

INTERVIEWEES: Drs. Frederick and Mary “Molly” Bernheim  
INTERVIEWER: Dr. James Gifford  
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BERNHEIM INTERVIEW NO. 1

JAMES GIFFORD: Durham, North Carolina, March 7, 1984. This interview presents Drs. Frederick and Mary Bernheim, original members of the Duke University School of Medicine faculty, in the fields of pharmacology and biochemistry, respectively.

*(pause in recording)*

GIFFORD: Perhaps I could ask each of you, in turn, to say a little bit about your personal family backgrounds, and how you came to go to Cambridge to study biochemistry.

F. BERNHEIM: Well, I went to Cambridge because it was a good place to go after I had graduated from Harvard. I didn't know what to do with myself. I knew that. I had a BA, and I had some friends going to Cambridge, so I went with them. When I got to Cambridge, there seemed to be a biochemistry lab there, so I went in and eventually I got a Ph.D. What about you?

M. BERNHEIM: Well, I was born in England and raised mostly in India, because my father was an Anglo-Indian doctor. He was a medical man in the Indian Medical Service, and so he always wanted me to be a doctor or a scientist. And so I got into Cambridge and decided there—I didn't know quite what to do in Cambridge, and I decided that not knowing what to do, I'd just walk around and see what the labs looked like, and there I met up with the biochemistry lab, and there was Frederick, sitting on a bench.

F. BERNHEIM: Don't sit on benches. That's the moral.

M. BERNHEIM: Don't sit on benches.

GIFFORD: Can you say something about the kinds of work that you did while you were doing your doctorates?

F. BERNHEIM: Yeah; well, at that time there was a great deal of confusion about how specific enzymes were and how they acted, and I took some yeast, I took some liver, and I did various extractions and got some specific enzymes out of these, and it was the first demonstration that these particular enzymes were specific things. That was my main—I did a few other things, too, but that was my main activity. And you?

M. BERNHEIM: Well, I worked with Frederick. He suggested things very often, and I took one of these enzymes from the liver and was very lucky, because it did—do you want any technical stuff? It was the enzyme which takes tyramine and takes the nitrogen group off the tyramine and makes it innocuous. So this happens in the liver. You eat tyramine, and if you don't eat it, you get it made in the intestines sometimes, and then the blood goes through the liver, and the enzyme in the liver detoxifies the tyramine. And this is known now as the monoaminoxidase, and it has quite a powerful effect on the brain.

F. BERNHEIM: Not the enzyme.

M. BERNHEIM: No, the tyramine does, and the tyramine oxidase is a preventative of this. And then, oh, we worked together on—

F. BERNHEIM: Well, I mean your enzyme does also—oxidizes adrenaline.

M. BERNHEIM: Yeah. Yeah. It oxidizes anything with a monoamine on it—monoamine on it. And that's what I wrote a paper on, and I got a Ph.D. from that. And then we came over to Hopkins.

F. BERNHEIM: We went to Germany.

M. BERNHEIM: We went to Germany for a year, first. I didn't get into that.

GIFFORD: What happened in Germany?

F. BERNHEIM: Well, we drank beer.

GIFFORD: (*laughs*)

F. BERNHEIM: Nothing very much. It was just playing around in an unsupervised way, and we didn't get anything publishable out of that work, but it was good fun. I mean, climbing the mountains and general messing around. So it was wasted as far as science goes, but it had a good psychological effect.

M. BERNHEIM: It was just before Hitler really got established. It was—

F. BERNHEIM: It was 1929.

M. BERNHEIM: Underground talks of Hitler and beer parlors and his talking there, you know, and shouting. But we were lucky to get there before anything serious was happening.

GIFFORD: So you left Munich and went to Hopkins. How did you decide to go there?

F. BERNHEIM: Well—

M. BERNHEIM: We both—I had a scholarship from Cambridge from Newnham College, and they gave me permission to use it at Hopkins, so I did.

F. BERNHEIM: I applied for a National Research Council fellowship, and also for a Yale University fellowship. The National Research Council fellowship came first, and I accepted it, and a week later the Sterling Fellowship was given to me, and if it had been reversed, I'd never have been down here.

GIFFORD: What kinds of work did you do at Hopkins?

