

**The Optical Society
Oral History Project
Past and Present JOSA Editors
Interview with Joe Goodman
Conducted on September 19, 2007, by Paul Kelley**

KELLEY: This is the fourth of the four interviews that the Optical Society History Project is having with former and present JOSA editors, and it's taking place on September 19th, 2007. This is in conjunction with the 90th anniversary of the founding of the Journal of the Optical Society of America, which is the flagship journal of the Society. I'm here with Joe Goodman, and Joe is going to tell us a little more about his experiences as an editor and some of his other activities in the Society. So let me start out by asking you, Joe, who persuaded you to be an editor? How did you come to get involved with JOSA?

GOODMAN: [01:18] Yes, the editor preceding me was Doug Sinclair, and Doug and his wife, who was very instrumental in helping him, decided at some point that they had done enough, and so there was a need for a new editor. Jaris Quinn, who knew how to ask a question it was very difficult to say no to, approached me and asked I would consider being editor. And so Jaris and I had some discussions about this over a period of two or three days, and of course the problem for me, in my view, was that my institution, Stanford University, wouldn't sort of view this as part of my regular university duties; this would have to be something I would do on top of my university duties. And so we eventually came to the conclusion that I would do this one day a week, and therefore be within the university guidelines of what's allowed for consulting. And so I would not do other consulting; I would do this instead. I needed some help, because in those days, as we may discuss, the editor's duties were a little different than they are today, and so my wife, actually, was...I think she had the official title of assistant editor, and together, along with occasional very part-time help, we were managing the JOSA office. So it was Jaris who got me engaged in this, and it was a great experience; I enjoyed it.

KELLEY: Bob Terhune told me that Jaris and Borystoychev came to his front door one Saturday afternoon—two thugs, scientific thugs.

GOODMAN: Made him an offer he couldn't refuse?

KELLEY: Did you talk to anybody else beside Jaris?

GOODMAN: Well, I talked to Doug a little bit, to get the feeling for what the workload would be, but I don't think I talked-- who else might I have talked to? No, I think I just talked to Doug.

KELLEY: So you got some idea what the scope of...

GOODMAN: How he ran the office, and who helped him, and what he had to do, and what his wife was able to do, and so forth.

KELLEY: And so you started on this in what year?

GOODMAN: I think it was '78, although I believe I read it was '79. So I don't know; it was either '78 or '79, and I think I continued this through '83, and Bob Terhune took over, I think, in '84.

KELLEY: And did you find the workload changed during that time, or was it pretty stable, or was the increase so gradual that you didn't notice it?

GOODMAN: [04:22] The paper flow gradually increased, but it really didn't affect our ability to do things the way we did at the beginning. We were still doing them the same way at the end. I think our paper flow at the end of that period was about 300 published papers per year.

KELLEY: That's quite a load.

GOODMAN: So if you figure that out, that's about 300 published papers, and there are 52 weeks in a year.

KELLEY: Six per week?

GOODMAN: Something like that.

KELLEY: Or if you divide by the number of working days, that's 1.5 per working day. That's the way I count it.

GOODMAN: My working day included Saturday, I have to confess. That was my consulting day—Saturday. And so I was working six days a week during this entire time.

KELLEY: So you probably gave up a lot of lucrative consulting.

GOODMAN: Well, I gave up some consulting, but Jaris worked out a package whereby, you know, I would get paid something and my wife would get paid something, and it was okay.

KELLEY: But it probably wasn't what you could get around Silicon Valley at the time.

GOODMAN: You're probably right, but it was enough.

KELLEY: You were still happy.

GOODMAN: It was steady, too. That was the other thing. Consulting comes in bursts, and that was steady.

KELLEY: Did you inherit a referee?

GOODMAN: [05:53] Yes, my recollection is that I had from Doug Sinclair a kind of index-card-based referee record of his—who he had used, who was in his database. Again, it was a database with some indication of how many times he had used them as reviewers, and indications of people who were really good reviewers and some who were not-so-good reviewers. So I inherited that.

KELLEY: And that was really before the personal computer.

GOODMAN: [06:36] Before the personal computer, and then, you know, as we discussed this morning, in the other interview, I believe I was the first JOSA editor to begin to use a personal computer to help in managing the paper flow. So I originally had a Tandy TRS-80, which I could program in BASIC. I think I had to record things on little magnetic tapes at that time. It had like four kilobytes of memory, I think. But eventually I graduated to a larger Tandy machine which was quite capable, and so I would keep the records of papers—when they arrived, who they were sent to, when the reviewers were sent the papers, and what kind of actions we took. In those days, I think there was a-- do you remember a program called DBASE or something, that was a database program? I think there was a programming language for DBASE, and I think wrote--

KELLEY: It may still exist.

