

# Decolonizing time: Time at the interface of science and religion

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# RgVeda 10.129

## Creation hymn

- ▶ Then there was neither existence nor non-existence

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Creation hymn

Colonialism

Calendar

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# RgVeda 10.129

## Creation hymn

- ▶ Then there was neither existence nor non-existence
- ▶ neither air nor sky beyond...

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# RgVeda 10.129

## Creation hymn

- ▶ Then there was neither existence nor non-existence
- ▶ neither air nor sky beyond. . . .
- ▶ Who knows, who can say how it all came?

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# RgVeda 10.129

## Creation hymn

- ▶ Then there was neither existence nor non-existence
- ▶ neither air nor sky beyond...
- ▶ Who knows, who can say how it all came?
- ▶ Even the gods came later...

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# Creation hymn: continued

- ▶ He who sees it from the highest heaven, he knows

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# Creation hymn: continued

- ▶ He who sees it from the highest heaven, he knows
- ▶ or perhaps he too knows not. . . .

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# Creation hymn: continued

- ▶ He who sees it from the highest heaven, he knows
- ▶ or perhaps he too knows not. . . .
- ▶ Only poets searching deep in their hearts understand what joins non-existence to existence.

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- ▶ That is: neither God nor gods,

- ▶ That is: neither God nor gods,
- ▶ but only poets can hope to understand creation!

# Definition of colonialism

- ▶ Colonialism = con-**all**-ism

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- ▶ Colonialism in India established by trickery

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- ▶ **not** through military or technological superiority.

# Converting the emperor

- ▶ Vasco da Gama arrived in 1498 CE.

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# Converting the emperor

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- ▶ But a century later Portuguese desperately tried to conquer India

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# Converting the emperor

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# Converting the emperor

- ▶ Vasco da Gama arrived in 1498 CE.
- ▶ But a century later Portuguese desperately tried to conquer India
- ▶ by doing a Constantine:
- ▶ they tried (but failed) to convert the Moghul emperor Akbar in 1582!

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- ▶ First major victory by British took 250 years:

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- ▶ battle of Plassey—in 1757

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- ▶ battle of Plassey—in 1757
- ▶ won by bribery and deceit.

# Militarily insecure

- ▶ British remained militarily insecure.

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# Militarily insecure

- ▶ British remained militarily insecure.
- ▶ Uprising of 1857 easily overthrew the British.

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# New weapon

- ▶ But then the colonizers introduced **a new weapon**

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# New weapon

- ▶ But then the colonizers introduced **a new weapon**
- ▶ a weapon which the colonized totally failed to understand:

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# New weapon

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# New weapon

- ▶ But then the colonizers introduced a new weapon
- ▶ a weapon which the colonized totally failed to understand:
- ▶ the University.
- ▶ (Macaulay 1847 said: education prevents revolt. How?)

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- ▶ Universities with international students existed in India from over 2000 years earlier (– 3rd c. CE)

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- ▶ e.g. University of Nalanda.



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- ▶ (Aim: to persuade Muslims who could not be converted by force)

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  1. created by the church
  2. during the Crusades (a time of religious fanaticism)
  3. to create an indoctrinated army of missionaries.
- ▶ (Aim: to persuade Muslims who could not be converted by force)
- ▶ the way pagan Europe was earlier converted to Christianity.)

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  - ▶ And propagate them as “superior”.

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- ▶ to indoctrinate people to believe in church superstitions
  - ▶ contrary to commonsense
  - ▶ such as virgin birth.
  - ▶ And propagate them as “superior”.
- ▶ **Instead of knowledge based on evidence, it taught people to rely on mutually supporting myths and stories.**

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- ▶ Though missionary schools had existed in India since 1508
- ▶ that indoctrination now became compulsory for entry to the university
- ▶ (and a government job).

- ▶ After 15 years of indoctrination

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- ▶ After 15 years of indoctrination
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- ▶ After 15 years of indoctrination
- ▶ the colonially educated did become blindly loyal to the West, and
- ▶ believed everything Western was superior.
- ▶ Like missionary minds, they did not apply commonsense
- ▶ or ask for evidence,
- ▶ but went by stories (also about science).

- ▶ Decolonization = unindoctrination.

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- ▶ Since indoctrination is achieved by myths

- ▶ Decolonization = unindoctrination.
- ▶ Since indoctrination is achieved by myths
- ▶ to **un**indoctrinate we must dismantle the myths and Western superstitions used by colonialism.

- ▶ Today I will restrict myself to Western myths and superstitions about time.

# Gifts of the Magi?

- ▶ These Western myths and superstitions about time

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# Gifts of the Magi?

- ▶ These Western myths and superstitions about time
- ▶ spread through three colonial “gifts” about time to the colonised:

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# Gifts of the Magi?

- ▶ These Western myths and superstitions about time
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  1. calendar

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- ▶ These Western myths and superstitions about time
- ▶ spread through three colonial “gifts” about time to the colonised:
  1. calendar
  2. clock

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# Gifts of the Magi?

- ▶ These Western myths and superstitions about time
- ▶ spread through three colonial “gifts” about time to the colonised:
  1. calendar
  2. clock
  3. clockwork cosmos

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- ▶ Today is 18 March 2017.

- ▶ Today is 18 March 2017.
- ▶ Did something special happen 2017 years ago?

# Myth, not history

- ▶ Typical answer: “birth of Christ”.

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# Myth, not history

- ▶ Typical answer: “birth of Christ”.
- ▶ However, **Jesus is myth, not history.**

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# Myth, not history

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- ▶ The zero point of the Christian calendar was fixed in the 6th c. by Dionysius Exiguus

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# Myth, not history

- ▶ Typical answer: “birth of Christ”.
- ▶ However, **Jesus is myth, not history**.
- ▶ The zero point of the Christian calendar was fixed in the 6th c. by Dionysius Exiguus
- ▶ in relation to the date of Easter, by back calculation.

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# ADBC superstition

- ▶ Today, colonial education teaches the ADBC superstition

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# ADBC superstition

- ▶ Today, colonial education teaches the ADBC superstition
- ▶ along with ABCD.

