Science in the Life of Elizabeth M. Boggs Interview: Elizabeth M. Boggs

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Part 1 (A-side of Tape 1)

TU: This is an oral history interview with Mrs. Fitzhugh W. Boggs in a state office in Trenton, New Jersey, on March 13th, 1979. The interviewer is Thomas Underwood. First of all, on behalf of the Alumni Association of Bryn Mawr College, I would like to thank you, Mrs. Boggs, for making this interview possible today. Usually, the way we like to preface these interviews is to start with some questions about your days at Bryn Mawr. The first question we usually ask is how did you happen to go to Bryn Mawr?

EMB: [0:00:36] Yes. That's somewhat interesting. I had strong interests in science from a relatively early time in my adolescence, I suppose. I was about 12 or 13 when I decided that I wanted a scientific career. I talked about going to MIT. I talked about this to my parents, who were not immediately dismayed by that notion, but I think that they—but more particularly my mother—were somewhat concerned that MIT would not offer to me some of the cultural advantages or social advantages of another type of colleges. They saw Bryn Mawr or comparable colleges as meeting some of my needs that perhaps I wasn't thinking about so much. I think that relevant to this whole discussion is the following observation. I

make this being aware of the fact that the college has recently asked alumni about their attitudes, for example, towards financial matters in terms of the influence that their parents had on the way they looked at financial management and the responsibilities of women to undertake that…

It was long after I was at Bryn Mawr that I realized that in many respects my father's family was rather unusual. My father was the eldest of ten children, and he was born in 1878. Every one of those ten children, including the five girls, went to college. This was in the Deep South. Now, consequently, as I was growing up, he accepted my intellectual interests in exactly the same frame of reference that he would have accepted them had I been a man. That was unusual for his generation and even for mine. I say that because he was thirty-five when I was born and I was the eldest, so he was by some standards a generation and a half older than I. I mention that because, in retrospect, I realize that it had a good deal to do with the ease with which I accepted my own desire to move into fields, which not only involved higher education, but fields of endeavor which at that time were not widely sought by women. My mother was not a college graduate. She had had a very good education, and she traveled widely abroad. She had had certain ambitions in the field of design, art, and architecture, which had not been entirely realized, although she had a very satisfying life from her point of view. I think that she also was more than willing to foster the realization of my ambitions.

At any rate, one of the steps which they took to move me along in the directions that I was interested in was to plan for me to attend during the last two years of my high school career an exceptionally good boarding school, with exceptionally good academics. That was Concord Academy. Concord Academy is rather an interesting place and has, as a matter of fact, a number of Bryn Mawr associations. There were two recent Bryn Mawr graduates there as faculty members when I was [at the academy]: Annie Leigh Hobson,[1] who later came back to the college as Mrs. Broughton, the wife of Professor Broughton, and Rosamond Cross.[2] It was a very young school at that time, only about ten years old, and did not have the widespread reputation that it now has. It was then a kindergarten-through-twelve school, co-educational in the lower school but not in the upper school. It's now a secondary school, which is co-educational throughout. It has now, as it had then, both a day and a boarding

[1] Annie Leigh Hobson: https://en-academic.com/dic.nsf/enwiki/2431667

[2] Rosamond Cross (1907-1993). See, *e.g.*, "Rosamond Cross; Headmistress, 86," *New York Times* (September 2, 1993), B:10. https://www.nytimes.com/1993/09/02/obituaries/rosamond-cross-headmistress-86.html (Consulted July 30, 2023.)

population. The boarding population is now larger than it was when I was there. It was only twenty-five of us when I was there. At any rate, I had a good experience there. It was somewhat more traditional in its approach to the academic aspects of the topic than I had experienced at the country day school I had previously been at, which was described in those days as a progressive school. The combination of those two things was really very good for me.

I arrived at the process of participating in the decision-making relative to Bryn Mawr with most of my options open, one might say. I don't recall having had any other colleges particularly in mind once I had been talked out of MIT. As I came closer to the decision-making time and the entry time, I began to recognize that that was probably a kind of a romanticized preference on my part anyway. If I had other alternatives in mind, they don't stick in my memory at the moment. We went through the usual procedures. In those days, of course, we all took college entrance examination boards in all the subjects for which we wanted any credit or information and all that sort of thing. So, there was quite a bit to do to get into college. Bryn Mawr's admission requirements, language requirements, this and all the other things – classical Languages and all the rest of it – were considerably more detailed than they are now. But I think that the focus on Bryn Mawr came about because my parents recognized that I was highly intelligent. They, in their browsing around, came to the conclusion that a small college with a high academic standing was preferable. That was something that met that criterion and met other things. I was fully in accord with this decision. I try to convey to you the sense of an era in which young people, without being particularly repressed or controlled, were nevertheless more guided in their decision-making than people of the same age I know.

TU: Not just specific to women?

EMB: [0:09:10] I'm talking about both boys and girls. I think it may have been a little bit more clearly defined in the case of women. As it turned out my younger brother did not go to college, but my guess is that if he had been going through the same steps I was going through, they would have exerted the same sort of guidance – and I use that word advisedly because I never had the feeling that I was being coerced. But the arguments were being put in a way [that] tended to determine the outcome.

TU: This question may be a little too general. If so, we can make it more specific. If you had to single out one area, what do you remember most clearly about Bryn Mawr? What have you retained through the years?

EMB: [0:10:00] That's hard to say because there are really a number of things. I found Bryn Mawr very exciting. It was a place where to a much greater degree than ever before, I took responsibility for what I did. I took responsibility in a larger scope for the academic work I did. I had to plan further ahead than I had in school. In school, you get weekly assignments; here, you began right away by doing something on a semester basis. It was also a place where for the first time in my life I did not feel very atypical. I had gone through school liking school and liking the subjects, being really interested in what I was learning, and not begrudging the time that I spent on schoolwork, but that was not typical. Even at Concord, where people took work fairly seriously, my level of interest in the subject matter was such that it was not shared by all my friends – whereas at Bryn Mawr, I was surrounded by contemporaries, girls of my own age, who were equally interested in whatever it was they were interested in. Most of my friends were not scientists. My best friends were historians or philosophers or English majors or whatever. There was a group of about half a dozen of us who were best friends together, and [the women in the group] were not mathematicians or scientists, but they were all intensely interested in what they were doing. None of us had to feel embarrassed because we were interested.

TU: Do you remember any names?

EMB: [0:12:04] Oh yes! Evelyn Thompson,[3] who's now Mrs. David Riesman; Elizabeth Kent,[4] who's now director of social work at the Community Mental Health Center that's associated with the Dartmouth Medical School in Hanover; Joan Hopkinson Shurcliff,[5] who eventually did marry a fellow who's a scientist [William A. Shurcliff]. They live out in Cambridge. I could go on. That gives you some of them to find.

TU: From the biographical data made available to me in the alumni office, I noted that you graduated with a BA in mathematics *summa cum laude*, no less, in 1935. Subsequently you were awarded the Bryn Mawr European

[3] Evelyn Hastings Thompson (1912-1998) married David Riesman, Jr. (1909-2002) in 1936. See, *e.g.*, Meg Nixon, "Finding Aid: Evelyn and Jan Thompson letters, 1930-1936," *William L. Clements Library, The University of Michigan* (2013). https://findingaids.lib.umich.edu/catalog/umich-wcl-M-4584.6tho (Consulted January 18, 2024.)

[4] Elizabeth Van Rensselaer "Kenty" Kent (1913-1983). See, *e.g.*, Marge Garfield, "Kent Family Papers: Louise Andrews Kent Collection, 1783-2000," *Vermont History Center* (2018). https://vermonthistory.org/documents/findaid/kentfamily.pdf (Consulted July 30, 2023.)

[5] Joan Prentiss Hopkinson (1913-2007) married William Asahel Shurcliff (1909-2006) in 1941. See, *e.g.*, Matthew L. Wald, "William A. Shurcliff, Who Helped Develop Atomic Bomb, Dies at 97," *New York Times* (June 28, 2006). https://www.nytimes.com/2006/06/28/us/28shurcliff.html (Consulted July 30, 2023.)

Fellowship. Can you explain? I'm not familiar with that. Can you tell us a bit about what that is?

EMB: [0:12:57] Yes. I certainly can. Let me say, first of all, it might be worth mentioning that my major was changed. I started out in physics and chemistry. In my junior year, I wanted to complete what had originally been planned as a major in physical chemistry, and also to take more mathematics. There were two undergraduate professors that I had, who probably had the most influence on me. They were William W. Flexner,[6] who was incidentally a nephew of M. Carey Thomas[7]—his mother was [Helen Whitall Thomas Flexner,][8] M. Carey Thomas's sister—and who was a relatively junior professor of mathematics. I guess he was an associate professor. And Lucy Martin Donnelly,[9] who is a legend at Bryn Mawr—or was for many years—and had been a lifelong friend of M. Carey Thomas, and who was professor of English, and who was an absolutely fascinating woman who lived in Low Building [faculty housing at Bryn Mawr].[10] During my junior year—junior or senior year I forget which—I and some of those friends that I just mentioned persuaded her to give a special half-unit course in creative writing, which was really just for us. We had a wonderful time. The class was often convened in her apartment in Low Building, and we all sat around and had tea in the English style and discussed semantics

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[6] William Welch Flexner (1905-1998) was the son of famed physician Simon Flexner (1863-1946) and Helen Thomas (1871-1956). He obtained a PhD in mathematics from Princeton in 1930 for a thesis entitled "On Topological Manifolds" under the supervision of Solomon Lefschetz (1884-1972). In 1932, he was married to Magdalen Glaser (1907-1972). The two were divorced in 1946, at which point he remarried with Elizabeth Anne Wrey (1917-2009). Around 1939-1940, he spent a year at the Institute of Advanced Studies in Princeton, New Jersey. Sources: *Ancestry.com*; "William Welch Flexner", *Mathematics Genealogy Project* (n.d.) https://www.genealogy.math.ndsu.nodak.edu/id.php?id=8582 (Consulted June 27, 2023.); "Flexner, William [Transcript no. 10]; Department of Mathematics Oral History Project records," AC057, *Princeton University Archives, Department of Special Collections, Princeton University Library* (1984). https://findingaids.princeton.edu/catalog/AC057_c44 (Consulted June 27, 2023.); N. Mayer, "Magdalen Flexner," *The Shalvi/Hyman Encyclopedia of Jewish Women* (1999). https://jwa.org/encyclopedia/article/flexner-magdalen (Consulted June 27, 2023.); "William Welch Flexner," *Institute of Advanced Studies* (n.d.) https://www.ias.edu/scholars/william-welch-flexner (Consulted July 25, 2023.)

[7] M. Carey Thomas: https://en.wikipedia.org/wiki/M._Carey_Thomas Disclaimer: Throughout these notes, Wikipedia entries are provided whenever possible for general identification. They should not, however, be understood as primary or definitive sources for any of the associated subjects.

[8] Elise Rolle, "Helen Thomas Flexner," *Queer Places* (n.d). http://www.elisarolle.com/queerplaces/fghij/Helen%20Thomas%20Flexner.html (Consulted October 30, 2023.)

[9] Lucy Martin Donnelly: https://en.wikipedia.org/wiki/Lucy_Donnelly. See also Elise Rolle, "Lucy Donnelly," *Queer Places* (n.d). http://www.elisarolle.com/queerplaces/klmno/Lucy%20Donnelly.html (Consulted October 30, 2023.)

