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Jaap Seidel, a friend

On May 8th, 2001, Jaap Seidel died at the age of 81. On the occasion of his eightiest birthday, N.G. de Bruijn delivered the following talk at the symposium 'JAAP 80'. The symposium was a part of the EIDMA conference on Geometric and Algebraic Combinatorics, which took place in August 1999 in Oisterwijk. The full text can be found in [1].

This talk was announced as "Career of a mathematician", a very demanding title, which I will not make completely true. I mainly talk about the beginning of that career, connected with my personal memories. We have been friends for 62 years.

Only recently I learned that Jaap and I had almost met even 69 years ago. We had been in the same warm nest, though not simultaneously.

1930, Den Haag, Galvanistraat. Masterclass, formed by the better pupils of five or six schools, intended as preparation for the entrance examinations of the harder variants of secundary education, the HBS and the Gymnasium. I remember the hard problems in applied arithmetic, about rowing boats in a flowing river. Mathematics of social interest, like our ministry of education now wants to introduce at the *end* of the secundary school curriculum, in order to have 'social mathematics' replacing so-called dry and formal mathematics. I left that class and the school in 1930. Jaap attended it in 1930–1931.

It was a very scientific neighbourhood, at least as far as the names of the streets were concerned. Jaap lived at a street named after Ampère, the school was at Galvanistraat, and in order to get there we had to go by the Archimedesstraat. Unfortunately, we learned about Archimedes only that he was a rich man who could afford a full bath in his tub every day, and not as the man who did the Riemann integral two millennia before Riemann.

Our class room was situated at the back of the school, with an exit in a street named after Snellius. Snellius (1580–1626) was (from 1613 onwards) professor of Mathematics at Leiden University, a position that Jaap and I never reached! Contributions to trigonometry and optics. Snellius was scientific advisor to the army of Prince Maurits in the war against Spain. That war lasted 80 years, and we know today how long that is! Snellius counted Tycho Brahe and Keppler among his friends. Stimulating environment for our school!

There is one important thing that I vividly remember about the time I left elementary school in the summer of 1930. It was that the Wall street crash, hardly half a year earlier, had made itself seriously felt in the Netherlands too. As a 12 year old boy I felt that we would not have much of a future.

Jaap lived in a slightly more protected area. Like so many other prominent Dutch scientists, he came from a family of teachers. Both his father and his mother were teachers. At birthday parties the young boy saw teachers all the time. He was educated in the idea that teaching was respectable.

Leiden

My first real meeting with Jaap was in 1937, when he entered Leiden University. I was a year ahead of him (and had got quite a different kind of upbringing). Jaap at once became a member of the little club of Leiden mathematics students living in The Hague, gathering weekly, usually at my home.

At two occasions we appeared as a singing group at social nights of the Leiden science faculty. It was called The Epsilon Boys, epsilon being for us the true symbol for mathematics. We were always in tune, within an epsilon.

Jaap was much more social than the others, certainly much more social than I was, and it always remained like that. At an early age already, Jaap had experience in what is now called Networking.

Why did Jaap go to Leiden? Quite recently

he asked: why not to Amsterdam, the Mecca of Mathematics, where the great Brouwer was?

Yet I think that in Leiden he was much better off. In Amsterdam he would have had hardly any contact with Brouwer, just with his assistant Freudenthal. Stimulating education anyway, in spite of the fact that it was not perfectly organized. But the main reason for preferring Leiden was, of course, that it was much cheaper. Times were hard. Living in the Hague, you could just stay with your parents, and travel up and down by train or tram, and if the weather was favourable even by a 90 minutes bike ride.

Leiden gave thorough, old-fashioned teaching by Van der Woude and Droste. For analysis this old-fashioned style was not bad at all: the standards were those introduced by Cauchy and Weierstrass. For geometry it was definitely out of date.

