NASA JOHNSON SPACE CENTER ORAL HISTORY PROJECT
ORAL HISTORY TRANSCRIPT

JAMES P. DAWSON
INTERVIEWED BY SUMMER CHICK BERGEN
EDMOND, OKLAHOMA – 9 NOVEMBER 2000

BERGEN: It is November 9, 2000. This interview with Jim Dawson is being conducted for the Johnson Space Center Oral History Project in Edmond, Oklahoma. The interviewer is Summer Chick Bergen.

Thank you for participating. We appreciate it.

DAWSON: Surely.

BERGEN: Why don't you tell us about your college studies and how you chose your career direction.

DAWSON: I started in really with chemistry. I have a triple major in undergrad school in chemistry, math, and physics, but I was primarily interested in doing research of some type, and that's one reason why took such broad major field. But I finished that up and went to work for the government in a petroleum experiment station, doing just that, research.

BERGEN: What types of research did you do there?

DAWSON: We were working at various kinds of uses of petroleum and its derivatives. We did a lot of fluorocarbon work that wound up in the refrigeration units, so we were the first ones to do that, which now, of course, has been abandoned, but it worked for a while.

BERGEN: Definitely. How did you come to work for NASA?

DAWSON: I got my master's at Oklahoma State [University, OSU]. I went to work for NASA on a subcontract with Sun Strand Turbo. What we were doing was putting together auxiliary power units and these were what they called SNAP Program, Space Nuclear Auxiliary Power. So I was working under NASA contract then with Sun Strand. I went to Atomics International when they developed it on up.

Then the testing that we did there is what led to going to Arnold Engineering and Development Center. That was a joint NASA-Air Force project. But at Arnold Center, what we were doing primarily was testing satellite systems. I'm talking about like Surveyor and Explorer that went to the Moon.

What we were interested in is how could we determine what the heat would be, because most electronics were sensitive to heat. So if it's exposed on one side to the sun and the other side is cold, how do you package it? This is what we were looking at. We were doing it in the big environmental chambers. That's really why NASA transferred me to Houston, is because Chamber A and B over there, they were going to test the satellite systems, were just coming on line, and I had the experience in the large chambers for that kind of testing.

But as we got over there, they changed it into Lunar Receiving Lab, because they had to have somebody that knew vacuum and that could talk to the great scientists and this sort of thing.

BERGEN: So was it pretty immediate when you moved over to NASA that you were going to be working on that Lunar Receiving Laboratory [LRL]?

DAWSON: When I went to Houston, it was what it was for, because they called me primarily about Chamber A, which was the big environmental chamber. Then when my resumé got down there and they found out that my background was physics and chemistry and whatnot, and at Arnold Engineering and Development Center I was in charge of the Radiation and Physics Section, so then they wanted to develop that with the "looney lab." Lunar lab. Got to be careful. So they transferred me immediately to that.

BERGEN: So how did you feel about that transfer when you got there?

DAWSON: Oh, I thought it was a lot more exciting. I was a little bored with the big-chamber stuff because it took so long to do something, and the results, we questioned them, because you're inside a closed environment. You're not in outer space. So there was an awful lot of corrections that had to be made that weren't necessarily, I think, legitimate. But it was fun.

BERGEN: So what was the task given to you when you moved over to the Lunar Receiving Laboratory?

DAWSON: I had been interfacing with the engineers at Arnold Development Center, and I was kind of an interface between some of the scientists and the engineers. The scientists always wanted to do everything pure, pure science, which was totally impractical. The engineers didn't want to monkey with a lot of that sort of thing. So I did a lot of that interface work.

When I went down to the Lunar Receiving Lab, my main job was to put together the vacuum system and to set up the facility to handle—I think there were 141 different scientific disciplines that were going to come in. So I was on the committee that was setting up how do we interface with the scientists not just at NASA, but the outside scientists also. And we had a number of contracts with the outside that we had to handle. So it turned into more a paper job than an experimental job.

BERGEN: When you first came into work at the LRL, what was the game plan as far as the development of that? Had it already been established into what it became, or were you still working out those issues?

