



CoIAUMS Space

NEWSLETTER OF THE ADELAIDE UNI MATHS SOCIETY

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MLC Drop-In Centre:

Monday to Friday (except public holidays)
10am to 4pm during Semester teaching
1pm to 4pm during breaks and exams
Level 3 Hub Central or online

One Hundred Factorial:

Wednesdays weeks 1 to 12 of Semester
12noon to 2pm
Either Level 4 Hub Central or next to the MLC

President's Welcome

Greetings to all Mathematics enthusiasts of 2023!
My name is Joe Harvey, and I am very happy to say that I am the president of AUMS this year. I have a good feeling that it will be a good year for students interested in mathematics, because we have a great committee planning many AUMSing events - including pub crawls; quiz night; our famous open ball; and numerous, distinct others. Our events are starting right away so come find us during O'Week to become a member and integrate AUMS into your university life. I look forward to meeting you all.

- Joe Harvey, AUMS President

Someone to Talk Maths With

Sometimes you just need to talk about maths with someone. At the Uni of Adelaide, the Maths Learning Centre is a safe place to do just that.

Maybe you're stuck coming up with a way to solve a problem and you need some guidance. Maybe you're super excited about this cool idea you saw in the lecture video and nobody will listen to you. Maybe you understand exactly how to do a proof but it sounds weird when you try to write it down. Maybe you think Killer Sudoku would be more fun with a friend. All of these times and more are the perfect time to talk with someone from the MLC.

You can visit our Drop-In Centre in person or online whenever we're open and a friendly tutor will come up to you, ready to talk about anything to do with learning and using maths in your uni courses. You are likely to meet other students studying maths courses there, who you can talk with as well. On Wednesdays during semester, you can also join in with our regular art, games and puzzle sessions called One Hundred Factorial, to have fun with others who also enjoy maths. You can even become an official One Hundred Factorial volunteer and help others to play.

I look forward to talking with you about maths. It's my favourite thing to do.

- Dr David Butler, MLC Coordinator

The First at UofA

The following is a brief early history of Mathematics at the University of Adelaide, focusing on Horace Lamb, largely taken from [4]. It was inspired by a wonderful seminar given by Associate Professor Thomas Leistner earlier this year to whom I owe my thanks for his help.

The beginning of mathematics at the University of Adelaide can be traced to the 6th of November 1874, with the donation of £20 000 by Thomas Elder. The first Council of the University subsequently founded two chairs, in addition to the two already in existence. The first university statutes reads:

There shall for the present be a Professor for each of the following groups of subjects, that is to say, for -

- Classics and Comparative Philology and Literature
- English Language and Literature and Mental and Moral Philosophy.
- Mathematics pure and applied.
- Natural Science, especially Geology and Mineralogy; the Professor to give lectures in Chemistry also.

Horace Lamb was appointed the first 'Elder Professor of Mathematics'. The position was passed to W.H. Bragg in 1885, with the role expanding in the Statutes to include giving instruction in Physics. In 1899 the professorship became the 'Elder Professor of Mathematics and Physics'. In 1920 the professorship once again became that of 'Pure and Applied Mathematics' and has continued to this day.

Horace Lamb born at Stockport, Cheshire in 1849 was elected a fellow and lecturer at Trinity College in 1872. As a lecturer, teacher and mathematician Lamb was highly regarded. A letter from a bush clergyman, F. Slaney Poole, to the editor of the Advertiser in 1934. In which Poole states that before accepting, but not taking up a classical mastership at St. Peters Collegiate School, he taught Lamb Latin and Greek in 'the Old Land'. He had noted Lamb had married and thus would have to resign his Fellowship (as was practice at the time). Poole, who was only three years Lambs senior, wrote to Lamb and suggested the position at the University of Adelaide. After a 43 day journey to Melbourne

at just 26 years of age Lamb, began at the University of Adelaide and established themselves in Robe Terrace, Medindie. Here he was well regarded, as one student wrote:

[Lamb] would fill the blackboard with an algebraic problem, written too speedily for us to follow. He would then turn and say, 'is this clear?'. We had to say, 'yes'; when one impudent fellow said, sotto voce, 'Clear as mud!'. The professor, seeing the doubtful looks on our faces, would rub off the figures and start all over again - a little more deliberately.

This anecdote shows clearly a dedication to teaching and the understanding of students which I like to believe has persevered to this day (as well as the importance of voicing concern!).

In the early days of the University, the Council arranged for Professors to give evening lectures to be presented publicly. Lamb presented lectures such as 'Sound as the Physical Basis of Music' in 1877 and 'The Scientific Principles involved in Electric Lighting, and in the Electric Transmission of Power' in 1882.