F. BERNHEIM: Well, mostly I did some plumbing and electrical and wiring, because I went there to work with a man called Clark who was the biochemist there, and he was interested in oxidation-reduction potentials, and he was just then moving into a new building, and he had his

students do the—literally, the plumbing and wiring to get his apparatus set up so that it would work eventually. But we didn't get much chance to work it that year. And interestingly enough, while Mary was in Abel's department, who was a pharmacologist, so when we were at Hopkins I was a biochemist, she was a pharmacologist—then when Duke opened, when George Eadie offered me a job here, again in Physiology and Pharmacology—no, I mean the first time in Physiology and Pharmacology, and then Perlzweig offered a job in Biochemistry, so you see what the switch was.

GIFFORD: Was there a good deal of excitement among people at Hopkins when so many came to Duke?

F. BERNHEIM: Yeah, I think there was a feeling of—Davison, of course, was a pretty strong character. I guess he—I don't know. I think that the whole faculty fitted into one room. We all knew each other.

M. BERNHEIM: Well, there was quite a to-do when we came down here, because there were not houses for us, and we were very fortunate. We grabbed onto the first house we could find, which was newly built and wasn't too bad, and so we started sort of helping out the other people. I remember George Eadie didn't have a house, and so he came temporarily and ate his meals, sort of. I don't think we had enough chairs, and it was all very difficult until they started building, and then that year there was a great deal of new building around Durham and Hope Valley and around in Rockwood, and things got sort of—you could find places to live. And we built a house then, which we still live in.

GIFFORD: Now, you were recruited by Dr. Eadie. Can you say something about him and why you came and what his interests were?

F. BERNHEIM: Well, he also was a sort of biochemist-physiologist. His interests were sort of

in kidney function, and also he was interested in enzyme kinetics. He was a very good mathematician, and he applied mathematics to various biological systems.

M. BERNHEIM: And glycolysis. He did a good deal of that.

F. BERNHEIM: Yeah. So I didn't do very much work with him. I sometimes supplied him with data with which he could try to formulate in a mathematical form.

M. BERNHEIM: He has a formula named after him—Eadie—I don't remember the fellow. He didn't know anything about the fellow whose name went along with it. You remember that?

F. BERNHEIM: It's a modification on (*unintelligible*).

M. BERNHEIM: Yes. Yes.

F. BERNHEIM: I think it's getting too hot in here. Turn it up.

GIFFORD: Now, when you came, you had been working in Biochemistry, and you were asked to teach, essentially, pharmacology.

F. BERNHEIM: Um-hum.

GIFFORD: Can you tell me a little bit about how you went setting up that course?

F. BERNHEIM: Hit and miss. Well, first of all, we got McNider—up from Chapel Hill. The one pharmacologist who was known outside the state was McNider, and he was a fairly ancient character at that time, and neither Eadie nor I, and there were two other people we had temporarily, knew any pharmacology. So what we did was to ask McNider to come over and give the lectures in pharmacology. He lectured in a very curious way. He wanted the students to take literal notes. He would make a statement, and then he'd wait and repeat it. If a student did not have a pencil and wasn't writing, he would give the student a pencil. So the students got literal notes from his lectures, which of course they Xeroxed. I don't know what they did then—the equivalent of that in 1930—and sold the notes, and the students then sat in his lectures with

the notes—Xeroxed notes in front of them.

M. BERNHEIM: From the previous lecture you mean?

F. BERNHEIM: No, of all the previous lectures, you see, and just held the pencil there and did this to fool McNider. That was a good game, and we enjoyed it for a couple of years, and then we decided we had to do it ourselves. So that's the way it worked. But he was a curious character.

GIFFORD: Now, when you first came here, you were working on histamine and atropine, and the reaction between them?

F. BERNHEIM: I did some, yeah. That was on the intestine. But I soon—after doing several years of work on the intestine—the effect of drugs on the intestine, I decided to change and really tried to integrate pharmacology and biochemistry. In other words, a biochemical approach to pharmacology, which was not available at that time. Practically nobody did it. They would inject, and they'd measure blood pressure, and urine flow, and reflexes. That was the pharmacological approach. That is, the physiologists would describe the normal behavior of the heart, lungs, or any organ. The pharmacologist then would take the animal, inject it with drugs, and see how normal behavior was modified by the drug, you see. Because they didn't tear anything apart and extract enzymes, or anything like that, or measure enzymes. And because I had a biochemical background, I thought this would be a fruitful thing to do.

