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14–15 November 2027 • Hyderabad, India

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Original articles pertaining to literature, art, history, culture and of general interest (other than political) are considered for publication in TRIVENI. Articles should be brief. The soft copies of the articles can be emailed to trivenijournal@yahoo.com.

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Triple Stream

Triveni at 100: Honouring the Past and Moving Forward

Prof. Y. Sreedhar Murthy

As *Triveni*, a journal devoted to literature, the arts, culture, history, and the intellectual current of the Indian Renaissance approaches its centenary, it is time to reflect on its enduring legacy and its continuing place in India's literary and cultural landscape. Founded in 1927, the journal has, across generations, provided a vital intellectual forum for writers, scholars, artists, historians and thinkers, bringing India's rich and varied intellectual and cultural traditions into a national conversation. In its early years, the journal featured articles from the builders and forefathers of our country including Mahatma Gandhi, Pt. Nehru, Dr. Radhakrishnan and philosophers like Sri Aurobindo, Jiddu Krishnamurthy and others. The founding Editor, Sri Kolavennu Ramakotiswara Rau, had the distinction of mentoring and shaping eminent journalists and writers, including Sri M Chalapathi Rau of *The National Herald*, Sri A S Raman, Sri Manjeri Esvaran, Sri Basudha Chakravarty, and Sri C L R Sastry, to name but a few. Over the years, the journal has featured contributions from distinguished scholars from across the world, as well as educationists and writ-

ers representing India's many regions, languages, and literary traditions.

Triveni's founding purpose remains as vital and relevant today as it was nearly a century ago: to advance the cause of the Indian Renaissance and strengthen the bonds of National Integration by serving as a catalyst. Its noble mission has been to bring the finest voices of Indian letters into a shared intellectual space through scholarly and path-breaking writings, translations and transcreations. By facilitating an enriching exchange of ideas and diverse creative traditions across linguistic and regional boundaries, the journal has sought to deepen our understanding of India's plural strengths in the field of cultural inheritance. *Triveni* seeks to contribute to this continuing renewal and understanding of the country's rich intellectual and literary heritage through a range of initiatives that advance the cause of learning and foster the interplay of variegated perspectives.

The journal's noble mission is also to nurture a discerning and informed readership by bringing to light interpretations of enduring works, neglected voices, and

new talent, while encouraging critical engagement with the ideas and creative achievements that have shaped India's cultural consciousness. The journal seeks not merely to preserve the country's rich cultural inheritance, but to reinterpret it for future generations. By facilitating an enriching exchange of ideas and creative traditions across linguistic and regional boundaries, the journal endeavours to deepen our understanding of India's plural cultural inheritance and contribute to the continuing renewal of its intellectual and literary life by playing an active role in shaping the intellectual and creative traditions of contemporary India.

Even in England, a country with a long tradition of literary culture, several distinguished journals had to close in the face of declining readership, changing literary and cultural tastes, newly evolving preferences of readers, which probably the journals could not accommodate. A preference for easily consumable forms of entertainment posed a serious challenge to publications committed to intellectual and literary standards in the 1930s and the 1940s in England, leading to the Editor of *Scrutiny*, F. R. Leavis, coming forward with his vehement critique of the homogenizing forces of modernity. Reputed journals like *Modern Review*, *The Indian Review* and *Bharati* in Telugu of our own country have passed into history for various reasons that include

change in the historical environment or loss of founding leadership or difficulty in sustaining serious readership and institutional support. An analysis of this decline places before *Triveni* the challenge of preserving the venerable founding vision, renewing its relevance, discovering new writers that stimulate the thinking of the readers, and cultivating a new generation of readers who value depth and enduring national and cultural values.

The aim, therefore, is to make the journal a forum for examining ideas, interpreting traditions, expressing disagreement with civility, and deepening the awareness of India's rich cultural mosaic through a fruitful interrogation of its many facets and dimensions. In this spirit, the idea of an "Indian Renaissance" should not be misunderstood as a historical episode, but as a continuing cultural project – one that brings into view India as a civilization of extraordinary plurality through the columns of the journal.

In this task, translation should play a significant role through the journal as a form of creative and critical engagement between India's diverse languages and literary traditions. Translations and transcreations are a vital part of the national cultural imagination. Linguistic diversity should not be a barrier for a shared cultural understanding. Dr S Radhakrishnan said, "Indian literature is one, though

written in many languages,” highlighting the spirit of unity in diversity, and further emphasizing that linguistic diversity does not prevent Indian literatures from being viewed as one broad literary tradition.

Marking the occasion of the Platinum Jubilee celebrations in 2004, all the back volumes of *Triveni*, dating from Vol.1, No.1 (1928), were collected, digitized, and made freely accessible on the journal’s website (<https://www.trivenijournal.org>). Since then, all the issues of *Triveni* have been made available on its website, offering younger researchers an accessible archive for exploring diverse themes, interpretive approaches, and readings for in-depth research.

With a view to further strengthening and promoting *Triveni*, it is planned to celebrate the Centenary Celebrations of the *journal* during 2027-2028. It is strongly believed that a year-long programme of centenary celebrations will provide fresh impetus to *Triveni* to reaffirm its founding

ideals, rearticulate its role in the changing milieu, and renew its vision, and envisage durable links with contemporary thought, so as to enable it to continue its publication journey for decades to come. During the centenary year, Seminars and workshops will be held in different parts of the country with writers, critics, and translators, with the aim of fostering a vibrant academic and literary community around the journal. These initiatives will also seek to broaden the journal’s reach across the country, help a deeper appreciation of its legacy, and encourage the participation of the younger readers, students, and emerging writers, and thereby open up new horizons for the journal’s future.

It is hoped that the centenary celebrations will lay the foundation for expanding *Triveni*’s readership, building a stronger and more sustainable institutional base, and developing the material infrastructure necessary to sustaining its growth and ensuring its continued vitality for decades to come.



Gurudev Rabindranath Tagore An Inquiry into His Enduring Greatness

Surajit Dasgupta*

Houston, Texas.

“... In this troubled world, it is good to remember him and to recall again the beauty in his message” - Pearl S Buck, the 1938 Nobel laureate for Literature.

“... This completely noble and harmonious thinker belongs not only to his people but to all humanity” - Albert Sweitzer, the 1952 Nobel Prize for Peace.

Introduction

On February 25, 2023, a unique new Memorial to Rabindranath Tagore was inaugurated in a public park (the Ray Miller Park) in Houston, TX. The Memorial, known as the Tagore Memorial Grove, a place for “peace and introspection”, was built by the Tagore Society of Houston¹ to pay homage to Tagore’s philosophy of humanism and universalism, and,



considering that this philosophy continues to inspire people all around the world, propagate his timeless messages (“*to recall again the beauty in his message*”) in a permanent eye-catching and palpable format. An additional incentive was that 2021 would

¹ Tagore Society of Houston (www.tagoresociety.org) was founded in 1974 with the sole purpose of propagating Tagore’s philosophy of Humanism and Universalism.

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mark the centennial anniversary of Tagore's visit to Houston. As one of the key persons involved with this Memorial project, it gave me an opportunity to not only work on a project of immense importance but also personally understand the basis for Tagore's enduring greatness, especially with a focus on how it could be adequately represented in a Memorial. Thus the reader should not look at this as purely a literary article on Tagore; it is actually the description of a brief but intense journey that began roughly in 2019, from early thinking on the Memorial, to a working concept and its final realization in steel and concrete. In the process, I had to understand/appreciate the total dimension of Tagore's greatness and develop a practical perspective of his Humanism and Universalism. It was through the lens of Tagore's own words and thoughts, and the words of other thought leaders that this perspective and understanding was developed. Those words and thoughts are interspersed in this article and also are inscribed on the display panels at the Memorial. In this article, as in the Memorial, other than statements of facts, the voice of the author has been minimized, instead letting Tagore's thoughts and words, and testimonials of other people, do the talking.

Genesis

The first discussions on this project occurred in 2019 as part of general discus-

sions on future initiatives of Tagore Society of Houston. It soon took a serious turn and we were off and running. We hoped we were not just fools rushing in where angels have feared to tread!!

The specific challenges the project faced at the start can be summarized below:

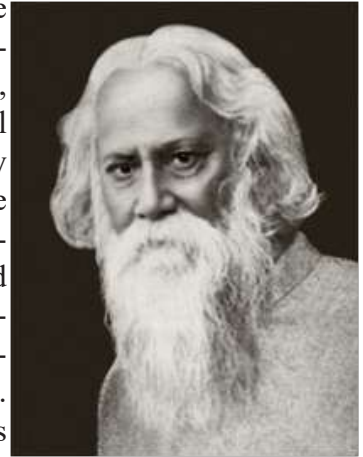
- a. Tagore himself said that "... *the only thing of which I feel certain is that I am a poet.*" However, during his life, the world saw him as a 'mystic', a reformer, a voice against oppression, and got moved by the philosophy he was espousing. It was his message of Oneness, Oneness among peoples, Oneness with Nature, and Oneness with the Divine, basically his Humanism and Universalism, that endeared him to people worldwide. Also, it became abundantly clear that Tagore, beyond his contributions as a poet and philosopher, left an indelible mark in almost every aspect of human endeavor. So we had to be able to represent Tagore in all these dimensions.
- b. The plot of land that we had was only 34'x34' - so it was a very restricted canvas. We basically had to put our arms around an infinite ocean and fit it into a small pail.
- c. The idea was for it to be an open air memorial in a public park, where

people would wander in, read a little bit about Tagore's life and achievements, ponder on Tagore's thoughts and words for maybe 30 minutes to 1 hour. So the structure had to be sufficiently unique to attract a passerby or a park visitor, and the content had to be sufficiently succinct and potent so that a visitor could read, understand, ponder, introspect and hopefully get inspired in the short time that he or she would have.

- d. It had to appeal to a wide variety of people, beyond just the Bengali diaspora, so the language was frozen as English.
- e. Since Tagore Society had already installed a Tagore statue at the location in 2013, the new Memorial had to complement the existing structure and environment.
- f. Finally, the Memorial had to evoke an atmosphere of 'holiness', i.e. sacrosanct space to be consistent with the theme of the Grove as a place for "peace and introspection".
- g. The final constraint was that the Memorial had to be completed by February 2021 to mark the 100th anniversary of Tagore's visit to Houston in 1921. We almost succeeded but for Covid.

Tagore's Achievements

As one starts to re-search Tagore, the historical facts quickly paint a picture of an extremely gifted and versatile person, a veritable polymath. Some of his key achievements are summarized below:



1. Tagore created nearly 3,500 poems, short stories, essays, articles, novels, novellas plays, and musical dance dramas. In fact the short story genre is attributed to him. There have also been many films and stage adaptations of his Works.
2. As aptly noted by Amartya Sen, the 1998 Nobel Laureate in Economic Sciences, Tagore not only reshaped Bengali literature but also music. Rabindra Sangeet is a unique lyrical style of singing that he introduced. As he himself wrote, "*The speech of my heart will be carried on in murmurings of a song.*" He penned over 2,200 lyrics of songs. His compositions reflect the ethos and experience of every hu-

man soul and reverence towards every aspect of creation. Patriots have mounted the gallows with his songs on their lips, as also young lovers when they are unable to express the depth of their feelings. According to Tagore, *"Music fills the infinite between two souls."*

3. Tagore is the only poet to have composed the National Anthems of two countries: India and Bangladesh. '**Jana Gana Mana**' was officially adopted as the Indian National Anthem after India gained independence from Britain in 1947. It was originally written in 1911. Each of the words in this song pays tribute to and celebrates the unity in diversity of India. '**Amar Sonar Bangla**' was adopted as Bangladesh's National Anthem after securing freedom from Pakistan in 1971. It was originally written in 1905 as an ode to undivided Bengal, on the eve of its partition into two states by the British. The National Anthem of Sri Lanka '**Sri Lanka Matha**' was also influenced by Tagore songs.

2 <https://edurank.org/uni/visva-bharati-university/alumni/>

4. Tagore innovated education. In 1901 Tagore established an experimental outdoor school for children in Santiniketan (Abode of Peace), in West Bengal, India. Here students are taught in a natural environment in the tradition of ancient hermitage schools of India. Several schools were later established, directly influenced by this experiment, the most famous being the Dartington Hall School, established in 1926 by Dorothy and Leonard Elmhirst. In 1921, Tagore established Visva-Bharati, also in Santiniketan, as an International University for



higher education, as a place *"Where the world makes a home in a single nest."* From its inception, Visva Bharati attracted global students and

has produced some of the world's foremost thinkers and Nobel Laureates, such as Amartya Sen, Satyajit Ray, Martin Kämpchen, Leonard Knight Elmhirst, Abhijit Banerjee, etc. Indira Gandhi, Gayatri Devi, Arundhati Ghosh are among many other notable alumni (a short list can be found here²).

5. Apart from the establishment of Visva-Bharati, Tagore also focused on the economic upliftment of the surrounding villages. In 1922, he established a school for rural reconstruction in Sriniketan, in close proximity to Visva-Bharati, to make the local villagers self-reliant and autonomous.

6. Relatively late, in his sixties, Tagore began painting. He completed over 2,000 beautiful paintings and, in 1930, was the first Indian artist to exhibit his works worldwide. His painting style was extraordinarily different with bold strikes, which later inspired many modern Indian artists. From the internet, one can find that his 1937 canvas *From Across the Dark* sold for \$1.2 million, and an untitled 1938 watercolor (*Three Bauls*) sold at Sotheby's for \$772,000. Smaller sketches or lesser-known works on paper may

occasionally start around \$4,000 to \$10,000. In Tagore's words, "*Art is the expression of the universal through the individual.*"

7. He pioneered Rabindra Nritya Natya, an unique genre of dance dramas that seamlessly blend classical and folk Indian dance movements



with expressive theater, poetry, and Rabindra Sangeet to explore profound human, social, and spiritual themes. Tagore himself would act in and/or direct some of these dramas.

8. In an age when travel was almost entirely by sea, Tagore travelled extensively to almost all corners of the world, several times to some countries. It was on his second trip to London, UK, in 1912, when *Gitanjali*, which won him the Nobel Prize, was first presented to the West.



Because of his travels, he is still a household name in China, Japan, and South Korea. His influence can be seen in Peru, Chile, Mexico, Brazil, Argentina, and Costa Rica, where many of his works have been translated into local languages. Notable South American literary figures such as Octavio Paz, Pablo Neruda, and Gabriela Mistral, all Nobel Laureates, became avid proponents of his poetry. Serious scholarship of Tagore still takes place in Universities in Europe and North America.

9. Tagore's crowning achievement was the award of the Nobel Prize for Literature in 1913 for Gitanjali (Song Offerings), a collection of mystical poems, becoming the first non-European to receive this prize. However it was only by divine destiny that Gitanjali actually came to

our notice - this story is summarized in the sidebar.

10. King George V awarded a British Knighthood to Rabindranath Tagore in 1915 following his

1913 Nobel Prize in Literature. Tagore renounced the honor in May 1919 to protest the brutal Jallianwala Bagh massacre in Amritsar. A copy of his renouncement letter can be

viewed here³.

Gitanjali Lost & Found

Tagore had begun to translate Gitanjali into English in anticipation of a visit to London in 1912. He carried the notebooks of his translations with him on the journey to London. Unfortunately, Tagore lost the manuscripts in the London Tube, a few days after his arrival. In an extraordinary twist of fate, the manuscripts were found by a good Samaritan and deposited in the "Lost Property" office from where they were recovered.