DAWSON: A lot of the details we ironed out. But the size of the buildings and whatnot had been pretty well determined, and where it would be located on Houston was there. The Back Contamination Committee had been formed, and that was setting up a lot of the requirements, and those requirements were the ones we had to deal with. I think there were seventeen federal agencies that had statutory requirements for taking care of anything coming into the United States. Each one of them wanted to do this, naturally, and so that's when they formed the Back Contamination Committee. They were going to then let the Lunar Receiving Lab be the central point for it, but at that time we didn't know for sure just what all it would entail.

Some of us didn't really think it was necessary, and I say that because the statutes require a given UV [ultraviolet] radiation to sterilize, requires a given temperature to sterilize in an autoclave, and it specifies you must have a one-micron biological filter, an absolute biological filter. But the point is, on the Moon they're already exposed to twice the UV that we would have in the lab. The heat was already many degrees above what it would be. Now, there's no water involved, but those two extremes, they'd already been exposed to it.

The other thing was that the only thing that could make it through an absolute filter was a virus, and a virus is about the only thing that could withstand those extremes. So we felt, the engineering sides of it, felt like we were just kind of spinning wheels, but it was a statutory requirement, so we had to meet the law, it's just that we thought we were wasting a lot of time.

As it turned out, it was fine, and we didn't know either, that's another thing, because we were dealing with something extraterrestrial and you don't know what's out there. I was hoping it would be real heavy things that we could just drain them out the bottom of the vacuum system, we wouldn't have to pump them, eat the air molecules.

BERGEN: When you first got to NASA, did you have any sort of training or orientation?

DAWSON: No.

BERGEN: Just threw you in?

DAWSON: We were cannon fodder. Because everything about the "looney lab" was really kind of unique, it'd never been done before. There had never been a containment facility established like that with such a broad background of science going to be involved, and we had to transfer things in and out, we had to keep it pristine, because we didn't want it decaying as far as radiation was concerned. So it was really a unique thing. There wasn't much you could be trained on other than government procedures, I guess.

BERGEN: Did you interface directly with other scientists?

DAWSON: Oh, yes. Now, with Joe [Joseph V.] Piland, my boss, there at the program lab, he put me in, as I say, between the engineers and the scientists, so we worked with all of the principal investigators. One of the main things I went down there for, was happy to go down there, is that we were going to be a principal investigator and do all the engineering things, but based on chemistry and physics. What we were interested in was heat transfer, with the idea of going to a Moon station, how do you balance the heat again. Just like we were dealing with the satellites. So that was one of my main things, and they went ahead and let us be principal investigators.

But Luis Alvarez and some of the Nobel people, they wanted everybody just to step aside and let them go do their thing. But Luis Alvarez, for example, had a [1968] Nobel Prize in Physics, but the theory of physics says there should be at least one monopole somewhere in the universe, but only one. What he convinced the government of is that one monopole was on the Moon and would be on one of the rocks that we picked up. Now, the extreme of that happening, the odds against it, but he was one that was one of the principal investigators and we had to set up a piece of equipment and everything for it. There's no way to engineer it, because we had no idea what kind of equipment we'd have to do it. They designed those things and we built it and stuck it in, but it turned out, of course, there wasn't any monopole that they found.

One of the things that we were trying to do, too, is look at the gamma radiation coming off the lunar samples. The theory was that they would decay as soon as they entered the Earth's atmosphere. So that was one of the reasons that we had to have time-sensitive-type measurements. We had to move quickly to get those samples down in the Radiation Lab, which was below sea level, forty feet below sea level, to get them down there and get the measurements started. Those we could handle, because they were very specific engineering requirements that we could get our hands on. The vacuum system had to be capable of transferring these under a vacuum. So we had to design all kind of containers that we could seal and that sort of thing.

But most of the scientists, the principal investigators, anyhow, built their equipment external to NASA, and the only thing we had to do was interface it with our systems in order to get the samples into whatever container they would provide. So that part of it was fairly simple.

The thing that I was doing, we set up a lab at the University of Kentucky and, working with Dr.[Clifford J.] Cremers and Dr. [R. C.] Birkebak, we did our work up there. This is what we carried on with as long as there were Apollo missions.

BERGEN: Tell us more about your vacuum system that you developed and some of the challenges that you encountered as you worked on that system.

