Atle Selberg -- June 15, 1989.

[This interview was conducted in Professor Selberg's office in Fuld Hall, at the Institute for Advanced Study.]

Devine   This is Betsy Devine, and I'm going to be interviewing Atle Selberg for the second time. This is side one, tape one, June 15, 1989.

So we were deep in the 1940's, heading on toward the Fields Medal when we stopped.

Selberg   Oh, I see.

Devine   You pointed out that if I read Harald Bohr's speech, I could find out why you won it.

Selberg   Well, I think that probably tells it reasonably well. And then, of course, there was the fact that as you saw, there were two Scandinavians on the committee.

Devine   But four or five non-Scandinavians!

Selberg   So I had two votes there, of course, and that undoubtedly is part of the explanation.

Devine   Well, I think it's especially quite an honor to win it after fourteen years of no Fields Medal. They had quite a field to pick from!

But I also wanted to hear more about your first years at the Institute, and your impression of the place when you and Hedi first came here.

Selberg   I must say, it was a very great change for me,

environmentally. Because I was used to being rather in isolation. I was not used to talking about my work. Essentially, my mathematical contact was reading periodicals and browsing in libraries. I didn't have any personal contacts, really, because the mathematicians in Norway, the older ones that I had contact with, all had other interests. I was not particularly interested in what they were doing; they were not particularly interested, I would think, in what I was doing.

Devine   Veblen felt it was very, very important for mathematicians to have contacts with other mathematicians.

Selberg   I think it probably is important. I think it does help a number of people. It may be that if I had started off more in that kind of thing, I would possibly have developed in a different way. I might have been more dependent on communication, and perhaps also more communicative!

Devine   I see!

Selberg   And, who knows -- I might have done better. It's quite possible. It's rather idle to speculate on these things.

I think, though, that there are probably different kinds of personalities. It's also quite possible that my personality may be more suited to work in isolation. But I think for most people that the contacts are very important.

And I must say it was also quite something for me to see several names that I knew from books, but had not really thought of as real persons -- like Hermann Weyl. Carl Ludwig Siegel I had seen before, as I mentioned. I had seen him in 1940, in Norway.

But the other people here I had not seen. I could have, if I had tried to in the summer of 1936, when there was this international congress

in Oslo. And I did go to some of the lectures, but I didn't really go and see any of these people. Although I know, for instance, Siegel and Weyl both gave lectures, I didn't go to their lectures. I did not go to the lecture given by Hecke, which turned out to be the one that interested me most when I finally saw the report of the congress.

I went only to listen to some of the things that I thought -- the title intrigued me in one way or another, not necessarily the right choices. I think what impressed me most at the time was a lecture given by Polya, which I went to and which I found very entertaining. Also, actually, it contained very interesting results.

I also listened to Mordell give a talk on some problems in number theory. Otherwise, I mostly went to the number theory section, to some of the things there. And most of that was not really that interesting, I thought.

Devine   I see. So, when you came here -- could you tell me a little bit about Hermann Weyl?

Selberg   Hermann Weyl? It was a bit slow, to get contact with him, I would say. It is possible that his wife already then -- in less than a year, she died of cancer. I talked with him, but mostly in the Institute.

I would say, that first year, of the professors it was Veblen and Siegel that I mostly talked with. Von Neumann, very little -- and some of the others, not at all.

Devine   Veblen is one of the people that I'm the most interested in. [Line 100, side 1 copytape.] So, you had mentioned, or maybe it was your wife who said it, the other day at lunch, that you thought that, especially because you were Norwegian --

Selberg   Yes, I think that may have been the reason, partly, in Veblen's case. Veblen came from a Norwegian family. Actually, Veblen's father was born in Norway, but came to the United States as a little boy and grew up in Minnesota. The younger brother of Veblen's father, the more famous Veblen -- Thorstein Veblen -- was born in the United States, after the parents had come.

