

Discovery of India-II

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Introduction

► Europeans did **not** discover India

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Summary

- ▶ Europeans did **not** discover India
- ▶ but they discovered much knowledge **in** India

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- ▶ (attributing their authorship to fantasy early Greeks).

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- ▶ but they discovered much knowledge **in** India
- ▶ On the doctrine of discovery, they appropriated this scientific knowledge as their own discoveries,
- ▶ the way they had earlier appropriated knowledge in Arabic texts
- ▶ (attributing their authorship to fantasy early Greeks).
- ▶ Later, they used this false history of scientific discovery to claim they were superior.

- ▶ In fact, when Vasco came to India, Europeans were poor and ignorant barbarians,

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- ▶ In fact, when Vasco came to India, Europeans were poor and ignorant barbarians,

- ▶ and their dreams of wealth depended upon overseas “trade” or piracy.

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Summary

- ▶ In fact, when Vasco came to India, Europeans were poor and ignorant barbarians,
- ▶ and their dreams of wealth depended upon overseas “trade” or piracy.
- ▶ This presupposed a good technique of navigation, which they lacked.

- ▶ Why is the European navigation problem important to us today?

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- ▶ and later declared to have been “discovered” by Newton and Leibniz. Understanding this process tells us that
- ▶ **the West may have got the stolen calculus wrong,**
- ▶ the way it got the size of the earth wrong.

- ▶ But colonial education declared that wrong calculus “superior”

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- ▶ But colonial education declared that wrong calculus “superior”

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- ▶ But colonial education declared that wrong calculus “superior”
- ▶ and that is the calculus we teach today.
- ▶ Actually, it may be an inferior version of what we originally developed,
- ▶ for we never compared the two.

- ▶ We almost **cannot** compare the two today, because

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- ▶ We almost **cannot** compare the two today, because

- ▶ (a) calculus is not taught properly:

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- ▶ (a) calculus is not taught properly:
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- ▶ (b) we forgot what calculus we originally had.

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- ▶ (a) calculus is not taught properly:
 1. students are taught belief in (but not knowledge of) formal real numbers and that
 2. Western certification is the ultimate test of validity (so they should not apply their own mind).

- ▶ (b) we forgot what calculus we originally had.

- ▶ Therefore, let us first understand how that happened, using the easier case of navigation.

Latitude

- ▶ Longitude was not the only navigational problem that Europeans had.

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- ▶ Longitude was not the only navigational problem that Europeans had.
- ▶ Vasco did not know how to determine even latitude.
- ▶ Recall that an Indian navigator, Kanaka, brought him from Africa to India,

- ▶ Longitude was not the only navigational problem that Europeans had.
- ▶ Vasco did not know how to determine even latitude.
- ▶ Recall that an Indian navigator, Kanaka, brought him from Africa to India,
- ▶ and Vasco foolishly recorded that “the pilot (sic) was telling the distance by his teeth”!

- ▶ Kanaka used the Arabic-Malayalam language in which the word kau means pole star but also teeth.

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- ▶ Kanaka used the Arabic-Malayalam language in which the word kau means pole star but also teeth.

- ▶ Further, the instrument kamāl has a string held between the teeth to observe the angular elevation of the pole star.

- ▶ Kanaka used the Arabic-Malayalam language in which the word kau means pole star but also teeth.
- ▶ Further, the instrument kamāl has a string held between the teeth to observe the angular elevation of the pole star.
- ▶ Hence, Vasco's confusion.

- ▶ Though Vasco carried a copy of the kamāl back with him

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- ▶ Though Vasco carried a copy of the kamāl back with him
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- ▶ The knots on the string of the kamāl are not equidistant,
- ▶ they mark a harmonic scale like the holes on a flute.
- ▶ Vasco said he would have the instrument graduated in “inches”, a linear measure!
- ▶ So, he confounded a harmonic scale with a linear one.

- ▶ To determine latitude in daytime

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- ▶ (or when the pole star is too low to be visible)
- ▶ one measures the solar altitude at noon.
- ▶ However, one can determine latitude from solar altitude only if one knows the solar declination (angle of sun with equatorial plane).
- ▶ as e.g. the 7th c. *Laghu Bhaskariya* points out.

- ▶ Knowledge of solar declination requires (at least) a good calendar.

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- ▶ Knowledge of solar declination requires (at least) a good calendar.

