

Music at MIT Oral History Project

Jeanne Bamberger

Interviewed

by

Forrest Larson

June 7, 2005

Interview no. 2

**Massachusetts Institute of Technology
Lewis Music Library**

Transcribed by: University of Connecticut, Center for
Oral History, Tapescribe, from the audio recording

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Note on timing notations:

Recording of this interview can be found either as one continuous file or as split up over two audio CDs. Timings are designated in chapter headings in both formats, with the timing on the full file preceding the timing on the CD version.

Contributors

Jeanne Bamberger (b. 1924) is Professor Emerita of Music and Urban Education at MIT. She taught music theory and music cognition at MIT 1971-2005. A student of pianist Artur Schnabel, she has performed extensively as soloist and in chamber music ensembles. She studied music theory with composers Ernst Křenek and Roger Sessions. Her research interests include musical development and learning in both children and adults. Among her many publications are the books *The Mind Behind the Musical Ear* (1995) and *Developing Musical Intuitions* (2000).

Forrest Larson, Library Assistant at the Lewis Music Library, has attended training workshops in oral history methodology and practice at Simmons College and by the Society of American Archivists, and is a member of the Oral History Association. He is also an active composer and violist.

Interview conducted by Forrest Larson on June 7, 2005, in the MIT Lewis Music Library. Duration of the audio recording is 1:45:45. Second of two interviews. First interview: May 27, 2005.

Music at MIT Oral History Project

The Lewis Music Library's *Music at MIT Oral History Project* was established in 1999 to document the history of music at MIT. For over 100 years, music has been a vibrant part of the culture at the Massachusetts Institute of Technology. This history covers a wide variety of genres, including orchestral, chamber, and choral musical groups, as well as jazz, musical theater, popular and world music. Establishment of a formal music program in 1947 met the growing needs for professional leadership in many of the performing groups. Shortly thereafter, an academic course curriculum within the Division of Humanities was created. Over the years, the music faculty and alumni have included many distinguished performers, composers and scholars.

Through in-depth recorded audio interviews with current and retired MIT music faculty, staff, former students, and visiting artists, the Music at MIT Oral History Project is preserving this valuable legacy for the historical record. These individuals provide a wealth of information about MIT. Furthermore, their professional lives and activities are often historically important to the world at large. Audio recordings of all interviews are available in the MIT Lewis Music Library.

1. Fulbright Scholarship studies, Embassy concert tour (00: 12–CD1 00:12)

FORREST LARSON: It's June 7th, 2005. I'm Forrest Larson in the Lewis Music Library. It's my pleasure to welcome back Jeanne Bamberger, Professor of Music and Urban Education at MIT, for a second interview. Picking up where we left off from the previous interview, you had a Fulbright Scholarship to study with the composer Olivier Messiaen [1908-1992] during the academic year of 1951 to 1952. Can you tell me how this came about?

JEANNE BAMBERGER: How? When I applied for the Fulbright, I'm not sure what I said I was going to do, at this point, but it was when I got there. They didn't know quite what to do with me, the Fulbright people. So they, this course was called aesthetics, "Musical Aesthetics," or something. And they decided that that's what I should do, so that's what I did.

FL: Uh-huh, so before you got there, you didn't really know what you were going to be doing?

JB: That's right. At one point I was going to try to, I was going to study the influence of Nadia Boulanger [1887-1979, French teacher and composer] on American music. But I didn't pursue that anymore. So, right, I didn't know what I was going to do.

FL: Had you had a previous interest in Messiaen's music?

JB: I don't think I even knew who he was.

FL: Uh-huh, wow! Yeah, wow. And on that, during the course of the year you also did a concert tour to various American embassies, right?

JB: Yeah. They weren't all American. In fact, I think the only one that was an American embassy was in Paris. There was, we did one in Basel and in Geneva and in Zurich. And at each one we had some person that somebody knew who arranged a concert, not necessarily in connection with the American embassy.

FL: What led to that concert tour? How did that come about?

JB: Well, we had, there were a bunch of us who were on Fulbrights, in Italy and in France, around Paris. I don't remember exactly how it came about; it just seemed like a good idea, so we tried to get it to go.

FL: Now, Roger Sessions [1896-1985] was part of that, in some degree?

JB: Well, he was on a Fulbright in Florence, for the year.

FL: Oh, I see!

JB: And I think I just got the idea that—the pieces we played were all by students of his. And so the idea was we would give a concert of students of Roger Sessions, and Roger Sessions would be there. It was, that was just an idea. And we, so I began trying to make contact with people here and there, and it worked.

FL: So what kind of audiences showed up for those concerts?

- JB: You're going to ask me a lot of questions, I don't remember anything! I don't remember whether there were many or few. What I did have, and I think I gave you some of the reviews.
- FL: Yes, right.
- JB: And that was—I don't know, I think—I was so busy practicing, and so busy trying to hold the whole thing together, I don't remember much more than that.
- FL: Yeah, well that's such demanding music, I can't imagine you having time to think much about anything else. So this aesthetics course that you took with Messiaen—it was often his practice, for courses, to focus on a single topic for the year. And you told me that the topic was Alban Berg's *Wozzeck* [opera]? [Alban Berg, 1885-1935; *Wozzeck* premiered 1925]
- JB: Correct.
- FL: Can you tell me about his approach to analysis? Was he interested, from a composer's standpoint, or a theoretical standpoint?
- JB: Most of all, since music of the Schoenberg-Webern-Berg type was not very much played in France, and not very much liked in France, I think that most of what he was doing was trying to expose the students to this piece of music, which they certainly didn't know, and had just then been recorded in a concert performance of some kind, with [Dimitri] Mitropoulos [1937–1949]. So, as I think I said before, my French is not very good, so I probably didn't know what he was talking about a lot of the time. [laughs] All I remember was that the students had to play from the score. And there was a lot of playing of the piece on the piano, and some, I guess, some listening to the recordings. But not very much—there certainly wasn't anything like twelve-tone analysis!. Or, I think he talked about orchestration, as I recall. I don't remember very much. It was a long time ago!
- FL: We'll get to—later I have a question about his, Messiaen and orchestration, but I don't want to get off the beaten path yet. Did he talk at all about the twelve-tone theory and stuff like that?
- JB: Not that I remember, not that I know. I mean, I really can't tell you very much about that whole thing, partly because I didn't understand what was going on because I didn't really understand French. And partly because whatever I did understand, I've forgotten! The, you know, I just remember a few quips.
- FL: So this might have been Messiaen's initial introduction to serialism.
- JB: Well, I don't know that it was even his introduction to serialism. It was just his introduction to atonal music. I mean, I don't really know. He was not—he was quite distant in his teaching. I mean, you didn't find out much about him.
- FL: Two of his students, as we all know, [Pierre] Boulez [b. 1925] and [Karlheinz] Stockhausen [1928-2007], were leading serial composers in Europe.
- JB: Later.
- FL: Yeah, it was later, though, yeah.

JB: Boulez was also sitting in on [Darius] Milhaud's [1892-1974]—I told you that at the same time that Messiaen was talking about *Wozzeck*, Milhaud was talking about *Wozzeck* in his class. And Boulez was in that class.

FL: So the Milhaud class, where was this?

JB: It was in his apartment.

FL: Uh-huh, so you were going to that at the same time? And, tell me a little bit more about his classes, and kind of what you—?

JB: Well, I knew him before, and I kind of came there as a friend of the family or something.

FL: So you met him when you were at Berkeley?

JB: Yeah, he was at Mills [College, Oakland, Calif.]. And I think I also knew him in Aspen [Music Festival and School], but I think that was afterwards. Right, definitely. And he was much more sympathetic and interested in enjoying the piece, compared with Messiaen, who seemed to be doing it as a duty. [laughs]

FL: Huh! Reading an interview with him about teaching a class, I certainly didn't get that impression.

JB: Well, it wasn't—not teaching a class, but *Wozzeck*.

FL: Oh, I see, with *Wozzeck*, particularly.