Oswald Veblen did not know any Norwegian. His father, and I assume also Thorstein, had deliberately broken away from it, because they grew up in a place where the Lutheran Church tried to keep the young people from learning English, and so from getting into the larger society and so forth. So they broke away and went to study at Carleton College.

Consequently, Veblen's father did not speak Norwegian at home, ever, to any part of his family, and he did not try to teach his children anything about their Norwegian background and relatives, and so on. There was a complete break. According to Veblen, only later in life did his father get interested again in his Norwegian background. But it was too late, of course, for his children, for Oswald Veblen in particular, to really benefit from this.

But he did learn about where his family came from in Norway, and where he had relatives. And later he actually did visit these places. I don't know that he was able to communicate much with them, though, because at that time, this must have been some time relatively early in this century, the instruction in English was not that universal in the schools as it is now. You had to take some what you would call higher education, really, before you started learning foreign languages. Whereas now English is taught already in elementary schools, in the later years. And of course today, they get English via television and all kinds of other things besides.

English is now very universal in Norway, but it was not at that time.

> *Devine*   I see.

> *Selberg*   I assume that when he visited this farm in Valdres

that the family came from, there was probably no one there that spoke

English.

> *Devine*   So, this visit took place before you met him.

> *Selberg*   Oh, yes. But there may have been someone around

that could act as an interpreter. Because at that stage, he had made contact

with Norwegian mathematicians, who of course did know English. So he

may have had someone with him that could act as an interpreter.

Otherwise, I don't see what he would do then, because he had not learned

any Norwegian.

But he had an interest in Norway, and he had learned about his

Norwegian background. This probably made him feel some affinity. At

least, he was extremely friendly, to both myself and to Hedi.

> *Devine*   Tell me more about their house. They were still

living at 58 Battle Road?

> *Selberg*   No, they had moved out, to this other place

[Herrontown Road], where now the arboretum is that they donated to the

county. So we have only visited them there. But he told us about the

house a lot, particularly when I came back as a permanent fixture here and

we began thinking about getting a house. He very strongly advocated that

we should buy that house [from the Institute].

Veblen told me of the wall that had been built by himself and

Birkhoff, the stone wall. It's a very impressive stone wall. Actually, it was

even more impressive in those days, because the gate -- if you go past

there, they have widened the gate, essentially by taking away the

gateposts, which were also of stone. It looked more decorative. Now the wall just sort of ends on both sides of a rather wide space. Presumably it was built originally at a time when they didn't have that much car traffic, and most of the cars were probably small ones, narrower than they were for a time. Now they are a bit narrower again, I think. [Line 200, side 1 copytape.]

So the gate was widened by just taking the gateposts off and finishing the walls off abruptly on each side. It looked nicer the way it was before, but I can understand it was impractical. There was also a gate attached to these posts that had to be opened to drive through. Now there is nothing, which I think is probably more convenient for people today.

Devine   Did you ever go out cutting wood with Veblen?

Selberg   Yes. It used to be on Wednesdays, in the afternoon. A group of people would go down. Essentially they would be mathematicians, and occasionally physicists mixed in. I know that Pauli was along on some occasions -- he was not reputed to be very skillful!

Devine   I see!

Selberg   Actually, some considered him outright dangerous.

Devine   Well, I hope he had a saw rather than an ax.

Selberg   But another physicist was Res Jost, perhaps you know him.

Devine   I don't know him, actually.

Selberg   From the E. T. H. in Zurich, also Swiss. He is retired. He is probably about my age. There is a book that lists --

Devine   Yes, A Community of Scholars. [This lists all I. A. S. members from 1930 to 1980.]

Selberg   You will find him there with some relevant

information. But it will not tell who was --

Devine It won't tell if he cut wood?

Selberg No. I remember, though. He was a rather big and burly fellow. He was quite good at it. Some people had, of course, some experience in handling tools before although most of them did not.

Of other temporary members who took part in that, I should mention Raoul Bott. He's at Harvard now.

Devine Yes, he was telling me about it as well -- that's what made me think of it.

