History and philosophy of science as a means for decolonisation

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As I have explained earlier[1], in 1823 Bengali intellectuals like Rammohun Roy demanded Western education.[2] This local support made it easy for Macaulay to establish colonial education in India. At that time the linkage of education to a government job was not clear, and Rammohun Roy demanded Western education only because he was conned by a false history of science. Macaulay, too, in his infamous minute[3] of 1835 stressed that the West was especially superior in the matter of science. One could argue that Rammohun Roy was gullible (he was taken in even by the coarser missionary propaganda and came to regard himself as a Christian[4]). However, attributing this to Roy's individual failings would not explain why Indians (and the colonised generally) did not cross-check that history of science for the next 180 years, including half a century after independence.

As I have also explained earlier,[5] Macaulay's claim that the West was immesurably superior in science (specifically astronomy) is a false claim. Nevertheless, that claim continues to be bandied about by influential philosophers even today. So, it is necessary to keep explaining why it is false. Thus, Kuhn's story of the Copernican revolution[6] is based on the chauvinistic fantasy that only Westerners did astronomy; hence astronomy remained static from the time of the Greek Ptolemy to the time of Copernicus and the European renaissance! This insult to the commonsense started off as Crusading history with the political aim to attack Muslims psychologically by projecting the Arabic texts translated at Toledo (during the Crusades) as lost Christian inheritance coming from Greeks (as pope Benedict still does[7]).

In fact, there never was any serious Greek tradition of astronomy. The Greeks were hopeless at arithmetic, as demonstrated by the non-textual evidence of their (Attic) numeral system and their calendar, which was grossly inaccurate and in complete disarray like its more refined descendant, the Roman calendar. They were notoriously superstitious, and believed the sun and moon were divinities. Indeed, they thought that those who studied astronomy, and denied the divinity of the sun and moon deserved a death punishment, and it was for this very reason that death penalties were awarded to Socrates and Anaxagoras.[8]

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1 C. K. Raju, *Ending Academic Imperialism*, Citizens International, Penang, 2011.

2 Rammohun Roy, Letter to Lord Amherst, 1823, available online, eg. at http://brookscollegeprep.org/ourpages/auto/2009/2/5/47331213/26-Roy-reading.pdf.

3 T. B. Macaulay, “Minute on Education”, 1835. The Minute may be found online on many sites, such as http://www.languageinindia.com/april2003/macaulay.html.

4 Rammohun Roy regarded himself as Christian. He was very upset to be labelled a “heathen” when he criticised Christian missionaries. See, e.g. *Life and Letters of Raja Rammohun Roy*, ed. Sophia Dobson Collet, Calcutta, 1914.

5 C. K. Raju, *Is Science Western in Origin?*, Multiversity and Citizens International, Penang, 2009. Daanish Books, Delhi, 2009.

6 T. S. Kuhn, *The Copernican Revolution*, Harvard University Press, Cambridge, [1957] 1966.

7 C. K. Raju, “Benedict's maledicts”, *Indian Journal of Secularism*, **10**(3) (2006) pp. 79-90; http://www.zcommunications.org/benedicts-maledicts-by-c-k-raju.

8 It is on this precise ground that Socrates was condemned to death. In his defence he denied he was Anaxagoras. Plato, *Apology*, 26. In *Dialogues of Plato*, trans. B. Jowett, Encyclopaedia Britannica, Chicago, 1996.

Obviously, there is no proof that Greeks ever did serious astronomy or that any Claudius Ptolemy even existed. Indeed, Ptolemy's purported dates are based on the dates of factitious "observations" for it has been conclusively demonstrated[9] that the dates (of e.g. eclipses) were back-calculated with systematic errors arising from wrong theories; those errors could not possibly be observational errors. As for the book *Almagest,* it was originally written in Persian[10] and the earliest available manuscripts are in Arabic from after the 9th -12th c. CE (since its star list mentions the current pole star, which was certainly not the pole star before the 9th c). (The *Syntaxis* is a late Greek translation from Arabic, not the other way round.) Like any scientific text, the *Almagest* was accretive, and it absorbed much Indian astronomical material from the Indian astronomical texts brought to Baghdad, from the 8th c. onwards, and to Persia from the 6th c. For example, the introduction to the *Almagest* paraphrases the long-drawn controversy in India over Aryabhata's (5th c.) theory of a moving earth. Like other Arab astronomical texts of that time, the *Almagest* mentions the difficulty with multiplication, etc. Western scholarship has no serious answer to any of this criticism, and just ignores it to persist with its fantasies, so it is time to reject those fantasies and move on.