JB: Oh, yes! Oh, for sure, yeah. He was very involved in teaching the class; I mean, he was very serious about that. But the fact that he was, that we were studying *Wozzeck* seemed to be more a matter of obligation than—but with Milhaud, it was clearly not that.

FL: We'll get back to Messiaen. With the Milhaud class, was there like a—how was that structured? How were the topics—I mean, was it like?

JB: Oh, it was just terribly informal. We just sat around in his living room.

FL: So you'd come up with, bring some idea to talk about, or some piece, or something, or whatever?

JB: I don't know, he was playing this recording and we were reacting to it, or he was reacting to it. There may have been other classes, and I didn't go all the time. I just sort of dropped in. So, I can't say anything about the way he was teaching, or anything like that.

FL: Did Milhaud have much to say about twelve-tone theory?

JB: Not that I remember. We're not going to get very far with that whole period because I really don't remember very much.

FL: Okay. Were there any fellow students in either of those classes that are memorable?

JB: Boulez.

FL: Yeah, he was with, yeah.

- JB: I remember him in the Milhaud class, but I don't remember—I didn't pay much attention; I didn't realize that he was going to be who he became. He was just another kid in the class.
- FL: Yeah, yeah. So, let's, I'll try a couple things with Messiaen, but again, if your memory—
- JB: We'd be better off moving on because I'm not going to be able—
- FL: Okay, I was going to ask if he had some ideas about rhythm and timbre and orchestration.
- JB: I mean, if you ask me about Sessions, I can tell you. I think it was probably because I just sat there, kind of like a dummy, because I didn't understand anything anyhow.

2. Listening to and understanding non-tonal music (11:00–CD1 11:00)

- FL: You've performed very advanced non-tonal music, and studied with leading composers. How has this experience influenced your ideas about teaching music theory, or has it?
- JB: Oh, I think a lot. I think the most—well, first of all, once it became clear to me that the way that you had to make sense of atonal music was by focusing on motivic transformation, motivic elaboration, and that changed the whole way in which I listened to Mozart or Beethoven or something. And it also has become a central focus in my teaching, that the whole notion of the germinal motive, and the elaboration of the initial idea, and all of that—that really grew out of playing and listening to and studying twentieth-century music, I would say.
- FL: I have some more questions that kind of follow from this, speaking of the germ, and leading to things here. Again, this is a hard and complicated topic, so bear with me on it.
- JB: Yeah.
- FL: Most musicians and composers would agree that there is a significant problem in the reception and understanding of non-tonal music. Do you have ideas about how this can be addressed in music education for both performers and how music theory is taught?
- JB: Well, it comes back—I mean, when I'm studying with students, I try to make the connection between the twentieth-century piece and what they're doing when they're listening to other music, and trying to show them where the connections are. But most of all, if I play a piece of Schoenberg, which they can make no sense of, then I'll ask them, for instance, Well, what do you think you need? Let's assume that it makes sense; it makes sense to me. What do you need to do, what would you like to do, in order to find out the sense that it's making? What would you suggest? Well, listen to it again. Okay.

And it's, by the way, exactly the same process, and same development, as in listening to some unaccompanied cello piece of Bach. They also—just goes on and

on. And I approach it exactly the same way. Where do you hear something happening? When is something developing? First of all, where do you hear—how would you chunk it? How many big sections do you hear? I'll ask exactly the same question of a Mozart sonata. Where are the big sections? Raise your hand when you hear something starting again. Okay, why? What's making that? What's making the boundaries—talking a lot about boundaries. What generates boundaries? And on the other hand, what makes this, in listening to this piece—and I give them atonal materials in the software. I just came from a school where I was working with sixth grade kids, and I gave them blocks from *Portals* [for string orchestra; by Carl Ruggles, 1876-1971].

FL: Oh, my goodness, of Ruggles, yeah! Wow!

JB: Just little—and asked them—I mean, we talked about it for a while. Do you hear any similarities? Are there any patterns? And they found patterns, and they also noticed changes in register, but with the same shape. And with the graphics in “Impromptu” [an interactive software application by Jeanne Bamberger and Armando Hernandez], you can see the shape. And then I—there were, I think, seven little motives, and they had to try to make a piece, make a melody that made sense. And so they did, and I have them. And they did interesting things with them, very much like what the MIT students do. But the question is: what makes it sound different from “Twinkle, Twinkle, Little Star” or whatever? [laughs] And the MIT students will eventually come up with things—it reveals the things which they take for granted, the assumptions, by asking what's strange about this? These are the strange blocks—what's strange about them? And they'll come up—that's a way of getting at that we take for granted a beat, okay? And what generates a beat? Well, if you have a piece that doesn't generate a beat, that's going to tell you, it's going to give you some insight into what does generate a beat. And it's also going to give you some insight into the fact that you take that for granted. Well, but now it becomes a compositional means; it becomes a compositional tool. You just don't take it for granted. You just don't take it for granted that if you're composing, you're going to generate a beat. So that becomes dynamic, instead of static.

FL: Right.

JB: And what else makes it strange? Well, like this little girl said, “There's a big jump here.” Okay, so you've got disjunct motion. Well, disjunct motion, that sounds—you know, who cares? But when it comes as a feature, or a factor, a compositional means. The question is, what are the compositional means that the composer is making use of? And how are they different and how are they alike? For instance, if you can't chunk it at all, then it's hopeless. Okay, but what makes a phrase ending, or a boundary, in some Schoenberg piece is often—it often shares with Beethoven certain features. For example, a longer duration, but not a tonic.

So that's the kind of discussion that goes on: what's different, what's similar? And if the students become engaged in these questions and questioning their own assumptions, and questioning the music that is familiar as well as the music that sounds weird, then they're already in it. And the other thing that I try to do is tell them, before you can say you hate this piece, you have to find out what the guy is

trying to do. And then once you have some sense of what's making sense, what there is to make sense of, then you can say, okay, I now understand it, but I still don't like it. That's okay, but first you have to try to approach it, to find its terms.

FL: Right. How do you work with students when they're questioning their basic assumptions about music? Sometimes that can be very unnerving for people. What's that like, working with the students on that?

JB: I've never found that it was unnerving except for some faculty members. [laughs] It's even worse with people—where I find it often is with musicians who have so internalized notation, music notation, that if you give them a different kind of notation—that, they really, that makes them very uncomfortable and very angry. Because they're so used to thinking in terms of the entities which are referred to by the notation, that if you try to get at the principles, like the fact that—typically, in my rhythm notation—not just mine—a duration of four is twice as long as a duration of two.

And that's perfectly obvious to people, except for musicians, who say, "No, it should be the other way around. That is, a two should be twice as long as a four."

Well, what are they doing? They're looking at half notes and quarter notes, and they're looking at the two and the four.

So if I say to them, "Well, it's really the same. Did you ever think about the fact that those are fractions?"

"Don't talk to me about fractions!" [laughs]

FL: [laughs]

JB: So, what I try to do is, at best, people, musicians, will engage this issue and begin to realize the underlying principles that the notation is representing. But very often they won't get there because they want to be doing it, not thinking about it. But I don't find that the—well, you know, the students who come to my class are not, usually—there are some—but they're not performing musicians. They're people who mostly, sometimes, play the guitar or listen to music, but they listen to music in the background, in their own background. I mean, while they're doing something else. So the other side of it is that students who've taken some music courses will often say that they always wondered why this or that. They always wondered why there's only one pitch that sounds like the most stable one, or they always wondered what are the bar lines doing? And nobody ever explained it to them or made them think about it before; it just is.

And the same thing is true with a key. So that people have, they're supposed to memorize the key signatures. Well, you don't have to memorize them. There's a principle there, and if you learn the principle—I mean, it's like the decimal system. If you know how to add one and one, you know how to add a hundred and a hundred, too. And if you know the principle of the key signatures, it's perfectly obvious. So I try to give them a big framework in which they can find out the underlying structure that's sitting there and that pieces of music are making use of all the time. And then you can see how the music that's not tonal—I mean, how do you generate something that's not tonal? I guess a lot of the time I'm talking about what makes that happen.

