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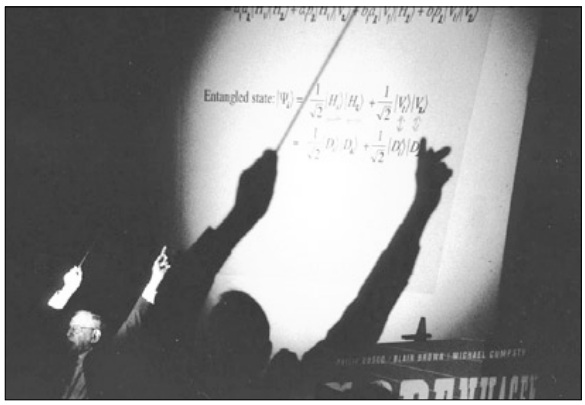

Above: Eugen Merzbacher explains quantum mechanics for an audience at Michael Frayn's Copenhagen. Bottom left: Guillermo Martínez

Literature is increasingly turning to science for inspiration. **Michael Williams** spoke to Argentine author **Guillermo Martínez** about maths and The Oxford Murders

A neurosurgeon is having lunch with a historian. The neurosurgeon explains that he intends to build up a good practice and make a name for himself before retiring and writing a history of the field. The historian responds that he plans to retire and take up neurosurgery.

This self-congratulatory joke is occasionally told by scientists and mathematicians. Any fool can be a success in the arts, it says, but it takes a lifetime's training to reach the level of skill required to deal in facts, systems and numbers.

Recently though, scientists and writers have been making tentative attempts to end this silly schism. Guillermo Martínez's The Oxford Murders, a quiet and graceful mystery set here in Oxford, is the latest book to attempt to integrate plausible science into serious fiction. It is Martinez's first full-length novel to be published English. It has been translated into dozens of languages and won lucrative prizes. A film adaptation is now in preparation.

Success aside, the book has another distinguishing feature: mathematics. Martínez is a professor of mathematics at the Universidad de Buenos Aires and, rather than hiding his mathematical pebbles on a beach, he now proudly displays them in his fiction.

The Oxford Murders begins in 1993 as the unnamed narrator, a young Argentinian, arrives in Oxford to join the Mathematical Institute. He takes up lodgings with a cheery landlady and her granddaughter in Cunliffe Close in Summertown. The narrator's naive observations of Oxford, England and academia are interrupted by the murder of his landlady. The only clue to the crime is a piece of paper marked with a circle and the words 'the first of the series.' With the help of Arthur Seldom, an Oxford fellow, mathematician and popular author, the narrator sets about solving what becomes a series of murders, each with cryptic clues.

This synopsis may be redolent of The Da Vinci Code with its cute mental games. That is probably fair in terms of bare narrative: the book is certainly an easy, breezy read, but the mathematics is not limited to puzzles. The characters' ruminations on logic and philosophy raise it from an airport novel to the kind of literary fiction that gets reviewed in the London Review of Books.

Martínez's background in maths and success in literature is not unique: both Primo Levi and Kurt Vonnegut were chemists, and Nabakov was a research fellow in zoology at Harvard, but it is unusual and worth recounting. I had the opportunity to discuss his life and his thoughts on writing when he visited Oxford last week.

Martínez was born in Bahía Blanca, Argentina in 1962. He grew up surrounded by books, won Argentina's national short story prize in 1982, and moved to Buenos Aires shortly afterwards. Encouraged by his 0aptitude for the hard sciences and the financial security it promised, he pursued an academic career in mathematics and was awarded a PhD.

But throughout this time in Buenos Aires, he had maintained his interest in literature and writing. "My first book of short stories was published when I was 25 [before the PhD] and I wrote a book of short stories even before that, when I was 18 or 19. So my writing came first."

He managed to juggle his growing reputation as a writer and his promising mathematical career until writing was put on hold when he was offered a postdoctoral postion at the Mathematical Institute. He moved to Oxford, renting a flat in Cunliffe Close in Summertown (if you were paying attention when the plot of The Oxford Murders was summarised earlier, this may sound familiar). He worked with Hilary Priestly, on whose work he had based his doctoral thesis.

"I had these kind of tough years here. I was doing really tough maths. I came here to do whatever my Director of Studies was trying to, so I had to study a lot and keep the pace with the other mathematicians. I wanted to keep going with my literature, because I had published my first novel in Buenos Aires, and I was getting some kind of name as a success and I was enthusiastic about that,

PERSONALITY – *Michael Winner*
"Laugh them into bed"

CENTRESPREAD – *The state of our affairs*
Why our sex lives are in crisis

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but I couldn't do any of that while I was here."

But, as Martínez said, "in my country we have a saying: there are no lost years to a writer."

His interest in English literature and culture developed. "Of course, I didn't make a strong friendship with English people because, well, they are friendly, but only up to a point. I rather prefer that kind of first layer of politeness."

His collaboration with Priestly generated that most valuable of academic currency, publications, and he returned to the Universidad de Buenos Aires where he took up a teaching position in the Department of Mathematics. In the familiar environment of his home country his writing career resumed, but he retained his interest in Oxford and England.

And so, suffering from a case of writer's block as an ambitious novel ground to a halt, Martínez's thoughts turned to the Oxford he had recently left. Inspired by the G K Chesterton short story The Sign of the Broken Sword, (which appears in The Innocence of Father Brown), he wrote a mystery which has gone on to become his most successful book – certainly outside of his native Argentina.