But there was also the much younger Kloosterman, with an open eye for what happened in the world. Along with his standard courses, Kloosterman had an extra topic each year, not for the curriculum, just for scientific interest. Examples of these were Abstract algebra (quite a novelty then), Hypercomplex systems, a magnificent course Linear operators in Hilbert space, Linear algebra, Stieltjes integrals and Spectral theory of self-adjoint operators. He did it for the needs of the theoretical physicists: quantum mechanics was a red-hot subject. He presented them perfectly, producing everything from scratch.

Jaap never stops telling me that it was me who urged him to attend that course of Kloosterman on linear operators, right in Jaap's first year. It was linear algebra, both with finite and infinite dimension. And linear algebra would be a main theme of Jaap's mathematical work all through his life. Wherever anything could be expressed in terms of eigenvalues, he would be there to do it.

'40–'45

Leiden university was closed in 1940 by the German occupational authorities, because of the students' protest against the dismissal of Jewish professors. For a time it was unclear whether this would be temporary or not. Students did not quite know what to do. At that time I ran a small class for some of those students, training them in algebra and number theory. I think it was Jaap's initiative to organize this. Later it became obvious that Leiden would not reopen at all, and most mathematics students decided to move to Amsterdam's Free University, where they could go on until,

Standing f.l.t.r.: J.J. Seidel, J.S. Mahler. Seated on the chairs f.l.t.r.: P.W.M. Boin, N.G. de Bruijn, J. Posthumus. On the ground: C.H.D. Steinmetz. The picture was taken on 11 December 1938.
Only P.W.M. Boin and N.G. de Bruijn are still alive. Posthumus was a teacher at the VHMO. Seidel became a teacher in Amsterdam and later an instructor at the TH Delft and a full professor at the TH Eindhoven. De Bruijn first became an assistant at the TH Delft, employee of Philips NatLab and a full professor at the TH Delft, University of Amsterdam and the TH Eindhoven. Mahler, Boin and Steinmetz have been employees at Delft. Before they came there, they'd been a teacher in Den Helder, employee at the TH Bandung and teacher at the institute for higher education in Medan, respectively. Steinmetz worked in physics, the others in mathematics.

a few years later, all Dutch universities had to close.

In Amsterdam Jaap came under the direct influence of Haantjes, very stimulating in many areas of modern geometry, much more so than Van der Woude in Leiden ever was. Jaap learned a lot from Haantjes. After the war, he got his PhD under Haantjes, who had moved, meanwhile, to Leiden. Unfortunately Haantjes died young, in 1956, at the age of 42.

Around the end of the war Jaap became a school teacher, at a prestigious school (Vossius Gymnasium). I believe he did very well there.

Delft

Towards the late fourties Jaap became instructor at Delft, where I happened to be a young professor. I caused a little revolution there by putting Analytical Geometry on the basis of Linear Algebra, and had a group of instructors to run the excercises.

I remember that there was a little revolt among my instructors (the leader was Salet). The instructors did not agree with the order of the subjects in my course. But the tradition was that the professor was the absolute boss. This instructors revolt around 1950 was long before the students revolt of 1948. I lost the battle and had to give in. Jaap was one of these instructors. Kuiper was another one.

Linear algebra had to remain simple, and certainly avoided complete abstract formulation. During a vacation trip to Switzerland in 1949 I visited the great Heinz Hopf in Zürich. I had heard that he had started courses in modern linear algebra too, and I wanted to know how he did it. He assured me that he did it even more simple than I wanted to do it. In later years people Bourbakized the subject and made it terribly hard.

In 1954 Jaap worked for some months in Rome, together with Van der Ven. Bottema (an influential mathematician, at that time rector of the university) had objections. I suppose that Bottema felt that someone below the rank of a professor should not have ideas of his own. But others helped Jaap to let him spend a term in Rome.

