

Ancient India's contribution to mathematics

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Abstract: The most striking misconception in the approach paper for this meeting concerns “Vedic Mathematics”, which has (a) no connection whatsoever to the Veda-s nor any clear connection to ancient Indian knowledge,¹ and (b) solely concerns some tricks of mental (elementary) arithmetic of little value to science.² Furthermore, (c) this misleading marketing label “Vedic” distracts attention from the real contribution of India to present-day mathematics. (I will pass over the very wrong spelling of Aryabhata as Aryabhata.³)

Briefly, most present-day school mathematics, (1) arithmetic,⁴ (2) algebra,⁵ (3) trigonometry, (4) calculus,⁶ and (5) probability and statistics⁷ went from India to Europe, between the 10th and 16th c. This was later repackaged, stuffed with a brazenly false history (e.g. that Newton “discovered” calculus⁸), AND a bad (church) philosophy of mathematics, declared as “superior”,⁹ and returned during colonialism.

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- 1 C. K. Raju, ‘Nothing Vedic in “Vedic Maths”’, *The Hindu*, 3 September 2014, <https://www.thehindu.com/opinion/op-ed/nothing-vedic-in-vedic-maths/article6373689.ece>; C. K. Raju, ‘वैदिक गणित में वैदिक कुछ नहीं’, *Jansatta*, 10 August 2014, <http://epaper.jansatta.com/318935/Jansatta.com/Jansatta-Hindi-10082014#page/17/1>.
 - 2 “Nothing Vedic in Vedic maths: response to comments”, <http://ckraju.net/blog/?p=100>.
 - 3 C. K. Raju, ‘Aryabhata Dalit: His Philosophy of Ganita and Its Contemporary Applications’’, in *Theory and Praxis: Reflections on the Colonization of Knowledge*, ed. Murzban Jal and Jyoti Bawane (Routledge, London, 2020), 139–52, <http://ckraju.net/papers/Aryabhata-philosophy-of-ganita-paper-2r.pdf>; C. K. Raju, ‘प्रसंग: दलित उपलब्धियों का जश्न’, *Jansatta*, 30 September 2018, <https://www.jansatta.com/sunday-column/celebration-of-dalit-achievements-jansatta-column/777664/>.
 - 4 For a quick account, see my talk at MIT, Cambridge, Mass. Video: <https://youtu.be/laodCGDjqzs>, abstract: <http://ckraju.net/papers/Calculus-story-abstract.html>, presentation: <http://ckraju.net/papers/presentations/MIT.pdf>.
 - 5 E.g. H. T. Colebrooke, *The Algebra of Brahmagupta and Bhascara*, John Murray, London, 1817. The word algebra derives from the al jabr wa’ al muqabala of al Khwarizmi, which translated the work of Brahmagupta.
 - 6 C. K. Raju, *Cultural Foundations of Mathematics: The Nature of Mathematical Proof and the Transmission of Calculus from India to Europe in the 16th c*, CE (Pearson Longman, 2007).
 - 7 C. K. Raju, “Probability in Ancient India”, *Handbook of the Philosophy of Science*, vol 7, *Philosophy of Statistics*, ed. Prasanta S. Bandyopadhyay and Malcolm R. Forster. General Editors: Dov M. Gabbay, Paul Thagard and John Woods. Elsevier, 2011, pp. 1175–1196. <http://ckraju.net/papers/Probability-in-Ancient-India.pdf>.
 - 8 C. K. Raju, ‘Marx and Mathematics. 2: “Discovery” of Calculus’, *Frontier Weekly*, 31 August 2020, <https://www.frontierweekly.com/views/aug-20/31-8-20-Marx%20and%20mathematics-2.html>.
 - 9 C. K. Raju, ‘To Decolonise Maths, Stand up to Its False History and Bad Philosophy’, *The Wire*, 2016, <https://thewire.in/history/to-decolonise-maths-stand-up-to-its-false-history>; C. K. Raju, ‘To Decolonise Math Stand up to Its False History and Bad Philosophy’, in *Rhodes Must Fall: The Struggle to Decolonise the Racist Heart of Empire* (London: Zed Books, 2018), 265–70.

However, mathematically challenged Europeans made subtle mistakes in understanding this imported Indian knowledge.¹⁰ It is both amusing and obnoxious that we still blindly imitate those European errors, and make no attempt to understand our real practical traditions, even while the whole nation is obsessively talking of tradition.

This widespread hostility to real Indian tradition, plus the insistence on blind imitation of the West by the fanatically colonised, results in the teaching of an inferior and difficult mathematics, especially as regards trigonometry and calculus,¹¹ the underlying “non-Archimedean” polynomial arithmetic, and probability and statistics.¹² Even in the matter of geometry, we would be much better off teaching traditional rajju ganita instead of “Euclidean” geometry.¹³

Since mathematics is the foundation for science, a fundamental change in the teaching and understanding of math would make a major difference also to science and technology, but that involves complex technicalities,¹⁴ hence would be omitted from this talk.

Author Bio: C. K. Raju is an Honorary Professor at the Indian Institute of Education. For a more detailed bio see <http://ckraju.net/cv/ckr-bio-1-page.html>.

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- 10 C. K. Raju, ‘Precolonial Appropriations of Indian Ganita: Epistemic Issues’ (International round table on Indology, IAS, Shimla, 2020), <http://ckraju.net/papers/ckr-indology-abstract.pdf>.
 - 11 C. K. Raju, ‘Teaching Mathematics with a Different Philosophy. 1: Formal Mathematics as Biased Metaphysics’, *Science and Culture* 77, no. 7–8 (2011): 274–79, arXiv:1312.2099; C. K. Raju, ‘Teaching Mathematics with a Different Philosophy. 2: Calculus without Limits’, *Science and Culture* 7, no. 7–8 (2011): 280–85, arXiv:1312.2100. C. K. Raju, ‘Decolonising Mathematics’, *AlterNation* 25, no. 2 (2018): 12–43b, <https://doi.org/10.29086/2519-5476/2018/v25n2a2>.
 - 12 C. K. Raju, *Statistics for Social Science and Humanities: Should We Teach It Using Normal Math or Formal Math?*, 2020, <https://www.youtube.com/watch?v=A9Og1k-Z5O4>.
 - 13 Udhbhavaha, “Euclidean” Geometry or Rajju Ganita? By Professor C.K RAJU- Day 1 (Bengaluru, 2021), <https://www.youtube.com/watch?v=ERm25QgyW1w>; Udhbhavaha, “Euclidean” Geometry or Rajju Ganita? By Professor C.K RAJU- Day 2 (Bengaluru, 2021), <https://www.youtube.com/watch?v=btf0e2flq8g>.
 - 14 E.g., C. K. Raju, ‘Eternity and Infinity: The Western Misunderstanding of Indian Mathematics and Its Consequences for Science Today’, *American Philosophical Association Newsletter on Asian and Asian American Philosophers and Philosophies* 14, no. 2 (2015): 27-33, <http://ckraju.net/papers/Eternity-and-infinity-Pages-from-APA.pdf>.