DAWSON: One of the things that they would have liked to have done was what they had the ultra high vacuum chamber with the ten to minus-fourteen—well, there's never been a system built like that before. So they wanted to use that for a long-term storage so as to be sure and not really harm any of the samples. But the handling of the samples themselves, we had developed a glove system to do this, because we were working in a glove box just like a biological glove box, but they had to have a full atmosphere across it. Even the spacesuits only had like a half an atmosphere across. So it was taking that technology one more step.

We had the crew systems there that had the experts and they, of course, set everything up for us. What we finally did, anyhow, in deep-sea diving they use convolutes, and what we did was reversed the convolutes. It worked pretty well. The first two missions, it did quite well. After that it was quite obvious that we didn't have any real problem with decay on some of the vacuum systems. I mean, the samples didn't decay like we thought they would. There was no real biological hazards, so things started really relaxing then and they could handle them like they would ordinary rocks.

The biggest problem was, too, is that when they got it all in, we had the same kind of rocks out in the backyard. The only difference was, there was less water in the lunar samples, but it looked just like the rocks we'd collected all over the world. So to a lot of the scientists that was a great disappointment. I don't know what they expected. Like your necklace says there, God made it all at one time; why should He differentiate? That did not go over too well either.

BERGEN: No. Well, you expect you go to a different place, you expect to find different things, but I think that was probably something to be learned in that itself.

DAWSON: Yes. The one thing that they learned is that there was some theories that had been put forward and were all wrong. It was just like the Earth, and we had eighteen missions up there, about sixteen of them, seventeen of them returning the samples, and we found nothing really different, other than they had a lot less water. But as far as the properties were concerned, the engineering properties, after the first three missions, we were sure what we had and we didn't have to worry so much about doing all of them again with samples. We didn't do the whole packages.

BERGEN: We talked about the back contamination. Did you feel that all the procedures that were set forth were sufficient to deal with that problem if it were to come about?

DAWSON: Yes. If we'd come back with a bad virus or something like this, or some bacteria that was dangerous, we would have been able to catch it. That was not a problem. The reasoning behind it sometimes was a little somewhat of a problem. A hundred years from now they bring samples back from the Moon, it may be a totally different story, because outbound we tried our best to sterilize everything, but there's no way you can totally sterilize something. There's a lot of the electronics and this sort of stuff that you couldn't sterilize like you should. The things that we left on the lunar surface, a lot of those may have had something in them. Now, will they develop and mutate on the lunar surface? I don't know. But it's a possibility.

So the back contamination to Earth we didn't worry so much about, because we thought we could handle it with everything we had. We had some of the best bio people in the world. But outbound, nobody was really that sure. So it will be something to look at.

BERGEN: But measures were taken to sterilize things, right?

DAWSON: Oh, yes. That's what I say. They went to extremes trying to sterilize everything outbound, but the point is that you cannot. There's no perfect sterilization system. Some of the things that we were looking at, being ultra clean and that sort of thing, I'm sure really helped, but the clean rooms they have now for handling chips for computers and things like this, are ten orders of magnitude better than what we had. So technology has really developed lately. But nobody knows.

It'll just be a question. It would be our luck that they will come back and they'll look just like persimmons or something like this.

One of the things that you'd asked was about the critics of the Lunar Receiving Lab. Most of the scientists wanted for them to give them the samples and get out of the road. They wanted unlimited funds to develop whatever experiments they wanted, and we, of course, were highly restricted as to what we had available in terms of dollars, so that did create quite a bit of conflict. Luis Alvarez, as I say, they gave him three million, but he was a Nobel Prize winner. Some people out here that were doing experiments that we thought were much more useful to us really weren't funded sufficiently. So that was the main problem we had.

But developing systems, we had to develop our own gas analysis system primarily because the things we were looking for were so broad that no one machine that was available could cover it. So we did that in-house just because we'd had to have had fifteen different contractors out there all trying to interface with each other. It turned out, though, that gas analysis system was used to find out why the astronauts were coming back with sore throats and this sort of thing.

BERGEN: Really? I hadn't heard that.

DAWSON: They had one on board, but they found out that it was a lithium hydroxide scrubber, some of the lithium hydroxide was coming out in vapor form, and they would breathe it, and it's just like breathing Liquid Plummer. The systems developed, we had sufficient calibrations to find out what it was. The biggest problem with outside source doing it is that no one had the facilities to go through and do all the calibrations that would be necessary and they did not have access to the spacecraft. And they would have had to, to do that.