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- ▶ Knowledge of solar declination requires (at least) a good calendar.
- ▶ which accurately identifies equinox and the number of days elapsed since equinox.
- ▶ Thus, if the sun is directly overhead at noon, and it is summer solstice, then (in the northern hemisphere), one is on the Tropic of Cancer.
- ▶ But if it is equinox, then one is on the equator.

- ▶ But as I have explained in “Tale of two calendars”

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- ▶ But as I have explained in “Tale of two calendars”
- ▶ the Julian calendar was inferior, and did not determine equinox correctly,

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- ▶ the Julian calendar was inferior, and did not determine equinox correctly,
- ▶ just because Greeks/Romans/Europeans did not understand elementary arithmetic fractions.
- ▶ This robust non-textual evidence of the bad calendar is far superior to
- ▶ wild tales of Greek mathematical achievement, wrongly based on excessively late texts.

- ▶ Even the Gregorian reform of 1582 is stated using a confusing system of leap years

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- ▶ Even the Gregorian reform of 1582 is stated using a confusing system of leap years
- ▶ and NOT a precise fraction for the duration of the tropical year.

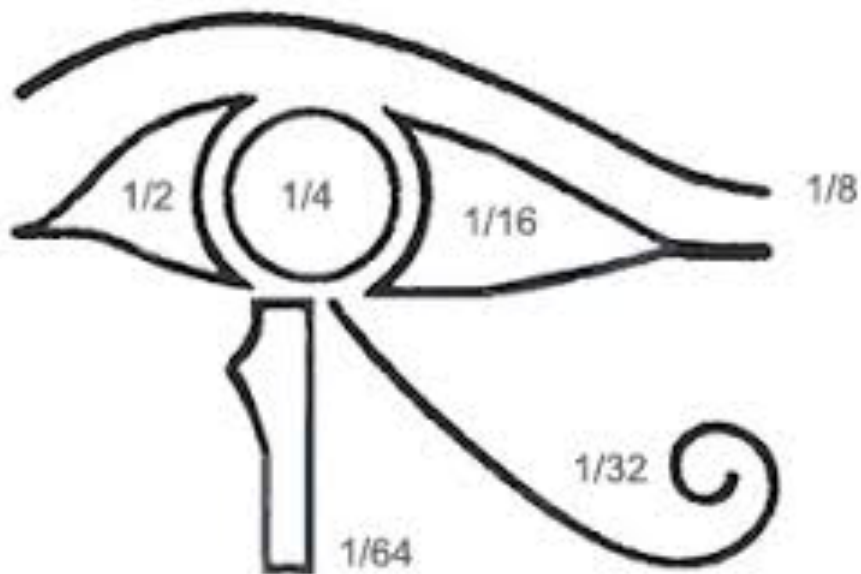
- ▶ Even the Gregorian reform of 1582 is stated using a confusing system of leap years
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- ▶ Fibonacci was a few centuries earlier, but that hardly makes a difference, for
- ▶ backward white Europeans “discovered” elementary fractions 3000 years after black Egyptians
- ▶ for Ahmose the scribe was teaching fractions in the Rhind papyrus from 3500 years ago.







- ▶ Recall also that though Europeans stole calendrical knowledge from India

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- ▶ Recall also that though Europeans stole calendrical knowledge from India

- ▶ they did not immediately understand it.

- ▶ Hence, Protestant Europe accepted the Gregorian reform only in 1752

- ▶ Recall also that though Europeans stole calendrical knowledge from India
- ▶ they did not immediately understand it.
- ▶ Hence, Protestant Europe accepted the Gregorian reform only in 1752
- ▶ (though it was quick to accept the “Doctrine of discovery”).

- ▶ Note that from a knowledge of latitude difference (from point of departure)

