2 Karlsruhe – the Ray-Transformer

Karlsruhe’s Polytechnic, known as the ‘Fridriciana’, is probably the oldest in Germany and has a very good reputation. Heinrich Hertz was one of many who had worked and taught there. I estimate that, in my time, there were about three to four thousand students in Karlsruhe. We cannot therefore regard the German Universities of that time as the student factories we know today, where student numbers of 20 to 30 thousand or more are the norm.

The relations between students and tutors were excellent and of a very cooperative nature during my time in Karlsruhe. I especially remember Professor Schleiermacher who taught us theoretical electrical engineering. He was a friendly old man. We also had a very fine mathematics professor called Böhm.

Professor Wolfgang Gaede taught us physics; he was one of the high gods and a little more distanced from us students. However, as mentioned previously, it was all very harmonious and we had no problems.

I found the teaching first-rate and well balanced. Professor Richter’s lectures on the theory of electric machines were much influenced by the practical facts of engineering. We learnt a great deal about direct current machines, commutators and similar things which have now almost completely disappeared. We also had exemplary teaching in mathematics, chemistry and physics. Overall, it was pretty well balanced and had an academic flavour. It contained much more than just the purely practical aspects of engineering.

Spannhake, a teacher of worth, taught us about hydroelectric power machines. He was of a more practical bent. Professor Tolle taught us technical mechanics and he was very good, and Professor Nusselt was our thermodynamics lecturer.

The most important part were the lectures. We didn’t have special seminars for our free subject, instead we would have a
lecture on, for instance, Einstein’s theory of relativity. The laboratories too were excellent. For our laboratory work we would be divided up into groups and given practical problems which we had to solve under the supervision of assistants. We worked quite independently. Later on we also had to design and build electrical machines. Our education was versatile and of good quality.

However, it was a shame that I no longer had the opportunity to study more physics. During my time in Karlsruhe, collaboration and communication with the physicists was not as good as it is today. There were few conferences, symposiums or meetings, and I also had very little personal contact with the physicists. Lectures on physics (Gaede) were of course included in our course, but we did no practical work.

It was also in Karlsruhe that I wrote my first publication – on a subject which has nothing to do with engineering. Inflation was rampant when I went to Germany in 1920; the value of the German Mark was constantly dropping. Price increases caused everyone to be interested in economics, and I would therefore make a daily plot of the US-dollar rate. This was for purely practical reasons. My father had initially bought me German Marks and now I wanted to know the best time to change money again.

This resulted in a dollar curve which, drawn on logarithmic graph paper, reached from the floor to the ceiling of my room. At first the dollar equivalent rose at a more or less linear rate, although naturally with major fluctuations, but by the end, in 1923, the exchange rate increased in such an alarming way that I had to use double-log graph paper. While one US-dollar had been the equivalent of 192 Marks in January 1922, by the end of 1923 it was about 4,200,000,000,000 Marks! This curve prompted me to write an essay for the Norwegian State Economics Magazine which was published in 1924 [Wi24]. I didn’t take much notice of such things later on, but it was my very first publication.

Karlsruhe had a Nordic Club. Quite a few Norwegians and Swedes as well as a few Finnish students (Swedish and Finnish Fins), frequented this Club. There was also someone from Iceland