BERGEN: Were there any other advances in technology, aside from the ones that you've already mentioned, that went into the Lunar Receiving Laboratory?

DAWSON: At the time we were trying to look at on-flight computers, and it wasn't just the "looney lab," but they gave TI [Texas Instruments] a contract, and the contract was to reduce the size of the computers, period. Maintain its capability, but just reduce the size. And that gave Texas Instruments a big boost in developing transistors and this sort of thing.

A couple of first experiments that they were playing with was heat shields, and they were trying all kinds of coatings of various kinds. If you remember some of the early ones, there was some flaking off. Okay. So we worked for a little bit on some pyro cerams. This was when I was with Sun Strand. We also worked with Teflon coatings. None of it worked, but the base data that was derived out of that research set up the Corning in terms of pyro cerams and the Teflon pan industries. And the taxes from those two have paid for the Apollo.

The basic research, I think, was the greatest thing that came out of the space program. [President Richard M.] Nixon killed it, really, in [19]'68. He stopped all the research contracts going out and held them to play politics with them in the primaries, so it never really got started again like it had been. Because we were looking at time frame, and the most important thing for any of us down there was to make the date. So we were putting schedules on inventions. That's never been done before.

BERGEN: Amazingly, it worked.

DAWSON: Well, people can do it if the incentive is there to do it, and if they're free to think. When we got down toward we knew when the people were going and this sort of thing, we knew when the shot would be, everything kind of slowed down because they said, "We made it." And [President John F.] Kennedy did us a great disservice by specifying a date. He put a goal: get a man on the Moon by the end of the decade. When we did, there was nothing else, nowhere to go. There was no definition as to where they should go from there. Now, if he'd said, "Get to Mars by 2000," they would have been able to keep it going.

But once they had a spacecraft that worked and missions that worked, then they had a problem maintaining their crews. We had probably the best engineering design staff in the world ever assembled, was at [The] Boeing [Company], and trying to keep them together to get into the Shuttle work, they were designing desks, gray desks and stuff like this for the government, but the problem is, when you pull the drawer out, the drawer come out 13.00000 inches, and that probably cost 10,000 dollars to build a desk to their specifications.

So people got really whacked off at that end of it. It was no longer exciting like it was before the shot. So people started leaving. With me, as I say, I was interested in the radiation physics, interested in doing the research. Dr. [Persa R.] Bell, my boss down there at the Lunar Lab, made it quite plain that I wasn't going to be able to have time off to go do the radiation stuff, that I was a PI [principal investigator] to do. So I told him, "Fine." I had to make a choice. But, as I say, we had the thing set up, up at University of Kentucky, so the lab and everything was set and ready to go.

So I came back up here to Oklahoma as special assistant to the governor for science and technology, and then started operating a research laboratory and did lunar samples on the side, but also took the data that we had from NASA, like all the soil samples and this sort of thing, and we worked a lot on the satellite, the Landsat. Before, we were doing the satellite surveys of the Moon and picking lunar landing sites. Then NASA said, "Well, we've spent all this money. Show us some practical solutions." So that went into Landsat.

Anyhow, with that background, well, we found out how to find oil using satellites, and started an oil company and four years later retired. You know, thank you for your taxes. But the technology was there and people just didn't apply it. But from the satellite itself, and—well, from the stuff we had at NASA when we were doing the various kinds of soil samples and testing, that sort of thing, a couple of things that they had to find out was, do the pesticides affect soils, fertilizer, these sorts of things, how do they affect the soils. We didn't have to worry about vegetation, but it was, of course, an effect. But the geologists would ignore all that. So in comparing, say, western Oklahoma soil to lunar soil, they weren't even considering what that soil had been through.

But when I came up here and started this research thing, we worked for the Department of Ag, [Agriculture] and so we put some of that in. EPA [Environmental Protection Agency] gave us a contract to develop a pesticide catalog, what effects it had on the soil, vegetation, and so forth. From those, we were able then to rule out on the satellite what was due to these various other things. Oil, the light hydrocarbons migrate up through the soil so they color, change the color of not only the soil slightly, but also the vegetation. So what we found was that out here in the wheat fields that hydrocarbons coming up through there, they would mature two to three weeks faster than where there wasn't no oil. They'd turn yellow compared to light green or something over here. It became obvious, so we just implemented in an oil company, oil search.

