...*

Well, that’s right. Well, the wooden hand of Hollywood can do anything with money except, typically, improve the quality of the script. You see, the script’s already written! And if you go with a bad script you’re going to get, inevitably, a dull movie. And unfortunately Heinlein said to me, he too thought it was a bit dull but he didn’t have sufficient hand in the script and he didn’t like the introduction of the Bronx (?) character and so forth for local color and all that. He said he would have made up some more interesting problems for them to solve.

*And it also doesn’t have the actress Osa Massen.*

Yes, that’s true.

*Who is the heartthrob of all of us early science fiction ...*

Yes, she was, she was our Ursa Major in a way.

*(laughter)*

So, I like that film. I really should see it again. It was a bleak photography and, as I recall, they shot it somewhere out in the Mojave Desert.

*I know a guy who owns the rights; they went back and shot some new scenes because in the original print the rocket that takes off from Mars is a, what do they call it, the Red Stone or something.*

Red Stone.

*With the gantry and everything.*

Really? And a... a gantry set up on Mars?

*(talking over each other) No, he re-shot with a special effects rocket going back. A lot of people hate him for this but he couldn't stand the idea of the middle of the film having a gaff like that.*

Exactly. No, no, I can understand that.

*So we seem to be preoccupied with coming back rather than going? I'm fussing on this.*

Well, here, let me give the deep reason. Ever think about "The Odyssey?" It is about going out, finding the strange, and coming back. Odysseus, again and again, goes to a strange place, encounters something, usually a peril; you know, the cyclops or the (inaudible), blah, blah, uh Cerberus and then comes back to a resting place -- a city state -- and then goes out again. And it's this oscillation between the frontier and reassurance of civilization that is, I think, the founding myth of Western civilization.

*(inaudible)*

Yes, yes, well you always want to sail back, don't you? Well that's the point because, you see, if you stop trying you go to hell. Faust. (laughter)

*Okay. Music is everywhere in your stories. This book was my introduction to your short stories, I have to tell you, as opposed to the novels. Yeah, "The Best of," which is our nominal topic here, I guess, and I'd like to ask you about that. Music and the arts, language, music. Uh, it's in the story "Sigma."*

"The Sigma Structure Symphony."

*Wow, this has got to be some kind of a capstone story for you, and is it going to be a novel and*

Yes. David Hartwell commissioned a story based on a painting which has now been published in

a book of five stories, I think it is, all of which depict this painting as a scene of some kind in some story. Gene Wolfe and a bunch of other guys are in it, too. So I put it into a novel I'm actually working on very slowly about a librarian at the SETI Library about two and a half centuries from now, and I simply looked at things that could happen to the SETI librarian and each one I've written as a short story, and this is the latest of those. My next major project, perhaps for 2016, is to shape all of those into a novel.

*Cause this is the only one of that series I've read.*

Yes. "The Sigma Structure Symphony" is the most sophisticated story I've written in that series, and the longest, because I have always been interested in the problem of it's fine if you have all these SETI messages but how the hell do you read them? What is your Rosetta Stone to read these, essentially, ancient texts because they were broadcast in some cases very, very long ago or written long ago, and repeatedly rebroadcast by what I call funeral pyre beacons in the galaxy which in a couple of papers in *Astrobiology*, the journal, my brother and my nephew and I presented a series of calculations showing the most likely kind of beacon to hail people across great spans of the galaxy is a light, almost lighthouse effect in which you send fairly short bursts to attract attention and embed a message that tells you where to look for a rather longer transmission at lower powers. So once you've got them, caught their attention with a spotlight, so to speak, you then convey most of the message in something that costs you less money to build. It was an economic view of SETI.

*And your character Ruth seems to be uniquely equipped to interpret, understand, encode all this.*

Right. The character Ruth, who is the lead character of the novel eventually, has a whole lot of skills that we don't have typically now and is essentially looking for structure inside mathematical messages which, if you don't have a Rosetta Stone, is almost the only way you can unwrap a SETI message because it's got to have lots of clues in the structure of how you read it. The classic example, evolved by Frank Drake and Carl Sagan, was you send them a transmission that is X number of 0s and 1s basically long -- a digital transmission -- but that X number actually divides into two primes. That is to say, there are two prime numbers being multiplied together will give you X, and then when you plot the 0s and the Xs on, say, the width is one of the primes and the length is the other, then you get a picture.

*Oh! Yeah!*

That method they worked out in the 19, late 60s I think, and it's still a plausible one, but there are other ways of embedding a clue in a message and Ruth's story in part is about trying to find out these things.

*(overlapping talk) really don't we go back to (?) solving the code in "The Gold Bug?"*

Yes, right, it's like "The Gold Bug."