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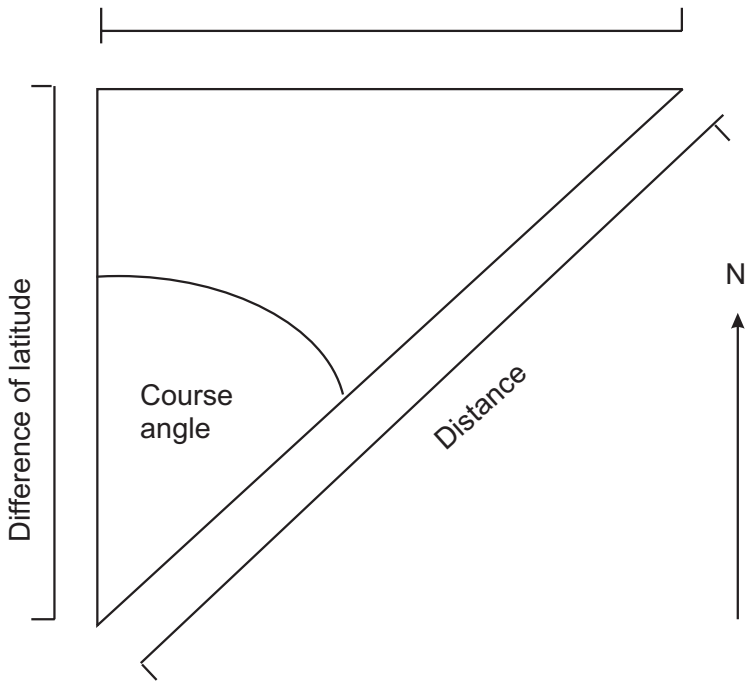
- ▶ and the course angle

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- ▶ one can calculate the longitude difference (from the point of departure)

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- ▶ Note that from a knowledge of latitude difference (from point of departure)
- ▶ and the course angle
- ▶ one can calculate the longitude difference (from the point of departure)
- ▶ by solving the navigational triangle
- ▶ provided one knows the size of the earth accurately.

Meridional departure



Loxodromes

- ▶ Apart from longitude and latitude, loxodromes were a third aspect of the European navigational problem.

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- ▶ European navigators used the magnetic compass they had obtained from Muslims in Spain.
- ▶ They moved in a fixed direction set by the compass or by an overhead straight line joining two stars (rhumb line)
- ▶ This method was OK for a small sea like the Mediterranean
- ▶ but it failed across vast oceans.

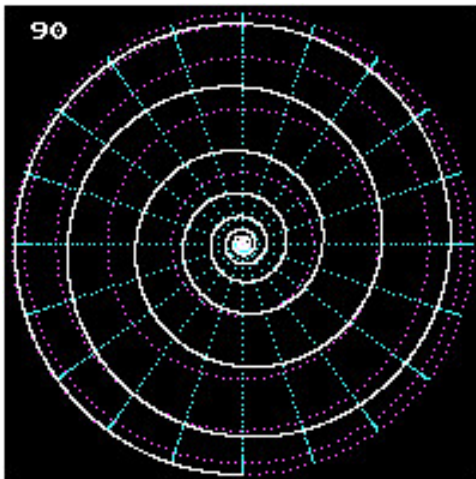
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- ▶ Moving in one direction does NOT result in a straight line
- ▶ as our NCERT class VI geometry text still wrongly teaches.
- ▶ On the earth, it always results in a curved line (=loxodrome),
- ▶ either a circle or a logarithmic spiral, spiralling towards the poles



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- ▶ Therefore, European navigators needed a map which shows loxodromes as straight lines.

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- ▶ The source of his accurate trigonometric values is “unknown”

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- ▶ even though accurate trigonometric were known to be available in Cochin and imported by Clavius among others!

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- ▶ The source of his accurate trigonometric values is “unknown”
- ▶ even though accurate trigonometric were known to be available in Cochin and imported by Clavius among others!
- ▶ (And Simon Stevin earlier used Āryabhaṭa’s sine values).

- ▶ To summarise: backward Europeans did NOT discover India

- ▶ To summarise: backward Europeans did NOT discover India
- ▶ but they discovered much knowledge in India.
- ▶ They systematically stole it and declared it their own “discovery”.

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- ▶ and well publicised after my 2003 book.
- ▶ But my Einstein correction was “independently rediscovered”
- ▶ by the world’s “leading” mathematician,
- ▶ in his Einstein centenary lecture of 2005!

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- ▶ (the hypothesis part is **an error**, showing lack of understanding, for no hypothesis is needed).
- ▶ **After** the repeated theft was caught, my prior work was patronizingly acknowledged in the *Notices of the American Mathematical Society*.
- ▶ On “superior” Western ethics, even repeated copying is OK for Westerners. They only need to acknowledge prior published work, when caught.