11. He uniquely innovated a style of modern visual art by transforming his manuscript erasures and crossed-out words into rhythmic, expressive doodle art. Without formal train-

3 https://www.reddit.com/r/india/comments/d2l-wkl/1919_letter_by_rabindranath_tagore_to_lord/

ing, these manuscript experiments evolved into over 2,000 striking, primitive-modern artworks that he exhibited globally (see Appendix for examples).

With such relentless achievements, it begged the question where or what was the wellspring of such creativity. The answers I found could be discerned by following the footprints of his own words.

Early Life and influences

Rabindranath Tagore was born in 1861 in Calcutta, India, during a period known as the “Bengal Renaissance”. He was mostly home schooled, so his earliest perceptions of life were through the lens of what he saw through windows or the views from the verandahs

of the house. This is evoked beautifully in his song, “*kothao amar hariyee jawar nei mana, mone mone*”, which can be loosely translated as “in my mind, I can wander anywhere without getting lost”. This is also where my journey into Tagore started for

this project. My wife casually remembered this poem from her Comparative Literature days in Jadavpur University. When I pondered on the meaning of those words, a veil suddenly lifted.

Tagore’s early life in Jorasanko Thakur Bari in Calcutta was obviously the crucible where his genius took shape. His father, Maharishi Debendranath Tagore, was a leader of the Brahmo Samaj. His grandfather Dwarkanath Tagore, besides being a well known businessman and industrialist,

was also a great contributor to the Bengal Reform movement. Other family members were already active in many literary and artistic endeavors. Born into this intellectual ferment, Tagore said this of his early life:

“I was born in Calcutta of a forgotten era... I was brought up in an atmosphere of aspiration, aspiration for the expansion of the human spirit...”

The following Preface from Tagore’s collection of essays entitled *Sadhana*, provides further light

on this eclectic upbringing:

“The writer has been brought up in a family where texts of the Upanishads are used in daily worship; and he has had before him the example of his father, who lived his long life in the closest communion



with God, while not neglecting his duties to the world, or allowing his keen interest in all human affairs to suffer any abatement.”

Under the influence of his father, from an early age, Tagore thus developed a deep spiritual understanding of Upanishads, the essence of ancient Indian philosophy, and a sense of oneness with nature.

“I had a deep sense, almost from infancy, of the beauty of nature, An intimate feeling of companionship with the trees and the clouds, And felt in tune with the musical touch of the seasons in the air.”

Epiphanic Experiences

In the book *Religion of Man*, Tagore himself has described how, during his early twenties, he had several epiphanic experiences of the divine. He had already started penning poems under a pseudonym **Bhānusimha** (or Bhanusimha / Bhanusingho). These early experiences were like a dam opening, contributing ultimately to the veritable waterfall of Tagore’s literary creativity, spanning almost 60 years. After one of these experiences, Tagore penned these lines:

“How did the sun’s rays touch my life this morn ... how did my soul wake up from the slumbers of the ages?”

My spirit longs to burst out like the waters, with unbridled passion ...

My heart is astir with passion, music and mirth.

I’ve so much to say.

Now I know why I am awakened today”
extracted from his poem “**Nirjharer Swapnabhanga**”

Buddhadeva Bose, a later noted Bengali Poet said of Tagore’s creative outburst, “... his writings run into a hundred thousand pages of print, covering every form and aspect of literature ... he is a source, a waterfall, flowing out in a hundred streams, a hundred rhythms, incessantly.”

As my research progressed, it became clear that the profound depth and breadth of Tagore’s humanism and universalism could be best understood through two interconnected dimensions:

1. **His Inner Dimension (Dharma):**
His spiritual core, contemplative realizations, and the underlying philosophical foundation of his universal worldview.
2. **His Outer Dimension (Karma):**
His active engagement with the world, global reach, lasting legacy, and how his actions resonated across cultures.

Conceiving Tagore in this fashion considerably simplified our search for content and the final representation in the Memorial.

Tagore's Dharma

The philosophical underpinnings of Tagore's philosophy and humanistic worldview can be clearly traced to his early life and epiphanic experiences. Reflecting on these experiences, Tagore himself said:

"I felt a larger meaning of my own self

When the barrier vanished between me and what was beyond myself."

On his subsequent spiritual journey, Tagore also wrote:

"You will find eternal traveller, the marks of your footsteps on my songs"

To me, Tagore was really a "self realized" saint in the highest traditions of our ancient rishis. Essentially it is a mistake to simply label Tagore as a great poet or as a great literary genius or even a great humanist, for it hides the true source of his genius.

So, borne out of his personal experience of Truth, "Borderless Humanity" became his battle cry. Education served as his primary instrument to shape the modern mind.

Thus he wrote,

"The object of education is to give man the unity of truth"

and

"The highest education is that which does not merely give us information, But makes

our life in harmony with all existence."

Also

"Education means enabling the mind to find out that ultimate truth which emancipates us from the bondage of dust and gives us wealth not of things but of inner light, not of power but of love"

And, very prophetically,

"That civilization perishes in which the individual thwarts the revelation of the universal." and,

"Patriotism cannot be our final spiritual shelter; my refuge is humanity..."

Tagore's Ode to Humanity is of course most powerfully expressed in his poem "**Where the Mind is without Fear**", a

Chitto Jetha Bhoyshunno
(Where the Mind is without Fear)

*"Where the mind is without fear and the head is held high
 Where knowledge is free
 Where the world has not been broken up into fragments
 By narrow domestic walls
 Where words come out from the depth of truth
 Where tireless striving stretches its arms toward perfection
 Where the clear stream of reason has not lost its way
 Into the dreary desert sand of dead habit
 Where the mind is led forward by thee
 Into ever-widening thought and action
 Into that heaven of freedom, my father
 Let my country awake."*

poem in Gitanjali. This poem was written in 1900, as an exhortation to Indians chafing under the colonial domination of India. It is one of the most memorized and recited poems by school children in India. But it has also reached cult status worldwide as a timeless anthem. It is a popular inspiration for social activists and reformers, all over the world. For example, American actor and activist Martin Sheen often recites this poem while addressing crowds (see an example here⁴).

Ekla Cholo Re is also another timeless anthem, written in 1905, as an inspirational song for patriots. Mahatma Gandhi cited it as one of his favorite songs.

"If no one heeds your call

*And comes along to stand by your side
Then walk on alone, my friend, walk alone.*

*If they all turn their faces away, afraid to
take stand Don't lose heart my friend*

*Just speak your heart out In your lone
voice, unafraid.*

*If they all beat a hasty retreat, not even
looking back Don't let that shake your re-
solve, my friend,*

*Let you bleeding feet take on the thorns As
you walk alone...*

If no one holds out a lamp

⁴ Martin Sheen Reciting Tagore is Everything. "Let our Country Awake" - **Youtube Video**

*As you trudge along the stormy, dark night,
And all the doors shut in your face*

*Then let the lightning strike to set your
bones aflame*

*And you burn alone, my friend, burn alone
through the night."*

Oneness, Love and Eternity wove timeless themes in Tagore's poetry and philosophy. This is most poignantly expressed in the poem *Ananta Prem* (Unending Love - excerpted in the side bar). The

*Ananta Prem
(Unending Love)*

*"I seem to have loved you in numberless forms,
numberless times
In life after life, in age after age, forever.
My spellbound heart has made and remade the necklace
of songs,
That you take as a gift, wear round your neck in your
many forms,
In life after life, in age after age, forever ...
You and I have floated here on the stream that brings
from the fount
At the heart of time, love of one for another...
Today ... it has found its end in you
The love of all man's days both past and forever
Universal joy, universal sorrow, universal life
The memories of all loves merging with this one love of
ours
And the songs of every poet past and forever."*

poem was one of American actress Audrey Hepburn's favorites. American actor Gregory Peck was famously requested by Audrey Hepburn to recite the poem at

her eulogy. A recording can be heard here⁵.

Tagore deeply felt the presence of the Divine in every aspect of life and believed that the essence of religion is unity of all humanity. This belief found spontaneous expression in all his writings. Some examples are provided below:

"I believe in a spiritual world – not as anything separate from this world – but as its innermost truth

With the breath we draw we must always feel this truth, that we are living in God."---

"Upanishads ... tell us that all that is, is manifestation of His joy, His deathlessness.

From the speck of dust at our feet to the stars in the heavens

All is a manifestation of truth and beauty, of joy and immortality."

Almost as a final exhortation:

"let Man declare across all space and time I am He."

Karma - Tagore's Travels and World Wide impact

A quick measure of Tagore's world wide impact is seen in the number of countries that have issued official stamps in his honor, the number of statues (or busts) of Tagore that abound around the world and the number of streets, parks etc named af-

5 Gregory Peck

ter him. A few examples are given in the Appendix but it will be a revealing exercise for the reader to do an internet search just on this topic.

The bridge between Tagore's dharma and karma is beautifully evoked in the following popular quote:

"I slept and dreamt that life was joy, I awoke and saw that life was service, I acted and behold service was joy"

The above quote is in fact the service credo of a major hospital chain in Houston, TX.

Tagore's life became an object lesson of dharma in action. The following quote probably was his personal mantra for his unrelenting activism.

"We individuals, however small may be our power, and whatever corner of the world we may belong to, have a claim upon us to add to the light of the consciousness that comprehends all of humanity."

In India, Tagore's karma is visible in literature, education, theatre, art, and political discussions. However Tagore's appeal & impact was universal and went beyond his voluminous literary output. It was precisely the unifying philosophy he espoused that moved people in far corners of the world.

The defining event of his worldwide acclaim was the award of the Nobel prize in literature in 1913. He was the first non-European and Asian to win the coveted Nobel.

The impact that Gitanjali made is summarized in this excerpt from the Nobel Proclamation: “... *because of his profoundly sensitive, fresh and beautiful verse, by which, with consummate skill, he has made his poetic thought, expressed in his own English words, a part of the literature of the West.*”

The exquisite beauty of these poems startled readers all around the world. Following is a snippet from Y.B. Yeats’ Foreword to the first published edition of Gitanjali:

“ ... *these prose translations ... have stirred my blood as nothing has for years ... I have carried the manuscript of these translations about with me for days, reading it in railway trains, or on the top of omnibuses and in restaurants, and I have often had to close it lest some stranger would see how much it moved me.*”

The impact Tagore made on the literati of England and Ireland during his UK trips is lovingly retold by William Rothenstein, who was Tagore’s close friend and host in England can be read here⁶.

It was not just the literati that were impressed or intensely moved. A story is related in Herbert Vetter’s *The Heart of God*, of an English soldier who had died in the battlefields in Europe during WW1.

⁶ <https://fortnightlyreview.co.uk/2013/05/tagore-in-london/>

Found among his belongings that were returned to his mother was a copy of poem #96 from Gitanjali.

Another story that actually transpired during the construction phase of the Memorial. As can be imagined, we were trying to reach out to potential donors all over. One such person that we contacted, an American doctor, heard us out and said he would call us later as he was at his Dad’s deathbed reading from the Gitanjali. His Dad was an American war veteran who had been in Calcutta during WWII and touched by Tagore during that stint. Many such stories abound.

Tagore traveled the world from end to end, and as alluded earlier, not once but several times. As he once said in a speech in Italy, he was “seeking the voice of humanity”. The Nobel Prize gave him the authority to speak, and he spoke. And people listened. He toured the US 5 times, and in 1921 even visited Houston. He became in a sense, an activist for “global humanity”. His words carried weight, and he was hailed worldwide as a voice for the voiceless, a bridge between East and West. As Octavio Paz, the 1990 Nobel Laureate in Literature, said: “*His work, as well as he himself, was a bridge between India and the world*”.

In the last week of March 1924, Tagore had stopped in Rangoon, the Burmese cap-

ital, en route to China. The residents of Rangoon offered him this Homage: *"We greet you as one representing the rebirth of Asia, and as one who had thrown across [a] chasm of ignorance and misunderstanding, a bridge of future comprehension between Asia and Europe-America."* Apparently five thousand people came to hear him speak.

This was the spirit in which he composed the poem "Lamp of the East" in 1929, at the request of young S. Korean students, to give hope to the Korean people during the Japanese occupation of their country. This poem is included in middle school textbooks in S. Korea. Tagore is in fact so revered in S. Korea, that his is

laration reads in part: *"Tagore was in truth a living link between East and West... His entire life he fought against narrow distrust of foreign cultures... He had faith in the fruitfulness of cultural intercourse and friendship. With this message he was and remains a Guru to UNESCO"*.

During his travels, Tagore spoke out frequently against colonialism, oppression and injustice, warned against materialism, blind nationalism, and sowed the seeds of peace and harmony. The poem, **Ode to Africa**, written at the turn of the 19th century, starkly evoked these timelessly relevant themes. The last para of the poem, a haunting rebuke of Western colonialism, is excerpted here:



apparently the only statue of a foreigner in Seoul.

In a homage to Tagore in 1961 on his 100th birth anniversary, the UNESCO dec-

"...When today on the western horizon

Sunset holds its breath in fear of a new storm... Come forth, Oh poet of change

Stand by the last ray of this evening's sun

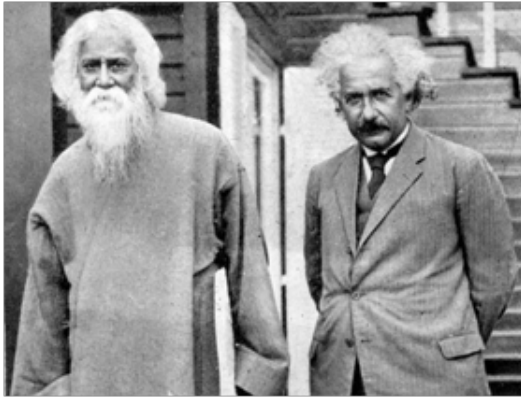
Where this unfortunate woman waits and say, 'Forgive me!'... Let that be the final reparation made by your civilization."

Tagore's consistent message, wherever he travelled, was this,

"True enjoyment can never be had through the satisfaction of greed, but only

through the surrender of our individual self to the Universal Self"

Tagore was fearless in espousing his experience of Truth. His interaction with Albert Einstein in 1930 is particularly famous. The New York Times had written about their meeting in an article headlined, "Einstein and Tagore Plumb the Truth."



The essence of their discussion can be summarized in the following exchange:

Einstein: Truth, then, or Beauty is not independent of Man?

Tagore: No...

Einstein: Then I am more religious than you are.

Tagore: My religion is in the reconciliation of the super-personal Man, the universal human spirit, in my own individual being.

Basically these two giants in their own fields agreed to disagree. To Einstein, there

was only objective truth. To Tagore, truth was subjective, experienced only through the mind.

Further proof of Tagore's unwavering commitment to his lived experience of Truth resonates in the preface to *Sadhana*—*"For western scholars the great religious scriptures of India seem to possess merely a retrospective and archæological interest; but to us they are of living importance.... To me the verses of the Upanishads and the teachings of Buddha have ever been things of the spirit, and therefore endowed with boundless vital growth..."*

Tagore also tangled with the other major dharma warrior of his time, Mahatma Gandhi. They differed on various issues such as nationalism, the freedom struggle, economics, self-reliance etc. Their differences are captured dramatically in their published letter exchanges, *The Mahatma and The Poet*. The basic difference was



that Tagore wanted an outward facing India, imbibing the best that the West had to offer, whereas Gandhi preferred an inward focus.

Tagore's philosophy on Universalism is probably best summarized by his own quote:

"Let all human races keep their own personalities, and yet come together, not in a uniformity that is dead, but in a unity that is living."