*...process. Now Bach and the Sigma Math hit on the same complex notes. To them it was a theorem and to us it is music.*

Right, yes.

*Wow!, that hit me over the head!*

Yeah, it suddenly occurred to me that we know that in the human cerebral cortex musical and mathematical information is stored very similarly and they come from the same parts of the brain, and it explains why there is a high correlation among particularly theoretical physicists and mathematicians for music. I don't know if you realize that but there have been studies done. It's not an accident that Einstein was a fairly lousy violist

*(laughter)*

... but he *was* a violinist, and almost every mathematical physicist I know, including me, has played an instrument at some time or another or is a big music fan. I'm particularly a Baroque kind of guy and classical but I still think it's obvious that J. S. Bach was the greatest musician of all time, and he has no rivals. And which is interesting and mysterious because this guy died before the American Revolution and we haven't had anyone of that quality since.

*Well, there has been work on mathematical structures seemingly embedded (inaudible)*

Oh yes, there's been lots of work studying Bach's methods; how do you build all these fugues so intricately, things like that. There's interesting (intricacy) and is intercut as, say, the Chartres Cathedral, if you've ever seen it. When you stand there and look at the majesty of all these soaring columns and these domes, the strut work, and realize that they built it this beautifully but it's also extremely strong! It's going to be here for centuries, has been here for centuries, and the necessity made you fulfill the obligation of "form follows function" and that's true in music too, that the form, it follows the function in Bach of construction, intricate mathematical sequences.

*And at no time are you saying that there's a risk of rendering the music sterile by dissecting it mathematically. You never imply that. That's not going to happen in your world.*

Well, it doesn't happen in the real world because no one would argue that, say, the Mona Lisa is devalued by doing a spectral analysis of its colors. I mean, you can understand a thing at a different level by looking at "how did he get this color and this strange tint?" and so forth, and you look at the spectra and you find out that certain bands have been expressed or enhanced. That's technique. It's like saying, "How did they build this Chartres Cathedral anyway? Oh, that's right, that's a hyperbolic arc." There's a reason these things work well. I mean, just like

the golden ratio which describes the Parthenon which is a

*Galileo*

Right. It's that there are principles in architecture that emerge from two sources. There's the human aesthetic, "Does this look beautiful?," and also "Is this statically stable?" And the Parthenon is actually remarkably stable. After all, it's been here over 2,000 years.

*Before we go any further, can I ask you to read a paragraph of your prose here, from "Sigma Structure?" It's "Where she sat"*

"She trove," is that the beginning?

*Could you just read that? I'd love to hear it.*

"She trove the background database and found human work on musical applications of set theory, abstract algebra and number analysis. That made sense. Without the boundaries of rhythmic structure, a clean fundamental, equal and regular arrangement of pulse repetition, accents, phrase and duration, music would be impossible. Earth languages reflected that. In Old English, the word 'ryme' derived from rhythm and became associated and confused with 'ryme' (?) an ancient word meaning number."

*Linguistics, music, math? Holy mackerel! Thank you for this. Now, I'm going to pair that with the great Galileo quote that you use, and I'm going to ask you where that came from.*

It occurred to me, in that thing about "ryme" (?), I should have mentioned we also get the Arabic word "algorithm." Yeah, an Arabic word.

*Something about reading something out loud triggers*

Yeah, yeah, exactly.

*It's one of the things I love most about teaching. Once your open your mouth and start talking, other things, unexpected, begin happening.*

Well, but it's the origin of the Freudian shlip... slip, also the Freudian schlep

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Track 3 Gregory Reads

GREGORY BENFORD: "... the universe, which stands continually open to our gaze, but it

cannot be understood unless one first learns to comprehend the language in which it is written. It is written in the language of mathematics and its characters are triangles, circles and other geometric figures, without which it is humanly impossible to understand a single word of it. Without these, one is wandering about in a dark labyrinth.”

*JOHN TIBBETTS: What a noble passage. You know, I would have thought that's from "The Starry Messenger." I don't know what the assayer (?) is.*

Right. (inaudible) stuff from exposures. The assayer. I think the assayer is part of "The Starry Messenger," isn't it? But I've forgotten.

*But I've always thought the word "starry" is the most beautiful word in the language. I can say that because my mother's maiden name is Starry.*

Really?

*Yeah. Isn't that beautiful?*

That's actually a surname?

*Yeah. "Time Shards."*

Oh yeah.

*Here we go. And among several stories, it would seem you're dealing with how do we deal with languages, how do we make connections with other cultures. "Phonograph technology." You had me convinced there was really something back in the past where we had actually heard sounds coming from an urn before. You had me convinced of that. I think in the story somewhere you had him saying that this had been done before.*

That's right. He says so in the story, a story I wrote, I think in 1979 for, on demand for Terry Carr who called me up and said, "Look, I've got a hole in this anthology. I need something like 3,000 words long."

