Music at MIT Oral History Project

Claude Brenner

Interviewed

by

Forrest Larson

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Interview no. 2

Massachusetts Institute of Technology
Lewis Music Library

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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 of the full file preceding the timing of the CD version.

Contributors

Claude Brenner (b.1928) received two degrees in aeronautical engineering from MIT, a B.S. in 1947 and a M.S. in 1948. During his student years, he sang in the MIT Glee Club under three different music directors, and joined the MIT Logarhythms shortly after it had started. Among his other student activities, he was editor of the student newspaper *The Tech.* He was President of the board of directors for the New Orchestra of Boston. Mr. Brenner has been chair of visiting committees for the MIT Department of Humanities and the Music Section. Since 1995 he has been a member of the Council for the Arts at MIT. Professionally he has worked in the aeronautics and defense industries and was President of Commonwealth Energy Group Ltd.

Forrest Larson, Library Assistant at the Lewis Music Library, has received training 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 May 1, 2009 in the MIT Lewis Music Library. Duration of the audio recording is 1:51:52. Second of two interviews. First interview: November 21, 2008.

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. Early career in aeronautics and defense (00:18—CD1 00:16)

FORREST LARSON: It's my honor and privilege to welcome back Claude Brenner for a second interview. He has a bachelor's degree from MIT in 1947, and a master's degree in aeronautical engineering in 1948. It's May 1st, 2009. We're in the MIT Lewis Music Library. Last interview, we concentrated mostly about your musical activities as a student, and we also talked some about your thesis in aeronautics. Wanted to ask you about your lifelong career, your professional career, starting out in aeronautics, and then you moved into energy. So, can you first talk about your aeronautical work?

CLAUDE BRENNER: Yes, of course. I think I wanted to be an aeronautical engineer, and to design and build airplanes, from childhood. I was of that generation; we developed an interest. It was just thirty years after the Wright brothers when we became sentient about these things. And so, that was first and foremost, and I saw myself working for an airplane company. But having been born in South Africa, and being sort of held captive here by World War Two, I was unable to return. I ultimately did, with the intention of working there, but found actually, despite all the warnings given me ahead of time that there would be nothing for me to do there, [coughs] found that I couldn't.

So I went to Britain to work. This was in late 1948, right after I got my degree here. And I went to work in the Aerodynamics Office of de Havilland Aircraft [Company], who were one of the premiere aircraft companies in Britain. At the time, there were about two dozen aircraft companies in Britain: de Havilland, and Vickers [Ltd. (Aviation Department], and English Electric were perhaps—and Bristol [Aircraft]—perhaps the best known names—Handley Page [Ltd.]. And so they were a thriving industry following the end of World War Two, and continued to develop, particularly, jet-powered aircraft.

And de Havilland had an inventory of military aircraft, which I worked on. But they were also developing the Comet, which was the first four-engine jet, passenger plane. And the Comet Mark 1 was a thirty-six-seater, powered by four five-thousand pound Rolls Royce Goblin engines, as I remember. No, Avon engines—sorry. And, you know, five thousand pounds of thrust is nothing today! But it was really an exciting time, and I still remember—and I was involved both in that, in the design of that, and in the design of other aircraft as well, in small ways, you know, designing specific features of the aircraft, not the concept. I was, after all, a newcomer, and had a lot to learn.

And I remember very well, July 27th, 1949, driving by on the bus—nobody had a car in Britain then—the runway, as it was—and I realized what was happening. It was making, unannounced, its maiden flight. And in fact, the bus drivers—bus inspector, who gets on and off buses to be sure that people have paid their fares—knew that something was going on. And so he was hanging around this area, [laughs] and swapping, transferring from bus to bus going each way, so that he could be there when he saw it. And I got off, and I watched the Comet first do its first liftoff, and

then land immediately, and then taxi back to the beginning of the runway. That was very exciting, the take-off on its first maiden flight.

It had a checkered history, regrettably, but it did pave the way. It ultimately grew to be the Comet 4, which was a hundred passenger plane, a much larger, stretched version. And it was the first, in fact, passenger service across the north Atlantic for British—then, British Overseas Airways Corporation, beating Pan-Am by three weeks! That was the big deal! [laughs]

But in the end, while I loved being in England, and I loved the work I was doing, England at the time was not a very comfortable place to be. The country was broke; the standard of living was poor. We were rationed, still, four and five years after the war. And you know, the issue of whether I would ever be able to save enough money to get my own apartment, and not have to live in digs with a landlady whom I detested [laughs]—it became plain to me that that wouldn't—wasn't going to happen for years, let alone own a car—my God!

And so, in the end I decided to return here, for that and other reasons. I just didn't see any career advancement for me there, particularly. Particularly because I realized that my colleagues in the office, in the Aerodynamics Office, who had been there several years, were older, several years more experienced than I, I discovered by accident, were not earning any more than I was! And so what did that mean? And what I was earning was, in those days, the equivalent of twenty-seven dollars a week. Not much money, and certainly not to buy a car.

So, what happened was that the day that I was leaving MIT after getting my master's degree, my senior advisor, my graduate advisor, Professor John [R.] Markham [MIT Professor of Aeronautical Engineering]—who, by the way, was an aeronautical engineer without a degree! He was an alumnus in the Class of 1918, I think—or maybe it was '16—but he left to fight the war, in World War One. And he returned, and didn't bother finishing. And there were one or two people in the department, in those days, without degrees. There were only, perhaps, a quarter of the faculty then had doctor's degrees. But he was a wonderful man, and he stopped me on the steps of Building Thirty-Three, and he said, "Claude, have you got a job yet?" And I said, "No, Professor Markham, I'm going home to South Africa." And he said, "Well, if ever you want a job, there's one for you here." Well, I had worked in his lab when I was a graduate student, and I thanked him for that.

And so I wrote him a letter. He was at that time, by now, running the Naval Supersonic Wind Tunnel, down Memorial Drive next to what is now Tang Hall. I think it's gone now. And that was very exciting, because supersonic flight was just in its infancy, and the aerodynamics of it, of course, were a deep concern in terms of developing effective mechanisms, effective designs. And so, I wrote him a letter, and I said, "Dear Professor Markham, I'm returning to America, and I'd like the job you offered me, please." [laughs]

FL: [laughs]

CB: So he wrote back and he said, "There's nothing open in my lab, but there is an opening in Professor Bisplinghoff's lab." Now, Professor Bisplinghoff, Raymond L. Bisplinghoff [MIT Professor of Aeronautical Engineering], who years later became

department chair, and then Dean of Engineering, and then subsequently, the President of the National Science Foundation—he ran the Aeroelastic and Structures Research Lab. Well, I hated structures! [laughs] I took the obligatory course, but it wasn't structures so much as it was structural dynamics, and it really was, the field was the interaction or the behavior of the structure to aerodynamic forces, which—dynamic aerodynamic forces. Airplanes had been designed to static forces, rather than to dynamic forces.

So it was all very interesting, and I did a number of research projects under him. And I must say that I was encouraged more than once to stay in the lab and take a doctor's degree, but I—in fact, one of the professors said to me, "You've already written a couple of dissertations in your research here. Do the courses and pass the exams." I didn't see myself doing that. I wanted to get out, and not spend the rest of my life studying, as I thought I would have to do. [laughs]

And one of my colleagues from graduate school, a man by the name of Larry Levy [Lawrence Levy, MIT Class of 1948], who was an NYU alumnus who took his master's with our class, he had started—he was there in Bisplinghoff's lab, running a special project relating to the effects of nuclear weapons on aircraft, the blast effects, over-pressure effects, and thermal effects, with respect to the safe delivery of such weapons. And ultimately—and that was a secret program in the lab. In fact, there was a guard at his—at the door of his suite, where his staff were working at the time! We were working in Building 22, which was a little two-story wooden frame structure that sits on the corner—sat on the corner of Vassar Street and Massachusetts Avenue, where Building, I think it's 35 is right now. In fact, that was being built while we were working in Building 33, and we used to watch the construction from our stairwells. And—which was fascinating to see.

And he—MIT was—wanted to divest of this work, because it involved field testing of weapons in the field, the Nevada Proving Grounds [correct name Nevada Proving Ground, now known as the Nevada Test Site], in Las Vegas—near Las Vegas, at the Frenchman Flats [correct name Frenchman Flat] and Yucca Flats [correct name Yucca Flat], and also at Bikini [Atoll] and Enewetak [Atoll, Marshall Islands]. And so he saw the opportunity, and he formed a company, and the contract for that work was novated to his company, and he invited me subsequently to join him, which I did after several years.

And so in the early years of my work with him, that's what we did. We studied the effects of nuclear weapons on aircraft—the entire inventory of Air Force bombing—the Air Force bombing fleet, starting with the B-29, the B-36, the B-50, the B-47, and the B-52, when ultimately it came along—to determine how airplanes could deliver, both individually and in squadron, the nuclear weapons without blowing themselves out of the sky. This was just a lot of very interesting mathematics that we dealt with, but it was from work that was derived from Bisplinghoff's laboratory. And in fact, Bisplinghoff was on Levy's, the board of directors of the company that Levy formed to do this work. They remained very, very close associates.

