Raymond Villard

Interviewed by Tucker Kearney

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Last time, we talked a lot about your past, but can we go over that one more time? Specifically, can you give me a brief background on your growing up, some of the events that you think influenced you and drove you not only to astronomy but also your interest in public relations, writing, the audio visual things?

Let me give you the Reader's Digest version. A lot of things in my elementary school age childhood influenced me. My father was very interested in astronomy and electronics. For whatever reason, I was a news junkie even at a very young age. I'd watch Walter Cronkite on the CBS Evening News every night. I do remember one morning in the 1950s watching The Today Show with Dave Garroway. He had a model of a NASA spacecraft that was going to land on the moon. It was called Surveyor. I was floored by its intricacy.

They had it on the set, and Dave Garroway was saying, “Look, this is going to go to the moon. It's got cameras and shovels.” I was mad because I had to leave for school, and I didn't want to miss the rest of the program. I'm like, this is really exciting stuff. Walt Disney had a three-part Man in Space series that electrified me. It depicted trips to Mars and the Moon with a Hollywood flare, but based on real “rocket science.” My parents were good about buying me space books by Willy Ley, and there was another childhood author, Roy Gallant I had a collection of his space books. In one book I learned that the universe was expanding. “expanding into what?” I pondered. The idea was terribly unsettling.
In the '50s, there were big articles in *Collier's Magazine* and *LIFE* magazine about going into space, about going to the moon. Then *Sputnik* was launched, and I remember it was a cultural tsunami in the United States. It was incredibly upsetting that the Soviets that beat us, and we didn't take it well. I did not understand all the fuss because the satellite was only this big as a basketball. Disney showed huge manned spaceships.

I had books that show rockets on moon for god sakes, and they just orbit this little thing. What was very memorable was that I stood with my father and watched *Sputnik* overhead. And seeing something man made among the stars was an epiphany. My dad was interested in astronomy. He never went to college. He just was interested in that stuff. He was interested in photography, so we did a lot of photography. I also loved writing as a kid. So all these things began to jell together. I loved communication, visual communication. I liked watching the news, and I always had a love for what's up and out there, going to the moon, going to Mars, and all that business. In fact, when I was in high school I made an award-winning movie about going to Mars, and I did it fairly seriously by researching NASA designs.

There weren't computer graphics then, so it was all accomplished by using the camera, what we would call in-camera effects. I hyper focused on accomplishing this, it required meticulous work I used this movie as a portfolio piece, and after I got out of college I actually showed it to prospective employers, and they loved it. They said, “This guy is creative.” I got my first job at the Museum of Science in Boston, the Maryland Science Center, and in between those, astronomy magazines.

At undergraduate school, I pursued a communication arts degree at the State University of New York at Albany. I was interested in Boston University for their film school, but I heard they had a science journalism program, and this was the heyday of the *Apollo* missions to the moon. I thought the future for NASA would be so exciting that I wanted to be part of it in some way. I would have never dreamt that the random walk through jobs would take me to a job with Hubble– and with any career, it's always good luck.

At the end, it's being at the right place at the right time, knowing the right people. I didn’t imagine the Hubble would end up as one of the most profound, momentous and historic endeavors ever undertaken by NASA that it would have as much name recognition as McDonald’s or Apple computers. Never. That goes beyond my wildest dreams.
TK: One of the points you touched on that I'd like you to expand on a little bit more is the launching of Sputnik and how it changed America's view on astronomy and space exploration. Can you just expand on that a little?

RV: Yeah, Sputnik. Now, this was the Cold War driver – we only went to the moon because of the Cold War. There really wasn't much it terms of science goals but to show that we were technically superior to the Russians, and this was a peaceful way to demonstrate that. Not building bigger bombs or a greater military, but to actually send people away from Earth. So there was a sense of melodrama through the '60s, where the Russians would do something, and then we would try to catch up to them, and they would do something else.

We would try to catch up to them. They were the first to put a man in orbit around Earth. They were the first to do a spacewalk. They were the first at all these things, so the excitement of space exploration, plus the melodrama of being in competition with the Russians, began to be like a movie script. I was delighted when Kennedy put NASA on the crash program to go to the Moon, and I would sit up all hours watching all kinds of news coverage from the planetary missions and the manned missions. Now Sputnik hit the country so hard they even changed the education system. They had something they called “the new math” that we had to learn. As a kid, I didn't understand the geopolitical impact.

TK: So when you first started working, you started working at the Boston Planetarium, and then you went to Astronomy Magazine, and then you went back to a planetarium back in Maryland Science Institute. What was the best part – what drew you to the planetarium?

RV: I liked the planetarium because it combined astronomy with multimedia shows. Although I liked writing, my real love was film, and the planetarium was the next best thing to that. Film, unless it was IMAX, would be on a flat screen. A planetarium is an immersive environment. I'm sure you've been to planetariums. So it was a toy universe, and my boss said that he must have had a twisted ego to want to have your own toy universe. It's like a model train set except it's the universe. So the music and narrative and visualizations are what I really enjoyed about that environment. Now the way we did it back then was slide projectors. It seems like shoeing horses today, because everything is computer graphics now.
At what point in your time at the Maryland Planetarium did you start hearing about STScI [Space Telescope Science Institute] and that it was going to arrive here, and what were your initial thoughts about that?