*And aren't we glad he did.*

And he called me on a Friday evening and I wrote the story on Sunday and mailed it to him Monday.

*(laughter)*

And I wrote it in one sitting because this idea had turned up in a paper in an engineering journal

about attempting to do this, and at the time the guy had not done it. But it has been done since, several times.

*What can you tell me about (overlapping)*

Oh. If you put a pot on a turning wheel and inscribe it with a very, very fine point -- which was done many times through the history of pottery and crack pottery -- it is possible to actually put the acoustic sounds in the environment into the joggle of that fine point and to inscribe it on a pot, and that has been heard, mostly as -- weirdly enough -- I've said in the story you can hear a horse in the background because it occurred to me that would be a common thing and it's loud enough and it's regular enough and, in fact, we have heard such a thing on a pot.

*That's mind boggling.*

Mostly what you hear is the thumping of the turning wheel because, you see, you have to push with a pedal, you have to push it with a pedal and you can hear the pedal of the guy driving the pot.

*That's amazing. Even if that's all it is, that's still unbelievable.*

Right. Yes. Someone told me that there was a plot element stolen from this story for the, what is, "The X Files" in which somehow they had a pot in which was inscribed the sound of Jesus saying something to Lazarus, and therefore if you could get the sound of this, it would be what Jesus said to raise Lazarus from the dead. So it was a method of restoring people to life. He told me about this show but I haven't seen it. I was not a fan of "X Files." I don't like mystification much. But apparently it exists and I was told by another guy in Hollywood that that's where they got the idea.

*A Richard Mathieson story, "The Traveler" takes it to the Crucifixion, and here, so you're taking this to a moment perhaps of the conversion to Christianity itself.*

Something like that, yeah.

*(laughter)*

It's kind of odd. Going back and visiting the Crucifixion is now almost a cliché in SF. I thought the best treatment was "Behold The Man," by Mack Morchan (Michael Moorcock?). Oh, it's really worth reading.

*Okay. File it away.*

Yeah. Won a Nebula.

*Meantime, the ultimate irony about this is that one of the characters is listening to this, is just so dismissive. Well, we heard advice about sheep, all of this*

(laughter) Yeah, yeah, right.

*... all of this renders it un-useful or illegitimate or, it just. I mean, I don't care if it's a baaing of a sheep; it's still history, it's*

You've got to realize that at every stage of human progress, there are always cynics and naysayers. "Oh, yeah. Oh sure!"

*This guy is dismissing what is occurring*

"Oh, oh sure, Newton and this apple falls. And that explains why the moon goes around? Uh, yeah, I don't think so. Uh, uh, no I don't see any connection there at all."

*Don't you think that what people in the future are going to be interested in is really the Desiderata of our language and our artifacts and all of that? They're not going to want to hear us declaim something profound; they want to know how we breathed and loved and lived. That's what this is!*

Yes. You see, it's easy enough to get from ancient history a large series of brags because most of the great stuff inscribed by rulers is brags about how terrific they were. "I, Ramses," you know

*Ozymandias.*

Ozymandias. You know, I wrote a whole book about this. "Deep Time," whose subtitle is "How Humanity Communicates Across Millennia" and the short answer is mostly it doesn't

(laughter)

... except the accidentally. And only occasionally do time capsules and deliberate messages actually get through.

*Well, Gregory, you have found a pot and it looks like there's something on it. What do you hope would be on it if you could listen to it; what, maybe a moment in history or something?*

I'd, if I could really go far back in this, I would like to hear linear A, Greek linear A spoken because from that, if we could associate it with a text or something, would allow us to decipher linear A which still is an unsolved problem. I think I've got this right; linear B we know how to read but not linear A.

*And we don't know what Greek music might have sounded like.*

And we don't know how Greeks, a Greek pronounced any of these words. We don't have oral information about language at all from the ancient world. I mean, we barely have a recording of Mark Twain speaking and, Christ, that was only a little over a century ago. I mean, you can hear his Missouri accent.

*Well, supposedly somebody says that there's some kind of recording technology of Chopin playing the "Minute Waltz."*

How long is it?

*(laughter)*

*(laughter)* "Oh, sorry, that's the "Half-Minute Waltz. I got confused."