Translations and reprintings continue apace – the book was first published in North America in October and republished in paperback in the UK a couple of weeks ago. The film adaptation, to be directed by Álex de la Iglesia, will begin shooting in Oxford in the spring.

In March of last year Nature, the pre-eminent international journal of science, published a special issue entitled Artist on science: Scientists on art. In it, Alan Lightman, formerly an astrophysicist at Cornell and Harvard, and now a writer and professor of the humanities at the Massachusetts Institute of Technology, thus explained the beauty of mathematics:

"I loved solving a set of connected equations, one logical step after another. I loved the shining purity of mathematics, the logic, the precision. I loved the certainty. With mathematics you were guaranteed an answer, as clean and crisp as a new $20 bill. And when you had found that answer, you were right, unquestionably right. The area of a circle is πr^2. Period."

But as Lightman later notes this is not the stuff of great fiction: "For artists the question is often more interesting than the answer, and often an answer doesn't exist. One of my favourite passages from Rilke's Letters to a Young Poet is this: 'We should try to love the questions themselves, like locked rooms and like books that are written in a very foreign tongue.'"

Compelling characters must retain a certain mystery and unfathomable depth, even for the author. Once we have seen to the bottom of their hearts, the novel is dead for us."

With this in mind it comes as no surprise that those novelists who have most successfully bridged the divide between the arts and science have found inspiration in the infinity of outcomes offered by quantum mechanics.

Top to bottom: Kurt Gödel with Albert Einstein pictured in 1954; novelist and astrophysicist Alan Lightman; Oxford's Philip Pullman. Bottom right: Ludwig Wittgenstein

Michael Frayn's play Copenhagen portrays a controversial meeting between Werner Heisenberg and Neils Bohr, during which they discuss the development of nuclear technology for Nazi Germany. Frayn uses quantum complementarity and uncertainty as metaphors for ambiguity in language and history. For Frayn, quantum mechanics is "that final core of uncertainty at the heart of things."

Philip Pullman's His Dark Materials trilogy is set in a self-consistent multiverse that is inspired by the Many Worlds interpretation of Quantum Mechanics. Children can even read The Science of His Dark Materials for a surprisingly detailed exploration of the physics. For Pullman, "[science] has to do what all backgrounds do: stand firm and solid. It must not sway alarmingly when someone walks into it or sound hollow when struck, it must conform to the rules of perspective and be vivid enough to convince but not so hectic as to distract."

David Lodge's Thinks... plays similar games with consciousness and artificial intelligence, which are perhaps the least understood areas of all science. They are certainly the fastest moving.

Mathematics in fiction is a tougher nut to crack. In part, this is because higher mathematics is even more impenetrable to the outsider than, say, string theory. Despite being a theoretical physicist whose office is just a few yards from the Mathematical Institute, my understanding of what they're up to in there comes almost entirely from Timothy Gowers's Mathematics: a very short introduction.

But it is also due to the 'shining purity' of mathematics described by Lightman. Where's the fun (and humanity) in logic and determinism? Martínez's The Oxford Murders finds an ingenious solution to this problem. There do exist areas of higher mathematics rich in ambiguity. Martínez selects Gödel's incompleteness theorem and Wittgenstein's rule-following paradox, both of which provide for uncertainty in mathematical systems. He integrates them into his fiction, drawing striking parallels between these profound results and the tropes of crime fiction.

2, 4, 8, 16, then what? 32? Sure. But 31 works too. Draw a line between two points on the circumference of a circle and you divide the circle in two. Draw a line between three points and you divide it in four. Four points give eight. Five points give sixteen.

But six points give thirty-one. Wittgenstein argued that it is possible to come up with a rule to justify any continuation of a sequence. For Martínez's murderer, this provides endless fun, as his clues (circles, fish, triangles) can't provide enough information to know where he will strike next.

As Martínez explains in The Oxford Murders, Gödel's incompleteness theorem "shows that even at the most elementary levels of arithmetic there are propositions that can neither be proved nor refuted starting from axioms, that are beyond the reach of these formal mechanics, and that defy any attempt to prove them; propositions which no judge would be able to declare true or false, guilty or innocent."

Poor Gödel's incompleteness theorem is often misused, particularly on the internet, to make the ludicrous assertion that we know nothing. Those who really understand the result rightly worry when they see it expressed in a language so ambiguous as English (or Spanish). However, Martínez's experience means that his careful use of Gödel is irreproachable.

So Martínez's first achievement is the accuracy of his mathematics and his observations of academia, as evidenced by reviews of the book by Marcus du Sautoy of All Soul's College in The Guardian and Robin Wilson of The Open University in The Notices of the American Mathematical Society.

His second achievement, which is much more important, is writing a satisfying, bracing, keenly observed thriller. The maths is deployed with a lightness of touch that ensures the maths serves and honours the fiction and not the other way around.

Was it necessary to include the mathematics? No, if truth be told. The maths could be lifted out of The Oxford Murders almost intact, leaving a perfectly comprehensible book behind.

Kurt Vonnegut writes, "novels that leave out technology misrepresent life as badly as Victorians misrepresented life by leaving out sex." Note that he does not mention maths. Maths is not part of everyday life. But surely it is sufficiently elegant to deserve an occasional cameo. William Morris was on the money when he said, "have nothing in your home which you do not know to be useful, or believe to be beautiful." He just meant to say 'novel' rather than 'home'.

Michael Williams is doing a PhD in theoretical astrophysics

The Oxford Murders is out now, published by Abacus at £6.99

"Success aside, the book has another distinguishing feature: mathematics"