You know we did a program on the history of space exploration and the future of NASA, and we had one set of pictures in the program that said NASA's going downhill. This mission is canceled, that mission is canceled. The space telescope is delayed. In putting the program together, I came across a 1970’s ad from Lockheed that built the space telescope. The ad said that the 1983 “Man may see to the edge of the universe,” and I was floored by that idea. I cut that out the ad and I hung it over my desk. I thought that was totally amazing.

Now as soon as I heard that Baltimore turned out to be the location for the Space Telescope Institute, I really obsessed. I thought this was something to do in astronomy way beyond simply planetarium shows and talking to school kids. It was an incredible stroke of luck that it was here in Baltimore, although wherever the institute was located, I would have still applied. But it was a great coincidence to be here in Baltimore.

I got to be friendly with the institute’s sole PR person, and she liked my writing, and said, “I'd like to bring you on board as a science writer.” The biggest piece of melodrama with this is that I interviewed in January of 1986, and I went home that night, and I was happy with the interview. I thought I had done everything I could do. Then late in January at the science center, we saw the news bulletin that the space shuttle Challenger had exploded, and I'm like, oh my god. I assumed that there would be a hiring freeze. I sat at home looking at the cover of TIME magazine. You've probably seen that picture.

But there was so much bureaucratic inertia that they were still hiring here, so I landed the job. It was scary. This is a very different place from my museum. This is a bunch of scientists that are very intense about their work. Back then it was almost exclusively middle-aged professorial white males.

The institute, pretty high powered, and it's all the weird political stuff that goes with academia, so it was a culture shock. But what has kept me here all these years, I've been here 29 years now, is the much loftier purpose of exploring the heavens. When you think about that, you don't let the everyday politics and bureaucratic stuff
that goes with the territory distract you. You have a passion. I tell my kids this: “You've got to be passionate. I don't care what you do, but you have to be passionate about your work.” That passion avoids getting too distracted by the day-to-day silliness that goes on, especially with a high visibility project like this.

TK: A lot of your articles have been about extraterrestrial life and searching for that. How has being at the institute helped you fuel that passion of yours?

RV: That passion goes back to childhood. I was in elementary school, and I got my *Weekly Reader* every Friday. The cover story in a 1960 issue was on Project Ozma -- to use radio telescopes to listen for signals from extraterrestrial civilizations, and I just thought that was cool. And I believed, from all the science fiction movies in the '50s, I believed there were creatures out there. I remember my mother read me an article. It almost scared me, the idea that there really could be aliens, and *LIFE* magazine ran an article about the radio search with these aliens. Some of the illustrations were scary. As a kid, there's element of terror to it. Not terror, but, “Oh my god, what would they look like?”

We look at the universe. We've got zillions of pictures, but every time I look at a Hubble picture, I see the emptiness of it -- empty of evidence of intelligent life. Now again, I'm not going to see it in that picture. It's like saying that I'm looking for individual atoms in the printer paper here. But to paraphrase the astronomer Ben Zuckerman, the universe is a vast wasteland, untouched by the hand of intelligence except perhaps of a god. So when I do look at those pictures, I do think about that. I can't look and see evidence, but I think about who's out there. And frankly if there wasn't intelligent life out there the universe would be a pretty boring place. God was horribly extravagant too.

We Hubble we see that the universe is a big fireworks show. It's chaos and destruction and collisions. But what's the universe for if you don't have intelligent creatures? A few of the Hubble pictures have been epiphanies for me. I think the biggest, which we just put out, was a huge panoramic of the Andromeda Galaxy, that's the nearest galaxy to us. In that picture are a hundred million stars. When you blow it up to a poster, you can walk up to it and see individual stars.

So it’s like looking at grains of sand on the beach, and it's frustrating. I know, philosophically, in that picture there must be untold technological civilizations. But the galaxy is 2 million
light-years away. That's something I'm never going to know, and frankly, it's one of those things I don't think could ever be known because it's so far away, unless there's a super civilization that does something in such a grand scale it stands out like a sore thumb. So I'm totally convinced that finding intelligent life is a question of when, not if. I hope and pray I see it in my career, in my lifetime.

The SETI folks predict that if aliens do use radio for interstellar communication then we should have evidence by 2030, because right now the radio detection sensitivity is going up an exponential curve. Things will happen on that curve if they're going to happen at all. It's something I think about every day. I really do. That's at the very kernel of my interest in astronomy – who's out there.

TK: So going back to another point you made earlier, how it was so easy for you to transition from the Maryland Science Center here, do you think that the institute being here in Baltimore is an advantage solely from the Institute’s perspective? Do you think there is a different location that might be more advantageous to the work they do here?

RV: No. I think the reason they won the contract is that you’re at the hub of a very high-tech region of the country. We have the Goddard Space Flight Center, we have NASA, the Hopkins Applied Physics Lab, and aerospace contractors, so you can easily draw the best of the best are here. You're plugged into a major airport hub, with lots of academic institutions. The Baltimore Washington corridor is a great place for us to be. [Hopkins president] Steven Muller teamed up with AURA, our parent company, and came up with a plan that was very attractive to NASA.