Selberg Bott took part. He's a fairly big strong fellow, so he did rather well.

Devine He's looking very well. He was here just about three weeks before you came back.

Selberg Well, he looked a bit different in those days. He didn't have a gray beard that, as you know, he now has.

Devine Yes, but it's a handsome beard. I think it's a Hilbert beard. [The mathematician David Hilbert had a well-kept looking beard.]

Selberg It's a bit more than Hilbert had, actually. And of course, Bott's face is rather different from Hilbert's, I think.

Devine Yes.

Selberg I don't think that Hilbert was particularly handsome. I would say Bott definitely has it over Hilbert when it comes to the exterior.

Devine And perhaps is a better woodcutter as well, who knows?

Selberg Yes, I don't know how Hilbert would have done.

Siegel, of course, was very active in this. Veblen at that time already was the oldest. He did not really take part so much -- he would come along to take part in the conversation, and not be very active with either the ax or the saw.

Devine   What sort of things did he say? Did he talk about the trees, or about mathematics?

Selberg   Often the talk was about mathematics. It was not restricted to talk about the best way of trimming a tree or things like that. I mean, that is not a subject that you can occupy yourself with for such a very long time. Because the rules are not really that many, and the things that have to be learned have to be learned, really, by doing them rather than by talking about them.

Devine   What sort of things -- you said that Veblen was friendly to you -- what did he do?

Selberg   They invited us home for tea. [Line 300, side 1 copytape.] Veblen's wife was English, and she was very particular about her tea. I believe she was rather well-off, independently. When they married, I assume that people thought that Veblen made a good catch, as one says. I think he probably had nothing, essentially. He was still a fairly junior person at Princeton, and she came from a rather well-off British family. Actually, there are several physicists in her family, even two with the Nobel Prize in physics.

Devine   Owen Richardson, I think, was her brother?

Selberg   Yes, and there was another one. [Elizabeth Veblen's sister Charlotte was married to Nobel Laureate C. J. Davisson.]

          And among other things, she had lots of shares in some tea company.

Devine   You're kidding!

Selberg   And got some very special tea that was given only to the stockholders --

Devine   I see.

Selberg   -- and was very particular about her tea, which was very good, by the way. So, we had tea there a number of times. They did not, at that time, engage much in other forms of entertainment. I don't think they gave dinner parties. They probably did so in earlier years. They may possibly also have given cocktail parties, which they certainly did not do in later years.

Devine   I think they left the cocktail parties to von Neumann and Alexander.

Selberg   Well, actually, Hermann Weyl gave cocktail parties, later. And probably also before, by the way. After his wife was dead, and he remarried, then he gave some cocktail parties up at the house. I assume that he had a somewhat similar social life in earlier years with his first wife.

Devine   Who lives now in Weyl's old house?

Selberg   I thought it was Constable. Let's see, what is the address that he is listed under? 284 Mercer Street -- it is a Mercer Street house, but I don't know the numbers well enough to know.

The first one who had it after the Weyls was, I believe, Frank Yang, the physicist. And Marshall Rosenbluth had it at one time.

Devine   Did you design your own house, the house you live in?

Selberg   We had it built. We had an architect. We had some input, but I would say that the layout was probably more the

architect's. My wife probably had a little input, but I did not. I made a sketch for the fireplace in the living room for the architect. He modified it a bit, although he kept some essential elements. I think architects are artists, and will try to satisfy themselves.

Devine   Yes.

Selberg   Probably not bad, unless they completely disregard the needs of the people who are going to live there. That can occasionally happen. [Line 420, side 1 copytape.] I don't think it happened in our case. I think we have been rather satisfied with it, and I think in retrospect that modifications were made in the design that I made, that probably do fit better with the rest of the house.

Devine   Did Veblen ever talk with you about the early days of the Institute? About his ideas of what the Institute should be like?

Selberg   We talked from time to time about this. Sometimes about things that maybe one shouldn't put into the historical record, but ones that had to do with the history of the Institute. I think that some of them were rather characteristic of Veblen.