[10] Low Building[s] was a faculty residence at Bryn Mawr. See, *e.g.*, "Emmy Noether at Bryn Mawr College," *Storymaps* (n.d.) https://storymaps.arcgis.com/stories/de8b145587294523bfd8c40df9b6d446 (Consulted July 30, 2023.)

and other subjects. Bill Flexner taught the first-year calculus course, which I took in my sophomore year—I don't remember what I took freshman year. Anyways, the first-year calculus course: I thought it was tremendously exciting. At any rate, he strongly wanted me to take additional mathematics, partly because he thought that I was interested in mathematics, and partly because he knew that it was desirable if I wanted to go on for graduate work in science. But under the then-existing Bryn Mawr rules, if you were a science major you had to take a social science [course]. If you were a math major, you didn't have to take a social science [course]. I would have liked to have taken the social science [course], but by changing my major to math I could take both the math and the chemistry [courses]. That sounds a little bit involved, but it's little of the sideline on the academic decision making.

TU: And the European Fellowship?

EMB: [0:15:56] I'm getting to that. I'm going to tell you something else that I really think probably should be recorded in this. That is that I had an extremely interesting experience my senior year as the result of the machinations of Bill Flexner. Incidentally, I still correspond with Bill Flexner, who lives in England now. His career took him from Bryn Mawr to Cornell, and he was therefore not at Bryn Mawr my senior year. He had anticipated the arrival on the Bryn Mawr campus of a very renowned woman, a German-Jewish mathematician named Emmy Noether. Emmy Noether's arrival had been arranged… She was essentially a refugee, but her arrival and reception at Bryn Mawr had been arranged by the department. They were quite pleased to have her come. Their primary purpose was to give her an environment in which she could continue her creative research in fairly abstract forms of mathematics and work somewhat with graduate students. But Bill had persuaded Anna Pell Wheeler[11] (a biographical sketch on whom I just recently sent to this project), who was the head of the Department of Mathematics, to allow me to take a half unit throughout the year of honors work with Emmy Noether. If you have enough tape, I'll tell you the story.

TU: We have of plenty of tape.

EMB: [0:17:50] These are the kinds of things that don't necessarily appear in the formal histories.

TU: Excellent.

[11] Anna Pell Wheeler: https://en.wikipedia.org/wiki/Anna_Johnson_Pell_Wheeler

EMB: [0:17:56] I had by that time passed my orals in French and German. If you don't have them anymore, I'll tell you about them too, but the orals in French and German where required of every Bryn Mawr graduate as a demonstration that she could read French or German to a level which permitted some scholarly research, shall we say. You were not required to speak it or understand it.

Emmy Noether arrived on the Bryn Mawr campus sometime before the opening of my senior year,[12] which was in the fall of 1934, obviously. She spoke no English. That was no problem for Anna Pell Wheeler, who spoke fluent German, but it was a problem for me because I did not speak fluent German. I had been warned by Bill Flexner that Emmy Noether was a very lofty personage, on whose time I shouldn't expect to trespass, and that continental university traditions about the relations between students and professors were such that the professors expected the students to do a good deal on their own and not bother the professors too much – and that all this business of frequent conferences in the library or in the professor's offices was something I shouldn't expect from her. So, I went into this bit not quite knowing what I was getting in for, until I went to see Emmy Noether. Between us, I managed to understand the following. She handed me a bright yellow book which was called *Moderne Algebra* by B. L. van der Waerden.[13] At any rate, this was a book on the abstract forms of algebra, not the kind you get in high school. She told me that I should sit down and study this. Well, it happens that the development of this subject from first principles is based on stating a few rather simple assumptions, and then applying logic to those assumptions and seeing where you can go. You also define your terms as you go along. "Group", for example, has a very specific meaning. So, I took the book home and I read enough German, so that I could follow it along. Then, as each new term was introduced, it was defined in German, but I could understand. And a lot of it, of course, was in formulas, equations and so forth and using symbols, which of course was familiar. If you don't know German, you probably are not aware that usually gives you a lot of scope because you have a whole lowercase and uppercase German alphabet you could use with all the Arabic alphabet, and that gives you a lot of symbols with which to play. Anyway, I decided that if I was going to sit down and read this book, which took [a while]. I would say that I could digest two or three pages in an hour. That's the nature of the compactness of the language, not of the German

[12] Emmy Noether arrived at Bryn Mawr in late 1933.

[13] B. L. van der Waerden, *Moderne Algebra* (Berlin, New York: Springer-Verlag, 1930). The book was based in part on Emmy Noether's lectures. See, *e.g.*, https://en.wikipedia.org/wiki/Moderne_Algebra

language but of the algebraic. So, I decided that if I was going to do this and it was supposed to be a half-unit course and so forth, that I better just decide to spend the certain amount of time each week doing it and pace myself that way. Otherwise, I would either not do it or I would be so preoccupied that I wouldn't get my other work done. I was taking other courses in math and so on. So, I did that. I made myself work at it as if I were going to a lecture and to take notes and progress along. And I seemed to manage pretty well, and I didn't think there was anything that I needed to ask Emmy about. Come January or so, Anna Pell Wheeler gently conveyed to professor Noether that she had to provide a grade for me. So, I was summoned into her presence, and we had a little discussion.

TU: In German, I suppose.

EMB: [0:23:00] Well, by that time Emmy had begun to pick up a little English. It was a combination of my perhaps understanding her German and answering her in English, I suppose. At any rate, she told me that there were some problems in the back of the chapters, and I should go and pick out some of those problems to do and come back. So, I did them. It was possible for me to do them almost entirely symbolically. I didn't have to write any German or English to do them. So, I did them and, apparently, I did them right, particularly when you can choose the ones you're going to do. So, I was duly scooted through with an "A" for the first semester in that, and nobody gave the matter much thought. However, come the end of March, spring vacation, and Emmy Noether was taken ill. She had a brain tumor of which she died in something like three weeks. So, I found myself in the middle of April with graduation one month away, six weeks at the most, with no major professor, and no one but myself knowing what I'd been doing. I found myself further in the situation that I could not discuss what I had been doing with anyone, because I didn't know enough German to say it in German and I didn't have the English words for all that mathematical stuff that I had been doing. So, I was somewhat nonplussed. Well, Anna Pell Wheeler was resourceful, and she recruited a gal named Olga Taussky,[14] who was a Czech who already had her PhD in mathematics, but who [had] come to Bryn Mawr to work on a postdoctoral level with Emmy Noether. Olga Taussky was also an algebraist. Well, Olga Taussky's English was not much better than Emmy Noether's and my Czech was nil, but we met and she did a rather ingenious thing. She said: "Here is a theorem, which I know is true because it has been proven by non-algebraic methods, but to the best of my knowledge no one has ever proven it using algebraic methods. I would suggest that you do this as an original

[14] Olga Taussky: https://en.wikipedia.org/wiki/Olga_Taussky-Todd

exercise." So, I undertook to try to do that. She and I met several times. I asked her questions, and we had conversations about it. Then, I remember a terrible panic that occurred about three or four days – it seemed to mem – before this final thing had to be in. I had worked it all through and I had written it all up. Fortunately, it was in relatively few pages. Then, I suddenly realized that I had made a mistake fairly early in the development of the whole damn thing. I was panicky. I was staying awake nights. Bryn Mawr European Fellow, I'm not. So, I eventually patched it up and it was accepted and processed and all the rest of it.

Well, meanwhile all the machinery that goes with European fellowships were generating… In those days… I think the European scholarships are still awarded although the criteria for selection may be a little different; it's generally done by vote of the faculty. It usually goes to the senior with the highest rank in the academic scoring, although it could go to someone else on the basis of an exceptionally distinguished honors thing or whatever. But basically, the senior members of the faculty get together and attempt to compare notes and to put forward their respective candidates. For all I know, there may be a certain amount of horse trading—if that's so, it's certainly kept from the students—because the departments like to have students who are winners of various kinds of awards. But it was – and I think it still is – the top-ranking graduation honor.

(In those days, at least, it was kept a deep dark secret. The fellow herself was told the night before and was allowed to tell one other person. If you ask me who I told, I don't remember. At any rate, I think it must have been one of my friends. It probably was Evelyn Thompson. I didn't tell my family because I remember my mother saying afterwards that she had said to my father: "I think they're focusing on something special." It was amazing. I think she got that impression, because during the time that my parents were around for graduation, I think that Lucy Donnelly had my parents and me for tea something of that sort, or maybe the whole group. I don't recall.)

At any rate, I think Lucy Donnelly, of course, being a senior professor, knew that I was getting the fellowship, and I had my mother sensed somehow that Miss Donnelly was responding to this. I don't know. At any rate, it's very exciting. The whole deal is quite fulfilling at least for the recipients. The Bryn Mawr European Fellowship has been given away since the very beginning. One of the first winners was a woman who was very prominent in the feminist movement, Emily Greene Balch.[15] She later won a Nobel Peace Prize. At any rate, I'm not sure that it can be said that at Bryn Mawr

[15] Emily Greene Balch: https://en.wikipedia.org/wiki/Emily_Greene_Balch

European Fellowship winners necessarily distinguish themselves later. I'm sure there are other people who come up with relatively mediocre grades, who end up doing much better. At any rate, I had already started to make plans to spend my next year at Cambridge, and I had gone through all the process of getting myself admitted to Newnham College in Cambridge, so that getting the European Fellowship contributed to my financial resources for that purpose, but it didn't change my decision to go. It's a little hard to leave all your planning for your graduate study until the day you graduate from college, the day you get your AB. Well, that was more than you asked me, but I hope you'll agree that the story about Emmy Noether is of interest.

TU: Yes, I'm glad to get that on tape.

EMB: [0:30:49] At any rate, I did receive the fellowship. It was very exciting, and I did go to Cambridge the following fall. I had originally planned to go there only for one year, as a kind of breath-catching undertaking with the idea of coming back and entering into a doctoral program in this country. However, at that time—and this is relevant perhaps your interests—the area of study that I was focusing on which was sometimes referred to as theoretical chemistry and sometimes as mathematical chemistry was developed in this country at only three or four universities, and most of them did not accept women – Princeton, and so on. So, my decision to go to Cambridge, which also had an outstanding faculty in this area, was confluent with my further career objectives, but it also responded to other interests I had. I thought it would be fun to live abroad, to try my wings in a different type of university and so on. At any rate, I went there. The British academic year is divided into three terms. After I had been there about a term, it appeared that I would be able to matriculate, and I was to become a research student formally and enter into a doctoral candidacy. I decided at that point to do that. I liked it. I had identified a professor who was interested in having me as his research candidate.

TU: And his name was?

EMB: [0:32:58] His name was J. E. Lennard-Jones.[16] He made a number of contributions in the area in which I actually did my thesis. So, you've gotten me through the European Fellowship, and you've gotten me to Cambridge. How much more do you want with that?

TU: You received your PhD in 1941.

[16] John Edward Lennard-Jones: https://en.wikipedia.org/wiki/John_Lennard-Jones

EMB: [0:33:31] Well, you have to recognize that the war had broken out in the meantime.