The institute runs the Hubble science mission, but the operation of the telescope takes place down at Goddard, so that's pretty handy to have Goddard 20 minutes away. The place that thought the institute was going to be was at Princeton–that would have been a whole different dynamic. The Institute would have been an island. Here, we're more like a peninsula. We can just scoot down to NASA Headquarters and scoot down to Goddard. I think from that point of view it's a very logical place to put it, and I think it has really flourished in this location and this environment.

TK: Now not looking at the institute as its own separate entity, since it is technically under the Hopkins umbrella–so you arrived here about 5 years after the Institute arrived. At that point, what was the university’s view of the Institute?
RV: The people I met were pretty excited about the institute being here. They built that whole physics and astronomy building a few years later and beefed up their staff. They were involved in other missions too, such as the FUSE [Far Ultraviolet Spectroscopic Explorer] mission. They've got their own missions. So no, it was fantastic for Hopkins. It's made Hopkins one of the astronomy hubs linked with us. So it was a win-win all around.

TK: You had mentioned you were hired right after the Challenger disaster. Going from the planetarium to science writing for actual researchers, did it feel like you were thrown in a frying pan there? What was your first reaction when you arrived here?

RV: I think the bureaucracy scared me. It was enthralling to be in touch with really high-powered intelligent researchers. Some of the people I've met were people I knew about from the literature, but to meet them face-to-face and to know them on a first-name basis, it was like a little kid and going somewhere and seeing all their storybook characters come to life. In particular, John Bahcall—the auditorium is named after him—he was the one who lobbied with Congress in the '70s to get the space telescope.

It had been cancelled a couple of times. And I knew the name, and I knew he was a really high-powered guy, and I was floored meeting him and we became friends. And Ricardo Giacconi, the first director, he was incredible. He was a fiery Italian with piercing eyes, who always smoked his pipe. But to be in the presence—and of course he won a Nobel Prize eventually—to be in the presence of such intensely intelligent people was—what's the word I want? It was intimidating. There were days I felt I was a humble servant and the presence of the wizard in Walt Disney’s adaptation of “The Sorcerer’s Apprentice.”

I knew my astronomy, and I knew how to write about astronomy, so it was a challenge. It got scary at times. You get used to the NASA bureaucracy. I frequently use the term, “Give Rome Rome's due.” We are a NASA contractor. We work for NASA. We have got to bend over forward and backward to keep NASA happy. And of course, like any government agency, it's a big bureaucracy. So it was a little intimidating. You always have bad days when somebody gets bent out of shape about something, but when I go home at night, I think about the last scientist I talked to who walked in the door with some incredible discovery, and that makes it all worthwhile.
TK: So you started off as a science writer here, and now you're currently with the Department of Public Outreach. Can you talk about how your career has evolved and changed with your time at the Institute?

RV: I came in [as a] science writing and public affairs officer. We were a small office back then. It was just me and my deputy Cheryl [Gundy] and the scientist they brought in to do education. We carried the ball through launch and the first few years until the telescope was fixed. Once the telescope was fixed, NASA through a ton of money into this operation and it grew to 40 people, so my news office became a small branch among education and outreach and all kinds of stuff. I always wanted to keep it small.

Somebody said, “The bigger you are, the bigger a target you are,” but it became a much bigger division called the Office of Public Outreach. That's been around since 1994. It brought added resources in. We have a bunch of artists and a computer animator, but because it's bigger, it too is more bureaucratic,

TK: So can you speak to what it's like interacting with NASA? Are they looking over your shoulder? Do you feel like it's more of an “equal playing field” interaction with them?

RV: The big thing is that we're a NASA contractor, so depending on what you're dealing with they look at you as a contractor. That said, I've enjoyed working with a number of people at Goddard and Headquarters. NASA Headquarters is the highest stratosphere. You've got some really powerful people there.

But I've always considered it a privilege to be working for NASA, to be supporting NASA. Given my background, I feel that I'm much more enmeshed in science communication rather than public affairs or even marketing. I mean, public affairs in terms of dealing with reporters, and since I worked freelance as a reporter for astronomy, I've walked both sides of the street, so I really know their needs. I can really talk one-on-one with them.

Some of the people I've dealt with at NASA public affairs just don't have that intellectual depth, and then they try editing what you're doing. I hear, “We don't understand this.” That gets a little frustrating, so it's always negotiation to keep NASA happy, to show that we're supporting NASA, but regardless of who wrote or created the end product, whether here or down at Goddard or Headquarters, was the end product successful in communicating the science story? It doesn't make any difference who did it. It
doesn't make any difference where the reviewer are on the food chain. It doesn't make any difference how many hours they put into it. Was it successful? So I really don't have any ego tied up in this. I don't think I have the best ideas in the world, but I have to be able to sit back and say, “Does it work or doesn't it work?” And I lectured my staff. If you go rent a DVD, whatever movies you like to watch, and on the DVDs they have outtakes. And often they'll show scenes that were cut. They might have poured millions of dollars into that scene. They looked at the movie and they said, “Great scene. It doesn't work. It's got to go.”

