Memories of a Mathematician

by Donald Birkby Eperson, Canon Emeritus of Salisbury

Eighty years ago, at a preparatory school, my mathematical education was soundly based on books such as 'A School Geometry' by Hall and Stevens, which was a revised version of the authors' 'Text Book of Euclid's Elements', used by my father in Victorian times. Euclid's axioms, definitions and postulates were far above the head of a nine-year-old boy, whose enjoyment of mathematical activities was not stimulated by 'homework' consisting of the memorizing of theorems such as the Pons Asinorum. The approach to formal geometry nowadays, through shapes and patterns, is more enjoyable and enlightening, as I have found by experience.

As a scholar at St Paul's School, founded by Dean Colet in 1509 for the free education of boys in 'Latin and Greke', I enjoyed writing Latin and Greek verses. This was probably because they were a kind of word puzzle whose solution depended upon finding words with simple rhythms that fitted into a musical framework of pentameters and hexameters.

When I reached the Lower Classical Eighth Form, the class was engaged upon translating Thucydides' account of the Persian Wars, that contains an account of a battle being postponed because of an eclipse of the moon. The master explained that an eclipse of the moon was regarded as a bad omen, but that the eclipse of a full moon was more terrifying still. Up went my hand: "Please Sir, you can't have an eclipse of the moon unless it is full!" I was allowed to draw diagrams on the blackboard in an attempt to explain why this is so, but in vain. A week later I was transferred to the Mathematical Eighth Form.

Here, I worked on books such as Smith's 'Conic Sections' and Askwith's 'Analytical Geometry', whilst also finding an interest in Rouse Ball's 'Mathematical Recreations and Essays'. The form master, Capt. H. R. Pullinger, gave us introductory talks on new topics, and then left us mainly to our own activities. He never moved from his desk during the 1½ hour lessons twice a day. We were also expected to do at least two hours of work at home each weekday evening.

I was intrigued by Pascal's Theorem and its dual, Briançon's Theorem, and spent one summer holiday exploring the Theory of Duality in geometry and trying to find other theorems in which the interchange of the words 'point' and 'line' and the phrases 'lie on' and 'touch' led to pairs of dual theorems.

In the year 1922–23 I sat for a University Scholarship in Mathematics and went on to Christ Church, Oxford, gaining a First in Finals in 1927. My tutor, Mr. T. W. Chaundy, was a successor to the lecturer in Mathematics known as Lewis Carroll. With some prize money I acquired a small library of books on the architecture of Oxford and of English Cathedrals. Many visits were made to village churches, cathedrals and abbey by bicycle.

I remember many lectures; in particular some on Cubic Curves, Cubic Surfaces, Professor Love's demonstration of the properties of gyroscopes using a bicycle wheel, and G. H. Hardy's lecture on Geometry where he covered himself from head to toe with chalk-dust and periodically came out with phrases such as "It is obvious that...". Hardy's book, 'A Mathematician's Apology', has been my mathematical gospel ever since I read it. I share his belief that Mathematics is an Art in its own right, and a source of intellectual delight, closely associated with the beauty to be found in the visual arts and in music.

For 11 years, I was the junior mathematical master at Sherborne School, where I also taught Divinity.

I trained myself by reading such books as 'The Teaching of Elementary Mathematics' by Godfrey and Siddons. A valuable asset was Boon's 'Companion to Elementary School Mathematic', and I soon began my own collection of notes on recreational topics, such as Magic Squares, Dissections and Number Puzzles. I soon learned the value in the classroom of 'side-tracking' from the appointed syllabus, and exploring topics such as Pythagoras' connection between mathematics and music.

In my spare time I organised visits to places of archaeological and architectural interest. I began to study for the General Ordination Examination and, after six months at Ripon Hall Theological College, was ordained Deacon in Salisbury Cathedral in 1930.

The Bishop of Salisbury, Dr. Lovett, showed confidence in me by offering me the living of Charminster and the chaplaincy at Herrison Hospital. For the next 15 years, I was kept busy with six services each Sunday, and occasional 80-mile weekday journeys to Salisbury for Diocesan meetings.

In September 1939, I married Miss Phyllis Perrett, a Cambridge mathematician, whom I had met whilst singing madrigals at Sherborne, where she was on the staff of the Girl's School.

Later, in 1951, I was appointed Honorary Canon of Salisbury Cathedral, in recognition of my work for education, which included being an Inspector of the religious teaching on behalf of the County Education Committee. Two years later I was appointed as Chaplain of Bishop Otter College in Chichester.

My wife became the warden of an hostel for 16 women students and I was also a part-time lecturer in Divinity and in Mathematics, teaching courses in mathematics and basic courses in mathematics for future teachers. Apart from the Ministry's 'Handbook of Suggestions for Teachers' there were few books for the guidance of training college lecturers when devising basic courses in mathematics. HMIs gave valuable help and encouragement, and in 1956, Mr. A. P. Rollett visited and invited the College to organise a supplementary one-year course for teachers who wished to improve their knowledge of mathematics and to teach the subject at secondary school. From 1957–1964 the course attracted over 70 men and women teachers.

Volunteers on the course assisted me in an investigation into Goldbach's Conjecture that every even number is the sum of two prime numbers, which yielded some interesting discoveries but no proof of the validity of the conjecture.