But as time went on, I did have the opportunity—in fact, I was required—to go out and spend a month during the Operation Hardtack tests in 1956, at Enewetak, because Boeing was conducting studies of side loads on a B-52, because, to gain information what a sideways exposure, not an overhead exposure, to a lateral exposure, would be to the aircraft. [Editor's note: Operation Hardtack was a series of nuclear tests conducted by the United States in 1958.] So instead of considering squadron formations—and so here we're dropping squadron's worth. I mean, it was insane, when you look back on it, but that was in the strategy! A squadron's worth of B-52's dropping their bombs, and trying to escape not only from their own weapon effects, but the effects on—from their squadron mates' weapons as well.

And the Air Force officer in charge was, had been ill, and had lost his flight status and flight pay, so he spent the time that he was recovering from—flying, getting the requisite flying hours for the year. And so he was unable to manage this contract—and he was the Project Officer at Wright Field [now known as Wright-Patterson Air Force Base, Dayton, Ohio]—for the Boeing contract to make these studies! And so they demanded that I come out and sort of be his sidekick—in effect, take over for him, because he didn't know what was going on. So I spent a very interesting month out there in Enewetak, dealing with the issues of—and, you know, observing the tests, and reducing the early data, participating with Boeing in those analyses.

FL: This place, Enewetak—where is that? Is that an island?

CB: That's a coral atoll that's out in the western Pacific. It's part of the Marshall Islands, I believe, and it's two hundred miles from Bikini, and it's about ten degrees south of the Equator, I believe. It's not the South Pacific, it's almost Equatorial Pacific, and it lies quite far west.

FL: Mm-hm.

CB: And we had [laughs] a very interesting experience on the trip home. I realized that—is this of interest?

FL: Yeah, sure.

CB: One of the engines in the transport in which we were now flying back to Hawaii, which was, as I recall, something like a ten hour trip. One of the engines failed, and they feathered the propeller, and they announced that we would be landing at Wake Island, since we had passed the point of no return, and we couldn't get back to Enwetak. So we were going to land at Wake Island, and Wake Island, at the time, was a refueling spot for Pan American's Pacific flights. And so, you know, we landed at Wake Island, and we spent the night, and they repaired the engine, and put our luggage back on the plane [laughs], and we flew on to Hawaii!

And then, the company diversified, ultimately, because they were—we couldn't focus only on this particular specialty, and we were growing, effectively—particularly into other areas, and particularly having to do with vibrations and aeroelastic effects, which was Larry's [Lawrence Levy's] specialty. But also ultimately into electronic systems, and all kinds of unusual stuff, seizing—he was very opportunistic, in terms of the kind of projects that he would go for.

And so we wound up, in fact, even designing a cigar sorter, by color. Now, [laughs] people don't know that cigars in boxes have to be sorted, because the wrapping leaves vary in color. And the color of the leaf is immaterial, apparently, but if you have a box of cigars, and every one is a difficult—different color, people won't buy that. And the industry at that time—this was in the fifties—sorted them into forty different colors, and used women to do this! So, the tobacco company from Connecticut retained us to design an automatic color sorting machine for cigars! [laughs] It was quite an undertaking!

In the end, I was with him about ten years, and then one day I got a telephone call from [Benjamin] "Ben" [J.] Brettler, [MIT] Class of 1948, who at the time was Vice President of Engineering at EG&G [Edgerton, Germeshausen and Grier, Inc.], here in Boston. And he said to me, he said—I was by this time Chief Engineer of the company; Allied Research Associates, it was called. He said to me, "We have an opening here for Chief Engineer. Are you happy as a clam, or do you want to talk?" Those were his exact words!

FL: [laughs]

CB: And I said, "No, I think I'd like to talk." There was a reason for that. The company—the president had left to do other things, Levy, and there was new management. And the focus had shifted, and the future was uncertain. And it was just the right time! I was prepared to leave. And so I went to talk to Ben about becoming Chief Engineer at EG&G. And I said, "I'm an aeronautical engineer. I know nothing about circuit design, or electronics." He said, "That's good! We have excellent circuit designers, and we don't want our Chief Engineer fussing with them!" [laughs]

FL: [laughs]

CB: So I went to work for EG&G. And EG&G was doing all kinds of fascinating things in oceanography, of course, which was "Doc" Edgerton's—at that time—personal interest. And he was, as Ben—even though he was Chairman of the Board—Ben used to describe him as our project manager on our oceanographic projects, [laughs] because he would come in and do his own thing.

FL: Just for the record, "Doc" Edgerton is Harold [E.] Edgerton, MIT Professor [of Electrical Engineering].

CB: Yes, yes, that's exactly who he was, and the founder, one of the founders, of Edgerton, Germeshausen, and Grier, which later, by the way, formally changed its name to EG&G, Inc. And there's an anecdote—well, never mind. And now that name has disappeared, because about ten years ago now, roughly, EG&G bought an optical company in Connecticut called—which had by this time grown to a three billion dollar company, although it had divested itself of all of its government business, because they were focused on designing the trigger for the nuclear weapon. That's what they were doing, and the Atomic Energy Commission was their principle customer when I joined them. They always just used to refer to "the customer," although there were others, but "the customer" meant the A.E.C.

But they got into a whole variety of fields. They divested themselves—grew to be three billion dollars, and divested themselves of all their government contracts, which cut the company in half. But, they survived that, and then went on to buy Perkin Elmer, an optical company—the company that ground the Hubbard [Hubble Space] Telescope.

FL: Mm-hm.

CB: Badly! [laughs] And this is now the fourth generation of senior management, was doing this, had long since left the company. And they decided that Perkin Elmer was a more familiar name to their market than EG&G was, so they scrubbed EG&G and adopted the name Perkin Elmer for the original EG&G. I'm told there is one somewhere off in this country, [laughs] there is a small subsidiary that still retains the name, or something that they spun off that still retains the name EG&G.

Anyway, I was with them also about a dozen years, and again, got involved in nuclear weapons testing, because that's what they were doing. They were—in fact, Ben brought me in at the time that the Russians abrogated the Nuclear Weapons—the Test Ban Treaty, and Congress demanded that we resume testing within six months. So EG&G was gearing up to resume testing, because they ran the tests. They constructed all the electronics that did the timing and the firing of the weapons, and captured data, effectively on very, very high speed oscilloscopes of EG&G's design. And you've seen Doc Edgerton's photographs, of course, of the first milliseconds, microseconds—milliseconds, I guess—of a nuclear weapon tower blast, where you can still see the guy wires standing before they get evaporated by the heat of the exploding weapon.

And so very early on in that, in the resulting weapons—our own weapons—testing series, EG&G was hiring a hundred people a month at that time. They started—when I joined them, they were doing twelve million a year. The following year it was eighteen—that's a fifty percent increase—adding a hundred people a month when I joined.

And Ben said to me one day, "You know, you're not really a true EG&G-er unless you've been out in the trenches, at the tests, with the guys! So, I want you to run a test. I want you to take over running the Navy test." And the Navy was firing a—an ASROC, anti-submarine rocket, a nuclear tipped ASROC, from a destroyer, as part of this whole Operation Hardtack—excuse me—Operation, yes, Hardtack. And they called it Operation Swordfish, and I was to be the project engineer for EG&G on that. Very wonderful experience and adventure! Going out to San Diego, outfitting not only the destroyer that was going to shoot the rocket, launch the rocket, but all the attendant instrumented ships and barges, and coracles, that were going to—were arraying over the ocean to measure the effects of this ocean blast, and do the countdown, and in effect, run the test. And that was—I could spend the rest of our time describing that to you. It was a wonderful adventure!

And it was successful, except [laughs] on the first day of the test, everything—even though we practiced and practiced and practiced, and were out on the Pacific, now, finally, at the test site, and everything was right, anything that never went wrong in any of the practices went wrong this time! [laughs] So it was a total

failure! Not on our part, I must say. We were there. It was the rest of the various elements of the test, the overhead aircraft radars failed, and back-up aircraft radar failed, and they weren't there to do their thing, and so we had to postpone it for a day. But it went off very successfully, and got the data, and it was a feather in the Navy's cap. And I talked to an alumnus of the Class of seventy-something—'73? '75?—at Tech Day last year, who's still in the Navy. "Oh yes, we talk about that test all the time!" he says. [laughs]

2. Later career in the energy field (24:04—CD1 24:00)

CB: And as time went on, the, again, circumstances changed. The management of the company changed; the nature of the management changed. The things we were doing changed, and it was time for me to leave. I decided to give up the defense electronics business that I'd been in for twenty-five years, effectively.

And I joined a start-up company in—funded by Gannett [Newspaper Co.] to use lasers—now, this was in 1973—to use lasers to print newspapers. And the reason for that was that Gannett decided they wanted to be a capital-intensive company, operation, and not a labor-intensive operation. They didn't want to have to deal with the Engraver's Unions. We were going to put Kodak out of business, in terms of the way newspaper pages were prepared. A photograph was taken, and set up, and burned into a plate, and then—by the engravers—and then that metal plate was mounted on the printing press, and that printed the press. And we were going to do all of this with lasers, in a two-step—essentially a simultaneous two-step process.