Martin Kamchen echoes this aspect in his book "One Hundred Years of Global Reception", written with Imre Bangha. In the book's Introduction, Kamchen says, *"Tagore saw himself as a world citizen, aiming to bring the 'East' and the 'West' together for an inclusive humanism."*

The global perception of Tagore is very aptly captured in an article written in the Rice University newspaper Thresher, on the eve of his 1921 visit to Houston: *"Considered a genius, the great versatility of Tagore makes him an outstanding figure in the world today. He has reached heights of excellence in every department of literature ...showing creative genius and great originality. He is remarkable in that he combines in himself the traits of the East and the West in a super-degree. He is a contemplative philosopher, a mystic poet, and yet he is ... an organizer who can make his dreams come true..."*

Tagore in a way had truly become his own version of '**Vishwa Mahamanav**', a term that he himself coined, a Great Person of the World.

Sarvepalli Radhakrishnan, President of India, 1962 – 1967, echoed these sentiments, when he said - *"Rabindranath Tagore was one of the few representatives of the universal person to whom the future of the world belongs."* This echoes the quote from Albert Switzer that is excerpted in the title block of this article.

His extensive journeys across the globe firmly established his status as a global citizen. Shashi Tharoor, the well known Indian author, journalist, politician and diplomat, summarized it best when he said in a commemorative article on Tagore's 150th birth anniversary: *"Tagore was a global icon before the era of globalization"*.

One of the most fascinating interludes in Tagore's travels was at the end of 1924 when he had to rest in Victoria Ocampo's villa in San Isidro, a few miles north of Buenos Aires, Argentina, to recover from the rigors of another one of his long intercontinental trips. Ocampo was a very influential figure in the Argentine cultural milieu during that time, and was already highly inspired by Tagore's Gitanjali - so the opportunity to take care of Gurudev was almost heaven sent. There is much to this story but Ocampo's regard for

Tagore is so beautifully captured in the annotation at the top of the photograph below,



"He is as near to me as my life".

Interestingly, as much as it was Tagore's mystique that drew him to all parts of the globe, it is also equally clear that he traveled almost compulsively, to satisfy his own intellectual curiosity. He said,

"We must glory in the illumination lamp lit anywhere in the world".

He also said:

"a traveler has to knock at every alien door to come to his own, and one has to wander through all the outer worlds to reach the innermost shrine at the end".

So, for Tagore, the journey outwards was essentially a journey inwards. He traveled not just to impart the spiritual wisdom

of the East and give hope to oppressed people, but also to learn. (In later years it was also to raise funds for Vishva Bharati.)

Final Design of the Memorial

So, in summary:

Humanism was Tagore's dharma,

Universalism was Tagore's Karma.

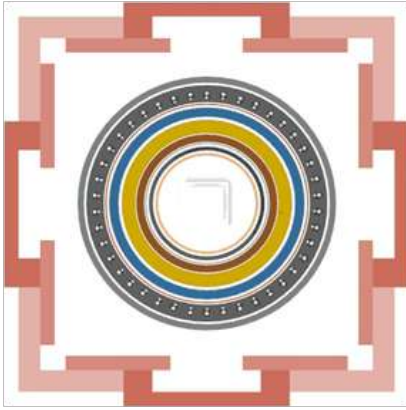
By conceptualizing Tagore in this way, it gave us a good way to portray the essence of Tagore in the Memorial. The final design of the Tagore Memorial reflects the above idea, where the outer walls of the Memorial display his "karma", i.e. his many achievements and how the world perceived him, while the inner walls display his "dharma" through quotes, thoughts and poems on various themes, his eternal wisdom. Other elements of the Memorial are described below.

Mandala

The structure of the Tagore Memorial is based on the ancient Hindu geometric spiritual and ritual symbol of the mandala.



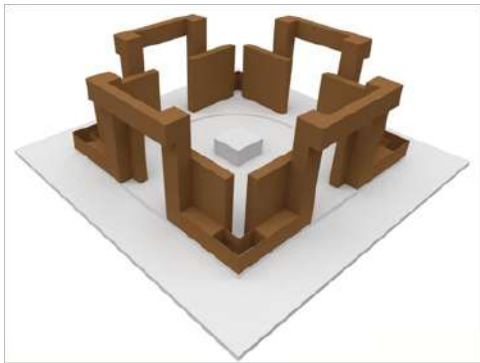
Architect's plan view of Memorial



Actual drone view of Memorial



Preconstruction 3D rendering of Tagore Memorial



Tagore Memorial after construction



la. Mandalas have traditionally been employed for focusing attention, aiding meditation, and as a pedagogical tool. In Sanskrit, mandala means “circle.” As a symbol of the cosmos, a mandala is a square containing a circle. The form’s symmetry represents the balance of the universe. When used to establish a sacred space, a mandala defines

a spiritual journey from outside the square to the circle’s inner core. This journey represents a movement from ignorance to enlightenment. The journey can begin at any one of four gates oriented to the cardinal directions. Mandalas are the basis for the designs of many sacred buildings in India and S. E. Asia.

Outer panel themes - Tagore's karma

- ★ Tagore - A Borderless Visionary
- ★ A Timeless Literary Genius
- ★ Humanist and Universalist
- ★ Poet and Music Composer
- ★ Educator and Painter
- ★ "...Wayfarer of the Endless Road"
- ★ Homage from World Luminaries
- ★ Nobel Prize

Inner panel themes - Tagore's dharma

- ★ A Timeless World Poet
- ★ Timeless Anthems
- ★ A Song of Self Reliance
- ★ Ode to Love
- ★ Humanity
- ★ Unity with God
- ★ Harmony
- ★ Parting Words - Epilogue

Example of an outer 'karma' panel

A Borderless Visionary

"I was born in Calcutta of a forgotten era ... I was brought up in an atmosphere of aspiration, aspiration for the expansion of the human spirit."



Rabindranath Tagore was born in 1861 in Calcutta, India, during the period known as the "Bengal Renaissance." Tagore was home-schooled and self-taught, but became a polymath and arguably the foremost poet, philosopher, social and political thinker of his time. In 1913, he was awarded the Nobel Prize for Literature for the exquisite beauty of his poetry in *Gitanjali (Song Offerings)*. Tagore passed away in 1941, but his powerful words and thoughts continue to radiate wisdom, encouragement, and spiritual upliftment to readers across the world.

From an early age, Tagore developed a deep spiritual understanding of **Upanishads**, the essence of ancient Indian philosophy, and a sense of oneness with nature.

"I had a deep sense, almost from infancy, of the beauty of nature, an intimate feeling of companionship with the trees and the clouds, and felt in tune with the musical touch of the seasons in the air."

"I felt a larger meaning of my own self when the barrier vanished between me and what was beyond myself."

This led him to see **Humanity** as an immense borderless spirit, **Love** as the universal unifying principle, and **Service** as the highest human goal.

"Love is the highest bliss that man can attain to, for through it alone he truly knows that he is more than himself, that he is at one with the All."

Tagore was a man of constant selfless action, a profoundly independent thinker, and a veritable Renaissance Man. He dedicated his life to the Service of Humanity and breaking barriers between the East and the West.

"Let all human races keep their own personalities, and yet come together, not in a uniformity that is dead, but in a unity that is living."

Example of an inner 'dharma' panel

Universal Anthems

"I accepted knowing that it is not my Father's, and found that it was indeed, I accepted and found, service was joy."

❀

A cast of Tagore's poems are poetic and beyond time. The poem below, composed in 1900, is often quoted by his admirers and reformers as their inspiration. Author and scholar Martin Green has often quoted this poem. (C. J. 1912: 284-290: 284)

Where the Mind is Without Fear
(Ditto jette bhoyshunye)

*"Where the mind is without fear and the head is held high
Where knowledge is free
Where the world has not been broken up into fragments
By narrow domestic walls
Where words come out from the depth of truth
Where intellects are stretched to their utmost perfection
Where the clear stream of reason has not lost its way into the dreary desert sand of dead habit
Where the mind is led forward by thee
Into ever widening thought and action
Into that heaven of freedom, my Father, let my country awake!"*

(Tagore poem 13)

❀

*"Let me not pray to be sheltered from dangers, but to be fearless in facing them
Let me not beg for the ending of my pain, but for the power to endure it!"*

Display panels

Through a careful curation of all the content, aided by several local Tagoreans, 16 display panels were envisaged for the memorial. To help focus and guide the visitor, each panel represents a theme which is clearly inscribed on the panel. These themes are summarized below:

Besides the displayed content, the Memorial also incorporates unique elements of art, architecture and Indian tradition. These subtle accentuating elements are described below.

Composition and Material of Construction

As indicated above, the exterior of the Tagore Grove Monument presents viewers with important facts of Tagore's life and achievements, i.e. his karma. As one enters the structure, Tagore's writings reveal the thoughts of the poet, i.e. his dharma. The actual structure of the mandala is created using 'corten', a special kind of weathering steel, which gains its beauty from a rust patina that forms and subtly changes over time. The rust patina represents the red-brown soil of Shantiniketan, India. The patina and the integration of planters into the structure is a reminder of Tagore's belief that humans and human creations can exist harmoniously with the natural environment.

Alpana

In the Tagore Grove Memorial, the mandala's inner circle is an alpana. An alpana is a Bengali folk art style consisting of colored motifs, patterns, and symbols that are painted on floors and walls. A lotus form was selected for the alpana design to signify purity, spiritual awakening, and divine beauty. The specific design used is apparently very similar to what Tagore would draw in Shantiniketan to welcome visitors. As such, the alpana is intended to be impermanent and replaced as needed. The impermanence of the alpana reflects the transitory nature of material life.

Lotus Motif on panels

The lotus motif has also been used as a separator symbol between



quotes and verses to evoke an atmosphere of purity and holiness.

Saree border



A saree border is one the most identifying symbols of Bengali culture. This was also used at the bottom of all interior panels to add a subtle cultural touch.

A quick video of the completed Memorial can be viewed at this youtube link⁷.

Parting Words and other reflections

So I part ways with the reader with a few poems by Tagore that powerfully evokes the voice of the eternal.

Gitanjali 93

*I have got my leave. Bid me farewell,
my brothers!*

*I bow to you all and take my departure.... I only ask for last kind words from
you.*

*We were neighbours for long, but I
received more than I could give. Now the
day has dawned and the lamp that lit my
dark corner is out.*

*A summons has come and I am ready
for my journey.*

Gitanjali 96

*When I go from hence let this be my
parting word, that what I have seen is unsur-
passable.*

*I have tasted of the hidden honey of this
lotus that expands on the ocean of light, and
thus am I blessed-let this be my parting word.*

*In this playhouse of infinite forms I have had
my play and here have I caught sight of him
that is formless.*

⁷ https://youtu.be/kB_0FaswMeg?si=-nU4_UfEQxy5ZfNb - You Tube video on Tagore MemorialGrove

*My whole body and my limbs have thrilled
with his touch who is beyond touch; and if the
end comes here, let it come-let this be my part-
ing word.*

Conclusion

Coming back to the objective of the original inquiry - what is the source of Tagore's enduring greatness. It is that Tagore spoke about eternal truths and could intellectually move you in a way few others could. There was a "beauty in his message" that spoke straight to the heart. As noted by Rev Dr. Herbert F Vetter, Founding Director, Cambridge Forum, "Like the Psalms of David, they transcend time and speak directly to the human heart." May Sinclair, a noted English Writer, 1863-1946, perceptively wrote, "...As long as I live, I shall never forget the impression that (your poetry) made. It is not only that they have an absolute beauty, a perfection as poetry, but that they have made present for me... the divine thing that I can only find by flashes and with an agonizing uncertainty."

Tagore's message of unity, compassion, and the pursuit of truth, is timeless, ever relevant. As we grapple with the challenges of our current world, his wisdom offers a timeless guide for navigating turbulent times.

Many of us Indians may readily think of the Bhagavad Gita as the ultimate distillation of the wisdom of the Upanishads. But as I researched Tagore, it dawned on me

that nobody has more powerfully distilled the voice of the eternal than him. The least that we mortals can do is to propagate his voice.

The Tagore Society of Houston, through projects like this Memorial, is aiming to move forward in that spirit, not only to pay homage to Tagore's infinite genius but also take his message to the world in permanent and meaningful ways, to ensure that his legacy lives on. We see the Memorial not just as a tribute to a God-like man from the past, but as a lighthouse for a future where humanity finally recognizes its shared, borderless essence.

Tagore almost prophetically said,

"When I shall cease to be on this earth, should you wish to remember me Come to the shady solitude of this Grove."

So I sincerely hope that the reader may get the opportunity to visit the Memorial. If you do find your way there, you will be greeted by this whimsical poem by Tagore,

"A hundred years from today, who are you... reading a poem of mine under curiosity's sway, a hundred years from today?"

Acknowledgements

The author acknowledges the grateful consent of Tagore Society of Houston in the publication of this paper. Many people aided in the original curation and organi-

zation of the content, and the construction of the Memorial. Only a few are named below for their key contributions:

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Statue construction: Gopinath Roy and Kamal Mondal

Monument architect: Alvaro Espinal, AIA (Espinal Architects, LLC)

Monument fabrication and construction: Aria Signs & Design Statue Restoration: Betz Art Foundry

Alpana consultant: Sudhi Ranjan Mukherjee

Alpana artist: Sneha Bhavsar

Appendix

A sample of Tagore stamps



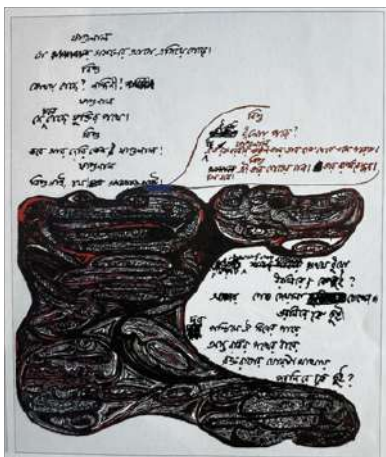
*Tagore Statue in
Balatonfüred, Hungary*



*Tagore Statue in
Moscow*



Examples of Tagore's doodle art



Most importantly, the author acknowledges the gentle hand of Tagore guiding this project from the start. Hope we have been able to do justice to his confidence in us.

Disclaimer

The content for this article is based on source material originally gathered for the Tagore Memorial Grove project. The author makes no claim on the originality or the accuracy of any information presented in the article.

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The Statesman

10TH DECEMBER 1913

RABINDRANATH TAGORE BECOMES THE FIRST
NON-EUROPEAN TO WIN A NOBEL PRIZE IN LITERATURE



On this day in 1913, Rabindranath Tagore was
awarded with the Nobel Prize in Literature for his
best known collection of poetry, Gitanjali

Gurudev Rabindranath Tagore did not personally receive the Nobel Prize. The British ambassador received it on his behalf. He gave the acceptance speech in 1921 when he visited Sweden



Can Neural Network Chess Engines simulate Mind in relation to the Universe?

Nagendra Rentala*

Why this title?

As a chess player, chess trainer, thinker (who amongst us isn't?), logician, mathematician, scientist, researcher, teacher, software engineer by profession, AI enthusiast and above all a philosopher (who amongst us doesn't *love wisdom* – even though some of us find it hard to define the term *wisdom*; try it), a keen student of occidental objectivism / oriental subjectivism or (inward) contemplation, I was deeply fascinated with the advent of Deep Mind's AlphaZero Neural Network (NN) chess engine § (1). With avid interest, I followed its roots from the legendary successes of AlphaGo § (2) (Go is a board game popular in far east) and subsequent progress with AlphaFold § (3) – an incredibly successful real world application in protein folding. No, I am not here to impress you with my skillset (if you look closely, most of them overlap anyway) but to passionately convey my motivation for the provocative title.

I am going to expand upon the same in next few pages. Let us start with what we know so far and continue the inquiry with some uncomfortable, daunting questions. Henceforth I will be using the term LC0 / Leela Chess Zero § (4) which is Deep Mind's rebranding of AlphaZero to connote neural network chess engines (NN-CEs) in general.