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# ADBC superstition

- ▶ Today, colonial education teaches the ADBC superstition
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- ▶ Must recite AD (Anno Domini) “year of our Lord [Jesus]”

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# ADBC superstition

- ▶ Today, colonial education teaches the ADBC superstition
- ▶ along with ABCD.
- ▶ Must recite AD (Anno Domini) “year of our Lord [Jesus]”
- ▶ and “Before Christ (saviour)” with every historical date one states.

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# A thousand lies make a truth

- ▶ Because dates are stated often

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# A thousand lies make a truth

- ▶ Because dates are stated often
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# A thousand lies make a truth

- ▶ Because dates are stated often
- ▶ and “a thousand lies make a truth”
- ▶ billions of people believe that Jesus was a historical figure born at beginning of the calendar.

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- ▶ But Jesus (Iesu) not even an original myth

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- ▶ Similar to Greek god of love: Bacchus

- ▶ But Jesus (Iesu) not even an original myth
- ▶ Similar to Greek god of love: Bacchus
- ▶ copied from Egyptian Osiris/Ausar (as Herodotus and Porphyry tell us).

- ▶ Bacchus born of a virgin mother

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- ▶ on winter solstice (21/23/25 Dec, depending on calendar; this was 9 months after spring equinox).

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- ▶ on winter solstice (21/23/25 Dec, depending on calendar; this was 9 months after spring equinox).
- ▶ The symbol of Bacchus is the cross (a phallic symbol).



# Copying and change

- ▶ However, though church copied from “pagans”, it changed Christianity.

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- ▶ However, though church copied from “pagans”, it changed Christianity.
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# Copying and change

- ▶ However, though church copied from “pagans”, it changed Christianity.
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- ▶ **and equity**

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- ▶ where people traditionally consumed *bhang* (cannabis, a hypnotic and aphrodisiac)

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- ▶ However, though church copied from “pagans”, it changed Christianity.
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- ▶ **and equity**
- ▶ as in the Indian festival of Holi
- ▶ where people traditionally consumed *bhang* (cannabis, a hypnotic and aphrodisiac)
- ▶ and throw colors so that everyone looks equal.

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- ▶ However, after church married state in the 4th c. CE

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- ▶ you articulate the superstition of **literal belief** in his virgin birth

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- ▶ So, when Jesus is declared Christ or saviour
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- ▶ (for he can save others only if he is himself free from “original sin”).

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- ▶ the church changed Christianity: **rejected equity**
- ▶ and declared sex a sin.
- ▶ So, when Jesus is declared Christ or saviour
- ▶ you articulate the superstition of **literal belief** in his virgin birth
- ▶ (for he can save others only if he is himself free from “original sin”).
- ▶ That is, church Christianity rejected both equity and creativity.

- ▶ In the 4th c. CE the church adopted the Roman calendar as the Christian calendar

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- ▶ which was defective

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- ▶ which was defective
- ▶ just because **Greeks and Romans were arithmetically challenged.**

- ▶ Thus, Greeks copied their calendar from Egyptians

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- ▶ but could not keep track of the months
- ▶ Roman wits joked that Greek **calends** (first day of the month) meant **never**.

- ▶ But the Roman calendar too was massively defective.

- ▶ But the Roman calendar too was massively defective.
- ▶ To realign the calendar with the equinoxes (“Julian reform”, –46 CE), a year of 445 days was needed, showing how much in error the Roman calendar then was.

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- ▶ the learned Egyptian Sosigenes, from Cleopatra's court,
- ▶ suggested the reformed calendar today wrongly called the Julian calendar.
- ▶ (This, incidentally shows that knowledge flows **towards** the barbarian military conqueror.)

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- ▶ Sosigenes understood that the Greeks and Romans were **arithmetically challenged**.
- ▶ Hence he suggested a simple scheme of 7 months of 30 days alternating with 5 months of 31 days
- ▶ with every fourth year a leap year.

- ▶ But even this was too complicated for the Romans!

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- ▶ But even this was too complicated for the Romans!
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- ▶ But even this was too complicated for the Romans!
- ▶ They counted as follows.
- ▶ 1 = 2016
- ▶ 2 = 2017
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- ▶ So, they reasoned after 2016 the next leap year should be 2019!

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- ▶ After decades this error was spotted and corrected by Augustus Caesar.
- ▶ For this brilliant achievement, the month of August is named after him.
- ▶ Since July named after Julius had 31 days
- ▶ August too had to have 31 days!

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- ▶ To correct it, they reduced February by 2 days.
- ▶ Thus, months on the Roman calendar have 28, 29, 20 and 31 days.
- ▶ No hope of keeping track of the lunar cycle!

- ▶ This damaged creativity in another way, for the lunar cycle

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- ▶ correlates with women's fertility cycle (ovulation and menstruation)
- ▶ (perhaps because of lunar tidal forces).

# Roman year

Solar cycle

- ▶ But Romans couldn't manage the solar cycle either!

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# Roman year

## Solar cycle

- ▶ But Romans couldn't manage the solar cycle either!
- ▶ Adding a leap year every fourth year assumes that the year is  $365\frac{1}{4}$  days.

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# Roman year

## Solar cycle

- ▶ But Romans couldn't manage the solar cycle either!
- ▶ Adding a leap year every fourth year assumes that the year is  $365\frac{1}{4}$  days.
- ▶ Is that correct?
- ▶ **This is wrong!** Even if you learnt it in school.

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# Arithmetically challenged

Both Greeks and Romans

- ▶ The tropical year is the time between two equinoxes of the same type (summer equinox to summer equinox say).

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# Arithmetically challenged

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- ▶ The tropical year is the time between two equinoxes of the same type (summer equinox to summer equinox say).
- ▶ Its duration is approximately 365.242 (tropical) days, NOT 365.25 days.

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- ▶ Its duration is approximately 365.242 (tropical) days, NOT 365.25 days.
- ▶ In early Greek or Roman numerals **there is no way to state so accurate a fraction** as  $\frac{365242}{1000}$
- ▶ The Romans had names for only a few simple fractions (parts of 12).
- ▶ So, they could not even **say** the right length of the year.

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# What difference does that make?

## The Christian calendar

- ▶ After the Nicene council the church used the Julian calendar

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# What difference does that make?

## The Christian calendar

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# What difference does that make?