TU: You were required to leave because of some…

EMB: [0:33:38] Well, I had intended to complete [my work]. Well, first place, by not making the decision to formally enter the arena for the doctoral degree until my second term, I had set myself behind schedule, not only in terms of the work but in terms of the amount of time that you have to spend in residence at Cambridge in order to qualify for a degree. You have to have nine terms or three years in residence. You can take longer to finish your work if you want and there is a thesis. There is no required coursework, but there are stiff exams to be offered by the faculty—oral and written—and consequently you had better take some course work. As a matter of fact, that's one of the most disconcerting parts of the thing, and that is you take lots and lots of courses you really don't know how well you're doing until the very end. So, I began more systematically attending courses and then I worked out the agenda for writing my thesis. Because I had to stay one more term than June provided, I decided to stay there essentially for four years, the first term of which I had lost in terms of having it counted as credit. I was busy taking courses, but it was lost from that point of view. Then, I took another term to come back to the United States in the winter of 1939, and I spent that time in Princeton, working in the Fine [Hall] Library, which is the mathematics library that they have.[17]

At a time when that whole library and the math department was populated with people who had come to Princeton to join the Institute for Advanced Study, which had been created as a corporation but whose building was not yet ready. There were people like [Danish physicist] Niels Bohr[18] and Albert Einstein flowing in and out of that whole ambience all that winter. I didn't know it at the time, but it was while I was there that Einstein came to this country in order to mobilize American scientists to go to [President Franklin D.] Roosevelt and say that he anticipated that the Germans were going to develop nuclear fission, and that Americans had better be on a competitive position. That was going on around me. I didn't know it, because obviously that was something they were very confidential about. But at any rate, it was an exciting place to be. But I was a very small and inconspicuous person with no status. I was just doing my work and having

[17] Robert Jantzen, "The Princeton Mathematics Community in the 1930s" (2018). https://www34.homepage.villanova.edu/robert.jantzen/princeton_math/ (Consulted October 30, 2023.)
[18] Niels Bohr: https://en.wikipedia.org/wiki/Niels_Bohr

the privilege of using the library as a result of the fact that my aunt,[19] who lived in Princeton, knew the dean well. I may say that although the Institute for Advanced Study was theoretically co-ed, it was a predominantly masculine environment.

TU: Did you find that there were any barriers? Do you feel…

EMB: [0:36:55] Well, no. I don't think that I felt discriminated against or concerned about my sex particularly, I just felt very, very small and insignificant in a society that consisted of recognized and arrived intellects of a stupendous variety. After all, here I was a student who hadn't completed her doctoral work, and these people were people who had not only completed their doctoral work but were responsible for world-shaking theories. At any rate, of course, there were some other students around, too, but they were the were the pick of Princeton's crop and they weren't paying much attention to me.

I think I forgot something. There was one little incident that I remember very well. Even the recreation of these people was somewhat bizarre. One of their pastimes for relaxation was playing a game called Kriegspiel,[20] which means war game. Kriegspiel is a form of chess which is played essentially—one might say—blindfolded. In order to play Kriegspiel, you have to have two players, an umpire and three chess boards. The two players sit with their backs to each other, each facing his own chess board. And then there is one chess board which is between the two of them. They're back-to-back but there's room for the chess board in between. The umpire has charge of the neutral chessboard, which neither of the players can see. The players have their own men, and they can move their own men, and know that they're moving their own men, but they cannot see where their opponents' men are, and do not know what moves their opponents have made. But the umpire tells you to make a move, you make an opening move, and then he tells the other fellow to make a move. Then, as time goes on you, begin to try to make moves that are not legal. By not legal, there's "you can't move there because in order to get from here to there you have to pass through a bishop. You don't have a clear path or whatever." Or, as in the later stages of the game, you may have a move

[19] It was her great-aunt, Beulah Brewster Pack (1869-1957), daughter of George Willis Pack, who married Philip Ashton Rollins (1869-1950) in 1895. See, *e.g.*, E. F. Bentley, "A Conversation with Mr. Rollins," *The Princeton University Library Chronicle* **9**(4), 178-190 (1948). https://doi.org/10.2307/26400287; "Philip Rollins, 81, Authority on West," *New York Times* (September 12, 1950), 26. https://nyti.ms/43GVtpV "Mrs. P.A. Rollins, A Clubwoman, 88," *New York Times* (December 23, 1957), 22.

[20] Kriegspiel: https://en.wikipedia.org/wiki/Kriegspiel_(chess)

that is illegal because it would put your king in check. You don't know why it's illegal, but the empire just tells you: "No, you can't do that." So, then you make another ploy. Of course, after a while, you learn to make these ploys to find out what you can't move because then you figure that you know where the other fellow is. For example, if you move a bishop all the way across the board and they tell you: "No, you can't do that." Then, you try the next move [which] is to move one short of that [until] you get to the point you can make [it]. Then, you know that there's an obstacle in the next square, but you don't know whether that's a queen who's going to take you or whether it's a knight who can't.

TU: I see.

EMB: [0:40:15] At any rate, this is an interesting game, and it was being played by particularly the postdoctoral fellows, the younger people who had come there as part of the entourage of the institute. This was a kind of social activity. I remember one occasion, on which I was [feeling] some trepidation: I sat down to play a French mathematician, whose name as I recall was Claude Chevalley.[21] Dr. Chevalley agreed to play me, and I won. Everybody was absolutely flabbergasted, especially Dr. Chevalley and, above all, me. The reason I won, as they were all quick to point out, was that near the beginning of the game, I had made several moves which were so naive that nobody should have made them. Dr. Chevalley argued that I wouldn't have made such a move, consequently I wouldn't have been in such a position. So, he miscalculated the situation. At any rate, that was another sideline.

At any rate, the other reason for my coming back at that time was that I became aware that, by going to school in England as I had, I had to some extent cut myself off from the American old-boy network, so to speak, which was the way people who were graduate students get into their first job. Generally speaking, I think it's still true that the availability of beginning positions in the academic world after graduate school gets circulated around, and the faculty members recommend the students that they apply here or they apply there, or the jobs are posted on the bulletin board or whatever. But a good deal depends on the inter-referral by peers, the faculty members, and their peers either on other faculties or in industrial laboratories. I was completely out of that network because J. E. Lennard-Jones, although he was well known in this country, didn't have that working relationship with other people. So, one of my purposes of my coming back into Princeton for that semester, that term, in the winter of

[21] Claude Chevalley: https://en.wikipedia.org/wiki/Claude_Chevalley

1939, was to see if I couldn't stake out some plans. I didn't have anybody here, excepting Bill Flexner, who was willing to fend for me. It was as a result of his interventions that I eventually ended up at Cornell with a research assistantship to another very…

TU: How does Princeton fit into this?

EMB: [0:43:27] You have to recognize that while I was in the town of Princeton, New Jersey, and was working in the Fine library, that I had, actually, absolutely no standing. It was simply that permission had been arranged for me to use the Fine Library while I was working on my thesis. I was working, but I had no standing in Princeton at all, except that I had the privilege of using the library. I could sit in there and borrow books. I had absolutely no credentials from Princeton.

TU: How did you come to work…?

EMB: [0:44:12] You know the story about how Princeton deviated from its traditions by awarding an honorary degree to Madame Curie and then there was great dissent about that…

TU: Yes. How did you eventually come to work at the Explosives Research Lab in Bruceton. I'm particularly interested in that and the type of work you were doing there.

EMB: [0:44:34] That was fairly simple and straightforward. When I was at Cornell, I worked as a research assistant for Professor John G. Kirkwood.[22]

TU: Didn't you publish an article with him?[23]

EMB: [0:44:54] Yeah, that's right. I was assigned essentially to work out problems he was working on. In other words, it's like other research assistantships. He's working ahead on something, and then he sees something that ought to be explored, and so he says: "Try to work this through, or find the references, digest the references," or "I think that if we move from this theory to that theory, such will happen and do the details." It was very instructive, but he was fairly typical of a the sometimes stereotype of a

[22] John Gamble Kirkwood: https://en.wikipedia.org/wiki/John_Gamble_Kirkwood

[23] J. G. Kirkwood and E. Monroe, "On the Theory of Fusion," *J. Chem. Phys.* **8**, 845-846 (1940). https://doi.org/10.1063/1.1750591; J. G. Kirkwood and E. Monroe, "Statistical Mechanics of Fusion," *J. Chem. Phys.* **9**, 514 (1941). https://doi.org/10.1063/1.1750949; J. G. Kirkwood and E. M. Boggs, "The Radial Distribution Function in Liquids," *J. Chem. Phys.* **10**, 394 (1942). https://doi.org/10.1063/1.1723737; J. G. Kirkwood and E. M. Boggs, "Note on the Theory of Fusion *J. Chem. Phys.* **10**, 307 (1942). https://doi.org/10.1063/1.1723729

professor who has really exceptional intellectual processes, which he's wrapped up in a lot of the time, and somewhat detached from what some people think of as the real world. I was supposed to have gone there in September of 1939. This all comes back to the question of when did I get my degree. At that time, I was essentially finishing the amount of time that I had planned to spend in England, and I was supposed to return to the United States toward the end of September and go to Cornell. However, I was in England, in Cambridge, when the war actually broke out in Europe and the Germans began moving into Poland and the Russians began moving in the opposite direction. I was writing my thesis with this news coming… Or doing the final corrections on the text, I should say. I had finished writing it, but it was being tightened. So, with the radio blaring out the progress of the sleep…

Part 2 (B-side of Tape 1)

EMB: Let me come back to the outbreak of war in a moment. I think perhaps you deserve a comment or two on the status of women in British Universities at that time.

TU: That would be great.

EMB: [0:00:19] Interestingly enough, the actualities of the position of women in the British universities at that time were entirely satisfactory – that is to say, as a member of Newnham College, which was one of the two women's colleges there… Colleges are used primarily for social purposes; that's where you had your access. The University or the academic part is separate. As a member of Newnham, I could attend any courses and any faculty that I wanted to. I could matriculate in exactly the same way as anyone else would. I had to have a college, but Newnham was the college and it had been around for quite a while. However, the form of your participation was still restricted. For example, I received only the title of the degree. The women faculty members, although they taught in the University, could not belong to the university Senate. Male members of the University who were not senior members, that is they were still in the student stage, had to wear cap and gown when they were outdoors. They're little, short gowns which they had to wear when they were outdoors after dark. The women didn't have to do this. This was a great advantage. The male members of the University were not allowed to practice archery in Petty Cury[24] unless they were suitably attired in Lincoln green.[25] Petty Cury was one of the more crowded spaces. Anyway, I did

[24] Petty Cury: https://en.wikipedia.org/wiki/Petty_Cury
[25] Lincoln green: https://en.wikipedia.org/wiki/Lincoln_green

not feel that I that I encountered discrimination in the academic sense. I was, however, atypical. As I recall, I was the only woman in the group of graduate students—of the group of research students as they're called there—with whom I associated and who [were] in the same faculty that I was. That sort of thing. However, the British tradition of giving able women academic opportunities was well established by the time I got there.

Come the war. The situation was that I completed my thesis and was able to hand it in, but meanwhile the whole country was mobilizing and there was imminent fear of air raid attack almost any night. Nobody was really in a position to bother about whether I got my orals taken or not. Furthermore, the British had been anticipating the possibility of the outbreak of war ever since the so-called Munich agreement, which had been the previous September: the famous trip of Mr. [Nevill] Chamberlain with his umbrella.[26] So, I remember Professor Lennard-Jones asking me—I think it was in June of '39 or so—whether: "In the event of an emergency, would I be interested in staying on?" What he meant by that was that, in the course of my graduate work, I had been using a rather interesting piece of equipment—I'll tell you a little bit about that later—called the differential analyzer. There was one other research student who had been using the same equipment and who understood it. He, it was known, would, in the event of the outbreak of war, immediately be committed to the Air Force[27]. So, LJ—as we called him—wanted to reserve me to operate that machine.

TU: You were the only graduate student then who was…

EMB: [0:04:47] Other than the one who understood it. I would say I understood it because I understood it, but who had practical experience of making it work. Let me say a little bit about the differential analyzer. This particular differential analyzer is what's known as an analog computer. It was designed to solve second-order differential equations. Subsequently, in the immediate post-war era, a considerably more sophisticated version of this differential analyzer was built at Caltech. A couple of years ago, I happened to pick up a little note that said that the Caltech differential analyzer of 1945 had just been given to the Smithsonian,[28] which shows you how far we've come with computers; with digital computation as we

[26] Neville Chamberlain in Munich, September 1938: https://en.wikipedia.org/wiki/Neville_Chamberlain#September_1938:_Munich

[27] Her coworker on the differential analyzer, Maurice Wilkes (1913-2010), was recruited to Telecommunications Research Establishment of the Royal Air Force. See, *e.g.*, Maurice Wilkes: https://en.wikipedia.org/wiki/Maurice_Wilkes

[28] Most probably, UCLA. See, *e.g.*, "Differential Analyzer Parts and Documentation," *Smithsonian* (n.d.) https://www.si.edu/spotlight/mechanical-integrators/differential-analyzers (Consulted June 26, 2023.)

now understand it was simply not feasible, not practical. It was not in use. I would say that nobody was doing it. The whole idea of using binary systems for computation was understood, but the availability of data processing as I understand it…

TU: Would this computer have been valuable to the war effort in any way?