Chess originated about 1,500 years ago in 6th-century Northern India § (5) as an ancient game called *chaturanga* (four units of army – infantry, cavalry, elephantry and chariots) and has long been hailed as one of the greatest inventions of human mind mimicking life itself. The rules of the game, opposing sides in conflict, vaguely competing values etc., bear close similarity to life, vying to accomplish precisely defined game objectives: safeguard your own King and capture the opposing King. The parallels as well as the contrasts with life are even more striking when one dives deeper: protect what you *value* most and oppose what is contrari-

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an. Easier said than done though in real life – what *value*? relative / absolute? generic / specific? Are there any signposts / roadmaps guiding us through intermediate steps? How do we know what we know is valid? Where do the multitude of options we face come from and how do we choose one? We will see how LC0 addressed these in an extremely limited, closed domain like chess, explore the parallels in further detail and learn what we can from that experience.

As opposed to brute force (IBM's Deep Blue chess engine beat Garry Kasparov § (6) in 1996) computation (akin to wildly intractable forest of decision trees and nu-

merous nested branches with no scope for further *human* learning), neural network approach (woven around pattern recognition, reinforced self-learning) brought chess engines much closer to human way of thinking. Since then, progress in LC0 research is phenomenal and competitively, even elite human players are trailing several rungs behind these 'Silicon Monsters'. While reasons for the widening gap are too numerous and not so relevant for present topic, on the bright side, we can examine the parallels more closely, identify themes and heuristics in LC0 decision making processes through reverse engineering (XAI – Explainable AI § (7)) and mine precious nuggets through that endeavor.

This miniature from the Codex Manesse shows Margrave Otto IV of Brandenburg playing chess. 1305–1340. Ruprecht Karl University, Heidelberg. Reproduced from GETTY IMAGES



The parallels

Human experience plays out in the theater of *space / time* (Shakespeare anyone?! – *All the World is a stage!*) with human actors & props (objects) and events (interactions or *energy* exchanges between entities, i.e., objects and actors). All entities are made up of *mass* (spatially confined physical structure of some material substance with intrinsic proper-

ties) and can generate *energy* (having an *impact* on other entities) according to ironclad laws of nature. The equivalence between space / time (relativity) and mass / energy ($E=mc^2$) is eloquently expressed in Einstein's famous equations. Interesting sidebar for students of physics: above equation can be rearranged as $[E<t><t>=m<d><d>]$, where $<t>$ and $<d>$ denote temporal and spatial dimensions respectively. Is there a deeper and more significant connotation here associating energy with time (e.g., a burst of energy) while mass has tangible spatial distribution?!



Image courtesy ADOBE

There in a nutshell is the STEM (Space / Time / Energy / Mass) framework in the real world context. It is important here to note here that the energy / mass equivalence implied in Einstein's equation is more of a book-keeping tool for conservation principles applied in particle physics. The key takeaway here for the purposes of current comparative discussi-

on is - *mass and energy are interchangeable*. An important extension to the topic is about the two *types* of energy: *potential* (by virtue of an object's position) and *kinetic* (by virtue of its motion). As we shall see, kinetic / potential distinction and the exchange between these two types plays a crucial role in the context of chess also.

In the past few decades, Bobby Fischer's genius personality, Deep Blue's epic victory over Garry Kasparov, LC0 and other NNCEs, the Netflix series Queen's Gambit § (8) and more recently, scandals about cheating at tournament play with the help of chess engines § (9), exploded chess into the mainstream of society.

Chess is played on an eight by eight checkered, grid shaped board characterized by rows, columns and diagonals traversing alternating light & dark (or white & black) colored squares - evidently the *spatial* component of the theater. *Entities* in this arena are two sets of opposing armies (light and dark colored figurines, conventionally called *white* and *black*) set up on the board according to an initial configuration rule. Army units (*mass* of 8 pawns, 2 rooks, 2 knights, 2 bishops, a queen and a King on each side) have different kinds of locomotion (confined to the 8 by 8 or 64 square grid) prescribed by the rules of the game.

The locomotion rules imbue entities with *intrinsic* (i.e., *static* exchange value, or potential) as well as *contextual* (*dynamic* exchange value, or kinetic) energy of varying intensity – e.g., a pawn is worth 1 (static) merit, knight 3 (static) merits etc. As we will see in subsequent sections, dynamic or contextual energy varies extremely wildly, bringing the similarities closer to real world experiences. Think of merits in chess as currency in real life. A knight can be traded for opponent's knight (3 merits each) or generally one wouldn't mind trading a knight for three pawns too. Analogously, a bag of rice in real life for instance can be traded for five bottles of water. *How about the cost of a bottle of water when you are desperately thirsty?* Thus far the parallels in chess for space, mass and energy are clear but *when* does *time* fit in?

Time plays a very intricate and far-reaching role in chess as it does in real life. Saint Augustine's § (10) famous quote in his book Confessions - "*What is time then? If nobody asks me, I know; but if I were desirous to explain it to one that should ask me, plainly I do not know*" captures this eloquently. For the sake of brevity, we will stick to the basic definition of *unit of time* in chess. It is one *move* or technically a *ply*. Players take turns moving their pieces with white making the first move (*ply*) and black following up with a *reply* and so on.

Having laid out the basic, comparative (advanced comparatives detailed in later sections) STEM *framework* above, it is time to link with the operating *agencies* – natural (human) wisdom on one side and artificial (*computer*) intelligence on the other. I use the word *wisdom* here to connote the vast arsenal which the human *mind* is endowed with, which combines multiple facets like intuition, experience, feeling, instinct, intelligence, knowledge, understanding, comprehension and so on. AI on the other hand, needs no such elaboration.

Computational Theory of Mind (CTM)

First the agency of mind: a refined version of its precursor RTM (Representational Theory of Mind), CTM § (11) is the confluence of several major, interrelated disciplines like mathematics, logic, computer sciences, linguistics and neurosciences. Its central premise is that the mind is fundamentally a computational tool in the sense of symbol manipulation according to a framework of rules.

Earliest among this line of enquiry is Hilbert's formalism § (12) – a closed system of axioms, formulas, and symbols. Logical deduction rules dictate how symbols can be transformed, combined, or erased. The objective of this formalism is to prove that the system is consistent (meaning no contradictory statements

like $1 = 0$ can ever be reached). Some critics dismissed the entire project as a "meaningless game of formulas", and Gödel later proved that complete consistency matching Hilbert's dream cannot be fully reached within any closed system § (13).



Image reproduced from Georgia Institute of Technology archives

Extending this formalism to mind, mental states are viewed as symbolic representations with semantic and syntactic properties, akin to mathematical symbols. Formalization connects semantics to syntax, and computation links syntax to causal mechanisms, supporting a physicalist view of reasoning. CTM goes hand in hand with the famous Chinese room argument (call it CTM *lite*).

While I opine that CTM is an extreme oversimplification (postulating a near identical equivalence between mind and computer is like asserting that the eye is nothing but video recording equipment),

it is a historically must visit site in our tour of mind / computer analogy. In summary, CTM is mostly applicable to occurrent propositional (i.e., meaning and truth) attitudes like beliefs and desires at specific moments explaining unconscious and infraconscious processes, including low-level perceptual and neural activities. However, CTM is totally inadequate for explaining dispositional (latency and behavior) states of mind and cognitive / creative processes. Key takeaway from CTM in the current context is the semantic / syntactic distinction as well as the indispensable interplay between the two – crucial to describing any formalism.

Analytical aspects of chess play and parallels in life

Enroute our foray into the second agency (AI), we need to take a brief detour into a formal description of the gameplay itself and its theoretical / analytical aspects. Chess theory is a compendium of over three centuries of experience and expertise from scores of leading players and theoreticians. The merits assigned earlier to chess pieces (pawn = 1, knight = 3 etc.) are in fact the accumulation of that experience. Same goes with the *theory* of real life – the merits society assigns to qualities like health & longevity, family life, wealth & social status, reputation and so on are likewise the result of thousands

of years of civilization meandering through progress, strife, course correction, the whole nine yards. At the risk of stating the obvious; life's lessons too are the distilled essence of millions of thinkers, their teachings, scores of 'ism's and yet we are still struggling to figure things out. Notice that the *values* have cultural / traditional, religious / moral, personal / subjective, logical / objective and ethical / legal undertones. And they are constantly shifting along the spectrum instead of being bound to a binary true / false, right / wrong paradigm.

Chess is a game where most of the activity takes place in the players' minds. The decision trees or variations culminate in the move choice enacted on the board. A new position arises, the opposing player goes through a similar mental exercise, responds with his move and the process repeats. Like other two-player board games, chess is purely analytical and is the most fertile arena for self-learning, improving from the study of master games and so on. No wonder that chess literature proliferated with astonishing pace. Reputedly the number of chess publications is twice as large as all other games and sports combined! Same trend exploded in recent times into online chess sites, AI adaptations etc.

Let us examine in a nutshell the foun-

dations of chess theory as played out in an actual game and compare how it relates to life. Theoretical studies invariably follow the iterative path of analysis (componentization), synthesis (integration), refined analysis, further synthesis and so on. In real life, the Hegelian triad § (14) - thesis, antithesis and synthesis adds another dimension to the same concept.

Broadly, the progress of a chess game is broken up into three stages – opening, middle game and endgame. In the opening stage, players develop their army. Middle game is the stage where the two opposing armies collide into something like hand-to-hand combat while one side's gains (if any) are consolidated in the final, endgame stage. The objective of the game as mentioned before is to capture the opposing side's King while safeguarding one's own. The side that achieves this objective is declared winner (scoring 1 point) and the opposing side the loser (0 or no score). If neither side manages to capture the enemy king, the game ends in a draw (perfect balance - both sides scoring half a point each).

What is the equivalent *game* in real life? What is the *objective*, who is the *opponent*, where are the *kings*, whither the *stages* and how does one *score*? Focusing on the essential (and not literal) similarities, here is my take: Every *interaction*

is a game; *success* (however contextually or subjectively one defines it) is the objective, *everything* (either external or internal) that comes in the way of achieving that objective is the opponent. The King is implicit in the *value* one perceives in the stated interaction, and the score is not the 0, $\frac{1}{2}$, 1 triumvirate but the level of one's *satisfaction* on a scale of one's choice. As to the *stages*, this is 'best' illustrated in the context of a project (rather than an *interaction*). For instance, after drawing up a project plan, one *assembles* (develops) the resources, tools and other accessories required for the project. The assembled components coordinate (*collide*) with external entities during the execution phase surmounting any obstacles in the path of successful completion, followed by the *wrapping up* (consolidation) phase. Delving further, chess lore abounds with references to tactics (quick wins or efficient achievement of short term goals in real life) and strategy (long term goals).

Last but not the least important facet of our comparison mosaic is the humongous collection of proverbs and adages encapsulating thousands of years of life's wisdom. Chess has its own huge share of quotable quotes. I start with Bobby Fischer's "Chess is life" and Blaise Pascal's "Chess is the gymnasium of the mind" which are direct reflections on life itself

and hence the comparisons are implicit / redundant.

And here are a couple of more chess quotes with my interpretations rounding up the associations with real life.

1. "Pawns are the soul of chess": François-André Danican Philidor
 - a. The (relatively) less mobile pawns constitute the structure of a chess position, and this quote has a direct connotation of emphasizing the importance of foundation (structure) of one's knowledge only from which eventually wisdom can be distilled.
2. "You may learn much more from a game you lose than from a game you win": José Raúl Capablanca
 - a. This one does not need much of an elaboration other than an advice to learn from one's own mistakes.

LC0's quantum leap in chess understanding

We now move on to the second agency – AI, and one particular NNCE, LC0. In their seminal work § (15), Sadler and Regan perform a meticulous biopsy of LC0's playing style with the precision of surgeons and the diligence of forensic pathologists. Following is a very high

level and *selective* enunciation of their work, cherry picking those aspects (and they are already a handful) of LC0 with direct relevance to mind and real life.



Image courtesy - Deep Mind

Dissecting the inner workings of LC0 based on extensive interviews with DeepMind development team, pouring through several of its games and drawing from their chess expertise, the authors developed a detailed framework for describing their findings. However, my goal here is different from theirs and hence the following general, layperson (non-chess player) palatable charter. I then strive to bring LC0 aspects (sans the chess flavor) on board. So, if this reminds you of the song ‘a square peg in a round hole’ or the comparison seems too far-fetched, ... good luck with that! Striking a personal note on this adventure, I was jolted out of my LC0 reverie in recent months when

it started vanquishing (and trolling) elite players with unimaginable *handicaps*. Even if you are not a chess player, I hope you will be able to relate to the more ad-

vanced comparisons (at least the focused life track side of the equation) drawn here. Depending on the level of your interest / expertise in chess, you can critically examine the chess track as well. This section is also my foundation for the conclusions, so I invite your special, critical attention.

1. Nature vs. Nurture

Unlike other NNCEs (notable among them Stockfish), the DeepMind team ‘homeschooled’ LC0 providing nothing but the basic rules, objective and reward function (result score) of the game. It was then programmed to learn *naturally* by playing against itself (reinforced self-learning). LC0’s main competitor Stockfish, on the other hand, was additionally fed hand-crafted, state-of-the-art, theoretical expertise or *nurtured*. LC0 was encouraged to actively explore the game domain and learn with zero (hence the 0 in LC0) amount of passive guidance or programming. Sadler and Regan conclu-

ded that ultimately *nurturing* adversely impacted Stockfish saddling it with excess baggage. Score victory for nature!

In real life, this is a vexatious dilemma for philosophers and academicians alike. The recent, widespread cultural disdain for science (evolution is only a theory?!, vaccines poison the body) shows that we all need to sit-up and take note of one fact - something has gone horribly awry in this debate, and the universal educational system is cratering. A detailed discussion on this is a topic for another day but I make my stand with few observations:

- Within the hunter / gatherer societies, education was predominantly natural. From those humble beginnings, it evolved in modern times donning a formal, structural mantle but in due course the *form* started corroding and consuming the *substance*.
- Because of this perceived failure of nurture, the pendulum in modern society is now wildly swinging to the other side.
- The recent COVID pandemic brought the pandemonium to a critical point resulting a sharp social divide.
- Education should be tailored to motivate and encourage the student to get educated.

- Designing a ‘golden mean’ curriculum balancing nature and nurture is an arduous and challenging (but achievable) task. With the hustle and bustle of current times, we are missing out on critical patronage from academia (with their *publish or perish* baggage) and leadership (*expediency of the moment* garbage) alike.

2. Decisions, decisions and ever more decisions

Chess players take decisions about their moves after examining a set of what are called *candidate moves* or plausible alternatives. The heuristics behind listing the elements of this set are largely based on experience, accumulated chess theory pertinent to a given pattern recognition context (or cluster of positions). A player’s thought process for instance might be articulated along the lines of ... *start with a list of forcing moves like checks and captures, moves that sacrifice material to attack enemy king, overprotect key squares, tuck own king to safety etc.*

LC0 uses the ‘Policy Net’ (PN) module to prepare a similar list drawing from its repository of patterns, successful moves played during self-play. Think of PN as its *formal*, (internally) documented constitutional manifesto. Most of human decision making on the other hand is extremely informal, oftentimes mentally

alternating between a pair of decision branches, which is of course understandable for mundane decisions. The only *formal* policy net one can think of that humanity “adheres to” (sic erat scriptum! or sic!) is the *legal* framework which is once again national or even provincial specific! And we wonder why people have difficulty agreeing with one another! Add to this the ethical, moral, cultural, traditional, religious undertones and we have a veritable quagmire on our hands.