However, in 1884, one of the local Adelaide papers sought to build controversy around the evening lectures and against Lamb. Lamb, in response, wrote a letter to the editor referring to said article:

It is stated that 'the motion [to hold evening lectures] was, in very questionable taste, opposed by a member of the Professorial Board.' The allusion here is to myself. I do not know that I should in any case care to argue the question of taste with the writer of that article, but I must ask leave to state, as a matter of fact, that I did not oppose the motion.

In 1884, Lamb was elected a Fellow of the Royal Society for his research, of which a large part was devoted to fluid mechanics. In 1885 Lamb resigned, and took a position of Professor of Mathematics at Owen's College, Manchester where he worked until his retirement in 1920.

- *George Savvoudis, COLAUMS Editor*

The Mathematics of Love

So, St. Valentine's day just went by on February 14, and I know exactly what you were thinking on such a romantic day, "What sort of maths shall I do today?" because what is more romantic than mathematics? Well, if you didn't end up finding anything on the day but your love for mathematics is as fervent as ever, you've come to the right place.

If you're like me and consume a lot of maths-related entertainment, then you may have come across articles or videos titled "How to find your perfect partner!" [3] or something similar, which use optimal stopping theory to formulate a dating strategy. The problem is most commonly known as the Secretary Problem or the Marriage Problem [2], and it was first solved by Bruss [1].

Regardless of your familiarity with this mathematical strategy to find your 'perfect partner,' here's a summary:

- Step 1: Estimate the number of people you think you can date in a lifetime and call it N .
- Step 2: Date and reject the first 37% ($1/e$ to be precise) of the N candidate partners.
- Step 3: Continue dating and pick the first person who is better than the initial 37% to settle down with.

If you're wondering where $1/e$ comes from, the Numberphile videos by [5, 6] go through a simple derivation.

Wow! So, I guess we've solved dating. Everyone should just use this strategy and be happy ever after, right? Well... not so quickly! I've told you the strategy but I am yet to tell you the assumptions and limitations of this strategy.

For this strategy to work, we are assuming that there is exactly one 'perfect' partner out there for you and you want to 'settle down' with that person. But, there could be multiple or conversely, no one who is 'perfect' for you, or you may not be interested in settling down with anyone or only one. This really comes down to your ideology of love... and I dare not promote any particular ideology through this article.

Say you choose to accept the assumed ideology, then you may also encounter your 'perfect match' in the first 37%... in which case, you will have to grow old alone. This is because the strategy assumes that after rejecting someone you cannot go

back to them, but we know that it is not uncommon for relationships to rekindle.

Or, you may only encounter the worst of the candidates in the benchmark phase and the next one may only marginally be more dateable. According to the maths, you will have to settle for them even if the other candidates are more desirable suitors.

At times, mathematicians (including me) are guilty of over-glorifying mathematics. We like to think that maths has the answers to everything. To some degree it does, but they may not be necessarily correct. The common aphorism "All models are wrong, but some are useful," (often attributed to George Box) best captures this idea. It is fine to model such scenarios with maths as long as we understand and communicate effectively to whoever wishes to use them, the accuracy of our models and the appropriate circumstances to utilise them.

If I had ended this article right after the statement of the strategy, some may have applied it blindly and ended up blaming me for the rest of their lives. All of you will be in my position fairly often in your mathematical careers. It is our responsibility that we communicate an accurate representation of our model so that the user is well-informed before employing it.

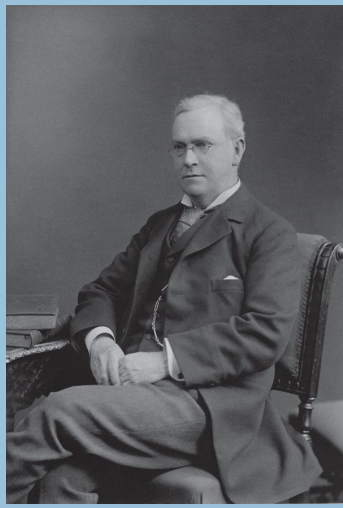
Personally, I subscribe to the philosophy of "SCIENTIST" by TWICE:

Love ain't a science, don't need no license [...]
Don't try to be a genius,
why so serious?