Right now we've got a running battle with the great scientists because the Earth looks just like the Moon, except we have vegetation on it.

Turn it off for a second. [Tape recorder turned off.]

BERGEN: You were talking about Tony [Anthony J.] Calio [phonetic].

DAWSON: Tony Calio was our kind of administrator. They put him down there trying to offset some of the great scientists, because they were going off the deep end and not really doing what they had to do from the standpoint of administration. When he left, he went to NASA Headquarters and started up technology utilization.

So what I did when I got to looking at this stuff, this was in '73, '72, '73, and I realized I had to have the pesticide, the fertilizer data, and so forth. But I finally got the EPA contact to allow me to make this great big assemblage of data, and the feds forced the companies to give me the data they had. It was all confidential and this sort of stuff, so nobody else got it but just us, and then EPA had to make warnings.

DAWSON: When I started looking at this satellite data then, NASA was correcting it. The satellite flies over and measures fifty miles to each side of its orbit. Well, right underneath it, that acre would be square, but out there fifty miles, it'd be elongated. It's a cosine factor, and you can calculate and you can square that up, but when you do, you go through this calculation, you change the position of each acre and you do it by nearest neighbors. So with NASA correcting the data, they were wiping out what I was looking for.

So at that time we had a little gentleman up there from Oklahoma called Carl [B.] Albert, the Speaker of the [U.S.] House [of Representatives]. So I went to him, told him what I wanted, what I was doing and why, and he called Tony and I got raw data, uncorrected. That's what we done with this upstairs, there's a billion acres down in Texas, Oklahoma, Kansas, Nebraska, big pieces of states on each side, Turkey, Israel, Jordan, China. So we had all the raw data. It's not available anymore. And that's what Houston naturally was after, was the raw data and then they don't know how to use it or didn't use it. But it could have solved a lot of the problems that they're having now with the oil thing.

But the main thing is that the technology was developed by NASA and it's free. It belongs to the people, if you can just get somebody to use it. That's probably the biggest disappointment that I've had coming out of NASA, was the vast information that they had wasn't being utilized. That's what Tony went up there to try to get them to do.

But one of the things that we did after we came back up here, we had developed some little light sensors to measure reflectants. We mounted them on a glass thing so people who couldn't communicate could look toward that little sensor, and the white of their eye would reflect the light and turn it on. They could sit there and step through like the alphabet with the display. Now, in those days we didn't have great big good displays like we have now. But they could step through there and spell out words if they wanted to, and it worked.

So here are people that couldn't communicate, could, and the government stopped us, because they couldn't prove that it didn't hurt their eye without experimenting, but they wouldn't let us experiment. So it kind of went away. But that technology was developed by NASA and it was developed by NASA for the lunar module, so they could sense the Earth and sense the Moon and this sort of thing without actually having to get out and do anything. But that's the biggest disappointment, is that they didn't use, still haven't used a lot of the technology they developed. But it started in on the electronics. Of course, that was the base. NASA's the reason of all electronics that have been developed to date.

BERGEN: Hopefully someday we can communicate that sort of information to the general public, so that they would appreciate the space program.

DAWSON: If somebody would just go back and dig out the actual taxes paid by Dow-Corning on our ceramics and on the Teflon pans, they could prove it, and could prove how needed the basic research is, because the information that's derived, you may not have any idea that that failure did any good at all, but somebody else can pick up on that data and use it. It's also why most of the companies are trying to go multi-discipline now in terms of sciences. But then you wind up with a committee again. If we don't blow the horn, we won't have to worry about it.

BERGEN: During your time working at NASA, what was your biggest challenge in your job?

DAWSON: I think the biggest challenge, really, was people. We had all these different disciplines, each one of them used to working in their own little area, you know, and yet they had to interface and had to really concede areas, space, time, money, to these other people, and everybody thought their experiment was the most important, of course. Working with people and getting them to work together was one of the problems.

The technical problems, we had the experts. If you needed something done in engineering, there was somebody over there who knew just exactly how to do it, if you could explain what you wanted. So that really wasn't that big of a problem. A lot of people think it was the great engineering feat; it was just applying what the people knew.