GOODMAN: It may. I wrote a program that would sort of prompt me to enter information. It would prompt me when a paper had been out to a referee over a certain period of time, and it would keep a record of all the actions that I took. So that helped a lot, and it also printed out-- or at least I was able to print out, maybe with a BASIC program, sort of standard-form letters for the various kinds of actions, which I could sort of customize to the particular case. So the personal computer came on the scene, and it began to change the way things were done.

KELLEY: Yeah, I think before the TRS-80, there was the Altair. There were some...

GOODMAN: Those were too complicated for me.

KELLEY: But I'm surprised, you know, Doug didn't think of doing this, because he's famous for the Oslo code for optical design. Well, he was probably busy with his design codes.

GOODMAN: Maybe.

KELLEY: He sent a letter of this meeting to the Optical Society, and one of the things he said, he was always considered as an interim editor, and he considered himself that. He was filing in between McAdam and you, and I don't know whether--

GOODMAN: [09:13] I'm surprised to hear that, because as far as I felt, he was the editor during his term, and I hadn't been approached about being an editor, and I don't think there was any-- I don't recall any commitment that he made to only serve for two years or three years, or whatever the time was.

KELLEY: What he told me over the telephone was sort of interesting, and hopefully we could pursue it at some later time, was that Brian Thompson suggested he do this—pushed him to do it, pushed him to become the editor from Dave McAdams.

GOODMAN: At that time, Brian was the provost for the dean or something.

KELLEY: And Brian wanted the Optical Society to merge with the SPIE. I guess Doug was involved with the SPIE, and he thought that would help that merger, and that's the message I got. It was from Doug, so we should ask Doug, I guess, in the future. That's an interesting historical thing.

Anyway, to return to you, starting with Doug's reviewer database, you developed your own database. You developed your own manuscript management system?

GOODMAN: [10:31] Yes. And I also began to use Knowledge Index, or its predecessor, whatever it was called, from Dialogue to help me find suitable reviewers when I didn't have a good enough lead in the reviewer database.

KELLEY: And you probably looked through the references in the article.

GOODMAN: I did do that, too, of course.

KELLEY: And the back issues of the JOSA...

GOODMAN: Right, yeah.

KELLEY: Well, that's how you got started, and you had about roughly how many manuscripts at the beginning? You said you ended up with about 300 per year published in--

GOODMAN: [11:14] Yeah, I think we probably started in the-- well, I'll make a guess: maybe 240 or something like that, and ended up with 300 over a period of, what, four years or five, I've forgotten which. So it was growing slowly, but it wasn't an exponential growth by any means. And at the same time, the fraction of non-US authors was growing perceptibly as well, but again, not in an exponential way. So things were changing.

KELLEY: Now, there was a publications committee of the Society, and they were responsible for, well, I guess, looking over your shoulder and advising you. How did you interact with the publications committee?

GOODMAN: [12:12] My recollection was that my only interaction with the publications committee was at the couple of meetings a year of the Society. I don't remember; did we have one annual meeting then, or did we have two? We had two back when I first joined the Society.

KELLEY: I think it was down to one.

GOODMAN: It maybe have been down to one, but we had some other meeting, maybe it was a leadership conference or something.

KELLEY: Well, there was CLEO.

GOODMAN: But we would have meetings with the publication committee, and all the editors would be there, and we would kind of share information. But it was not the kind of meeting where sort of edicts came down from above; it was more kind of sharing of information.

KELLEY: Was Karl Kessler the chair of the meeting?

GOODMAN: I don't remember Karl-- I know Karl, but I don't remember him being the chair.

KELLEY: At one point, Freeman Hall was the chair.

GOODMAN: [13:07] I think Freeman Hall was the chair. I do remember him in that capacity, yeah. And this is before the structure developed, and which one had the board of editors, and then a bigger publications council or something.

KELLEY: The publications committee, at some point in time, became the publications council—in 1991. So the publications committee persisted for quite a while.

GOODMAN: Yeah, it did, didn't it?

KELLEY: And the publications committee started in 1962, which also coincides with the founding of Applied Optics. Now, you were in the board of directors of the Society as an editor. How did you find that?

