Dialectics of myth and genius

By Edwin Madunagu

WHEN I was growing up, I, like many other school pupils, regarded people who "know too much book" as eccentrics. There were two main sources of this popular belief: how we saw "book people" behave, and what we were told. We carried this impression through secondary school, the university, and even beyond. But as we became older, though the impression remained, we no longer regarded all "book people" as eccentric: Only some "book people", most of whom were teachers and students of mathematics, were now seen as eccentrics. The eccentric mathematics teachers and students were usually brilliant, very brilliant. Some of them were "geniuses" where "genius", in this context, carries one of its ordinary non-meta-physical dictionary meanings, namely, a person endowed with extraordinary intellectual power; and "eccentricity" means deviation from an established, or mainstream, or dominant, mode of behaviour.

In the university we called eccentric mathematics students "Aro" after the Psychiatric Hospital in Aro, Abeokuta. We also called them "Ese", abbreviated and corrupted from "eccentric". One of such "Aros" or "Eses", now in his early seventies, a complete gentleman, a good family man, and a first-class brain, still retains that nickname. Although there were some brilliant mathematics students and teachers who were clearly not eccentric, who were not "Aros" or "Eses", we still tried to find some eccentricity in them. In several instances, we saw the gentleness or "normality" in "non-Aro" brilliant students and teachers as special cases of "Aro-ness" and eccentricity. And we were usually satisfied with our judgments.

It is usually difficult, if not impossible, for someone popularly regarded as eccentric to dispel that notion. All efforts to shake off this ascribed eccentricity are usually regarded as further proofs or confirmations of eccentricity. I remember *Madman*, one of the short stories of Chinua Achebe, where a perfectly normal gentleman who was provoked into a stupid action by a madman ended up being declared a madman while the madman becomes the sane man. The unfortunate gentleman tried all he could to convince his people that he was not mad. But he did not succeed. He carried the label to the grave. Mathematics students and teachers who deservedly or otherwise acquired the reputation of eccentricity usually carried the honour to their graves – even if, in later life, they had renounced the subject or their brilliance in it had departed from them.

But why am I remembering this subject now? Readers may recall that in my piece, *My precious acquisitions (The Guardian,* December 17, 2009), I reported that I received many book presents that year and that none of my benefactors told me why exactly he or she had sent particular books to me. I left matter at the level of speculation but with the promise that I would in future appreciate some of them in this column. One of such books is *A Mathematician's Apology*, first published in 1940. It was authored by Professor Geoffery Harold Hardy, a British pure mathematician more familiarly known as G.H. Hardy.

Although I had come across G.H. Hardy and excerpts from his *Apology*, I cannot remember having seen the book until my journalist friend and Comrade sent a copy to me late in 2009. Reading the book, and checking through the Internet, I was convinced that the man was indeed eccentric. In fact, mad. But he was a brilliant mathematician, indeed a genius. However, what is true about eccentric mathematicians in general – namely, that they are not eccentric in the way they do mathematics or else they would not be brilliant mathematicians – applies, with great force, to G.H. Hardy. He was eccentric, not in the way he did mathematics, but in the way he did everything, excluding mathematics, and spoke about everything, including mathematics. Hardy was "maddest" not when doing mathematics –which he did beautifully like a "creative artist" – but when he spoke about mathematics.

The edition of *A Mathematician's Apology* which I have with me now was published by Cambridge University Press in 1992. It covers less than 40,000 words with the Foreword taking up about two-fifths of this volume. The Foreword was written in 1967 by one of Hardy's life-long friends, Dr. C.P. Snow. The words are printed in fairly large letters and arranged in short pages. The production is beautiful – the type that Hardy, a lover of order and patterns, would have appreciated. The main book, that is, Hardy's book minus the Foreword, is divided into 29 short sections and a two-page "Note", a sort of Appendix. In this "Note" Hardy faithfully recorded some of the views of reviewers which – for various reasons, philosophical and technical – he was unable to integrate into his monograph.