*So all of these projects that are afoot to see; I mean, what did Brahms' voice sound like? How far back can we go to actually hear a sound from the past?*

It's very hard. I mean, that's why I wrote "Time Shards." Terry said, "I need this story," and I sat down and I wrote it on a manual typewriter, one draft, that's it. Because I tend, I like stories that run on their own melt (?) as the saying goes, to steal from Frost. I mean, when you get started, that's, you see there's a reason that really like writing, is you get in the zone and you just write, and people who talk about sweating out the words and Balzac quibbling over a comma for a day and all that is utterly the opposite of the way I write. Writing has always been a hobby of mine which I do, while I was also being a theoretical physicist and running a plasma physics lab and consulting and doing things like that, because it was fun! Because you could sit down and do something complete, just let it flow right out of your head, and that's the kind of creation I like.

*But then you revisit*

I revisit and do some rewriting. I actually do very little rewriting, less than maybe five or ten percent of the narrative.

*(inaudible)*

Well, I am spectacularly lazy. I talked to Heinlein about this. He has a parable about the lazy man who invented all these labor-saving devices because he just didn't care to do a lot of unnecessary work. Well, I was working and writing a great deal of stuff, including "Timescape," on a manual typewriter; a really great Royal which I still have with a Canterbury typeface, and I

hated retyping. So sometimes I would write in triple space so that I could handwrite in stuff and still force it off on an editor who would have it retyped and set in type, just because I just didn't want to waste time retyping stuff. And you know, computer, the moment I saw a really good workable computer in 1979, I paid \$10,000 to have a custom computer built so that I could use for calculations and word processing which was, for over a decade, better than anything commercially available. It finally died on me.

*(laughter) Huh! Overwork!*

It was written in CPM language which I could write in but CPM is extinct like much other coding methods that I've used, although FORTRAN -- my first coding language -- still works and is still used. It's the basis for MS-DOS and also for the software called Mathematica, which is the best general mathematical software. And you can still write in FORTRAN, in Mathematica.

*I find it, I find it odd to run across writers who seem to boast about the fact that they only write in longhand. It's like a jazz musician boasting that he can't read music. Is that something to boast about?*

Well, I don't really care much whether people write in longhand or not. Joe Halderman does and, each day, it's in a different color of ink so he can tell how many words he wrote. That's an artifact, by the way, of his devotion to Hemingway, who literally counted the words he wrote every day, you know, which is, goes, you know, that's super anal, whereas I will typically look at how many words I wrote in a day just so I have roughly an idea but that's done by a machine. I don't, never occur to me to count words. On the other hand, the easiest way to tell an amateur from a pro in writing is if, when you say "How long is this thing you wrote?," they give it to you in pages instead of words. (laughter)

*But if I show that to somebody, how long did it take you? How long did it take you (inaudible)? That's the only reaction you should get about anything (inaudible).*

I never ask that.

*How many words did you write? But for somebody to boast about the fact that they don't read music, to boast about*

Yeah, that's odd

*I find*

Right

*How many jazz musicians have we heard say that? One, I don't believe it, and two, I think it's an incredibly self-limiting thing to say.*

Paul McCartney said that he only learned to write music when they were in the middle period, right about "Revolver" and "Eleanor Rigby," when he started to work with that string quartet he famously brought in to do the background passages because then he had to talk to them about, you know, this should be in C Minor and so on, but that John Lennon never learned to read music. But you know, I learned to read music and have forgotten.

*But you would think you'd want to embrace*

Yeah. If I was composing, I would re-learn music, how to write music.

*Now, going to switch gears. I came armed with this very tiny quote from "Exposures." "I do not believe that there is a communion."*

Yes.

*Are you into a kind of not, agnostic gospel thing here?*

Well, yes, I'm an Episcopalian so

*Well that's clear from some of your characters.*

And I was an acolyte in the church when I was twelve and thirteen, and I always assisted in the communion service and therefore, you know, I got to schlep out the wafers and then the wine, and the problem is that it was in the old days when the acolytes wore the full robes and it was July in Atlanta with no air conditioning in the church and you were always in danger of passing out. So it made it a spiritual almost against your will. You were barely holding onto consciousness and so it actually has a kind of hallucinogenic effect on you when you're trying to get through the service. Thank god they didn't drink too much of the wine

*This is, this is a pun on the word "communion?"*

Yes.

*It's not just a churchly ritual but communion as an interaction of (inaudible)*

Well astronomy has a form of communion with the infinite. That's what "Exposures" is about. Everyone's had the spiritual experience of gazing into the night sky and saying, "Good lord, look at that!"

*When they can find a night sky with (inaudible)*

Uh, if you can.

*It's getting harder.*

Yes, it is. Although in Kansas you get out away from the city lights, you're fine.

*Well, I was in Montana recently this summer and, oh my god, it was like I had never seen the sky before even though I grew up in the Midwest.*

Oh, it's one reason I have a place in the High Sierras. I spend the summer there and you can see the entire plane of the galaxy walking among the trees.