Letters to the Editor

Retarded Differential Equations and Quantum Mechanics

G. W. Johnson and I wish to draw attention to the work of C. K. Raju that is related to some of the ideas discussed by Sir Michael Atiyah in his talk “The Nature of Space”, which we reported on in the June/July 2006 issue of the *Notices*. Ideas suggesting a link between retarded differential equations and quantum mechanics were put forward some years ago by Raju, and we, along with Atiyah, believe they deserve attention. Interested readers are encouraged to read, in particular, the following papers written by Raju:

1. *Time: Towards a Consistent Theory*, Kluwer Academic, Dordrecht, 1994 (Fundamental Theories of Physics, vol. 65), ch. 5b “Electromagnetic time” (pp. 116–122), and ch. 6b “Quantum mechanical time” (pp. 161–189).
2. *The Eleven Pictures of Time*, Sage, 2003, pp. 298–302.
3. “The electrodynamic 2-body problem and the origin of quantum mechanics”, *Foundations of Physics*, **34**, (June 2004), 937–962.

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Colonial education

- ▶ So, the process of “discovery” continues, even after colonialism.

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- ▶ But the story is not complete

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- ▶ But the story is not complete
- ▶ What was the mystery of the “Noorie tables”?
- ▶ Who or what was the Arabic sounding “Noorie”

- ▶ So, the process of “discovery” continues, even after colonialism.
- ▶ But the story is not complete
- ▶ What was the mystery of the “Noorie tables”?
- ▶ Who or what was the Arabic sounding “Noorie”
- ▶ I quickly resolved the mystery at the Kavaratti public library.

- ▶ The tables were taken from a British sailing manual

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- ▶ The tables were taken from a British sailing manual
- ▶ written by one Capt. James Norie

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- ▶ The tables were taken from a British sailing manual
- ▶ written by one Capt. James Norie
- ▶ The book was issued by Kunhi Kunhi Maestry (I have the issue card).

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- ▶ The tables were taken from a British sailing manual
- ▶ written by one Capt. James Norie
- ▶ The book was issued by Kunhi Kunhi Maestry (I have the issue card).
- ▶ They were tables of the declination of the sun.

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- ▶ written by one Capt. James Norie
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- ▶ They were tables of the declination of the sun.
- ▶ Though the idea was available long ago in Indian tradition, the sources have changed.

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- ▶ written by one Capt. James Norie
- ▶ The book was issued by Kunhi Kunhi Maestry (I have the issue card).
- ▶ They were tables of the declination of the sun.
- ▶ Though the idea was available long ago in Indian tradition, the sources have changed.
- ▶ This source was not indigenous navigation at all, but colonial navigation!

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- ▶ How and when did the switch take place?

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- ▶ How and when did the switch take place?
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- ▶ How and when did the switch take place?
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- ▶ for children in Lakshadweep.
- ▶ The text was published in 1938, and since then the islanders started using British techniques of navigation

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- ▶ and noticed that children were not attending the colonial school in Amini.
- ▶ To get them interested, he commissioned a Malayalam text on British navigation
- ▶ for children in Lakshadweep.
- ▶ The text was published in 1938, and since then the islanders started using British techniques of navigation
- ▶ which they just assumed were “superior”.

- ▶ But what about their traditional navigational instrument, the kamāl?

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- ▶ But what about their traditional navigational instrument, the kamāl?
- ▶ Due to colonial education, the tradition was quickly lost.
- ▶ Just as the Indian way of doing calculus was lost with colonial education
- ▶ (until I rediscovered, after 1998, that it was calculus, not merely infinite series).

- ▶ The oldest people (about 70) recalled seeing their fathers and grandfathers using it,

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- ▶ One thought the instrument was used to measure speed in knots.
- ▶ Kazi Siraj Koya referred to a book in Arabic Malayalam which no one could translate.

- ▶ Finally, Mr Abu Backer of Kavaratti supplied a physical copy of his father's kamāl which he had preserved.