As for Copernicus, due to fear of the Inquisition, he suppressed his Islamic sources (Ibn Shatir of Damishk, and the Maragheh school of Khwaja Nasiruddin Tusi[11]). He was not a revolutionary but a mere translator, who translated into Latin from the Greek translations already available, without fully understanding them. One might quibble, as a Harvard don has done,[12] that Copernicus "independently rediscovered" Ibn Shatir's model, even though Copernicus regularly visited the Vatican library which contained a Greek translation of Ibn Shatir's book (Western scholars are shatir at quibbling about "independent rediscovery"! But would one grant a PhD to a student who reproduces a book in the library claiming he did not see it?) Nevertheless, that still does not justify Macaulay's claim that the West was immesurably superior in astronomy, so that justification for Western education falls flat.

Then, there is the issue of the Newtonian revolution. Newton's planetary model is based entirely on the calculus, now known to have been imported from India. By 1832, the Indian origins of infinite series had already been made public by some honest Britishers,[13] and, as a historian, Macaulay should have been aware of that when he penned his minute of 1835. Further, as I have brought out,[14] regardlss of Western quibbles to the contrary, those infinite series *did* amount to the calculus, and Europeans did learn about calculus from India, the way they earlier learnt arithmetic algorithms from India.

Jesuits replicated the Toledo model in Cochin, systematically translating and taking a variety of Indian texts, including astronomical texts, from India to Europe. These texts naturally went to people like Clavius (a Jesuit general) and Tycho Brahe (Astronomer Royal to the Holy Roman Empire). Naturally also, Tycho Brahe's astronomical model is a carbon copy of Nilkantha's, and Julius Scaliger's Julian day-number system was common used in Indian astronomy. Noticeably, Clavius' Gregorian reform of the Christian calendar was based not on observations but on texts; and surely those texts were not 3

9 R. R. Newton, *The Crime of Claudius Ptolemy*, Johns Hopkins University Press, Baltimore, 1977.

10 The *Almagest* starts off by addressing a Cyrus. G. J. Toomer, *Ptolemy's Almagest*, Princeton University Press, 1998.

11 N. M. Swerdlow and O. Neugebauer, *Mathematical Astronomy in Copernicus's De Revolutionibus*, Springer-Verlag, New York, 1984, part 1, p. 47. Also, George Saliba, "Arabic Astronomy and Copernicus", *A History of Arabic Astronomy*, New York, 1994, ch. 15. For a more recent update, see http://www.columbia.edu/~gas1/project/visions/case1/sci.1.html.

12 Owen Gingerich, "Islamic astronomy", http://faculty.kfupm.edu.sa/phys/alshukri/PHYS215/Islamic_astronomy.htm.

13 Charles M. Whish, paper presented in 1832: "On the Hindu quadrature of the circle and the infinite series of the proportion of the circumference to the diameter exhibited in the four Shastras, the Tantrasamgraham, Yukti-Bh¯as¯a, Carana Padhati and Sadratnam¯ala", Trans. R. Asiatic Soc. Gr. Britain and Ireland, 3 (1835) 509–523. The account of an earlier discussion and the statement of Heyne is in J. Warren, *Kala Sankalita*, Madras, 1825.

14 C. K. Raju, *Cultural Foundations of Mathematics*, Pearson Longman, 2007.

centuries old as the pope made out in his bull. Kepler fudged his data, he was nearly blind, and Tycho's masonry instrument (which copied al Kashi's) were far too inaccurate. So, Kepler's precise orbit of Mars was also taken from Indian texts, for it could not have been obtained then by observations. (Indian astronomy incidentally used elliptic planetary orbits.)

Every problem of Newtonian physics involves the solution of a differential equations. Indian astronomers who obtained the precise "trigonometric" values needed for the calendar and navigation, and developed the related infinite series, belonged to the school of Aryabhata 5th c., who was the first to discard geometric methods, and numerically solve the differential equations for sine and cosine.[15] Aryabhata's numerical method is today known as "Euler's method", which Euler "independently rediscovered" after perusing Indian calendrical texts!

All this suggests a completely different picture from the crass glorification of the West one finds in the usual histories and philosophies of science, propagated through school texts, and history channels on TV. Instead of being the glorious creative inventors they paint themselves to be, Westerners come across as people who systematically expropriated not only the physical resources of others, but also their intellectual resources, and then falsely glorified themselves. (Glorifying itself through false history was a declared church strategy since Orosius' *History Against the Pagans*.) Remarkably, the same set of lies with some minor variations served to put down (a) Muslims during the Crusades, (b) it served to "morally" justify[16] racism during the slave trade, (c) it served to capture minds and build West-supporters through Western education across the colonies, and (d) today it continues to serve the interests of hegemony through soft power after the Cold War.[17]

This church technique of mind control through false history was amplified and propagated through Western education. That education system started during the Crusades; it aimed to create fervent missionaries by brainwashing the minds of the young by stuffing them with a variety of false myths and superstitions. Macaulay was well aware that Western education helped control the human mind and human behaviour; in his speech on education in the British parliament[18] he touted education as a superb counter revolutionary tool, far superior and cheaper than maintaining armed forces to curb internal violence!