And there was a start-up, and I was brought in as Vice President and General Manager to run the operation. And it was new technology. We were using carbon dioxide lasers and argon lasers. And the carbon dioxide laser, which was the instrument that was going to do the cutting, if you will, of the special printing plate that we had to design, that could be cut accurately by carbon, carbon dioxide lasers, were—had to be made themselves. There were a lot of difficulty in bringing this product to market. And we had it at a few test sites, but what we really needed—this was simply the brassboard system, and what we really needed was—we didn't even have a beta site yet, if you will. We had to learn from the field operations about where the improvements were, and what needed to be made.

But Gannett didn't have the stomach for that, and they decided that—they didn't understand what's involved [laughs] in developing a very sophisticated state-of-the-art—because that's what it was at the time—electromechanical system of this magnitude. And the other interesting thing, of course, was that the market was limited, essentially, to the specific number of newspapers in the country that could afford equipment like this. While there was an international market, and we did make—I did make presentations at international conferences on this, which were very well received, it was a limited market. But in the end they just lost patience with it.

And they put us in a catch-22 situation where we couldn't respond. We had a pilot plant out in California with one of the, with one of the, with the *Fresno Bee*,

those newspapers, and then we had a Hearst paper in southern California. And they were going to buy this, or at least take it on trial, on the condition that Gannett put a team of maintenance people out there. Because they didn't want to be out there alone, with the *Fresno Bee* and the two of them. And we were helping maintain, ourselves, the *Fresno Bee*. And the *Fresno Bee* wasn't going to pay us until they didn't need us anymore. And so Gannett said, "Either you—*Fresno Bee* pays you, or we close the whole operation." Or, "Either the *Fresno Bee* pays you, or you get this other newspaper to take its place." Well, the other newspaper wouldn't take its place [laughs] if the *Fresno Bee* wasn't going to pay us! So, and they wouldn't pay us until we had another newspaper in place!

So it was just impossible, and they shut the company down, in the end. But as luck would have it, that was at the time when the first energy crisis had arisen, and it was the end of the Ford administration, and there was established the Energy Research and Development Agency, ERDA. And [Robert] "Bob" [C.] Seamans [MIT Professor of Aeronautical Engineering], at the very end of the Ford Administration, last half—Bob Seamans, who was a—Professor Robert Seamans, who was Associate Director of NASA at the time of the Apollo program—essentially saw that, had oversight of that project personally. He was appointed by the Ford administration to run ERDA. And ERDA, at the time—as you know, he was a Professor in the Department of Aeronautical Engineering, at the time Aeronautics and Astronautics.

And he—ERDA, at the time, had issued a request for proposal to the fifty states, to the Governors of the fifty states, to establish a new national laboratory called the Solar Energy Research Institute. And [Lawrence] Levy, who had also left Allied Research for an appointment in the Kennedy administration, and later did many other things, and was now a Senior Vice President at Raytheon, was invited to run the New England effort.

And the Congressional delegation wrote the six New England Governors and said, "Look, we don't want,"—the entire New England Congressional delegation wrote their Governors and said, "We don't want six separate proposals. Let's join together with a single New England proposal." And he was invited to manage that whole proposal effort, to bring a new national laboratory, equivalent to Los Alamos in stature, and Lawrence Livermore, and Fermi Labs, and so forth—Argonne National Labs—in stature. And he asked me to join the proposal effort as his deputy.

And [laughs] I still remember, when—the decision was to be made in November of 1976, but of course, that was election November, and Ford was not elected; Carter was elected. And so they postponed the decision as to who would win this contract until March. And we were running this under the aegis of the New England Council, which is the New England Chamber of Commerce, if you will, the President of whom at the time was [Edward] "Ed" [J.] King, who later became Governor of the Commonwealth [of Massachusetts, 1979 – 1980]. And he came in, ultimately, the day before the decision was to be announced.

He came, called us into his office, and he said, "I just spoke to [John Joseph] 'Joe' Moakley," who was the Congressman I think from the then Seventh District

[correction: Ninth District of Massachusetts]—I've forgotten—but South Boston, and Boston generally. "Just spoken to Joe Moakley." And he said, "He told me that the New England proposal was not the best proposal, that the New England proposal was not among the best proposals." And our spirit sank! He said that they said that the New England proposal was the very best proposal!

FL: [laughs]

CB: So after months of agony, and waiting, and promoting, and marketing, we finally—and to a degree, lobbying, of course—we were assured of getting this thing. So I went to work the next morning; the office was empty. Everybody was in Washington because the award had been given to Colorado.

But, out of that, the Defense Department gave our group a contract to write a plan to establish what was called to be the Northeast Solar Energy Center, one of four solar energy centers in the country, regional solar energy centers, which were to be—to essentially act in a multiplicity of ways, in interacting with the public and state governments to promote the development of solar and alternate energies, conservation, and renewables, in their region. When we said, "What's our region?" they said, "think big," so we approached sixteen states to be part of our region. In the end, including the New England states, we—New York, New Jersey and Pennsylvania joined us in the Northeast Solar Energy Center. And that was an exciting, interesting time. We were given five hundred thousand dollars, and six months to do it!

FL: [laughs]

CB: To write this plan. And that meant engaging with the Governors and their staffs, of the nine states—because they had to have input to this plan, and participate in it, to see what role they would play. The function of these centers would be to take the technology that was developed at the Solar Energy Research Institute and transfer it into a nascent and growing renewable energy industry, to foster a renewable energy industry, in the region, and to communicate and educate—with and educate the public on the need for solar and renewables, and to convey to them the opportunities available, and be an information bureau, and also interact with the academic communities for their own inputs.

And we finished the plan, and we finished it in six months. I worked—I still remember this! [laughs]—forty-two days straight, at the end, to be sure that we would have it on time. And we brought it in under budget, which was rare! And ultimately we won a contract to run the Northeast Solar Energy Center, and I was there as Vice President of Operations and Deputy Director.

But that—we were doing quite well until the Reagan Administration came along, and he didn't believe that the government should play any role in this whatsoever, and he canceled the whole undertaking. So, from that, I believed so strongly in the need for paying attention to the facts, that back then—even back then [pounding on table]—the forecasts were that we would maximize, we would come to the peak of our known oil supplies in the year 2001! This was thirty years earlier! Or twenty years earlier.

FL: Yeah.

CB: And we knew it! And we had to be dealing with it! And so I decided that it was my mission to go and tell people that, [laughs] and help them make the change. And so I established a consulting company which I called Commonwealth Energy Group [Ltd], and tried to persuade industry, but found it was a losing battle. And from there, I went to a whole bunch of other areas as a consultant in generally, in defense, back to the defense electronics, and Federal electronics, and aerospace activities, as a consultant. That's my career.

FL: Wow! There's a book that you wrote called *Third Party Financing: a Primer for Baffled Energy Professionals* [Brenner, Claude: *Third Party Financing: a Primer for the Baffled Energy Professional* (Winchester, Ma. : Commonwealth Energy Group, Ltd. 1983)]. Can you—?

CB: Yeah, at the time the government had—and this was going full-tilt, both the federal and state government had a number of tax credits for people who adopted solar energy, both for individuals and for companies. And there was a lot of underwriting that could be done, because there were people who were willing to invest in these things, and who would put up the money—that was the third party financing—to take advantage of these tax credits.

And so this was a book for people in the energy profession who were developing solar systems, or photovoltaic systems, solar thermal systems, wind turbines, and so forth, as to how their companies could find investors, and find—take advantage of the tax credits that were available to them. And it simply was a tutorial in the process that one had to go through, as well as the elements that one could take advantage of to implement this.

But that all fell apart when the oil—oil at the time of the, when Reagan entered office, was forty dollars a barrel. And it fell—soon fell to fifteen, and nobody was interested. It's the same argument that's being made today, that to keep the interest up, we have to have a floor on our gasoline, on the gasoline price.

FL: Right.

CB: Otherwise people are going to go back and buy SUV's again.

FL: [laughs]

3. Music, Arts and Humanities at MIT (38:19—CD1 38:16)

FL: So, to radically change the topic here—

CB: Sure.

FL: I want to talk to you about MIT's student musicians. As you know, the musical culture at MIT is quite vibrant. There's the Symphony Orchestra, there the Festival Jazz Ensemble, the Chamber Music Society, two choral groups, Gamelan Galak Tika, Rambax, which is the Senegalese drumming ensemble, numerous a cappela singing groups, including, still, the Logarhythms, which you were a member of during its

early years. And you've been to a lot of performances over the years, and of course your experience as a student. Can you talk about why the performance quality of these groups are such high quality, and even the individual musicians, some of them are quite artistically gifted?

CB: It seems to me that should be self-evident: they're MIT students.

FL: Mm-hm.

CB: And they come with multiple gifts! And I—and for the last ten years, I have enjoyed very much being an educational counselor, and talking to applicants. And I remember one in particular, who in the eighth grade had developed a computer game which was now being licensed and taken over by—in the eighth grade he had done this! He was brilliant in electronics, and he wanted to go into computer science, et cetera. And he—at the interview, he said, "First, let me tell you about my music." And he'd been studying violin since he was six. We spent an hour and a half talking about his music, before we—this is quite against the rules, you know! The interview is supposed to take an hour. But we spent an hour and a half talking about his music before we then spent another hour and a half talking about his electronics! [laughs] He was late for supper, unfortunately! I met him after school.