Instead of ivory tower bound, philosophical hair-splitting on moral dilemmas like the infamous *Trolley Problem* § (16) or concocting pedantic guidelines like the ... *greatest good* § (17), how about learning a valuable lesson from LC0’s policy net and weaving our own? We have the thinking apparatus as well as the processing means available today to seriously pursue this project. Failing this, we are caught in the status quo quicksand till total social collapse. It is no hyperbole to suggest that majority are feeling like deer caught in the headlights of a doomsday juggernaut.

Complementary to PN is the equally important ‘Value Net’ (VN) module in LC0’s code base for evaluating the resulting (new) position that is reached after the decision is implemented (or chess move made). Three things are strikingly

self-evident here. Since we are dealing with computations, firstly, the value (attributed to any given, *static* position) we speak of is obviously a numerical measure. Secondly the after (node) to before (node) differential value along any decision arrow indicates the strength of that particular branch and finally the objective is to keep the after to before differential positive or at least zero. LC0’s VN evaluation function is a linear combination of features like material, space, king safety, as well as their dynamic nonlinear inter-relations.

Applying the concept of ‘value differential’ in human VN context, consider this rhetoric from Eldridge Cleaver § (18): *If you are not a part of the solution, you are a part of the problem.* Different times and different context, but on the other extreme of the ideological spectrum (hence a diametrically opposite VN) George W. Bush echoed the exact sentiment § (19): *Either you are with us, or you are with the terrorists.* Try this neutral VN (NVN) instead: *If you cannot be a part of the solution, at least do not be a part of the problem.* The question is – how does one arrive at the NVN or even more ambitiously, find its global equivalent (GVN)?

3. Value measure

With its novel and unique *probabilis-*

tic treatment of *value*, LC0 breaks astonishing new ground with concrete real world applications. To put it in context; historically, the measure of evaluation in chess was purely descriptive / qualitative. For example, players might be mentally conjuring up statements like ... the position is slightly worse (for me), much better, outright losing or equal with chances for both sides etc. Over the centuries however, human thinking has become more structured and quantitative¹ and chess followed suit.

In chess, the pawn (value=1) became the universally accepted unit of measurement. This is understandable because material (a tangible asset) is the easiest to count and humans are extremely adept at that. If you lose a bishop (value=3) in exchange for a pawn (value=1), you are down 2 points, or the evaluation is -2 from your perspective (equivalently +2 from the opponent's). However, adding more elements like control of open communication lines / critical outposts, piece coordination, king safety etc., to this

schema, converting one type of advantage (i.e., value) into another became a head scratching, convoluted algorithmic (for NNCEs like Stockfish) problem. The subjective / qualitative (even though we are speaking with numbers) nature of this type of evaluation is evident. Diving deeper and driving home the point, if you ask a chess player who perceives the value of his current position as +3.5 units if he could lose from that position, you can expect derisive laughter while Stockfish might crash in confusion.

LC0's inventive evaluation protocol is based on probabilities instead of currency exchange. From the same chess position in the above example (+3.5 evaluation), LC0 would say something like – my expected score is 82% which translates to winning 82 out of 100 games from the same position. This is tantamount to losing the remaining 18 or might also mean winning 64 games out of 100 and drawing the remaining 36, which is another route to achieve the expected score of 82%.

As Sadler and Regan noted, the *numerical* evaluation schema leaves Stockfish in the long run with a decisive disadvantage when pitted against LC0's *probabilistic* evaluation. In certain chess positions where the interchangeable elements are finely balanced, Stockfish gets caught in the whirlpool of 0.0 numerical evalua-

1 Lord Kelvin [William Thomson]: "When you can measure what you are speaking about, and express it in numbers, you know something about it; but when you cannot measure it, when you cannot express it in numbers, your knowledge is of a meager and unsatisfactory kind."

tion, i.e., neither side has any advantage and is happy to call it a day (or a draw) by repeating the moves. In similar positions, LC0's probabilistic mindset (sic!) lets it probe deeper. This is not exactly a programming drawback with Stockfish but an issue with its evaluation schema demonstrated in the following example: as LC0 continues the game (avoiding the draw when Stockfish thinks it is 0.0) and accentuates the hidden semantics in the chess position, Stockfish *recognizes its mistake* and its evaluation veers significantly from its earlier 0.0 valley.

4. Grand union of the trinity

When synthesized into a single operating agency, LC0's Policy Net (PN), Value Net (VN) and Probabilistic Evaluation (PE) aspects unravel it's unique and revolutionary chess playing strength. The essence lies in the harmonious symphony of the trio. As Sadler and Regan noted (and paraphrased here): *without seeking perfection (searching for the absolute best move or ideal course of action) and armed with mutually reinforcing PN & VN modules LC0 looks for a generally favorable direction (PE not decreasing) to navigate the chess labyrinth.*

Waxing lyrical, the following analogies are too mesmerizing for me to unsee:

1. *Gliding on the complementary wings*

of PN & VN akin to a conjugate field pair, PE is the chess equivalent of Schrödinger's probability wave function

2. *One wonders if LC0 discovered the Tao of chess in the flow of PE, balancing Yin (PN) & Yang (VN)?*

Discovery and concluding remarks

In his introduction to § (15) Demis Hassabis, Chairman of DeepMind makes this interesting observation about chess pieces - *the exquisite balance of the bishop and knight across the set of all positions, despite their vastly different mobility creates the dynamic tension in the game.* Likewise, in life are there any important and critically balanced dualities that create *tension* or what I would like to refer to as *information content / story value*? Can you articulate few (or at least one) such duo?

Jumping ahead to the keystone of my hypothesis, I would like to further emphasize the importance of Demis' statement. Within a symbol shuffling, rules based (i.e., purely *syntactic*) formalism confined to a closed domain like chess, Demis uncorked one specific, meaningful (i.e., *semantic* and pardon my pun, *pedantic*) facet of the game. As we have seen in the previous section, LC0 *discovered* and most significantly *applied* several

such chess *semantics* (with unbridled admiration, Sadler & Regan label them as *romantic*) to improve its strength. However, being purely syntax-based, LC0 cannot articulate them as eloquently as Demis or Sadler & Regan do. Can XAI tease them out? Are semantics *somehow* embedded in the chess syntax?

Back in real life, how does generative grammar § (20) fit into this schema? Unlike the chicken first or egg first conundrum, the intertwining semantic / syntactic aspects in linguistics can easily be dissociated – just watch a child’s verbal development. Hands down semantics play the preeminent role while syntax is a subsequent, gradual enrichment and hence the disproportionate redundancy in language.

Let’s wrap it up with an *antiparallel*: chess started out (and still is) a *syntactic* (formal) endeavor and modern day AI is (unconsciously) distilling its *semantics* (Caissa, the muse of chess would be proud) as reflected in its application through reinforced learning / self-play leading to astonishingly successful game score.

Humans invented language to communicate (i.e., exchange meaning or *semantics*), eventually enriched it with grammatical structure (*syntax*), storytelling and poetry. The resulting exponential proliferation in information exchange led to a peculiar situation of generating humongous clutter (twitter / chatter) as well as insightful enquiry into the deeper / meta structures. In essence, within semantics, consciously, sub consciously or even unconsciously, we are searching for deeper, axiomatic foundations in the universe itself.

The teleological, ontological and eschatological questions that occupied ancient philosophers have evolved in modern times into structural ones like: Is consciousness universal? Is the uni-



Image courtesy medium.com

verse a simulation? Most audacious of them all is Max Tegmark's thesis that the universe is fundamentally a *mathematical* structure. Even as a deeply interesting and engaging read, towards the end, Tegmark's voluminous work § (21) only glosses over the most pivotal question of his thesis about the infinite regress / Russian nested doll analogy § (22). He doesn't address related questions like: Is it a unified, universal mathematical structure or contextual (if so, there are nested structures)? What is the apex (if any) of the (plausible) meta structural pyramid?

Here are the mind-blowing implications of LC0 in the human context. Skimming though my wide spectrum of observations, I will leave here with two:

1. The simple one – human attachment to material wealth is not a problem of greed or *materialism* as most people label it, but one of inertia in not choosing the right value metric and hence not asking the right questions.
 - a. Instead of asking 'how can I get rid of the bike that I bought a few years ago for \$500 (numerical evaluation)', ask instead 'what is the probability that I will be using it in the next **n** number of weeks? It might change your mindset, and you might actually start using it if you are not willing to discard altogether.

2. And now the ambitious – the *astor-ishly* close 50:50 split (take a moment to digest it) in the opinion pool (started in US and rapidly spreading to other parts of the world) indicates that, in spite of all our collective intelligence and punditry, like Stockfish we are stuck in the 0.0 valley. Why? – we lack a formal PN, VN and definitely missing out on PE. The 50:50 stalemate is because one side is stuck committing sins of *omission* and the other side sins of *commission* with neither side willing to *realize* let alone *concede* that they are still *sins* after all! We are at an inflexion point where global catastrophe is waiting on the wings when the scales tip.

- a. The urgent need for working together on our PN, VN and PE schema cannot be overstated.

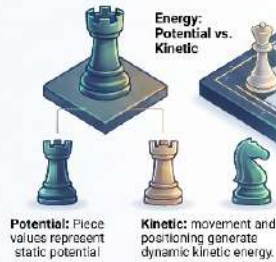
My thesis is that LC0's chess-playing paradigm (gleaning semantics from syntax) provides a roadmap for discovering the axiomatic (semantic) foundation of the universe much like Lao Tzu's *Yin / Yang duality*, Wu Wei (effortless action) & the *Dao*, Emmy Noether's *Conservation laws and Symmetry*, William Rowan Hamilton's *Principle of Least Action* and Fritjof Capra's *Tao of Physics*. As these giants of human intellect demonstrated, the Universe provides the *syntax*

The Chess-Universe Connection: Mapping AI Logic to Life

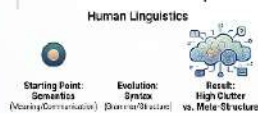
The STEM Framework (Chess vs. Life)

The Theater of Space and Mass

The 8x8 grid represents spatial constraints, while pieces symbolize mass and material assets.



Development Path Comparison



The LCO Decision Matrix

Policy Net (PN)

identifies candidate actions



Value Net (VN)

evaluates the resulting state's strength and safety

Probabilistic Evaluation (PE)

Replaces rigid numerical values with win probabilities, allowing for deeper exploration of complex systems.



Extracting Semantics from Syntax

LCO learns the "meaning" (semantics) of chess solely through its rigid rules (syntax).

Ph. Gernert Notebook

everywhere we look – what are its *semantics* that we are yet to discover fully? When this can be accomplished at least in the social context, my *VN* becomes *Global Value Net* or *GVN* stated thus: *No one needs to be a part of the problem if all of us think meta and articulate the problem first, design the Policy and Value Nets accordingly and devise means to measure the value probabilistically.* AI and its cousin XAI are eager and on hand to help!

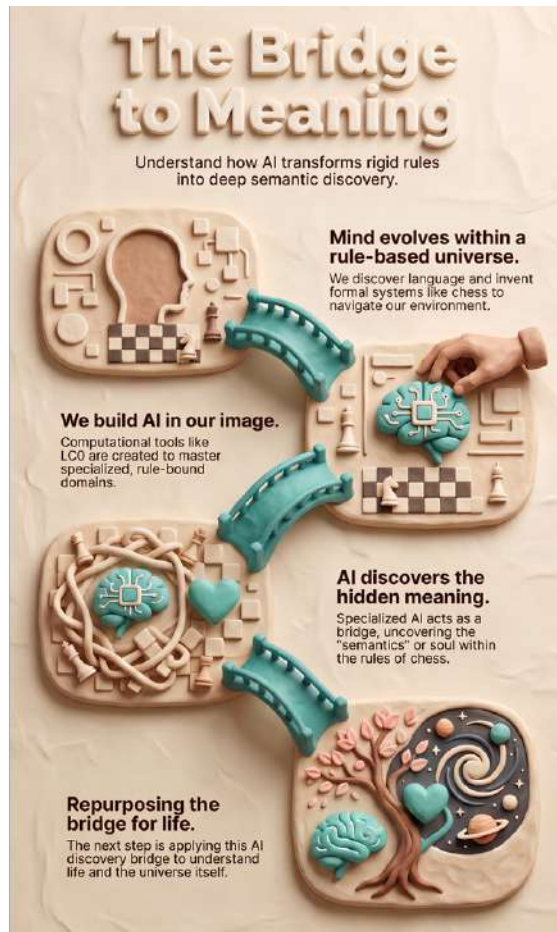
Caissa did infuse Chess with a deep-rooted meaning and so did Mother Nature to the Universe.

Summary

- a. The *mind* is constantly *searching* for meaning (semantics) at the levels of:
 - i. Individual; who am I, how do I validate my knowledge?
 - ii. Societal; what is morality, what social norms are relevant?
 - iii. Humanity; what is the meaning of life?
 - iv. Universe; does it have a beginning, an end, what does all this mean?
- b. The collective search led to accepted and identifiable vistas:
 - i Structures; space / time, our planet and solar system, their place in the firmament



- ii. Norms; religious, moral, cultural, social and legal
- iii. Communication and cognition tools; linguistics, science and mathematics branching into
 - 1. Syntactic formalism (e.g., Hilbert's)
 - iv. Recreational avenues; fiction, poetry, music, arts and games, some of them following the path of syntactic formalism
 - 1. Chess
 - v. Technology; life quality enhancing appliances, computational devices



- vi. AI; a computational model of the *mind* closing the loop (recursion) on where it started
 - 1. Giving rise to domain specific, limited capability *minds* (LCMs - LC0 is one such)
- c Serendipitously, fortuitously, or simply inevitably, the interconnected
 - i. This success promotes LC0's *modus operandi* as the viable approach for organizing the search at higher levels.

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Haiku

Dr. Kumarendra Mallick*

morning tea
 brewing over the cup
 my thoughts

mother's house
 on every corner
 pieces of childhood

modern art
 child's scribbling leaves
 all guessing

mother's prayer
 fragrance of the evening
 whenever at home

morning fog
 small voices on the way
 to the school

still pond
 a heron among
 the lotus

string of pearls
 an unread poem
 in every eye

bed time
 specks of dreams
 in child's eyes

wild flower
 the child's giggle
 in every petal

morning tea
 a lump of cloud
 in my cup

beyond the sunset
 a new love story
 in star light

autumn morning
 mist overflows
 in the lake

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drops of rain
seeds of life
on earth

seaside
the child fills the shell
with songs

seaside
we hide our hands
in the sand

daybreak
the rays climbing down
branch by branch

shipwreck
the sun sinks in sea
of gold

old love letters
even fire fails to burn
the emotions

first touch
I fly into a weightless
height

school auto
a load of laughter
in the narrow lane

sundown
the boat man's song
wafts down stream

spring rains
blossom of dreams
in our rose garden

end of a long dream
still i hear the sound
of her anklets

darkness to light
wisdom takes
tiny steps

morning assembly
a host of mynahs
on the tree top

bedtea
an extra spoon
of her smile

afternoon drizzle
the sun paints
a rainbow

cloudy hilltop
the peacock unrobes
its kimono

home visit
one - legged race to reach
childhood



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Engineer-entrepreneurs as Changemakers for Rural Transformation

Tilak Agerwala and Bratati Ghosh*

Introduction: Engineering is a Noble Calling

Engineering is more than a career—it is a noble profession and a way of thinking. Why is engineering a noble calling? - At its core, engineering is about solving human problems on a large scale, utilizing technology and machines to enhance lives. From bridges and ships to computers, the internet, and health tech, and now AI and climate technologies, engineering solutions have propelled human progress and saved lives.