- Violet Evergarden, Assistant Editor

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- [1] BRUSS, F. T. A Unified Approach to a Class of Best Choice Problems with an Unknown Number of Options. *The Annals of Probability* 12, 3 (1984), 882 – 889.
- [2] FERGUSON, T. S. Who Solved the Secretary Problem? *Statistical Science* 4, 3 (1989), 282 – 289.
- [3] FRY, H. How to find your perfect partner! — Head Squeeze, 10 2013.
- [4] POTTS, R. B. *Mathematics at the University of Adelaide, 1874-1944*. University of Adelaide, Dept. of Mathematics, Adelaide, 1976.
- [5] SYMONDS, R. Choosing Toilets (mathematical extended ending), 2014.
- [6] SYMONDS, R. Mathematical Way to Choose a Toilet - Numberphile, 06 2014.



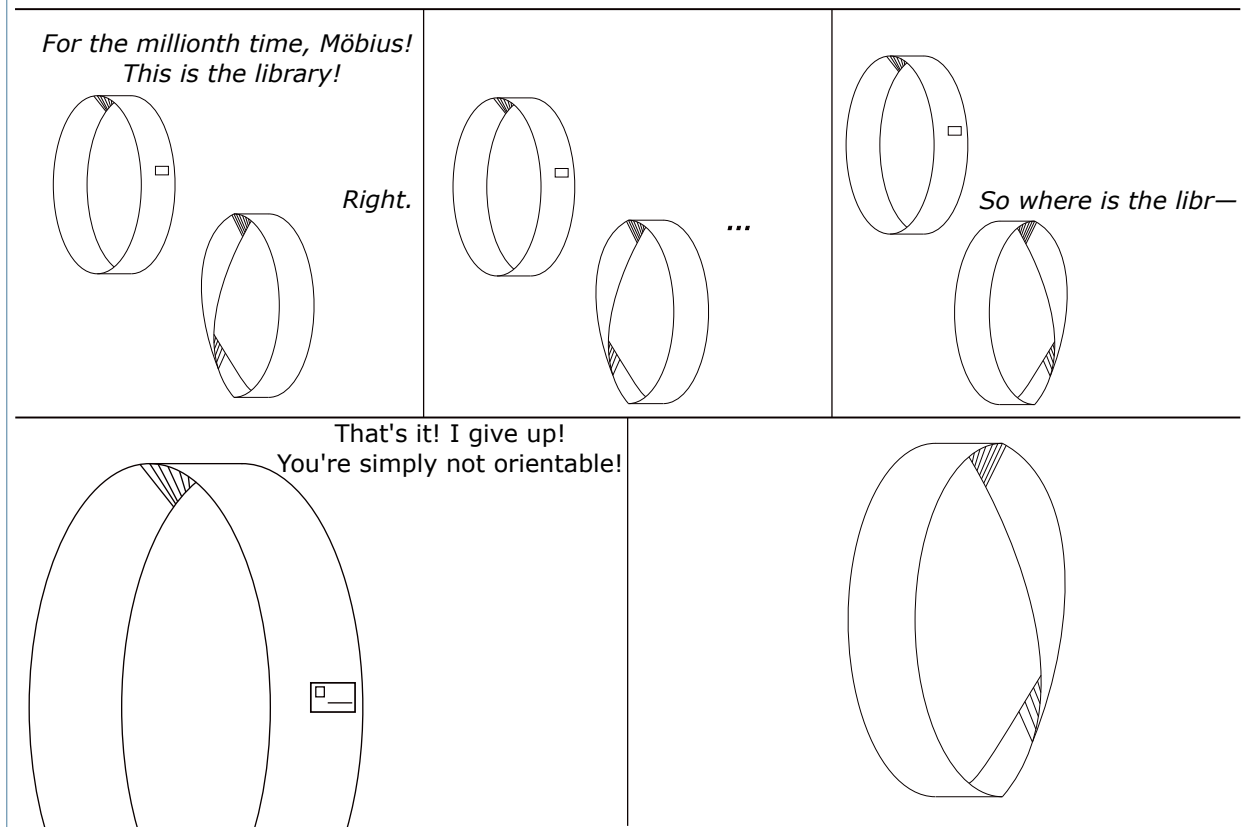
Puzzle 1:

This question is Question VI of the first examination paper in Pure Mathematics I at the University of Adelaide (written by Horace Lamb, see left).

'A man sets apart £28 a-year to be spent in drink, and considers that he requires in the year a quantity of alcohol amounting to 24 (reputed) quarts. He prefers claret to ale but claret costs 40s. a dozen, ale only 12s. a dozen. The percentage of alcohol in the claret being 10 and in ale 6, how much does he buy of each? If the price of ale rises, will he drink more ale, or less, than before?'

(Hint: Assume the prices are in shillings per quart)

Möbius Attends Orientation Day



- George Savvoudis, ColAUMS Editor

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Because we're irresponsible.

This includes divisions by zero, logical fallacies and wild assumptions.

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Edited by George Savvoudis.