EMB: [0:06:06] Well, it might have been. As it turned out two things happened. One was that LJ was translated [sic] from Cambridge to London and became high muckety-muck in the Ministry of Supply, which was the ministry charged with developing the materiel for the war effort.[29] The second thing was that he had anticipated getting me employed in the backup system. However, we had a problem. You have to remember the United States quickly passed the Neutrality Act—well, you don't remember—which was kind of a declaration that we're not taking sides in this war.

The British were meanwhile being overrun with refugee Poles, people from Poland who came in on Refugee status. Ostensibly, the Poles were allies because they were part of what Britain was out there rescuing. However, there was no real way for them for the British to tell which ones of these immigrants were Russian spies, and which ones were something else. They had no way [to tell] because Poland was overrun. They had absolutely no way of checking up on the credentials of any of these people who came in ostensibly as refugee allies. The result was that they had applications, of course, from these people who wanted to work in the war effort, and more particularly in secret work, which is what I would have gone into. About two months after the war started, the British government just decided that they would have a blanket rule that there would be no aliens in secret work, which I could understand, but it ruled me out almost of any job that I would have been in use to LJ, [it] was out of the question. So, it was at that point that I decided to come home. Meantime, I had essentially resigned from the appointment at Cornell on the grounds that the war superseded.

TU: Was this still in the summer of '39 at this point?

EMB: [0:08:29] Well, I had negotiated with Bill Flexner's help this appointment. I don't remember exactly when it was consummated, but by the summer of '39 I knew I had a job at Cornell beginning in September as a research

[29] See, *e.g.*, J. D. Scott and R. Hughes, *The Administration of War Production*, (London: Longmans, Green and Co., 1955). https://archive.org/details/admin-war-production In particular, "Chapter XIII: Administration of Research, Design, and Development," 270-288.

assistant. But then, when the war broke out and I was asked to stay, which was in the middle of September, I wrote I wasn't going to come after all. I also didn't come home for my brother's wedding,[30] which took place at the end of that month. So, I reneged on those things. So, when I decided I had to come back then I reactivated some of the whole bit, the previous plan. I might tell you that the process of getting back from England to the United States was very exciting. I wrote a long letter about it to my father who was in Cuba at the time. I think I can find a copy of that letter.

TU: I would love to have it.

EMB: [0:09:33] I think I can send a copy of that letter. It might be of interest. He had it typed up. I must've written up… I think he had it typed up, so it's more legible. I won't go into all of the details here, but I wrote immediately to Cornell and Kirkwood said "yes," he'd be glad to have me start at the second semester, which was on the first of February. So, I came up back to United States just before Christmas, and I went to Havana, where my parents were at the time, to spend Christmas. It was just an absolutely changed world. The Cubans had really no sense that there was a war going on anywhere. I came from Europe. Remember there are short days in December here, but Britain is further north, so the days are even shorter there. So, you have the sense of being closed in. We had the blackout curtains up. You had this sense of being confined and having very little light. Suddenly, there I was in Havana, which is brilliant, tropical, warm carefree, what have you. It was the most fantastic contrast.

At any rate, I came back to Cornell in the early part of February, and Professor Kirkwood took me aside and said, very apologetically, that he had reserved an office for me, but when I hadn't arrived in September, he had permitted a graduate student to install himself in my office and there [was] some calculating equipment there. Not computers, just a mechanical calculator that he was using. He, [Fitzhugh Willets Boggs (1911-1971)],[31] was a teaching assistant and a doctoral candidate. He, Kirkwood, was reluctant to dislodge him, so would I mind sharing the office. I said very magnanimously that I had, of course, not minded sharing the office. Then, apparently, he took the student aside and went through some of the same exercise: "You know, this girl is coming from England, but we have to have some place to put here. Would you mind sharing her office?" He said he wouldn't mind, and subsequently his fellow students told him that he

[30] Allyn Adair Monroe (1916-1983) married Dorothy Frances Roberts (1914-1996) in Rye, NY, on September 16, 1939. See, *e.g.*, "Dorothy Roberts Wed to Mr. Monroe In New York Church," *Medford Trail Tribune* (September 24, 1939), 4.

[31] See, *e.g.*, "DR. FITZHUGH BOGGS, ORDNANCE EXPERT, 59," *New York Times* (January 18, 1971), 35. https://www.nytimes.com/1971/01/18/archives/dr-fitzhugh-boggs-i-ordnance-expert-59.html

should have really stood his ground. This was tongue in cheek, but still, that he should have said: "There's a lot I'll put up with, but a woman in my office no." At any rate, we shared an office. That was the winter of 1940, and in September 1941 we were married.[32] So, that was most interesting.

[The] experience at Cornell was interesting too, because there were about 70 or 80 graduate students and although I was not enrolled as a student, I really had the same status because I was a research assistant. But if I recall correctly, I was either the only woman or there was one other. I forget for sure. If there was one other she wasn't in our part of the building, in the entire Baker Laboratory,[33] at the graduate level. The result was that everybody knew who I was right away, and I had to work through the seventy to eighty other males to get them identified and know who they were. That had some further relevance in that Fitzhugh and I kind of felt that as we finally got around to it, and we felt that we had been conducting our courtship rather in public. Thereby hangs an interesting tale, and this is relevant to the status of women and all the rest of it. Come the spring of 1941… I should say that the summer of 1940 I had spent at Cornell, although I wasn't obligated to do so by the terms of my employment. I think regular graduate assistants got 500 dollars a year and I was getting 700 or something like that. I wasn't required to be there during the summer, but I was interested, and it gave me a chance to work out who I liked. Ithaca is a very nice place during the summer there. I did stay there during the summer, and I did work for Kirkwood over that on what we were interested in. He was grateful for that. So, come the following spring—the spring of 1941, by which time Fitzhugh and I were engaged, but we hadn't told anybody—I thought that I really owed it to Kirkwood to probably [tell him] that I wasn't going to hang around during the summer, because if we planned to get married, I knew I better go home and deal with my family. In those days, at least in my family, you observed a certain protocol. We weren't telling anybody we were planning to get married until I had been able to take him home and have him talk with my father. So, after that was accomplished, we could be a little more public. At any rate, we did feel we conducted, as I said, this courtship rather in full view. So, when I went in to see Professor Kirkwood to tell him that I was planning to take this couple month in the summer off, I said to him: "As you probably surmised, Fitzhugh and I are planning to get married." And he said: "You and who?" And I said: "Fitzhugh, Fitzhugh Boggs, who was a student of his. He said:

[32] See, *e.g.*, "ELIZABETH MONROE BRIDE; Wed to Fitzhugh Willets Boggs in Manchester, Vt., Ceremony," *New York Times* (September 21, 1941), 40. https://www.nytimes.com/1941/09/21/archives/elizabeth-monroe-bride-wed-to-fitzhugh-willets-boggs-in-manchester.html

[33] Baker Laboratory (1923-Present) was built in 1921 as one of the first postwar projects on campus. It currently houses classrooms, faculty offices, and research labs. Source: "Department History," *Cornell University* (2023). https://chemistry.cornell.edu/department-history (Consulted October 30, 2023.)

"Oh! Very nice." So, we did get married. We went on occupying the same office and all is well, excepting that 1941-42 was Fitzhugh's final year as a student. Kirkwood was busy doing the usual things of obtaining avenues to him for employment.

The lead he gave to Fitzhugh took him to the Westinghouse research laboratory,[34] which was in East Pittsburgh, Pennsylvania, and which was at that time headed by E. U. Condon,[35] who was also a very famous physicist, and part of the old boy network. So, Fitzhugh obtained a job which was very interesting to him, very suitable for him. I began casting around for employment in the Pittsburgh area. Fitzhugh, in the course of being interviewed by Condon, talked about mining [my own] for employment. Condon said he would try to work out some opportunities for me. The upshot of that was that Condon recommended me to the University of Pittsburgh physics faculty. I went there for a year as a lecturer, which sounds very important, but really is a very lowly job. I can tell you some stories about that. At any rate, I worked at the University of Pittsburgh in the department of physics primarily with pre-medical and pre-dental students who were taking their pre-medical and pre-dental physics. I was not very happy there for a variety of reasons, but perhaps the most important of which is that it was the first encounter I had with a university in which academic standards and integrity were not taken very seriously.

TU: You weren't involved in any research there either, right? You were just lecturing, so that was part of it.

EMB: [0:17:43] No. In the first place, I was a young matron, the war was already under way, Fitzhugh was working six days a week, we had a house to maintain, and, in those days, you had rationing and things of that sort. So, I didn't want really a full-time 48-hour a week job. You have to understand how much more difficult it is to live under wartime conditions to appreciate perhaps the reasons for that. (Particularly [in the context of] today, when both members of a couple are very commonly holding full-time jobs.) A full-time job in those days was a six-day a week job. At any rate, during the war it was. So, I really was content to have a job that didn't take me down there every day, and I didn't attempt to do research. However, I was more interested in doing research, and I was not intentionally unhappy with this proposition. So, some further conversations were held with Condon who knew that the in the process of

[34] See, *e.g.*, "Westinghouse Electric Corporation East Pittsburgh Facility," *Historic Pittsburgh* (n.d.) https://historicpittsburgh.org/islandora/object/pitt:MSP285.B031.F07.I03 (Consulted July 26, 2023.)
[35] Edward U. Condon: https://en.wikipedia.org/wiki/Edward_Condon

the war activity, the Explosives Research Laboratory,[36] which in peacetime was an experiment station operated by the Bureau of Mines and the US Department of the interior was being taken over, that whole unit was being taken over by the Carnegie Institute of Technology, which is now [Carnegie-]Mellon University, and being run by them for the Office of Scientific Research and Development, and that they would be employing additional scientists to work there. He recommended me for that. They hired me—after some concession they made—on a four-day a week basis, even though they were running six days a week too. That was quite a commute. Because Fitzhugh was in East Pittsburgh, we had an apartment in Swissvale, and this was way out the other end of Pittsburgh in a very rural area.

The reason for its location was that when you work with explosives there's always a chance one may go off, so you want to make sure you're not in the middle of a populated area. So, this was a was very much out in the country. It was in a township called Baldwin Township, which was, I think, the largest township in Allegheny County in terms of its area. But [it] was at the time we first moved there populated almost entirely by farmers, except for the part of it that was closest to Pittsburgh. It was just beginning a very rapid ex-urban and subsequently suburban development. Anyway, we subsequently… I think it's incorrect to say that the closest research laboratory was in Baldwin Township. It was in Bruceton, but it was nearby to Baldwin Township, which we subsequently bought a house in, which made it easier for me. Fitzhugh did the driving and I worked there. At any rate, that's how I went to work there.

I was a member of a small group that was headed by a fellow named George Messerly,[37] who now lives very near where I live and has retired.

TU: I'm particularly interested in the type of things you were working on at that time.

EMB: [0:21:35] George Messerly had designed a rather interesting type of camera, the purpose of which was to study explosions, detonation rates and so forth, by photographing a moving trace. When a detonation passes through a solid explosive or even a liquid explosive, the wave produces

[36] R. A. Connor and G. B. Kistiakowsky, "History of Division 8," In: *Chemistry, a history of the chemistry components of the National Defense Research Committee, 1940-1946*, W. A. Noyes Jr., ed. (Boston: Little, Brown and Company, 1948), 15-140.