To be an engineer is not merely to hold a degree. Engineering is a systematic, disciplined approach to problem-solving. An engineer is someone who applies **critical thinking, ethical reasoning, and practical creativity** to develop solutions that can be implemented here and now.

This disciplined approach has been practiced in various forms across civiliza-

tions—from ancient irrigation systems and architecture to modern digital technologies. Over time, both the tools and the contexts have evolved, but the underlying mindset—structured problem-solving—has remained constant.

Importantly, this mindset is not limited to those formally trained as engineers. It can be cultivated in anyone. When applied broadly, it enables individuals to approach challenges—whether in agriculture, healthcare, education, or governance—with clarity, creativity, and responsibility. In this sense, engineers are engines of development, and their mindset can transform societies.

This raises a question: *Can the engineering mindset—rooted in ethics, problem-solving, and practicality—become a continuous driver of transformation in rural India?* We believe the answer is yes.

To understand how, we must first explore four foundational ideas: critical

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thinking, ethics, engineering, and entrepreneurship.

The Four Pillars of Transformation

Critical thinking involves questioning assumptions, analyzing problems deeply, and exploring multiple solutions rather than accepting the first obvious answer. In rural development, this might mean asking, for example, what the real cause of water scarcity is. Could existing resources be used differently? Such inquiry is crucial where needs are urgent and resources are limited. **Ethics** ensures that problem-solving is not only innovative but also fair, sustainable, and respectful of local communities. For rural India, this means designing solutions that empower (rather than exploit), align with cultural and local contexts, and protect the environment. Ethics acts as the compass guiding engineers toward justice and inclusivity, while critical thinking serves as the map navigating the complexities of the real world.

In the Indian wisdom tradition, this ethical orientation overlaps with the broader concept of dharma. While ethics typically refers to principles of right and wrong conduct, dharma includes not only moral norms but also contextual duty, social responsibility, and alignment with ecological and societal harmony. A

development project that is technically efficient but disrupts community cohesion or environmental balance may satisfy narrow efficiency criteria but fall short of dharmic responsibility. Thus, ethics and dharma converge in emphasizing responsible action, though dharma places greater emphasis on role-based duty and systemic balance.

Separately, each has limitations: ethics without critical thinking can become rigid rule-following, ignoring whether actions are practical or effective; critical thinking without ethics can be applied for selfish or harmful purposes, for example, financial scams or manipulative politics.

Combined, they act as checks and balances, prompting us to ask both, “Is this right?” and “Will this work?” Together, they produce solutions that are both just and effective. Public health during COVID-19 illustrates this interplay: critical thinking guided scientific decisions, while ethics ensured fairness, protection of the vulnerable, and respect for privacy. Policies that lacked either component were either unjust or ineffective.

Engineering applies science to practice. In rural contexts, this may involve developing low-cost irrigation systems, clean energy solutions, resilient sanitation systems, or community infrastruc-

ture. True engineering for rural India is practical, community-centered, and sustainable. **Entrepreneurship** translates ideas into viable and scalable ventures. When engineers embrace entrepreneurship, they do more than solve problems—they create livelihoods, inspire others, and spread innovation. A thriving rural entrepreneur not only supports their family but also trains local youth and generates employment opportunities, thereby strengthening self-reliance within their community.

When these four pillars—critical thinking, ethics, engineering, and entrepreneurship—work together, they nurture rural engineer-entrepreneurs who are practical, ethical problem-solvers. They address immediate challenges while driving social and economic change. By combining analytical rigor with moral awareness, these four pillars empower India's youth to innovate responsibly, create opportunities, and develop their communities.

Barriers to Building Critical and Ethical Thinkers in Rural India

India's modern education system was shaped during British colonial rule. The goal was not to educate everyone to think freely, but to train a small group to serve

the colonial administration. Some of these effects are still visible today.

One lasting impact is the language of education. English became the main language of schooling and professional life. Even today, many urban professionals work mainly in English. Although independent India has promoted education in local languages, students still feel pressure to learn English because of global economic realities. This can make learning harder for many children and reduce deep understanding. This is especially true in rural areas where English is less prevalent.

There is also a shortage of well-trained teachers in rural India, especially for science and technical subjects. Because higher education was long dominated by a few select English-medium urban institutions, many rural schools today struggle to find teachers who can explain complex ideas clearly or encourage discussion and exploration.

(The National Education Policy emphasizes the need for teacher training in bilingual/multilingual pedagogy and the development of high-quality materials in Indian languages.)

Another legacy is rote learning and obedience. Colonial education rewarded

following instructions and memorizing facts rather than asking questions. Independent thinkers were discouraged. This has carried over into today's classrooms, where students are often trained to repeat answers rather than think critically.

While memorization has its place—especially in building foundational knowledge—over-reliance on rote learning can suppress curiosity and independent thinking. Students may become proficient at passing examinations but need additional training to develop the ability to solve unfamiliar problems, evaluate evidence, or think critically about real-world challenges. This is particularly important in engineering and entrepreneurship, where innovation requires questioning assumptions, experimenting with alternatives, and learning from failure. Memorization should support thinking—not replace it.

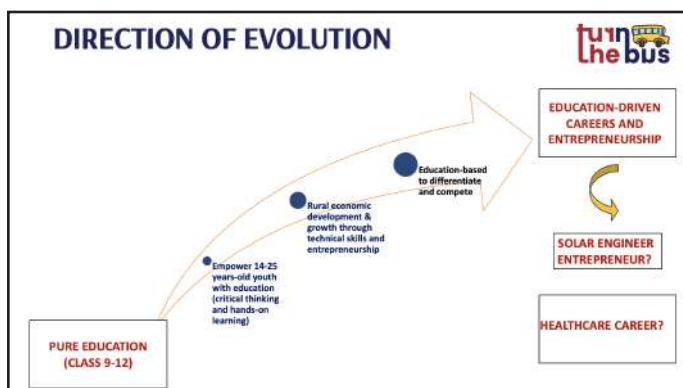
Education has also tended to separate technical skills from ethical thinking. Subjects like science and math are often taught as neutral skills, with little attention to values, social responsibility, or ethical judgment. Yet education should help students learn how to think responsibly and engage in thoughtful public dialogue.

For underprivileged youth, these challenges are made worse by poverty and

lack of resources. Many students have household duties or work, leaving little time to reflect or explore ideas. They may lack access to mentors, libraries, and peer groups that support debate and curiosity.

Together, these factors limit the development of critical thinking, ethical awareness, and entrepreneurial skills. These systemic barriers—shortages of well-trained teachers, limited bilingual/multilingual pedagogy, lack of high-quality learning materials in Indian languages, an over-reliance on rote learning, and the separation of technical education from ethical reasoning—are precisely the gaps that digital platforms and AI-enabled learning can help bridge at scale.

Turn the Bus leverages smartphones to deliver high-quality, curriculum-aligned content in accessible formats, reducing dependence on scarce local teacher capacity while supporting learning in regional languages. Smartphones are vital to education and rural development, as they put the power of technology and global educational resources at the fingertips of young people in India. In the educational context, AI-powered tools can also personalize learning paths, provide real-time feedback, and model inquiry-based Socratic pedagogy, shifting learning from memorization to critical thinking.



Simulations and virtual labs enable experiential learning even where physical infrastructure is lacking, while entrepreneurship games and ethical decision-making scenarios integrate values directly into technical education. In this way, Turn the Bus and AI do not replace teachers; they **augment** them—potentially acting as scalable co-educators that democratize access to high-quality instruction, multilingual resources, and ethically grounded, problem-based learning for rural youth.

Technology as an Enabler: The Turn the Bus Model

Turn the Bus's mission is to reduce income inequality sustainably by reducing educational inequality with the help of smartphones.

Exhibit A - How education can gradually power higher lifetime income

The model begins by building strong conceptual foundations through rigorous,

curriculum-aligned videos for Class 9-12, ensuring that students not only memorize but also truly understand core subjects (even as they prepare for Board exams).

From this base, Turn the Bus is developing innovative tools to cultivate higher-order skills that go beyond school-level learning. For instance, the AI-powered Physics Lab offers interactive simulations that encourage students to explore, experiment, and hypothesize, thereby shifting the learning process from passive absorption to active inquiry and engagement.

Using a Socratic style, our AI Tutor can strengthen both technical reasoning and ethical decision-making within engineering-oriented education by guiding students through structured questioning rather than providing ready-made answers. Instead of solving the problem for them, the tutor prompts students to define the problem precisely, examine assumptions, analyze data, consider alternative designs, and justify conclusions with evidence. This directly builds core engineering competencies such as root-cause analysis, systems thinking, and evidence-based evaluation.

It might be helpful to remember that

the classic idea of **Socratic pedagogy** comes from the interaction between Socrates and his student Plato. Socrates would engage his interlocutors in dialogue, asking questions that revealed gaps or inconsistencies in their thinking. Plato later documented many of these dialogues, preserving this method as a model of inquiry and philosophical reasoning. In modern education, this approach is especially powerful in engineering.

The Turn the Bus AI tutor will employ targeted Socratic questions:

- Clarification (“What exactly is the constraint in this irrigation system?”)
- Assumption testing (“Are you assuming uniform water access across households?”)

- Evidence evaluation (“What field data supports this design choice?”)
- Stakeholder perspective (“How might this affect small farmers differently from large landowners?”)
- Implications and consequences (“What are the environmental and social impacts over 10 years?”)

These implication-focused questions integrate ethical reasoning directly into technical design. Students are encouraged to assess not only feasibility and cost-efficiency, but also fairness, sustainability, community impact, and long-term ecological balance. In this way, ethical reflection becomes embedded within engineering analysis rather than treated as an external add-on.

TURN THE BUS FAMILY OF APPS/PROGRAMS



(IN VARIOUS STAGES OF DEVELOPMENT)

By systematically linking technical rigor with social responsibility, the AI Tutor prepares future engineers to ask both: “Will this work?” and “Is this just, sustainable, and appropriate for this context?”

The Entrepreneurship Simulation Game adds another dimension by placing students in real-world scenarios where they must practice decision-making, navigate ethical dilemmas, and balance profit with fairness and sustainability.

Exhibit B: Turn the Bus Product Portfolio

Together, these tools create an environment that fosters not only knowledge but also creativity, ethical awareness, and entrepreneurial confidence—skills essential for transforming motivated rural students into future-ready engineer-entrepreneurs. This is if we understand “engineers” to be problem solvers rather than degree holders.

Engineer-Entrepreneurs as Change Agents

Entrepreneurship among rural youth is more than an economic opportunity; it is a potential pathway to inclusive and resilient communities. By solving local problems, rural entrepreneurs can create jobs, reduce migration, and inspire others to do

the same. Over time, this could build cultures of innovation and self-reliance.

When powered by technology, the engineer-entrepreneur mindset can eventually scale across villages. Digital platforms in local languages can teach critical thinking, expand financial literacy, connect entrepreneurs to markets, and enable peer-to-peer learning networks. This is what we believe at Turn the Bus, and intend to deliver. In this vision, rural youth would not be passive beneficiaries of development but active architects of their own futures.

As an example, Deepa is a young lady who has graduated from High School (Class XII/Intermediate exams) with 85% marks in Physics, Chemistry and Mathematics. Her favorite subject is Physics. If you ask her what her ambition is, she says, “I want to be a Physics teacher”. If you ask her, “If you had to start a business in your village, what would it be?” - she answers, “I could launch a catering business, or a baking business” - entrepreneurial opportunities where her excellent academic credentials are of no use at all. This is the nature of the disconnect between education and entrepreneurship in India.

If we were to give Deepa a little additional training in the technology of solar

energy generation, an understanding of how to assess market demand, and access to local sources of funding, she could thrive as a solar engineer-entrepreneur.

Just one household solar installation can net a profit of more than Rs. 20,000 for the businessperson who installs and maintains it, and a rural entrepreneur can complete multiple such installations in a month.

Conclusion: Envisioning a Just and Sustainable Rural Future

The challenges facing rural India—poverty, inequality, climate vulnerability—require solutions that are not only technically sound but also ethical, practical, and scalable. The integration of

critical thinking, ethics, engineering, and entrepreneurship can provide a robust framework for transformation.

By combining this framework with digital tools and AI, we believe that initiatives like Turn the Bus show how rural youth can be empowered as innovators, job creators, and community leaders. We welcome multi-lateral partnership opportunities across government, academia, for-profit renewable energy companies, and other for-profit and not-for-profit organizations to make this vision a reality.

The engineer-entrepreneur mindset, scaled through technology, can offer a pathway to a just, resilient, and sustainable rural future—where opportunity is created locally and shared equitably.



Science, Civilization and the Future of Humanity: Opportunities, Challenges and Responsibilities

T. Harinarayana*

Introduction

Human civilization is the story of humanity's continuous quest to understand the universe and our place within it. From the earliest observations of the stars by ancient astronomers to the modern exploration of space and the decoding of the human genome, science has profoundly shaped the course of human progress. Every major transformation in civilization—from agriculture and metallurgy to electricity, computing, and artificial intelligence—has been rooted in humanity's scientific curiosity and the systematic pursuit of knowledge.

Science, in its true sense, is not merely a collection of technologies or inventions; it is a method of inquiry based on observation, experimentation, and critical reasoning. Civilization, likewise, is not simply the existence of organized societies, but the collective development of knowl-

edge, culture, institutions, and shared human values. When these two forces—scientific understanding and civilizational growth—interact, they generate powerful transformations that redefine the way humanity lives, communicates, produces, and thinks.

Throughout history, scientific discoveries have repeatedly altered the trajectory of civilization. The heliocentric theory of Copernicus changed humanity's perception of the universe; Newton's laws explained the mechanics governing nature; and modern advances in medicine, communication, and energy have dramatically improved human life expectancy and living standards. Yet the same scientific power also raises profound questions about sustainability, ethics, and the long-term future of humanity.

Today, the world stands at an unprecedented moment in history. Emerging technologies such as artificial intelligence, biotechnology, renewable energy systems, and space exploration are rap-

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idly reshaping global society. While these developments hold immense promise for solving some of humanity's most pressing challenges—such as climate change, energy security, and disease—they also demand careful reflection on their social and ethical consequences.

This article examines the dynamic relationship between science and civilization, exploring how scientific inquiry has shaped the evolution of human society and how present-day scientific advancements may influence the future of humanity. By looking at the past, understanding the present, and imagining the possibilities of the future, we may better appreciate the responsibilities that accompany humanity's growing scientific power.

1. Science and the Rise of Civilization (Ancient to Medieval Period)

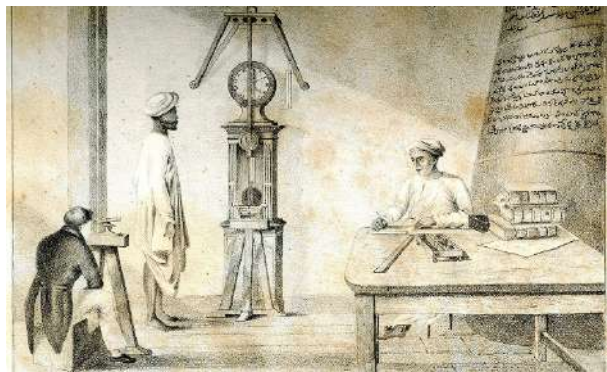
The origins of civilization are closely intertwined with humanity's earliest scientific observations. Ancient societies sought to understand nature through careful observation of the skies, the seasons, and the behaviour of plants and animals. Early developments in mathematics, astronomy, agriculture, and metallurgy enabled humans to transition from nomadic lifestyles to organized settlements and complex societies. Civilizations such as those of India, Mesopotamia, Egypt, and China contributed significantly to ear-

ly scientific knowledge. Indian scholars developed sophisticated mathematical concepts such as zero and the decimal system, while ancient astronomers studied planetary movements with remarkable accuracy. The Egyptians made advances in medicine and engineering, and Chinese innovators introduced inventions such as paper, gunpowder, and the compass. These achievements were not isolated discoveries; they were part of a broader intellectual tradition where science served practical human needs. The growth of knowledge during the ancient and medieval periods laid the foundation



Discovery of Massive Ancient Egyptian Observatory

for later scientific developments. In this sense, the earliest civilizations were also



The Madras Observatory: from Jesuit cooperation to British rule

the earliest laboratories of human curiosity and experimentation.