Veblen was politically very shrewd. I remember he told me, in the early days, when the Institute started, he wanted to have one man more from the university with him. Actually, the two people in the math department at that time that would have been the best choices would be Lefschetz or Alexander. It seems clear to me that Veblen probably felt that Lefschetz was the more difficult personality, so that he really wanted Alexander.

He did not say so. What he did was that he presented it to the trustees that these men were rather evenly matched, and that he would leave it to the trustees to make the choice.

Devine   I see.

Selberg   His reasoning, as he explained to me, was the following: the board of trustees, at that time, was rather rather heavily Jewish. Lefschetz was Jewish.

Devine   Mm hmm.

Selberg   Alexander was not. And Veblen felt sure they would pick Alexander!

Devine   My gosh!

Selberg   That is how he explained it to me. Whether it was the best choice is hard to know. It's true that Lefschetz was a difficult personality, -- that, everyone agrees on. On the other hand, he was a more active person. It was very good for the university to have retained him, of course, because he helped the university very much. He was a very strong chairman. So it that sense, it was probably better for the university that he remained there rather than Alexander.

Alexander, on the other hand, -- after a while, he sort of lost interest in mathematics. You see, Alexander was independently wealthy. His income from a professorship at the Institute was insignificant compared to -- whatever. That can be rather dangerous. [Line 518, end of side 1 copytape. Beginning of side 2 copytape.]

Devine   So his income at the Institute was insignificant --

Selberg   I think, in comparison to what he had inherited from his father. I think that can be dangerous, because he did see the freedom to sort of retire completely from work. The incentive of having to make a living often keeps people working in periods when they otherwise might not. And I think everybody may have periods when his interest at least slackens, for a long period or so.

Also, it contributed in Alexander's case that he had some people at the Institute with whom he had a close personal relationship. But Veblen retired, and Siegel left the Institute. Hermann Weyl also retired, and I think when all this happened, that really brought Alexander to the point that he felt -- so he gave up his professorship.

Devine   Mm hmm.

Selberg   And stayed on nominally as a permanent member, but didn't really come around. Except occasionally, he came to visit Veblen, who has still living. But Veblen was greatly handicapped -- he was essentially blind. He could only read by holding very big lenses, because his central vision was rather ruined by, as I understand it, some disease whereby scar tissue was formed on the retina.

He had some vision. He could recognize shapes. He might recognize a person, say, walking down the corridor, but not by recognizing the face, but rather by recognizing how his whole body moved. And he couldn't read, really, except by using very extraordinary measures.

As I say, Alexander came to visit him occasionally then, and was, to some extent also helpful in some ways, in helping him to obtain certain types of equipment -- big magnifiers, and things that would enable him to extend what little vision he had a bit more.

But basically, Veblen was reduced at that time to having someone to read to him, when he wanted to know what was in print. He couldn't really do anything himself any more that way.

I spoke with Alexander in those times. It seemed rather pitiful, in a way. What he told me was that he essentially was experimenting with various types of high fidelity, or stereo, equipment, and listening to music. This was in the early days, right at the beginning of stereo, certainly. It

seemed to me rather a sad way of spending one's time!

It's fine to do this for some recreation, but to have that as your main occupation -- I don't think he was very happy with what he was doing after his retirement from the Institute, but somehow he didn't have any incentive to snap back into work. I think if he had not had this great private income, he would probably have stayed on, at least gone through the routine duties of administration, reading applications, and so on. And eventually he probably would again have become interested in something.

Devine   That may well be true.

Selberg   I do believe Alexander is a rather sad case, in a way. He was only in his fifties, I believe, when he withdrew from the Institute.

Devine   Well, according to Professor Tucker, in his later years he began to be very nervous about crowds.

Selberg   I think that may be aggravated when you start withdrawing from things. If you all the time have to go out and see people, and so forth, then these things may not develop so much.

