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ROBERT SINGLETON
(with ALBERT TUCKER)

This is an interview of Robert Singleton at the Cromwell Inn on 6 June 1984. The interviewer is Albert Tucker.

Tucker: I would like to talk to you, Bob, about your recollections of Fine Hall. When was it you arrived at Princeton as a graduate student?

Singleton: In September 1935.

Tucker: How did you decide to come to Princeton?

Singleton: The previous year I was at Brown, getting a master's degree. I decided then that my interests were in geometry, and people there recommended Princeton.

Tucker: Anybody in particular?

Singleton: I can't remember.

Tucker: So you came to Princeton. Did you study geometry?

Singleton: Yes, I took [Luther P.] Eisenhart's Riemannian-geometry course the first year.

Tucker: What did you think of Eisenhart?

Singleton: Well, he wasn't the man for a young fellow like me who needs things explained. The course was formal, and formalistic. I had no difficulty getting the techniques of the Riemannian geometry, but there were no examples, so that a Riemannian space was purely a set of symbols on a piece of paper.

Tucker: What other courses did you take?

Singleton: [J.H.M.] Wedderburn's course on matrices.

Tucker: Did you take a course from H.F. Bohnenblust?

Singleton: I never took a course from Bohnenblust. I was sorry not to, but I wasn't that interested in the sort of things he did.

Tucker: A course from S.S. Wilks?

Singleton: No. I sat in on his statistics course one year, not that first year, but later. I don't know, I obviously took one more course that first year.

Tucker: Take a course from [Solomon] Lefschetz?

Singleton: No.

Tucker: T.Y. Thomas?

Singleton: No, but I had what amounted to a tutorial with him in projective differential-geometry. That also was later. That must have been in '38-'39.

Tucker: Did you have a course with someone from the Institute? Marston Morse?

Singleton: No, but one of the semesters I took Einstein's course in the mathematics of relativity.

Tucker: Now that is interesting. I had forgotten that Einstein ever taught a course.

Singleton: Yes, this was a course in the mathematics department, primarily for mathematicians.

Tucker: I know that he had given seminars.

Singleton: And it was very clear. He was an excellent expositor.

Tucker: Didn't he have difficulty with English?

Singleton: I knew a lot of German then, so it didn't bother me. And he was very good about it. He spoke clearly, and when he got hung up on a word he didn't know, he would smile at the class and say "please" and somebody would supply the translation. That is, he would give the German word and someone would give the English word. That went very smoothly. I enjoyed that course. I didn't enjoy the other two. Wedderburn at that time was, I guess, ill, and his book had not been published yet, but he ...

Tucker: Would dictate the book on the blackboard.

Singleton: Exactly. He would come in. I guess he would look at us, but then he would turn around, face the blackboard, and then mumble, writing all the time, never looking at us.

Tucker: If anybody asked a question?

Singleton: He answered with almost the same words he had used the first time. He didn't say it quite verbatim, but it did no good.

Tucker: And if anybody pushed him on it, all he would do was go back and do it again, just the way he had done it the first time.

Tucker: Do you remember any of your fellow graduate students?

Singleton: Some of them. Bill Randels, Israel Halperin, and Norman Steenrod were older than I. Tony Morse came a little later than I did. Alex Mood, of course.

Tucker: Did you ever have anything to do with the logicians?

Singleton: That must have been the other course I took the first year. I took Church's logic course. There Church was a clear lecturer. He didn't provide little examples either. In fact, almost nobody did in the place. The little examples, which I think are so illuminating, I found myself in reading, but nevertheless it was pretty clear what Church was doing. I enjoyed the course because then I saw what people did in formal logic and knew I did not have to worry about it anymore. Some years later I bought his book; I hadn't before. I bought it for nostalgia, I guess, more than anything else. I tried to dig through it. I found that the introduction explained things. I found that excellent. I now know what he tried to do: to say what 'true' means. Of course one has the intuitive feeling of truth, but one doesn't in a formal definition. Church explained it well. So I like his books. I got Wedderburn's book eventually. While I could follow it--by that time I knew the theory of matrices by an entirely different approach--it didn't appeal to me. I preferred Eisenhart's book, which I referred to quite a few times. Not so much for the Riemannian geometry as for the mechanics that he explains very well. When I adopted, for other work, the index notation and the summation selection and so on, I used the parts of the book dealing with mechanics quite a bit.

Tucker: Do you remember anything of social activities with other graduate students?

Singleton: We didn't have a social life.