[37] George Henry Messerly (1911-1981) married Dorothy Louise Pursley (1911-1988) in 1938. In 1938, he also obtained a PhD in Chemistry from Penn State University for a thesis entitled *Thermal and vapor pressure data for tetramethylmethane from 13.220 K to the boiling point: the entropy from the Raman spectrum*, conducted under the supervision of Prof. John G. Aston (1903-1990). Source: *Ancestry.com*

luminescence at the front of the wave, sometimes diffuse sometimes very precise. This camera had a rotating drum and a slip which enabled you to track that moving bang stripe, whatever you want to call it, to track a point on it and create a record on moving film, which if you knew the rate at which the film was moving past the slot, you could calculate the rate at which the detonation was moving in the explosive. That was basically the element behind that. It also permitted for the study of certain other phenomena like the shape of shock waves, where the phenomenon itself produced some sort of luminescence, or could be illuminated, and whereby focusing on just a piece of it, tracing the amount of it that you can see through the slip over time by moving the film passing. We had a variety of things that we could study that way. Every time we wanted to take a picture, it involved setting up the bombproof. This was all done in an underground cavity, where the explosion could take place without damaging anything. You had to mount the film in the camera. You had to set all the parameters. Then you got the film and you had to measure the trace on the film and calculate the rate and so forth. Well, I did some of the theoretical work that attempted to interpret what were the experimental results we were getting.

One of the things we did… Well, when I first went to the Explosives Research Laboratory, there were perhaps a dozen of these individual working groups, who were physically separated from another. We were already engaged in work that's classified as confidential, so we were under instructions… We didn't fraternize as much as we might otherwise, because each group was supposed not to talk about what it was doing to another group that was doing unrelated work. There was an overall director to the laboratory, who was responsible. When we first went there, we were primarily just studying the detonation rates in classical or traditional explosives, which are used not only in bombs but in torpedoes. The question [was]: “How fast does a detonation move from the back of the torpedo to the front of the torpedo?” One of these other things we studied [was] the way in which the casings of torpedoes break. They tend to peel off like banana peels. At any rate, this group was commissioned by the Navy, and the threw away [??] some welding rate. We were working on those things.

Then, there was a stage. I began there in the summer of ‘43 and I left there in the summer of ‘45. About halfway through that time the Manhattan Project was gearing up and the Los Alamos laboratory was busy preparing the first a so-called atom bomb. One of the problems that had to be solved with the development of an atom bomb was that it had to be portable in a safe condition yet capable of being detonated accurately. Now, the whole thing, as you probably know, behind the explosion of a fissionable

mass is that the nature of the fissionable material is such that it will only explode when a critical mass is brought together. A certain minimum amount of it has to be compacted in one place, and at that point it will explode. You can have quite a lot of it around provided you keep the pieces separate. The problem was to bring the critical mass together in a controlled way. That is to say, not inside the airplane that was carrying the bomb, but somewhere outside it at a time that was appropriate to the target. We had developed in the course of the work in our particular group, techniques for shaping detonations. That is to say, in the ordinary course of events you started detonation in an ordinary explosive at one point. You set it off with a detonator and the wave that ensues from that is approximately spherical, like ordinary radiation. We, however, had need to produce as nearly as possible flat detonation waves. Now, we had needed to do that because we could only put a limited weight of explosive into that bombproof with that camera, without blowing up the camera. If we spent a lot of our explosive getting the wave from being a small circle to being a large one so it was nearly flat, so that we can study a flat wave, we would never have gotten to the part we wanted to study. So, we had been busy devising ways to get from a point detonation to a flat wave.

I won't go into all the details about that, except in that we had observed that detonation waves follow somewhat the same rules that light follows, in that you can shape the front by putting it through something like a lens, and lenses depend on the difference in density between the two mediums. If the shape of the interface is not just a straight line or a plane surface, then the way in which the light rays come out as a wavefront out of one medium with one another will be changed. We used the same principle because we had solid castable explosives that were of different detonation rates, so we had been able to do that.

Well, the upshot was that they came to us with a problem. This is one of the interesting problems of security. They didn't really want to tell us what they were going to do with the product they wanted us to design. So, they told us what they wanted us to do. If we had really known what their end product was supposed to be, we would have gotten there faster. What they wanted to do was to cast as a hollow sphere of explosive and coat the interior with the fissionable material and then cause what they called an implosion, that is to say an explosion from the outside going inward toward the center, which would have the effect of collapsing that shell of fissionable material that coated the interior of the hollow sphere of explosive. Are you with me?

TU: I got you.

EMB: [0:30:08] Their idea of how to do that was to take the sphere of cast traditional explosives and attach it to the outside of it a large number of detonators. So, the whole thing would look like a permanent wave machine,[38] if you've ever seen one. In the old days when women had permanent waves, they had lots and lots of little rollers put in their hair with electric wires coming out of them. They were heated.

TU: I know what you're talking about now. I've seen pictures. I thought it was some sophisticated scientific equipment I didn't know anything about.

EMB: [0:30:50] No. Nowadays, you just do it chemically, but in the early days they heated each individual curl. So, when you were having a wave, you were sitting under this thing with the wires going up. Well, it would have looked rather like that. The problem that they presented us with was that in order to have all of those detonators go off at the same time you had to have Primacord,[39] which is a special fusing device. Primacord is a hollow plastic casing about quarter of an inch in diameter, which is filled with solid explosive, powdered explosive which is packed. The detonation rate of Primacord is fairly well known. See, you detonated at one end—it's a fuse—and the explosive inside the Primacord travels at a fairly predictable rate, so that you can calculate how long it's going to take for something to get from one end of the meter-long cord to the other, although you would scarcely see it with your eyes. Their idea was to have lots and lots of trails of Primacord for each of these points and to detonate the Primacord in one central place. They needed to have very reliable Primacord and they wanted us to improve the reliability of the Primacord and study it. We eventually used an entirely different technology, which was to design an explosive lens which was composed of two places of explosive cast together but having different detonation lengths and having a curved interface. The mathematical formula for that curve was such that when you started the detonation right up here, you produced a straight detonation in the initial explosive but that had the effect of setting off a curved detonation in the second explosive, like focusing light. That was eventually what was used. It was designed to produce an implosion -- that is to say: two hemispherical detonation waves, which converged on this sphere and produced the collapse. Now, you asked me a question, which led me to give you that explanation. I don't know what the question was.

TU: I was just asking you what you were working on at that time in general.

[38] See, *e.g.*, Perm: https://en.wikipedia.org/wiki/Perm_%28hairstyle%29
[39] Primacord: https://en.wikipedia.org/wiki/Primacord

EMB: [0:33:37] So, we completed that work… I have to tell you another feminist story. We completed that work sometime in the spring of 1945. It had to go to Los Alamos, and they had to do the things that were necessary to design their…

TU: July 1st you finished, I believe.[40]

EMB: I left the establishment in July, but we finished the work on this particular thing in the spring. Surely, I didn't leave the exact moment when we finished that particular project. We were doing other things concurrently with this particular project. The lab closed at that time. Now, in the meantime, I had become pregnant. I went on working and that was fine. However, there was an interesting episode, because during the winter or spring of '45, the American troops were moving across Europe, and we'd already had the V-E Day, [May 8, 1945]. The Americans were capturing research equipment and research records in German, and they had sent back quite a lot of confidential and secret papers that had been written in the German laboratories. Reports that had been written in the German laboratories. These had been sent to a repository in – I think it was actually in – Washington. At any rate, the management of it was in Washington. They would circulate to various American laboratories that were working on these kinds of things lists of the papers that had been found in the occupation there. We were supposed to be able to request and obtain copies of papers that we thought were immediately relevant to our work. So, I perused the list. We got them every week or something, and I perused these lists.

TU: Had the material been translated into English or was it in German?

EMB: [0:36:13] No, I think it was in German but that wasn't going to bother us. They were supposed to give us a—Xerox wasn't exactly around in those days but—duplicated copy or a microfilm of the material if we wanted it. I looked at this list and I selected three or four papers that I thought we could use. So, a letter went forward from the director of the laboratory requesting these things. We got a letter back, which said that before they went through the expense of their budget—of the agency—duplicating this material they thought that somebody from our laboratory should come at our expense—all on the government, on our budget—to look at the material to see whether we really wanted it and whether it was really worthwhile for them to Xerox it. In other words, we should spend $125

[40] An end date of August 6, 1945, is instead given in official correspondence. See, *e.g.*, "Elizabeth M. Boggs Research Associate," Sent by D. P. MacDougall to E. M. Boggs (September 1, 1945). *Boggs Center archives.*

before they spent $25 to see if it was worthwhile. Dr. MacDougall,[41] the head of the laboratory, wrote back and said that Dr. Boggs was six months pregnant, and her doctor suggested that she not travel unnecessarily. You have to remember wartime travel was a little more difficult, because we didn't have all that flying. But that was also a way of getting by this bureaucracy. So, the next letter came back, addressed to Miss Boggs. Well, anyway. We did, I think, eventually get those papers, but not until I was about to leave. So, I left the laboratory 1st of July. If I recall correctly V-J Day was something like August 6th or 7th.[42] [That was] in itself something of a fantastic experience. Everything closed down. Everything. I was on a fairly restrictive diet. In those days, people who got pregnant were supposed to limit the amount of weight they gain. (That proposition has been considerably modified since then.) I was not supposed to gain more than twenty pounds. My doctor had told me to stop eating sweets and things of that sort. So, I had been on this fairly restricted diet when everything closed down for V-J Day… My husband[, wanting to help], got something. He said: "What do you want" I said: "I want chocolate malted milk." We drove around trying to find a chocolate malted milk, and there was no place open that could provide chocolate malted milk. Everything closed down, except maybe the bars.

I was going to tell you a little story. This is not a feminist story, but it does illustrate the interesting aspects of this whole thing and particularly in view of what people have thought about the war later. Sometimes, when I talk to people of your generation or maybe the people who were students in the '60s, one has to recognize that this war was an entirely different kind of a war. We had an entirely different attitude about it. Compared to the Vietnam era, the whole ambience was entirely different. We had been unfairly attacked. The United States had been unfairly attacked, and we were dealing with situations in Europe that involved the whole concentration camp bit, the extermination of the Jews, and all these sorts of things. Even though some things may have been the subject of propaganda, the whole rationale was entirely different. The sense of

[41] Duncan Peck MacDougall (1909-1990) obtained his PhD in Chemistry from the University of California Berkeley in 1933 for a thesis entitled "The production of temperatures below 1° absolute by means of the demagnetization of $Gd_2(SO_4)_3 \cdot 8H_2O$", under the supervision of William F. Giauque (1895-1982). He was an instructor at Harvard (c. 1934-1937) and at Clark University (1937-c. 1941), before participating in establishing the Explosives Research Laboratory, along with George B. Kistiakowsky (1900-1982) and others. He was married in 1942 with Hildegard Kistiakowsky (1897-1973), née Moebius, Kistiakowsky's first wife, with whom he previously had a son, Peter MacDougall (1937-2021). Sources: *Ancestry.com*; "Peter MacDougall—Providence, Rhode Island—September 22, 1937 - October 27, 2021" *Tribute Archive* (2021). https://www.tributearchive.com/obituaries/22933757/peter-macdougall (Consulted June 27, 2023.); R. Connor et al. *Chemistry, a history of the chemistry components of the National Defense Research Committee, 1940-1946* (Boston: Little, Brown and Company, 1948).

[42] V-J Day was actually on August 15, 1945.

common effort was something that has never been equaled since in this country, the community of responsibility.

