NMSS 1999

We sat, we thought, we existed. Thoughts rotated around in our mind with a certain symmetry that could only mean the beginnings of mathematical process. Distractions didn't detract, but rather added to the collection of karma that existed in Bruce Hall.

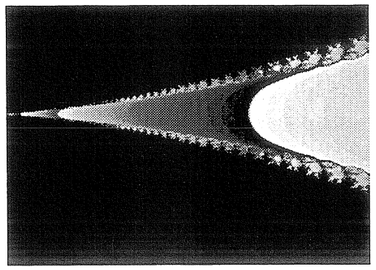
So what has happened to us, what occurred in those brief two weeks to alter the state of our existence? I have lost faith in the calculations performed by inferior machines which store e to a trivial 12 decimal places. I question the authority of the calculator to which I was once so devoted. In my artwork I now try to recall the intricate detail and creativity of the EG boards. Is this to become the new modernist ideal?

More important still are the names which keep appearing in my email "in box"; these people I didn't know six months ago, suddenly entering into the everyday normality. I wonder how much of the research performed by the EGs (more accurately Mary) would still be considered "current information", and what exactly has changed?

Gargling on the true cacophony of ideas, I wonder if intelligence can be measured in what we know or what we have the potential to learn? To end with a quote from the master Yoda "you must unlearn what you have learned".

Julie Teague

A group of unicorns is called a blessing. A group of rhinos is called a crash. A group of Nemesisians is called a number! Faces from NMSS 1998.



NeMeSiS

1999

Newsletter of the National Mathematics Summer School

Welcome!

Welcome to the all-new annual NMSS newsletter. We hope that you enjoy this issue. If you have any questions, comments, feedback, ideas or submissions for the next issue, you can either tell Terry or contact me (email merrynmathie.cit.com.au). Thanks to everyone who contributed to this newsletter.

Happy reading!

Merryn Mathie

NMSS: 1975 to 1999

From my perspective the single biggest difference between NMSS99 and NMSS75 is the increased expectations we have of the mathematics.

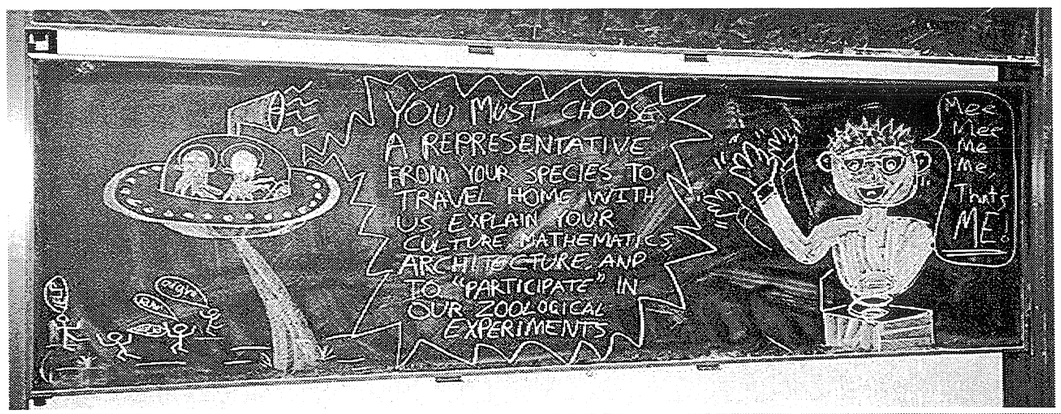
When I first came to NMSS, we had the idea that we needed to entertain the people. They were not to have a single free minute. So we had a barbecue at Cotter Dam, we went to look at the embassies, we took people in buses to the pub at Gundaroo for (an alcohol-free) lunch ... One night we walked to Black Mountain Peninsula and had soft drinks under the stars.

It was Arnold Ross who influenced NMSS towards a more academic frame of mind and as time went by we let up on the entertainment and focussed on showing students some serious mathematics! In this respect, the study sessions and tutorials are now an indispensable part of the program, which they were not in the early seventies.

I think Arnold Ross wanted students to learn mathematical facts which would help them in later mathematical life, a commendable point of view! But I have come to think that people forget the facts ... "*What was the Chinese Remainder Theorem, again?*"

On the other hand, they don't forget the ambience of the school, the excitement of learning something new and hard, in the company of people who are interested in doing just that, and able to do so! Exactly what fact it was may be forgotten. But the challenges, the successes, the fact that there is this huge body of knowledge, developed over thousands of years in which they can make progress for themselves and even maybe discover some little things their teachers at least haven't thought of before - that will stay with them! I'm sure of it.

This element of NMSS is more important even than the mathematics. It captures the excitement of research, the challenge of discovery, the ability to guess and experiment and test a conjecture, to adapt it when the experiment doesn't fit the conjecture. The search for truth, no less.



I go back to NMSS every year amazed that it is still fresh and exciting. The students are still the same people I taught in 1975, though they do look and think differently! The challenge is to try to make it just as interesting and stimulating for them as we all know it can be. I think we have been remarkably successful in this. I hope we will continue to be!

