AARDRA JITHESH

RECLAIMING THE NAME

Decolonising mathematics: reclaiming non-Europeans mathematics attributed to European mathematicians

WHY IS THIS IMPORTANT?

To dismantle the coloniality of knowledge and education, we need to help bring awareness to contributions of non-European mathematicians, especially in cases where the credit was given to a European.

By reclaiming non-Europeans mathematics and giving the credit to them, we bring attention to and celebrate their achievements. Without this representation, there is a risk that people embrace the false notion that 'white' people are inherently better at science, more inventive and greater thinkers.

WHERE ARE THE WOMEN?

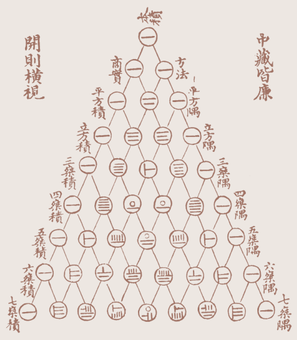
Women have faced many forms of oppression throughout history, and many did not have the privilege to study and learn mathematics as their male counterparts did. The women in mathematical history who successfully achieved in making strides and advancements in mathematics often had privileges such as socio-economic status to aid their journey. Yet, to reach there, these women still had to face many obstacles.

One example is **Hypatia of Alexandria**, the first female mathematician whose life and work are reasonably well recorded. Since Hypatia was the daughter of an upper-class mathematician and philosopher, she received the same education as her male peers. She produced work on conic sections and developed the concepts of circles, ellipses, parabolas, and hyperbolas by dividing cones into planes, and also constructed and taught how to operate astrolabes, a device for monitoring astrological events.

She was renowned during her life as a great teacher, but was seen as a threat to a violent Christian bishop who incited rumours Hypatia was a sorceress. Understanding nothing of her philosophy, church leaders called her a witch, and she was **tortured and murdered**. The Alexandrian school, which she had led, shut down. All of Hypatia's writing was lost as part of the church's conspiracy to repress heretical knowledge.

REMEMBER THEIR NAMES

A few examples of people who were affected.

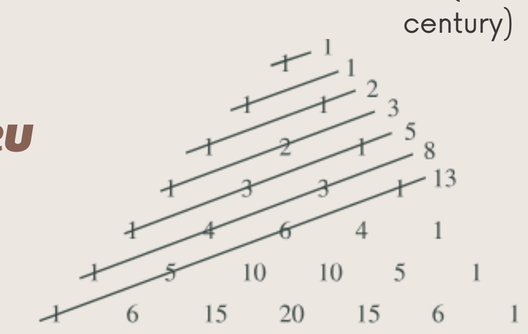


Pascal's Triangle

AL-KARAJI, JIA XIAN, PINGALA

الكرجي, 贾宪, पिङ्गल

Described by Pingala around 200 BC, then by Al-Karaji and Jia Xian around the 11th century, about 19 and 6 centuries before Pascal (17th century)



Fibonacci Sequence

PINGALA'S *MATRAMERU*

पिङ्गल

Pingala described the sequence in 200 BC. Fibonacci himself said he studied Indian mathematics and did not come up with the series himself, yet was given the credit regardless.

$$\frac{\pi}{4} = 1 - \frac{1}{3} + \frac{1}{5} - \frac{1}{7} + \ldots + \frac{(-1)^n}{2n+1} + \ldots$$

Gregory, Leibniz & Newton's Series

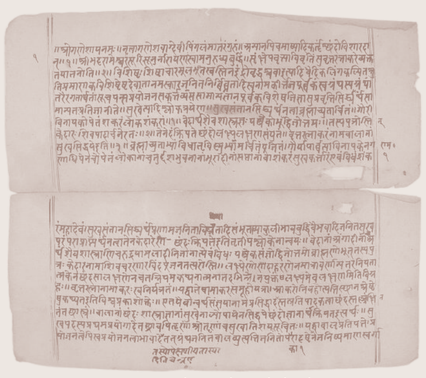
MADHAVA OF SANGAMAGRAMA

സംഗമഗ്രാമമാധവൻ

The series expansion for sine, cosine, arctangent and the infinite series for π were discovered by Madhava around 1400 in Kerala, about 250 years before they were rediscovered in Europe, and accredited to those Europeans as well.

Pingala was a poet, and his book Chandah Shastra, meaning science of poetic metres, **contained 'Pascal's triangle', binary numbers** and **'Fibonacci numbers'**

200 BC



From Pingala's Chandah Shastra

0

200

400

Hypatia, a renowned mathematician and astronomer, was one of the **first women** in mathematics to have their life and work recorded

An astrolabe, an astronomical device which Hypatia would construct and teach how to use.

600

800

1000

al-Karaji wrote the **triangle** in a book which is now lost, and then later Khayyam studied it. In Iran it is called Khayyam's Triangle

Jia Xian studied the triangle and its link to the **binomial coefficients** and later Yang Hui studied and popularised it, in China it is called Yang Hui's triangle

1200

Fibonacci published the Rabbit Problem in his book Liber Abaci. The book contained knowledge from many cultures and helped Europe move forward with mathematics.

1400

Madhava or one of his followers discovered the series expansion for **sine, cosine** and **arctangent** at the Kerala School of astronomy and mathematics. While his works did not survive, they were referred to by other mathematicians.

1600

Pascal published the triangle in 1665 with additional properties and proofs, and other mathematicians named it after him

1800

In Europe, the same series were rediscovered by **Gregory, Leibniz and Newton.**

2000

WHAT CAN WE DO?

There have already been efforts made to change the names of many of these mathematical ideas, one example being the series of sine, cosine and arctangent. In literature in recent times, they are now more commonly being referred to as the Madhava-Gregory, Madhava-Leibniz and Madhava-Newton series, with Madhava first to show his precedence.

Continuing to **give credit to the earlier mathematicians** will certainly be a step in the right direction. Additionally, giving credit when teaching in lectures and also in textbooks will not only give non-European mathematicians the recognition they deserve, but also help inspire future mathematicians with representation.

Furthermore, we should challenge the notion that the European standard of mathematics is the universal standard of mathematics. We should **stop disregarding alternative cultural perspectives of mathematics** and understand and embrace it instead.

While there have been many cases of misplaced credit and we can never truly know who the first person to discover something was, it is important to **shift the Eurocentric narrative** of mathematics and help bring recognition to non-European peoples' achievements.

The intention of this is not to belittle the incredible discoveries of the European mathematicians, but instead to bring light to the forgotten figures in mathematical history.

SCAN TO LEARN MORE

Image credits: Astrolabe, two women and map of India with Kerala highlighted all permitted to use via Canva; Pingala's Matrameru and Jia Xian's triangle free to use via Wikipedia; Pingala's Chandah Shastra free to use via Internet Archive; Madhava's pi series via IndianInterest