To conclude this technical introduction to the book, I find it helpful and appropriate to quote from the publisher and two newspaper reviews: "This 'apology', written poignantly as his mathematical powers were declining, offers a brilliant and engaging account of mathematics as very much more than a science. When it was first published, Graham Greene hailed it alongside Henry James' notebooks as the best account of what it is to be a *creative artist*" (Publisher); "(The book) is one of the most eloquent descriptions in our language of the pleasure and power of mathematical invention" (*The New Yorker*); "Great mathematicians rarely write about themselves or about their work, and the few of them would have the literary gift to compose an essay of such charm, candour and insight, a manifesto for mathematics itself" (*The Guardian* of London).

Although I would frame the first two citations differently, I would still endorse them. But I reject the last. It would have been sufficient for the reviewer with *The Guardian* of London to praise G.H. Hardy's book for its great "charm, candour and insight", and leave the alleged limitation of mathematicians' "literary gift" – a generalised assessment that was false, and still false. The review would have lost nothing with such truthful moderation.

Godfrey Harold Hardy was born in Cambridge, England, on February 7, 1877, received his education and training in mathematics in Cambridge, did most of his work as a teacher and researcher in mathematics in Cambridge and died on December 1, 1947, at the age of 70, in Cambridge. The book, under appreciation, *A Mathematician's Apology*, was first published in Cambridge. In his adulthood, the only human activity, other than mathematics, which Hardy enjoyed, the only other activity which he respected, was the game of chess. A problem in chess was, for Hardy, an "exercise in Pure Mathematics, although he conceded that chess might not be "entirely" a game "since, Psychology also plays a part". His main areas of work were Mathematical Analysis and Theory of Numbers.

Hardy had very few close friends, including his main collaborators in mathematics, J.E. Littlewood and a young Indian, Ramajunan, and the man who wrote the Foreword to *Apology*, C.O. Snow. They were all males. Apart from close friendships he had emotional, but non-sexual, relationships with a number of young men. But although his friends were few, he was actively sympathetic to the masses of the poor and the "disadvantaged", preferring them to "large bottomed" people – that is, "the confident, booming, imperialist bourgeois English" who included "most bishops, headmasters, judges and all politicians, with the single exception of Lloyd George". Hardy was an *atheist.* He was a bachelor all his life. His sister took care of him in his last years.

The most famous of our own eccentric mathematicians was Professor Chike Obi who died about two years ago at the age of 87. Readers may wish to refer to my tribute, *For Professor Chike Obi* which appeared in this column on March 27, 2008, for a brief survey of his eccentricity. Chike Obi must have either met, or felt the presence of, G.H. Hardy when the former was in Cambridge in the mid-1940s as a graduate research student of Differential Equations. Although G.H. Hardy and Chike Obi were both brilliant mathematicians, indeed geniuses, although they were both seen as "eccentric", especially in the way they talked about mathematics, they were dissimilar in several material particulars. In other words, Hardy and Chike Obi haboured different types of eccentricity.

We may illustrate: Whereas Hardy was almost a-political, and regarded politicians with disdain, Chike Obi was acutely political and understood the language and indices of political power; whereas Hardy believed in the "harmlessness" or "neutrality" of "pure" mathematics, and loved and remained with that branch of mathematics solely on account of this, Chike Obi held fast to the view that our break from underdevelopment would come through science and technology in which the development of mathematics and theoretical physics occupies a critical position. The last point can be framed differently: Whereas Hardy reserved his eulogy for pure mathematics, Chike Obi poured encomiums on science and technology in general. And whereas G.H. was almost celibate, Chike Obi was very comfortable in the company of women.

Next week, in the concluding part of this essay, I shall briefly present what I consider the mixture of myth and genius in both Chike Obi and G.H. Hardy, especially in the way they talked about mathematics.

