DINNER SPEECH TO MARK 40 YEARS SINCE IMA WAS FOUNDED

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It is a great honour and pleasure to address this dinner in Manchester celebrating 40 years since the IMA was founded here in 1964. Congratulations to all at Catherine Richards House for today's arrangements. As a research student I greatly enjoyed James Lighthill's inaugural lecture on Group Velocity which he made as first president.

The IMA was set up following on from the success of the annual British Theoretical Mechanics Colloquium initiated in the 1950s. Dr. Eric Watson here today has attended every one of its meetings since then. At that time it was about 30 years since the famous pure mathematician G. H. Hardy had raised the toast to "Mathematics – may it never be applied". However, Hardy and Littlewood were among these who taught Lighthill at Trinity College in the 1940s. Pure mathematicians have not only taught and inspired applied mathematicians, but their research greatly contributed to practical developments in applied mathematics in the 20th century. One thinks of innovations in functional and Fourier analysis, asymptotic techniques and numerical analysis. Applied mathematics and mathematical physics had demonstrated their extraordinary usefulness in the Second World War and then the cold war. These applications spawned great advances in technology that are still of great benefit. Mathematicians were appointed to run Government bodies and industry. Lighthill went from Manchester University to direct RAE and Met Office; O. G. Sutton became the Director General of the Met Office; Sir Arnold Hall, a student of G. I. Taylor, became chairman of Hawker Siddely Aircraft Company.

Ian Duff points out that we should not forget France has had one or two mathematicians in senior Government positions, such as J. L. Lions. The U.K. is probably unique in continuing to have so many in such senior positions. One used to see on the notice outside

Stephen Hawkins room in Cambridge a list of all these ‘top’ people who had been trained in mathematics.

When the IMA was founded, James Lighthill brought together a galère of very distinguished British applied mathematicians who followed him in various posts as President and Vice President, among whom were some distinguished women mathematicians. We are honoured that Dame Kathleen Ollerenshaw is here today. There was a notable involvement of industrial applied mathematicians, such as Ron Scriven of the Central Electricity Research Laboratories, who became an active vice-president, and John MacDonald of British Aerospace who preceded me as President and who tragically died in office. Ron Scriven, who recruited me in 1968, greatly impressed me with the value of simple calculations to aid policy, when he demonstrated quite clearly how in the 1960s UK’s sulphur dioxide emissions from power stations were reaching Scandinavia, a fact was only admitted to at a high political level in the 1980s. Then finally something was done about it!

Together with the energy and originality of Norman Clark and later Catherine Richards, our first two registrars, the IMA encouraged the move of U.K. applied mathematics into new areas.

This was stimulated by its vigorous conference programme with innovative meetings on finance, extreme events, control theory, math surface, numerical methods, biological mathematics, industry and the Government, who have been strong supporters and have found these conferences invaluable. Sometimes they have been so successful that the conferences were taken on by others, such as the notable early meetings on computational fluid dynamics, and numerics and dynamics. In its relatively brief history, the IMA has not been afraid to tackle controversial public issues such as the mathematics syllabus in schools (castigated as "soft" in the late John Hammersley's devastating and witty articles), the standards reached in examinations, and the teaching of mathematics for engineers and scientists in universities.

The IMA has not been afraid to go to the Press on these issues, sometimes educating the press in the process - the Times rang me to ask what is a standard deviation when I had mentioned, in my presidential speech, the lack of statistical knowledge among many graduating engineers. But I hope that IMA has also been seen as taking a supporting role to hard pressed and devoted school teachers working in the modern cultural milieu that is so unsympathetic to sustained learning, especially of difficult subjects such as mathematics.

IMA has promoted popular understanding of mathematics through its school lectures and by publishing paperbacks on new applications and newer uses of mathematics. These were translated into very successful Japanese editions. The IMA has developed new approaches to collaboration between mathematical institutions by working with the LMS and RSS to present a united U.K. council for mathematical sciences. Conferences and meetings are now held in collaboration with universities and the multiple disciplinary centres for mathematical sciences, such as the Lighthill Institute based at UCL, Isaac Newton Institute at Cambridge, and soon the new Manchester Institute.

Internationally, very successful links have been established through ICIAM and ECCOMAS, as John Ockendon pointed out today. The European Community presents a new opportunity for U.K. mathematical institutions to collaborate more effectively, and also to benefit from the funding and wider perspectives of E. C. programmes. I was impressed by the Congress I attended in 2004 of the European Community of Mathematics in Industry.

In drawing up our account of IMA's contributions over the past 40 years, it is interesting to see them as part of the general progress of mathematics and the wider appreciation of the importance of mathematics, both intellectually and practically. One measure of this progress is the general way that qualitative concepts of pure, applied mathematics and statistics, often mixed in with systems theory, have become part of the daily language of politicians, media, managers and the public. This is also a reflection of how we now live in a much more quantitative and technological society. I have certainly seen this development while working in government service, as a government/industry consultant, and as a part-time politician. During the outbreak of foot and mouth disease, ministers repeatedly spoke of comparing predictions of numerical models. Commentators talk about orders of magnitude, windows of opportunity, return periods of floods (now a banned term by civil engineers), lagging and leading indicators of economic growth, and the inevitable uncertainties involved in discerning trends from fluctuating data. Mr Lawson explained the random nature balance of payments as the differences between two large numbers! Though he forgot to remind Mr. Wilson about this point in the election campaign in 1970!

It has become a cliché to blame the failure of every system or of any forecast as a manifestation of chaos theory. There is a nice story of the up-to-date old lady on a park bench who saw a few butterflies and confided in her friend “it will be a good summer, you know”- a splendid example of the dangers of the popularisation of emerging scientific ideas. In fact, many forecasts for the climate 3-6 months ahead are improving through statistical correlation based on ocean temperatures, though Lord May’s and E. N. Lorenz’s butterfly analogy for the behaviour of dynamical systems is certainly a powerful aid to understanding the limitations of computer based predictions. One hopes that our new gold medallist Michael Thompson will not only improve communication about chaos theory but also help revive general interest in the mathematics of catastrophes.

A partially missed opportunity in the strategy for mathematics has been the weakness of the links between our subject and computer science, a point recently made in the LMS bulletin. In the 1960’s, I recall how post office engineers originally thought that only a minority of the population would have telephones. Also, at that time, there were less than 10 computers in the UK. Yet now, a majority of homes have a computer and several telephones, all connected up to global systems. Mathematics is playing a vital role in this mass extension of intelligent communication and dissemination of knowledge. Recently a colleague at Cornell explained how it was the training in graph theory in the computer science courses at Stanford that provided the basis for the mapping of the whole internet in the Google software system. Though he reckons that Google’s success is also based on its use of more computing power than may be available to any Government agency in the USA. If IMA and UK mathematics has missed such opportunities in the past, surely we should be building on the important work of our recent past president Henry Beker and gold medallist Professor Fred Piper, who clearly saw how number theory and coding can be applied in the design of secure computing systems. I understand that the IMA benefited financially from the flotation of Henry Beker's company during the dot.com boom.

One wonders how the IMA should best be involved in the next most likely revolution that will occur when computers become more friendly, faster, talkative and intelligent. This will only be possible through interactions between research in mathematics, physics, computing, and communication. An ever-wider range of biological disciplines should also contribute, an idea that might interest out present bio-mathematician president Tim Pedley. James Lighthill gave us huge confidence that with mathematics one can understand almost anything and with the vision that our subject can bring, mathematicians can become great leaders in any walk of life. After 40 years the IMA can look forward with confidence and excitement, and at the same time backwards with satisfaction.