Much later Bottema changed his attitude to Jaap. I remember that in the middle sixties Bottema was the chairman of a national committee for the mathematics on the university level. Jaap had been quite active in such matters, but at a certain moment his term in the committee ended according to schedule. At the last meeting where Jaap took part, Bottema gave a short speech to thank Jaap for his contributions, and ended by standing up, walking to Jaap's place at the end of the room and shaking hands with him. It struck me as unusual and very moving. It was as if he had always underestimated Jaap and his young institute at Eindhoven, but that he now wanted to show that he considered Jaap as his equal.

1954 had the International Congress of Mathematicians at Amsterdam. Jaap was leader of the entertainment committee. We got the idea to attach an Escher exhibition to the congress. It was a great success. A great thing for Escher too: having it in the prestigious Stedelijk Museum, it gave him recognition that he did not have before and it brought him into contact with scientists from all over the world, in particular with Coxeter and young Penrose. The effect on his work is easily seen: he had learned about the circle groups.

As I said, Haantjes died in Leiden in 1956. After his death Jaap was temporarily hired in Leiden to teach some of Haantjes' courses, in particular Linear algebra, but before that, Jaap already acted as a stand-in for Kloosterman (on leave for a year), and taught the so-called HocusPocus course. Mainly analysis for non-mathematicians. How-to-do-it without fully understanding it.

I think it is very important that Jaap gave both courses. The HocusPocus was mainly analysis, which never was Jaap's topic in particular. But it may have been the root of Jaap's idea of having in Eindhoven an integrated course in mathematics, not split up into subjects (like analysis, analytic geometry, etcetera). And Jaap had seen everything at all levels: the student's level, the one of the instructors, and the one of the professors.

His master's voice

It all was a wonderful preparation for his start as the first man in mathematics at the new Technological University at Eindhoven. Jaap organized the mathematical department and the mathematical curricula all by himself. It was really a one-man-show. He was a wonderful organizer, knew to attract quite a good group of professors and instructors, and let them do it the way he wanted it done. One of the professors who had to follow Jaap's scheme mockingly called his course "His Master's Voice".

Everything in Eindhoven was much more modern than it had been in Delft, and Jaap made full use of it. He at once used the possibility to prepare printed material for courses and excercises, and turned the mathematics

education in Eindhoven into a big, smoothly running factory. It was extremely successful, certainly the best one in the Netherlands.

Eindhoven's mathematics department was outstanding, not only because of the quality of teaching, but also scientifically. Around 1970 we had 4 members in the Netherlands Academy of Science, where the total number of mathematicians was 10.

Research

Jaap was a late starter, as far as his own scientific activities were concerned. For a long time most of his energy had gone into educational and organizational matters. It is really amazing that he picked up large scale research in 1966, at the age of 47, and that he became so productive in the years after that. It was of course connected with the fact that he resigned as head of the department: the machine was running so smoothly that he could leave the managing to others.

I think that 1966 was the first time that Jaap attended an international conference on combinatorics. It was at Varenna, in Northern Italy at the Lago di Como. A romantic place. Frank Harary was the organizer. We went together. I introduced Jaap to Harary, and Harary asked: "Is he your student?" I said at once: "No he is my boss!" That impressed Harary and changed his attitude.

By the way, Jaap and I went there with our wives. We usually travelled crammed in a small car, either our Volkswagen Beetle or their Renault 4, even smaller. We went to Paris that way in 1957, to the Edinburgh International Congress of Mathematicians in 1958, and let us not forget the pleasant sailing vacations with our full families in Friesland.

I mentioned Linear Algebra as a central theme in Jaap's life. But we should also stress Networks. In the mathematical sense: graphs, but also other kinds of networks. Connecting different branches of mathematics to each other. And getting people together and let them collaborate. The best example of a network in nature is a spider's web, so let us imagine Jaap as the spider sitting in a corner and abiding his time. ⬅┈

References

1   N.G. de Bruijn, *Jaap Seidel 80*, Designs, Codes and Cryptography **21** (1999), 7–10.