• *To be concluded next week.*

Dialectics of myth and genius(2)

By Edwin Madunagu

IN the first part of this survey of the life and work of late Professor G. H. Hardy (1877-1947) and his book, *A Mathematician's Apology*, I devoted myself to general comments on the great and eccentric English mathematician. And by way of comparison, I brought in our own Professor Chike Obi (1921-2008), an equally great and eccentric mathematician, where "eccentric" is used in its ordinary dictionary sense. I acknowledged both men as geniuses. In this concluding part, I concentrate on aspects of their thoughts on mathematics, science and technology. You may recall that I had indicated that G. H. Hardy and Chike Obi were eccentric, not in the way they did mathematics, but in the way they talked about it. I shall build on this, starting with Nigeria's Chike Obi.

On December 8, 1975, in Dakar, Senegal, Chike Obi gave a Keynote Address to an *International workshop in mathematics*. In this Address, titled: *The contribution of mathematics to the development of Africa*, Chike Obi said: "All of us know the meaning of technology and how to manipulate some of its gadgets; even the most illiterate can drive a car; every child can switch on an electric light; gorillas can be taught to carry guns; but only a few can even comprehend Maxwell's equations for a homogeneous isotropic medium containing no free charge". Mixture of genius and myth? Yes, but you need to read G. H. Hardy.

At another point in the same Address, he looked directly at his audience, made up of eminent mathematicians from across African and the world, and declared: "That branch of Physics which the present rulers of the world regard as their special preserve is *Theoretical Physics* (Chike Obi's emphasis), or Mathematical Physics, or Applied Mathematics. The experimental physicists themselves acknowledge that it requires superior brains to be a theoretical physicist. All you need for this type of work is paper and pencil and a *good* library". Mixture of myth and genius? Yes, but wait for G.H. Hardy.

Then, in the closing paragraph of his Address, to remove all doubts about his thoughts on this subject, Chike Obi declared: "Unless our race contributes to science and technology the present advanced races will never accept us as their equal. Any fool can be a diplomat and babble in the United Nations. But it requires some innate superiority to invent a thermionic value". Mixture of myth and genius? And we cannot deny that the speaker was very bright, that he was not a charlatan. Wait for G. H. Hardy.

Nine months before Dakar, on March 17, 1975, Chike Obi had delivered a Keynote Address to the *16th Annual Conference of the Science Association of Nigeria* in Calabar. He spoke frankly – very frankly – on *Nigerian Scientists in the Development Economy*. But not surprisingly, Chike Obi went beyond the subject, touching on our technological backwardness, ethnicity (tribalism) and uneven development, the "quota system" or its modern name, "federal character", religious fanaticism and fundamentalism, revolution and modernisation, transfer of technology, foreign assistance, etc. He ended with his usual slogan "Long live the people". I made more than 20 markings on the eight-page paper, but I find it inappropriate (or "politically incorrect"), at this time, to present excerpts. Except the following tempered prediction: "Watch my words; it took the Soviets about 15 years to install a steel factory in Hungary; it will take them eternity to do so here!" How prophetic!

Now to G. H. Hardy. Snow began his Foreword to Hardy's *A Mathematician's Apology* by telling us how, on his being introduced to Hardy for the first time, the mathematician started examining him on the game of cricket which their mutual friend had said Snow knew something about. Snow told us: "As I had plenty of opportunities to realise in the future, Hardy had no faith in intuition or impressions, his own or anyone else's. The only way to assess someone's knowledge, in Hardy's view, was to examine him. That went for mathematics, literature, philosophy, politics, anything you like. If the man had bluffed and then wilted under the questions, that was his lookout. First things come first, in that brilliant and concentrated mind" (page 11).