M. BERNHEIM: And it was. You published a monograph on it, which lasted for a long time.

F. BERNHEIM: Yeah.

GIFFORD: Now, what were you doing in these first years?

M. BERNHEIM: Oh, mainly teaching medical students. I've enjoyed teaching very much, and there again, like Frederick, I had no experience with teaching. I didn't know, really, what was

happening, and the students and I learned together. They were hardly older than I was—hardly younger than I was, and Eleanor Easley, for instance, was a member of the first class. And we did a lot of experiments that are not done nowadays, because the medical students don't have time, and we had an awfully good time. We enjoyed each other, the teaching. I enjoyed the students, and we enjoyed Dr. Perlzweig. And I don't think I did very much research in those days. I just felt really more interested in the teaching business. I did some abstracting for chemical abstracts.

GIFFORD: Can you tell me a little bit about Dr. Perlzweig, since he was the one who recruited you here?

M. BERNHEIM: Well, he was a Russian, and he had a very volatile Russian temperament. One minute he would be very pleasant, and the next minute he would be absolutely furious, and five minutes later, he would be just as sweet as he could be. You never knew quite what he was going to do, which added to the spice of life considerably. He, again, didn't know—or he had some ideas about teaching, of course—but we modified our ideas as things went along, very much. He was not ready to take one's point of view until he had thought it out for several days, and then he was ready. He took a long time over it. And he got very angry with the students, very angry with me, sometimes. But then, on the other hand, in two minutes everything was just as sweet as it could be. And he did a lot of good work.

GIFFORD: Can you say something about the students in those days, what it was like to teach?

M. BERNHEIM: I don't know, really, because I had very little basis for comparison. They were always pleasant, and they didn't know awfully much. They were medical students. It's hard to tell, really, how they compared. This was before the war, and after the war when they came back, when medical students, having had a long interval during the war, when they came back, they

had forgotten a great deal and were much harder to teach, really. But the first early ones, I think, were mostly very good. They knew as much as we did.

GIFFORD: And in what classrooms—did you have them in laboratories for significant periods of time?

M. BERNHEIM: Oh, yes. Whole days, days, and days, and days. Every day, as far as I remember. Three days a week, or something. Do you remember? We had them a long time.

F. BERNHEIM: Three days a week, I think. The whole term.

M. BERNHEIM: I would work all through these hot afternoons. There was no air conditioning, and each one had a little open dish of his own twenty-four hour urine, and they were all boiling these down, like everything. That lab was pretty awful. But we managed it. And they learned a lot of stuff from that, and nowadays they don't have any practical work, and they don't know any details of that at all.

GIFFORD: Toward the end of the thirties, you became involved in working on TB, as I remember.

F. BERNHEIM: Yeah.

GIFFORD: Can you say a little bit about that?

F. BERNHEIM: Well, the idea was that the war was coming, and usually the aftermath of war is tuberculosis epidemic. And the sulfa drug seemed to work for a number of infections, and (*unintelligible*) started in '35. So I thought the thing to do was to study the tubercle bacillus, and see what affected it in terms of its metabolism. And I found that one of the things was salicylic acid, which greatly disturbed the metabolism of the tubercle bacillus. And I published a note about that in *Science*, and it was the last *Science* that got to Europe because of the war.

M. BERNHEIM: Is that so? I didn't know that.



F. BERNHEIM: And it got to Sweden, where a very good friend of mine saw it, and he decided that a good drug would be a salicylic acid derivative. I also tried a number of salicylic acid derivatives, but his was the right derivative. Mine were not too toxic. And this derivative was known as paramina salicylic acid.

GIFFORD: This was Professor Layman?

F. BERNHEIM: Yeah, yeah. And it's not used very much now, but for a time it was very useful because it provided a development of resistance in the tubercle bacillus, which is streptomycin, which was then in the drug of value.

GIFFORD: Before we leave this early period, each of you has talked a bit about the research that you were doing. I have the impression that in these years, the 1930s, there wasn't much money around to support research.