## The Christian calendar

- ▶ After the Nicene council the church used the Julian calendar
- ▶ to fix the date of Easter.
- ▶ Easter (not Christmas) was then the major Christian festival.

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# The date of Easter

- ▶ Easter was defined as the first Sunday (Christian holy day) after the first full moon after the vernal (spring) equinox

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- ▶ Easter was defined as the first Sunday (Christian holy day) after the first full moon after the vernal (spring) equinox
- ▶ provided it did not coincide with the Jewish Passover (which is like Bakr-Id), in which case it was shifted to the next Sunday.

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- ▶ provided it did not coincide with the Jewish Passover (which is like Bakr-Id), in which case it was shifted to the next Sunday.
- ▶ So, to fix the date of Easter required a calendar which could
  1. correctly fix the date of the equinox and
  2. describe also the lunar cycle and phases of the moon.

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# The slip in the date of Easter

- ▶ The error of 0.01 days in 1 year (in the length of the year on the Roman calendar)

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# The slip in the date of Easter

- ▶ The error of 0.01 days in 1 year (in the length of the year on the Roman calendar)
- ▶ meant an error of 1 day in a 100 years.

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# The slip in the date of Easter

- ▶ The error of 0.01 days in 1 year (in the length of the year on the Roman calendar)
- ▶ meant an error of 1 day in a 100 years.
- ▶ Hence, the date of Easter slipped within a century.

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# Hilarious reforms

- ▶ Various calendar reforms were hence attempted in the 5th c., notably by the pope unfortunately named Hilarius.

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- ▶ Various calendar reforms were hence attempted in the 5th c., notably by the pope unfortunately named Hilarius.
- ▶ But **those calendar reforms failed**.
- ▶ The church controlled the Roman state then, hence had access to all knowledge in the empire.
- ▶ Hence failure of calendar reforms means the **then lack of serious knowledge of astronomy in the entire Roman empire**.

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# No Claudius Ptolemy

- ▶ Contrary to stories of Greek glorification.

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- ▶ Specifically the *Almagest* attributed to a 2nd c. Claudius Ptolemy (unrelated to Ptolemy dynasty) did not then exist in its present form.

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- ▶ It had a slightly better (but still incorrect) length of the tropical year, which was never used in the Christian calendar.

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- ▶ It had a slightly better (but still incorrect) length of the tropical year, which was never used in the Christian calendar.
- ▶ Thus, failure of 5th c. calendar reforms proves that stories of early Greek achievements in astronomy are **fraudulent**.

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# Is Science Western in Origin?

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- ▶ **early Greeks and Romans were inferior and backward in mathematics and astronomy,**

- ▶ In contrast, the 5th c. Āryabhaṭa's value for the duration of the (sidereal) year was an order of magnitude better.
- ▶ Thus, the calendar provides **robust non-textual evidence** that
- ▶ **early Greeks and Romans were inferior and backward in mathematics and astronomy,**
- ▶ contrary to Greek glorification based on late (post-12th c.) texts (plus biased speculations).

# The practical reason for Gregorian reform

Needed for navigation

- ▶ Though never mentioned in Western history, the Gregorian calendar reform had a practical motive, related to wealth.

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- ▶ Though never mentioned in Western history, the Gregorian calendar reform had a practical motive, related to wealth.
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- ▶ Solar altitude at noon, declination, and local latitude are connected by a formula given by the 7th c. Bhaskara 1 in *Laghu Bhaskarīya*.

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- ▶ For more details see my video: tale of two calendars.

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# What the Gregorian reform did

- ▶ The Gregorian reform corrected the duration of the tropical year.

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# What the Gregorian reform did

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# What the Gregorian reform did

- ▶ The Gregorian reform corrected the duration of the tropical year.
- ▶ Every 100th year was made not a leap year.
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- ▶ So duration of year =  $365.25 - 0.01 + 0.001 = 365.241$ .

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# What the Gregorian reform did

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- ▶ Every 1000th year was made a leap year.
- ▶ So duration of year =  $365.25 - 0.01 + 0.001 = 365.241$ .
- ▶ How did Clavius (the real author of the reform) arrive at this figure?

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# Reform based on documents

Not knowledge

- ▶ The Gregorian reform was also based on imported documents.

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- ▶ Without observational confirmation, Protestants (British, including Newton) rejected the Gregorian reform as a papal plot and accepted it only 1752 (after Newton's death).

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- ▶ So, Europeans did not know the right length of the year even in the 17th c.

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# Jesuit spy

- ▶ Clavius' student and Jesuit spy Matteo Ricci was in India

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# Jesuit spy

- ▶ Clavius' student and Jesuit spy Matteo Ricci was in India
- ▶ in Cochin trying to understand Indian methods of timekeeping.

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# Ricci's letter of 1581

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- ▶ In 1581 Ricci was in Cochin and wrote that he was looking for “an honorable Moor or an intelligent Brahmin to tell him about Indian methods of timekeeping”.

duas ou tres leguas e depois não tem mais nome, o mesmo se de ser em ta-  
nem e em Malagua q' tem rios de agua doce dos quaes e seus rios me em  
montanhas; Gra' não tem neither rio de agua doce mais q' este de agua sal-  
gada vbi se chama rio de Gra' q' tambem se mette m<sup>a</sup> g<sup>a</sup> terra dentro  
os rios Los Beis são tao desacommodados q' não destes q' nunca agora sei  
algua mais q' do Mozor q' se chama Hezebar, não outros os sabem un' tudo  
não me parece q' será impossível saberse mais se de ser por esse d'algum nome  
conhecido ao bramae a intelligencia q' saiba as cronicas dos tempos dos  
quaes eu p<sup>o</sup>veria saber tudo  
comprehendere folgues com o p<sup>o</sup>mo da sua historia q' me mandou, e folgaria  
tambem os outros q' a lerão, e inda q' ex não possa dar bom uerzo das cousas

- ▶ In contrast, on the Indian calendar a month always has exactly 30 lunar days or *tithis*.

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- ▶ celebrated in song and dance in Indian culture.

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- ▶ Hence, colonial adoption of the Gregorian calendar leads to the phenomenon of “delayed monsoon”
- ▶ the monsoon is on time on the traditional calendar,
- ▶ but “delayed” on the Gregorian calendar.
- ▶ This ruins Indian farmers.

