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KENNETH O. MAY MEDAL AND PRIZE - 2009

In a special session of the International Commission of the History of Mathematics, during the International Congress of History of Science and Technology (Budapest-Hungary), Ivor Grattan-Guinness received the Kenneth O. May Medal. The speeches given on this occasion are transcribed below.

PERORATION FOR THE KENNETH O. MAY MEDAL AND PRIZE

ICHM at ICHS, Budapest, 31 August 2009
Prepared by Karen H. Parshall, chairman ICHM; read out by Craig Fraser[1]

Ivor Grattan-Guinness

Ivor Grattan-Guinness took a B.A. in mathematics at Oxford University in 1962, an M.Sc. in the philosophy of science at the London School of Economics in 1966, and an M.A. at Oxford University in 1967 before earning first a Ph.D. and then a prestigious D.Sc. in the history of science at the University of London in 1969 and 1978, respectively. Beginning in 1964, he served on the faculty of Middlesex University, becoming Emeritus Professor of the History of Mathematics and Logic there in 2002 at the age of sixty.

Grattan-Guinness's first book, *The Development of the Foundations of Mathematical Analysis from Euler to Riemann* (1970), was based on his Ph.D. thesis and is reflective of his deep interest in and contribution to the history of the foundations of mathematics as well as of mathematical analysis. In this study, Grattan-Guinness exhibited what have become hallmarks of his research: penetrating readings of key primary sources in a wide range of languages and broad syntheses of mathematical ideas. This work, with its extensive examination of the mathematics of Cauchy and his immediate predecessors, also served to focus Grattan-Guinness's attentions on the early nineteenth-century French scene, a vast topic that came to dominate his research for some two decades.

Early fruits of those labors appeared in 1972 with the publication, co-authored by Jerome Ravetz, of *Joseph Fourier 1768–1830*. A survey of Fourier's life and work as well as a critical edition of the 1807 monograph on heat propagation that Fourier presented to the Institut de France, this book highlighted not only the Parisian mathematical and broader scientific milieu of which Fourier was a part but also developments in what Grattan-Guinness would later style "applicable mathematics." He developed both of these themes, as well as that of mathematics education and its ever-evolving venues, in his magisterial, three-volume *Convolutions in French Mathematics, 1800–1840: From the Calculus and Mechanics to Mathematical Analysis and Mathematical Physics* published by Birkhäuser Verlag in 1990.

[1] See also in *Historia Mathematica*, 37 (2010). pp. 2-4.

Grattan-Guinness's ability to synthesize and illuminate vast amounts of mathematical knowledge was also in evidence in *The Norton History of the Mathematical Sciences: The Rainbow of Mathematics* (1998), in which his subject was no less than *all* of the mathematical sciences. The latter distinction is important: the *mathematical sciences* and not just *mathematics*. In the words of Victor Katz, "Grattan-Guinness makes absolutely clear that the use of mathematics in other fields, including economics, statistics, engineering, hydraulics, ballistics, astronomy, mechanics, optics, and so on, was a very important factor in the development of the field and to write a history of mathematics without including its applications would be highly misleading".

Broad synthesis also characterized *The Search for Mathematical Roots, 1870–1940* (2000), although in this case the topic was, as the book's subtitle reflected, "logics, set theories, and the foundation of mathematics from Cantor through Russell to Gödel." Another historical *tour de force*, and one that resulted from the fruits of his research during a Leverhulme Fellowship from 1995 through 1997, this study traced the complex development of a multitude of systems of mathematical logic in a wide range of national contexts—from Italy to Germany to England to the United States to Poland—as well as the broader philosophical contexts in which those theories evolved.

If profound research on the mathematical sciences in diverse national contexts has characterized his scholarly output to date, so, too, does the production of high quality reference works aimed at uniting the disparate communities of historians of science, historians of mathematics, and mathematicians. A gifted and seemingly indefatigable organizer and editor, Grattan-Guinness mobilized and oversaw the contributions of some 130 scholars to the two-volume *Companion Encyclopedia of the History and Philosophy of the Mathematical Sciences* (1994) as well as of the thousand-page collection of *Landmark Writings in Western Mathematics 1640–1940* (2005) with extensive historical commentary. He also served the broader scholarly community as editor of the journal, *Annals of Science* from 1974 to 1981 and as the founding editor of *History and Philosophy of Logic*. These, and his many other, contributions to the field of the history of science have already been recognized by his election as *membre effectif* of the Académie international d'histoire des sciences. Today, we are pleased to recognize Ivor Grattan-Guinness with the highest honor in the history of mathematics, the Kenneth O. May Prize and Medal, awarded for lifetime scholarly achievement and commitment to the field.