But that's the kind of applicant we have! And that's the kind of—they all have multiple interests. They're remarkably broad young people, who want to come to MIT. Very rarely do you find somebody who is so narrowly focused—do I find someone, at least from—the people from Lexington [Massachusetts] High School, principally, where I interview—who is so narrowly focused on the biology or the physics or the mathematics or the mechanical engineering or the computer systems, that they ultimately wind up doing here.

FL: Mm-hm.

CB: And so I think they start with that, and they're attracted to MIT. Because you know, MIT is—I've always said, it's like riding a bicycle. MIT is—the students come here because MIT is what it is, and because of the faculty and the opportunities here. So we have to maintain the faculty and the opportunities, so that the good students will come here! They're interdependent! And so we have the best—one of the best faculties in the world. And we have all these wonderful opportunities for students to engage in other interests, and develop themselves.

And even though music and art have been at MIT essentially since its inception—music, art, and some literary undertakings—it's, grew tremendously under, particularly under, beginning, I would say, with [Jerome B.] "Jerry" Wiesner [MIT President 1971 – 1980], and his successors: [Julius A.] "Jay" Stratton [1959 – 1966]—Howard [W.] Johnson [1966 – 1971], Jay Stratton—all of them. What [Catherine] "Kay" Stratton has done for the arts here is well known!

FL: Right.

CB: And so, we've understood. I'm a member of the Council for the Arts [at MIT], and at a recent meeting of the Grants Committee, which is the committee that awards the monies that the Council raises, to proposals, one of the participants who was new

said, "Why don't we introduce ourselves and tell us—tell each other how we came to be interested in the arts?"

Well, I was—when I was an undergraduate, they were very limited: Glee Club, as we've talked about, and a nascent symphony orchestra, of really amateur undergraduates, led by an undergraduate. This is just before Klaus Liepmann [the first Professor of Music at MIT]. And I knew intuitively that I lacked an appreciation of art and music. I knew it! And we were required, as—I think from time immemorial, that we take eight semesters of humanities! In our time, the first two were requirements of English literature, and the second year was history. And then we had four electives.

And in my senior year, the electives that I chose were fine arts, in the—which was taught from the Architecture Department, and music appreciation, which was taught by Dean Mattison Fuller [MIT Professor of English, Director of Dramatics]. And that opened two new worlds to me! Subsequently, in later years, I used to spend every Sunday at the MFA [Museum of Fine Arts, Boston]! I had to go to the MFA to write a paper for—you know, go to the MFA, write a paper on what you saw. And I loved it!

And it was—the same was true with the music. And I had no understanding, no appreciation. It hadn't been in our family background. And so I learned from—how to understand music, and appreciate music, and I became a devotee from that! And so, to see it grow now, to what it is, is just wonderful for me.

And I participate as an audience. I think one has to be an audience, you know. Everything needs an audience, and so I try to go to as many of these events as I can, to support them. And I tell all my friends about it. I bumped into some—unsuspectingly, at a concert—Symphony concert one night—some non-MIT friends. "What are you doing here?" "Oh," they said, "This is the best bargain in town!" [laughs]

FL: [laughs]

CB: The best music, for the smallest amount of money!

FL: Yeah!

CB: And so, at that time the admission was a dollar. It's now five, but still! I'm talking twenty years ago. So, and so, no, it was the intention, because William Barton Rogers [Founder of MIT and President 1862 – 1870 and 1879 – 1881]: an Institute of Science, Technology, and the Arts! And so, that's the fulfillment of his vision, and we've done it in so many ways. He would be proud! I'm sure.

[Editors note: William Barton Rogers, in the original 1861 MIT charter and other founding documents, did advocate the integration of professional science based training and liberal education. But his use of the word "arts" referred to the industrial or practical arts, a commonly understood meaning of the time.]

FL: Mm-hm.

CB: And I think the man was a genius, from all I know of him, in his conception, and his execution, and his understanding of what was needed, and how to effect it!

FL: And in a little bit, we'll talk a little bit more about that specifically. Do you think that MIT students', their facility in math and science, actually helps them as artists and musicians?

CB: I can't say. I don't know. When we talk about—as I know we're going to—David Epstein [MIT Professor of Music and Conductor of the MIT Symphony Orchestra, 1965 – 1998], and the New Orchestra of Boston, that issue is going to arise. So perhaps we can delay my response until we get there.

FL: Okay. Alright. *[Editor's note: Please insert the second disc if you are listening along with the CD version of this interview.]*

FL: So, picking up your point, in the class reunion book for 1947, the fiftieth reunion book in 1997, you have this entry: "We alumni, privileged to be part of an institution unique in the world, and by now acknowledged and envied as the world model for, and leader in, science and technology-based education." And I'm pulling out the phrase "science and technology-based education" because that's what, obviously, makes MIT a distinctive institution. Can you talk about what that means to you? You know, the curriculum here, and how it's different from a liberal arts institution?

CB: Well you know, in the strict definition of liberal arts, MIT is a liberal arts institution.

FL: It is, right, yes!

CB: Because the liberal arts student has science and technology and so forth.

FL: Right. I guess, I mean the more traditional.

CB: No, no, the traditional, or yes, the usual thing. Well, [pause] I'm not so sure that its—how they differ. The way I perceive it is in how the faculty in the arts at MIT demand of themselves the same standards that the faculty in the sciences and engineering demand of themselves. They understand what MIT is all about. There are no shortcuts. They're the same high standards, the same rigor, the same academic discipline, in their fields, they bring to the education here.

So, I guess the issue is, yes, you can take a degree in the humanities here. But it's a different kind of person who is taking that degree, because he has taken the general institute requirements, which [pounding on table] every student must take, in science and technology. So it's a student who has those insights as well as his own, or her own, appreciation for the specific humanities undertaking, and I'm not including social sciences in the school. I'm talking about humanities, arts, and—the Humanities Department: literature, foreign languages and literatures, and so forth, music, and theater arts. All of those students are science and technology oriented students to begin with. They didn't come to MIT to become musicians, to take music degrees in composition or musical history, music history. But they found that it was offered, and knew that they could get a first-rate education in that, and so they turned to it as they came here. And some of them have gone on to be prominent in their field, as educators and composers, and to a lesser degree, as performers.

FL: Mm-hm.

CB: So I'm not quite sure, beyond that, that's—it's the—. Whereas, you know, we're not a conservatory, obviously not a conservatory. We do offer, through the Emerson

Scholarships, some of the offerings of a conservatory, through individual instrumental performance instruction. But—and we're not a liberal arts college. Because, you know, if you're doing a history degree, you get a B.A. everywhere else. You get an S.B. at MIT, and [laughs] it's a different kind of history degree!

FL: [laughs] Right.

CB: A different kind in—that's why the Science, Technology and Society program is so effective here, because it bridges those two things. It bridges those two disciplines. The history of science is a terribly important history to understand. And we teach it here, and we study it here, and we do research in it here. There are other institutions where it's done the same way, but not with quite the same perspective, I would argue.

FL: Mm-hm. What would you say would be the, kind of, ideal MIT student? What should they be getting from the education today? Is there a way you can—I know you can talk endlessly about that.

CB: Yeah, I'm not sure I can answer that, because I think each—that's self-defining for each student.

FL: Mm-hm.

CB: I knew what I wanted when I came here, but things were much narrower, and easier to define, sixty-some years ago—

FL: Yeah.

CB: —than they are today. MIT is a much broader place than it was, in every dimension: in science and technology as well as in humanities and the arts. So I can't put myself into today's environment, and say what they should get, you know. The students will get as much as they want to get out of this place, and it's self-determining, self-defining.

FL: Mm-hm.

CB: [coughs] Excuse me.

FL: Do you think, if you're looking at a more traditional liberal arts education, do you think some of those students are actually kind of deprived of a certain breadth of knowledge, because they have less, kind of, science and math? As opposed to somebody here, who would get a humanities degree, but they're taking the general institute requirements? There is a broad education they get. But could you say that maybe a—?

CB: Well, I would say, to a degree, yes. Because in this day and age, I think every individual must have some knowledge of science and technology, some appreciation of it, some understanding of the issues that they're facing, that only science and technology can now deal with.

FL: Right.

CB: And solve. I mean, given the perilous precipice that the world is on, with respect to climate and energy, an educated public is essential! And we've known that the health of any nation is dependent on an educated citizenry. But now, the citizenry must not

merely be educated in the three R's, but in the sciences and technology, to a degree larger than was true in earlier decades, in earlier centuries.

FL: Mm-hm.

CB: Some people aren't cut out for that, but that's okay.

FL: Yeah.

4. Humanities and Music Visiting Committees (53:31—CD2 07:14)

FL: You were Chair of the Department of Humanities Visiting Committee from, I believe, 1979 through 1985, and you were chair of the music section subcommittee before they had their own visiting committee, as you told me.

CB: Yes.

FL: The Music Section, and it's now called Music and Theater Arts Section [in the School of Humanities, Arts and Social Sciences], is the administrative—is administratively roughly the equivalent of a department. Anyways, when—how did you become involved in that Visiting Committee for, first of all, the Humanities?

