Beauty the clue in search for mathematical truth

On eve of his 80th birthday, Sir Michael Atiyah tells **Mike Wade** of his passion for mathematics

When, five years ago, he shared the £480,000 Abel Prize, the equivalent of a Nobel prize in the world of mathematics, Sir Michael Atiyah might have listened to his wife's urgings to put his feet up and settle into a comfortable life. But that would not have been his style. "Some mathematicians retire," he concedes with a smile. "I don't think I have."

This week, Sir Michael's 80th birthday and a life dedicated to science and political activism is celebrated in a series of events. A three-day conference celebrating his contribution to geometry and physics, at the University of Edinburgh Informatics Forum, ends today, his birthday. Tomorrow and on Friday his Sir Michael's role in promoting disarmament is recognised with readings and lectures dedicated to exposing the folly of nuclear weapons.

Much has been achieved at an age when contemporaries might have settled for a quiet life. In 1995, as president of the Royal Society and aged 67, Sir Michael made a stinging attack on Britain's nuclear weapons policy.

Subsequently he accepted the presidency of the influential Pugwash disarmament conferences, which unite scientists in opposition to the arms race.

He still believes passionately in the cause, which, he says, is more important to the world than maths, "because if we blow ourselves up, there will be no mathematics anyway".

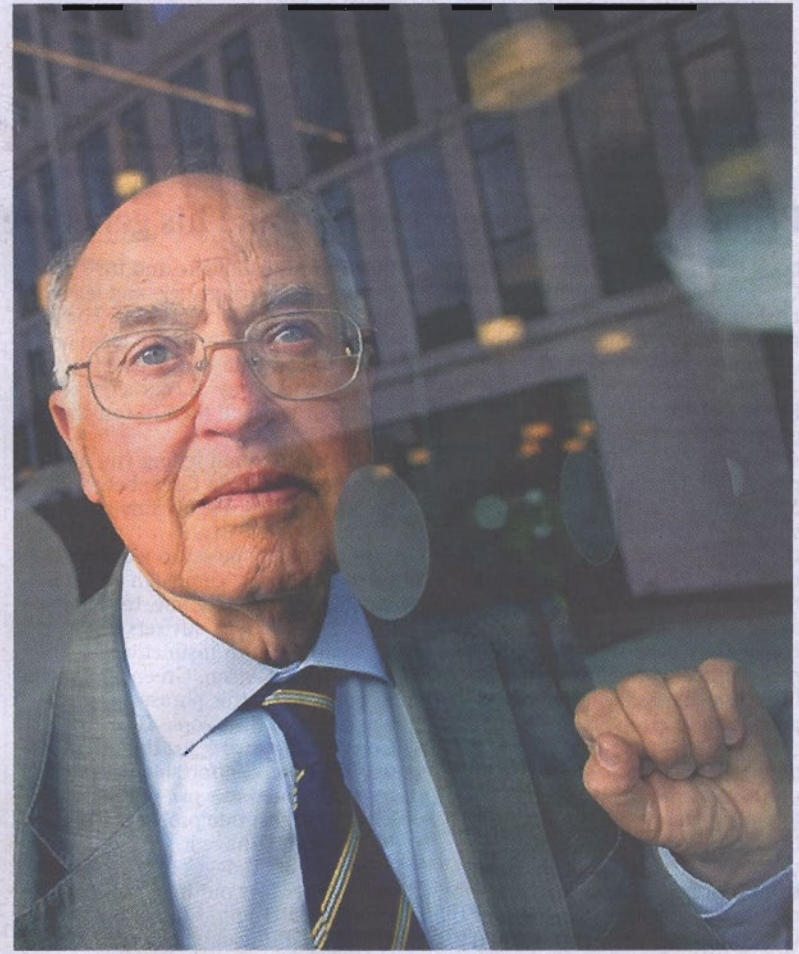
Sir Michael discovered his aptitude for mathematics during his boyhood in the Sudan. His Lebanese father was an Oxford graduate and a civil servant, his mother was Scottish and he grew up regarding himself as British, studying at Manchester Grammar School and Cambridge University.

The key professional encounters in his life came in the United States in the 1950s, when he joined the Institute for Advanced Study, at Princeton University, a gathering place for the world's most brilliant mathematical minds. Here he forged relationships which have endured, and much of his greatest work has come from what he calls the "dialogues of ideas" established there.

His greatest achievement has been the Atiyah-Singer theorem, which secured his fame and prize money, shared with his collaborator, Isadore Singer, of the US. At the time, he said he couldn't think what to do with his share; the sporty red Lexus parked outside the Informatics building suggests he has since given it more thought.

In simple terms, the theorem provided a kind of analytical bridge which could be shifted between disciplines. "The theorem technique enables you to get to an answer by-passing all the intervening calculations," he says. The idea "was something where you could calculate numbers of solutions by very indirect methods which applied in a very wide range of situations: geometry, algebra, physics…"

JAMES GLOSSOP



Mathematician Sir Michael Atiyah celebrates his 80th birthday today

Maths, he says, is something he plays out in his mind as he walks around his flat and his garden, and he jots things down — "the dull stuff" — only when he has to check something.

"Walking helps the physiological process. You have to maintain a very high pitch of concentration when you do mathematics. It's illumination – shining the mind's eye on a problem and really seeing through it.

"The old clichés about the beauty of maths are true. It has beauty within it, but not all parts are equally beautiful. Beauty in mathematics is the thing that helps you in the search for truth."

Some people, he believes, are born with mathematical brains, although they might choose other careers. One former student won the Nobel Prize for Economics, another is the best-paid hedge fund manager in the US. So was Sir Michael never tempted to use his mathematical skill in a wider world? Could he have solved the global financial crisis?

"Economics is a combination of gambling, psychology and who knows what," he says. "The current crisis? I think people made a bloody mess. You can foretell that the bubble will burst – the question is when. If you gambled on it you might win or lose a lot of money. I just didn't gamble."