*"But I do not believe that there is a communion." Is this almost kind of a credo for you?*

Uh, yes, there is.

*You're not a religious person in a more*

Not overtly religious but there's a difference between spiritual and religious, but there is a spiritual sense that humans have and I think it comes from being deeply embedded in our evolutionary progression because remember we're the only branch of the primates that actually got out of Africa and spread over the whole planet. The other forms of the higher apes that we're with never got anywhere except the orangutan was, managed to get to Madagascar I think or maybe beyond, and we did so very rapidly. We now know new forms of early humans, like the (? At 15:32) or this latest discovery in South Africa or the ones near New Guinea, that we had many different forms and we obviously evolved very, very quickly in our perception of the world and spread through it, and we picked up a whole lot of skills and you can see it in our local adaptations now. We're the only one remaining, all our competitors are eliminated, the most recently apparently the Neanderthals, and there are vestigial little signs of local adaptations, what we call the races, the Mongolians, the Caucasians and the Negroids, but these are tiny little differences in skin color and nose size and the folds of the eyelids. Really just cosmetic changes. Nonetheless, those are local adaptations for the world and so we are deeply rooted in the world individually.

*I think Harold Bloom has a new book out where he talks about the American sublime where the sublime is within, it's not without.*

Yes, right.

*The human (humanist?) sublime.*

Humanist. And, but the modern sense is to merge that sublime with the technological sublime so the perspectives of the universe you get from telescope give you the technological sublime. Or there is the sublime nature of just the technology itself. And here the rocket is the technological sublime for the expansion of human horizons now which five hundred years ago was the sailing ship.

*Send them a clue (inaudible) that extends art.*

Yeah. Well it's technology that extends the human grasp.

*Yeah, okay. If I could take maybe another ten minutes. You've been so generous. That leads us to "The Voice." Now, the Big Read is set for the spring here in the Midwest and it's going to be "Fahrenheit 451"*

Again? Boy, L.A. did that

*Well, we're catching up. Not my favorite book, by the way, but that's off the record.*

(inaudible question at 17:38)

No.

That's a really good book. It was The Read in Mammoth, California this last summer. It's really terrifically good. The great voice of the late nineteenth century.

*Well what I'm getting at with this is in the Big Read that Michael Dirda's coming in, I'm going to do some stuff and they want me to talk about "Fahrenheit 451" in whatever direction I'd like to take it. So I come across "The Voice," just a few days ago. "Centigrade 233?" Talk to me about "The Voice." This is an acoustic, macluinesque (?) acoustic world these people are living in.*

Yes. I first wrote in a tribute volume to Ray Bradbury my story "Centigrade 233" which is the same temperature, which is set in the future rapidly approaching in which people don't read in physical books much any more, and so it's a satirical take on that. Ray liked the story, he told me actually.

(inaudible)

Yeah, it was in a tribute anthology and I was doing a signing with him and one other person who was in the anthology. I've forgotten who that was; maybe Harry (?), and he sat next to me and he said, "You know, I just read your story. It was really terrific. It really knocked me off my

pins” or something like that, because it’s a satirical look at what might happen. The flip side of that though is that the digital revolution now plainly has allowed many more books to be published. There are more books in print now than have ever been, by a factor of several. I mean, the number of books issued per year in English has gone up by a factor of about three in the last decade. It really is not going away (laughter).

*(laughter)*

And that’s because you can self publish and so I’ve been able to take several of my novels that I got back from New York publishers, put them back into print and keep 85% of the money! It only costs 15% of it to sell it to someone and make it.

*Well, you describe the “narrow age” of literacy.*

Right.

*Quote, “a time of constrained modes, hopelessly linear and slow. People were divided by their access to information.”*

Yes, that’s right. Everybody talks about being able to read opens up the whole universe, which is true, but we now have a lot of people who read but not well, who can understand the street signs but not Shakespeare, and that mode in which visual information comes at you so fast can, in a way, easily triumph over the linear word and sentences. After all, that’s what movies do. Look at it this way: you can look at all the paintings of Vermeer, which I have, in person, seen every one in person.

*Even the one in Buckingham Palace?*

No, I, you’re right. Touché. I saw that in a print. I haven’t seen the one, and wasn’t that a great movie?

*Absolutely. My favorite movie...*

“Tim’s Vermeer,” god, unbelievably good. But you can see all of his work in an hour, easily enough, in prints, but try digesting all of Faulkner’s work. You can’t do it in a month.