Devine   I guess that by the time you came -- was he not doing very much? He was a topologist --

Selberg   Yes. Well, when I came, he was still here. During my first year, I had no contact with him. I saw him later, around 1950, in the early years after I had come back as a permanent member. There was a time when we had de Rham here. [The topologist Georges de Rham was a member of the Institute in the spring of 1950, and again in the academic year 1957-8.] There was a seminar on things that -- that was the last time I saw Alexander really being interested in something in mathematics. He came to this; he had occasionally even some comments.

It was a seminar on de Rham-Hodge theory, something that I don't really know that much about. [Line 100, copytape side 2.] I knew a little bit at that time, but what I knew I have forgotten.

Devine   I see!

Selberg   Because I didn't further engage in that sort of thing myself. I did go, at least so that I had little inkling of what it was about at that time. And I do remember that Alexander was there, but that was the last flicker of interest in mathematics, as far as I know, on his part.

It was a somewhat sad case, I think.

Devine   Well, certainly Hermann Weyl, as he was growing older --

Selberg   Oh, yes.

Devine   -- got a lot of satisfaction in working with the younger people, and giving seminars.

Selberg   Oh, yes. And Siegel kept working well into his eighties, after he had returned to Göttingen. I think that the normal thing is to keep on working unless you have some disease that impairs your ability to. That can of course happen. Not to speak of Alzheimer's.

Devine   Yes.

Selberg   I don't know any mathematicians who have Alzheimer's. I know of some who have Parkinson's disease. Szegö, at Stanford, had Parkinson's for quite a number of years, and would probably have been quite active, if that had not happened.

Devine   After you came to the Institute, you did some work here on automorphic forms, and I think Harish-Chandra also did some.

Selberg   Yes.

Devine   Did you work together?

Selberg   No, we did not work together. Actually, we came to these things from quite different sides. Harish-Chandra thought about the physics, and became interested in group theory and representation theory originally by working with the Lorenz group in physics.

With me it was quite different. I had been interested in -- not automorphic forms and functions in general, but modular forms. At the quite early stage, that interest was really awakened partly by Ramanujan and partly by Hecke. I would say, mainly by his lecture which I did <u>not</u> go and listen to in '36.

Devine   I see!

Selberg   But I started to do some work, and did work mainly on such subjects until I switched over to the Riemann zeta-function in '41 or so. And most of the work I did at that time was not published. I only published a few small things, but I did have a lot more I did not publish.

Then what happened was, I think in 1949, a paper appeared by a German mathematician Hans Maass, which raised some rather interesting problems. You see, earlier the automorphic functions and forms -- one had essentially thought of functions that were often called holomorphic, analytical. And Maass started studying functions that were not of that nature, but were instead solutions of a certain partial differential equation of second order -- solutions of a certain eigenvalue problem, which had a certain type of behavior with respect to the discrete group which corresponds to the modular forms. Maass also worked essentially just on the modular group and its subgroups, not on general groups.

At any rate, I saw this paper, I saw some of the open problems that were left there. I thought they could be attacked in a different way

by using some ideas that I had had before and experimented with, but only in connection with the analytic, holomorphic modular forms. That's what I started with, and it turned out that I could use them to answer some of these open problems, but then, as often happens, my focus of attention shifted because I saw that I could also do some things that I thought were very much more interesting. This was really then the path that led me to what is called the trace formula, which I established in various stages, first looking just at the hyperbolic plane, and the modular group, and also at other groups as long as they had compact fundamental domains, which the modular group does not have. [Line 200, copytape side 2.]

Then it was a big problem to handle the general case of a non-compact fundamental domain of a finite volume. I did succeed in that in the summer of '53. The other things, I think I had more or less in line by '51 for the compact fundamental domain, and for the modular group, and the arithmetic subgroups, the congruent subgroups of the modular group.