And that separates the men from the boys. You've got to be able to look at your stuff dispassionately and say, “I went crazy on this, but it doesn't work, and it's got to go.” So in terms of NASA, this is ongoing negotiation. I'll give you, an example. We sent a story to NASA that we're putting out tomorrow or Thursday—a little web article, it's really a press release, but we're calling it a web article—we had the phrase, “…looking across the universe we see baby pictures of galaxies,” because they have grown and evolved over 10 or 12 billion years. Now, “baby pictures” is a cute term. It's like going through the family scrapbook and seeing pictures of you when you were a baby, your parents when they got married, and stuff like that. So to be colloquial, it works, and they are baby pictures. As galaxies grow, they develop. They go through an embryonic stage and the NASA person took that out, and that irritated me off so I put it back in.

They put in some just scientific sounding thing, but it doesn't mean anything to the public. Baby pictures do, and you can make a link there and see something that was different long ago, and it has gone through developmental stages to where it is today. It's a good analogy when dealing with galaxies.

Again, I feel privileged to work for NASA. We don't always agree when it comes to public communication, but I try to be the best asset I can in terms of giving them my thoughts and feelings on these topics.

TK: Now in your position in public outreach, you're the middleman between the public and the scientists. What do you find to be the hardest task, being that middleman?

RV: Let me give you an analogy. It’s like trying to build a bridge across the Grand Canyon. What scientists want to be communicated, what they think the public should understand, is way above what I know the public can understand, because I deal with the public every
day. So in the middle, again I'm trying to span this, and it's a balancing act between understandability and accuracy. Clearly we don't put out anything that's not accurate, but what scientists forget about—and this is a consistent thing—is that there's a difference between accuracy and \textit{precision}.

They obsess about precision, but that's lost on the public. You can't get into that kind of nitty gritty detail in a web article that may be 300 words. I was accused of being metaphor rich where they don't like analogies like the baby picture book. My mantra, which I actually got from a Pulitzer Prize winning writer Jon Franklin from \textit{The Baltimore Sun}, is: “It doesn't make any difference how accurate it is if nobody bothers to read it.” With good, popular writing, you have to have fun as well as educate.

When the scientists come to me, they trust me with doing the translation, and they get very nervous about that. Number one, they don't want to worry about their peers making fun of them. You've got to be very astute about what kind of analogies work and analogies that don't confuse people. In the end nothing beats success like success. When the final piece comes out if he gets a lot of news coverage, they're happy. But it took years to build up that trust and that confidence. At this point everybody, the thousands of people that use Hubble, know that if they come to this office they'll get a nice looking press release, they'll get news coverage, and it will be respectfully treated. But it is an ongoing challenge for anybody in the business of translating the science down to the public level. I think the analogy I gave you last time, it's like an electrical transformer. It takes 110 volts that are going to kill you down to 5 volts that are safe for you and for charging your iPhone.

So you're always walking a fine line. It's an ongoing tension between what's cute, fun, and understandable, and where the astronomer feels you've crossed the line. Now I love that aspect of the job. It's an ongoing challenge, but I've been doing it long enough here that I'm pretty comfortable with tackling almost any topic and turning it into something to the astronomer’s and the public’s satisfaction.

\textbf{TK:} We talked about your interaction with NASA. What else is your interaction like with the university itself and their PR team?

\textbf{RV:} Well Hopkins have a news office. We worked very closely about the time of Hubble’s launch. Their PR folks wanted to make sure that Hopkins' name was out there. And sometimes I thought they
were a little pushy in terms of marketing, but we always had a good working relationship. They keep changing job positions over there, so as of today, I don't have somebody I have a tight relationship with. But in the early days of launch it was mutually supportive. It was a really good relationship.

And I think I mentioned one of the astronomers, Adam Reiss, won the Nobel Prize. The Hopkins press folks jumped on that, because it brought so much fame to the university. They did an excellent job with publicizing it on short notice. I also have a very good working relationship with the Applied Physics Lab, because we're in the same boat. They're running space missions for NASA, so it's great to be part of that whole Hopkins community.

TK: How much interaction do you have with Applied Physics Lab?

RV: Not a lot. Our next upcoming interaction was is for me to go down there and volunteer to help the newsroom support when the New Horizons probe flyby of Pluto in July 2015. That's going to be a freaking zoo. That's going to be a huge story. Again, we know each other and we chat and all that, but it's not a month-to-month kind of thing.

TK: You touched on this earlier when you mentioned that the astronomy program, or the physics and astronomy department, was much larger, but how do you think the Institute's presence has affected astronomy from the Hopkins perspective?

RV: STScI presence has made JHU one of the few great astronomy centers in the world. People from all over the world come here for meetings, colloquia, and major workshops. It's really put Hopkins on the map as an important node in the whole world of astronomers who are doing cutting-edge astronomy. So on the Hopkins campus, we're a big tail wagging the dog, I would say. This institute is a magnet for the brightest and the best, and we're not just looking at Hubble but future large space observatories.

We're looking at the James Webb Space Telescope and another telescope which I'll call Super Hubble. It's got the same size mirror but it takes a wide-angle view of the sky. So our goal is to be the telescope institute for a lot of telescopes in space, not just Hubble. And Hubble has allowed this place to build the expertise and the infrastructure, the data archive capability, and spacecraft operations capability. Running Hubble was a completely different experience from the way astronomers did astronomy. And under the guidance of Ricardo Giacconi, STScI’s first director, the
infrastructure was built from the ground up and by amazing people here. And that really cemented us in place, the logical place, to operate space telescopes. For Hopkins, that's a huge crowning achievement.