CB: I was told I was appointed to it.

FL: Uh-huh!

CB: I had joined the corporation as—

FL: This is the MIT Corporation?

CB: —MIT Corporation, yeah, as—ex-officio, as President of the Alumni Association, for the year '79 to '80, and then was elected subsequently to a five-year term in my own right. And I was simply told by the secretary of the Corporation that, "You're going to chair the Visiting Committee to the Humanities Department, and you'll also serve on the—then the Visiting Committee to Aeronautical Engineering," which was my home department. So that's how I got there!

FL: Mm-hm.

CB: And [Harold John] "Harry" Hanham [Dean of the School of Humanities and Social Science] was the Dean at the time. And I went to introduce myself, and I said—I don't think I even knew him! And I said, "I'm going to chair the Visiting Committee." He said, "Yes, I know. I asked for you." [laughs] I never asked him why, or how, you know! But that's what he said. And so that's, apparently, how I got appointed to that. And it was, a difficult—I served on the Aero Department Visiting Committee only for one meeting. I realized that I had been out of the field, by that time, for so long, I had nothing really to contribute.

And so I asked to be given another assignment, and I asked for the Dean for Undergraduate Students, at the time—the Dean of Students, it is now. It's gone through a variety of titles. Now, the Division of Student Life, it is, the Dean. And I still sit on that committee, now as a guest, as well. I've been on that since then, in all

its various manifestations. So that's how I got the appointment. And initially, it embraced all six sections of the department, and when we would have a meeting we would meet with each of the sections, in a day and a half that were—separately. It was kind of a crammed meeting, to sort of separate us out.

And when my term ended, and I could no longer chair the Visiting Committee, but I continued to receive appointments as a member—the reason I could no longer serve, because a Corporation member has to chair the committee, as you know—Mary Frances Penney Wagley [MIT Class of 1947], my classmate who was also a member of the Corporation, and President of the Alumni Association, first woman President of the Alumni Association—she was taking over as Chair, and asked me to chair the Music Section. She broke up the meetings into three different groups, [coughs] and asked me to chair the Music Section.

And so I got closer and closer involved, more closely involved, with the music people, and simply continued when we, that section, pled the case that the Music and Theater Arts were unique in the department, as a section, and needed its own visiting committee. And the Corporation agreed to that. And I remained on that committee, but a Corporation member, again, had to be appointed to chair it.

FL: Mm-hm. I'm wondering if some of what was behind your interest in the Humanities Department, and the Music Section, was a growing interest in music and humanities, anyway, kind of just—?

CB: Yes.

FL: Yeah.

CB: Mm-hm. I don't know why Harry Hanham asked for me, but it was right, whatever it was! And I hadn't had any connection with the department, particularly, until that time.

FL: Mm-hm.

CB: You know, I used to come to the occasional concert, and so forth, and the occasional Dramashop performance, but that was the extent of it.

FL: Uh-huh, interesting. Wow! What were some of the projects and issues that came up to the committee while you were chair, if there are some things you can talk about without—?

CB: Which one?

FL: The Music Section Visiting Committee. Is there anything you can talk about without breaching confidentiality, things that, you look back?

CB: Well, you know, this was something that I realized of the whole department, from the beginning, and of course it carried over particularly into music and theater arts, that [pause] they somehow felt undervalued in this place, and I think to a degree still do. And they saw one of the key issues at the time, this is in the early eighties now, was that humanities courses were all 3-6 courses, that is, three hours of class time, and six hours of study time, for credit. Whereas, every other course in the Engineering and Science Departments were 3-9. That, of itself, said that the Institute doesn't place as

much value on humanities courses as it does on the science and technology courses; whether the courses be history, music, archeology and anthropology, didn't matter.

FL: Mm-hm.

CB: And we fought that battle, and won! And finally it was agreed that they should be given the same status, as it were, by recognizing that as much was expected of a student taking a humanities course, in terms of home study, as was expected of the science and technology courses, science and engineering courses.

FL: Mm-hm.

CB: That was one of the principal issues that we dealt with, and—but it was sort of a pervading, a pervasive sense that we weren't—we, the faculty, are not really appreciated as the professionals, academic professionals, that we are, in, by the rest of—by our peers, by our colleagues on the faculty, because we're those softies who don't demand much of our students. And that's why, I think, as much as anything, my perception of the faculty is their demand on themselves and on their colleagues, to be the best that they can.

The fact that John Harbison [MIT Professor of Music, composer] was first made a Killian Professor [recipient of the James R. Killian Jr. Faculty Achievement Award, 1994 – 1995] by his peers on the faculty—that's a faculty election—says a lot to the fact that that battle was won, ultimately, mostly. But there's still—even though I sit on the committee now—still, one has that sense—you can't avoid it—this faint sense of being undervalued by the rest of the community here, the rest of the academic community.

FL: Hm.

CB: When I took over, the department was in turmoil. The Chairman was a man by the name of Peter Smith, who was a student of Hispanic Studies and Literature. He wasn't highly regarded by his colleagues, regrettably, and he left after two years, in any event, to chair the department, I think of Hispanic studies, at San Diego, University of California at San Diego. But it was that sort of—as I remember, there were all kinds of, yes, little struggles, that went on, which I don't think are worth, or should be repeated. But I think when finally it got its own visiting committee, that was an acknowledgement that it was important.

There were two battles, one which we won, and I think was a—one wasn't really a battle, that when David Epstein retired as—from the faculty as Director of the Symphony, that we argued that the—it was important that that position be a faculty line, and not a staff line. And that was agreed to, and resulted in bringing in Dante Anzolini [MIT Professor of Music and Conductor of the MIT Symphony Orchestra, 1998 – 2006]. Then of course, when he was not granted tenure—the decision that I think now was properly made in the context of the fact of the wind ensemble—of the fact of the choral groups, the academic choral groups, that they be directors [Lecturers in Music].

And I don't think that the symphony has suffered from that as a result. I think it was David's prestige that was necessary at the beginning, but now it's earned the right. David, of course, used to seed his orchestra with the occasional professional,

one or two aca—staff members, but professional musicians of whom he knew from the wider Boston community, to kind to strengthen this section and that section. That's not done now, and I think that's proper, as I look back on it.

FL: Yeah, yeah.

5. Council for the Arts at MIT (1:04:44—CD2 18:27)

FL: So you've been a member of the Council for the Arts at MIT since 1995. But you told me that you had some unofficial affiliation with them before that?

CB: Well, only in that I had a dear friend from my undergraduate days who was a—lived in Chicago, and was a member of the Council. His name was Leonard Bezark, Junior, he—[MIT] Class of '49. And he died not too long ago, I'm sorry to say. And he was a fine amateur musician, and he was a member of the Council. And every time he would come to Boston we would get together, and he'd take me to the Council meetings with him! [laughs]

FL: So what did he play?

CB: He played the piano.

FL: Uh-huh.

CB: And he continued his studies with the piano, and he, in fact, funded the practice rooms in Building Four.

FL: Oh, yes, mm-hm.

CB: Mm-hm.

FL: Wow. So, how did you get interested in actually joining the Council for the Arts?

CB: Well, somebody said to me, "You know, Claude, you're here all the time. You ought to be on the Council." And I said, "Yes, I ought to be!"

FL: [laughs]

CB: [laughs] And so the letter was written by, I guess, Chuck Vest, at the time, appointing me to the Council. And I haven't—it's a three year term. I haven't received any further letters.

FL: Right, and that's [MIT] President Charles [M.] Vest [1990 – 2004]?

CB: Yes, mm-hm.

FL: Right. Pardon this very broad question, because I'm sure you could talk about this for hours. But just in general, what do you see as the mission of the Council for the Arts at MIT?

CB: Well, the Council for the Arts at MIT's mission is very, very clear. And that is simply to foster artistic undertakings outside the academic mainstream; to satisfy the need of students, faculty, and staff, for artistic expression. And our priority, and our support—sole purpose of the Council for the Arts is to foster the arts at MIT, to raise

money to fulfill that purpose. Because the work of the Council is done through grants that we make to applicants for artistic undertakings.

We just had, yesterday, April 30th, 2009, we had a meeting, the final meeting of the year for the Grants Committee. And we get these wonderful applications from students, undergraduates, graduates, faculty, and staff, to pursue small and massive artistic undertakings, and we try to fund as many of them as make sense to us. Sometimes we get some off-the-wall ones, which we dismiss out of hand, like some years ago the two young women who wanted to form an a cappella group and hire a minibus and tour colleges during spring break, between here and Miami! [laughs] Well, we didn't think we wanted to support that!

FL: [laughs] Yeah.

CB: But that's kind of an extreme example! But for the most part, we find a way, in all kinds of ways, to support, particularly, the students.

FL: Mm-hm. There's various subcommittees of the Council for the Arts. Which subcommittees have you been on, and do you want to talk about some of the projects you've been involved with?