F. BERNHEIM: No.

GIFFORD: Is that right? And can you say how your research was conducted in the absence of what we, today, would know as the granting system, and so forth?

M. BERNHEIM: No grants.

F. BERNHEIM: No grants, but each department, or in our department, had a certain sum for research that came in the departmental budget.

M. BERNHEIM: Yeah.

F. BERNHEIM: And then you sat around and tried to persuade the chairman to give you a little money.

M. BERNHEIM: Not to give you money, but to give you a piece of apparatus. Or to allow you to order something.

F. BERNHEIM: Yeah, that's what I mean.

M. BERNHEIM: Yeah.

F. BERNHEIM: You said you needed this, and you got it. I mean, it was very cheap then. I think the most we ever got a year was \$300.

GIFFORD: For the department?

F. BERNHEIM: I'm not sure, but I think the department got a little more, because I think I got, at the end, I got \$300.

M. BERNHEIM: The first year we were here I shared a salary with Susan Smith, David Smith's wife. And the total sum for both of us was \$1,500, so we each got \$750 for the year.

GIFFORD: I perhaps should have asked you this before, but, of course, being in biochemistry, you would have worked with Dr. D. T. Smith.

M. BERNHEIM: No.

GIFFORD: No.

M. BERNHEIM: He was in Bacteriology.

GIFFORD: Bacteriology, okay.

M. BERNHEIM: So I didn't work with him. Susan did, actually, that first year. She did teach biochemistry, but she wasn't too enthusiastic about it. I think she only taught for one year, and she was, of course, passionate about vitamins. That was her field.

GIFFORD: Okay. Can you describe what happened at Duke with the onset of the war, how it affected the School of Medicine, and the hospital, and your own work?

F. BERNHEIM: Not really. The impact was in the clinical side where a number of the doctors formed—I think it was a Duke unit wasn't it?

M. BERNHEIM: Yeah.

F. BERNHEIM: So that their lives were affected by the war. Ours were only affected in the

sense that we taught more than we had.

M. BERNHEIM: Taught more.

GIFFORD: The accelerated scheduling?

MW: Yeah.

M. BERNHEIM: And that in the hot summer. It was very hot.

F. BERNHEIM: I was too old to be drafted, and I didn't feel like volunteering, and so we stayed here and taught.

GIFFORD: What was the climate in the medical school? I have the impression somehow that being involved in the war was something that was much more favorably looked upon in those days than it is now.

M. BERNHEIM: Yeah. It was rather.

F. BERNHEIM: I don't know. I don't think many of the preclinical people left. Certainly not Perlzweig, Eadie, McCrea, Taylor, me.

M. BERNHEIM: Well, they wanted doctors so badly.

F. BERNHEIM: They wanted doctors. We had no—

M. BERNHEIM: We felt we were doing our part by teaching.

F. BERNHEIM: We had no function in the Duke Unit, the Duke Clinical Unit. If we wanted to volunteer, we didn't know whether they would use us as just ordinary soldiers or experts in certain fields. It didn't seem at all necessary to fight that war.

M. BERNHEIM: Life was complicated in our household, because we had two refugee English students who came over. We had a daughter of our own, and then these two: a boy and a girl, who went over on that ship just after the Athena was sunk and the children were drowned, and these were on the next boat. They got over safely, and they lived with us for five years, and they

were darling children. But that complicated life for me a little, because here I was, teaching all day, and going home to three children, suddenly, instead of one.

GIFFORD: Were the students at that time generally enthusiastic about America's participation in the war? Did you have any sense of that?

F. BERNHEIM: No, no; we had English doctors over here. There was a program in which third-year English medical training was done in this country, and so there were a number of English doctors here. That is, a number of English medical students took a year of training in this country. I don't know how many came to Duke, but certainly some did.

M. BERNHEIM: One thing I'm pretty sure of, and that is that there was not, during or after that war, there was not the feeling that there was during the Vietnam War, at all. It was much more a feeling that we had to fight. It was the only thing to do.

F. BERNHEIM: Yeah.

M. BERNHEIM: And very little criticism of the fact that America went into the war. Is that right? Is that how you remember it?