All this suggests that a false history of science is a very dangerous thing, since so much power continues to flow from it. Even though slavery and colonialism have officially ended, a false history of science propagated through school texts continues to result in millions of students developing an awe of the West and developing blind faith in Western authority, which can then be used to mislead them as desired. If false history of science was critical to colonisation, then decolonisation must necessarily proceed by correcting that false history.

Also, a false history of science also leads to a bad philosophy of science and that leads to bad science. (e.g. claiming that Newton developed calculus leads to the present-day bad philosophy of calculus with limits[19]). Further, it is the bad philosophy of math which makes math difficult, and puts people off

15 *Aryabhatiya*, *Ganita* 12. See the detailed exposition in *Cultural Foundations of Mathematics*, cited above, p. 132 et seq.

16 E.g. Immanuel Kant, "Of National Characteristic...", trans. John T. Goldthwait, University of California Press, Berkeley, 1991, pp. 110–1.

17 S. P. Huntington, *The Clash of Civilizations and the Remaking of World Order*, Viking, New Delhi, 1997. For an elaboration of how this strategy operates through science, see C. K. Raju, *The Eleven Pictures of Time*, Sage 2003.

18 T. B. Macaulay, Speech delivered to the House of Commons, 18 April 1847. *Miscellaneous Writings and Speeches of Lord Macaulay*, vol. IV, *Speeches of Lord Macaulay.* Project Gutenberg ebook, http://www.gutenberg.org/files/2170/2170-h/2170-h.htm#2H_4_0031.

19 C. K. Raju, "Teaching mathematics with a different philosophy." Part 1: Formal mathematics as biased metaphysics.

math; consequently, they end up accepting Western authority in math and science. Through the education system (even in supposedly secular subjects like mathematics) this bad philosophy even propagates religious biases to hundreds of millions of students worldwide. For example, Islam is attacked on the grounds that it does not believe in "laws" (as in Newton's Laws") and is hence contrary to science. In fact, the belief in "laws" of nature is part of Christian dogma, not science.

Correcting this false history (and consequently the philosophy) also results in better science today: Newtonian physics failed just because Newton, like other Europeans, failed to understand the infinite series in the imported Indian calculus (for they were summed with a different philosophy). This led him to the error about time in his physics. Correcting this error leads to a reformulation of physics in general, and Newtonian gravitation in particular, using functional differential as I have explained.[20] Decolonised science is a better science.[21] This very much also applies to math, as already indicated, for going back to the original philosophy with which arithmetic and calculus developed makes math easy.

Therefore, for better math and science education, and, indeed, for better math and science, we should do the exact opposite of what Macaulay said: we should reject Western education together with the false history of science used to motivate it. Since that education system has many blind adherents today (those who were brainwashed by it), it is necessary to start by un-brainwashing youngsters by giving them a more honest account of the history and philosophy science.

To this end, AlBukhary International University initially conducted a one-week long international workshop to evolve a new curriculum for the history and philosophy of science. A version of this curriculum suitable to be taught at the undergraduate level was was then evolved,[22] and I would be teaching it from January 2013. Since AIU is an international university with students from over 50 countries, the history and philosophy of science taught here has to be internationally representative. However, if other universities to reproduce this model, far and wide, the next generation will have a chance of intellectual liberation from the mind control techniques of the West.

Science and Culture **77** (7-8) (2011) pp. 274-279.
http://www.scienceandculture-isna.org/July-aug-2011/03%20C%20K%20Raju.pdf. Part 2: "Calculus without Limits", Science and Culture 77 (7-8) (2011) pp 28-85. C. K. Raju, "Probability in Ancient India", *Handbook of Philosophy of Science*, vol. 7. *Philosophy of Statistics*, North Holland, San Diego, 2011, pp. 1175-1195. Online at http:ckraju.net/papers/Probability-in-Ancient-India.pdf.

20 C. K. Raju, *Time: Towards a Consistent Theory*, Kluwer Academic, 1994. C. K. Raju, "Retarded Gravitation Theory", in *The Sixth International School on Field Theory and Gravitation*, ed. Waldyr A. Rodrigues et. al., American Institute of Physics, 2012, pp. 260-276. C. K. Raju, "Time: What is it that it can be measured?", *Science&Education*, **15**(6) (2006) pp. 537–551.

21 See reference 16 above, and the press release posted at http://ckraju.net/press/press-release-rgt.htm.

22 See http://ckraju.net/papers/History-and-Philosophy-of-Science-New-Curriculum.pdf.