CB: Well, yeah, there's the—the committees that I'm on are the Grants Committee, which is the principal committee. And then there's the Biennial Trip Committee, for example. I've been on those, choosing a site, where we'll go on our trip. This is for the members-only entertainment. We take some very interesting trips. And I must stay, the staff of the Council do wonderful things in preparing an artistic experience, an experience of the arts, whenever we go to a European city, or a Canadian city, or an American, domestic city, which has a good arts scene. We'll go there for three or four days.

So I served on that committee for a while. Kay [Catherine] Stratton chaired it herself in the past. And now, as—and I also chair the Student Art Awards Committee, the award—the committee that chooses from the nominations for the Wiesner Award [Laya and Jerome B. Wiesner Student Awards] and the Sudler Award [Louis Sudler Prize in the Arts] each year. The Wiesner Award is given to three students who show outstanding performance in the arts in the broadest definition, and who also through that have demonstrated service to the community. And the Sudler Prize is for a graduating senior who has excelled in the arts. So we get nominations from faculty and friends and classmates of the students, [aside] excuse me, [clears throat] and so I chair that committee. We sit for three hours once a year, and argue with each other about who is most deserving of the prizes. It always all comes out—always comes out right.

FL: Mm-hm.

CB: And so as a result of that, I also sit on the Executive Committee of the Council, which is comprised of the officers and the chairmen of the committees.

FL: Some of the writings and stuff concerning the Council for the Arts, maybe not so much now, but I have seen frequent references to humanizing sciences—scientists and engineers, and broadening their view. Do you think that's really an outdated, kind of, notion? Or do you still think that there's—?

CB: Yes.

FL: Yeah?

CB: I do. I don't think we think of ourselves that way. I think that—yes, see, this is, MIT is self-generating now, in those issues. The kids don't need humanizing. They know what they want.

FL: Yeah, yeah.

CB: And, in that sense. You know, the brilliance of William Barton Rogers [founder of MIT], and of the Institute, the people who constructed our curriculum, and the general institute requirements in my generation, in those years, was that we were so tightly focused on science and engineering. We didn't understand the necessity of the arts when we came here, even though some of us had—I'm speaking very, very generally. And so the requirement for humanities, in its various manifestations of our choice—I mean, I satisfied that requirement; I took a course in psychology and a course in economics under Samuelson [Paul A. Samuelson, MIT Professor of Economics, 1970 Nobel Memorial Laureate in Economics], you know, one term, of which I remember nothing.

But I still remember, if I may, the anecdote when I was, in 1989, as a member of the Boston, MIT Club of Boston, and I was chairing a dinner series of the—in which we were featuring the Nobel Laureates who were on campus that time. And as chairman, I used to introduce the speaker. And I always used to go and visit them first, or take them to lunch, and get to know them, so I could introduce them properly. And so I went to see Samuelson. And he looked at me, and he said, "Did I teach you?" [laughs]

FL: [laughs]

CB: And I said, "Yes, you did." I didn't tell him: but I've forgotten all you taught me!

FL: Wow!

6. The MIT Symphony Orchestra (1:12:51—CD2 26:33)

FL: We were talking a little earlier about Professor David Epstein, who was the Conductor of the MIT Symphony [Orchestra] from 1965 until his retirement in 1985. He had a real distinguished background even before he came to MIT. He studied with Max Rudolf, Izler Solomon, and George Szell. We'll get into more about his work in a minute, but I want to talk about the MIT Symphony. When he came in 1965, did you go to any of the real early concerts that he conducted?

CB: I don't remember that I did, no. Probably, but I don't remember it.

FL: Because when he came he basically had to rebuild the orchestra, because the members from the previous year had boycotted the orchestra, because the previous conductor, John Corley, had been asked to step aside, and they were—so David basically had to start over again to build the orchestra.

CB: Oh, no, I didn't know. I wasn't that close to it in those years. I was too focused on growing my career, I think.

FL: Mm-hm. When did you start going to symphony concerts?

CB: Well, probably, I think probably in the late sixties, early seventies.

FL: Mm-hm. With the MIT Symphony, are there any particular notable or memorable concerts you remember with David Epstein?

CB: [pause] No. No, I don't think I remember any particular memorable concerts.

FL: Were you at his farewell concert when he did the Beethoven *Ninth Symphony* [Symphony No. 9 in D minor, Op. 125]?

CB: Yes.

FL: Yeah. Anything you remember about that particular—?

CB: No.

FL: Yeah, yeah.

CB: Not particularly, just that it was a very rewarding experience.

FL: Mm-hm.

CB: As Beethoven always is!

FL: Yeah, of course, of course! As we'll get into in a little bit, you got to know David quite well in various ways. And I'm wondering, when you were talking with him—with the MIT Symphony, particularly in his early years, he programmed a lot of contemporary music. Less so in his later years. Did he talk to you about his interest in some of these pieces that he was doing? Did he talk to you about new composers?

CB: No, he didn't, and he didn't do any, that I remember, either with the MIT Symphony, or with the New Orchestra of Boston. He tended to play the better-known, and not so better-known, standards. But the, you know, the traditional, major composers.

FL: Right, there was a lot of that. There were some notable things that he did. There was piano concertos by Vincent Persichetti [Piano Concerto, Op. 90], William Schumann, the Alban Berg [Violin] Concerto with Joseph Silverstein, and this piece by Henry Brant called the *Spatial Concerto*, among others. But he didn't talk to you about that, and his interest in that?

CB: No, and you know, I saw a lot of him. I just don't remember that he did. The piece that he wrote, of course, was in the contemporary style.

FL: Yeah.

CB: The one symphony that I have a record of, that he gave me.

FL: Right.

CB: But that's my only—my sense of him was that he conducted the—what I remember, not my sense, what my memory is—and maybe—it's a little dim now, twenty years ago, of what he was doing.

FL: Yeah, he had a passionate interest in the traditional repertoire, and much of his scholarly writing was about the traditional classical repertoire. You know that the MIT Symphony toured and made commercial recordings. Do you think that helped raise, kind of, the visibility of music at MIT?

CB: No. I think—it may have, to the extent that it—that the community was made aware of it, you see. We really rely on the Institute publications to talk about it to the community. So, *Tech Talk* [MIT newspaper] used to carry a page of arts events every week. What the Symphony did was occasionally reported in that. To the extent that it raised the public awareness within the Institute? It may have, but I'm not sure that the world was—people are still astonished to find that we have music at MIT! And despite how prominent music is today, and how prominent some of our faculty members are in the outer community, people are still surprised that there is music of this caliber at MIT, and that it is taught as an academic discipline!

FL: Mm-hm. I don't know if this is a fair question or not. Looking at David Epstein's work with the Symphony, do you have any kind of thoughts about that, reflections about that? And if there's any comments you have about that? I know that's a really broad question, and it might be an unfair one.

CB: Well, the thing that I remember was that he always used to—always, without fail—talk about the quality and the enthusiasm and the caliber of the musicianship of the students in his orchestras. He said MIT students were just fantastic! He had no students from elsewhere. And we never explored, sat down to talk about the specifics of that, but he would—it was a comment that he would make, or comments like that, from time to time, with some frequency. He had a very high regard for the musicianship of the students with whom he was dealing.

FL: Mm-hm. And he's among—other directors of MIT groups talk about the same kind of thing.

CB: I think, to a degree I think he was—well, I think we talked about his leaving, and Dante Anzolini coming in, and my being at his first concert, which I haven't forgotten.

FL: I'm going to ask you about that in a second.

CB: Okay. Go on, then.

FL: So, David Epstein's successor was Dante Anzolini, who conducted the MIT Symphony Orchestra from 1998 through 2006. And just a little bit of background about him: prior to coming to MIT, he already had an international conducting career, and since leaving MIT, among many accomplishments, he has conducted the MIT—Metropolitan Opera in April, 2008. And he's currently Director in Argentina of this called Teatro Argentino, and he's Principal Guest Conductor of the Linz Theater in Linz, Austria, among many other things that he's doing. So, as you just said, you were at the first concert that he conducted. And you told me that you knew something was up from the very first chord.

CB: Yes.

FL: Tell me about that.

CB: Well, yes. It was an [Edward] Elgar Overture, and it started with this great, full orchestral sustained chord. And I knew immediately that this was a different orchestra from David's. And the point I wanted to make, before we introduced Dante, is that David was, I think, not demanding of his students. He accepted the best that they were prepared to give, I think. And so sometimes, perhaps that's why he had to seed the orchestra with professionals from time to time. And that's why sometimes there were the missed beats, you know, the missed entry, too soon, too late. But he was never critical of them.

Whereas Dante was intensely demanding! It was obvious from that concert, that very first chord, that there was a difference in the orchestra, because it was a matter of discipline. And Dante was very demanding. He interviewed—I don't know what David's selection process was, how he selected the people to play, the students to play in the orchestra. But Dante interviewed every one of them, a hundred and sixty applicants! It takes a lot of time to spend up to an hour with each one of them, before he's got his orchestra made. I don't think it was that long in every case. Whereas David took them in; they could play, and this is—he took what he had. And so did Dante, but he had a finer mesh on his selection process, I believe. And he was a, probably, I believe, a stronger disciplinarian in his rehearsals. It had to have been there!

FL: Yeah. So, Dante Anzolini's successor is Adam Boyles [2007 – present]. Do you have any comments about some of the concerts you've seen under him?