*Not sure I’d want to.*

Well, I’m a Faulkner fan but I haven’t read everything because there’s a great deal. So there is a place for visual information and I just want to satirize it quickly into “Voice.” “Voice” just came to me out of nowhere, and I sat down and I realized it was an intersection of Bradbury and I think Asimov to some extent. I’ve forgotten actually what I was thinking of when I was writing

it but to think of a future in which writing was the secret language and it was used by the underground because if you know much about the ? (at 21:25) in the Soviet Union, that was the underground. You, it was actually carbon paper-made fanzines basically. I took that to mind because the first fanzine my publisher, my brother and I ever published, called “Vacuum,” was done with carbon paper just the way they did it with ? (at 21:46) in the Soviet Union. You know it was a capital crime to own a mimeograph in the Soviet Union? In the Stalin years. *A capital crime.*

*If you stop and think about it, I guess you can understand why it would be.*

And typewriters were, had to be licensed. You had to get a permit to buy one. When I was in the Soviet Union in 1984, I noticed that a sure sign that the regime was starting to crumble was there were not one but two padlocks on each Xerox machine in a national laboratory (laughter). You had to go to two people to get it unlocked and make a Xerox copy. Those little visual cues, which I wrote up in my report to the CIA, which is, are really telling. Nobody remarks on it, it’s just there’s some padlocks over here on the Xerox machine. Isn’t that odd? Well, it’s not odd to them. That’s the point.

*Well, you write about this growing independence from linear print slavery. Do you think this is happening?*

Some people regard reading as an encumbrance.

*(laughter)*

No, that’s obviously true. Look at the people who don’t read the textbooks among undergraduates. I hear this all the time at UC Irvine. You can assign the text but you can’t force their eyes over it and oddly enough the texts have gotten longer and longer so that they’re heavier and heavier and cost more, and the revolt against that is two-pronged. One is to a) not read it, or just go through enough in order to solve the problems. You see that all the time in physics classes. They won’t actually read the chapter; they’ll just go, “Well, I’ve got to do this, so here’s this piece. I’ll read that and see if I can take it out and,” which is a very bad way to try to learn physics. And the second method is to simply put all the books into a Kindle edition, which has happened.

*I know. Me too. I’ve never revisited them, the books. Okay...*

###

Track 4 Centigrade 233

*JOHN TIBBETTS: What are you saying about “Centigrade 233,” let’s keep with that title, about*

*“Fahrenheit 451.” Does the book live? Does the book need to be somehow re-envisioned? Not to rewrite Bradbury but make the book relevant, if that’s the word, for future generations?*

All the other methods of presenting art, science, so forth, are evolving, particularly along the visual axis because we get so much information visually. I mean, the eyes are not really in any sense independent, right, they’re so closely integrated that by the time information gets to your brain from your eyes there’s already been a great deal of processing done on the way, along the optic nerve. So print, books generally must evolve too, and of course it always does. I mean, we like Jane Austen novels and so forth. It was written in a different time and place and they’re written very well but there are many, many ways to tell that story. So much nuance is conveyed aurally and visually beyond the written word. The written word has a nice solidity to it but it’s just one of the ways.

*But when Francois Truffaut gives us images of people walking back and forth in a semi-trance, reciting the books they have memorized, that bothered me a little.*

It goes back to “The Odyssey,” which let’s remember was conveyed forward for centuries by memorization, before they had written language at all. So we know that text can survive a long time; if they’re important enough they will be memorized. The thing you don’t realize reading “The Odyssey” in English is, in the original Greek, apparently, it rhymed, which is the only way to make something last a long time is the rhyme keeps you suggesting the next line, and so that was the invention of song too. That’s why songs rhyme, because you can remember them better that way, and we’re back to Frost again.

*But as they recite these books, they memorize and recite them in days to come, they will change. Can the prose of a Dickens or a Bradbury, the prose style now, can that survive the changes of endless re-tellings?*

Well, there’s always a transcription error problem if you’re doing it orally alone, but I would point out the Borges story about the guy who could re-construct portions of “Don Quixote”

*Oh yes*

... because he immersed himself in the time so he could go into a trance and get into the same state of mind and so write portions of “Don Quixote” which is a supreme feat of creation to have immersed himself in the past so much that he can literally create exactly the same thing. But the point is, you see, that Borges wrote this satirically because it’s a satirical view of the originality thesis. My god, what a supreme feat to do exactly what was done! And you know it’s true because he gets exactly the same words. That’s the fetish of authenticity.

*Do you want your books to be memorized and recited to future generations?*

No. No, I prefer that they be inscribed in large type on the sides of mountains (laughter).

*Then we can have people stumbling across these marks on the walls, like in the stories.*

I would prefer granite, if you don't mind, not that messy sandstone that everybody else is using. (laughter)

*(laughter) Well, we're going to have to get out of here. Is there a question that you've always wanted to be asked during an interview but somehow never comes up?*

Where are the drinks? (laughter) Well -- a question

*I never get anywhere with a question like that, as a matter of fact. People say, "No."*

Yeah, I can't, there's no particular question I would like to be asked. I mean, if I want to say something I just say it anyway. (laughter) I'll use any pretext. So where's all this work going to appear?