Sometimes I think I'm looking at a piece of music like an engineer looks at a motor. [laughs] How does it work?

FL: I have some more questions later on about that. Another related question: in music education, eighteenth-century music is still often taught as though it's kind of the basic norm from which all music flows. I mean, the public at large thinks that Haydn, Mozart, Beethoven, and Brahms are the essential, real classical music, and everything else is kind of getting away from it, or a precursor. Do you have any kind of thoughts about that subject?

JB: Well, I don't teach it that way, and I don't believe it.

FL: Yeah, but how do we deal with that in terms of education?

JB: Well, I think I don't agree with you, really, that that's what people think.

FL: I read so many—I mean, music theory classes, they start you off with—

JB: Oh, yeah, but that's music theory classes. That's not the general population.

FL: Uh-huh. I know so many people, that's—when they think classical music, it's those composers, and everything else—

JB: Yeah, but they're probably not—they're listening, as Schoenberg would say, to the style, not to the idea, anyhow. So, I mean, in that first book that I wrote, there are all kinds of—

FL: Yeah.

JB: And it's what is creating coherence in different ways, given the materials that are out there. It's not a matter of being reverential and taking as the—for instance, the forms that people teach. When I first began, when I was a teaching assistant in the music appreciation course in Berkeley [University of Southern California, Berkeley], I had to teach sonata form. Okay. So I go looking for some pieces to use, and I couldn't find any pieces that fit the description. [laughs] Well at that point I thought, wait a minute. Something's funny here. But people still go on teaching it as if it were some kind of a template that people pour their music into. Ice cube trays, I always think of.

FL: Right.

JB: So it's starting from the wrong place. You have to start with—if you start with “Hot Cross Buns,” [laughs] which I find myself spending an awful lot of time with, it's got in it, if you really look at what's generating boundaries? What's generating coherence? What's generating contrast? For instance, [sings da-da-da-da | da-da-da-da]. Is that the same duration as [sings bee-bum-bum]? Well, it doesn't seem like it. So what do you mean by fast, or what do you mean by slow? And in fact, the whole issue of fast and slow is enough to spend two or three weeks on all in itself. So, I just, I think the people who think of that music as being the meat of the situation—those are people who go to concerts. Those are people who consider themselves musically educated, I think. But the ordinary public doesn't listen to it, to that stuff or any other. Most of the students that I get in my classes have really never listened to music that you hear in the concert hall. So you're not violating something when you play Brahms or Debussy to those people.

- FL: Do you find, with that kind of background, a certain openness to ideas because they don't know what to expect?
- JB: It isn't a matter of—it never gets to the point of being openness. Well, it does in a way. I remember playing, I don't know, *The Rite of Spring* [by Igor Stravinsky, 1882-1971], some part of it, or something. And some kid said, "That's never going to make the charts!" [laughs]
- FL: [laughs]
- JB: So, but then, you know, immediately I'll say, "Why not?" So it isn't a matter of trying to propagandize, or to convince people, but rather the question always is what's happened? What's going on here? What is this? What's there? And juxtaposing, I don't know, African drumming and Stravinsky, or whatever. And then I'll ask them, "Why do you think I put those two together?" [laughs]

3. Philosophy, music theory, research, and teaching (28:35–CD1 28:35)

- FL: That's some really interesting work that you've done. As a performing pianist, what prompted you to get a master's degree in music theory, and moving away from, in some ways, from performance to more theoretical work and research?
- JB: Well, the first move was when I got the B.A. in—well, it was in philosophy. But here I had this B.A., and I realized I couldn't make a living off of that.
- FL: Right, and that was from the University of Minnesota in 1946, right?
- JB: Right. Was it?
- FL: That's the date on the resume.
- JB: Right. We talked about that before. I guess that's right, but it seems funny because I didn't go to Berkeley until '48, and what happened to those two years?
- FL: Yeah.
- JB: But, that's probably right. I think I went back to New York in between. Anyhow, yeah, and besides that, now really mostly because of the things that came up in the lessons with [Artur] Schnabel [1882-1951], I began to be curious about—well, particularly about, you know, why am I playing it this way instead of that way? What's the basis of the decisions that I'm making? And I had no idea how to approach that at all!
- FL: And this followed from the way that Schnabel was teaching?
- JB: Partly. And also, in New York I was listening to lots and lots of music, you know, going to lots of concerts, which I had never done to that extent before. So I was really puzzling over—I think I had been puzzling over why people listen to music. Why is it there? What is it doing? All those questions were—plus the fact that Schnabel sort of sent me off to Sessions. They were friends, and he kind of passed me on. And then, well, getting interested in these issues of music theory were really just, they were the same kinds of questions I was asking in philosophy. They were

- really philosophical questions. But from the time I was, I think, six years old, I was already wondering why do people listen to music? And why doesn't my Aunt Jessie listen to me when I play? Why does she start talking as soon as I—? [laughs] Why am I doing this? Those were questions I had been asking myself forever.
- FL: Backtracking just a little bit, in regards to your B.A. in philosophy, you studied with Herbert Feigl, who was a very influential figure in the field of what they called logical positivism. Was that something really new, a real brand new way of thinking for you? Or was it—what was that like?
- JB: Well, I argued with him a lot. I resisted it. And the person that I really liked was this guy Wilfrid—Wilfrid?—Sellars, with whom I did my senior paper. And he was very different. I mean, I took a course in Plato with him, and I wrote my, that paper was on the arts in Plato's writing. But with Feigl, I hated all his truth table business and pure logic. But I had to ask myself why, and I had to sort of learn how to do it in order to be able to say why I didn't like it. He was also—Feigl improvised horribly on the piano. [laughs] I mean, it was just kind of thick stuff! And he had—so I argued with him a lot about music, too, because he had this idea that the only reason there was any affect in listening to music was because it would remind you of where you heard the piece before, and what you were doing, and it was all associated with external associations. And on the one hand, here was this formal logic stuff, and on the other hand was pure emotion when he played.
- FL: Did any of that kind of disciplined way of thinking kind of stay with you?
- JB: Oh, yeah, I think so. I mean, I'm always asking people, "What do you mean?" I'm kind of—I'm not very patient with stuff that is not explainable. That's not true, because there are a lot of things that are not explainable. But at least I'm always trying to find a why, or a what for, or something.
- FL: So, Wilfrid Sellars, who you did your paper—?
- JB: I'm a little confused there because his father was at the University of Michigan, and I think his father's name was Wilfrid, but I'm not sure. [Editor's note: father's name was Roy Wood Sellars]
- FL: Okay.
- JB: But Feigl and Sellars were the editors of a whole series of books, which—and it's that Sellars, that worked with Feigl.
- FL: Okay. So what was his philosophical orientation?
- JB: I don't know. [laughs]
- FL: But he was a Plato scholar of some sort?
- JB: I don't know that he was particularly a Plato scholar. I knew him as he was teaching a course in Plato. I don't remember very much except he was somehow more congenial. He was not as—he was not a logician.
- FL: You taught at the University of Chicago. I have the years 1955 through '69—is that correct? Were you hired as a music theorist there?

JB: Yes, I guess I was. I was also hired to teach a course called Hum 1, Humanities One, which was a course in art, music, and literature.

FL: Right, and that was with Leonard Meyer [1918–2007], and Howard Brofsky [dates unverified]?

JB: Well, there were about ten of us, and each person was a specialist in either art or music or literature. And everybody could sort of manage one of the other areas, but not three. And that was a wonderful course, and I think I learned as much there as I learned in any university. We had meetings every Thursday afternoon for about three hours, where somebody—well, the way the course ran, we never tried to put the things together. We would have three weeks on art and three weeks on music and three weeks on—or something like that—on literature. And the focus was on the work, that is, so that in literature we were reading the *Iliad*, or we were reading Joyce poetry, or whatever it was. But it was on—it was certainly not historically-based. And so, at these meetings somebody would take the paintings that we were going to be looking at that week: Breugel or—and it was often not historically bonded. That’s where this ahistorical thing really came from.