But working with the people was a problem. Joe Piland, Bob's [Robert O. Piland] brother, was in charge, he worked in the Engineering Division, Administration Division, or directorate, and he was probably one of the best construction managers going. I think probably the greatest achievement that we had was that when Congress authorized the Lunar Receiving Lab, we moved in the same fiscal year that they appropriated the money, and Joe and Bob and some of them went up there and convinced Congress to let NASA engineer its own building, just get the Corps of Engineers out of it. They wanted nineteen months to do the design, and we did it in sixty days. But by removing the Corps, we completed it and moved in in eleven months. That's never been done before, and I'm sure never been done since. But that was the kind of expertise they could focus at that point.

BERGEN: You've mentioned a few people. I was wondering if there are any other people, or maybe you might even want to reiterate some of the people you've talked about that had a significant influence on you.

DAWSON: Joe Piland probably was the greatest, because the way he managed things, everything got done. No nonsense. I learned an awful lot from him of how to conduct what we were doing. I applied his techniques to this Landsat thing and it worked. We did with five men and NASA was sitting there, in fact, we were doing work for NASA, satellite work for NASA, and they had all the big computers and hundreds of people involved, we were sitting up here with five people and two mini computers and could outperform them every time. That's because we had no bureaucracy to go through, we didn't have to ask anybody's permission. You had a task, you did it. That's the way it was with NASA up until the time they landed on the Moon. Then it turned into a bureaucracy.

BERGEN: What was your most memorable moment working for NASA?

DAWSON: We had some funny ones. Dr. Birkebak and I were at the University of Kentucky and it was the first time that we had a sample of lunar "fines" that was open. By that I mean it wasn't under vacuum. But our system was set up that we had to put it into the vacuum chamber, even though we didn't put a vacuum on it, to do our measurements, because everything was geared that way. To get it in, we had a great big valve with an arm that we could screw out, so we could hook that big valve on the side of the vacuum chamber and screw the sample out to a center where we needed it. This thing weighed, I don't remember, fifteen, twenty pounds, minimum. But I was sitting there cradling that valve on my knees, and Dr. Birkebak was trying to put the lunar sample into the little holder. We got tickled, and we spilled it all over the floor. We had plenty left to do our experiment, but NASA was very particular about returning every little bit. So I figured that whoever gets that sample twenty-five years from now, will say, "Look! Organics!" because there's floor sweep all over it.

We wrote a letter, we told them what happened and whatnot, but some of the guys down there afterwards said that, boy, they tore that letter up quicker than anything. They didn't want people to realize. Like we're talking about the bugs on the Moon, we may have organics in lunar samples here and everybody will say, "Oh, we missed it."

Just like now they had that tektite up there that they found, I think it was in Illinois someplace, and they've had it for twenty-two years, and all of a sudden they found some crustaceans in it that looked like there would be life on Mars. It turned out it was just about two and a half weeks before the appropriation committee met with the Senate for NASA's budget. They'd had it for twenty-two years, for gosh sakes. How did they know it was from Mars?

But on Borman's flight, the first cislunar, they did delay that so he would be coming back when congressional committees were meeting, and that really whacked everybody off, because from then on it was politics. They were telling us to be so careful and all this sort of thing, and here come President [Lyndon B.] Johnson up and sends fifty pounds all over the world. We were telling the great scientists, "You can't have any more because this is too precious to do it." And he shipped it all over the place. But that didn't set well either.

I think that the meetings with a lot of the scientists, I'm talking about the great scientists, Luis Alvarez, was really a thrill for a kid like me. Those were heydays.

BERGEN: I think we've covered most of my questions, but I wanted to see if there's any other things that we didn't mention that you were involved in.

DAWSON: You were talking about this article from *Science*.

BERGEN: Yes.

DAWSON: The four basic requirements that quarantine is dictated by federal statute, so that was not a matter of choice; it was a matter of implementation. The time-sensitive experiments, or the very fact that the gamma radiation counts and whatnot would decrease over time, so we had to move them as fast as we could. There were several other experiments the same way, and these were ones we had to ship out of the lab.

The storage requirements, they wanted to maintain a large percentage of the sample if they could in storage to try to keep it in pristine shape because of new techniques developed up and down the pike, they'd be able to have it to do that sort of thing. The preliminary examination was just that, what did we have.

But the lunar lab, as I say, the principal thing was quarantine, as far as statute was concerned. Its main task, though, other than quarantine, was to get the samples divided and into the scientists' hands so that they could run their experiments.