Terry Gagen

Where are they now?

Andrew Usher (NMSS 91) is at the University of London completing a PhD in Algebraic Topology.

He writes: "*What am I going to do next? - Good question! A career in academic Mathematics is possible but unlikely; the alternative is some form of teaching - preferably either English as a Foreign Language or Kindergarten teaching.* Why does someone with a PhD in Mathematics want to teach Kindergarten? - Because I like being with kids!"

Robbie Gates NMSS student (88,89), tutor & course leader (91-99) writes:

"I completed a PhD in category theory at Sydney University. Uni was a fantastic experience but after eight years I'd had enough and went to work for Bell Labs Innovations as a Software Engineer. While enjoyable work, I found myself less satisified than I thought I'd be so I returned to academia and became aware that I really love teaching.

I'm currently halfway through a 1 year contract as a Lecturer in Computing at Macquarie University and am thoroughly enjoying the teaching. Careerwise my future is still up in the air, but I hope to remain in the university sector for a while yet, in either computing or maths.

Outside of work, my life centres around my friends and in particular my partner Megan. My free time is usually occupied by computing, cafe or pub culture with friends, enjoying music, and just generally enjoying life."

Boud Roukema (NMSS 84 & 85) writes

"From '89 to '93 I completed a PhD. I also gave some Mt Stromlo talks to new NMSS generations and conned you into believing that it is sufficient to know the sign of the curvature of space in order to know if the Universe is spatially finite or infinite. Since arriving in Eurasia (France/ England/ Japan/ Poland/ India), I started suspecting that this might be wrong, and started work on how to measure the topology of space. Because of new astronomical satellites which will be launched in the next few (5-10) years, we may be able to soon find out whether the Universe is finite."

Boud is presently working in India. An article relating to his work appeared in the Scientific American (April 1999).

David Chalmers author of "The Conscious Mind", a book written to rave reviews in the US, was at NMSS in 1982:

"These days I am mostly a philosopher thinking about consciousness. I got partway into postgraduate work in maths at Oxford before switching fields into philosophy and cognitive science. I didn't so much become disenchanted with maths as I became excited about working in an area no-one really understands, where things are as wide-open today as they were in physics before Newton. I now live in Arizona, where I am associate director of a new centre for consciousness studies and professor of philosophy.

I still think about my two summers at NMSS with fondness. Card games and cricket matches and bad jokes and midnight walks around the lake, and a lot of thinking. I occasionally still hear Arnold Ross intoning 'Think deeply of simple things'. and I had a terrific time, making friends — please drop a line!"

Announcements

For those of you with internet access, take a look at http://www.cse.unsw.edu.au/~andrewm/nmss/ This site contains links to many of the other NMSS web sites, email addresses, photos and lots more.

If anyone lost 3 juggling balls at this year's summer school, Merryn has them (merrynmathie@cit.com.au)

sauce unknown

I have a spelling chequer
It came with my pea sea
It plainly marques for my revue
Miss steaks eye cannot sea

As soon as a mist ache is maid
It nose bee fore two late
And eye can put the error rite
Its rarely, rarely grate.

I've run this poem threw it
I'm shore your pleased two no
Its letter perfect in it's weigh
My chequer tolled me sew

RECREATIONAL MATHEMATICS

Maths and Juggling

Imagine juggling 3 balls in a cascade pattern (Pattern 1). In this pattern, all the balls follow the same path. You begin with 2 balls in one hand and 1 ball in the other. I will assume that you begin with 2 balls in the right hand.

Ball 1 is tossed from the right hand at time 1, and is later caught in the left hand. Ball 2 is tossed from the left hand to the right hand at time 2, and ball 3 is tossed from the right hand to the left hand at time 3. Ball 1 (which has been caught by the left hand by this time) is then tossed from the left hand to the right hand at time 4, and so on.

We can denote these throws using site swap notation (independently invented by Paul Klimek and Bruce Tiemann 1985). To do this, you list the hands and the time that each ball is in the air:

BALL	1	2	3	1	2	3	1	2	3	1	2
HAND	R	L	R	L	R	L	R	L	R	L	R
TIME	3	3	3	3	3	3	3	3	3	3	3

This pattern can now be expressed as [333], or simply as [3]. This is a 3 ball pattern of length 1. Pattern 2 can be expressed as [441], a 3 ball pattern of length 3.

How many 3-ball patterns are there of length 3?
Generalise this result to determine the number of k-ball patterns of length n.

Pattern 1

Pattern 2

Identify the guilty party in this police line-up. Who shot the little green guy?

CAN YOU HELP?

One further thing. As you are aware, the NMSS needs all the support you can give us. We are now without a major sponsor and the school exists entirely on parental contributions, the Larry Blakers Memorial Fund and donations from past students and friends of NMSS.

I urge you to make a tax deductable donation to NMSS if at all possible. Cheques should be made out to the Australian National University (NMSS) and sent to Professor TM Gagen, Director NMSS, PO Box 70, Turramurra NSW 2074.