Instead, it would be a question of, I don’t know, color or texture or—but a lot of the focus was on structure, so that it was very easy to go from Rembrandt to Picasso, to talk about how the—to look at the Rembrandt as if it were an abstract painting. But I learned a huge amount from those sessions. And the same thing, you know, if it was literature, we were talking about the work, not the historical—it was during the time when, you know, “the New Criticism,” [Ed. note: See Bamberger Interview no. 1, Chapter 4 (pg 19 in printed transcript).] where the work was, that’s what was there, and you didn’t go looking at the historical context very much. And it was all seminar kind of thing—people, students, sitting around a table, asking, you know, “What do you see?” And the same thing was true with music. So, and they were very good people on the group. Of course, it changed over the years, but the faculty was very impressive. Then there was a, once a week there was a lecture for all the sections, that somebody, one of the people, gave.

FL: And you were telling me that this was, in a lot of ways, inspiration for your book *The Art of Listening*. [Bamberger, Jeanne & Brofsky, Howard: *The Art of Listening: Developing Musical Perception*. (New York: Harper & Row, 1975)]

JB: Well, it grew out of—that’s what we wrote it for, was for that course—the music part of that course.

FL: Uh-huh, and that was with Howard Brofsky, who’s a jazz trumpet player and an expert in eighteenth-century Italian music.

JB: Right.

FL: And Leonard Meyer has also written some very influential books, on music arts, and ideas. And I can see why, you know, a course like that would be so inspirational.

JB: Yeah, it was. And the people, as I say, in literature and art were just as interesting and just as dynamic. But we all had this approach of looking at the work of art. So that the students would make crossovers: “That’s just like what we were saying last

week about—”. But we made, we didn’t really make any attempt to see how music was like painting, and I still feel that way.

FL: Mm-hm. That approach, I mean, in some ways is in line with the so-called new criticism. But there’s something different about it because you weren’t—I mean, the fact that you were even looking at painting, and music, as opposed to just one piece of music, and saying you can’t even compare it to another piece of music. I had a professor in college—you couldn’t even compare two Haydn string quartets!

JB: [laughs] Right!

FL: And there’s something still—

JB: Oh, yeah, that’s going a little far. [laughs] And on the other hand, I think it’s a healthy thing to fight against. [laughs] I mean, and as I said, we didn’t deny it.

FL: Yeah.

JB: But it came from the students. And it was very interesting the kinds of analogies that would emerge out of the discussion.

FL: Right. And the last edition of the book [1988], you have a historical section there. Tell me how that came about?

JB: Well, that came out because of the editor, because of the publisher. They were trying to appease the masses, or something, to—because these introductory music courses, of course, are usually historically-based.

FL: Yeah.

JB: So, but here the idea was more, if you wanted to approach something historically, how would you do it? So, that’s why we picked the beginning of the twentieth century.

FL: Right, and you brought Roland Vasquez [MIT Lecturer in Music 1980–1988, musicologist, conductor, violinist] in on that, right? Wasn’t he the—at least in the book, it says, it credits—?

JB: I guess so. I’d forgotten about that, right. I guess so. Right, I don’t remember what role he played exactly, but I don’t think he did any of the writing.

FL: There’s some credits on the front author page.

JB: Yeah, now that you mention it. But mostly what we did was we’d think of a piece that would be good for the talk about phrase structure. And then, or even—no, it was not, it was more: here is this piece. What do you have to do—this was the question we were always asking each other—what do you have to know how to do in order to really hear what’s going on in this piece? And then we tried to develop *that*, whatever *that* was. I mean, you had to hear the motivic stuff. You had to hear phrase structure. You had to hear hierarchical structure. Well, how are we going to get there? And how are we going to—I mean, just like I think that it’s so important for people to, in order to get any, to understand a basic principle in science or anything else, it’s very important to move across media, and sensory modalities, and modes of representation. And then, the principle becomes not something that’s attached to gears, or attached to Mozart, but rather is something which is much more general.

FL: When you were at the University of Chicago, were the ideas of John Dewey [1859-1952, philosopher, psychologist, and educational reformer] still current? He had taught there earlier in the twentieth century.

JB: In education.

FL: Yeah. Was he—?

JB: I didn't have anything to do with the education stuff at that time, and I don't think I was much aware of Dewey, either.

FL: Mm-hm, because I've come across quotes from John Dewey in some of your writings.

JB: That was later.

FL: That was later.

JB: Yeah.

FL: Uh-huh.

JB: I mean, you must—you realize that I was there during the whole sixties thing?

FL: Mm-hm, that's right.

JB: I was much more involved with that than I was with John Dewey! [laughs]

4. Teaching and research at MIT (44:08–CD 1 44:08)

FL: So, I want to ask you about what brought you to MIT. You came in, I believe, 1971, as a Research Associate in the Department of Electrical Engineering?

JB: That was later. I was in the Music Department first.

FL: You were? Okay.

JB: I came into the Music Department in 1970, in the second semester, because David Epstein [1931–2002, Professor of Music and conductor of the MIT Symphony Orchestra 1965–1998] was on leave, and they wanted me—I came in to fill in for him while he was on sabbatical. And that happened because I met Bob Freeman [Robert Freeman, MIT Association Professor, 1968–1973] on an airplane, [laughs] coming from some conference.

FL: And he was teaching at MIT at the time, yeah.

JB: He was teaching at MIT, and he was also accompanying somebody. And he invited me to somebody's big house in Weston [MA], where he was trying out this program.

FL: So you had moved to the Boston area at that time? Did you move because of MIT?

JB: No, uh-uh. I moved because, first of all, I wanted to—I no longer had a job at Chicago because when I began having children, I got off the tenure ladder and became a lecturer or something. And then I discovered, I was told after a while that you could only do that for ten years. And that was the end of that. Plus the fact that

this was right in the midst of all of the sixties business, so the students, some students tried to take up my cause, along with other people who were being fired, or not getting tenure, or something. And I really wanted to get out of there. Plus the fact that my husband, who had been writing his M.A. thesis for ten years, or something, got a job at Honeywell [technology and manufacturing company] on Route 128. So that's why we came here. And for—

FL: And your husband's first name?

JB: Frank. Ex-husband.

FL: Yeah, right.

JB: [laughs] And we moved to Wayland [MA], and for the first time in my life I was not connected with some educational institution. And then I met Bob [Freeman], and he said, "Go tomorrow, and call Klaus Liepmann [1907-1990; first Professor of Music at MIT] because they're looking for somebody to teach David's classes." Which I did.

FL: And these were music theory classes?

JB: Yeah.

FL: Yeah.

JB: And I, well also the introductory music course.

FL: And at that time, was that still 21-60 [Introduction to Western Music]?

JB: It was 21-60, yeah. And so I called him up the next morning. I had lunch with him, and that was—so that's what I was doing the first year, and then into the second year. So that was the fall semester—the spring semester in 1970, and then the fall and spring semester in '70-'71. And in '71 he called me into my office and said I was not going to be continued. But in the meantime, I had, I was doing stuff at Project Zero at Harvard. And Howard Gardner and David Perkins [co-directors, 1972-2000] had taken me to hear a talk given by—a talk! It was a whole day thing—Marvin Minsky and Seymour Papert [MIT Professors; pioneers of Artificial Intelligence]: "Teaching Children Thinking." And Klaus had told me I shouldn't have anything to do with those people, particularly Marvin Minsky, who fancied himself doing something with music. And music was in the Music Department, and that's where it belonged, and none of these other people should be fooling around with it. But I went anyhow.

And the day after I was at that day-long thing, I went to find Marvin Minsky because he said he had this digital music box [Triadex Muse]. It was probably the first digital music-playing thing that was invented. And, so the stuff that Seymour was talking about, they were both talking about—anyhow, it looked to me like it was going to be a way that people who didn't play an instrument, and were not musicians, could really get their hands dirty in making music somehow. And that's what I was looking for because I got tired of talking and being talked back at and playing records. So I went to see Marvin, and he showed me his box, like these cardboard boxes, full of wires. And that was the digital music box. [laughs] But then he sent me to see—well anyhow, sometime after that, Klaus called me into his office and said, "That's it." And so I went and called up Seymour and I said, "I've just been fired." And he said, "You've just been hired." [laughs]

FL: [laughs]

JB: And that was how that happened. So, I had already been hanging around there, but I knew nothing about computers, and everybody treated me like I was a moron or something. But then, in the fall of what, '72 I guess, there I was, over there. And that was a whole—I mean that was another whole new education, a totally new education!