# Delayed monsoon

- ▶ E.g., “delayed monsoon” happened in 2005

Decolonizing  
time:  
Time at the  
interface of  
science and  
religion

C. K. Raju

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**Calendar**

Clock:  
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Calculus

Clockwork  
cosmos

Creative cosmos

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# THE TIMES OF INDIA

M F HUSAIN GETS NOSTALGIC ABOUT AUG 15, 1947; RULES OUT RETURN TO INDIA 13

WORLDWIDE  
Including Karnataka  
FREE  
SALV AT V OUA

## Govt scrambles to save kharif, prays for rabi

### Deficient Rain In 31 Out Of 36 Met Zones This Month

Rajeev Dostananda & Nitin Sethi | 7

**New Delhi:** An unexpected dry first fortnight of August has starkly set out the big task before a drought-hattered government... to salvage whatever remains of the kharif crop. At the same time, it's praying the rain goes raw so that monsoon to the end would help successful sowing of the rabi (winter) crop.

As things stood on Friday, the country has had deficient rainfall in all parts, barring Orissa, Rajasthan and southern Orissa (see news). The latest farm and rain statistics for the week August 9-12 show an easy 31 out of 36 Met sub-divisions were in either "deficient" or sub-deficient or "scanty" (25) rainfall category.

Cabinet secretary K M Chaudhry-Sankhar, whose office is overseeing drought mitigation, told TOI, "The effort is to try and save the crop in the field at all costs with additional power and diesel subsidy while tackling urban problems like drinking water. The government is working on a war footing."

An emergency subsidy of Rs 1,000 crore is being given for diesel for farms nationwide. Additional power will be provided to crucial farm states, and hundreds of new tubewells will be sunk. The government is seeking to focus on oilseed and pulses cultivation at this late stage to salvage whatever is possible. For this, there is an effort to boost fertilizer use.

■ Monsoon wraps in August, raising doubts about IMD's recently revised forecast

■ In week gone by, rain deficit is 85% in east Rajasthan, 81% in AP's Rayachota, 80% in Maharashtra and 66% in west UP

■ Except for Saurashtra and south Karnataka, all other Met sub-divisions got below normal rain in Aug 6-12. As many as 17 districts declared drought-hit

■ Paddy sowing down by 25% west in UP (-28%) and Bihar (-34%). Total foodgrain sowing down by 11%, coarse cereals by 14%. Sugarcane sowing near normal, but hit by poor rain in UP, Maharashtra



### OPERATION SALVAGE

- Govt provides Rs 1,000 cr to subsidize diesel for pumpsets. Plans extra power for rain-deficit states and hundreds of new tubewells
- Food stocks to be released in market. Sugar, pulses to be imported. Move to shift to coarse grains, oilseeds to help farm earnings afloat
- Enhanced release of NREGS in areas where crops fail. More fertilizer use in irrigated areas to boost productivity
- Govt pins hope on early rabi sowing and normal winter rainfall to cover kharif deficit



# India faces monsoon washout

## North May Be Worst Hit, Kharif Crop In Danger

THEIR NEWS SERVICE

New Delhi: The monsoon is part of India's problems this year. Instead of being a savior to its economy, it was the weatherman on Wednesday lowered the prediction for the 2009 monsoon, saying that India would get only 80% of normal rainfall of 1,160 mm for the month. More worryingly, it predicted that the grain belt of the country — northwest India including Punjab and Haryana — would suffer the most getting only 60% of the long-term average for the region.

Considering that the regional production levels have an average level of 8%, rains in north-west India could be as low as 75% of normal, leading to a major drought in the region. This is a significant "correction" from IMD's mid-April statement predicting a "near-normal" 90% rainfall in the country.

### Why Met dept rarely declares a drought

A 60-year report whether India is facing a drought and how likely to answer what kind of drought? The types of drought include hydrological, agricultural and meteorological. Typically, it's the relevant ministry, rather than the IMD, that decides whether a region is drought-hit or not. **P 13**

At a press conference on Wednesday, senior meteorologist P. D. Devanahalli Chavan accepted that the situation was worrisome but claimed that the worst was over and July and August would see monsoon pickings up in most parts of the country. Up to June 24, the country got only 55% of normal rains. Central India was the worst sufferer getting only 25% of normal rainfall till now.

► Govt keeping tabs on monsoon, **P 13**

## NOW, A DOWNTURN IN RAINS

| Actual (in mm)            | Deficit | Forecast (in %) |
|---------------------------|---------|-----------------|
| <b>National</b>           |         |                 |
| 50                        | -53     | 93              |
| <b>Northwest India</b>    |         |                 |
| 21                        | -46     | 81              |
| <b>Central India</b>      |         |                 |
| 24                        | -75     | 99              |
| <b>Northeast India</b>    |         |                 |
| 121                       | -56     | 92              |
| <b>Southern Peninsula</b> |         |                 |
| 83                        | -25     | 92              |



• Rainfall recorded for monsoon season till June 24  
 1 mm less to Sept. 20th, as compared to long-term average

### WHAT IT MEANS FOR THE ECONOMY

► A drought would hit gov't finances on both revenue and expenditure side.  
 ► As revenue, reduced rural demand could impact industrial demand, and hence growth. That would mean lower collections of

all major taxes — excise, customs, corporate, personal income.

► On expenditure side, drought would increase demand for job guarantee scheme and hence the money needed to fund it. Other costs may also become necessary.

### WHAT IT MEANS FOR AGRICULTURE

► Why June is bad news for Kharif sowing which needs good rains for 15 days in June, early July.

► The predicted 13% shortfall in rains in India's grainery — Punjab, Haryana, west UP — could have major impact on this year's foodgrain production.

### Reservoirs Dry Up

**Tehri**  
 Present level  
**741m**  
 Shutdown level  
**740m**

Water power output at 1/3rd of normal

**Bhakra**  
 Present 450m  
 Shutdown 446m

### Rain Prediction

July: 93% of Normal  
 August: 101%

## Tempers rise on water, power shortfall

By Lalitha Bhatnagar & Richi Verma | THE

New Delhi: Grappling with a severe power and water crisis, Delhi is on a short fuse. There were five protests over water or power shortage in the last two days, one of which led to a rally from which angry protesters vandalised a DTC bus at Anandpur Nagar on Wednesday morning.