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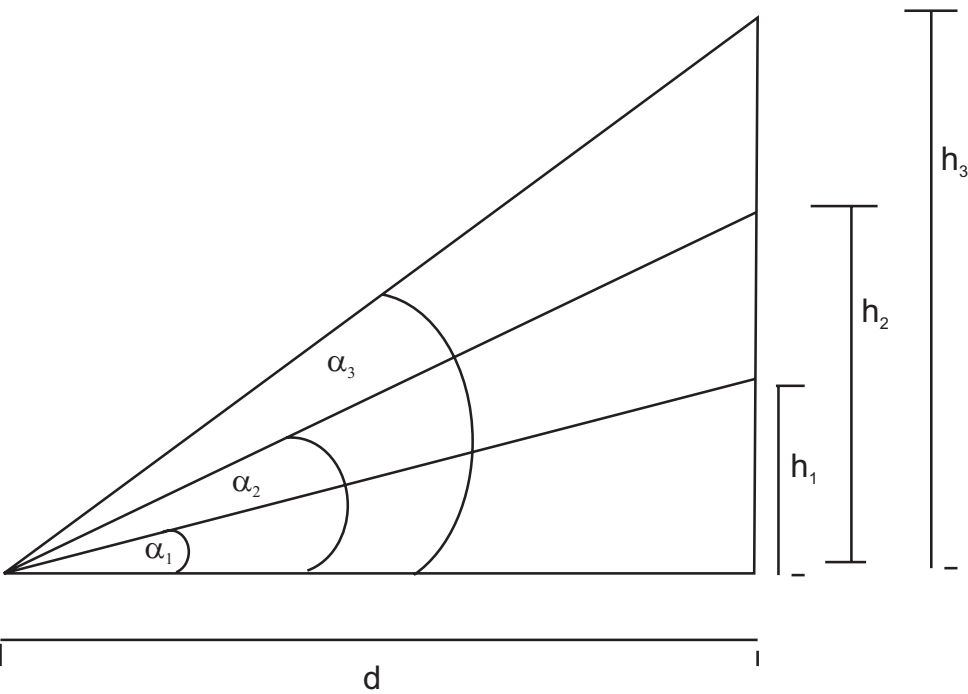
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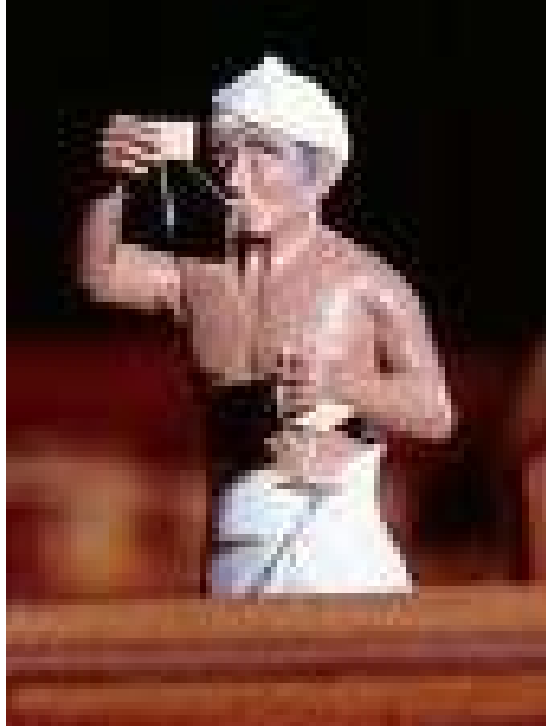
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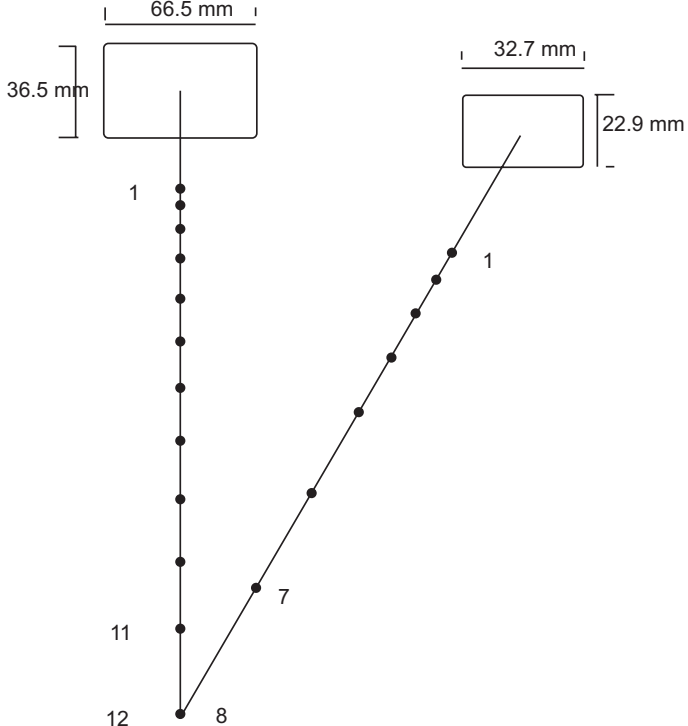
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- ▶ Each piece was attached to a string with knots in harmonic proportion.
- ▶ It is basically an instrument to measure real-life angles
- ▶ and, specifically, the angular elevation of the pole star.