I also started to look at higher dimensional spaces, and see if I could do that. In particular, first in the case of compact fundamental domains, and also the problems that would arise if the fundamental domain was not compact. That was, of course, much more complicated in higher dimensional spaces because, simply, the type of non-compactness that could occur was -- not only that it was in general more complicated, but there also was a variety of possibilities to choose between. There is, in the hyperbolic plane, only one type of non-compactness that can occur, so that there was essentially only one type of thing to consider.

So this is what led me into -- when I started looking at the higher dimensional cases I had to try to find out more about the groups,

which I didn't know anything about. Before, I had never studied any Lie-group theory. I still haven't, really. I mean, also in group theory I mostly worked with my own methods, but I did of course have to deal with certain questions which, for some reason, nobody had considered before, concerning the possibilities of groups in higher dimensions.

This led also to these first results, about the rigidity of groups in the higher-dimensional cases, which are by now rather completely resolved. The first results about rigidity I think date back to '57, when I proved the first results for irreducible groups on product spaces of hyperbolic spacesof dimension two and three. Then later I obtained somewhat more general results.

Devine   I guess André Weil, after you had done group work, he was one of the people who was interested in that as well.

Selberg   Yes. He took up some of the questions, yes.

Devine   Was this before or after he came to the Institute?

Selberg   It was after he came to the Institute. He came to the Institute in '58.

Devine   Just a little after Borel?

Selberg   I think Borel came in '56 or '57. One can look these things up. [Borel was a member at the Institute from 1952 - 1954, and became a professor in 1957.]

Devine   Yes.

Selberg   But with André, I know it was '58. There are good reasons why I remember it.

Devine   You were on the faculty already in 1958, so you must have been --

Selberg   Well, I was a permanent member from '49, and

then a professor since, I think, 1951 -- yes, the summer of '51. [Line 300, copytape side 2.] The permanent member status in our school now has fallen into disuse. It was felt that it didn't serve any legitimate purpose. I can see, in a way, that it could serve a purpose -- if you have someone whom you want to support, and think that this would be a good place for him, but for some reason or other you feel that he is completely unsuited for taking part in faculty meetings or school meetings.

Devine   I see you smiling -- are you thinking of any particular permanent member?

Selberg   That would be, to my mind, the only good reason for having this possibility. I would not argue with what the other schools do, but I think in our case we didn't really need this, and I doubt that they'll ever revert to using that position.

Devine   It's been kind of a grab-bag position. Originally, of course, there was no intention by Flexner or Veblen to have that kind of a job, but Einstein wanted it, so --

Selberg   Yes, but I think Walther Mayer got really a designation that has never been used for anyone else. He was the only associate professor the Institute has ever had. He was called "associate professor."

Devine   I see.

Selberg   Yes, and the reason was: Einstein wanted him very much. Clearly, the mathematicians did not feel that he really should be a full-fledged faculty member. This was at an early stage, so they took a designation that was used in American universities. Only later did it occur to them to create a new thing called "permanent member."

I don't know who was the first permanent member. It may

have been Gödel. It could have been in one of the other schools, because in the School of Historical Studies there were, when I came here, several permanent members.

Devine   I see. I think that's Neugebauer's title.

Selberg   Yes, but there are several others. Most of them are probably by now dead, but if you would look in the early lists of membership of the Institute, you would see that in the School of Historical Studies there would be quite a number of permanent members.

Now, some of them had positions, really, elsewhere, so they weren't really here full-time. As a matter of fact, I don't know that any of them were full-time, so maybe Gödel was the first one for whom this was used who really was here full-time.

Devine   But he did eventually become a professor. [Gödel became a professor in 1953.]

Selberg   Yes.

Devine   And was quite a nuisance in the faculty meetings.

Selberg   You see, what I know about this is what Veblen has told me -- I mean, what I know about Gödel. When he came, he was considered to be somewhat unstable mentally, and that was probably one reason. Actually, according to what Veblen told me, the association between Einstein and Gödel arose in the following way.

Veblen felt that he had to look out for Gödel, and spent quite a lot of time talking with him. And then, he thought that he might perhaps get Einstein to take over part of this responsibility. And that seemed to go so extremely well that Veblen removed himself, essentially, from the picture.

