

UNIVERSITY OF YORK

**Presentation address by Professor Walter Hayman on the occasion of the conferment of the honorary degree of Doctor of the University upon Emeritus Professor Frank Bonsall on 13 July 1990**

My Lord and Chancellor,

It is a privilege to present Frank Featherstone Bonsall for an honorary Doctorate of the University of York.

Frank Bonsall is a good Yorkshireman, at least on his mother's side. She was born in Glaisdale, North Yorkshire and was in the first batch of graduates of the University of Leeds, where Frank is now a Visiting Fellow. Frank's father had the misfortune to be born outside the pale in distant Middlesbrough. He later worked in the City of London, becoming a Company Secretary. Frank's elder brother, Sir Arthur Wilfred Bonsall KC.M.G., had a distinguished career in the Foreign Office.

Frank served in the Royal Engineers from 1940 to 1946 and before and after the War he studied as a Postmaster at Merton College, Oxford, finishing with an M.A. and later a D.Sc. In 1947 he and Gillian married. We are delighted that Gillian is with us today. The young couple moved to Edinburgh and a year later to Newcastle, where Frank was successively Lecturer, Reader and in 1959 Professor of Mathematics. Here he built up a splendid research school in Functional Analysis. From 1965 to 1984 Frank was Professor in Edinburgh. In between he was Visiting Professor at the Tata Institute, Bombay; at Stillwater, Oklahoma; and at Yale University. On Frank's retirement he and Gillian settled in Harrogate, very fortunately for us.

This bare outline scarcely does justice to Frank's seminal influence on Mathematics and in particular on Functional Analysis. Mathematics has many strands. One can perhaps single out Algebra, concerned with discrete processes, structures involving the laws of arithmetic, combinatorics, logic and computing; Analysis, which deals with continuous processes such as motion and change; and Geometry, dealing with shapes and forms. These areas have developed over two to three thousand years into something so vast that most of us are content to range over a small sub-field of one of the above broad divisions.

"There was once a student of Cam,  
who said, I've found out what I am:  
A creature that moves  
in determinate grooves —  
in fact not a bus, but a tram."

Algebraists and Analysts are frequently barely on speaking terms. Nevertheless great progress can sometimes be achieved through a mingling of different areas. One such breakthrough was achieved by the Polish mathematician Stefan Banach in the 'twenties

and 'thirties. He noticed that functions such as  $x^2$  and  $\sin x$ , although describing continuous processes, can be added and subtracted. This led him to define spaces of type B (perhaps he had our graduand in mind). They are now called Banach spaces. Ten years later I. M. Gelfand and others in the Soviet Union saw that functions can also be multiplied and this led to the creation of Banach Algebras. It is not easy to divide by functions since the denominator can be inconveniently zero. So this is as far as the theory has gone for the time being. It has developed most powerfully in the last fifty years.

Analysts in this country, led by the powerful school of Hardy and Littlewood, were very reluctant to accept that this sort of stuff was any use. They called it soft analysis as opposed to the hard stuff, which is what they did. A similar attitude can be seen in our lectures today when we mention some result from another course. Fortunately there were one or two broader spirits such as Frank Smithies in Cambridge, a superb expositor and supervisor of research students, and Lionel Cooper in Cardiff, a good researcher. Frank Bonsai' is supreme in exposition and research as his three books, seventy papers and 23 successful Ph.D. students show. The last figure must be a record for a Pure Mathematician outside Oxbridge. In the year when Frank moved from Newcastle to Edinburgh he was supervising 9 students all of whom did well subsequently. Frank and his students used the new techniques most effectively, solving problems of great interest even in the classical areas. When it became clear even to the most reactionary among us that the Royal Society needed Functional Analysts, Frank's claim was outstanding. Since his election in 1970 two more Functional Analysts were elected from Newcastle, so he left the place in good hands.

When I came here five years ago I was most pleased to find Frank living in the neighbourhood; and having heard one of his superb lectures we analysts in York were delighted when he started coming regularly to our seminar. He has taught us to respect the beauty and power of the tools of Functional Analysis, such as the closed range theorem (useful especially in winter), and to co-operate with him in his most recent work on atomic decomposition (unlikely to cause a nuclear accident). Once again the young are being inspired by Frank's vision.

It is not only in Mathematics that our graduand is such a delightful companion. His comments on climatological matters are a real tonic. Not for him the attitude of the fat boy in *The Pickwick Papers*, who, like most of the media, "wants ter make yer flesh creep". Frank points out that any effect of global warming due to extra Carbon Dioxide is completely undetectable compared with fluctuations in hot and cold periods that have occurred in historic times. The real danger is the next Ice Age, which is bound to come within a mere 10,000 years or so.

The mathematicians at York, with sincere gratitude for what Frank has given and is giving us, are delighted to present him to you, sir, for the degree of Doctor of the University *honoris causa*.