GOODMAN: [14:04] Well, actually, I had been on the board earlier as an elected member of the board. The service on the board as editor was worthwhile in the sense that as editor, I really got rather directly the sense of what the board was feeling about the publications, but at the same time, I didn't really feel I had lost a lot when we went to the other structure, where the chairman of the publications council was on the board and there was less direct involvement with the editors.

KELLEY: I think a lot of people don't realize that being on the board of directors can begin to wear on one after a while.

GOODMAN: It's a lot of work. There's a lot of meetings to go to.

KELLEY: A lot of stuff that may not be of very great interest.

GOODMAN: And those meetings often interfere with interesting technical sessions you would like to attend. So that's right.

KELLEY: So you were no longer an editor when the editors-- because I think after Optics Letters was formed, Bob Terhune was added to the board as a third editor, but when it came to developing further journals and having more editors, it was just pretty clear that the editors would eventually overwhelm the elected members of the board, which, of course, was against the bylaws of the Society. I think the bylaws had to be changed each time.

GOODMAN: That's right, to add members of the board, basically, ex officio.

KELLEY: You were actually able, as I remember, as an editor to vote for motions.

GOODMAN: Yes, I believe so.

KELLEY: Which was okay when the number of editors was smaller. So now your things are going-- the journal's expanding, and maybe the science is tending more and more towards lasers and applications of lasers, and science generated by lasers. How did you feel about that trend, and the classical things that went on in JOSA spectroscopy?

GOODMAN: [16:45] It was pretty much before the optical communications boom, so that part of it was some theoretical papers on modes and various kinds of wave guides and so forth, but the boom of optical communications came considerably later. But there were increasing numbers of papers having to do with lasers—that's very true—but spectroscopy and vision both remain sort of stable as things that the Society had traditionally published and continue to publish. So there was certainly a lot of breadth there.

KELLEY: Was there much non-linear optics?

GOODMAN: [17:29] There was the beginning of non-linear optics, but not too much in applications, because that appeared in Applied Optics, usually. There was a lot of work on optical propagation through the atmosphere, and a lot of that was motivated by lasers as well.

KELLEY: Turbulence?

GOODMAN: Yeah.

KELLEY: So things were changing, but it was probably not very perceptible on the time scale that one works as an editor?

GOODMAN: Right, right.

KELLEY: Looking back 30 or 40 years over what's happened, it seems like it's an amazing change.

GOODMAN: It looks exponential, doesn't it? But if you look in a little section, pretty linear, that's right. [Laughter] Very true.

KELLEY: So now, we come to the changes that occurred in JOSA. Could you maybe describe a little bit about the changes?

GOODMAN: [18:30] Well, let me just say a word first about the changes that happened while I was editor. I would say aside from this gradual increase in activity, the major change occurred, I think, after maybe I had been editor for two years, at which time we decided—and I think this was a discussion on the board of directors, I'm sure—that rather than having the AIP do all the publication, the post-editor publication part of the work, that we would try to do that in-house in the OSA and add the necessary staff to do that. And so that was a major change, and basically we became more of an in-house journal. It was in kind of the middle of my term when that took place.

KELLEY: I remember talking to Doug. In fact, in his letter, he said the AIP was the publisher. The OSA was the publisher, but in the copy-editing and type-setting and all that stuff...

GOODMAN: [19:39] There were some frustrations there. There were some things the AIP liked to do certain ways, and the OSA maybe wanted to do them a little differently, but it was sort of hard to get that worked out. And so you know, I think it was a good move to move it into the OSA, to do it.

KELLEY: Now, they already had that copy-editing manage editor, and so forth. They had contracted with a press—I guess it was Mack, or I'm not sure who it was—to do Applied Optics.

GOODMAN: Yeah, that's right. So Joanne Spray is the person I remember from those days. Did she work for Applied Optics as well as JOSA? I don't quite remember.

KELLEY: I'm sure there were copy editors in-house that worked...

GOODMAN: Yes, there were some copy editors who worked...

KELLEY: Applied Optics was Patty Wakely.

GOODMAN: Of course, I remember her very well.

KELLEY: Patty Wakely was the managing editor of Applied Optics, and I think she started out as an OSA staff person.

GOODMAN: And then she split off on her own.

KELLEY: But it was basically done through the OSA office.

GOODMAN: I had forgotten about her. I'm glad you reminded me about her.

KELLEY: So anyway, JOSA was basically moved to more or less the same structure as Applied Optics.

GOODMAN: More or less.

KELLEY: Did this affect you?