Einstein and Gödel remained very close. They tended to come

to the Institute together, and leave the Institute together, very often. Of course, Gödel's interest in the theory of relativity undoubtedly goes back to this association with Einstein. [Line 420, side 2 copytape.] I don't think he had any interest in physics before that. I know he had some philosophical interests, but I think the specific interest in the theory of relativity, in which he did write some papers and create some results of significance, that goes back to that association.

It was clear that, I believe, Hermann Weyl and Siegel certainly, after Veblen had retired, they did not want to have Gödel as a faculty member. So it was only later, after Siegel was out of the picture and Hermann Weyl was retired, this was, I think, initiated by von Neumann. It was then Gödel became a full faculty member.

Of course, he was rather peculiar in many ways. He was, I would say, from some points of view, rather difficult to handle at school meetings. He tended to reason, in a sense, probably impeccably logically, but his premises were usually rather different than those of other people.

Devine   I see. Could you give me an example?

Selberg   Well, even his use of the language was often very strange. I remember once I talked with him at a school meeting, he described someone as "excellent." It turned out, when I questioned him, that for him "excellent" did not mean at all as much as, say, "very good!"

Devine   I see!

Selberg   That's, of course, very contrary to the interpretation that most people give. Because "very good" is fine, but "excellent" would for most people seem to mean about the same as "extremely good."

Devine   Yes, it would seem to be excelling over, say, "very

good," that's right.

Selberg   So even in assessing the various shadings of language, you often wondered what he meant by his -- [Line 510, end of side 2 copytape. Beginning of side 3.]

Devine   So with Gödel, you often wondered what he meant by some of his statements.

Selberg   Yes, it was a problem.

He had another idiosyncrasy, and this was that it was very hard for him to end a conversation. I was the executive officer of the school for a number of years, and -- I have to go into some of the conflicts that we had. This was after the first Milnor affair, if I may call it that. [A good account of this conflict is given by Armand Borel in his article in A Century of Mathematics in America: Part III.]

Devine   Yes, all right.

Selberg   This led to rather high disagreements and high tempers within the faculty. After that, I deemed that it was better if the school meetings of mathematics would take place without the presence of Oppenheimer. Earlier, Oppenheimer had been sitting in on the school meetings. They were actually held in his office.

I thought this was something -- it was better if the school did not take a vote on it, that it was just the personal responsibility of the one who was arranging the meetings. So I sent Oppenheimer a note to this effect, that I would call, from now on, the meetings in my office, and that I would appreciate it if he would not try to attend, but that I would keep him informed of the agenda in advance and come to him with the minutes after the meetings and go over the items, and keep him informed in that way. But I thought, under the circumstances, it was better to avoid the

friction that I considered inevitable if he was there.

He agreed to try this. So we began to meet in my office. Gödel did come to the first meetings, but then he raised objections. Essentially, the background is the following: for Gödel it was essentially so that all authority comes from God.

Devine   I see!

Selberg   So that meant -- yes. Surely, I have always thought that if Gödel had remained in Austria he would probably, although he might personally have reservations, he would probably have accepted the Nazi authorities as also representing God.

Devine   Good thing he left.

Selberg   Yes, he did leave. I think part of the reason that he left was that he didn't feel he had any position. Actually, there is something about this in the obituary that Kreisel wrote for Gödel in -- the Royal Society in England publishes obituaries of members. Kreisel had a rather close association with Gödel over many years, and also Kreisel is from Austria. George Kreisel. He wrote about this.

You see. apparently Gödel had had some difficulties in Austria, because some people thought he was Jewish, -- which he was not. According to Kreisel, he considered this to be typical Austrian *Schlamperei*, as he called it, and actually was supposed to have said that the Germans will never make such mistakes.

Devine   Gödel was supposed to have said that?

Selberg   Yes, that it was typical Austrian *Schlamperei*, meaning that Austrians are not as efficient and exact as the Germans! Which might well be true, for all I know!