FL: I want to pick up that in a minute, but I want to go back with Klaus Liepmann. He was the first Professor of Music at MIT and founder of the music program. Did you ever hear him play the violin?

JB: No.

FL: No.

JB: [laughs]

FL: I still have not met anybody who ever heard him play.

JB: In fact, I think of him as a conductor.

FL: Yeah, but he was a violinist. And I'm just—did you have any experiences with him, where you got a sense of him as a musician?

JB: Well, there was his book.

FL: Yeah.

JB: What's it called? *The Language of—*?

FL: Yeah, *The Language of Music* [New York: Ronald Press Co., 1953]. But as far as seeing him in actual operation as a musician or talking with him, did you?

JB: No, not really. I think of him as a choral conductor.

FL: Yeah.

JB: And he really—he ran the place like a—I must say that he gathered around him, the faculty that he gathered, is impressive. And, but he still ran the place like the boss. He couldn't do that anymore now. I mean, you couldn't—even a, I don't think—well, I guess you probably could call in a substitute teacher, which is basically what I—well, I wasn't; the second year I wasn't. You couldn't call somebody in and say, “So long!” [laughs] I don't think you could do that anymore.

FL: Yeah. But obviously, the music section here picked you up again, after—?

JB: Well, only after the DSRE [Division for Study and Research in Education], the Education Division, folded.

FL: Oh! Uh-huh, and then they rehired you?

JB: Everybody in the Education Division had a joint appointment. No two people had joint appointments in the same place. So, I had a joint appointment in music and in the Education Division, but I wasn't teaching any music courses. It was just—but when the tenure decision came, then the Music Department had to agree to it.

FL: I see.

- JB: And shortly after I got tenure, I was back in the Music Department, because shortly after that, the Education Division was made to go away. [laughs]
- FL: What was that transition, kind of back to the Music Section?[Ed. note: The MIT music program is administered by the Music and Theater Arts Section (previously, the Music Section) within the School of Humanities, Arts, and Social Sciences.]
- JB: Well, I think I never felt a part of it, really. [laughs] The Education Division was a remarkable thing, and a remarkable group of people, and we were all so much working together. And I still have friends who are—and I’m still working with people that I worked with there. And I never worked with anybody in the Music Department. I mean, people don’t work together in the Music Department! [laughs]
- FL: Yeah. You must have done a little bit of work with Evan Ziporyn [MIT Professor of Music]. He wrote the introduction to your latest book.
- JB: That was not my idea, by the way. What’s her name? Maribeth Payne, who was the Music Editor at Oxford Press for a number of years, and was when my book was going through—she had apparently asked Evan to review a book or something. Anyhow, she’d been very impressed with him, and she decided that he should write the introduction.
- FL: I see.
- JB: Which was fine with me. I mean, I actually hired him, originally, when he first came. And he’s the person that I’ve, I guess, been most friendly with, in the department. We also wrote a paper together.
- FL: That’s right, that’s right! That’s a very interesting paper. Wish we had time to go into more detail on that. Moving back to the AI [Artificial Intelligence] Lab, as you just described, you were a real kind of greenhorn when you got there. Was this where you really developed your ideas about kind of a scientific approach to observing how people learn and perceive music?
- JB: Absolutely. Well, that’s not quite true, because starting when my kids were little—for instance, I used to spend a little bit of time in the—well, we started a Montessori school in Chicago, and I spent a lot of time essentially running that school. But I also spent some time—the thing that had attracted me to Montessori was the music stuff in there, which is pretty amazing. And I had spent some time with these little kids in the Montessori classroom. And that’s where I first began to get interested in—well, it was even before that. When I was at USC, I was impressed with the fact that the students, that there were students who were wonderful performers. I think we talked about this before. And they were failing these ear-training classes. And I began asking myself, “What has this stuff got to do with what you do when you’re being a musician? And what does it mean, anyhow? What are you doing when you’re being a musician?” And that was, that became pretty—I was thinking about that a lot while I was at USC, plus the fact that the applied music, so-called, the performance stuff, was several blocks away in one house, and all of the history and theory stuff was in another place. And it just didn’t make sense to this whole thing! So I began thinking a lot about what is this music theory for? And then at Chicago there was the

moment—I have mentioned this too—Chris Cullander [spelling unverified], he said,—this was this Hum. 1 course.

FL: What’s his field?

JB: Chris?

FL: Yeah.

JB: He was just an undergraduate, whatever. And he said—I said, “This piece is in D major,” or something. And he said—I mean, it could have been anybody, but I just remember it was him because he was one of our best babysitters. I remember him very well!

FL: [laughs]

JB: He said, “What do you mean it’s in D major?” And I realized that there was nothing I could say. As I usually tell the story, I either had to tell him to sit down and shut up or shut up and sit down. Or else go and think about it for the rest of my life. Because it wasn’t going to do any good to say, “Well, there are two sharps in the key signature,” or something like that, because I knew that he and everybody else could hear the tonic. But what does it mean to be in a key? So, that was—it was a series of things like that. Then I was living next door to a woman named Carol [Fleisher] Feldman [d. 2006; research scientist, last position held at NYU, Dept. of Psychology], who was in the Psychology Department, that started this Montessori school. And then, I’d started a teacher training program within the Montessori school, and so I was talking to people in psychology, and a little bit in education, and getting them to come and participate in the teacher training program. So, all of these things. Going into the AI Lab was not a beginning.

FL: Mm-hm. Working with Marvin Minsky, there’s aspects to his thinking that very much remind me of logical positivism.

JB: I don’t think so. [laughs] Only in the sense that the AI people are pursuing logic. But it’s a very different, very different kind of logic. And the whole way in which the computer is being used to model whatever, vision, or classifying, or whatever you want—that’s really different from the positivists.

FL: But the idea that meaning is completely outside of the human being, it’s all kind of out there, and it’s only through experience—?

JB: No, the AI thing is that logic is entirely in the head! [laughs] It’s symbolic.

FL: But it’s only symbolic, as opposed to—?

JB: Well, symbolic in the sense of letters or symbols. It’s not symbolic in the sense of, if I say, “This is symbolic of nature.” It’s not symbolic in that sense. It’s symbolic in the sense that you can write programs.

FL: Yeah, right. But there are some people who say that that’s the only kind of meaning that there really is.

JB: Well again, meaning is a charged word. I mean, you know, it’s not meaning in the sense of, “That’s very meaningful for me.” Not like that. But there is the—I think it’s more the notion that you can make an algorithm, or you can make a procedure

which will look like what people do when they're solving problems, or something. But I think one of the important things about—Marvin initially thought that the whole, that the vision—I mean, how do we make objects out of the stuff that's coming? He thought that that was going to be an easy problem, and he very quickly found out that, well, it's still a very long way from being solved. And now he writes detective novels—science fiction. He writes science fiction.

FL: I didn't know that. Wow.

JB: He's written at least one, if not two, novels.

FL: And your work with Seymour Papert—is that where you—he seemed to be real influential for you. Is that where you got interested in Jean Piaget and all that?

JB: Right, except that this woman, Carol Feldman, who lived next door—my first introduction to Piaget was, again, like almost everything else, an accident. I mean just, I had taken my younger son to take his—guitar lesson?—I guess so—in some community music school near Wayland—in Sudbury [MA], to be exact. And while I was waiting for him, I went across the street to the used bookstore. And there I saw this book called *The Language and Thought of the Child* [London: Kegan Paul, Trench, Trubner, & Co., 1926], or something, and I bought it. And that was Piaget. And then I began talking to my next door neighbor, who was in the Psychology Department and a developmental psychologist, about what I was reading. And I began to see connections between what I was reading there about language and thought with what I was seeing in musical development. So, it had, it went back. The Piaget thing had already started before that. But certainly, being in that lab, and being with, spending all that time with people there was, again, a whole new education.