Tucker: Did you live at the Graduate College?

Singleton: No, I didn't. I lived in a room in town.

Tucker: That was very common at that time during the Depression, because it was less expensive to live that way than at the Graduate College.

Singleton: And that year, my first year, the other graduate student in the house was American and a graduate of Dartmouth, Class of 1935, I believe. His subject was humanistic—perhaps French or English. We were not close, just lived in the same house, but both of us were usually out. I saw a lot of Israel Halperin for some reason.

Tucker: He was in Princeton about ten days ago, and I interviewed him. Of course, all he would really talk about was John von Neumann. Von Neumann was everything to Israel Halperin, and Halperin did his thesis with von Neumann.

Singleton: The reason I remember Israel and the reason for our contact is that often we were both studying late in the evening in Fine Hall and we both liked to go for walks at night. Many are the times we walked down to Lawrenceville and back, talking all the time about most anything, primarily for the walk. I enjoyed it.

Tucker: Since he came from Toronto, I had met him before he came to Princeton. The fact that I had gone to Princeton made him think of Princeton as the place to come and of me as an informal advisor after he arrived. But he was completely immersed in his contact with von Neumann, which I am glad to have gotten on the record. I wasn't able to get much else from him, but you said that you did your studying in the library mainly.

Singleton: Both in my room and in the library. It depended on what I wanted to do.

Tucker: But you found the library a good working place?

Singleton: Yes, a very good working place, an excellent resource.

Tucker: I felt in my days there, the common room and the library were the focal points.

Singleton: I agree.

Tucker: And one seemed to learn more from fellow students than from the faculty.

Singleton: Yes.

Tucker: For a time you were thinking of doing a thesis in statistics, weren't you?

Singleton: That was later, after I had been working for Merrill Flood for a year or so. I thought about it after I was exposed to Wilks's course; I talked to Wilks about it, but I didn't have enough background just from that.

Tucker: Did you know Joe Daly?

Singleton: No, I didn't.

Tucker: I think Joe Daly was actually the first Ph.D. that Wilks had. After that, he had Alex Mood. Then there was a whole stream of them in the late '40s. That was a remarkable collection of students that he had. You never really got involved?

Singleton: Not really. I talked to Sam Wilks a couple of times, but, no, I never embarked on it.

Alex Mood was a close friend of mine. When I returned to Princeton for the 1937-38 year we lived across the hall from each other in a house on Bank Street. He could play the violin beautifully, and did. I could play, but not like Alex, so I didn't. He would play and I would love it. We remained friendly for several years after we had married (Harriet Mood, Helen Singleton).

Quite a few years later when Alex's book came out I bought it. That book, plus Sam Wilks's notes, really got me started in statistics.

Tucker: Are there any other things that you can add about the people or the atmosphere of the building?

Singleton: The atmosphere of the building was good. It seemed cold when you walked into the halls there, but it really wasn't, not in the common room or in the library. Of course, I enjoyed my first year. I was earning my tuition by assisting you in putting out notes, by mimeographing. That was fine. Yes, it must have been then, in spring, that you got me assisting in your course, an undergraduate course on the group structure of elementary geometry. I enjoyed that a great deal. You also had me give a lecture in that course. I don't remember whether you were really going away or you did it to provide me with an opportunity, but I liked lecturing. I found I could do it well, and I enjoyed it.

Tucker: That was a favorite course of mine.

Singleton: That was a good course. It taught me things too, putting a structure into things I already knew. Up until graduate school my intellectual progress had been guided. I was the kind of guy who was quite willing to be guided as long as what I was learning appealed to me. In that first year of graduate school I started to get some intellectual independence. The lack of guidance made me uncomfortable. I gained some independence by Eisenhart's lack of small examples, but I also got some other things out of it. I began to think of mathematical philosophy, with a mathematical formulation of course, the Descartes sort of thing. I tried to study that, but of course, I never got any startling results. I did get some knowledge of what it was all about, and I saw that not everything is analytic and hence Descartes' idea that the present gives you the whole future doesn't really work.

Tucker: So your first year there turned you into more of an independent mind.

Singleton: Yes, it did. In the spring, my father was willing to continue supporting me in graduate school; business was beginning to pick up, and he was making money again. But I decided that I had had enough of being supported. I wanted to start out for myself, which is why I left Princeton and then was so glad to come back a year later. The math community did it for me really. It was all the people there, though I'm not able to specify how, who did that.

Tucker: It was the intellectual atmosphere that opened things up.

Singleton: Yes, very much so.