I think the analogy I could draw is that you've got Caltech, and out of Caltech you have JPL. We've gotten to share the universe with them. They survey the solar system, and we reconnoiter the rest of the universe.

TK: Right after launch, it was determined that there was a broken mirror. How did that affect you all here?

RV: It's like you wake up with a broken heart, and it's like, “Okay, I've got to live with this.” Certainly the worst day here was the day that NASA announced the mirror problem, and the phone was ringing off the hook. I certainly believed NASA when they said they were going to fix the optical problem, to do it with the space shuttle. The space shuttle could get back and fix it, and that's what I told the reporters. I think what helped us was neither we nor NASA tried to stonewall the facts or seriousness of the situation.

NASA went public and said that they screwed up, and that they were going to fix it. And every time we got data from the telescope, they actually showed it was still working better than ground-based telescopes, even with the mirror aberration. We would use every opportunity to put this news out to the public, and I will thank the science reporter community. They did not want to see Hubble fail, so they really cut us a lot of slack in terms of how they reported on Hubble. Those were the seasoned science reporters. The more general reporters were looking for scandal and they got obnoxious, and so there were some nasty articles. And we were the butt of many late-night comic jokes.

I never went home in tears or depressed or started drinking or anything like that. It was like a car accident. You’ve got to fix it. The scariest moment in my whole 29 years was back in May 2009, when the astronauts were trying to pull out one of the big cameras—the size of a baby grand piano—and the bolt stuck. Sitting in the shuttle cargo bay was the replacement camera, which was even more powerful – at a cost of 100 million dollars.

You know, we all do home projects, and you go to take off a tire, and the bolts stick. Now, there's no rust up in space, but you do have something called cold welding in a vacuum. Things can really stick together, and the astronauts just couldn't turn the damn bolt. I
was down at the Johnson Space Center, and one of their public affairs people—who's a drama queen—was pacing the floor going, “Oh, it's the end of the mission. End of mission.” Finally ground controllers in Houston said, “Take off the torque limits, and just turn it as hard as you can,” and they said, “If it breaks, it breaks, and the camera stays.” The old camera.

And the astronauts were incredulous. They said, “You want us to just twist it as hard as we can?” They said, “Yeah. If it breaks, it breaks.” So my heart was pounding, because I could see the immediate crisis in the public mind. A bolt breaks, and the shuttle comes back with the camera that it can't install.

RV: That was the day my heart was thumping. That was heart attack time. Nothing else on the mission got me upset. Although I will mention something that I was warned about it. If I had seen it I would have had a heart-attack moment. There was a film in the early '90s of *The Naked Gun* series, *The Naked Gun 2 ½*.

RV: Well, the films were parodies of our pop culture. *The Naked Gun 2 ½* had a scene set in a place called the Blues Bar. There was this sourpuss, depressed singer. It's the bar where losers go, so on the wall there's a picture of the *Titanic*, the Chicago Fire, the *Hindenburg*, the Edsel – you know the Edsel?

TK: No.

RV: Okay. And then there was Hubble. So the Hubble was broken, and the camera pans across and you see Hubble. I think about that if I was watching the movie in the theater, I would have thought: uhh-oh, they're not going to show that! The scene drove NASA crazy. They changed the way the public affairs operated after they saw the movie. I think I would have died if I'd seen it, but the stuck bolt was the high point of real terror over Hubble.

TK: So you mentioned this was your most terrifying moment. What would you say was the most celebratory or joyous moment?

RV: I'll tell you, the celebratory moment for me, which made me feel like I was living in a science fiction movie, was six months before a launch. We had a science writer workshop here, and the auditorium was full of reporters. Excitement was building and I was the one that got to stand at the podium and say, “I just wanted to announce that last night under the cover of darkness, the Hubble Telescope was flown from Lockheed to the Kennedy Space Center.” It was just a dizzying moment; This telescope was really
going to go. I never felt more ebullient when making that announcement. History was unfolding and I was part of it.

Hubble had to go in the dark of night, because the telescope had to be carried in a spy satellite container so DOD wasn't worried about Hubble, but they didn't want anybody to see pictures of the container because they could figure out the spy satellites sizes.

In terms of Hubble images, hundreds and hundreds and hundreds of images, the one that I think struck me the most was one, in 2002, when we put out a portfolio of pretty pictures. We looked at something called the Tadpole Galaxy. It's a galaxy with a long tail because it's colliding with something, but it was only the foreground galaxy. The background was nothing but an infinite sea of galaxies.

It was like looking into a pond full of fish. It's like you had blurry eyesight, and you just saw these shapes in the pond, but then you put on some glasses and you see the fish. The universe was full of crystal-clear galaxies, and my jaw dropped and I said—and I didn't mean this in a hard-core religious way—but I said, “This is the way God intended the universe to be seen. This is the eyesight of God. This is the upmost clarity imaginable.” So the image floored me. I sat speechless for five minutes.

The other one which has gone everywhere is the Pillars of Creation. I got a call from NASA. They said we're going to do a press conference.