*Okay. Well, I'm going to contact "The Journal of the Fantastic and the Arts," for one thing. I know people there and I've published on Straub there before, and at the same time I'm working on the radio. That's why I had you read some of these quotes, and I'm going to submit it to a public radio station here and see maybe where it goes. I've had good luck sometimes getting into the national platforms. So whatever I transcribe, it's going to come to you first, and as far as any of the vocal stuff goes, well I'm always apologizing for ambient sound and I just don't even do it anymore. I think ambient sound is pretty terrific sometimes.*

It's fine. The occasional babble of

*Unless, unless it's what I interviewed a great violinist named Aaron Rosand and there was a waterfall at the far end of the hotel lobby and it was a monsoon on the tape.*

Because it probably, probably if it was a curved wall then it was acoustic focusing on you.

*Probably.*

And you didn't notice.

*No. Okay. A last quote, sixty seconds maybe. "Mentalities cannot persist without the rub of the real."*

*"The rub of the real," I always like alliteration and "the rub of the real" is, that must be from "Times Rub (Rough?)," right?*

Yep.

*Yeah. Well, actually, you quote it also in, (inaudible)*

In “Time Shards?”

*Page 592 (laughter), “the rub of the real.”*

Right. “The rub of the real” is the feeling that it, I deal in abstractions and the first part of my career was primarily a mathematical physicist so I’m always instructed by the rub of the real because it reminds you that mathematics is enormously powerful but it is an abstraction and the world is messy and, or as another character of mine occasionally says, “Nature bats last.” (laughter) I’ve always liked short summaries of ideas and “nature bats last” is one of my favorite. The other element is that behind “Time’s Rub” is what’s called Newcomb’s Paradox which I think is explained, well, somewhere or other.

*Oh, I’ve heard of it but you’ll have to*

Newcomb’s Paradox is, I can’t recite entirely, but it’s about placing a bet based on a prediction made by a superhuman intelligence and what’s the smart way to make the bet. Newcomb made it up but never published it but he told people about it, it became so well-known it became a logical paradox and there’ve been books written about it. But I went back and of course I knew Bill Newcomb, I published a number of papers with him. He was a theoretical physicist at Livermore when I was a post-doc at Teller and then a (? at 7:21). So I never really had any other solution to it and Newcomb himself didn’t really have a solution; he just thought it was an interesting paradox. But about six years ago when I was talking to a mathematician about it, we realized that there’s a way to confront it using a piece of mathematics that I barely knew, and so we actually analyzed it using this kind of decision theory and found out that the paradox is evaporating. That is, it’s not actually a paradox; if you frame the paradox in English, there is an infamy which you know is a syllogism with a missing middle.

*Okay.*

That’s a Greek term which no one seems to remember, and so if you unpack the sentences, you realize there’s an assumption hidden in it and if you do go into an actual calculation of decision theory, there’s a point where you have to make a judgment and so you get two different answers depending upon how you make this judgment. I can’t go any, into any more detail, but what we did was show that the paradox doesn’t exist, if you do it mathematically and that’s a good example of how mathematics can tell you something that language, with its sloppiness and slipperiness, cannot because it’s not logical. But if you do formal logic on it, then you can see that it’s not actually a problem.

*Somehow you have mastered both, both (?) kinds of languages.*

Right. Well, I started out being good at mathematics and I realized that was a thing I could exploit. I remember in high school, when I could easily learn calculus, and everybody else was saying, "Gee, what, this is really tough." It was the first year calculus was taught in U.S. high schools, public high schools, it was 1958 when my brother and I went back to school in Dallas, Texas and the results of the, what turned out to be later the SAT exams, had just come through and both he and I had perfect scores in both categories. And so this is post-Sputnik and the U.S. government was so lean and mean then that from Sputnik, October of '57 to opening of school in September of '58, the U.S. government had a whole new high school curriculum drawn up by a team at M.I.T., "Insights in Mathematics," and deployed into public schools so that many schools debuted an advanced physics course, a true calculus course of one year's duration which had just simply not been there in public education, and BAM! we walked in the front door and were given our classes and here were courses we didn't even know were there before, plus the fact that we were in them because we had done so well on this exam. First such exam I ever took except for an IQ test. And I realized that I was really good at this so I just decided, you know, well I'm going to bang on this drum! (laughter) And so I decided to become a theoretical physicist. Also, though, I had read Laura Fermi's biography of her husband, Enrico Fermi, and I realized what it was like to be a physicist, and it instantly convinced me that that was what I wanted to do, and I did, and so did my brother. We both have PhDs from UCSD.