2. The Scientific Revolution and Industrial Transformation

The Scientific Revolution of the sixteenth and seventeenth centuries marked a turning point in the relationship between science and civilization. Thinkers such as Copernicus, Galileo, and Newton challenged traditional beliefs and emphasized observation, experimentation, and mathematical reasoning as the basis of knowledge. Their discoveries transformed humanity's understanding of the universe and the laws governing nature. This intellectual revolution eventually led to the Industrial Revolution of the eighteenth and nineteenth centuries,

when scientific principles were applied to machines, manufacturing, and transportation. Innovations such as the steam engine, mechanized production, and improved metallurgy dramatically increased productivity and economic growth. Cities expanded, global trade networks developed, and societies experienced rapid social and economic change. Science thus became a powerful force driving industrial progress and technological innovation. However, industrialization also brought challenges such as urban overcrowding, labor exploitation, and environmental degradation.

Nevertheless, the scientific spirit of inquiry continued to propel civilization toward new horizons.

3. Science in the Twentieth Century: Medicine, Space and Computing

The twentieth century witnessed an extraordinary acceleration in scientific discovery and technological innovation. Breakthroughs in physics, including the theories of relativity and quantum mechanics, transformed our understanding of matter, energy, and the universe. Advances in medicine, particularly the discovery of antibiotics, vaccines, and the structure of DNA, revolutionized healthcare and significantly increased human life expectancy. At the same time, the development of computers and micro-

processors ushered in the digital age, fundamentally altering communication, commerce, and information exchange. Humanity achieved remarkable milestones in space exploration, most notably the Apollo missions that landed astronauts on the Moon. Satellites and space technology have since become essential for navigation, weather forecasting, and global communication. Scientific research during this period demonstrated humanity's capacity to explore both the microscopic world of atoms and the vast expanse of the cosmos. These achievements illustrate how science has continually expanded the boundaries of human knowledge and capability.

4. Science in the Twenty-First Century: Emerging Technologies

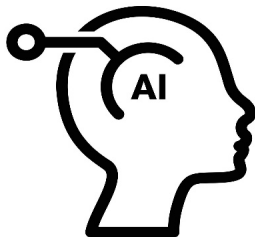
The twenty-first century is characterized by rapid advances in emerging technologies that have the potential to reshape civilization. Artificial intelligence and machine learning are transforming industries ranging from healthcare to

transportation and finance. Biotechnology and genetic engineering are enabling breakthroughs in personalized medicine and the treatment of previously incurable diseases. Renewable energy technologies, including solar and wind power, are becoming increasingly important in addressing the global challenge of climate change. Meanwhile, advances in materials science and nanotechnology are leading to stronger, lighter, and more efficient materials for industrial and technological applications. Space exploration is entering a new era with private companies and international collaborations planning missions to the Moon, Mars, and beyond. These developments highlight the extraordinary potential of science to solve complex global problems. Yet they also raise important questions about how societies should manage and regulate these powerful technologies.

a) Satellites around the Earth, b) Development of artificial intelligence and c) Robots



(a)



(b)



(c)

5. Challenges: Ethics, Climate Change and Inequality

While science has brought remarkable progress, it has also introduced complex ethical and social challenges. Technological advances can create unintended consequences that affect both society and the environment. Climate change, largely driven by industrial activity and fossil fuel consumption, represents one of the most pressing challenges facing humanity today. Similarly, developments in artificial intelligence and biotechnology raise ethical concerns related to privacy, security, and the potential misuse of powerful technologies. Another challenge lies in the unequal distribution of scientific and technological benefits across different regions of the world. While some societies enjoy advanced healthcare, digital connectivity, and economic opportunities, others continue to struggle with poverty and limited access to technology. These disparities highlight the need for responsible scientific development guided by ethical principles and social responsibility. Science must therefore be integrated with moral wisdom and public policy to ensure that technological progress benefits all of humanity.

6. The Future of Humanity: Science with Responsibility

The future of humanity will depend

largely on how wisely scientific knowledge is used. Science has the potential to address many of the major challenges facing our planet, including climate change, energy scarcity, food security, and global health crises. Innovations such as nuclear fusion, advanced renewable energy systems, and sustainable agricultural technologies may transform the way humanity produces and consumes resources. At the same time, advances in artificial intelligence and robotics could dramatically reshape the nature of work and human interaction. As humanity ventures further into space and explores possibilities for long-term settlements beyond Earth, scientific knowledge will continue to expand the horizons of civilization. However, these developments also require thoughtful governance, ethical reflection, and international cooperation. Ultimately, the future of civilization will not depend solely on scientific progress but also on humanity's wisdom in using that knowledge for the common good. Science must therefore remain a tool not only for discovery but also for the advancement of human values and global well-being.

Conclusion

The story of human civilization is inseparable from the story of science. From the earliest observations of nature by ancient civilizations to the sophisticated technologies of the twenty-first

century, scientific inquiry has continuously expanded the horizons of human understanding. Early societies developed foundational knowledge in mathematics, astronomy, medicine, and engineering, which laid the intellectual groundwork for later generations. The Scientific Revolution transformed human thought by emphasizing observation and experimentation, while the Industrial Revolution demonstrated how scientific principles could reshape economies and societies.

During the twentieth century, science accelerated the pace of change through breakthroughs in physics, medicine, computing, and space exploration, fundamentally transforming everyday life. In the present century, emerging technologies such as artificial intelligence, biotechnology, renewable energy systems, and space missions promise to usher in another era of profound transformation. Yet alongside these remarkable opportunities come serious challenges—ethical dilemmas, environmental concerns, and the growing inequality in access to technological benefits.

These challenges remind us that scientific progress alone cannot guarantee a better future. Science must be guided by human values, ethical responsibility, and a collective commitment to the welfare of society. The knowledge generated by science has the power to alleviate suffering, improve living conditions, and expand humanity's intellectual and cultural achievements. At the same time, it requires wisdom and foresight to ensure that technological power is used responsibly and sustainably.

As humanity moves forward into an uncertain but promising future, the relationship between science and civilization will remain central to our destiny. The true measure of progress will not merely be the sophistication of our technologies, but the extent to which they contribute to peace, sustainability, and the well-being of all people. In this sense, the future of humanity will depend not only on scientific discovery but also on the values, imagination, and responsibility with which that knowledge is applied.



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An Expressive Narrative on Nehru*

P. Purnachandra Rao**

Lo! the day, Flowers all, Roses too
withered and Earth in solitude wailed in-
consolably

The dove too fainted facing blistering
sun None to shelter the motherless chil-
dren even.

The compass in the Ship developed
glitch in mid seas The Signpost on the
pilgrims path collapsed

History lost its glimpses in the High
noon and Swooned In the midst of city
road highly socialised.

Acknowledged Astronomically the
run of worst days Dreamy eyes tender
toddlers hearts lay as screenshots

The curious in the five continents stuck
in thoughts groping in dark The filth of
the well designed colonies drowned the
city gorgeous.

Welcome Festoons glittered the sky in
his honour

In war and death, invincible was he
and attained eternity

With Fallen countenances, sea of peo-
ple paid tearful tributes soulfully Gener-
ations to come listen his immortal voice
and lay motivated

Due to this abrupt and shocking turn
of events

How Incomprehensible it was to suffer
ruination of all And my heart yelled wilt-
ing catastrophically

Who he must be, till now

Walked upon this earth with dignity,
handsomely And with gay abandon

Who must be, on this vast firmament

Moved past from one end to the other
impacting Generations to come idealisti-
cally and commandingly Scripting trends
in gold letters

Who that sage king must be, knocking
the doors of world history To rekindle the
hearts of those groaning in the darkened
rooms By lighting camphor lights

*Original in Telugu by
Devarakonda Bala Gangadhara Tilak,
Sahitya Academy Awardee

**Former Principal, Indian Institute of
Management and Commerce (IIMC)
Hyderabad & Former General Secretary,
Andhra Mahila Sabha, Hyderabad.

JAWAHAR

Captain beloved of forty five crore
people Inconceivable for me to feel you
are no more

Not comfortable viewing the cracks on
the mirror perfect

Open the hearts of anyone of this na-
tion

Lo, see him appear immersed in
thoughts deeply With empathy yet boldly

Take a way and turn in this nation, and
face

the structures of your perception in-
fusing confidence with a smile How can
I disentangle myself from your thoughts
and memories And drown the grief

You are Virtuous and noble an Exem-
plary human being dedicated and devoted
administrator par excellence.

Flowers bloom ever in that Garden

Where it was spring and spring all the
time

The tree shivers not recapturing the
autumn gone by Young in spirits ever he
remains

Sharp as sword was his behavioural
pattern Gripping it he negates cynical in-
stincts

The wicks soaked in burnt oil

Squeezes he and lights it up beckoning
the times to come Historical perspective
was his valour

Steered the chariot of progress on the
path equity Remaining upfront unaffected
while ill tempered Clash with each other
like wild animals, was his wont

Great leader was he, hailing from stal-
wards family sans stigma

In him merged the DNA of Trinity
Vivekanand, Ravindra and Mahatma,

“Prince Charming darling of the mil-
lions” on the move, clear the way The
soul’s astrals orbiting around his cadaver
in honours

Jawahar our kin Bharat Ratna proceed-
ing forward, shed no tears Roses show-
ered by millions of hearts began kissing
his feet

Nehru Pandit most charming asleep
eternal, make no sound Mother Earth
mournfully began humming elegy.

Administrator par excellent and un-
wavering in execution How come you
forsake us so untimely leaving the

Perceived form incomplete and assort-
ment of events too unfinished How could
you silently vanish unnoticed behind the
curtains Leaving the Nation in consterna-
tion and humans despaired.



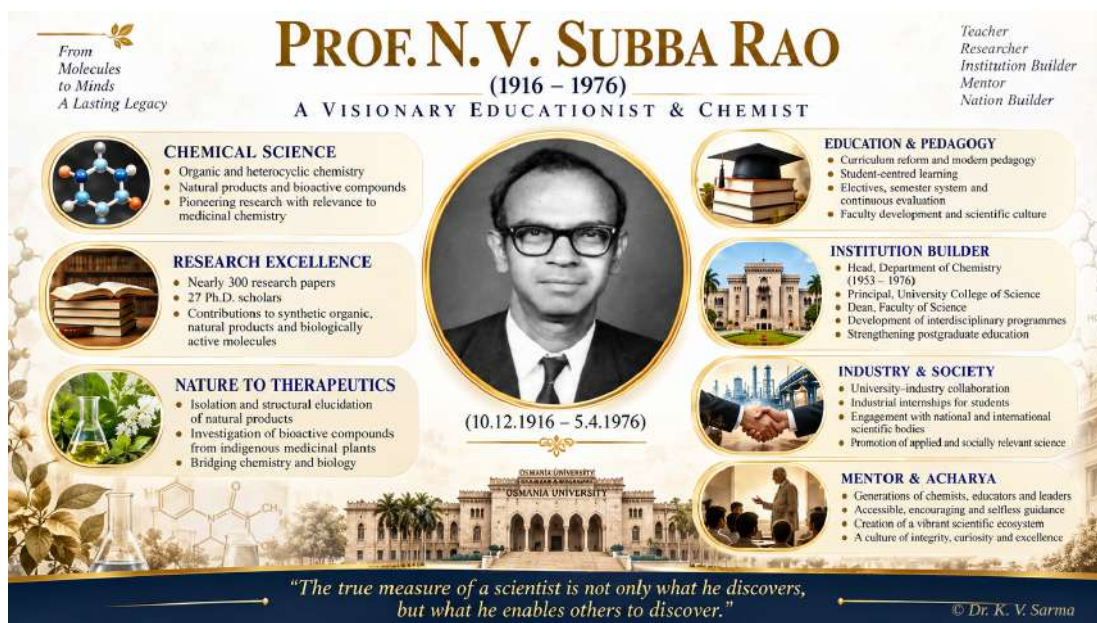
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Reflections on a Luminary: Bridging Legacy, Chemical Sciences and Modern Innovation*

Dr. K. V. Sarma**



Commemorative infographic: Prof. N. V. Subba Rao (1916–1976) - Chemist, Educationist, Mentor and Institution Builder.

Reading about a scientist is usually an exercise in professional recognition. Now

and then, it becomes an encounter with a generation.

* A Commentary on "A Tribute to a Visionary Educationist: Prof. N. V. Subba Rao (1916–1976)" by Prof. P. S. N. Reddy and Dr. C. V. Ratnam (Triveni, pp. 13–19, Volume: 92, Oct.-Dec. 2025, Number: 4)

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The tribute by Prof. P. S. N. Reddy and Dr. C. V. Ratnam belongs to the second kind. It is not simply a biographical account of an accomplished chemist — it is a reminder of what a university professor could once

mean to a nation at a formative stage of its scientific development.

I feel privileged to write on Prof. N. V. Subba Rao garu's life. My own path has been rooted in chemistry: organic chemistry at the University of Allahabad, doctoral research in heterogeneous catalysis in Europe, post-doctoral work in France, and later a career in pharmaceutical drug discovery (Europe & USA) — work on molecules relevant to CNS disorders, cancer and thrombosis — followed by quality control and regulatory science.

So I did not read this tribute as a student of history. I read it as a chemist looking back at one of the architects of India's chemical-education ecosystem.

There is a personal dimension too. Prof. Subba Rao garu's son, Shri Kameswara Rao garu, an engineer, is a good friend of mine, and that friendship makes his father's story feel less distant. But it is the scientific and educational dimensions of his life that command the deepest professional admiration.

From a Small Village to the Larger World of Science

The early life Prof. Reddy and Dr. Ratnam describe is striking: it shows how intellectual promise can emerge independent of privilege.

Born in Tapeswaram in 1916 to a mod-

est family, Prof. Subba Rao's brilliance showed early — he completed his tenth standard at thirteen, went on to Andhra University, and excelled despite real financial constraints. His journey from a small village to advanced scientific education was itself proof of what education can transform.

But he never treated education merely as personal advancement.

His intellectual formation owed much to Prof. T. R. Seshadri, whose mentorship became one of the defining relationships of his scientific life. Subba Rao earned his D.Sc. from Andhra University, then went to Imperial College, London, for a Ph.D. in Agricultural Chemistry, specialising in residual analysis.

Great scientific careers often share this pattern: mentorship, curiosity, and the willingness to cross disciplinary and geographic boundaries without losing one's roots.

A Chemist Who Understood That Science Must Grow Through Institutions

What strikes me most is that Prof. Subba Rao's achievement cannot be measured by his publications alone.

He became Professor and Head of Chemistry at Osmania University in 1953 and stayed there until his death in 1976. In those years he rebuilt the department

from the ground up: revised curricula, electives, special tracks for advanced students, the semester system, continuous evaluation, faculty development, student outreach, industry collaboration, stronger doctoral research, interdisciplinary programmes, and national and international conferences.

This is where the word visionary, in the original tribute's title, earns its place.

Vision in academia is not just foreseeing a discovery. It is recognising what an institution will need before the need becomes obvious. Interdisciplinarity, continuous assessment, faculty development, industry exposure, international engagement, student-centred learning — all now staples of higher-education policy — were already alive in his initiatives.