These structures are well known. They exist in all starbirth nebulae, they're like stalagmites in a cave. they are nicknamed elephant trunks. And I say, “Are you crazy? Are we that desperate? This is not a discovery. What are you talking about?” And then I got all huffy. They said, “You haven't seen the picture.” I said, “I know what these look like.” “No, you have got to see the picture.” “I know what these look like.” So one of the administrators at headquarters came into my office and said, “Here, take a look.” “Okay.” [laughs]. Well, there's only one Beatles, there's only one Pillars of Creation. I came up with the name Pillars of Creation, which I'm proud of. I had my video producer at the time who was in the office with me, and we kept looking at the picture going, “We have got to call this something momentous.” We started doing name association. They look like pillars. Stars are being born. Yeah, yeah, we'll call it “Pillars of Creation,” and the name just stuck. It reminds me of a story I’ve heard about related the the rock group The Doors. They've got that
classic tune “Light my Fire,” and I read this when Jim Morrison was making up lyrics like, “Baby, light my fire.” What can rhyme with that? What rhymes with fire? “Pyre. Pyre. And our love become a funeral pyre.” That was great. So I did this with the Pillars of Creation, and it stuck.

TK: How do you think the institute has evolved over the time that you've been here?

RV: That's a really good question. It was a much smaller place in the 1980s. We didn't have those bookends on the building. It was more like a family with Riccardo Giacconi as director. Riccardo was like the Godfather, and it was more like an Italian family. With subsequent directors it became more corporate, I think, and bureaucratic. I think what's in the woodwork here is that it's very stratified place. I think I mentioned that before. You've got the science elite, and then you've got the support and worker bees, and so on.

And it's probably true, there are other facilities like that, but if you don't have a PhD, you feel at a lower strata. I don't care what strata I’m at, I just want people to respect my ideas. I had my sphere of expertise, which I know very well to the point of being a little cocky. I know what I'm doing, so I do get frustrated when somebody, because they have a PhD, thinks they know more about the task than I do. The problem is that everybody reads the newspaper, so they all think they know about news. I still get this.

The reporters are my customers. They're my stakeholders. I know what they're thinking. Astronomer treat our education folks the same way. because the went to school once, they say, “Well, you know, we should show the kids this, tell the kids that, or show the kids this.” Never mind that our education director does the studies and works with consultants, and knows what she’s doing. and so in a stratification like that, there's a feeling that because “I have a PhD, I know everything.” That gets frustrating.

TK: So you've been here for almost 20 years now.

RV: Thirty.


RV: I can't imagine that, but it's true. I stopped counting.
TK: I'm sure you have a very clear idea also of the direction that the institute is headed in. What do you see is the future for the Institute?

RV: Oh, the most exciting years lie ahead, assuming continued NASA funding. Now the James Webb Space Telescope will be a huge thing, probably among the most complex and expensive science instruments ever built, at an $8 billion price tag, and I hope that will electrify the public as much as Hubble has. But I'm not sure people will get excited. The images will not be sharper than Hubble’s.

Farther down the road—now we're talking about the 2030 the so-called “High Definition Space Telescope,” a telescope with a mirror much larger than Hubble's that would see ten times better. So if you do another factor of ten increment like that, now you're talking about something extraordinary.

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What I preached about, and NASA clearly is on track with this I think, is how do I sell these—what are perceived as—expensive space machines? The Webb is what, $8 billion? People spend at least that much on skin care products every year, so you're not talking about a lot of money. They spend nearly that much on dog food in the course of a year. But what gets the public excited, gets congressmen excited. It's tough to do, because nobody votes because of space policy.

You go for gun control or not gun control—more not gun control—and of course, the congressmen have to support their industrial base, which is why we have a space station. What could you do in space that a congressman could understand, even Ted Cruz, that he could communicate to his constituency and say that it's worth reporting. What was driving the Apollo program, which in today’s dollars would probably be well over $100 billion, was the Cold War. Today, you build these machines to find Earth 2, to find a planet that you believe is inhabited with something. What value is that to our civilization? I would say it’s priceless. What’s forgotten is that billions of dollars it takes to find life beyond Earth it will all be spent here on Earth, and inspire innovation, education, science, and technology in extraordinary new ways.

We don’t know if we are alone, unless space aliens send us a message and say, “Hi, how are you? We're fine. What color are your clouds?” But to find an inhabited planet, and you can do that
with one of these super Hubbles of the 2030s, you can sell that to people. We're looking for life. When we do stories about finding life in space, they get broad news coverage. So I don't think sending people to the international space station gets the public excited, or at least some parts of the public. But to say you're going to look for a duplicate of Earth out there, I think you could entice people. In terms of the great future observatories, this is a fundamental theme: to look for planets like Earth around nearby stars. If there's nothing else NASA does with space telescopes, that's the *prime directive*, as far as I'm concerned. I think the public will support that.

**TK:** How do you think the institute has impacted you personally?

**RV:** It kept me employed [laughs]. You know, after all these years, I still have to pinch myself to believe this space adventure is reality. I look forward to coming to work. Again, there's the bureaucratic stuff, but I still look forward to coming to work. I look forward to dealing with a great bunch of people, great staff, and the astronomers are fun to deal with. What I'm really enjoying now is that there's a whole new generation of young astronomers. Many more female astronomers, and they're not afraid to publicize what they do, and that's been a real culture change.