GOODMAN: [21:23] It didn't affect me in a big way, but I guess it was kind of comforting to know that you could pick up the phone and call the OSA and talk to someone you had talked to before, whereas to talk to the AIP, that was a giant organization, and you didn't know anyone there. I guess Joanne or someone in the OSA would be the conduit into the AIP, usually. So it was sort of separated a little bit.

KELLEY: Now, Joanne is famous for her corrections of authors' English. Did you get involved in any triangles as editor between Joanne and an author?

GOODMAN: [22:05] Well, there were such triangles, but I think the biggest triangle in that regard occurred before me, and after having been an author and having my papers edited by David McAdam—which I generally found to be very helpful—whatever Joanne didn't seem like very much at all compared to what David did. So I don't recall any real friction between authors and Joanne about that.

KELLEY: I'll stop and tell a little story. I had a boss at Lincoln Laboratory, Al McWater, who would correct all our papers. He spent a lot of his valuable time looking at his division's papers. But there was another person in our division, Alan Strauss, and Alan Strauss, when he would get a paper to review, he would go through it, and he would rewrite the paper. And he kept getting thanked by authors for having totally rewritten it. I mean, he was that good. He was that good.

GOODMAN: Well there, are always some authors.

KELLEY: You know how Dave McAdam was. Maybe he was in the category.

GOODMAN: [23:28] Well, I always felt that he improved the manuscript, but there were some authors, I think, who resented-- you know, they thought they had presented it in sort of the best possible way, and they really didn't like people fiddling with the way they did it. But it was a minority, I think.

KELLEY: So that takes us up to what, '82?

GOODMAN: Mm-hmm [yes], '82, '83. And I've forgotten whether my term as editor just ran out and I decided not to renew it because-- well, in '82, let's see, I had...

KELLEY: There were no term limits at the time. Well, I'm not sure, I think the term limits came in some time in the middle '80s. That was Bob Terhune's idea. I think it could have occurred before, because it was right around--

GOODMAN: [24:32] Yeah, but I think they did go in terms; they just renewed them indefinitely. So in any case, I have trouble remembering exactly what all the factors were that suggested to me that it was time to step down. I think I had been doing it for five years, and it does wear you down after a while—particularly if you've got all of the office functions there to handle. It limits your ability to leave a home for long periods of time, although I was able to do that in '79 with a one-month trip to China, and I honestly don't know exactly how we managed that. That was really stretching the limits. I remember also in '84, I had the chance to spend a two-to-three-month sabbatical in Australia, and it may have been that sort of looming on the horizon that suggested to me that maybe the end of '83 would be a good time to step down.

KELLEY: Now you've started one or two companies, right?

GOODMAN: [25:40] That was before I had been involved in starting companies. No, I take it back. The first company that I was involved with, Optivision, was actually founded in '83. So that was just towards the end of my term. And you do raise a good point; I had an increasing need to devote time to the company, and my one day a week, in particular, I couldn't fit both

into. And so I did kind of transition into spending time with the company after I finished that term in '83.

KELLEY: Amazing ability to do all these things.

GOODMAN: [26:22] You know, everybody has to find their own balance of how much time they devote to work and how much time they spend with their family, and I think I kind of erred on the side of being a workaholic, as many of us in our profession do. But my wife and daughter never complained about it. When I started as editor my daughter was in her teens, and I guess she was just about going off to college or in college when I finished, but while she was in high school, you know, it would have been nice to spend a little more time with her. I would spend one day a week with her instead of two, I guess. But she doesn't seem to resent that at all. She turned out okay in spite of that—or maybe because of that.

KELLEY: I'm familiar with the experience. My wife tells me I had nothing to do with the kids. [Laughter] Not that I ever did all the stuff you've done, Joe.

GOODMAN: [27:38] Well, you kept plenty busy, I think. So when I stepped down... I'm trying to remember the transition to Bob. I don't remember it extremely well, but when I became editor, I actually went to visit Doug Sinclair and sort of see his office and talk with his wife about how she managed manuscripts, and so we got a running start on how to do it because of that. But Bob, I think, had his own system. His situation was enough different than mine. He had the company behind him, and had a lot of resources with the company. So my experience wasn't that valuable to him. I'm sure I passed on my referee file to him in some form, but he sort of had a fresh start.

KELLEY: Yeah, he mentioned this morning, and then once again in the second interview, that he wrote the first programs in machine language.

GOODMAN: I wouldn't be able to do that.