F. BERNHEIM: Yeah. I think people who were against it were known as the isolationists, and they were usually fascist-minded, and they were the only people who—

M. BERNHEIM: I don't remember among our friends any criticism of the war.

F. BERNHEIM: No.

M. BERNHEIM: It just had to be done.

F. BERNHEIM: Yeah.

GIFFORD: Okay. When the war ended, the accelerated schedule stopped, but a lot of people came back.

M. BERNHEIM: Yeah.

GIFFORD: Can you say anything about what happened during those years?

M. BERNHEIM: Well, from the teaching point of view, it was very difficult, because they had been away, maybe they'd never been into college or maybe they'd been six and seven years back, and they were very hard to teach, because they'd forgotten how to learn, really. They'd been just out of it for so long. I would say that those kids were quite hard to teach, but they were always very nice about it. The GIs, as we called them, were difficult.

GIFFORD: How did you cope with that?

M. BERNHEIM: Just taking individuals as much as I could, and coaching them, and just generally trying to show them how to learn again, trying to do that, which I enjoyed. That was when a few of the black people began to come in, just very few here and there, and they needed help, too.

F. BERNHEIM: Well, that was after the war sometime in the late forties. Shannon started the whole NIH program and the grants—began giving grants, and this was a wonderful period, because people came down from his office and said, How much money do you want, and will you take it for five years?

M. BERNHEIM: *(laughs)*

F. BERNHEIM: You see, apparently he persuaded Congress to give him a certain big sum of money, and he had to get rid of it by giving people grants. So there was no question of writing out an elaborate schedule of what you were going to do—

M. BERNHEIM: Proposal.

F. BERNHEIM: Proposal, and nothing, no red tape at all. You got the money. You didn't have to make any report, and it came in regularly, and you could support graduate students with it. You could do anything you want, and it was absolutely—

M. BERNHEIM: Those were the days.

F. BERNHEIM: It was halcyon days. I guess it lasted as long as Shannon did. I don't remember when he resigned, due to age. And then, of course, the bureaucrats got busy, and the paper multiplied, and now, you know, a man spends at least a quarter of his time writing proposals and reports. So I got out of that after finishing—after this ended, after the early easy things had ended, I managed to have, during that period, accumulated apparatus and most of the chemicals I wanted. So I could get to do what I wanted on a very small amount, which I could get from sources other than NIH.

GIFFORD: After the war, I know you did the TB work just before the war. Could you sort of go through your research development from when you stopped the TB work, which would have been somewhere in 1940 or so, and sort of give me an idea of how your research activity developed from that point?

F. BERNHEIM: Well, we went along with finding out how (*unintelligible*) metabolized, using animals, and so on. And when the funds didn't dry up, but when it became more difficult to get funds, I decided that I'd stick to bacteria, because bacteria don't cost what a rat costs. You grow your bacteria for a year on the price of a dozen rats. So, in other words, I cut down the cost of my research by working with bacteria. And I worked in various aspects of bacteria. One was in the swelling and shrinking of bacterial cells, and what affected that, what affected specially the membrane of the cell: the (*unintelligible*) membrane. And this has been rather amusing to me, anyway. And that's what I'm doing now.

GIFFORD: And what directions did your work take?

M. BERNHEIM: Well, I worked with Whittard for quite a long time. We were doing enzymes connected with the metabolism of the amino acids, and we published a number of papers

together. And then gradually when Frederick decided to do the bacterial work, I—for some time I was busy with teaching, and I didn't do very much research. And then I began to think that really, nutrition was the thing that was really interesting. I think possibly Susan Smith started me thinking about vitamins. I didn't do any experiments in nutrition, but I did study it, and can give, and still do teach a few medical students who get very little nutrition in their schedule. They don't have time for it. I quote "time." So they come out at the end of the three or four years knowing fantastically little about what is happening. For instance, my approach is like this: "You've just done pediatrics haven't you?" And they will say, "Yes." And I'll say, "What do you feed your babies?" "Formula." "What's in the formula?" "We don't know." And that is the standard, standard approach. And so I decided that for the rest of my life I would do all I possibly could to teach medical students something about the ordinary, practical end of nutrition. What's in milk, how to go to the grocery store and buy a good diet cheaply. I remember one of the experiments we used to do with the students. We would send them to the supermarket and say, "Buy a diet for a family," we would specify what sort of family, "as cheaply as you can for a week's good nutrition." And they would have an awfully good time doing this, and I think it was a very valuable exercise. Many of them have come back to me later and said, "That's the one thing that I remember, is that experiment." And so I try to get my students now to do that same thing, but in price, of course, it's quite different. You can't do what you used to do. But that's what I like to do best, is see what's happening in nutrition, because it's never dull. It's always changing. People know so little about it, even now.