At any rate… I've forgotten now exactly when in July the first bomb was thrown[43]… Even though we had been not allowed to know very much about what was going on in Los Alamos—it wasn't even mentioned by name, it was just that place out there—and we didn't know exactly what it was, but definitely some of our senior people went out there. Although we had not been told very much about what it was we were doing, and why we were doing it, we had enough knowledge of it so that when that bomb was dropped, I knew that that had been the target against which we were working. By the target, I mean the accomplishment towards which we were working. I remember my husband coming home and say: "Well, all of us at Westinghouse are glad we had nothing to do with that dastardly thing." So, I had to sit quiet and not say a word. Anyway, so that gets you through that. At that point, then David was born on August 25th.[44] That was the first free Saturday that Fitzhugh had had since, well, 1942. After the war was over, they went back to a five-day week.

In the first place, I don't see how we could have done something different at the time. And in second place, we were dealing with a worldwide war against a totally unscrupulous enemy. I think that you know Einstein, for example, who was an extremely peaceful man, perceived that it was a weird day. In a certain sense, if we had not done it first, we would certainly have been the victims. I think that there are certain moral problems in life for which there's no nice and unambiguous answer. That's one of them.

On August 25th, 1945. As far as we know he [David] was normal at birth, but he had a very severe illness before we left the hospital, which we believe retrospectively was the cause of his mental retardation. However, with the close of the war, Fitzhugh decided to leave Westinghouse. I forgot to mention that all during this period, he and I had been under separate security orders. So, we couldn't talk about our work together. He couldn't talk about his work to me, and I couldn't talk about mine to him, which was an unusual shift from sharing the office and having very common interests. At any rate, he decided that he would leave Westinghouse and look for some other employment. He obtained a job at what was then called the US Rubber [Company] research lab, which at that time [was] in Passaic, New Jersey, and is now called Uniroyal and was moved to Wayne, New Jersey. We were in the course of the year 1945-'46. We were in the process

[43] Trinity Test was on July 16, 1945.
[44] See, *e.g.*, "BOGGS, JONATHAN DAVID," *New York Times* (March 3, 2000), A:19.
https://www.nytimes.com/2000/03/03/classified/paid-notice-deaths-boggs-jonathan-david.html

of moving from Pittsburgh to New Jersey, and we began to realize by the time that David was about eight months old—maybe six or eight months old—we began to have some misgivings about his development, but the whole process was rather gradual, and I described it in a couple of other documents which I could send you. At any rate, finding a house and all that… Housing was very short after the war, so just getting ourselves relocated was a major undertaking. Suffice it to say that by the time he was about two, we were really quite convinced there was something seriously wrong. For that reason, I didn't attempt to go back to work for a while, because it really was not clear how much of my time it was going to take, what the whole situation was. The whole business was… There was so much uncertainty associated with it that it was really very hard to contemplate going back to work full time. So, I postponed applying to the Esso Corporation to crack hydrocarbons or something of that sort, and we got ourselves settled.

Then, in the history of The ARC in New Jersey, which is before the NARC was formed, is that it started as a small very small group of parents in 1947. We essentially got into our house in the winter of 1947.

TU: How did you originally meet these other parents?

EMB: [0:47:01] Well, I'll tell you.

Part 3 (A-side of tape 2)

EMB: We did not become active in New Jersey until 1949. The first parents' group to form in New Jersey was formed in 1947. There is some historical information on that. They got together because one mother who had figured that she had a problem that must be shared by others that she didn't know, wrote a letter to the newspaper, and said:[45] "I'd be interested in hearing from other parents." That way a nucleus of about twelve people was formed. They started up in Bergen County.[46] Then, there were some parents from Essex County and in 1948 they split off and formed the Bergen-Passaic group and an Essex County group. The meetings of the Essex County group were announced in the Newark news, and we read about them, my husband and I, but it happened that they had meetings on Tuesday nights, and I was enrolled in an adult school course of some sort of Tuesday nights, so we didn't to follow up on that until the fall of 1949.

[45] See, *e.g.*, "Archaeology," *The Arc of Bergen & Passaic* (n.d.). https://www.arcbp.com/about_the_arc/leading-the-way-for-70-years/ (Consulted June 28, 2023.)
[46] See, *e.g.*, "History," *The Arc of Bergen & Passaic* (n.d.). https://www.arcbp.com/about_the_arc/mission.html (Consulted June 28, 2023.)

That's when we became active in that group, which was still quite small and had no staff, and was just meeting in church parlors and things of that sort. I meanwhile would become active in the League of Women Voters.[47] I was home a good deal taking care of David, but I had to have something to exercise my mind. I joined the League of Women Voters, which turned out to be very helpful later, because I got to be active on their legislative committee, and I got a clear picture of how the New Jersey state government operates from a legislative point of view. It was during that period also that New Jersey was devising a new constitution for the state,[48] and I was somewhat involved with that. So, I got a very good education as it turned down for what I was going to do later. So, I became active in the Essex unit in '49, and in October of 1950, I began running the school projects. We started two classes for so-called trainable children, children who were excluded from school at the time. In the meantime, I had joined the American Association on Mental Deficiency,[49] which now wouldn't let me in because they have more strict standards – but, at any rate, I just joined it. I went to the meeting of the AAMD that was held in the spring of 1950 in Columbus, Ohio. There were some other parents in attendance from different parts of the country at that meeting, and we decided to form a National Association.[50] There's a fair amount of history that's in the public domain on that subject, so I won't follow it up, but at any rate I decided to go to Minneapolis for this organizing meeting. Then, we're about six or seven other parents from New Jersey, and I was elected to the board of the new organization at that time, in 1950. I served two three-year terms on the board and was then elected third vice president. Then I went up as second vice president and first vice president, and eventually I was elected president. I was president in '59. The first two or three years of NARC depended entirely on volunteer effort. We had a total annual income of about $2000 for the entire organization, nationwide. We had a president in Seattle, a treasurer in New Jersey, a secretary in Brooklyn, and vice presidents spread around Western, Central and Eastern. Just communicating among those people took some doing. We organized committees, we began correspondence.

The most important effort that was done during that era was not done by me. (I was chairman of the education committee. I also worked on the organization of standards committee.) The most important work was done

[47] League of Women Voters: https://en.wikipedia.org/wiki/League_of_Women_Voters
[48] Constitution of New Jersey (1947): https://en.wikipedia.org/wiki/Constitution_of_New_Jersey
[49] Now, the American Association on Intellectual and Developmental Disabilities: https://en.wikipedia.org/wiki/American_Association_on_Intellectual_and_Developmental_Disabilities
[50] See, *e.g.*, "The Power of Parents," *The Arc* (n.d.) http://www.thearc.org/about-us/history/ (Consulted June 28, 2023.)

first by Woodhull Hay,[51] who was subsequently killed in an automobile accident, who was the secretary, and by a gal in California named Beatrice Bemis,[52] who was the membership chairman. Those people conducted a fabulous correspondence with individual parents who wrote in in response to some sort of publicity. There were several articles that were written in national magazines—the *Saturday Evening Post* and whatnot—that called attention to the organization and gave an address, a post office box number. So, desperate parents were writing in from all over the country and basically what was happening was that other parents were responding to these letters saying: "Yes, there are things you can do. Here's how to organize a group etc." So, that went on until 1954, at which point we opened a small office in New York and actually employed staff, but it was very, very hard work on the part of a large number of people. I don't know how much you want me to go in all that.

TU: I'm just trying to get an idea of something behind the scenes.

EMB: [0:05:54] Well, most of the parents who were involved in this… The parents who were involved in that came from all sorts of different backgrounds and experiences. Many of them had had no experience in organizational work. They didn't know how to write a constitution or how to focus a charge for a committee—or something of that sort—or even how to keep the books, let alone how to raise money, or how to run a nominating committee, and any of that stuff. So, those of us who had some organizational skills had an edge up in a certain way. We had a contribution to make to the group. But there was a tremendous drive and a tremendous feeling of need for help, a tremendous feeling that society had neglected the children, and it stigmatized the parents totally unjustifiably. All this was

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[51] See "1947 - 1980 The Parents' Movement," *Parallels in Time: A History of Developmental Disabilities* (Minnesota: The Minnesota Governor's Council on Developmental Disabilities, 2023). https://mn.gov/mnddc/parallels/five/5a/6.html (Consulted October 30, 2023.) See also Larry A. Jones, *Doing Disability Justice* (Lulu Press, 2010): 289 (#98). "Hay, a New Yorker and author-editor of an insurance treatise, was killed in a Chicago traffic accident soon after his election as NARC president and perhaps while on NARC business. At least, a school for children with disabilities in the Shoreline suburb of Seattle was named for him and later the Woodhull Hay chapter of WARC was formed around that school's parents."

[52] Beatrice Bennett (1905-1993) married George Washington Bemis (1905-1994) in 1940. See, *e.g.*, Oscar Hidalgo, "Education pioneer George Bemis dies," *The San Bernardino County Sun* (October 7, 1994), B:4. https://www.newspapers.com/article/the-san-bernardino-county-sun/3729202/ (Consulted January 18, 2024.) On Bemis, see also *The Routledge Companion to Disability and Media*, Katie Ellis, Gerard Goggin, Beth Haller, Rosemary Curtis, eds. (New York: Routledge, 2020): 211. "Created by parents of children with disabilities in 1954, APAE [Association of Parents and Friends of the Exceptionals] was inspired by Beatrice and George W. Bemis, members of the American diplomatic service, who moved to Rio de Janeiro with their daughter Caroline, who had Down syndrome. George Bemis who had served as vice president of the US National Association for Retarded Children (later renamed the Arc), and Beatrice Bemis became actively involved in founding APAE's first school in Brazil."

very much intensified by the fact that during the Depression and the War practically nothing had improved or expanded. In fact, most of the institutions in these public-school programs, which had been quite good in the '20s, had actually gone to rack and ruin, because there had been no construction and no recruitment, and the budgets had been cut back. The overcrowding became unbearable. Many of the institutional problems we have today—the Pennhurst-kind of situation[53]—is partly a result of the fact that those facilities became so overcrowded that no one who was a staff member there could function as a human being. It was a dehumanization of staff as well as the individuals. Then, when they began to get resources back into those facilities, some of them were resilient enough to reorganize themselves. In other cases, they just added the staff, but they didn't change the way they did business. They didn't change the way they deployed the staff or utilized them. I could lecture on that at some length. It's a little like buildings from the Revolutionary era. There's some of them that are worth restoring and shoring up, and you can still use them. And there are others that no amount of shoring up really makes them into good buildings. You would be better to bulldoze them and start again. And it's much the same way with social structures.

TU: Let's move up, then, into the Kennedy era. In one of the articles, you wrote—I believe this one we have right here called "Federal Legislation"[54]—you say, "The Kennedy years had a unique and powerful impact on public interest et cetera", having to with mental retardation. How much of that was due to John Kennedy himself and how much was this just ambience?

EMB: [0:08:51] That's a very interesting thing. I think I'd have to go back and tell you a few facts that were not in that article that explored the situation. We move from 1950 to 1954. We got staff and '54. In '54 to '58, we had a very good friend in the Congress, [as we recounted] there was John Fogarty.[55] We began to have impact on federal legislation. During that period, we had a very active Massachusetts Association, and there was limited knowledge but knowledge in Massachusetts that the Kennedy family had an interest in this area. All sorts of efforts were made to access them through Cardinal Cushing,[56] the archbishop, directly and otherwise. You couldn't get a rise out of it. It was along about the late '50s, I guess—I've forgotten. The

[53] Pennhurst State School and Hospital: https://en.wikipedia.org/wiki/Pennhurst_State_School_and_Hospital

[54] Elizabeth M. Boggs, "Federal Legislation affecting the mentally retarded 1955 -1967 – An Historical Overview," In: *Mental Retardation*, Vol. III, Joseph Wortis, ed. (New York: Grune & Stratton, 1971): 103-127. https://mn.gov/mnddc/parallels2/pdf/70s/71/71-FLA-EMB.pdf (Consulted June 28, 2023.)