The water regulator has again refused to order out WDS, a schedule of power cuts and orders to R. But the

predictions of a deficient monsoon mean things are likely to get worse not just on the water front but also power. Low hydro-generation is already being cited as one of the key reasons for the shortage of power supply.

In the case of water, the initial problems of silt and damaged pipelines have been compounded by lower supply from the Tehri barrage — the city normally gets about 700 MTD water from there — and the power problems which mean that DWS cannot run its pumps.

The power woes also have to do with the lack of rains as low hydro-generation has affected total power availability in the Northern Grid. Though Delhi's own share of hydro-power has not gone down much, the lower availability in the grid and higher consumption by neighbouring states — there was a 14,000 MW power shortfall in the country on Wednesday — has left the city gasping.

► Dry taps snare Delhi in the face, **P 9**

# Drought almost certain now, admits IMD

## GoM To Ready Contingency Plan

Prasad Kulkarni | 170

**Pune/New Delhi:** There is every possibility of 2009 being a "drought year," with weather officials saying that only rainfall 30% in excess of normal for the remainder of the monsoon from mid-August to September — a good possibility — can now stem off the spectre of drought.

PM Manmohan Singh on Thursday set up a group of ministers to chalk out a contingency plan to deal with the situation while a committee of secretaries may be asked to look into import of sugar. Agriculture minister Sharad Pawar said the government would decide next week on whether to release food stocks into the open market to stabilise prices.

With the cumulative shortfall in rainfall touching 28%, the monsoon has defied predictions that it could reverse to the extent that it significantly lowers the deficit in regions like north-west, central and north-west India.

A senior IMD official at Pune said the country was more than likely to end up with a drought unless the remaining 45 days of monsoon see much more than average rainfall — something that would be contrary to the IMD's own predictions.

Explaining the scenario, IMD's deputy director general for weather forecasting A B Alexander said, "The rainfall should be at least 30% in excess of normal rain for the remaining 45 days of the monsoon season."

The average rainfall of the June-to-September monsoon season in the country is 1186mm and normal rain for the mid-August to end of September period is 524mm.

Manmohan said, "The rainfall should be at least 80% more than the 524mm mark for the country to avert potential drought. This can happen only in case of unusual rainfall activity."



### Running Dry

- Monsoon cannot revive enough to lower the deficit in large parts of India
- Only 30% above average rains in remaining 45 days of season can prevent drought
- Drought year is declared when 20% to 40% of the country's total area is rainfall deficient and has a top shortfall of 10% or more

## 'N India's groundwater vanishing'

**Mumbai:** Using Naas satellite data, scientists have found the groundwater levels in northern India have been declining by as much as seven centimetres per year over the past decade.

Attributing the loss almost entirely to human activity, Naas's Jet Propulsion Laboratory said more than 180 cubic km of groundwater disappeared from aquifers in Haryana, Punjab, Rajasthan and Delhi between 2001 and 2008 — far more water than can be replenished by natural processes.

The finding is based on data from Naas's Gravity Recovery and Climate Experiment, a pair of satellites that ping-pong across the planet, water stored above or below the Earth's surface. ■ 15



## MONSOON MADNESS

Frog marriages in Nagpur (top) and Andhra, 'auspicious' rain during the Puri Rath Yatra (right), yagnas and black magic... it's all happening and it's all for rain



# India's wettest zone in driest phase

Rahul Karmakar  
Gwahati, June 23

AT AN average 11,430 mm, Cherrapunjee and adjoining Mawsynram in Meghalaya receive the world's highest rainfall. This monsoon, however, these 'rain magnets' are nowhere near half that mark.

Meghalaya is the reason why the North-East is India's wettest zone. But ever since the monsoon officially set in on May 20, the region (minus Sikkim) has received 66 per cent less rainfall. Meghalaya leads the table with a whopping 76 per cent deficit.

"This monsoon has started on a very disturbing note," regional director of Regional Meteorological Centre Debra Kanta Handique told IIT. "Like Meghalaya, Nagaland has received 56 per cent less rainfall up to June 23. Manipur, Mizoram, Arunachal Pradesh, Assam and Tripura follow with 48, 44, 36, 35 and 37 per cent deficit respectively."

Farmers in the hill states, dependent on rain for their terrace or slope farms, have been hit hard. In the plains of Assam, drought-like condi-



Cherrapunjee receives an average rainfall of 11,400 mm. But this year, it has received 76 per cent less rainfall.

tions have affected paddy cultivation. "This is the kharif (sowing season) requiring ample rainfall, but fields in the prime rice belts are lying barren," said Hhoben Kalita of a self-help farming group in western Assam's Rangitya subdivision.

The Assam government has taken a few measures to combat the crisis. "We have decided to provide diesel worth Rs 6 crore to farmers in drought-

hit areas so that they can run generators to draw water for their fields. This is being worked out with the Irrigation Department," said Assam Agriculture Minister Pranali Hani Boshma.

Bearing the brunt of this low rain situation are the state electricity boards. The normally power surplus Meghalaya has resorted to abnormal power cuts to be able to sell enough electricity to

adjoining states for revenue generation. The Union reservoir, the State's main source of electricity, has almost bottomed out to deepen the crisis.

Assam, the most industrially-aided among the seven north-eastern states, has been the hardest hit. "We can do nothing about the unprecedented power crisis if the rainless climate continues," said Assam State Electricity Board chairman Anil K Sachan. "Because of humidity, peak hour demand has crossed 900MW but we have been able to provide only 750MW."

Deficit rainfall has affected generation of ASER's 200MW Kapili hydropower project. Drastic reduction in water level has resulted in North East Electric Power Corporation Ltd's Rangasadi (in Lower Subansiri district of Arunachal Pradesh) producing only 180 million units from March to May as compared to 282 million units during the same period in 2008.

The installed capacity of Rangasadi is 400MW and Assam gets 200MW of this under normal circumstances.

## SIDELIGHTS

### 'El Nino effect not responsible'

Scientists at the Indian Meteorological Department (IMD) and the Indian Institute of Tropical Meteorology, both in Pune, declared on Tuesday that contrary to popular belief, the El Nino effect was not responsible for the delayed monsoon. El Nino is a peculiar ocean-atmosphere phenomenon that suppresses monsoon winds of their strength. "El Nino is still in the formation stage," said A.K. Srivastava, director, National Climate Centre, IMD.