As far as I know, it was so that he ended up without a proper

position. It was, I think, for this reason, that he was passed over. This was
the reason that he -- you may look up this obituary.

Devine   I will look it up. It's in the proceedings of the
Royal Society?

Selberg   Yes, I think they publish some separate volumes
with obituaries.

Devine   All right.

Selberg   So Gödel withdrew from the meetings and said that
he could not take part in our school meetings because they were then
without the director. Well, I thought we could try to manage a way around
that, by the following scheme: I would habitually consult Gödel about the
applicants that were in the areas that he was interested in -- foundations,
and logic, and so on. I would then find his opinion about them, and I would
cast his vote for him, and I promised that I would also add my own.

It didn't work that way, because it was very hard to get an
opinion out of him. Also, he tended to take those applications that he was
interested in and sit on them for a long time, so that I really had to try to
badger him a bit to get them back so that other people could also see these
applications.

Devine   Yes. [Line 100, side 3 copy tape.]

Selberg   As I say, I wanted then to have a list of his
preferences, but he apparently had great difficulties making up his mind. I
often had phone conversations with him, very often that were initiated by
him, he was complaining about something, and the problem was that he
didn't know how to end them.

I felt that if he initiated them, really it was he who should end
them also. He would go over the same thing, again and again, and I would

answer the best I could. He would repeat -- and finally I had always to find some excuse. It was the only way I could get out of it.

Devine   Did you know his wife at all?

Selberg   I didn't really know her. I knew her, of course, because I had seen her, but I had not really talked with her.

Devine   Deane [Montgomery] said he used to sit next to her at Oppenheimer's parties.

Selberg   Ah ha. That may well be. I don't think I ever sat next to her at any party. I don't know, but this may indicate that Deane was not particularly in Oppenheimer's favor!

Devine   I see!

Selberg   Actually, I did see her from time to time. The Institute used to have a spring dance, as it was called in the Oppenheimers' time, and Mrs. Gödel was very fond of dancing. He did not dance. They usually were there, undoubtedly at her request. I am sure he had no interest in coming. I believe that she had been some kind of entertainer before they married -- she may possibly have been a dancer.

Devine   I think she was an actress.

Selberg   Well, maybe an actress. Some type of entertainer. I think probably Kreisel would have that information also. It's probably there. I don't remember what it was.

Devine   Well, I want to thank you very much. [Line 150, side 3 copytape -- recorder switchoed off briefly, then on again.]

Selberg   He was American.

Devine   Mordell was American? I thought he was European.

Selberg   When he was sixteen years old, he traveled on his

own to Cambridge to take part in the tripos, these examinations -- and got
a scholarship!

        Devine   I see.

        Selberg   It's rather an astounding story. Actually, I heard
that from him. That a boy that age would have the audacity to do this on
his own -- he must have had great confidence in his own abilities as well.
Fortunately for him, it was justified!

        Devine   Yes!

        Selberg   It would be otherwise very dangerous, and I think
for most people it would have been a rather disastrous thing to attempt
something like that. But it shows a kind of -- I couldn't have imagined that
I would have done something similar at that age, although I had when I
was sixteen started with mathematics.

        Devine   I wonder -- was there somebody special at
Cambridge he wanted to work with?

        Selberg   I don't think so. I don't know why he would go to
England, first of all. But there may not have been much in the way of
fellowships available in the United States at that time. Because this must
have been comparatively early during the century, certainly before the
First World War.

        Devine   That would make it more understandable, then,
because I'm told there wasn't that much real mathematics here then.

        Selberg   Well, Veblen had already started something at
Princeton, at that stage. And surely George Birkhoff was active
somewhere, I don't know where he was at that time.

        Devine   George Birkhoff was at Princeton for a while --

        Selberg   He was also at Princeton. Princeton was really the

best place already then. [Line 198, side 3 copytape -- end of second
interview with Atle Selberg.]