[1:05:00–CD1 1:05:00—END OF CD1]

FL: I wish we had more time to talk about your work there. Some of the questions I have follow from some of your later work. Again, biting off a huge topic, in a way that we can't really cover adequately—but I'm going to try to take, you know, some particular questions. You've done a lot of research on the development of intuitive musical understanding, and watching children learn, and all that. It's pointless to ask you to summarize the research. But I want to ask you about some of your ideas about the nature of intuition—what is it?

And I want to read you a quote. It's from one of your papers; you're quoting Donald Schön, who was Professor in the Department of Urban Studies, and you had done some work with him and wrote some papers. He says here, "When you go about the spontaneous, intuitive performance of actions of everyday life, we show ourselves to be knowledgeable in a special way. Often we cannot say what it is that we know. When we try to describe it, we find ourselves at a loss, or we produce descriptions that are obviously inappropriate. Our knowing is ordinarily tacit, implicit in our patterns of action, and in our feel for the stuff which we are dealing."

And then he says, “It seems right to say that our knowledge is our actions.” And that last—

JB: Knowledge is *in* our actions! [laughs]

FL: Yeah, right. And that caught me kind of by surprise because the first part of it captures very much what’s mysterious. The questions, when we think about what is intuition, and kind of the mystery of that. And then, when he says it—can you talk about—?

JB: Well, I think he—the business of the mystery is not of interest! [laughs] And when he or I are talking about—we’re talking about what you know how to do but can’t yet say. And I take it to be, when I talk about intuitive knowledge, I’m talking about knowledge. And I think that we make a—it’s a big problem that we stop at the point when we say, “Well, this is mysterious.” Or, you can’t ask about—even the notion of tacit. I think that’s exactly the place where we have to begin trying to say what it is that a person knows how to do, when they know how to do that—whatever that is. So, all I mean by intuitive knowledge is what you know how to do. What’s the nature of the knowledge that you’re bringing to bear when you make sense of “Twinkle, Twinkle, Little Star”? That’s what I mean by intuitive knowledge.

FL: And so the more, if you will, mysterious part of it—that’s really not of interest to you?

JB: No. And when we were teaching classes together, like we taught a course called “The Role of Metaphor in Learning and Design.” And people would come expecting to—I mean, there were always a certain number of people who were there, who thought we were going to be teaching Zen, or something, teaching—you know, that we were going to be into that kind of world. Because as soon as you aren’t programming a computer, or talking about stages of development, or have some kind of a theory that you believe in and that you’re promulgating, then people think you’re in the world of mystery and magic. And so we were always arguing with that and trying to say you *can* explain some of these—uh—used to talk about the garbage can approach to knowledge, where there were just a whole lot of things that you just had to—not that they weren’t worthwhile, but that you couldn’t say anything about them; they were just pushed aside.

And everything that I’m trying to do with music or learning or anything else is trying to get at this knowledge which is, as Don talks about, knowledge in action. I think actually I said that first, but, you know, what’s the nature of this— what’s the nature of—for instance, if you ask, often if you ask a jazz musician, “How did you do that?” he says, “Smart hands.” [laughs] If you ask a car mechanic, how did he know how to do that? “Smart hands.” Well, hands don’t have smarts. So what’s the nature of that knowledge?

Well, it isn’t the kind of knowledge that you can lay out—one, two, three, four, but it’s a complicated intersection of a whole lot of things, and we’re not very good at talking about it or thinking about those kinds of—I often notice that in science, in medicine, that the big breakthrough comes when people realize that they have to speak in terms of relationships, of networks, or whatever you want to—of higher level connections, and stop talking in terms of—not stop—but have to find

- explanations not in the, at the smallest, microscopic level of entities, but rather in the way they relate to each other. So, for instance, we can talk about pitch, and we can talk about time, but nobody hears pitch—you can't hear pitch without time.
- FL: Mm-hm.
- JB: So you have to talk about events. And we like to say this piece is in three-four time, or something, but it isn't until that's generated. Well then, how come we can keep time when there isn't any beat actually being performed? Well, you can explore that. You can ask, what is it in the music that you're responding to? You can find out a lot of thing, if you ask questions in terms of what people know how to do, rather than in terms of the notations, for example, in terms of the way we represent stuff, because that's already very biased.
- FL: As a high level artist/performer and pianist that you are, there also must come a time, though, when there are certain things that you're doing that you, yourself, don't understand why, and you're making certain spontaneous decisions.
- JB: Sure, at the time, and certainly when I'm playing I'm not thinking about any of this stuff.
- FL: Yeah.
- JB: But I'm still making use of some kind of knowledge. And when I, if I'm playing a piece and I can't—I try to find out why I'm hearing it this way or why I can't get it! So, but that gets—I mean, I can't play if I'm thinking about that kind of stuff!
[laughs]
- FL: Right.
- JB: Because it's a different kind of action, but it's informed by everything I know.
- FL: Right, they're not opposed to each other, it's just they have their time and place.
- JB: Yup, and you can almost feel your head switching [laughs] to another place sometimes.
- FL: Mm-hm. Your work with Howard Brofsky—did you spend much time with him on just improvisation? And what, maybe, you've learned from him—has that influenced your work at all?
- JB: We didn't spend any time on improvisation. But he helped me to hear Stravinsky, for example, because—to listen to sound and texture, and that kind of stuff. And also, you know, he taught me how to hear the twelve-bar blues. [laughs] And other jazz kinds of stuff. But he also, well, okay, that's—
- FL: You mentioned in a previous interview about improvisation in the learning process.
- JB: Right.
- FL: So that's—can you talk about—so that wasn't from Howard Brofsky, or anything like that?
- JB: Not at all. That was just, I guess, pretty much my invention.

FL: Because you've talked about trying to find different creative solutions to the same problem.

JB: Well, it was much more—it wasn't that organized. I mean, I'd just sit and noodle and doodle around some spot until I had a feel for it, whatever that means.

FL: Do you listen much to jazz, or does that interest you very much?

JB: I don't listen much to music, to tell you the truth. I'm always surprised when I think about that. I mean, compared with some people I know, I have very, very few records, CDs, or anything else. It took me a long time to get a stereo instead of a monaural—[laughs]

FL: Uh-huh! [laughs]

JB: —record player. So. I like real jazz. I like Billie Holiday and Art Tatum, but I don't—I really, I hardly listen to music at all, I'm afraid, except when I'm studying it, you know. But I can't just have it on.

FL: Yeah, I can't either.

JB: [laughs] Right?

FL: It just drives me crazy. Background music just drives me crazy.

JB: I walk into a party and somebody's got something, music playing, I turn it off! [laughs]

FL: Yeah. Tell me about some of the piano playing that you've done recently? Is it just pretty much kind of informal playing and chamber music, and stuff like that?

JB: Yup. And sometimes long periods will go by and I don't play at all. In the last couple of months, somehow, we've been playing trios almost every week, but that was very unusual. I'm hoping to do more.

FL: Maybe at the end, if we have time, I can ask you about some of your musical plans when you get to California. And the other hard topic: music and mathematics, and artistic creativity.

JB: Okay! [laughs] Ugh!

5. Music and mathematics (01:17:15–CD2 12:15)

FL: [laughs] So bear with me here. The subject of the relationship between music and mathematics is vast, to say the least. But I wanted to ask you, in your years working with children and also mathematically gifted MIT students if you might have some interesting observations on the following topic: There are many people who excel in math and are also fine musicians and composers. These are people who are not just good at counting complicated rhythms or getting the pitch right. In short, their music is not emotionally sterile; it's often at a high artistic level. And there have been many such students at MIT.

JB: Mm-hm.

FL: In your observations, do you have any thoughts on the relationship between mathematical and musical artistic thinking? Are they, at a certain point, different modes of thought? Can you talk about that?