When I first got here, it was a bunch of stuffy middle-aged white males, who really, really looked down their nose at PR, and they thought news was frivolous. It was the bastardization of science, which historically is the way scientists have looked at science communication. That has changed tremendously, and I do find especially in the exoplanet community, looking for other planets, many astronomers that are excited about telling their story. Not to be sexist, but I think it's almost a Mother Earth kind of thing for female astronomer, to look for life.

So I love the new generation of astronomers I'm dealing with. I get mad when I begin to feel that I'm taking it all for granted, and it's funny to go home and turn on TV and you happen to see a documentary about Hubble. And you go, “Well, that's cool.” And then you go, “Wait a minute. I had this for breakfast, lunch, and dinner – this is my job.” I think in terms of my vision of the universe it's made me feel humble and naive, because every day we find something we didn't know about. I'm not a religious person in terms of organized religions, but I would say it has instilled a sense of awe and respect to the level of spirituality. The way things work out there—and again I don't mean this in an intelligent design sense--but--astronomers said to me, “There's a logic to the
"The way the forces of nature have come together – it's a profound mystery out there that's much bigger than anything you would read in organized religion. One of my favorite passages is from a book by Christopher Hitchens, who was an atheist, "God is Not Great." He said that one picture from Hubble tells you more about the beauty and terror, this yin-yang of creation, than any passage from Scripture. I think one reason Hubble is so popular is that on a visceral level it communicates those feelings to people. I've come to realize that the universe is stranger than I could ever imagine. When I came here, having communicated astronomy for 20 years, I had imagined looking at a lot of pretty galaxies and the Horsehead Nebula, and I'm still flabbergasted by the totally bizarre things happening under a few simple laws of nature. So the best quote, which I'll paraphrase, came from an astronomer, Virginia Trimble, who was at College Park. I think she's retired. But she said, we live in a compulsive universe. If it's allowable within the laws of physics, it's happening somewhere. If there's anything that the Hubble pictures communicate, it's this idea of a compulsive universe. If it doesn't break laws of physics, a lot of weird stuff is happening out there.

TK: Another thing you mentioned was the influx of women in astronomy. I noticed when I was sitting out in the lobby the Baltimore Charter for Women in Astronomy was out there. How has the Institute supported and allowed that to continue?

RV: The Institute has tried to nurture that. Now the Institute in the early days was accused of being a sexist kind of place. One of the astronomers felt underprivileged here. The directors had worked very hard to turn that around, but I think it's a bigger issue, given today's culture. I think what bothers me is we live in a Bart Simpson culture. It's cool to be stupid, and so I would say the middle-aged female astronomers grew up in a world where science was mocked or really suppressed, and not to mention there were probably other barriers.

But I didn’t see evidence this was the fault of the Institute – though I’ve heard complaints to the contrary. The Institute has worked very hard to encourage diversity, but with your generation, it has changed where young women feel much more empowered to pursue these things than they did in earlier generations. So we've tried to work hard to boost the role of women in astronomy and to have them not feel intimidated. But yeah, astronomers can still be vicious in the way they treat their colleagues, regardless of sex.
There’s no excuse for not having good manners. You sit in the scientific colloquium. They'll tear each other apart, but that's fine. It's all in the search for truth and science by its nature is very critical. That's okay, but you don't use those same laws for interpersonal relationships and that's where things get hotheaded around here. And these astronomers go, “That's part of our culture.” No, good manners is good manners. I don't care what you're doing.

TK: Looking back at your career overall, what would you say has been your role in changing the visibility for astronomy as a whole?

RV: I think I've done a lot. I don't want to sound egotistical, but somebody else in this position might have not been so passionate and intuitive about addressing the needs of our public. My worst “parallel universe” scenario is that they had put an astronomer in this position. They would likely have been very pedantic. I was at one meeting where a scientist asserted “not knowing he second law of thermodynamics is as bad as not knowing Shakespeare!” Whew. But I've approached my job with a pragmatism, a sense of fun, a sense of trying to inspire people. Now, the flipside of that, regardless of who was running this, you would still have incredible pictures out there, and those would carry the mission. But I have worked very hard with stakeholders, like reporters, and the user community. I'll give you a concrete example. NASA has a fantastic mission, the Cassini mission. Do you know about that one?

TK: I've heard of it.

RV: You've heard of it. Have you seen pictures from it?

TK: I'm sure I have. But I wouldn't associate the images with Cassini.

RV: Okay, so you've heard the name. Cassini is the last of the *Battlestar Galactica* missions. It's a huge interplanetary probe. Nuclear powered. It's got “chromium wheels.” It's ready for the road. Anyway, so it's been orbiting Saturn for about a decade. If you go online, the pictures are drop dead gorgeous. They're better than something illustrated in a science fiction movie. So I've been puzzled. Why doesn't Cassini get the press that Hubble does?

And the feedback that I keep getting is that it's so tough to work with the investigators on that mission, that the public affairs arm, which is JPL, doesn’t think it’s worth the difficulties. I think as planetary missions go Cassini could have risen higher in the public consciousness, and I'm really thinking it's the chemistry among the
players involved. In this case one Principal Investigator leading a single team of scientists. Now Hubble is a general user facility where astronomers around the worlds make observations, so I have a much bigger playing field to deal with. I also think we are very good at being open and attentive to the needs of the stakeholders: NASA, the investigators, and the public. We are very passionate and proactive in translating the science into something that's palatable to the public.