YOGESH JOSHI, PUNE

### No Doppler help for Mumbaiites

Doppler radar, the latest gizmo in the arsenal of the Mumbai's Met Department to ensure accurate forecast, will remain parked in boxes and will not be of any use this monsoon or help citizens to get better weather updates.

SOURBH MITRA, MUMBAI

# Delayed monsoon 2009

► and then ...

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Send your questions to: [local@timesofindia.com](mailto:local@timesofindia.com)

**BROAD'S FIVE-WICKET HAUL PUTS ENGLAND IN STRONG POSITION 23**

## As heavens open up, it's hell on city roads

THE TIMES NEWS NETWORK

**New Delhi:** For the second time this season, the heavens opened up over the capital and brought on hell for commuters and residents within a span of a few hours on Friday evening. As it turned dark and rain came down in sheets accompanied by strong winds, thrilled Delhiites soon witnessed the horror of familiar traffic chaos across the city. Several areas were completely flooded in the 74mm rain and

**STALLED BY STORM**  
PAGES 3 & 4

many people spent hours on the road, stuck in traffic jams. The IGI Airport proved to be the biggest amber-treatment in part of the roof of the new departure terminal got blown off and a large part of the terminal got waterlogged. Many flights were delayed and diverted as visibility fell to between 100 and 300m. Several passengers also missed even delayed flights because they were stuck on the road.

The city last several times, INDMC said 100 trees were fully or partially damaged, while MCD said 14 trees were uprooted in its area) blocked roads, aggravating jams. Parts of central Delhi were also hit by hail.



**WOMEN TO GO:** A driver takes a turn during a massive jam.

Yet again, unrepentant and flyovers were a sore point as acute waterlogging in and around them led to traffic diversions. Traffic lights also stopped working. Clogged

roads and overflowing sewers and drains also saw water entering many houses. The maximum temperature early Friday afternoon — 38.8°C — fell to 29.7°C within

### RAIN & PAIN

**What Came Down**

- 74mm of rain in an afternoon storm with windspeeds up to 51 kmph (Palam)
- Temperature by 14°C (from 39°C to 25°C)
- Power demand by 1,500MW (from 4,000MW to 2,500MW)

**What Went Up**

- Stress levels and chaos. Just one car helpline got 600 breakdown calls by 5pm

**5 Slowest Trips\***

- Gurgaon-SP Marg, Time: 5 hrs
- New Friends-South Ex, 3 hrs
- Ex-India Gate, 2.5 hrs
- Dahli Gate-Mandi House, 2 hrs
- IGI-Domestic Terminal, 1.30 hrs

\*Based on commuter feedback

**Airport Down Under**

- Part of new ID terminal roof blown away. Operations stalled

**Forecast**

- Isolated showers over northwest India to next 48 hrs

► Avg speed 5kmph, P 4

**short stories**  
**DELHI FINALLY RAIN-SURPLUS**

**8 mm**  
 Delhi's rain surplus of today evening

**NEWSLINE** The Capital's precipitation is over. The rain that in monsoon months had left the city with a deficit, this September 17, is averaging around 76.3 mm rain, about 10-millimetres 'over' for July by September 16, the city had recorded 66.3 mm rain so far.

The city recorded 28 mm rain on Friday. The MoEF also forecasted the same amount of rain in the next 10 days.

Thanks to the wet weather the temperatures, too, have been falling between 14 and 20 degrees Celsius.

**Roof collapse kills mother, child**

**NEWSLINE** This afternoon, involving a three-year-old child, were critically injured on Friday when the ceiling of their home collapsed due to heavy rains. The incident near the site of Indraprastha Colony in the Lodhi area of Delhi. The incident happened around 4 am. Police said that following treatment, the mother of the child, 38, and her daughter, leaving the family members hospitalized under the Delhi.

Delhi. Delhi's rain surplus of today evening

# It's raining trouble n

**TOO MUCH OF A GOOD THING** Unabated rainfall is breaking up roads, causing traffic jams and b

204.83 m Yamuna's danger mark in Delhi | 203 m Water level recorded on Friday | 207.49 m Record water level on June 6, 1976, when great flood was recorded.



The Yamuna is expected to breach its danger mark by Saturday afternoon.

## Yamuna's bank rupture looks imminent

Mo Environment | Flood Control Department to be set up | The amount of rain | Yamuna's danger level was 207.49 m on Friday. It is 204.83 m now.

## Dengue malaria to take BREEDING T multiply in wet

Just Street Health

**NEWSLINE** The heaviest rain in the Capital in over a month is believed to have already started breeding mosquitoes in water — dengue and malaria — this have already been reported cases and are expected to increase. Delhi has not only dengue water but also malaria. The health department has already started spraying the city with insecticides. The MoEF also forecasted the same amount of rain in the next 10 days.

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- ▶ Another repeat in 2014.

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- ▶ The colonised mind, like the missionary mind, goes by stories, not evidence.
- ▶ Hence, the colonised elite adopted the Gregorian calendar, though it ruins farmers in India.

- ▶ Apart from a defective and unscientific Christian calendar,

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- ▶ the mechanical chronometer (watch) was the second time-gift of colonialism.

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- ▶ Rate of burning: incense sticks
- ▶ Biological rhythms: breath, pulse

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- ▶ Developed by Arabs (Al Jazari, 12th c.)
- ▶ Appears in Europe, around 14th c.

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- ▶ What is important is that the West made mechanism a part of culture.
- ▶ The church adopted the mechanical clock and clock towers as its symbol.