JB: Not very much! But I can tell you this: notice that you said there were people in math who were also good in music. You don't find many members of the BSO [Boston Symphony Orchestra] who have anything to do with math!

FL: Yeah, I'm one of those! Although I'm not a BSO person, but I'm not—yeah! [laughs]

JB: Right. And it really is one way. Musicians are not interested in math. It's only mathematicians who are interested in music, except for the rare exception. So, I have often asked MIT students who are in computer science or mathematics or something, and also play an instrument or compose, if they see any connection between their math and their music. And invariably, they say no, there's no connection.

FL: Uh-huh.

JB: For them, they're different. At least—what was his name? I remember Alex—

FL: Rigopulos? [Alexander Rigopulos, MIT class of 1992]

JB: Yes. I asked him. He said, "No connection! No connection!" [laughs] And that has often been the—whenever I've asked. For instance, I live immediately next door to Raoul Bott [1923–2005], who's a distinguished mathematician at Harvard. He also plays the piano. [laughs] He can't understand music theory, he says!

FL: [laughs]

JB: Just doesn't get it. And there's no connection.

FL: Wow! Wow! There are some MIT students that I've broached the subject with, and they've found them not distinct at all. They saw it as just different kinds of creativity.

JB: Well, what do you mean by creativity? [laughs]

FL: Yeah! And that surprised me.

JB: I mean, they're not—what about painters or poets or something?

FL: Right. Yeah, there's one woman I asked, and she was kind of surprised that I would even think that they could possibly be distinct.

JB: Distinct?

FL: Yeah. I mean, in the sense of radically different modes of thought.

JB: Oh. Ah.

FL: She saw them as kind of similar territory, doing different things.

JB: Well, I'd have to find out what was the commonality.

FL: Yeah, right.

JB: The only thing that I have thought about that is that both math and music are basically non-referential. That is, they don't refer to something outside of themselves. So that what you're looking at are patterns and structures inside each domain. But, I don't know. The stuff that I'm doing with math and music, and with kids, has to do with

some of—has to do with patterns. It has to do with ratio and proportion and common multiples and fractions, because if you ask what is it that generates a beat, proportional temporal relations are what. If you use non-proportional relations, you don't get—you probably won't be generating a beat. But anyhow, it just turns out that partly because of the notation in *Impromptu*, there's all kinds of—it isn't even math; it's arithmetic that comes out, that's kind of interesting, so that kids can actually hear common multiples, and they can hear proportional relationships.

And so they take on a kind of reality, a kind of substance, a kind of sensual reality, sensory reality, that's useful. And I'm always connecting it up with movement, as well. But it doesn't, I don't think, get into—the thinking about it is useful maybe in terms of learning how to generalize, learning how to see things, seeing *as*, like [Ludwig] Wittgenstein [1889–1951; philosopher] said, seeing this as that, and being able to come to see things in a new way, and sometimes the old things in new ways. You can call that creativity if you want to.

FL: Yeah, I think some people might see that kind of higher level kind of thinking related to some kinds of musical thinking, and stuff like that.

JB: Yeah, well I think that that might be the case. It's remarkable to me how kids can begin to—as long as you're telling them what they're supposed to hear or do, you're never going to find out what they're doing. [laughs] But on the other hand, it's not just a matter of how do you feel about this, or what did you—? But just today, with these *Portals* things, they were noticing all kinds of interesting patterns among the blocks. And then making use of them when they made their tunes. So, I don't even know what the original fugal subject was.

FL: Wow!

JB: I have no idea!

FL: Wow! [laughs] It would be interesting to kind of see what they're doing with that.

JB: I have it somewhere.

FL: That's a great piece. Moving on, specifically to music at MIT, are there special qualities that MIT students bring to music in the classroom and as performers?

JB: I don't know about as performers, but certainly in the classroom. And the main thing is that they really like to think! They really like to be puzzled, and to get, to probe the puzzlement. And it sometimes worries me that I'm so accustomed to being able to challenge students and to get them to think about—that's another part of it—but to confront puzzlements, that I sometimes worry that that's not going to be characteristic of students in Iowa, or something, or Minnesota. I think I told you, whenever I'm demo-ing my software, after a few minutes almost invariably people will say, "Well, you really want people to think, don't you?" [laughs]

FL: [laughs]

JB: And I sort of feel like I should apologize or something. But yes, I do! And that's why it's so—why I like the students here so much. Yeah, the other part of it is, at first they're very puzzled, speaking of puzzlement, and confused, because I'm trying to get them to think about their own thinking and trying to get them to account for their

- own perceptions. And they're not used to that; they're used to trying to figure the professor. They're not used to the professor trying to figure them. So, the remarks will vary. Like one student came up sometime in the second week and said, "You know, I'm having trouble taking notes in this class." [laughs]
- FL: [laughs]
- JB: And some students, I suppose, will think, you know, why don't you just tell us? Why is there all of this? I remember what's his name—John? The choral conductor.
- FL: John Oliver. [Senior Lecturer and choral conductor 1964-1996]
- JB: John Oliver—he was one of the few people who picked up on the previous book, *The Art of Listening*, and was using it as a text. And he said that at first it was really hard for him because, particularly as a conductor, he was expecting to tell people what to do. And this book is really asking the instructor to try to find out what the students are hearing and thinking. And he wasn't used to that, but he had learned a lot from it. And he kept on using it all the time he was here.
- FL: I mean, even in your own research you're asking yourself questions of yourself in the process of observing students, and that's a very different research methodology.
- JB: Yeah, right. [laughs] I wonder—the basic question for both the student and the instructor is, I wonder why that happened? [laughs] All the time. Or what does that mean?
- FL: Here's another kind of broad subject, here. What do you see as the function of teaching music here at MIT, an institution, while striving to give a university education, specializes in science and engineering?
- JB: [laughs] Well, because, I mean, that really goes back to what we were just talking about. I think getting—for me, it's getting students to question their assumptions, getting them to question their assumptions about something which is so different from—in some ways—I mean, before I said that for me trying to make sense of a piece of music is more like—see, I think musicians are more like engineers than they would like to admit. Because I think in order—there are all kinds of aspects of it. In order to play a piece, you have to get all around it. You have to know how it's made, and that's what engineers are doing, is trying to figure out how something in nature, or something in—they want to make something happen—so, in that sense, uh—The flip side of it is that I used to say all the time around here, we need to know more about what the students are doing the rest of the day. We need to know more about what they're studying and not try to be off here by ourselves in some other world—which of course nobody wanted to hear. But I think that taking the kind of smarts that the MIT students have and bringing it to bear on sensory stuff, on what is heard, and what is kinesthetically practiced, is good for music and good for them.
- FL: Mm-hm.
- JB: And I certainly don't take the attitude that I've heard expressed about, you know, we're all artists here, and we don't want to know anything about what goes on in the lives of engineers or scientists.

- FL: Is the specific discipline of music—well, let me ask you this way: the music program at MIT in some ways is different from lots of university and college-level curricula. Do you think it should be different and in some ways tailored to some special needs here?
- JB: No, I just think it should be—well, in the first place, I don't find it that different.
- FL: Uh-huh.
- JB: Except that there seems to be a reluctance to bring much analytic focus, which is of course a reaction to what's around. And I think it should just be as good as the best music department. I think that there's a tendency to water it down here, or to be, you know, to sort of dig in your heels and say, "We're different from you," [laughs] rather than trying to help the students to make use of what they're good at, but in ways that are appropriate to musical issues.
- FL: The actual music major program here at MIT—do you think that there's resources that MIT has to bear that could make that a distinctive program, and if so, is that a useful—?
- JB: The thing that's bothered me all the time is that there's no real analysis course.
- FL: Right.
- JB: And I think that's shocking! I mean, a really, really—like the course that Roger Sessions taught—there ought to be a really, really good—a course that comes at the notion of analysis from lots of different points of view and, well, just that. [Ed. note: See Bamberger Interview no. 1 (5/27/05) for details on Roger Sessions's analysis course.] And the theory classes should make that possible. I think to teach an old-fashioned tonal music theory class here is—you could do better. Not that you could be teaching to the engineers, but it could be more experimental. [laughs] Just that.
- FL: I mean, there's just the standard harmony and counterpoint, and it has surprised me that it just continues to be the same as when I was in college.
- JB: Right, right.
- FL: And it perpetuates certain kinds of encrusted ideas.
- JB: Right, and that's why, I think, when students who've taken those courses, one or the other, when they take my class, when they say these things like—that I'm trying to get at questions that weren't even approached in those classes, like what generates a beat. [laughs] I mean, never mind identifying the pieces. You know, in the beginning theory classes you have to write out measures that are in three-four. So, what does that mean? It means having the equivalent of three quarter notes in a measure, but it might not sound like triple meter at all! But that doesn't—nobody makes that step. So then you come back to the question of—and that's one of the things that's the kind of a project that I'll give to students: make some rhythms that generate triple meter. Well, they're hearing them back all the time, but even so, some people will come up with pieces that nobody else is going to hear in triple meter. And sometimes it's ambiguous. And those are interesting questions.