[55] John E. Fogarty: https://en.wikipedia.org/wiki/John_E._Fogarty

[56] Richard Cushing: https://en.wikipedia.org/wiki/Richard_Cushing

Kennedy Foundation was established [in 1946] shortly after the war and consisted of Joseph P. Kennedy Jr.'s share of the family fortune.[57] He was, you recall, shot down during the war.[58]

I don't recall exactly at what point they began to make contributions out of the foundation, but they did make contributions to several catholic residential facilities, including the one where Rosemary is in Wisconsin[59]. But there are others that belong and are operated by the same Sisterhood, the same order. So, there were contributions to the one in Hanover, Massachusetts, and the one in Wisconsin, and so forth.[60]

It was in the late '50s that they began to get advice from Dr. Robert E. Cooke,[61] who was a pediatrician. He essentially said to them, in effect: "You can give your entire fortune to these private facilities, you will scarcely notice the difference. You had better begin addressing yourself to basic root causes and in developing research interests in these areas." So, they did begin, about 1958, to give some money to university centers, notably to Hopkins for [cerebral palsy]. That's the origin of the Kennedy Center at Hopkins[62] [undecipherable]**.** But we couldn't get them to in any way open up to the parents' association, to join the [NARC], or to acknowledge the problems they had. You probably want to read Eunice Schriver's article in the Saturday Evening Post which came out in 1962,[63] I guess, which I can probably get a copy of for you, which tells their side of the story. Well, come '59 and so, of course, the decision was made for Kennedy to run for

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[57] Joseph P. Kennedy Jr. Foundation: https://en.wikipedia.org/wiki/Joseph_P._Kennedy_Jr._Foundation

[58] Joseph P. Kennedy, Jr. died when munitions exploded midair while on a mission. See, *e.g.*, R. Connor, "Remembering the Death of Lt. Joe Kennedy Jr. and America's First Combat Drones," *Smithsonian (*August 19, 2014). https://airandspace.si.edu/stories/editorial/remembering-death-lt-joe-kennedy-jr-and-americas-first-combat-drones (Consulted January 17, 2024).

[59] Rosemary Kennedy: https://en.wikipedia.org/wiki/Rosemary_Kennedy. See also, "Rosemary Kennedy", *John F. Kennedy Presidential Library and Museum* (n.d.). https://www.jfklibrary.org/learn/about-jfk/the-kennedy-family/rosemary-kennedy (Consulted October 31, 2023.)

[60] St. Colleta's by the Sea opened in Hanover, Massachusetts, in 1947. "Five sisters from the Sisters of Saint Francis Of Assisi of Milwaukee, Wisconsin, noted for its expertise in working with intellectually disabled children, honor the Cardinal's request to relocate from the Midwest in order to co-found and run St. Coletta's by the Sea, which will be the first school of its kind in the Northeast." Source: "Honoring our bright past; Building a bold future," *Cardinal Cushings Centers* (n.d.). https://cushingcenters.org/about-us/history/ (Consulted January 17, 2024.)

[61] See, *e.g.*, B. Weber, "Robert E. Cooke, Pediatrician Who Helped Create Head Start, Dies at 93," *New York Times* (February 14, 2014), A:29. https://www.nytimes.com/2014/02/11/us/robert-e-cooke-a-creator-of-head-start-dies-at-93.html (Consulted June 28, 2023.)

[62] Kennedy Krieger Institute: https://en.wikipedia.org/wiki/Kennedy_Krieger_Institute See also, "Kennedy Krieger Institute – History," *Kennedy-Krieger Institute* (n.d.). https://www.kennedykrieger.org/about-us/at-a-glance/our-history (Consulted October 31, 2023.)

[63] Eunice Shriver, "Hope for Retarded Children," *Saturday Evening Post* (September 22, 1962), 72-75. See, *e.g.*, https://www.si.edu/object/nmah_1862968 (Consulted June 28, 2023.)

president and a very careful campaign was laid out. It seems to me that in the book called *The Making of [the] President*,[64] which was written by Theodore [White], at some point he mentions that up until a certain point, which was a long about 1962, they had made a strategic decision not to identify the Kennedy family with Rosemary or with the cause of mental retardation, because they thought it would be a political liability. But by 1962, they decided that that was archaic, and that they would do better to go public. But at the time the president's panel was established in '61,[65] there was no acknowledged relationship, personal interest in the matter. I might say, first of all, that during the Kennedy campaign, Kennedy stopped somewhere in Pittsburgh and a retarded child there gave a bird feeder that had been made in a workshop to Kennedy. That was photographed and a copy of that photograph appeared on the front page of *Children Limited*, which was our national magazine, and underneath those little captions it said that President Kennedy has a retarded sister.[66] We had to send out a notice, subsequent to that to all our state and local member units saying that the Kennedy family did not wish that to be given publicity, and not to build on that particular piece of information that had not been approved.

After the election but before the inauguration, Kennedy had a task force which [was] headed by Wilbur Cohen[67], who subsequently became the assistant secretary for legislation during the Kennedy era and after that became Secretary for Health, Education and Welfare in the Johnson administration. Wilbur Cohen headed a task force, of which Robert Cooke was a member, to emphasize and discuss what major thrusts the Kennedy administration would undertake. They did decide to push for the establishment of the National Institute of Child Health and Human Development[68], in which there would be a major emphasis on mental retardation research. That was Cooke's idea and he had to sell it to Cohen. However, it was Eunice Shriver who really was the impetus behind the establishment of the president's panel. If you recall—I remember writing it

[64] The Making of the President: https://en.wikipedia.org/wiki/The_Making_of_the_President_1960 . See also "The Making of the President," *National Book Foundation* (n.d). https://www.nationalbook.org/books/the-making-of-the-president/ (Consulted October 31, 2023.)

[65] "President's Panel on Mental Retardation," *The Minnesota Governor's Council on Developmental Disabilities* (n.d.) https://mn.gov/mnddc/parallels/five/5c/1.html (Consulted June 28, 2023.)

[66] *Children Limited* **9**(6), 1 (December 1960). https://www.jfklibrary.org/asset-viewer/archives/EBPP/002/EBPP-002-009 (Consulted October 31, 2023.) "President-elect John F. Kennedy accepts planter from six-year old [sic] Andrea Sullivan […]. Planter, made in chapter's adult training center, was presented to Kennedy during campaign swing through Pennsylvania. The President-elect has a mentally retarded sister who is in an institution in Wisonsin."

[67] Wilbur J. Cohen: https://en.wikipedia.org/wiki/Wilbur_J._Cohen

[68] Now, Eunice Kennedy Shriver National Institute of Child Health and Human Development: https://en.wikipedia.org/wiki/Eunice_Kennedy_Shriver_National_Institute_of_Child_Health_and_Human_Development

in there—that different Kennedy family members had different assignments. Basically, Eunice took the DMR one. She and her mother were both very interested in Rosemary. Her mother, of course, was devastated by Rosemary's condition and Eunice was near Rosemary. Eunice, however, read the report of the joint commission on mental health, which totally ignored mental retardation. Eunice was offended by that, so she essentially tried to sell the idea that there would be another joint commission on mental retardation. It was out of that that the idea of the panel came out, and it was differently constituted. Dr. Richard Masland,[69] who had previously been employed by NARC in our research enterprise and was at that time the director of the National Institute of Neurological Diseases and Blindness,[70] was very much involved with Bob Cooke in the development of the panel idea and in making nominations for who would participate on the panel. I think my participation was largely the outcome of Doctor Masland's knowing me. At the moment of all this was happening, I was the immediate past president of NARC.

TU: You term was up in 1960?

EMB: [0:16:55] Yes. Fall of 1960. And I had been deeply involved in President Eisenhower's National Committee for the White House Conference on Children[71] which was in 1960. So, I had a certain amount of national visibility. But I had also done a lot of work for the NARC research committee, and I had had contacts with that connection. The upshot of all that was that I was appointed to that panel, which was a quite small group. Cooke was on it; Cooke is also a parent. And there was one other biochemist by the name of Oliver Lowry,[72] as I recall, who was from St. Louis, also in the academic community. Either of those guys could have gotten out on his own steam. They were in fact parents. But I was on because of my work in NARC. I was the only NARC associated type who was on that. We worked very, very hard. But at the time of the announcement of the Kennedy panel, the announcement in the *New York Times* said of the Kennedy family interest, only that Kennedy President Kennedy's sister Rosemary worked as a teacher in a school for the retarded in Wisconsin.[73]

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[69] Richard Masland (1910-2003). See, *e.g.*, I. Oransky, "Richard L Masland," *The Lancet* **363**, P663, (2004). https://doi.org/10.1016/S0140-6736(04)15615-8

[70] Now, National Institute of Neurological Disorders and Stroke: https://en.wikipedia.org/wiki/National_Institute_of_Neurological_Disorders_and_Stroke

[71] White House Conference on Children and Youth: https://en.wikipedia.org/wiki/White_House_Conference_on_Children_and_Youth

[72] Oliver H. Lowry: https://en.wikipedia.org/wiki/Oliver_H._Lowry

[73] "PRESIDENT SPURS RETARDED STUDY," *New York Times* (October 19, 1961), 24. "Much of the Kennedy family's interest stems from the fact that another of the President's sisters, Rosemary, suffered cerebral

That's what it said. I think she had some nominal teacher's aide-type of position. But anyway, that's what it said.

There was one incident that revealed to me how little Eunice Kennedy understood of the dynamics of NARC, which was very definitely a parent organization. I guess it was at the second meeting of the panel. The first meeting was in October. The second meeting was in December of 1961. I think it was a couple of days in Washington. The first meeting we had was in the White House, but then we had subsequent meetings that were at other places, and we were being transported from where we were meeting to the Department of Justice, where we were going to have lunch in the Attorney General's suite. They had recruited a bus to transport the group of us. The way I remember it, both Eunice and I were standing up holding on to a pole in the bus. I don't know why because I'm sure we had seats. Eunice turned to me and knowing—she must have known that I was the immediate past president of NARC—she turned to me and said: "Are you married?" That simple question revealed to me how little she knew about the dynamics of the whole deal. At any rate, she began to discover NARC during those times, because by that time we had a very dynamic executive director, who really went out of his way to do the kinds of things that were useful. Gunnar Dybwad[74] was the executive director. Gunnar was very assiduous about being helpful, offering staff services, turning out our constituency when we had hearings around the country. Eunice began to realize that there was tremendous… I don't recall what our membership was in those days—70,000, 100,000, I don't know—but at any rate we were pretty much all over the map. We were still pulling ourselves up by our bootstraps. Most local associations didn't have much in the way of staff, although the bigger ones did. We were running schools and clinics, and all the rest of it. So, Eunice became aware that there was this force. Now, your question was how much was Kennedy's personal interest and how much was the ambience? Well, the first answer that question is that Kennedy would not have been interested had Eunice not been interested in it and pushed him into it. That's number one. The second thing is that the Kennedy interest could not have had the great impact it did had not that whole decade of groundwork been done. There had already been a great deal of work done at the state legislative level, and as a result of the parents' activities there was a resurgence of interest in education, a demand for fostering the improvement of Institutions and this had led to the development…

palsy in childhood. She is now doing some teaching in an institution in Illinois."
https://timesmachine.nytimes.com/timesmachine/1961/10/19/101479421.html?pageNumber=24
(Consulted October 31, 2023.)

[74] Gunnar Dybwad: https://en.wikipedia.org/wiki/Gunnar_Dybwad

TU: So, to some degree it was a case of being in the right place at the right time.