KELLEY: We can write things in the high-level languages, but not machine languages.

GOODMAN: [28:56] Not me, anyway. Then, actually, after I stepped down as editor, at some point—and I don't remember which year it was, but it was not long after that—I believe I became chairman of the publications council. But I'm not sure when that was. And then, again, I was on the board of directors because of that.

KELLEY: Yeah, the restructuring was that in the mid-'80s sometime-- actually, 1986 was the formation of the board of editors, so that must have been when the editors went off the board of directions, and the chairman of the board of editors came onto the board of directors, and he or she was accompanied by the publications committee, which became the publications council by that year. So there were two representatives of publications—appointed people who were on the board. I remember I was involved in this restructuring, and I remember I was involved in writing the motion to do this, and I remember struggling with this, because we had a board of editors that reported to the publications committee, yet they both had seats on the board. So it wasn't a normal structure. But I kept thinking about it. So what? [Laughter]

GOODMAN: [30:45] It worked out. In what year did JOSA divide into JOSA A and B? Was that '84?

KELLEY: I have '84.

GOODMAN: So quite soon after Bob.

KELLEY: Oh, and the Board of Editors was '86. Did I say '84?

GOODMAN: No, you said '86.

KELLEY: Yeah, it was '84.

GOODMAN: So in '84, I do recall I was on the board when that decision was made, so I must have been there by virtue of being chairman of the board of editors or something.

KELLEY: Well, since the board of editors was founded in '86, that's probably when the editors went off the board of directors.

GOODMAN: [31:24] But I was off the board by virtue of being an editor. I was off the board after '83. So why would I have been on the board in '84?

KELLEY: The publications committee?

GOODMAN: Through some duty. Anyway, I was on the board.

KELLEY: We can't figure it out, and that's one of the things that we want to do, is to get all the structure and the timing figured out. We don't even have a list of who's been the editor of what available, and I hope the publications department will help Chad accomplish that, to get the listing of-- and by the way, this list of the major developments, if you and John Childs can sort of look it over, it would be very helpful. So go ahead.

GOODMAN: [32:16] But anyway, I was on the board when the split was approved, and I will go through the confessional today to say that in the board of directors vote as to whether to split JOSA into A and B, there were two people who voted against that split. I was one of them, and Chris Dainty was the other. We both made impassioned arguments that we loved the fact that we had a journal where we could see so many different fields of optics at once. We could be generalists. And of course, we were both from universities, and you know, perhaps that's a little more common amongst a university person to sort of want to have this broad view. But what we didn't see—and we were clearly wrong about this—what we didn't see was that with the growth of paper flow and the clear desire of the members to free themselves up from this enormous amount of literature, that they wanted to focus on what they were interested in, and so the split was absolutely the right thing to do. But I have to confess, I was on the wrong side of that issue, but in retrospect, I can see I was wrong.

KELLEY: As I told you earlier, I'm a physicist by background, and when I was in graduate school, I thought I was supposed to know every field of physics, and I know about only a few percent now.

GOODMAN: [33:58] Well, you probably had an oral exam in which you were expected to know everything about physics, right?

KELLEY: Exactly. So I mean, there is a nice thing about the unity of science and sort of trying to be a polymath in a particular science field. So now JOSA was split, and Bob Terhune was the person that facilitated the split, and he became the editor of JOSA B, and shipped off JOSA A to Harry Barry.

GOODMAN: Yes, that's right.

KELLEY: I'm sure you know Harry.

GOODMAN: [34:48] I know Harry well, and I know Bahaa, who followed him, very well. I must say the Optical Society has used very good judgment in choosing editors. I mean we've had some very top-notch people.

KELLEY: We also changed over to a very different way of managing the refereeing process for the topical editors. I'm curious to know what your thinking is about the change.

GOODMAN: Well, they certainly made the job of being editor easier than it was under the old system. I can't remember if we talked about this morning or if we talked about it already, but we used to receive the papers, and we would go through the whole office procedure, and once the transition took place to the OSA receiving the papers and handling all the mechanics of manuscript handling, that really took a big burden off of the editors, and it must have been much easier to get people to agree to be editor under that kind of situation. So that, too, was a very good move.

[36:01] And of course, now that's all done in a totally different way. You don't submit your paper on paper; you don't ship the paper around to referees, you do it all electronically, and that makes the process much more efficient, I'm sure, and hopefully faster. The delays of publication due to all of this handling of manuscripts and mailing them—sometimes internationally—really contributed to a long time to publication. Maybe we do it faster now—I would hope. The only negative—and I don't think that it's a serious negative—is that the author doesn't have quite as personal an interaction with the deciding editor, which as an author, it's nice to be able to know who-- well, you know who made the decision, I guess, today.