I think ambiguity is something that these students can deal with, and it doesn't, you know, it doesn't throw them into a loop of some kind. But, and I think what people tend to think of when they think about, these students are engineers and they're mathematicians and all they're going to do is do their exercises by calculation. [laughs] Which I think they probably do. But that's not necessary. I mean, you don't have to. That's not what they're—they're very good at that; that's how they got here. But that's not all they're good at.

FL: I think also, you know, those students working with you realize that the music is not what's on the page.

JB: I hope so! [laughs] Right.

FL: There's a performance emphasis in the music program here.

JB: Absolutely.

FL: Which in some ways is different from some—?

JB: Yeah, that is different from some departments, like Harvard. [laughs]

FL: Yeah, yeah. Do you want to talk a little bit about--?

JB: Well, I think that's wonderful! I'm just always blown away by the level of performance of these students. And how they do it in the midst of everything else, I don't know. I think that's great, and maybe that's enough. But if we are going to teach music theory courses, I think that they could be—well, first of all, I would like to see some connection made between theory and performance. [laughs] And that could happen in—analysis could be that kind. I think at some point or other I proposed having a theory for performers or theory and performance class. But the feeling always was that that goes on in the performance classes. [laughs]

FL: [laughs] Wow.

JB: Or else, there is no connection.

FL: Yeah, right, and a resistance to it. It seems that MIT was a place where your interdisciplinary interests could really blossom and be explored. And while there aren't hard and fast boundaries between disciplines or departments, at least in some parts of MIT, would it have been harder for you at a more traditional college or university to do the work that you've done?

JB: Oh, I'm sure, for all kinds of reasons. In the first place, just the fact that you can sort of invent a course and teach it! I don't think that's true in other institutions.

It's interesting that Elaine Chew now, she's in—I don't know what the department is; something like Operations Research, that she was in before. And she's been trying to make contact with the Music Department, and she's having a really hard time! [Ed. note: Elaine Chew, MIT S.M., 1998; PhD, 2000; Operations Research; pianist, music theorist. Jeanne Bamberger was her PhD thesis advisor, "Towards a Mathematical Model of Tonality."]

FL: And which university, again, is this?

JB: USC.

FL: Yeah, yeah.

JB: Yeah, the problem is that it's very easy in moving across these disciplines to become a dilettante. For instance, what does Arthur Mattuck [MIT Professor Emeritus of Mathematics] do when he's here? I know he takes a composition course; he takes music theory.

FL: He's a cellist.

JB: He's a cellist and he's a pianist, too.

FL: Oh, that's right.

JB: And he's in the Math Department. Well. But he comes in and out as a student, not as a—and Marvin Minsky also does this crazy improvising. It's not crazy; it's pseudo-Bach and it's awful! [laughs]

FL: [laughs]

JB: Yeah, if I think about—yeah, I guess I'm thinking about the other institutions that I've been part of. Well, it'll be interesting to see what happens in Berkeley, because I expect to have connections again in different parts of the university.

FL: So you may be doing some teaching there, University of California at Berkeley?

JB: Yeah, I'm not sure what. It looks like I'm going to be, to begin with, a Visiting Scholar in the School of Education. But I also expect to have some contacts in the Music Department. I mean, I have some contacts there, but I don't know what will develop.

FL: Can we backtrack just a little bit, because I'm realizing there's a lot over the years—I didn't realize how much you were teaching. Well, there's the Department of Urban Studies, which has—there's an educational—?

JB: Well, I started the teacher education program. It ended up in Urban Studies partly because I was focusing on inner city, urban schools.

FL: And that's where the subject of urban education kind of comes from, yeah, yeah. So there were a lot of courses that you were teaching there that weren't music-related at all, but were strictly educational.

JB: Well, it was science and math. It was for kids, students who wanted to teach science and math in middle and high school.

FL: Did you do any like this semester, and stuff like that?

JB: No, well I'm not part of it anymore. When I retired, it was taken over by somebody else and turned into something altogether different.

FL: Are there some other MIT colleagues that you've worked with who haven't come up in our discussions that you want to mention? Or anybody we have mentioned that you want to talk about some aspects that we haven't?

JB: I don't think so. I mean, in all of these interdisciplinary things, I've worked with somebody else. Don [Schön, 1931–1997] was a close friend, and I taught courses with him for a number of years. One course was called “The Role of Metaphor and

Learning in Design,” and the other course was called “Learning to Design and Designs for Learning.” And they were all in the Education—in the DSRE.

FL: And DSRE stands for—?

JB: Division for Study and Research in Education.

FL: Okay.

JB: And then we wrote these various papers together. Susan Carey I worked with in the teacher development—yeah, the teacher education program. She was in Psychology; she’s now at Harvard. And in the teacher education program, I worked with a guy named Brian White, who’s now at UMass Boston. He was in the Biology Department. I mean, I always had to find people in science and math, or psychology who knew that stuff. I never pretended that I was any kind of any expert in those areas. Who else? Well, I’m now, I just finished writing a paper with Andy [Andrea] Di Sessa [MIT Ph.D., 1975] who’s at UC Berkeley, and she was a physics graduate student here, and also in Seymour’s [Papert] logo lab. And Hal Abelson? [MIT Professor of Computer Science and Engineering]

FL: Oh, yes.

JB: I worked with him. Those are—who else? [pause] I guess those are the main ones. Since I came back into the Music Department—well, in the teacher education program there were—I was interacting with people in Urban Studies, and I had a kind of oversight board, and there were a lot of people from all over the Institute in that thing. But I don’t think of anybody else, and it’s four o’clock. [laughs]

FL: Yeah. So, you’re leaving Cambridge here and you’re going to UC Berkeley. And do you have any kind of more musical, pianist plans, of playing music with people?

JB: I hope to play lots of chamber music. Do you remember Asher? Asher—what was Asher’s last name? [Asher Davison, MIT M.S. Biology, 1997]

FL: I can’t remember his last name.

JB: He’s there, and whenever I’ve gone there to visit, he’s a wonderful clarinetist. And a young friend of mine has just gotten a job in the Ed. School who is a terrific cellist, so I’m sure we’ll find other people.

FL: Is there a particular chamber music repertoire that really does it for you?

JB: As a listener?

FL: As a player.

JB: The trios is what I tend—I think the piano chamber music literature that’s the trios are the richest collection of stuff. I mean, sonatas here and there, but I really like playing trios of one sort or another.

FL: Yeah, there is something magical about a kind of a trio combination.

JB: Yeah, right.

FL: Well, I want to thank you very much for your time and your generosity. This has been great, and I wish we had had more time for some more of the questions. But I

want to thank you for dealing with kind of big broad questions anyway. So, thank you very much.

JB: Well, it was a pleasure. And what do you do with this stuff? You transcribe it?

FL: Well eventually, we hope to do that. In the meantime, we're working on getting this material at least available so that people can listen to the recordings in the library. By the end of the summer, these interviews will be catalogued, and there's a nation-wide oral history database that we hope to have these in.

JB: Okay.

[End of Interview]