GIFFORD: From the point of view of biochemistry/pharmacology, other than yourselves, who do you think at Duke has made the major contributions to the development of that field over the course of the years you've been here?

M. BERNHEIM: At Duke.

F. BERNHEIM: Well, I mean now—

M. BERNHEIM: David Smith, of course, did an enormous lot in bacteria, in TB, and vitamins. He was interested, too, in nutrition. Who would you say?

F. BERNHEIM: Nowadays, I mean, in the last few years, the techniques that have evolved for a very much better assessment of how to grow exact and isolating receptors, and [Robert] Lefkowitz here has done some of that. There are others who have (*unintelligible*) too. But as far as pharmacology goes, I should think that that is a present interest of molecular pharmacologists, is to isolate and characterize receptors which react with the drugs that you inject, and that this is the main emphasis, I think, just as when I started the main emphasis was the interaction of drugs and enzymes. Now it's the interaction of drugs and receptors of membranes.

M. BERNHEIM: I would think that the most lasting contribution in the biochemistry department, certainly, has been L.U. Fridovich and his superoxide dismutate. You've come across that, of course, and that is, I think, getting to be more important. This superoxide stuff is terribly poisonous, and ways of getting rid of it are very, very important to the body. It may be the reason why we grow old. I don't know. Nobody's sure yet. But it's of very great importance, and I think that some things were known long ago, the breakdown of hydrogen peroxide for instance, and he got the stuff one stage before that. And many, many vitamins and all sorts of things are concerned with their ability to act on the dismutate, on the toxic products and get rid of them. I think this is tremendously important. Have you come across that at all?

GIFFORD: I know the name. I haven't yet interviewed him.

M. BERNHEIM: I think he's very important.

GIFFORD: Perhaps we could circle back for a little while and pick out personalities and events



and just get you to comment on them a little bit. You mentioned that Dr. Davison was a strong character. What can you tell me about Dr. Davison?

F. BERNHEIM: Well, what I meant was that when they started the university council—academic council, I got on it. I was on the first council, and when I met Davison he said, “I know you’re on the first council.” And I said, “Yes. I feel pretty good about it.” Well, he said, “I arranged that you would be on.” You see what I mean. He had his fingers in all the pies. I think he did a very good job in starting the medical school. When he got to the point where he couldn’t take the government financing—In fact, Social Security, he delayed our entrance into the Social Security program.

M. BERNHEIM: TIAA.

F. BERNHEIM: What? Was it TIAA?

M. BERNHEIM: Yeah.

F. BERNHEIM: Yeah, I guess. Social Security was automatic. But he wouldn’t—he discouraged—I don’t know, our entrance in the TIAA-CREF program for several years because he didn’t think—I don’t know what he thought.

M. BERNHEIM: He thought it might be an approach to—.

F. BERNHEIM: Socialized.

M. BERNHEIM: Socialized medicine. He was dead-set against that. He was very prejudiced in many ways, but did a very good job, I think. It was said—we don’t have certain knowledge, that he built his house in Hope Valley with the bricks from an old, torn-down church. He was inclined to be quite parsimonious. But he was a good fellow. I thought he did a good job.

GIFFORD: Now, in the development of the basic sciences at Duke, the growth of the basic sciences at Duke, who played the major role?

M. BERNHEIM: In the basic sciences?

F. BERNHEIM: Oh, I don't know. I don't know, really. You mean who was the outstanding person?

GIFFORD: Well, I'm not sure what the scale would be for outstanding, but I'm sure that there must have been players in the game who were seminal to the development of the basic sciences here.

