May 1998
Staff room

Delegate's diary: MA Conference 1998

The Mathematical Association Annual Conference

University of Warwick, 4th − 6th April 1998.

Over four hundred teachers and lecturers attended this year's Annual Conference of The Mathematical Association. The conference opened with an address from Anthea Millet (Chief Executive of the Teacher Training Agency); on the Sunday afternoon, Tony Gardiner (University of Birmingham and President of The Mathematical Association) gave the Presidential Address; and on the Monday, David Tall (University of Warwick) gave the closing address.

In addition to the three plenary lectures, there were nine workshop sessions. The workshops were organised in six strands, with at least one workshop in each strand in each session. The strands were (with some examples of workshops in them):

- Developing Primary Mathematics Teaching:
  Effective numeracy: mental methods,
  Language and communication in mathematics,
  Dyslexia and mathematics at primary level;

- Developing Secondary Mathematics Teaching:
  Mathematics for low attainers,
  Providing for able pupils in comprehensive schools,
  Algebra in the school curriculum;

- Mathematics for 16+:
  Bringing applied mathematics problems alive,
  Desert Island Polynomials: which eight would you take?
  Mathematics undergraduates' learning difficulties;

- Technology in Mathematics:
  Geometer's Sketchpad / Cabri: using movement and dynamics in learning shape and space,
  Mathematics on the TI−92,
  Using spreadsheets to develop mathematical ideas;

- Extra−curricular:
  How to solve Olympiad problems,
  School Maths Clubs and Regional Maths Fairs,
  Mathematical masterclasses;

- General Interest:
  The mathematics and history of sundials,
  Applications are what really pays the mortgage,
  Saddles, humps and curvature: Gauss−Bonnet for beginners.

There was a general perception that the sessions were of a high quality, with much that was both useful and inspirational. Some workshops took the form of talks but others involved practical activities with plenty of opportunity to do some mathematics. Many were given by teachers talking about their classroom experiences, with ideas that had worked for them in meeting challenges they faced.

> See also the puzzle "Three−digit numbers" elsewhere in this issue. It was presented in the workshop *How can A−level mathematics meet the needs of students with so many different backgrounds and aspirations?* by Charlie Stripp, Exeter College.

The domestic arrangements were also of a high standard. In fact so much so that probably more, than found the opportunity to, could have benefited from making use of the university sports centre which was available for free use by delegates. A high point was the Annual Dinner on the Sunday evening at which Melanie Phillips gave a characteristically robust speech exhorting teachers to stop seeing themselves as victims and get their house in order.

Opening Address: Anthea Millett

In an authoritative and enthusiastic address the speaker exhorted the teaching profession to have more belief in itself: "without teachers there would be no other professions".

In 1997/98, applications so far are 34% below target for secondary teacher training recruitment. The Teacher Training Agency (TTA) has responded by a series of cinema advertisements that started at the beginning of March, these advertisements were extended to television from the 13th April. There has been an effect: there were 101 new applications in the first three weeks of March 1998 compared with 72 in the same period last year. During March there were 449 enquiries from potential mathematics teachers to the TTA hotline compared with only 1113 in the whole of the previous five months. The target number to start training this autumn is 2150 which represents nearly a half of all new mathematics graduates. This raises issues of how scarce resources, mathematics teachers, are to be deployed, and from what other sources they might be found. In the primary sector the issue is quality. The average UCAS point score of those entering all degree courses is 18.8, but for primary teaching it is 13.3 with few having taken mathematics or science A−levels.

To encourage teacher−training institutions to recruit potential mathematics teachers, the TTA has attached a 5% funding premium to mathematics places, but the TTA alone cannot solve the problem. Ways need to be found to pay off at least part of the student debt of those entering the teaching profession, so that we can attract more and better−qualified people into the profession. The speaker then went on to say what her listeners could do.

> Enough do A−level Mathematics, but not enough go on to do mathematics degrees. Teachers at A−level need to encourage their students to read mathematics and to consider a career in teaching.

Mathematics graduates are highly marketable and it is unlikely that sufficient will enter teaching. The TTA is seeking advice, especially from the subject associations, on recruiting more people with other degrees with a high mathematical content.

The subject associations should be promoting mathematics.

Mathematics departments in higher education need to get more involved in raising the numbers going into teaching: some pilot schemes are already under way.

There is a need to build up a pool of teacher advocates for careers and public−relations events.

If you want to nominate a teacher who has meant something special to you, then contact the TTA at nominate@teach−tta.gov.uk, because "no one forgets a good teacher".

The speaker then went on to describe other aspects of the TTA's work in setting standards for teacher−training courses, Qualified Teacher Status, Special Educational Needs Co−ordinators, Subject Leaders and the National Professional Qualification for Headteachers.

Presidential Address: Tony Gardiner

Dr Gardiner asserted that radicalism and mathematics are in tension. He asked where should we be heading? He presented four areas for consideration:

Mathematics	The profession of mathematics teaching
The messy world of educational politics	The messy world of mathematics education

Mathematics is the art of knowing. The speaker suggested two problems for consideration:

How many two−digit number are there which when reversed and added to themselves give a perfect square?

Can you tile a plane with triangles in such a way that at all vertices seven triangles meet?

In response, one might start with false trails and experiments, go on to find some useful ideas and then perhaps obtain a complete solution. Dr. Gardiner asked where the mathematics is to be found in this process, and said that without the last stage the mathematics is incomplete.

The speaker then went on to summarise intellectual development over the centuries, starting from the mathematical achievements of the Greeks which were paralleled by the recognition of the distinction between empirical and certain knowledge, going on through the Renaissance, with the realisation (to use the words of Galileo) that 'the book of nature is written in mathematics', the Scientific Revolution, with the rediscovery of the need for proof and the acceptance that discussions and decisions should be based on reason not authority, the Industrial Revolution, with the development of science and technology, and modern mathematics which is paralleled by positivism. His conclusion was that mathematicians have a binding commitment not to tolerate a contradiction. This brings mathematicians into conflict with post−modernists who have attempted to deconstruct mathematics into beliefs, feelings, dogmas, politics and congenial personal experiences, whilst the essence of mathematics is openness, imagination and integrity. Dr. Gardiner was concerned that many of those who now hold influence in education had their formative years during the student revolts of the late

nineteen−sixties, and that this lay behind much of what was wrong with the current state of education.

Closing Address: David Tall

The speaker spoke on 'real maths − real learners − real teachers', enlivening his talk with many anecdotes.

In school, what does real maths mean? We use the word 'real' in many ways, to characterise 'real life' and the 'real world', but also to in the phrase 'real numbers'. We must be careful about trying to tie our teaching of mathematics to the 'real world', as everyday maths (with its informality and its contextual dependence) can get in the way of real maths. There is a progression from street maths through mental arithmetic to algebra. As the level of abstraction increases, mathematics involves processes which may not be recognised as being connected to the real world.

His researches had led the speaker to the belief that real learners do not naturally grow through successive levels of increasing sophistication. Learning is a discontinuous rather than a continuous process. He had found that no child who counted−on had derived a single number fact from the experience. Progress came from the compression of process to concept, with symbols used as process to do mathematics and as concepts to think about mathematics.

The speaker divided teaching into three broad categories: transmission (where learners are treated as empty vessels to be filled with knowledge), discovery (where learners are to be helped to discover and construct knowledge for themselves) and connectionist (where the new is taught by linking it to knowledge already held by the learner). From his research, he found the last type to be the most effective.

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The Mathematical Association:http://members.aol.com/mathsassoc/MAhomepage.html

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