CB: Yeah, he's—the students relate to him very well, and he conducts very nicely, albeit left-handedly, but. [laughs]

FL: Mm-hm. [laughs]

CB: And he has a very positive and engaging personality, and I'm sure the students relate to that. And I think the quality of music that he's producing is good, and I think that his programming is very interesting; he's done—doing some interesting new stuff.

FL: Mm-hm.

7. David Epstein and the New Orchestra of Boston (1:23:57—CD2 37:58)

FL: So, touching on some stuff we mentioned in the past, but I'm going to kind of move it into some other topics, as you know, historically there's a long tradition of scientists who are also musicians. Some good example, William Herschel, the astronomer who discovered Uranus, and Albert Einstein was a violinist. Here in Boston, Burton Fine, the Principal Violist of the Boston Symphony, was a Ph.D. chemist. Alexander Borodin, the composer, was also a chemist before he really became a composer.

And David Epstein had developed a deep respect for scientists who were musicians, as you were talking about, and David brought a real scientific rigor to his own research. I mention this because it's a prelude to talking about David's work

with this group called the New Orchestra of Boston. So that group started in 1984, and you were Board of the—President of the Board?

CB: No, it started earlier than '84.

FL: Oh, the first concert was in '84, as far as I can tell. I think it was—there were some organizational meetings in 1983, but—

CB: No. I'm trying to remember, because—

FL: Because there's a program that I saw, and it said this was the premiere concert of the orchestra.

CB: Yes, yes, yes, yes, yes, I beg your pardon, mm-hm. Yeah, go on. I don't remember the dates exactly. It's earlier than that, in the eighties, by a year or two. In those days, my connection with it came about through the [MIT] Music Section. In those days, the Music Section chose to appoint—elect, from their memb—from their colleagues, a new Section Head every year.

FL: Right.

CB: And the year of my first Visiting Committee, which I think was either late '79 or early 1980, David was Section Head, but was ill, and couldn't come. So I didn't meet him until a couple of years later, although at that time the Visiting Committee was meeting annually. And he had established, or conceived, of the New Orchestra of Boston as an instrument that would display the musicianship of scientists and engineers, to pursue the point that you're making, that is there a connection between quality musicianship and quality science and technology?

He wanted to play on that particular rubric, and his idea was to have an orchestra, a professional orchestra, which would include musicians from the faculty, staff, and student body of the Institute. And he went to Jerry [Jerome] Wiesner with the idea, and he called it the New—he saw it as an orchestra in residence at MIT. And he went to Jerry Wiesner [clears throat] [aside] excuse me, he went to Jerry Wiesner with the idea, and Jerry bought into it, and gave him ten thousand dollars to set it up, and to pursue the concept. And no, he promoted it as the concept of science—engineers and scientists as musicians, in an orchestra of professional quality.

He was also told that if he was going to do this, he ought to have a board of advisors, because he couldn't handle this on his own, with his academic duties, even though it was going to be a resident orchestra, per se. And so he asked me to chair the Board of Advisors, and he had already got a group of people whom he knew from the community. In fact, later when the—when, we'll come to it—when the orchestra was incorporated as a 501(c)(3), the lawyer who did that became a member of the board and so forth. And there was a ten member board of advisors.

And the question was, really, what's—who is the audience for this? But the deeper question, really, was why does Boston need another orchestra? Well, David was always very facile at answering that question, because this was totally different from all the other—it's not a philharmonic, it's not like the symphony, it's not like the Longwood Symphony, da da da da da da. This is a specific orchestra which

features scientists and engineers. Well, Longwood has doctors, but so what? [Longwood Symphony Orchestra. Members drawn primarily from Boston's medical community]

But then, of course, he needed additional funding, and he had to go back to ask for the second year's funding. And Jerry told him to see Francis [E.] Low [MIT Provost, Professor of Physics], who was the Provost at the time. And I went to see Francis, and Francis's nose was very much out of joint! He felt patronized. "I play the piano," he said. "What is all of this nonsense about? Of course we are! I don't want to be patronized to look at these peculiar examples of scientists and engineers playing music. We don't need to convey that." So he refused to fund it, and it was only in residence, then, at MIT, for a year.

But David, who had driving ambition, and really pursued his interests with determination, decided that it would—he'd maintain the concept, and maintain the orchestra, and would organize it into a 501(c)(3), and break it off from MIT, in effect. To a degree—he did have—when he did have the first concert, there were, was—the MIT connection was made, and the *New York Times* gave it a write-up, and I think it was performed at the Lincoln Center. I didn't go.

And then it became the struggle of keeping this orchestra afloat, in a—it was comprised, principally, of the freelance musicians in the community, in which Boston has a very rich pool, of the musicians who play for the Ballet, and play for the Pops, and play for the various other symphonic ensembles that require musicians of their quality. And he put together a forty-five person orchestra. And he was the chief salesman, and he was the man who organized the programs, and got us—got the orchestra invited to a concert in the Azores. He was connected with the Azorean community in New Bedford [Massachusetts], and we gave concerts down there, and we got them on the board of directors.

But as soon as it split off from MIT, essentially all of his board of advisors, save three or four, quit, because there was no longer any cachet! It was no longer the New Orchestra of Boston, in residence at MIT! It was just another wannabe symphony orchestra in Boston. And so they just pulled out, so we lost that support, and they were fair weather friends, at best.

And the real issue was—I used to point this out to David. I said, "You know, we're going at this backwards." You think now—he talked of establishing a symphony orchestra in Boston—in Lexington [Massachusetts], where we both lived. I live there now; he's since died, as we know. As his wife died also, not too long ago, in California. He would get the wealthy families in Lexington to underwrite the orchestra. Well, we now had a symphony in Lexington. And I don't know how that happened, but we have a symphony orchestra in Lexington. And I kept saying to him, "You know, an orchestra—a community—an orchestra is founded when a community decides it wants an orchestra, that they merit an orchestra, that they want to have an orchestra to represent the quality of their community. And a group of people get together and say, 'Let's have an orchestra.' We're an orchestra looking for a community!"

FL: [laughs]

CB: And you know, when we told the board of directors that everybody's expected to contribute, because the musicians have to be paid, because the fees that we got for the concerts never quite—they always covered, I think, barely covered the cost of the musicians, with the cost of operations, and so forth. And David took no fee; he was quite vocal about it. "I'm not charging a fee. I'm doing this for nothing, now." With the implication that in the future he expects to take a fee, his directorial fee.

But in the end, people just drifted away. We never got it off the ground. And the selling of the idea, finding the audience, finding the venue and finding the audience, finding a place where people, "Yes, we'd like you to perform, and pay your fee to perform in this venue," was exceedingly difficult! He never gave up on the idea, though, even after the New Orchestra.

In the end, I resigned, too, because I just felt I could do no more. Whom am I going to raise money from—I remember going to Howard [W.] Johnson [MIT President 1966 – 1971] at the time, when it was young, and asking him to contribute an endowed—an amount to endow a stream of income from—for the orchestra, to sustain it. And he told me, "Oh, that's a wonderful story you tell." And then he told me to go and see [Kenneth] "Ken" Germeshausen, of EG&G [laughs], who was a great supporter of the arts, and life member of the Corporation. And I went to see Ken, and he had no interest in it! It's a very tough sell! And the fundraising was impossible, to keep this going. I had nothing to give, at that time, except the occasional small, few hundred dollar annual contribution. And board members lost interest. And David was fighting to save it on his own, but it never quite survived.

FL: Did his [the orchestra] cease at his death, or did it cease before then?

CB: Well, it ceased well before then. I've forgotten, regrettably, the name of his colleague who was on the board, and who took over. [Editor's note: likely Howard Webber.] I was President of the Board when it was incorporated. His colleague had been the Director of MIT Press, and David knew him very well, and then he went to Harper's, where he was a Vice President. And he remained with the board, with David. In fact, he eulogized David at the memorial service that was held in Wong Hall, in the Tang Center, for David.

FL: Yeah.

CB: I've forgotten the man's name, regrettably. But that was it. And nothing happened with the orchestra for years after. Even during the period, in the early bursts of concerts, there was a concert at Triple-A.S. in Cambridge, the American Academy of Arts and Sciences, in Cambridge, and David was too ill to conduct on that one, I remember, and John Harbison conducted it for him. But, and I remember the couple at Bridgewater State College, concerts that we did for the New Bedford and southeastern Massachusetts community. And then there was one concert, as I mentioned, where they went to the Azores. They took a small orchestra of fifteen or twenty people to that.

FL: Right.

CB: It was a good orchestra. You know, it was a good, run-of-the-mill, good orchestra. It wasn't a brilliant orchestra; they were very competent professionals. The one thing,

just as an example, the last time I ever heard the New Orchestra of Boston play was in late eighties, early nineties, I'm not quite sure. David was a member of the American Society of Conductors [correct name is Conductors Guild], and they had an annual tutorial concert—tutorial meeting, where people who wanted to learn conducting could pay a fee, conduct an orchestra, and receive a critique from a panel of conductors as to their techniques, and so forth. And he had persuaded—it was always held in Manhattan—and he had persuaded them to bring it to Cambridge.