Well, that was Hardy's method of enquiry into someone's knowledge in anything, including mathematics and the game of cricket. And so he subjected a newly introduced acquaintance to a rigorous examination. I don't think Chike Obi would have done so unless he thought the fellow was posturing or something important – say, strategic appointment – was at stake. Although many people, including my humble self, would sympathise with Hardy, not many would endorse his method. But strictly speaking, Hardy was right: truth and confirmation come via interrogation. It is however not in every instance that one needs to immediately establish and confirm a claim. I cannot imagine a world or a society where that rule operates. In any case, I would personally not wish to live there.

Hardy had deep contempt for people who reviewed or critiqued other people's works. "Exposition, criticism, appreciation, is work for second – rate minds", he asserted. But the mathematician lied, if I may borrow the expression of our poet, Odia Ofeimun. And, applying this thoroughly eccentric thesis to himself and the book he was writing, Hardy said: "If then I find myself writing, not mathematics, but 'about' mathematics, it is a confession of weakness, for which I may rightly be scorned or pitied by younger and more vigorous mathematicians. I write about mathematics because, like any other mathematician who has passed 60, I have no longer the freshness of mind, the energy, or the patience, to carry on effectively with my proper job". (page 63). And yet his book is a masterpiece!

On this question of age Hardy addressed himself to his compatriots: "No mathematician should ever allow himself to forget that mathematics, more than any other art or science, is a young man's game. To take a simple illustration at a comparably humble level, the average age of election to the Royal Society is lowest in mathematics (pages 70-71)... Newton gave up mathematics at 50, and had lost his enthusiasm long before; he had recognised no doubt by the time he was 40 that his great creative days were over. His greatest ideas of all, fluxions and the law of gravitation, came to him when he was 24 (page 71)... Galois died at 21, Abel at 27, Ramanujan at 33, Riemann at 40... I do not know an instance of a major mathematical advance initiated by a man past 50" (pages 71-72).

Then, hear this: If a man of mature age loses interest in, and abandons, mathematics, the loss is not likely to be very serious either for mathematics or for himself. On the other hand the gain is no more likely to be substantial: The later records of mathematicians who have left mathematics are not particularly encouraging". Hardy gave illustrations from the lives of Newton, Painleve and Laplace after "retirement". Mathematics had said, "is not a contemplative but creative subject; no one can draw much consolation from it when he has lost the power or desire to create; and that is apt to happen to a mathematician rather soon. It is a pity, but in that case he does not matter a great deal anyhow, and it would be silly to bother about him". At the time he was writing the *Apology*, about the age of 60, Hardy believed he was finished, first as a mathematician, then as a human being. He died shortly after.

Chike Obi once told me, as his student, that any brilliant and serious student of mathematics would excel in any other discipline. That was by way of dismissing my "Marxist fire". I read the same opinion in G.H. Hardy's *Apology*. But Hardy went further. The latter claimed that any mathematician who was equally committed to any other subject could not be a great mathematician. In other words brilliance in mathematics would exclude any other brilliance. Although he went on to cite examples – you could always find examples – it is clear that Hardy was projecting from his own life: he was a great mathematician, but an eccentric in everything else.

The "best" mathematics was, in Hardy's view, both "serious" and "beautiful". He then went on to explain what he meant by "serious". The seriousness of a mathematical theorem lies, according to Hardy, "not in its practical consequences...but in the *significance* of the mathematical ideas which it connects. Roughly, a mathematical idea is significant if it can be connected, in a natural and illuminating way, with a large complex of other mathematical ideas". Correct, and beautifully put. Hardy gave two examples. One is Euclid's proof of the existence of an infinite of prime numbers, where a prime number is a number that cannot be resolved into small factors. Examples are 2, 3, 5, 7, 11, 13,

Another serious mathematical idea, according to Hardy, is Pythagoras' proof of the 'irrationality' of the square root of the number 2, that is, the impossibility of expressing the square root of 2 as a simple fraction, where the denominator is not zero. What is known today in mathematics as the *Theory of Numbers* is erected on these two theorems and a few others. Beautiful exposition by Hardy. In spite of his eccentricity!

• *Concluded.*