Quarantining the astronauts we did, but it was kind of a mess. We had one M.D. that I swear he couldn't have tested an ingrown toenail. How he got a job down there, I don't know. He'd have been a death to anybody that got back and got sick. They finally moved him out. But that was the only one that I think was really a bad choice by NASA. It was a political choice.

BERGEN: When you worked as the principal investigator working with the lunar samples, did you find anything that surprised you?

DAWSON: Yes, almost got us excommunicated from NASA. They had a sample that they called the Genesis rock, and we had it, had a piece of it. We split it to do our experiments. When we did, we found that there was a glass sphere, little bitty, of course, but there were little bitty glass spheres in the sample. Now, for that glass to form like that, like they form marbles now, they melt the glass and drop it, and they drop into usually warm oil or something. But when it's in the air, the surface tension pulls it and it's round. So that had to be done without touching anything.

We also found some that were dumbbells, where the two glass pieces have plugged together. So that meant there were some mixing when this occurred. Also one of these had been hit by something and there was a groove across one end of the dumbbell, where something solid had hit it before it completely solidified. That's fine, except we also found perfect cubes of glass, and to form a perfect cube of glass takes extremely slow cooling, with absolutely no interference.

The point is, all three of these could not have been made at the same time under the same conditions, and could not have been made inside that rock. That rock had to be a composite. So what part were you going to count to make it four billion years old? You could not. You never heard NASA say anything more about the four billion-year-old rock. All the great scientists were flipping, because here are a bunch of young cats down there playing engineering, using engineering parameters, were really poking holes in the idea that the Moon was four billion years old, which is what NASA put out.

From what we could tell, it couldn't possibly be more than 20,000 years old. So the counts, the radiation counts, are almost fictitious, because you don't know what was there to start with. They say, "Well, when something is formed, like a rock formed, melted, from that point on, it decays." Well, that's fine. But what do you do if every rock out there is a mixture? I mean, how many pure rocks do you have? Diamond. Okay. This sort of thing. They don't know.

The second thing is that there's a theory, and we were working on that back in the early eighties, that the speed of light decays. We have experimental measurements. It's all on our web site. We have experimental measurements back to 1640 and it shows a definite decay in the value of the speed of light and to where now it's almost constant. They have backed up and redone all of these experiments using the same equipment these people had back then, and they don't get those answers.

Now, if the speed of light is decaying, that means that the time we measure for radiation also changes, because it's a function of the speed of light. We've run through the calculations and showed that if we take that and line it up with like what the Bible says, we wind up with creation being 15 to 18 million years ago by atomic counting, atomic clock. But they come together just about the time of Abraham. So the scientists are right, they're just using the wrong time scale as a function of what the solar time scale is.

We published the thing. Nobody here in the United States would take it. They did it in Europe. It's now become not really accepted by the scientific community, but at least recognized as a possibility.

If we had applied that back at the "looney lab," we would have probably got a completely different set of time frames involved. We know that the decay of the Earth's magnetic field indicates it's not more than 20,000 years old. There was a magnetic star about that time ago. There's all kinds of things that have the same decay. Everything on Earth that we've found, including the Scriptures, shows a decay curve, or expediential growth curve, like the population. So everything is going to that pattern. The great theologians, you know, they say that, well, 1,000 years is like a day and a day is like 1,000 years, 2 Peter. That's fine, except if you look at that, what it says is that a 1,000 years is like a day, it's the top of an expediential curve, and a day like a 1,000 years is the bottom of one. I think what he was telling us is you've got the curve.

As a matter of fact, getting in and looking for truth, okay, you have to have good data, and the only thing I found that has perfect data is Scripture. This whole thing here came out of Scripture, because in Genesis it says, "The days of [unclear] the Earth was divided." In Genesis 1 it says that at one time the land was all together. Then I got to looking at how did it divide. You've heard of continental drift, plate tectonic theory.

So I started digging into these. Well, I could put the Earth back together based on the NASA soils, 180,000 soil samples, and the geometry. Put all the continents back together to a single super continent. But when I did, it turns out that the Mideast or Israel is the center. Okay. That's exactly what he said in Ezekiel, "I put my people in the center of the earth."