KELLEY: It's done through a third party.

GOODMAN: It's kind of done remotely.

KELLEY: It's electronic now. Although I assume that the office still gets phone calls and emails asking, "Where's my manuscript?" I'm sure Joan handled a lot of calls like that.

GOODMAN: [37:30] Yeah, and not only did I keep a database in my computer, but she had a written one just in case the computer crashed and the disk got wiped out. So she would be able to answer those questions just from her paper database.

KELLEY: I hope I pronounced the name correctly.

GOODMAN: Oh, you did perfectly.

KELLEY: So I'm about through with the questions I have. If we have a few minutes, you know, you've been involved in this Society in many other ways, and I think we're going to be interviewing, although I would think I would not be involved, we're going to be interviewing the presidents—as many as we can. And so you might want to speculate on what you think of this process, and how we might make it better, and what we might-- you know, and your experiences, if you want to, as the president, and what might be important to ask presidents of the OSA.

GOODMAN: [38:51] Well, it's always interesting to know, you know, what important events occurred during your presidency. I say that because there was a very important even that occurred during my presidency. Jaris announced that he was going to step down. That was a very important event. But I think every president can probably think of one or two important things that happened during their tenure. So that would be interesting to explore.

KELLEY: And sometimes there's a crisis. That was a crisis of one type, but I mean, there are sometimes where there are--

GOODMAN: Oh, it can be financial crises, too. I don't know how many of those we've had while Liz has been involved, but...

KELLEY: Ineffective management, which has occurred a couple of times.

GOODMAN: [39:41] Yeah, there have been some of those, too. Right. So the presidents would have a lot to say, I'm sure, about their terms. You could also ask them—it would be interesting to know—how they first got involved with the Optical Society. Was it strictly the fact that this was the place to publish in their field, or did they have other things that drew them to the Society? How do they compare the Society when they joined, and how do they compare it now? Because it's a very different society now.

KELLEY: Yeah, that's interesting. I was never president, but I do remember exactly when I got involved with the optical society. Tony DeMaria, who I know pretty well, because I worked on things related to mode locking. So I got a call from him one day, and he said, "You know, Kelley, you should think..." I was an APS, "Why would anyone want to be anything else but an APS member if you're a physicist? So he said, "Kelley, you know, you should get involved with this nice, little society. You could be effective there." And he basically told me to join the Optical Society.

GOODMAN: What year was that?

KELLEY: The late '60s. I don't remember exactly when.

GOODMAN: [41:16] Yeah, because I was a member of the IEEE, which was also a much bigger society, but I got drawn to the OSA in approximately 1966, maybe '67, when I was invited-- my very first invited paper, I was invited to give a paper at one of the two general OSA meetings per year in San Francisco to talk about applications of holography, and that was a big event for me; that was my first invited paper, and in the process of doing that, I discovered what a nice society this was. At that time, Mary Wager was the executive director, so it goes back to Mary Wager. And gradually I got involved with the Society more and more.

KELLEY: Did you have an opportunity to meet Mary?

GOODMAN: [42:13] Oh yes, I knew her quite well. She was really a wonderful person. I remember once being at an OSA meeting in Washington. I had forgotten the circumstances, but we had dinner together in Washington somewhere, and so I got to know her reasonably well. She was a great person, and I liked her a lot. But the Society was small enough so that you did feel you could have an impact on it.

KELLEY: She was first executive secretary, and then she became executive director. I think she had one person on our staff. When Jaris came it, it had grown to three or four. And most of that was, I think, due to Applied Optics.

GOODMAN: Yes, that's true.

KELLEY: And so Jaris came in, I forget exactly what date—it was the late '60s, early '70s. And when he came in, there were six people, and when he left, there were 100 people, and now there are 135 people.

GOODMAN: What a change, mm-hmm [yes].

KELLEY: So anyway, how long have we been at it? We have four minutes?

MALE: 44 minutes.

GOODMAN: Okay. That was probably long enough.

KELLEY: Well, thank you, Joe, very much.

GOODMAN: Thank you, Paul. You did a great job, I must say. You've been doing this all day; you've held up very well.

KELLEY: I didn't realize Liz was watching, or I would have been much more nervous. Thank you for hiding back there. [Laughter]