M. BERNHEIM: Well, Joe Beard published a great deal. I don't know much about what he published really, but he was—.

F. BERNHEIM: Yeah, on viruses.

M. BERNHEIM: He did do a lot. Yes, on viruses. He certainly worked on them.

F. BERNHEIM: I don't think there was anybody who—or a group of people who said we represent the basic sciences, we're going to order the way the departments are run, and we're going to tell people how to teach. There were no tsars on that. Davison, I mean, to his credit, didn't interfere with our teaching methods, and he never came around and checked to see what we were teaching, so I can't answer the question.

GIFFORD: Okay.

M. BERNHEIM: On the other hand there was a (*unintelligible*) round of arguments about what sort of schedule the medical students should have, and every year they argued about it, and after a few years they went back to exactly what they had tried before and found it was a failure, so they tried it again, and this went on, and it's still going on.

GIFFORD: Yes, I wanted to get to that and to ask about the evolution of the curriculum.

M. BERNHEIM: (*laughs*)

GIFFORD: And so any development eventually of the so-called new curriculum. Perhaps it

would be a good time for me to stop this for a minute and let us all get our breaths and turn the tape over, and we can go from there.

*(End of Tape 1, side a; side b begins)*

GIFFORD: You were saying before I turned the tape that there were, over the years, continuing arguments about the curriculum, about the structure of learning that the medical students would have. Could you say something more about that, as it evolved?

M. BERNHEIM: Well, it definitely involved the cutting out of anything that they thought was not essential to the medical students' knowledge, and this was mainly, they thought that the amount of knowledge that they got from a day spent in the lab was not as effective as a day spent listening to lectures. So they got more and more lectures and less and less lab work, so much so that sometimes, nowadays, they have up to seven lectures a day and almost no lab, if anything. They go through medicine without any time in their medical career handling a biochemical pipette. I think, myself, I think that their emphasis is not very good, because I think that they learn a lot more detail--used to learn a lot more detail in biochemistry. They used to learn a lot more practical work in biochemistry, which was very useful. They now learn a lot of theoretical material concerning the structure of enzymes and things, which they never remember and don't use as doctors. So I think that they're not heading in the right direction, but I think they'll realize that sometime soon.

F. BERNHEIM: Well, the—.

M. BERNHEIM: Frederick and I have a big argument about this.

F. BERNHEIM: The byword here was that we trained academic physicians. That Duke was oriented so that a great proportion, or a large proportion of the graduates would go into academic medicine, in other words medical research.

GIFFORD: When did that become the byword? Was that true from the very beginning, or—?

M. BERNHEIM: Yeah.

F. BERNHEIM: Yeah, that was the general thought. And I mean if we do badly on national boards, of course, we don't teach that student how to pass national boards. We teach him how to do medical research. But when you analyze the figures, the group there, there are not very many Duke graduates in academic residencies any more than there are from Harvard, or Yale, or any other school. There's always a certain percentage that do go in, and Duke's percentage is no better than any other percentage. So this was not—I haven't heard this saying in some time now. I mean, this--whatever you want to call it—cliché—so it's difficult to know how to present in a uniform way, the material. And I don't think it should be presented in a uniform way. I think each person who is teaching should try to do the best to communicate what he wants to communicate. And to say that there should be so many lectures and so much lab work, or that they should include this and exclude that, has a fiat from above, is ridiculous. If the lecturer is any good, he's spontaneous. I mean, in a way, he has to be.

M. BERNHEIM: Of course, the one thing that I suppose people all recognize is that the amount of material—the amount of biochemical knowledge has increased vastly. It's getting more and more all the time, and so you've got to pick and choose. In the old days we knew very, very little, and you could get most of it into the student's heads in a few months, but nowadays it's a different matter.

GIFFORD: When did graduate students in the basic sciences first begin to appear in numbers at Duke?

M. BERNHEIM: We used to have them in biochemistry. We had half a dozen or so back in the old days.

F. BERNHEIM: Yeah.

GIFFORD: Pre-war?

F. BERNHEIM: Yeah, pre-war.

M. BERNHEIM: Yeah, I think so.

F. BERNHEIM: I had a couple pre-war.

M. BERNHEIM: And then I don't know. When we moved over here, we lost track of graduate students--numbers of them, rather soon. I'm more interested in medical students than I am in graduate students, really.

F. BERNHEIM: Well, I usually have one or two a year. The last one I had graduated three or four years ago. That's enough. I don't want to do any more.

