

## UNIVERSITY OF YORK

### **Presentation address by Professor Anthony Sudbery on the occasion of the conferment of the honorary degree of Doctor of the University upon Professor Paul Butzer on 11 July 1996**

Chancellor,

I have the honour of presenting to you Professor Paul Butzer, an eminent mathematician and very good friend of the Mathematics Department in this University.

Professor Butzer was born in 1928 in the Ruhr region of Germany, but because of their opposition to the Nazi regime his family left Germany in 1937. He spent four years in this country before moving in 1941 to Canada, where he received the bulk of his education and started his academic career. He is still a Canadian citizen. In 1955 he moved back to his native land, and after brief appointments in Mainz and Freiburg he settled in his mother's home town of Aachen, where he was a Professor at the Rheinisch-Westfalisch Technische Hochschule, the largest university in Europe, for thirty-five years (and the only Canadian citizen in the German Civil Service, which normally – for less highly valued staff – insists on German citizenship as a condition of employment).

In 1958 mathematics at Aachen consisted of just three chairs (in the German sense of a section headed by a Professor Ordinarius). When he retired from his chair in 1993 the department was the largest in Germany, with thirteen chairs in mathematics and six in computer and information science (we can only admire their sense of proportion), and one of the best in Europe. This development was very largely Paul Butzer's work. He is admired and highly respected at Aachen, not just for the growth that he has fostered, but for the distinctive atmosphere of his chair, which had a democratic ethos of teamwork that was quite different from the usual assumptions in German universities of that time. He is known for the very high quality of his research students, and has always insisted that he obtained many of his best mathematical results in the course of collaboration with his students.

The area of mathematics that Professor Butzer has particularly made his own is approximation theory. If this strikes you as a surprising topic to be treated by the most exact of the sciences, take it as evidence of the determination of mathematicians to be precise even about imprecision. And Professor Butzer's work has been above all precise, belonging as it does to a tradition which is known for the uncompromising rigour of its argumentation. The approximations he has been interested in are those involved in the synthesis of a signal emitted continuously over a period of time. That such a signal can be built up from elementary types of signal has been known for centuries to organ builders, who can make approximations to the sound of many other instruments by combining pure tones. Mathematicians, for reasons not even known to themselves, refer to 'functions' rather

than signals, and think in a generality which can encompass ideas far removed from signals emitted in time, with elementary functions which can be very different from pure tones. Professor Butzer's work was originally of this very general and abstract type. Since the early 1970s, however, he has been much concerned with the specific problems of signal processing and prediction, and has worked closely with electrical engineers on them. His results have been used in the guidance of rockets. He has also done very significant work in other areas of pure mathematics, particularly probability theory and the theory of numbers.

Professor Butzer's distinguished body of work, contained in over two hundred papers and six books, has been recognised in a number of honours. He is an honorary member of the Hamburg Mathematical Society, which, founded in 1690, is the oldest such society in the world; he succeeded Sir Harold Jeffreys as associate member of the Royal Belgian Academy; and he has already been awarded an honorary doctorate by the University of Liège.

As well as mathematics and engineering, Professor Butzer has a deep interest in history. He is an authority on the medieval history of mathematics, and has edited a book on *Science in Western and Eastern Civilization in Carolingian Times* to which he contributed an article on mathematics in that period.

There is a deep historical resonance to his present link with York. In AD 782 Alcuin travelled from York to Aachen to join the court of Charlemagne as, roughly speaking, his Minister of Education. Alcuin wrote probably the first medieval mathematics text-book, *Propositiones ad Acuandos Juvenes* (Problems to Sharpen the Young). Professor Butzer has a special scholarly interest in Alcuin, and has been instrumental in setting up the Alcuin Symposium, a framework for meetings between academics in Aachen and York in a number of different subjects, including Biology and History as well as Mathematics. There has been a regular biennial series of symposia on mathematical analysis and its applications, alternating between Aachen and York, in the course of which Professor Butzer has been a regular visitor to York and a regular host to York mathematicians in Aachen. He has had a long-standing mathematical relationship and personal friendship with two of York's leaders of mathematical research, Jim Clunie and Walter Hayman, which dates back to long before they came to York; as a result of the Alcuin Symposium he has become a close friend and colleague to others here, particularly Maurice Dodson.

As a host and friend Professor Butzer elicits warm praise from all who have known him. One of his guests at Aachen wrote of him "Paul is one of the most decent people I know, loyal to a fault with friends, generous, supportive and able to draw out the best in people. Whether you are royalty or mongrel, you will be treated the same, with respect and dignity. He moves comfortably among the famous and unknown. He will defend as vigorously the work of relatively obscure people as that of acknowledged stars."

Chancellor, I have the honour to present Professor Paul Butzer for the degree of Doctor of the University *honoris causa*.