FOUR TIMES LUCKY

I. Grattan-Guinness

In response to the award of the Kenneth O. May medal and prize, Budapest 2009

1. I am very pleased to be here to receive this medal, because I am very pleased to be here! "You were lucky", said the surgeon after performing emergency open-heart surgery on me at the beginning of September 2008. I had experienced mild symptoms or warnings already, and yet when I had my first small heart attack I did not recognise it as such. I did know that something was wrong and that I needed to see the doctor, but I went there on my bicycle…. The moral of this absurd story is stark: be more familiar with your physical body than I was of mine, for if you are not and do not have my luck, then you will not live to regret it.

2. I am very pleased to be here to receive the May medal. I think that he and I started our serious interest in the history of mathematics at around the same time, in the middle 1960s. He came into a field that he saw had been in the doldrums for a very long time, but that maybe was beginning to pick up. By 1970 he was wondering about reviving this Commission, and especially about using it to launch a journal in the field that would not only carry articles but also serve as a source for the growing members to consult. He asked many of the leading figures in the field for their opinion; and luckily for me he also asked some of the youngsters who had begun to emerge. The general opinion was that the idea was attractive, though its success was not obvious. In the end, May resolved to go ahead. This decision led to the choice of title for the journal: after some learned international correspondence about the use of the ablative case in Latin, the name "*Historia Mathematica*" was agreed. The first volume appeared in 1974, and I ran a couple of departments in it for the first few years. May's hunch proved to be correct: for 35 years later the journal is still going strong, and it is a special pleasure for me that two of my former doctoral students at Middlesex University, Niccolo Guicciardini and Adrian Rice, are now involved in its administration.

3. In the 1960s it was extremely unusual for anybody to take an interest in research in the history of mathematics. May's motivations lay partly in mathematics education, and partly in questions involving bibliography and information retrieval. My own motivation came entirely from a negative reaction to mathematics education. I had taken a mathematics degree for three years at the University of Oxford, but I might as well have done religious studies: paraded before me was a sequence of indeed impressive mathematical theories, but why did one need to study them in the first place? Why were they being taught in such an obviously unsatisfactory manner? Further, where had they come from? Surely nobody had sat down one Thursday afternoon and invented, for example, group theory in the way it was being served up to us.

Tuesday mornings in my first year were especially baffling. The lecture course on the calculus served up wall-to-wall epsilontics and limit theory; but it was followed at once by hydrodynamics, with infinitesimal cuboids of fluid flowing under various conditions. Both courses obviously involved the calculus, but in completely different forms. Were there two sorts of calculus? Had this always been the case? Why did neither lecturer refer to the calculus used by the other one?

I realised that these questions that I had set myself were not themselves mathematical, but philosophical in some way; and I had no idea how to handle them. Then I came across an offbeat philosopher called Karl Popper, and took a Masters course in his department in the London School of Economics.

Popper's offbeatness was perfect for my purposes, as he taught one heresy after another:

- Life is always problem-solving of some kind, and one is theorising all the time;
- Even science is guesswork, and the aim there should be to test theories severely: falsify them, or at least criticise them in some way;
- The growth of knowledge is more important than any particular state that it is in;
- We dig down to foundations of knowledge, not up from them;

- The roots of philosophical problems lie outside philosophy;
- In epistemology one seeks not only the roots of knowledge but also the roots of ignorance;
- The future is open, not only subjectively but also objectively.

In addition to all these heresies, a bonus came with the logic courses. There he stressed as fundamental the distinction between logic and metalogic, and indeed between theory and metatheory in general. One should think explicitly in terms of different levels.

Popper said hardly a word about mathematics; but he had armed me richly with means to tackle my post-religious studies questions. Indeed, there were now two contexts: not only the history of mathematics (where I chose to examine the calculus, because of those Tuesday mornings) but also the history of logic. There was even a bonus meta-question, of great interest: why were mathematics and logic so different from each other?

I do not normally discuss this background, as I know that historians of all kinds are not fond of philosophy; but I owe a huge debt to Popper, and want to acknowledge it on this occasion. A book collection of my essays, called *Routes of Learning*, is due to appear later this year from Johns Hopkins University Press, and I have deliberately chosen several articles in which these issues are explicitly treated. I was very lucky to get all these insights right at the start of my career.

4. One of Popper's more sexist pieces of advice to students was the conjunction of imperatives "Find a good problem, and find a good wife". Thanks to his own teaching my first search had been successfully accomplished, indeed twice over; and while a student I also obeyed the second instruction. I am very glad that Enid can be here this afternoon, for she has not only put up with me for all of these 45 years, but also helped me in many practical and secretarial ways. Saving the world from the world's worst typist (including right now) is alone worth a medal. I was lucky for the fourth time.

Ivor Grattan-Guinness with Sergio Nobre, Rosa Baroni, Lígia Arantes Sad and Marcos Vieira Teixeira, members of the Brazilian Society of History of Mathematics, during the event.