GIFFORD: Do you have any feeling that the funding of larger programs for graduate students in the basic sciences influenced medical school teaching?

M. BERNHEIM: Not in my department. Medical school teaching is down at the bottom of the totem pole in the present biochemistry department, and the graduate students are aware of that. I don't know why this is, but that's the way it is. It's considered an unattractive thing to lecture to medical students. Is that so in pharmacology, would you say, too? I don't know.

F. BERNHEIM: I don't think so. I think they rather like the idea. They teach graduate courses, of course, too.

M. BERNHEIM: Yeah.

F. BERNHEIM: I've had no complaints though. I haven't heard any complaints about it, oh, hell, we've got to teach medical students now. It's (*unintelligible*).

GIFFORD: Well, I know you have to leave fairly soon, so let me put as a question to conclude this interview, from the point of view of your experience at Duke, are there things that in your

minds ought to be remembered as important to the history of the medical school and hospital, and particularly the basic sciences, things that any account of what went on at Duke ought to include?

F. BERNHEIM: Anything dramatic?

GIFFORD: Well, no, not necessarily. Just what you consider to be important.

M. BERNHEIM: I would say the characters of Dr. Eadie and Dr. Perlzweig, and their completely different relationship. The way they tackled problems was very, very different, and they're both, in their own ways, extraordinarily fine people, but they were so totally different that somebody should write an account of the two of them. Have you been reading Olga Perlzweig's articles? Hers don't give you a very vivid impression.

GIFFORD: No. No. Can you articulate the difference between the two men for us?

M. BERNHEIM: Well, Eadie was very controlled. I never saw him in a temper. Did you ever?

F. BERNHEIM: *(No audible response)*

M. BERNHEIM: I've heard him make very cutting remarks, and he could say things that hurt badly, but he never would let you know that he was out of control. Now, Perlzweig would get, with Perlzweig we would go creeping up the stairs and stick our head into his office in the morning and say to the secretary, *(M. Bernheim whispers)* "How is he today? Is he all right?" And then the secretary would respond, and then things would be all right for a time, but then he would fly into this furious temper and bawl out everybody who was around.

F. BERNHEIM: I don't know what effect that has on the rest of the medical school.

M. BERNHEIM: I don't know.

F. BERNHEIM: I think of the medical education more or less Handler and Stead, I think, are the two outstanding people who affected the medical education.

M. BERNHEIM: What did Handler—did he do anything very dramatic? He was a very marked personality.

F. BERNHEIM: Well, he had a lot to with the increased building program.

M. BERNHEIM: Yeah.

F. BERNHEIM: And various curricula. And he was also responsible for this new curriculum, which is a terrible one, and which we're still suffering from, whatever you call it. I mean, it makes a medical student almost a wreck the first year with the tremendous number of—

M. BERNHEIM: Seven lectures a day.

F. BERNHEIM: Yeah. A lot of them supposedly have to go to psychiatrists to get straightened out after the first year in medicine. Then once they're through that, they feel so good that they think it's—because the rest is a much less crowded curriculum. After the first year it's less crowded. In fact, I think maybe it's a good idea to really get all that stuff over with. What they look upon, what they get the first year is just something they have to get through, because it's all the pre-clinical stuff. They do it in one year. To get through that. They're never going to see it again, and to hell with it. They're going to enjoy now the practice of medicine by studying pathology and going on rounds, and that's what they do. And some of them, they say, All right. I know it's hell the first year. The first year is hell here. I'm glad to get it over with so I can go the (*unintelligible*). But that's not, I think, a criterion for a good curriculum.

GIFFORD: Well, I thank you very much for the opportunity to have you speak. What will happen here, is that the interview will be transcribed and that will take a little time, but once it is transcribed I'll see that you get a copy of it to go back over, and see that it's been typed accurately and see if there are any things that you want to add or change.

M. BERNHEIM: It's not going to be published as such, I hope?

GIFFORD: No. What will happen is that the typescript will be in the Medical Center Archives for research purposes, but it's not going to be published as such.

M. BERNHEIM: Oh. And you will—what's the situation with the history? How are you coming?

GIFFORD: I'm working on two things at the same time. I don't need to record this part I guess.

*(End of Tape 1, side b)*

*(end of interview)*