<u>N</u>**apier Historical Meeting**

Friday 4th April 2014 at the James Clerk Maxwell House, 14 India Street, Edinburgh, EH3 6EZ.

Introduction to the John Napier meeting

by Sir Michael Atiyah, OM, FRS, FRSE (Former President of the Royal Society and the Royal Society of Edinburgh)

In introducing this meeting to-day, I feel somewhat intimidated to be surrounded by so many professional historians of mathematics. I have an interest in history but it is very much as an amateur.

However, one thing I do when studying history is to have a few dates onto which to hang things; 'pegs' so to speak.

For me, the most important date is **1642**[i]**.** That, as you know, is the year in which Galileo died and the year in which Isaac Newton was born. It is the year in which the torch passed from Italy to England and it may claim to represent the start-date of modern science.

If you talk to historians of other sorts, they say "1642, ah! the year of … *(a certain battle)*… in the English Civil War!" But to me, and, I think, to the audience here to-day, the date of Isaac Newton's birth is much more important. That is a date you do not forget. So 1642 is my benchmark.

When I was asked to introduce this meeting, celebrating John Napier and 1614, I asked myself whether 1614 was Napier's year of birth. No, I thought, that cannot be quite right as John Napier was born in Edinburgh in 1550 (in Merchiston Tower, a visit to which is on our agenda for to-day) and, by 1614, was an 'old man' of 64 - not quite as old as me but perhaps as old as some of you - but, in 1614, he was justifiably celebrating the publication of his famous book on logarithms.

After that, things moved rapidly - there were big steps forward. Given Napier's book came out in 1614 (and Napier died a few years later, the work on logarithms being taken over by, among others, Professor Henry Briggs, one of my predecessors as Savilian Professor at Oxford) the first aspect that I found most remarkable was, that by 1625 (which is only some dozen or so years after the 1614 publication) log-tables had had so much success, and were taken up with such enormous enthusiasm by others, that, I am told, by 1625 there were calculations for the logarithms of all numbers up to 100,000 and each to 10 decimal places! That is an enormous piece of work - it all had to be done manually. It shows how important logarithms were and all achieved in such a remarkably short space of time.

When I was at school in the 1940s (some 70 years ago) - not in the centre of civilisation, like Edinburgh where Napier was born, but in darkest Africa - we still used log-tables. I remember doing my homework with the use of log-tables. The book of log-tables was the 'bible' in school mathematics classes. The book is imprinted on my memory. Thus, it is rather remarkable that, even in the 1940s, we were still using an invention dating from 1614 and basically the same set of tables that Napier had invented. It represents remarkable longevity for a mathematical invention.

Then, when I came to England after the war (and went to school here) I was given a slide-rule as a present. At the time, it was the latest technology. It was a beautiful slide-rule being made out of ivory. I put it in my desk but never used it - it was more value for engineers. Slide-rules were overtaken by electrical calculating machines - then the electronic computer came along - so now we are in a totally different world in terms of doing calculations. But for several hundred years, logarithms were the basis of all arithmetical calculations.

Quite often, when new things come along there is a reluctance to embrace them (particularly by the older generation!) but logarithms took off fast. They rapidly became very important and were the key to the

calculations of Kepler and Newton regarding ellipses. Thus logarithms came at just the right moment, heralding the transition from large amounts of numerical data to the development of modern mathematical theory.

I do find it rather encouraging that someone became famous for a publication at the age of 64! Of course, he took some years (prior to publication) to perfect his innovation but his motivation was primarily practical. He wanted and needed to do calculations and that was why logarithms were successful. From our point of view, we see logarithms (and exponential functions) as being a very important part of mathematical theory, and they are of course, but for him and people at the time, that was secondary - logarithms were primarily a tool for doing calculations.

It was a case of applied mathematics driving pure mathematics. It was necessary first to do the work (the applied mathematics) and then, en passant, all the corresponding pure mathematics dropped out.

Well, I have more than taken up my allotted time. I am sure you will hear much more, during the course of today, about logarithms and Napier's other contributions to mathematics (like the decimal point and 'Napier's bones' - a method of calculation using small rods).

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[i] Galileo, 1564-1642, Napier 1550 – 1617, Kepler 1571 –1630, Newton 1642-1727, English Civil War 1642-51