And he got hold of Killian Hall, and for two days—I came and listened. It was a very interesting experience! Each conductor was given the first movement of Beethoven's *Fourth* [Symphony No. 4 in B Flat Major, Op. 60], I think, and the second movement of one of the [W.A.] Mozarts [symphonies], I think probably the *Fortieth* [Symphony No. 40 in G minor, KV. 440]. And it was so interesting for me to see how differently it was played by each conductor, and how responsive, immediately, these—and that was the New Orchestra of Boston. There were only two people in that orchestra that I'd ever met before, but it was the New Orchestra—David's New Orchestra of Boston, you see.

He did—there was one other occasion when it made an important public performance, and that was a year or two before that. David was a member of the Humboldt Society. And the Humboldt Society, which recognizes the great German scientist [Alexander von Humboldt], is an international society, the members of it, and they meet everywhere. And they chose Cambridge as the venue. And he persuaded the committee that the New Orchestra of Boston should be their entertainment for one evening, and particularly because—and you mentioned the pianist's name?

FL: Yeah, Manfred Eigen.

CB: Manfred Eigen, who was a Nobel Prize winning chemist, and an amateur of great repute, amateur pianist, would be there, and he was going to play a Mozart concerto. I have to tell you that it was a disaster! His performance was appalling and embarrassing! I was sitting there amongst, as simply, as David's supporter, I wasn't a member of the Society. But here are these hundreds of members of the Humboldt Society and their guests, and the two men next to me said—were vocal about it! "What is this? What's going on here?" Because Eigen's fingering—everything was—it was awful! He couldn't trill, he couldn't run. He struck double notes. It was embarrassing!

And I felt obliged to tell David about that, and he wasn't embarrassed or fazed. "Oh, no," he said, "I think that Eigen played a very fine concert. And yes, he's a little older," and so forth—very forgiving of him, which is, I think, characteristic of David. I think it was the same attitude coming forth that he felt towards his students, that they were playing quite well.

FL: Mm-hm. So they actually recorded two Mozart concertos on a CD at some point?

CB: They must have, yeah.

FL: Yeah. I have not been able to locate a copy, but—

CB: No, I don't have that.

FL: Yeah. As you know, David was also a composer, and he wrote fairly modernist, atonal music. Did he talk to you much about his own composition, and kind of what inspired him?

CB: No, he didn't. He gave me, as I may have mentioned earlier, a recording of his symphony, which was atonal and modernist, and in that genre. And that's essentially all I can say of it. But he didn't talk about his composing. He was much more interested in his inventions, and so forth, which [unclear].

FL: Did you hear any other music besides the symphony, any other performances of things?

CB: No.

FL: Because there's quite a bit that he wrote. It seemed like after the mid-eighties and stuff, that he—it looks like he pretty much stopped composing, and was concentrating on his scholarship and conducting.

CB: Mm-hm.

FL: So David knew the conductor Herbert von Karajan, and seemed to have great respect for him. Do you know what their professional relationship was, and how that came about?

CB: I don't know how it came about. I do remember that von Karajan was ill here in Boston, and David went to visit him in the hospital, and talked about the fact that von Karajan was looking for a successor, and fancied that there was a strong likelihood that he would name David, because they'd had a long relationship. But nothing came of that.

FL: Mm-hm. I don't know how much of von Karajan's work you're familiar with, but often times, he liked to take very slow and expansive tempos. And there are some performances of David's that have some aspects of that. Do you know if there's any influence there? Did David talk to you about stuff like that?

CB: No, he didn't.

FL: I just wonder. There are some places where he takes things noticeably slower than other, more traditional tempos, and I just wondered if he had talked about that. In David's book, monumental book, called *Shaping Time* [Epstein, David: *Shaping Time: Music, the Brain and Performance* (New York: Schirmer Books, 1995)], he has some mathematical graphings of some of von Karajan's performances, and some of the tempo changes that he did, and so he seemed to really regard von Karajan's work very much. So this book was published in 1995. It's five hundred and ninety-eight pages; it's a massive book!

CB: Yeah.

FL: And here's David bringing science and music together. There's a real attempt at deep scientific rigor. But what's a thread throughout the book: there's the rigorous science and mathematics, but he seems—he wants to make it clear that the science is not governing the musician, that he's trying to shed light on things that can actually

bring about more vital and intuitive performances, but trying to find out what's behind some of the intuition. Did he talk to you about the book?

CB: Yes, he did, and his thesis was that in ritardando and accelerando in particular, everybody did it the same way—that there was, in fact, the slowing down was—could be, could be defined mathematically. And he got involved in talking to people in Brain and Cognitive Sciences here, and he was very connected with one or two individuals in that department, to discuss these issues of how the brain responds to these instructions by the composer. And that's where the mathematics come from, that it can be mathematically described, and that it is a uniform—as I understood him to tell me—that it is a uniform formula that everybody follows in his own way.

FL: So when you were talking with David about either this book or other things, what kind of effect has it had on you as you listen to music and go to concerts?

CB: None.

FL: None?

CB: No.

FL: No?

CB: No. I just throw myself into the—I don't analyze it—I just throw myself into the music, and let it sweep over me and consume me.

FL: Mm-hm.

8. Musical tastes (1:45:53—CD2 59:54)

FL: So we haven't had a chance to talk about much of your own, kind of, musical tastes, and the kinds of concerts that you like to go to. Want to talk about that for a little bit?

CB: Sure. How are we doing on time?

FL: We've got a few minutes here.

CB: Okay. Well, I go to as much music as I can. I tend to—tend more to the traditional, and I'm very, very fond of chamber music now, as well as classical, symphony. Opera is probably something that I'm not strongly attracted to. I've only—not heard many in my lifetime. I think that was because I had a terrible experience as a child, [laughs] being taken to an opera that I didn't—in German, or whatever. I didn't understand it. So, my tastes tend to be in the cla—tend to be, in large part in the classical, and—classical and to a degree contemporary, but—certainly twentieth century music, early twentieth century music.

FL: Who are some of the earlier twentieth century composers that you like?

CB: Stravinsky, Ives, you know, those kinds of people.

FL: Yeah, mm-hm.

CB: [Sergei] Prokofiev and [Dmitri] Shostakovich in particular. I often ask myself which of those two I prefer. They're quite different—so very different. And somehow

Prokofiev seems to me, overall, more lively, more sprightly in personality than—this is what comes to me from his music, than Shostakovich does, even though they both have gloomy themes.

FL: Yeah, yeah.

CB: And deservedly so.

FL: Well, you mentioned Charles Ives. I'm passionately in love with the music of Charles Ives. And David Epstein had an interest in Charles Ives.

CB: Mm-hm.

FL: Are there particular Ives pieces that you've enjoyed? Were you at the concert that David did, the Ives *Third Symphony* [Symphony No. 3, (*The Camp Meeting*)]?

CB: Yes, mm-hm. Yes, he did that very well.

FL: Yeah.

CB: Yeah, he's not a composer I listen to often. I have a large collection of vinyl records, which I won't give up. And I try to listen to them, and it's—I don't think that I have much of him, perhaps only one, two.

FL: Who are some of the—tell me about either composers or pieces that really get you excited.

CB: Well, you know, just recently—I heard [Gustav] Mahler's *Sixth* [Symphony No. 6 in A minor] in—last October at the Boston Symphony Orchestra. And David did that, I remember. Or was it—no, Dante [Anzolini] did it.

FL: That's right!

CB: Dante did it. He did it brilliantly. And it's a magnificent piece! And I have, I realized—and I was anticipating going to Mahler's *Fourth* [Symphony No. 4 in G major], fairly recently, at the Symphony. And I realized that I only had his *First* [Symphony No. 1 in D major], *Fourth*, and *Eighth* [Symphony No. 8 in E-flat major] [pounding on table]. And that I—I wanted to know: what was it about Mahler that distinguished him? And so I got out of the library the CD's for all those that I didn't have, and I listened to the entire library of his symphonies in sequence!

And you know, it began to be, for me, at least at that time, that there was a sameness to them. I mean, they are Mahler qualities, and in every symphony the same sounds appear, the same use of instrumentation appears, the same dark periods, followed by light periods, followed by dark periods. You know, one has in one's head, if you look at Beethoven's nine symphonies, for example, how different each one is from the next. Not true of Mahler, somehow.

But I still like Mahler. And the *Fourth* is lovely, and in fact it's probably the easiest to like, I think—I think, to my simple layman's mind—of his symphonies. And of course, he had sketched his *Tenth* [Symphony No. 10], and hadn't orchestrated it himself, when he died. So it has been orchestrated, and properly. It sure is Mahler! [laughs]

FL: [laughs] So to conclude here, are there any either final thoughts on music at MIT, or any final thoughts on anything that we've spoken about, something that you wanted to talk about that I didn't ask you about?

CB: That's exactly the question that I ask my student applicants: is there anything that you'd like to know from me, [laughs] after the interview is over? No, I think I've said everything that—I think you've brought out all the issues, and I've been able to respond to them.

FL: Mm-hm. Well, it's been just a delight to have you and your—contribution of your thoughts are really valuable. So, thank you for your time today.

CB: Enjoyed it! Thank you.

[End of Interview]