*What then does he do? Is he a teacher or*

No, no, he has always been entrepreneurial in the private section. He did research in industrial places like Physics International and he started his own company, Microwave Sciences, which has done very well. He's one of the world's -- maybe *the* world's -- big, best known expert on high-power microwaves.

*Well, not to be maudlin about it but you're lucky to still have your twin because you can lose your twin.*

Yeah. It's a big deal. I know. How old were you when he died?

*Well, I'm sixty-eight now. It was about 2002. I'll let you do the math. (laughter)*

Yeah. Yeah, my wife died that year. What month?

*Oh, this was April.*

March for Joan, March 25. Yeah

*And I think it's one of the reasons I like Schumann so much because he is very much involved in the dual personality and the splitting of self. All of that stuff (inaudible)*

Oh, he's the king of sadness; the sultan of sadness, I should say. (laughter)

*But I'll tell you the moments of triumph in that music that are wonderful .*

Oh yeah.

*...(inaudible)...*

Oh there are.

*...give that a listen*

Oh, certainly I will. I will learn, maybe I'll do so in flight, you know, just play it on my laptop.

*And I can't thank you enough for your time. This has been extraordinary.*

Oh, it's fun to get to talk and this is nice cause there's an invitation to go the longevity thing. They're paying me to go, paying all my expenses and a thousand bucks, and I thought, "Hey, I can go to KU, too, or UK!," and see people here. Because I hadn't been here in a long time, and from here I'm going to Oak Ridge to stay with an old friend and get a tour of the place and

*(inaudible) KU because of the Kansas City gig? Some people knew about that*

Right. It's at the, what's it called,

*Linda Hall Library.*

Linda Hall Library and then, but I also got an invitation to speak at Vanderbilt, the Physics Department, because the chairman of the department there has started writing science fiction and he wrote to me about it and said, "How would you like to come?" and so I'm going to give the talk I'm going to give today but I'll give in more detail, I will give at Vanderbilt in the Physics Department on the physics of, on the economics of

*The talk this afternoon*

Yeah

*And you're doing something at 11:30, we better get you over there.*

Oh. Yeah, what time is it anyway?

*It's almost 11:15.*

Jeez, we better

*Well, I will thank you*

###

James Benford - Sailships. Gregory Benford - Is Mathematics Eternal? Panel - Getting to the Target Stars. Jim Benford: Breakthrough Discuss 2016 " Power Beaming Leakage Radiation as SETI Observable." They are the parents of two children.[7] Benford modeled characters in several of his novels after his wife, most prominently the heroine of *Artifact*. She died in 2002.[8]. Gregory Benford's first professional sale was the story "Stand-In" in the *Magazine of Fantasy and Science Fiction* (June 1965), which won second prize in a short story contest based on a poem by Doris Pitkin Buck. In 1969, he began writing a science column for *Amazing Stories*. Benford tends to write hard science fiction which incorporates the research he is doing as a practical scientist. Gregory Benford (born January 30, 1941) is an American astrophysicist who also happens to be a bestselling award-winning science fiction author. His story " - Create New - Analysis Characters FanficRecs FanWorks Fridge Haiku Headscratchers ImageLinks Laconic PlayingWith Quotes Recap ReferencedBy Synopsis Timeline Trivia WMG YMMV. Advertisement: Gregory Benford (born January 30, 1941) is an American astrophysicist who also happens to be a bestselling award-winning science fiction author. His story "And The Sea Like Mirrors" was included in Harlan Ellison's anthology *Again, Dangerous Visions*. Benford's novels include: *Timescape*. *Against Infinity*. Gregory Benford is perhaps best known as the author of Benford's law of controversy: "Passion is inversely proportional to the amount of real informati...". Chapter 2 BENFORD IN HIS OWN WORDS: Toward a Craft of Science Fiction. (pp. 20-44). Gregory Benford has written much nonfiction commentary over his long career, both on his own fiction and on that of others. He has also written on philosophical, cultural, and political issues that concern science fiction. These writings are essential to understanding Benford's science fiction, for in their aggregate they define his science fiction as a literature of action. Benford, Gregory. Type. Recording, oral. This record contains recordings of an interview with Gregory Benford. The recordings are being made available in both .mp3 and .aiff formats. A transcript file is included. We want to hear from you! Please share your stories about how Open Access to this item benefits YOU. Except where otherwise noted, this item's license is described as These creative works by John C. Tibbetts are licensed under a Creative Commons Attribution-NonCommercial-NoDerivs 3.0 Unported License. Contact KU ScholarWorks.