In 1961, I enquired into the mathematical courses provided at over 120 Training Colleges for Teachers. The result of this research was that very few colleges appeared to make an effort in assessing the capability of students to teach mathematics in school. November 1996
probationary year. The majority expressed deep concern at mathematics. In consequence, many obtained the Teacher's Certificate, but dreaded the prospect of having to teach arithmetic in Primary schools. The headteachers of 101 Secondary Schools looked for better-trained all-subject teachers, and reported a dearth of 'specialists'. Many girls were allowed to drop mathematical studies as soon as they showed symptoms of 'mathophobia' when teenagers. Meanwhile, I became a Principal Lecturer and was promoted to Dean of Chapel.

We considered our work with the teachers taking the Supplementary Course to be very worthwhile but, at the age of 60, my wife and I were retired. In my spare time, I paid an annual visit to each of the church schools in the Archdeaconry of Chichester as Diocesan Inspector. I was fortunate to obtain a post as Senior Lecturer in Mathematics for 5 years at Christ Church College, Canterbury, where my wife taught sixth-form mathematics. I was licensed by the Archbishop to officiate in the diocese of Canterbury, so that I have been able to conduct Sunday Services in over 40 parish churches in and around Canterbury, besides being a Minor Canon (or Cantor) at the Cathedral for 4 years.

When I retired in July 1960, after 16 years of service in C.E. Colleges of Education, I worked full-time for one term at a Secondary Modern School at Deal, where the Headmaster had made use of my Mathematics for Pleasure material. This was the outcome of my work with college students suffering from 'mathophobia', for whom I devised activities, based upon traditional and 'modern' mathematics, that would stimulate their interest and convince them that elementary processes and ideas were not beyond their powers of comprehension. My belief is that, at every stage, mathematical activities can be as enjoyable as any other topic in the school curriculum. The material was never published, but the duplicated sheets were in great demand from over 500 teachers.

Since 1970, I held temporary part-time posts at local schools. In 1973, Miss Margaret Gow collaborated with me in producing a 64-page booklet entitled Mathematical Recreations, as a source of ideas and materials to supplement the conventional kinds of classroom work. Four thousand copies were sold, producing a profit of £400 for Oxfam. This was followed by Puzzles, Pastimes and Problems in MiS. During the 1970s, my Maths Teasers were published regularly in the 'Maths Extra' issues of the Times Educational Supplement, as well as occasional articles on recreational mathematics.

Various contributions were made to the Mathematical Gazette, including an essay on Lewis Carroll - Mathematician, Triangular Numbers, the 'Doodling Theorem' (with its formula $P - L + R = 1$, corresponding to Euler's $V + F = E + 2$), and Eperson's Conjecture (that the sum of any 3 consecutive square numbers, $n^2 + (n + 1)^2 + (n + 2)^2$, can always be expressed as the sum of three other square numbers when $n > 1$). I produced a film-strip called 'Alice in Numberland' looking at the professional and leisure-time activities of the Revd Charles Dodgson. This was presented to the Lewis Carroll Society in London, after which there was a renewed interest in his work as a creative mathematician.

In 1988, I produced a book called Patterns in Mathematics, emphasizing mathematics as a form of art which can be enjoyed by young and old alike, and containing hundreds of original puzzles and pastimes. Just as Rhythm is the basic element in all forms of Music, Pattern is the basic element in Mathematics that can give pleasure to everyone.

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The Big Story
Geoffrey Matthews

Mr Big left the Big Apple in a Boeing 747 (which is bigger than the 727). He flipped over the pages of the big, glossy flight magazine and came across the trick question 'Which is bigger, 2 or 4? Big Deal, he grumbled, who cares?

He was greeted at Heathrow by a big delegation of officials and was whisked away in a big limousine to his big country mansion. He found his young boy, Shorty, in tears. He had fallen over and had a big lump on his forehead. His father cheered him up: 'big boys don't cry and you're a big boy now'. Shorty cheered up immediately and asked if he could go out and play football with his cousins Fatty and Lofty. 'You might get hurt', said Mr B, 'I'm afraid you'll have to wait till you're bigger. You get on with your homework now, and when you've finished I've got tickets for the Big Top.'

Shorty burst into tears again. 'I don't understand the question Draw a big house. 'Never mind', said Mr B, 'I'll do it for you'. He drew a picture of Buckingham Palace the size of a postage stamp, and then found a big (A2) piece of paper on which he quickly made a big sketch of a 2-roomed cottage. 'Now you can't lose', said Mr B, and when the teacher sees these, it will be your big moment'.

Next day Shorty was late for school as there was a big pile-up on the M 25, so he had to creep in at the back of the big assembly hall, where the school were singing (no big prize for guessing):

All things bright and beautiful, All creatures great and small.

Later, at the break, Shorty shared his little cake with his friend Tina. Big-hearted as ever, he told her that she could have the bigger half.

It is an uphill job to stop young children from using 'big' indiscriminately, and it might be a good exercise to turn the above story into English.

By convention, we read $4 > 3$ as 4 is greater than 3. However Julie was a bit shatted when a child wrote a page full of correct statements such as $4 > 3, 7 > 5$, but ended with $8 > 8$, on the ground that she had drawn the first 8 bigger.

Again by convention, numbers like 10 000, 5 million are referred to as large numbers and its worth starting young:

'That's a big number'

'Yes, dear, it's a large number'.

Piaget belonged to the society for the suppression of big with his pair of pencils, one short and fat and the other long and thin. 'Bigger than' clearly wasn't enough: one was longer and the other was fatter.

Perhaps we could have bigger for volume. A four-year-old in Cardiff was climbing through a barrel in the playground. I foolishly asked if I could go through, and got the withering answer: 'You're too bloody big'.

There's no answer to that. ❄️