RMB: [0:21:57] Sure. There had been a reinstatement of the professional community. Students were again being recruited and trained in colleges and universities, and the growth of the Council for Exceptional Children[75] teachers' organization and the American Association on Mental Deficiency[76] had been quite spectacular. The states were making up in terms of construction for what they had missed in the War. I wrote a report, which is called *Decade of Decision*.[77] I guess it's not in this folder.

TU: I don't believe we have that one.

EMB: [0:22:30] I'll try to get that for you. It doesn't have my name on it, but I did in fact write it for the White House Conference in 1960. It intends to say what had happened essentially between 1950 and 1960. So, the Kennedy panel was one of the hardest-working public advisory councils, I think, that's ever been mobilized. We had to work very fast in order to meet the Kennedy legislative schedule, which turned out to be lucky because if we dragged our feet, we wouldn't have made it before he was assassinated. So, his interest tremendously dramatized the cause, made it more respectable, and all that sort of thing. Also, during the period of his administration – unlike the present administration's[78]– he was in a position because of the way he had campaigned, and the mandate he had, and the extent of the rapport between him and Congress, to move on an issue like this as fast as he wanted to, which he did. However, after his assassination, while Johnson followed through for about a year the things that had been started by Kennedy, as soon as the Vietnam War began to produce a budget crunch, the programs that had been initiated in that legislation began to be cut back. You'll find that in the second article. The second article begins with that problem.

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[75] Lynda Van Kuren, "Council for Exceptional Children," *Encyclopedia.com* (n.d.) https://www.encyclopedia.com/education/encyclopedias-almanacs-transcripts-and-maps/council-exceptional-children (Consulted June 28, 2023.)

[76] See, *e.g.*, Rick Heber, *A manual on terminology and classification in mental retardation* (Albany, N.Y.: The American Association on Mental Deficiency, 1959).

[77] *Decade of Decision* (New York: National Association for Retarded Children, Inc., 1959). https://mn.gov/mnddc/parallels2/pdf/50s/59-DOD-NARC.pdf (Consulted June 28, 2023.)

[78] President Jimmy Carter's administration had a notoriously poor relationship with Congress. See, *e.g.*, Steven V. Roberts, "Carter Discord with Congress," *New York Times* (June 5, 1979), A:17. https://www.nytimes.com/1979/06/05/archives/carter-discord-with-congress-president-is-apparently-seeking-to.html (Consulted January 17, 2024.)

TU: You participated in a number of international congresses and this type of things. How would you compare the United States progress in the area of federal programs for mentally retarded versus that of other nations during this time?

EMB: [0:24:20] Well, you have to remember that the United States is a large federation, and that most of the European countries are about the size of states—the larger states in the United States, that they have at the national level much of the responsibility that is carried by state governments in the United States, and [that] they have smaller and more manageable constituencies. One of the important results, one of the important panel activities was its study of European systems. I was a member of one of the four missions that was sent abroad. We spent three weeks just in Holland, visiting facilities. I think that there's an article there that results from that visit with a description of the program in there.[79] That was a very intensive study. We learned more in three weeks than most people would learn in six months, because we had arranged the whole thing so tightly. We had such access. The Dutch government cooperated. There were people from Scandinavia, people in England, people in Russia. The Scandinavian group, in particular, came back with very laudatory remarks about what they saw. So, there was a general feeling generated here that the Europeans were ahead of us, particularly so in Scandinavia, which was a point of view the Scandinavians were very happy to exploit, to repeat. I think that we have always been ahead in our research activities, basic research and particularly the National Institutes of Health approaches in this area, the biomedical research. I think that by and large, we have equal or at least equal and, in most eras, excelled in the area of diagnostic technology. We haven't always had that spread around so that it's available to everybody, but the diagnostic technology that's available in the major medical centers in this country is very [strong], and the whole evaluation process has been good. Our special ed has been up and down over the years, beginning in 1890. We have never, until very recently if indeed we do now, achieved the universality of education that the Dutch have for handicapped children. They're less interested in doing something for the first time, doing something novel, than they are doing something as well as they know how for as many people as possible. The same goes for their sheltered employment. They developed sheltered employment after the War not only for the retarded but for certain other groups of people who were finding it hard to compete. When we visited

[79] W. Wallace Tudor, Elizabeth M. Boggs, Charles B. Brink, John Melcher, F. Ray Power, and Mrs. Sargent Shriver, *Report of the mission to The Netherlands – The President's Panel on Mental Retardation* (Washington: U.S. Department of Health, Education, and Welfare, 1962). https://babel.hathitrust.org/cgi/pt?id=mdp.39015078619122 (Consulted October 31, 2023.)

there in 1962, they were doing more for more people and for more seriously handicapped people than we do even now. The balance has changed somewhat. We've gotten so busy flagellating ourselves for our poor performance that we're now, as I would judge by the Vienna Congress that I went to last October,[80] competing quite well. We still have some bad spots, and they have bad spots they don't talk about. There are some pretty bad places even in Sweden.

TU: In conclusion, there are two areas I want to touch upon, the first of which concerns attitudes toward the mentally retarded. I've noticed that within the last several years there's been a tremendous amount of publicity. As a matter of fact, I've seen posters stating: "My biggest handicap is your attitude." And you've stated yourself in an address to some parents: "The meaning attached to the retarded child is tremendously amplified and modified, again uniquely for each family, for better or for worse, by the attitudes which they feel expressed around them in the days, months, and years during which they were trying to cope with their ever-changing problem." Do you see that as a key problem still?

EMB: [0:28:56] Yes. I see it as a key problem. I also see it as one which has changed enormously in the period in which I've been active. I will send you another article that discusses this to some extent. When Fitzhugh and I became active and when the NARC was first formed, the public attitude towards the mentally retarded was very stigmatized, and it was also stigmatizing toward their families. This was partly the result of a widespread assumption that mental retardation was either inherited or was the result of decadent living patterns: alcoholism, prostitution, etc. This was in turn the result of a distorted representation of the findings of studies such as the Jukes[81] and the Kallikaks,[82] which was completed in about 1914 or thereabout. There was a development of a certain mythology about the mentally retarded, which became exaggerated. The result was that when a parent had a retarded child, a family had a retarded child, they tended to feel that they must have done something wrong. In some cultures, there was even a religious overtone that the sins of the fathers were visited on the children, and this was something God was doing to the family. But even people who didn't have that form of guilt

[80] 7th world congress of the International League of Societies for the Mentally Handicapped on mental handicap, October 1-6, 1978, Vienna, Austria.
[81] Jukes family: https://en.wikipedia.org/wiki/Jukes_family. See, *e.g.*, Arthur H. Estabrook, *The Jukes in 1915* (Washington: Carnegie Institution of Washington, 1916). https://www.disabilitymuseum.org/dhm/lib/detail.html?id=759&page=1 (Consulted October 31, 2023.)
[82] Kallikaks family: https://en.wikipedia.org/wiki/The_Kallikak_Family. See, *e.g.*, Henry Herbert Goddard, *The Kallikak family: a study in the heredity of feeble-mindedness* (New York: The Macmillan company, 1912). https://wellcomecollection.org/works/d7gvpd4f (Consulted October 31, 2023.)

overlay had the feeling that there something far more sinister in their family. It was very important in the early days of NARC that two prominent people came out and wrote their personal histories. One was Pearl Buck, who wrote a story called *The Child Who Never Grew*,[83] who was about her own only natural daughter. She had a number of adopted children, but she had only one child on her own [Caroline Grace Buck (1920-1992)], who had as far as I know phenylketonuria,[84] although it wasn't identifiable until much later because we didn't know phenylketonuria, and it was totally untreated. She is at a training school, [Vineland Training School, Vineland, New Jersey]. She must be 55 or 60 by now.[85] The other person was Dale Evans Rogers,[86] who was the wife of Roy Rogers, the movie cowboy hero. She wrote a book called *Angel Unaware*,[87] which in my personal point of view is a most marvelous book, but it is her story about their only naturally born child [Robin Elizabeth Rogers (1950-1952)] who had Down Syndrome and died at the age of two. She wrote this about 1951 and it was published in [1953]. She made over the royalties to NARC, which is an extremely magnanimous thing because we were a small struggling organization and frankly, we would have had a hard time in making it from 1954 to 1958 without these royalties, which exceeded everybody's expectations. The book was translated into umpteen languages, and it kept on selling. The importance was for the movement and for parents individually was that these here were two prominent families, distinguished families, prominent in the sense that they were well-known, distinguished in the sense that the people who were writing had successes in their chosen fields. And these people had retarded children. So why is it so bad that I have one? I know that Fitzhugh and I, each of us had PhDs, but we would have people say to us: "You? How could that be?" I think that the stigma was much more intense in those days. Now, this isn't to say that families today don't have a tough time. I was talking just yesterday or the day before to a fellow who is a member of the Advisory Council on Social Security, and who is currently working. He has a great-grandson who is six years old and retarded, and whose father is a physician at Mass General [Hospital]. He says his daughter—the mother of this child—still encounters people who avoid the subject or treat her gingerly or whatever. But I know that that's not nearly as intense as it was. The attitudinal frame of reference that we're dealing with today has to do not so much with disgrace, stigma as it has to do with questions about: How much you can expect? How much you should allow? Whether retarded children should have education "wasted on them"?

[83] Pearl S. Buck, *The Child Who Never Grew* (New York: The John Day Company, 1950).
[84] Phenylketonuria: https://en.wikipedia.org/wiki/Phenylketonuria
[85] See, *e.g.*, S. Finger, S. E. Christ, "Pearl S. Buck and phenylketonuria (PKU)," *J. Hist. Neurosci.* **13**, 44-57 (2004) https://doi.org/10.1080/09647040490885484
[86] Dale Evans: https://en.wikipedia.org/wiki/Dale_Evans
[87] Dale Evans Rogers, *Angel Unaware* ([Westwood, N.J.]: Revell, 1953).

Things of that sort. Allocations of resources issues. Things of that sort. We do have still quite a bit of the kind of prejudice which makes people say: "Well, it's fine to have a group home for the mentally retarded but not on my block." Or "If those crazies move in, I won't let my little girl to play in the yard by herself" kinds of things. Those kinds of things we still have. There have been some studies done in connection with the Willowbrook[88] deinstitutionalization in New York of the attitudes of upper middle- and lower-class Whites, Hispanics, and Blacks. There is quite a variation in that.

TU: The final area I want to ask you about is: What do you think can be done on a collegiate level to further the cause of …?

EMB: [0:35:33] I wish you had given me some more time to think about that. There's lots that could be done. Do you mean in the curriculum or by students or what?

TU: By students. Do you think that something should be…

EMB: [0:35:48] For a long time, there was need to clean up the textbooks in sociology and even in psychology. We are still being treated by doctors whose medical books talk about Mongolian idiocy,[89] which implies that the people with Down syndrome are idiots. Only a small proportion of them are idiots in a technical sense, and we are not using that term even in the technical sense. I think that's true. I personally feel that when I was growing up there was a general tendency to shield students at either high school or college students from what was considered to be the seamier side of life.

TU: So, you would favor a mainstream policy…

EMB: [0:36:37] I obviously favor mainstreaming approaches, but also favor exposure of people at the late high school and college age to programs that people who are handicapped—not just those who are retarded but with people with all sorts of handicaps. I do this now not only because I think that we want mainstreaming and integration of the handicapped, but because you cannot tell which member of your generation is going to be a parent of a handicapped child. The shock that my generation encountered was frequently due to the fact that we assumed that it couldn't possibly happen to us.

TU: Okay. On that note, I'll close it off then.

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[88] Willowbrook State School: https://en.wikipedia.org/wiki/Willowbrook_State_School
[89] Mongolian idiocy: https://en.wikipedia.org/wiki/Mongolian_idiocy