None of what has been accomplished here could be done without the tremendous support of the STScI director, the science community, and NASA. I think Hubble is a huge success because was the perfect storm for generating wide public attention. It was the first of the major space telescopes. It was tied to the shuttle and manned spaceflight. This made it very sexy to people. It launched at about the time the Internet was coming online so we had a mechanism for getting lots of pictures out to the public easily. That never happened before. The melodrama of the broken mirror and fixing the mirror was the classic American comeback story. You couldn’t write a better sci-fi movie script.

Everybody wanted us to come back from the mirror disaster. I never thought we'd come back so strongly that we would become a household word. You have to wonder—in a parallel universe—if the mirror did work correctly, would Hubble have the notoriety that it does? So the Hubble drama plays out like a movie script, to be honest. That said, I think a news director who was pedantic and more worried about nitty gritty precision of the Hubble stories—rather than about putting out exciting stories above all else—might have diminished the direction of the public’s awareness and excitement. Hubble was bound to be successful, whoever was running its outreach in news. You might say it was written in the stars.

TK: Had the opportunity not arisen for you to come join the Institute, where do you think you would have ended up?

RV: That's a scary thought. Hubble was the biggest game in town. It was finally my foot in the door into the NASA PR empire. I think I would have tried to continue getting some job down at the Goddard Space Flight Center, because Goddard has several space science missions. And my dreamboat was JPL. But I think I told you that when I contacted them out of grad school, they told me they were laying off people rather than hiring. Many years later when I was working here they invited me to apply to be news chief at JPL, which would have been a dream because I love California.
but there’s only one Beatles, and there’s only one Hubble. It has become as legendary as the Apollo moon landings – and much longer lived.

Nobody's ever asked me that question about an alternate career. I don't know. I couldn't have just stayed in museums all these years. Let me just say, I was tremendously lucky, and I still have to pinch myself. I’m still amazed Hubble has become such a science celebrity despite the mirror and despite all the other craziness that has gone on since launch.

TK: Would you say you're also happy to be able to be so close to NASA yet still be removed from NASA itself?

RV: Well yeah, NASA for me is way too bureaucratic. This place is academic, it's kind of loosey-goosey, it's not as stuffy as what I put up with at NASA headquarters. It's a fun and cushy place. A great environment. A think tank. A crossroads for great astronomy ideas. No, I would be a fish out of water at NASA headquarters.

TK: Scary thought?

RV: I'd jump out the window. And, I'm not picking on the individuals I deal with. It's just the bureaucracy of it all. And again they're under the gun because they have to answer directly to Congress. That said, it's just a big government agency, and people drink the Kool-Aid to lock into a certain bureaucratic thinking. I could never do that, as much as I'm extraordinarily excited about what NASA does. I mean, the dream job would be to be at headquarters and the interacting with all the great missions out there and helping them with doing quality science communication.

TK: One last question for you. In your time here, has there ever been any article or press release where, as soon as you press that “send” button there was an “oh, shoot” moment, like, “I wish I could have had one last chance to take that back and make this change”?

RV: I'm trying to think, there was one. It was silly and it was a cultural thing. We had a bunch of pictures of galaxies colliding and we put out a whole portfolio of that. We were co-releasing this with the European Space Agency. Now my colleagues at ESA came up with the title *Galaxies Gone Wild* and I thought it was cute. So we stuck with the title. The minute that went out, there was a female scientist here who took tremendous offense at that title, and it started rippling through the building that we were putting out this sexist thing.
She didn't like the way I wrote it either, which is very ironic because I playfully wrote about galaxies coming together – how did I phrase it? They make a pass at each other, and they merge, and there's a flurry of star birth. I actually stole that narrative from a female scientist who was giving a talk at a press conference a few years earlier, and I thought it was cute. It was in the back of my mind. So to try and be clever I wrote the introduction to this release. The scientist thought I was being salacious, which I wasn't. What is that going to buy me? To this day, there was nothing wrong with the title. And I don't call it cultural blindness. You can Google that phrase “gone wild,” and it's used everywhere. Yes there is a video series, which I haven't seen an ad for this in about ten years, but there's a video series “Girls Gone Wild,” which apparently they don't sell in Europe.

This gets even better. So we had these galaxies colliding, and the coolest looking collision we posted as the primary image and the lady who complained said that picture looks sexual and it took me three years to figure out what she was talking about because it's all in the way you look at a picture.

Our director said that we had to change it. And my deputy, who's an African American female, was mad. She said, “I saw nothing wrong. I'm on the diversity committee.” I said, “Well, it's got people upset.” So one of the directors came in the office, Matt [Mountain], and said, “I don't think this is really a big deal, but we do have this diversity issue.” So he wasn't mad, but he says we really should change it. So what did we say, “Galaxies Galore,” or something stupid like that? So I was a little chagrined.

Early on some astronomers accused us of hyping Hubble, and that goes against my ethics. You don't have to hype anything that is intrinsically doing something extraordinary, and the minute you do that, it diminishes your credentials with the press. So it's pointless, and we're only as good as our credentials with media and scientists. And I've got a very solid sense of ethics about that.

TK: Well thank you so much for your time, Raymond.

RV: Okay. It's been fun. It's fun doing this memory dump.

[End of Audio]