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- ▶ Clocks were no doubt used to synchronize prayers

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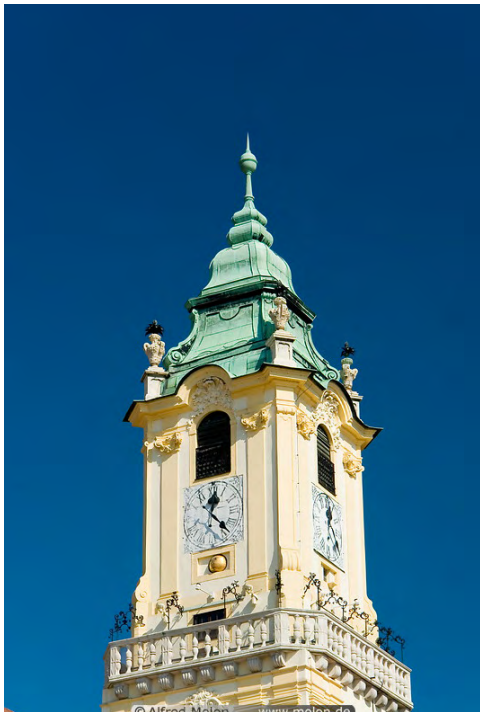
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- ▶ This is done in other ways by other religions: only the church adopted the **mechanical** clock,
- ▶ to emphasize apocalypse: the myth that “time is running out”.
- ▶ “Repent, for doomsday is near” was an important dogma for the medieval church.



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- ▶ for European dreams of wealth then rested in overseas trade/loot.

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- ▶ Harrison's chronometer solved this problem
- ▶ However, the full story is suppressed.
- ▶ That local time varies with longitude was a fact well known from at least a thousand years earlier.

- ▶ For example, the 5th c. Āryabhaṭa says “the earth is round like a *kadamba* flower” (Gola 7) and “stands supportless in space” (Gola, 6).

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- ▶ He concludes (Gola 13) “when it is sunrise at Lanka, it is midnight at Siddhapur, midday at Yavkoti and sunset at Romaka.
- ▶ Lanka (not Sri Lanka) the point where the meridian of Ujjayini meets the equator, other cardinal cities 90° apart.

- ▶ But the key neglected question is this:

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- ▶ when Indians, Arabs . . . , certainly knew celestial navigation.

- ▶ Answer: Europeans did not know the correct radius of the earth (until 1672)

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- ▶ because they were arithmetically challenged
- ▶ (had a poor understanding of “Pythagorean” calculation also called trigonometry).

- ▶ 7th c. Indian mathematician Brahmagupta said

Creation hymn

Colonialism

Calendar

**Clock:**  
**Chronometer**

Calculus

Clockwork  
cosmos

Creative cosmos

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- ▶ to verify Khalifa al Mamun’s 9th c. physical measurement of  $1^\circ$  of the arc.

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- ▶ But this too requires accurate trigonometric values.

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- ▶ Though the Jesuit general, Christoph Clavius (author of the Gregorian reform)
- ▶ published the stolen (and interpolated) Indian trigonometric values (accurate to ten decimal places) in his name in 1608
- ▶ He did not know enough trigonometry to measure the radius of the earth correctly!

- ▶ The chronometer solved the longitude problem (in principle)

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- ▶ in a way which did not require calculation or any application of the mind.

- ▶ The chronometer (the watch you used to wear) became part of the culture

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- ▶ The chronometer (the watch you used to wear) became part of the culture
- ▶ a shackle to industrial civilization
- ▶ which greatly mechanized life: one is always “running out of time”,
- ▶ with no time left to be oneself or be creative!

- ▶ Even music has been mechanized.

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- ▶ Even music has been mechanized.
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$$\left(\frac{3}{2}\right)^{12} = 129.746 \neq 128 = \left(\frac{2}{1}\right)^7.$$

- ▶ Even music has been mechanized.
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$$\left(\frac{3}{2}\right)^{12} = 129.746 \neq 128 = \left(\frac{2}{1}\right)^7.$$

- ▶ Western music today (equal tempered scale) uses  $\sqrt[12]{2} \approx 1.059$  which makes every note slightly off-key.

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- ▶ calculated using the infinite series of the calculus
- ▶ invented in India
- ▶ and stolen from Cochin by Jesuits in the 16th c.

PEARSON LONGMAN

History of Science, Philosophy and Culture  
in Indian Civilization

*General Editor* D. P. Chattopadhyaya

Volume X Part 4

Cultural Foundations of Mathematics  
The Nature of Mathematical Proof and  
the Transmission of the Calculus  
from India to Europe in the 16th c. CE

C. K. RAJU

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PHISPC

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CENTRE FOR STUDIES IN CIVILIZATIONS

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- ▶ Today, credit for calculus falsely given to Newton and Leibniz
- ▶ **who did not quite understand it.**
- ▶ The West understood practical value of calculus
- ▶ but added tons of junk metaphysics.

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- ▶ He thought calculus could be made “perfect”
- ▶ by making time metaphysical.
- ▶ He said “**absolute, true, and mathematical time**, flows on **without regard to anything external**.”

- ▶ That is, he did not define a way to measure time.

Creation hymn

Colonialism

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- ▶ For example, Newton's first law speaks of **uniform motion**.
- ▶ A body is in uniform motion if it covers equal distances in **equal times**.
- ▶ But we cannot "judge" when two time intervals are equal
- ▶ their equality must be **defined** by defining a physical way to measure time.

- ▶ Newtonian physics failed just because of this

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- ▶ **conceptual error about time**

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- ▶ **conceptual error about time**
- ▶ arising from Western superstitions.

Creation hymn

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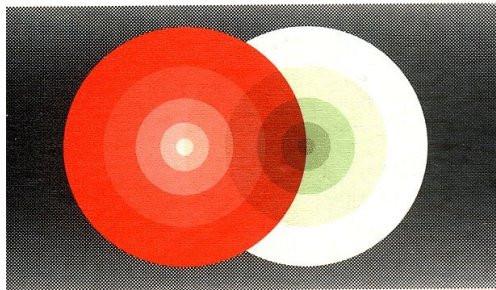
Creative cosmos

# **Time: Towards a Consistent Theory**

by

**C. K. Raju**

**Kluwer Academic Publishers**



**Fundamental Theories of Physics**

- ▶ Apart from a religious and unscientific calendar

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- ▶ and a life regimented by the mechanical clock

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- ▶ and a life regimented by the mechanical clock
- ▶ the third gift of colonialism was a clockwork cosmos or a **mechanistic cosmos**.

- ▶ No easy correction to Newtonian physics (which failed).