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- ▶ for he did not apply even elementary commonsense (and our own anthropologists accepted his authority).

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- ▶ bigger piece: 1 knot \approx 55 miles
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- ▶ Drunk with his notion of “superiority” Prinseps lacked the commonsense to ask this question.

- ▶ Norie (of “Noorie tables” fame, end 19th c.) recognizes it is a very difficult feat to navigate to small islands

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- ▶ Norie (of “Norie tables” fame, end 19th c.) recognizes it is a very difficult feat to navigate to small islands

- ▶ and recommends complex manoeuvres.

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Summary

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- ▶ and recommends complex manoeuvres.
- ▶ (Run into the latitude, and then go east or west.)
- ▶ These won't work without **precise latitude determination**.

- ▶ The truth is that the kamāl can do it; it is far more accurate than appears at first sight.

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- ▶ The truth is that the kamāl can do it; it is far more accurate than appears at first sight.
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- ▶ (when a measurement is between two knots)
- ▶ (In school we study interpolation only for linear scales (between millimetres), and falsely attribute it to Vernier.)

- ▶ Using both pieces increases the precision of the kamāl by a factor of 5.

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- ▶ Using both pieces increases the precision of the kamāl by a factor of 5.
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- ▶ It has an overall range of 1500 miles north-south.
- ▶ So, the kamāl is a truly remarkable instrument
- ▶ which the West never understood because of its obsession to keep asserting its superiority.

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- ▶ Just as we accepted the inferior Gregorian calendar without a critical appraisal.

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- ▶ They also became dependent on colonial knowledge: “Noorie tables” etc.,
- ▶ becoming consumers of knowledge instead of producers of knowledge.
- ▶ In short, they became slavishly colonised.

Summary

- ▶ Europeans came to India as ignorant and weak barbarians.

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- ▶ Europeans came to India as ignorant and weak barbarians.
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- ▶ Macaulay then used that false boast of “superiority” to trick us into accepting “superior” colonial education
- ▶ which was actually church education designed (by the church) to indoctrinate and create loyal missionaries with a slave mentality.

- ▶ The colonised never critically checked the claim of “superiority”

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Summary

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- ▶ In many cases, indigenous knowledge is superior
- ▶ E.g. the Gregorian calendar is still inferior to the Indian calendar.
- ▶ The Lakshadweep islanders ended up with a method of navigation inferior for their limited purposes to their traditional system.

▶ This story is a prelude to another:

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- ▶ This story is a prelude to another:
- ▶ the calculus too was stolen from India

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- ▶ This story is a prelude to another:
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- ▶ The West added the absurd metaphysical fantasy of “limits”, and formal “real” numbers, which made calculus inferior
- ▶ but they declared it as “superior”.

- ▶ The changed calculus together with its false history and bad philosophy

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- ▶ The changed calculus together with its false history and bad philosophy

- ▶ was returned to us through colonial education

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- ▶ The changed calculus together with its false history and bad philosophy
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- ▶ was returned to us through colonial education
- ▶ and is currently taught in our schools and universities.
- ▶ Sadly, we forgot the original.

- ▶ Formal mathematicians say “calculus with limits” is “superior”.

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- ▶ Formal mathematicians say “calculus with limits” is “superior”.

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- ▶ Formal mathematicians say “calculus with limits” is “superior”.
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- ▶ (the indigenous calculus and the colonial calculus).
- ▶ To do so, **we must first discover the India we forgot.**

- ▶ Even after that it is no cakewalk. We will need to fight a stronger foe.

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- ▶ Even after that it is no cakewalk. We will need to fight a stronger foe.
- ▶ The West will oppose any challenge to its claim of “superiority”

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- ▶ In 2016, my article on decolonised math went viral
- ▶ but was **censored after publication** even by Indian newspapers. (Google “mathematics and censorship”).
- ▶ What is so dangerous about a new history and philosophy of mathematics that it needs to be censored?

- ▶ Today our teachers **cannot** publicly defend the rotten math syllabus they teach.

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- ▶ Today our teachers **cannot** publicly defend the rotten math syllabus they teach.

- ▶ Why are Western/formal mathematicians **so afraid of a critical comparison?**

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- ▶ Today our teachers **cannot** publicly defend the rotten math syllabus they teach.
- ▶ Why are Western/formal mathematicians **so afraid of a critical comparison?**
- ▶ (even more afraid than Alexander's army was of Indian war elephants!)
- ▶ But that is another story for another day.