So we got to looking at that, and it turns out that that's also the central point for the distribution of oil all over that hemisphere. If the North Pole, if the Pole was through Israel or thereabouts, I think it was the Dead Sea, but anyhow, it had to shift to where it is now, the North Pole. Well, we know from science that it shifted at least four times, but we don't know how much and we don't know when, because the alignment of the dipoles. Same thing Luis Alvarez was looking for.

But if it shifts, it's like an armature in an electric motor. If you put it in [unclear] field and you spin it, it develops torque, but at a right angle to the spin. Well, if that's the axis and it shifted up here, then the torque should had been at a right angle. It turns out that it's Arbuckle Mountain here in Oklahoma. So with that as the central point, using the satellite stuff, we hit 90 percent. But the great geologists come in and they say, "Well, how'd you come up with this?"

"Well, it's right there in the Bible." Out the door they go. [Laughter]

But what it amounts to is that everything that we were playing with at NASA, I learned the satellite stuff, I learned the radiation stuff, I learned about the soils, I had access to the soil samples, it was all applied right there. Try to get somebody to believe that. So we cried all the way to the bank. That's one reason now I'm back here now doing all the research on Scripture. It is so much more fun. It's a perfect database.

BERGEN: It's nice to see that that data from NASA is being used in a constructive way. Hopefully more people will discover that and utilize it.

DAWSON: There are a lot of people using that, but there is so much more that could be used, I think. Like the electronics, they've gone way past where NASA was. But in terms of the geology and this sort of thing, they've ignored what they've learned, the way I look at it. All the satellite work they've done has a direct application, rather than cell phones and stuff like this. But we were using that finding pollution sources, taking samples downstream, and then finding out what the soil was that was in that sample, and going back to the banks and the satellites, find out where it started.

Here in Oklahoma, we had a whole series of projects Department of Ag started to stop erosion. They didn't even know it was occurring until they started making those measurements down there in Texhoma. So it's being utilized, but they're slow getting around to it.

BERGEN: I think one of the problems in our world today is we have so much information, sometimes it's hard to pick out the good stuff.

DAWSON: Yes. See, and that's one thing I've been trying to get across to them. Information is fine. Knowledge is how to use the information, or where to find it. Wisdom is why and when to use it, and that's the part that we ignore. You stack up all these databases, nobody knows how to use them. It's kind of a waste of time. It's like the oral history here. People can get a real insight into what happened at NASA if they'll listen to it. That's going to be a challenge. That's the next challenge is to get them to pay some attention to it.

BERGEN: We hope we can do that. We've got a lot of plans. We just hope they can come to fruition.

DAWSON: But setting up a web site, it's no problem. I run two back here. One of them is a 150 megabytes. I've taken four one-hour lectures and put them out there in audio with slides. I'm getting about 3,400 hits a day on it. And it's all Bible stuff now. But it's taken a year and a half for people to really find it, and now it's really going crazy. But I get like 100 e-mails a day, half of them are questions about the Bible or something like this, you know. The other half is some Arab trying to tell me something.

But it can be done. Once the site is set up, then being able to get people to go to it, you're going to have to start quite a little program back in the science classes and this sort of thing, because that's where it will do the good is these young people. Most of us old goats are so set in our ways that we're not going to change much anyhow.

BERGEN: This is important for my generation and younger generations, because we weren't around to see the great things that were done by the people that worked at NASA, that great collection of engineers and scientists that came together to achieve going to the Moon.

DAWSON: But you have to have a cause in order to generate it with the people. World War II brought such a cause together. The science that came out of World War II laid the base for all these things. As I say, Kennedy picked the goal, and we had to race with the Russians, so that was the incentive to go do it. But now people can't make up their mind what they want. They can't choose. I think the election is a perfect example. They don't know what they want. They have no real guide going.

But when you get into the Scripture, that's exactly what it says, that we're running to and fro without gaining knowledge. It also says that knowledge will abound exponentially. Well, that's where we're going.

My grandson's up at OSU. He's getting his master's. The things he had as a junior in high school were what I had as a senior in college. Such a massive amount of information. So everybody has to specialize. They cannot master a field anymore. They have to cut out a little piece of it, and that gives them tunnel vision. I'm not sure they could put together a project like NASA now, because we don't really have the visionaries that have broad visions, because they've been trained in tunnels. So we'll see.

BERGEN: Thank you for taking time out to share with us. I appreciate it.

[End of interview]