Creation hymn

Colonialism

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- ▶ No easy correction to Newtonian physics (which failed).
- ▶ Thus, Aquinas (*Summa Theologica*) put forth the dogma that
- ▶ God rules the world with eternal laws (“laws of nature”).
- ▶ **Contrary** to beliefs in Islam, Hinduism, Buddhism . . . .
- ▶ But the West superstitiously came to believe that in these “laws” and that they are formulated in the language of eternal truth: mathematics,
- ▶ specifically calculus: physical “laws” formulated as differential equations.

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- ▶ Differential equations are a way to steal your soul!
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- ▶ Writing down a physical law as differential equation requires that time should be like a line
- ▶ (defining derivative with respect to time requires time to be like the real line).

- ▶ What has that got to do with your soul?

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- ▶ Ancient notion of soul was understood in the **physical** context of **quasi-cyclic time**

- ▶ What has that got to do with your soul?
- ▶ Ancient notion of soul was understood in the **physical** context of **quasi-cyclic time**
- ▶ or a quasi-cyclic cosmos.

- ▶ In a quasi-cyclic cosmos **approximately** the same events repeat across cosmic cycles.

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- ▶ **All** events approximately repeat
- ▶ so people too are repeatedly reborn.
- ▶ This happens not immediately after death, but billions of years “later”.
- ▶ (Nietzsche) But people are not conscious of the time gap.

*You fancy that you will have a long rest before your second birth takes place,—but do not deceive yourselves! Between your last moment of consciousness and the first ray of the dawn of your new life no time will elapse,—as a flash of lightning will the space go by, even though living creatures think it is billions of years, and are not even able to reckon it. Timelessness and immediate re-birth are compatible.*

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- ▶ On Newtonian physics, in a closed cosmos every event must repeat
- ▶ so the dead too are reborn (after a long time called the Poincaré recurrence time).

- ▶ However, because Nietzsche used a **mechanistic physics**

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- ▶ he thought this rebirth must be a mechanistic process, endlessly repetitive.

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- ▶ he thought this rebirth must be a mechanistic process, endlessly repetitive.
- ▶ That is, he confounded quasi-cyclic time (which permits change) with supercyclic time or eternal recurrence (which permits no change).

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- ▶ Western thinkers (Mircea Eliade, T. S. Eliot etc.) also confounded
- ▶ quasi-cyclic time with eternal recurrence.
- ▶ In fact, post-Nicene Christianity is founded on this confusion.

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- ▶ He misrepresented Origen’s notion of quasi-cyclic time as the “Stoic” notion of eternal recurrence.
- ▶ The church agreed saw the political benefit, and cursed the belief in “cyclic” time in 552 CE (5th Ecumenical Council)
- ▶ This created the false Western dichotomy between “linear” and “cyclic” time.

# The Eleven Pictures of Time

*The Physics, Philosophy, and  
Politics of Time Beliefs*



C. K. Raju

- ▶ After it married the state,

Creation hymn

Colonialism

Calendar

Clock:  
Chronometer

Calculus

Clockwork  
cosmos

Creative cosmos

- ▶ After it married the state,
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- ▶ After it married the state,
- ▶ the church changed Christianity for political reasons:
- ▶ it rejected **equity and creativity**.
- ▶ Changing reincarnation to resurrection also turned the soul metaphysical.

- ▶ So, how to recover your soul?

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- ▶ So, how to recover your soul?
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- ▶ Answer: **decolonize time!** Reject the “gifts” of colonialism/church.

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- ▶ How to have a science compatible with creativity, as we observe every day?
- ▶ Answer: **decolonize time!** Reject the “gifts” of colonialism/church.
- ▶ How?

- ▶ The calendar and clock are just easy examples.

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- ▶ and restore equity and creativity.
- ▶ Requires a reform of both **religion** (Christianity)
- ▶ **and** reformulation/decolonization of **science (and math)**.
- ▶ This is a big agenda.

- ▶ Easiest step (conceptually easy, politically difficult):

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**Creative cosmos**

- ▶ Easiest step (conceptually easy, politically difficult):
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- ▶ Easiest step (conceptually easy, politically difficult):
- ▶ **reclaim original Christianity** and
- ▶ original notion of soul along with the original notion of an immanent God.
- ▶ This also restores equity, and compassion sorely missing from inequitable church Christianity.

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- ▶ we first need to reformulate calculus so that

- ▶ To be able to do a non-mechanistic science
- ▶ we first need to reformulate calculus so that
- ▶ mere use of calculus does not make time linear.

- ▶ Possible by using my philosophy of math called zeroism

Creation hymn

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**Creative cosmos**

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- ▶ (For technical details, see abstract and video of my MIT talk; google)
- ▶ (Now working on easy math for schools with IIE).

- ▶ Zeroism a **realistic**, and **practical** philosophy

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**Creative cosmos**

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Creation hymn

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- ▶ (For more details, see the video of my conversation with the Dalai Lama; google!)

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- ▶ Changing the philosophy of math not only makes math easy, it makes room for a better science.

Decolonizing  
time:  
Time at the  
interface of  
science and  
religion

C. K. Raju

Creation hymn

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- ▶ (Article now re-published in *Journal of Black Studies* in the context of decolonization in South Africa.)

- ▶ Proposed reform of science: allow future to interact with present and past

Creation hymn

Colonialism

Calendar

Clock:  
Chronometer

Calculus

Clockwork  
cosmos

Creative cosmos

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- ▶ also called a “tilt in the arrow of time”.
- ▶ (Changes the equations of physics to mixed-type functional differential equations.)
- ▶ This results in a **non-mechanistic physics** which permits both **spontaneity** and **creativity**.

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- ▶ Allows creativity needed by artists.

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- ▶ History dependent physics **irreversible**: entropy or disorder increases.
- ▶ Physics with history dependence + anticipation allows entropy to (rarely) decrease spontaneously.

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- ▶ ripples may converge **spontaneously** and throw the stone out of the pond.
- ▶ Popper's resolution of this "pond paradox" incorrect: assumes everything must have a cause.
- ▶ With the new physics such "uncaused" events permitted.

# Cosmic music

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Decolonizing  
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Time at the  
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C. K. Raju

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# Cosmic music

- ▶ That is how **we create harmony in the cosmos by us.**
- ▶ (Immanence) **You** are the creator.
- ▶ Upanishads: “that art thou”.
- ▶ and the task of creating a better and harmonous world is ongoing.

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