What is remarkable is the timing. He was pursuing these ideas in the 1950s, 60s and 70s, decades before they became familiar vocabulary.

The Researcher: Organic Chemistry with a Biological Imagination

As an organic chemist myself, I found the research side of his career especially compelling.

The tribute describes him as an accomplished chemist who pioneered work on bioactive heterocyclic compounds and the chemistry of indigenous medic-

inal plants — nearly 300 papers, and 27 scholars guided to their Ph.D. But numbers don't capture the character of the work. His research followed a chain any pharmaceutical scientist will recognise: nature, isolation, structural elucidation, synthesis, biological activity, therapeutic relevance.

Drug discovery today has high-throughput screening, computational modelling and automated synthesis. But the core question hasn't changed: what molecular structure produces a biological effect, and how can chemistry help us understand and harness it?

The tribute highlights his work on *Cleistanthus collinus* and other medicinal plants, including compounds such as cleistanone and the cleistanthins, whose biological activities were studied further. The lesson isn't that every natural product becomes a drug. It's more fundamental — India holds an immense chemical heritage in its biodiversity, and turning that heritage into knowledge takes sustained work across chemistry, biology and translational science.

From Molecules to Mentors

Yet Prof. Subba Rao's greatest contribution may not have been any single molecule — it may have been the people he built around them.

The tribute records how he encouraged colleagues across Organic, Physical and Inorganic Chemistry to build strong research programmes, with an equitable share of support. Under him, research grew across synthetic organic chemistry, natural products, chemical kinetics, photochemistry, electrochemistry and organometallic chemistry.

There is a real distinction here. A successful scientist produces papers. A scientific leader produces other scientists — and that contribution compounds across generations. By guiding doctoral students, developing laboratories, and strengthening links with industry, Prof. Subba Rao built a scientific ecosystem that outlived him. That may be the truest measure of academic legacy.

The University–Industry Bridge

This aspect of the tribute means something particular to someone who later worked in the pharmaceutical industry, as I did.

Under Prof. Subba Rao, the Chemistry Department at Osmania built ties with organisations such as Indian Detonators Ltd. and Indian Drugs and Pharmaceuticals Ltd. — industry scientists taught courses, and students took up industrial internships.

University–industry collaboration is now considered essential to employabili-

ty and innovation, but the principle is older than the phrase. A university that keeps its knowledge locked in classrooms goes stale; industry benefits when education stays grounded in fundamentals rather than narrow technical training. Prof. Subba Rao understood that balance well — he trained students in the foundations of chemistry while letting them meet the realities of industrial practice. That is worth recovering today.

The Teacher as Acharya

The tribute calls Prof. Subba Rao by a particularly apt word: Acharya. In the Indian tradition, an Acharya is more than an instructor — knowledge is transmitted, but so are standards, discipline and values.

A professor teaches spectroscopy; an Acharya teaches a student how to look. A professor teaches synthesis; an Acharya teaches the discipline of asking whether a structure or conclusion is actually justified. A professor supervises a thesis; an Acharya builds the intellectual character of an independent researcher.

This is why his educational legacy deserves to stand alongside his scientific one. The article portrays a teacher who was accessible, encouraging, and genuinely invested in the people around him — a legacy that lives on through everyone he mentored.

The Wider Institutional Vision

His vision did not stop at chemistry. As Principal of the University College of Science and Dean of the Faculty of Science, he helped build departments in Biochemistry, Chemical Technology, Genetics, Geophysics and Microbiology, and worked to strengthen postgraduate centres outside Hyderabad.

He understood that chemistry does not exist in isolation — that it would inevitably intersect with biology, medicine, agriculture and industry. That is exactly the direction science has taken since: chemical biology, medicinal chemistry, materials science, biotechnology, computational chemistry. Disciplinary boundaries have grown porous, and his institutional philosophy anticipated that, treating departments as connected rather than sealed.

Scientific Leadership Without the Pursuit of Limelight

One of the tribute's most striking notes is his institutional loyalty. He served on national bodies, took part in IUPAC-related and UNESCO work, and helped develop the Open University system in Andhra Pradesh — yet despite chances to move to more prestigious posts, he stayed with Osmania and its Chemistry Department.

There is a lesson here: scientific leadership need not be measured by visibility. Building a reputation is visible; building

an institution is often recognised only decades later. Prof. Subba Rao's life, as Prof. Reddy and Dr. Ratnam reconstruct it, belongs firmly to the second kind.

A Personal Reflection from a Fellow Chemist

Reflecting on this tribute, one thought kept returning. My generation entered chemistry in a world very different from his — computational tools, automated synthesis, molecular databases, artificial intelligence. Yet the essential virtues haven't changed: curiosity, rigour, integrity, the need for good mentors, and the scientist's responsibility to create knowledge for society.

The farther one travels in science, the more one sees that knowledge is cumulative — we stand on foundations laid by people we may never meet. Prof. N. V. Subba Rao was one of those foundation-builders.

The Legacy Beyond the Laboratory

There is another reason this tribute deserves to be read today: Prof. Subba Rao's life shows that education is itself a form of nation-building.

He did more than publish papers. He revised curricula, developed teachers, built research programmes, connected universities with industry, strengthened postgraduate education, and helped shape

national scientific policy. And he left behind an institutional culture that survived him — perhaps his greatest achievement.

Publications become historical record. A laboratory can vanish. But an intellectual culture reproduces itself through generations — and that is what makes an educator's legacy different from an individual scientific one.

From Legacy to the Future

The best way to honour Prof. Subba Rao is not simply to remember him, but to ask what his philosophy would demand of us now. Working in today's university, his instinct for interdisciplinarity would likely lead him toward chemical biology, computational chemistry, drug discovery, green chemistry, advanced materials, AI-assisted research. But the vocabulary would be secondary — the principles would stay the same: strong fundamentals, excellent teaching, rigorous research, industry engagement, international exposure, and above all, the development of people.

This matters especially now. AI can accelerate literature review, molecular design and data analysis, but it cannot substitute for scientific judgement. The future scientist will need not just more information, but better discernment — which makes teachers like Prof. Subba Rao more relevant, not less.

A Legacy That Lives Through People

The tribute's closing sections are especially moving, extending the story from university to family. His children took up medicine, industrial psychology, organic chemistry, engineering and fine arts — his son, Shri Kameswara Rao, an engineer, is the friend I mentioned earlier.

That diversity says something about his philosophy: a great educator does not produce replicas of himself, but independent human beings. The goal of education is not to make every student follow the teacher's path, but to give them the confidence to find their own. That may be the truest mark of an Acharya.

Conclusion: What Remains After the Scientist

The tribute by Prof. Reddy and Dr. Ratnam is therefore more than a remembrance of a distinguished chemist — it is a meditation on what scientific leadership can accomplish when scholarship meets character and institutional commitment.

Prof. N. V. Subba Rao garu belonged to a generation that understood India's scientific future could not simply be imported. It had to be cultivated — through universities, laboratories, teachers, students, and institutions capable of generating knowledge of their own.

His contribution to chemistry was sub-

stantial. His contribution to chemical education was greater. His contribution to institution-building was greater still. And perhaps his most enduring contribution was the culture of scholarship he built in the people around him.

For a fellow chemist, there is something humbling in such a legacy. For an educator, inspiration. For a university leader, a model. And for a nation still building a knowledge ecosystem of global standing, a reminder: the true measure

of a scientist is not only what he discovers, but what he enables others to discover.

Prof. N. V. Subba Rao garu did both. His molecules entered the literature. His students entered the scientific world. His reforms entered the institution. And his ideals entered the generations that followed.

That is a legacy that does not end with a lifetime. It becomes part of the living history of science.

The true measure of a scientist is not only what he discovers, but what he enables others to discover.



Golden Article

Rabindranath's Internationalism

DR. A. ARONSON, Ph. D.
(Viswabharati, Santiniketan)

The artist throughout the 19th century was a social outcast; handicapped by the economic uncertainty of his profession and his pathetic lack of social adjustment, he led a truly a-social existence, a glorified escape from the conflicts of social and political evolution into an unreal but delightfully satisfying dreamland of his own creation. The artist today has to take sides if he does not want to get lost in the general turmoil of conflicting ideologies, if he wants to keep his sensibility and conscience intact; for the issues involved in the social and political struggles of the last forty years affect the writer in an intensely personal way, one from which there is no escape. That is why some of the most gifted English and French writers went to fight in Spain for a republican democracy; that is why Rabindranath responded both in theory and practice, and in the most consistent way possible, to the social and political life of man. And

he responded to it with the whole force of his personality, not as something that lies outside the fanciful occupations of a poet, but as something that concerned him and his art most vitally and directly. He was, however, no politician: to judge him by the standards of a professional politician, his views were appallingly 'out-of-date'; but in terms of political awareness he saw perhaps deeper into the chaos of political disintegration than any other artist of this century. His political vision was indeed prophetic: for while others fought over irrelevant issues, he put before the world one of the most consistent and certainly one of the most forceful of political programmes.

Tagore's integration of the universe always started with the 'soul', the inner spirit of man; no wonder, therefore, that his social consciousness was based upon the belief that there is a spiritual unity among men transcending the narrow frontiers of self-centered individualism and nationalism. Political issues, of what-

*Reprinted from **Triveni** Jan-Mar 1942,
Vol. XIV, No. I*

ever kind they may be, can be solved only with reference to, and in terms of, the ultimate unity of the spirit that pervades all men. Confronted by the destructive ideologies and political aspirations of our age, we have to go back to the first and primal 'truth' of our existence, the human soul "To me the mere political necessity is unimportant; it is for the sake of our humanity, for the full growth of our soul, what we must turn our minds towards the ideal of the spiritual unity of man."¹ It would, however, be wrong to assume that Rabindranath, in emphasising the inner spirit of man, lost sight of the creative significance of social and political conflicts. Conflicts there must be, as there must be darkness before the creation of light; the 'path of struggle and travail' leads upward towards final fulfillment, although human beings have first to pass 'through cyclic darkness and doubt'. For life, and least of all social life, is not a harmonious whole, a pre-established unity, and abstract and conflictless entity. In both harmony and disharmony, war and peace, there is 'truth': "...they seem to hurt each other, like the fingers and the strings; but this very contradiction produces music. When only one predominates, there is sterility of silence. Our problem is not only whether we should have war or peace, but how to harmonise them perfectly."²

The conflict between the individual in his spiritual isolation and the community, in which he lives, produces social consciousness and awareness of the most intense type. The individual is all the time oppressed and besieged by invisible forces from outside, forces that emanate from political bodies and institutions, preventing him from a free expression of his own individual self. The individual, that is, the 'complete man', is being continually sacrificed to some conventional morality and to that hideous man-made demon which, Tagore calls the 'nation'.

The implications of such an attitude can be realised only if we understand what Rabindranath meant by 'nation'. He was no, anarchist; and yet, a nation, as he conceived it, was to him essentially an administrative body for the purpose of satisfying the human lust for power and wealth. But within the nation there are 'the people', composed of feeling and thinking human beings, struggling for certainty and truth in the mediocrity of their lives. They are deeply rooted in the soil that produced them; they are culturally and spiritually, and even physically, part of that good earth on which they happen to live. They have a 'personality' of their own which is subject to the inner rhythm of birth, growth and decay. They live and create: "The nature of the people

depends for its manifestation upon its creative personality. It has religion, arts, literature, traditions of social responsibility and co-operation. Its wealth to maintain itself and power of defence are secondary; they are not the ultimate ends for the people. But the Nation manifests itself in its property. The people present life, the nation materials.”³

Rabindranath, in this quotation, substitutes a living reality (the people) for an abstraction (the state). If we study carefully the intellectual tendencies of recent years in Europe, we shall come across a similar dissatisfaction with abstract concepts, both in the social sciences and in literature. Modern sociology has rejected the unreal political formulas of the past in favour of a new synthetic approach to social phenomena. What indeed is the state, asks the sociologist, if it is not composed of human beings; what is a political unit if not a living and ever-changing organism consisting of the hopes and aspirations, the failures and dreams of individuals? In literature we had the recent revival of the national ‘saga’, the ‘epic’ novel in which the attempt is being made to depict the growth and development of particular social units or nations in terms of individual experiences; we have Galsworthy’s *Forsyte Saga* in England, Jules Romains’ *Men of Good Will* in France,

and John Dos Passos’ *Trilogy U.S.A.* in America. Rabindranath was, perhaps, the first to express in inspired language what both sociologists and writers in the West realised much later, and what, incidentally, Aldous Huxley formulated in one of his recent books: “The monstrous evils which arise when remote abstractions, like ‘nation’ and ‘state’ are regarded as realities more concrete and of greater significance than human beings may be remedied, in some measure, by the insistence on the relative concreteness of individual men and women.”⁴ It is surprising to find that some of the most ‘intellectual’ writers in Europe have come to exactly the same conclusions as Rabindranath, although they founded their theories on Science rather than on Intuition. Their analysis of scientific progress during the last century led them straight to the point where Rabindranath started: a state has to be either morally good or morally bad; the only standards therefore which we can apply in our judgment of a state are moral standards; and these standards have been supplied to us by the greatest religious teachers in this world: “And if we want to make a reasonable assessment of the value of any given state, we must judge it in terms of the highest morality we know—in other words, we must judge it in the light of the ideal postulates formulated by the

prophets and the founders of religion.”⁵ Therefore, if we come to the conclusion that economic reforms are necessary, we have first to create the proper context; this context, however, can only be created if we change our ‘metaphysical and ethical beliefs’. Although most of the available beliefs of the past have been shattered in the West, Huxley’s arguments are fundamentally based on religious experiences (supplemented as they are, of course, by scientific investigation and analysis). The following quotation from the same book shows the remarkable manner in which Rabindranath formulated what Western writers took up a decade later: the urgent necessity to go back to the primal and elemental experience of human life, religion:

“Religion, is among many other things, a system of education, by means of which human beings may train themselves, first, to make desirable changes in their own personalities, and, at one remove, in society, and, in the second place, to heighten consciousness and so establish more adequate relations between themselves and the universe of which they are parts.”⁶

This is not a coincidence. Both in sociology and literature we find the new awareness that human relationships can be established in only between individuals, or ‘the people’, as Rabindranath says,

not between Nation and Nation. Rabindranath always took for granted that there is among human beings a genuine desire for such human relationships, not so much from a sense of fear and for the sake of self-protection, as rather from an inner and primal urge that must be fulfilled. The only obstacle to such an internationalism (based as it is on the spiritual unity of man) is the nation. For an internationalism that should be truly creative knows no frontiers either spiritual or geographical. Rabindranath translates this ‘creative internationalism’, with the Sanskrit word ‘dharma’, the principle “which holds us firm together and leads us to our best welfare”. A civilisation which represents not only a Nation or even several Nations, but ‘the people’ expresses this ‘dharma’ in the social and political life of man. A civilisation (and Rabindranath never conceived of a civilisation but as international) is no mere organisation like the League of Nations. It is like a living personality, continually creating everything anew: “A civilisation remains healthy and strong as long as it contains in its centre some creative ideal that binds its members in a rhythm of relationship. It is a relationship which is beautiful and not merely utilitarian.”⁷

The ‘power’ of a Nation should lie in the creative strength of the people. Only

if all the individuals that constitute the people grow and mature “in the atmosphere of a profound knowledge of their own country”, can they assimilate foreign cultures and become part of a civilisation which transgresses their national boundaries. Should ‘dharma’ become the expression of both individual and collective perfection, then indeed “it is a moral duty for every race to cultivate strength, so as to be able to help the world’s balance of power to remain even”.⁸ Intellectual co-operation will become meaningful only after all the races of the world have established an inner equilibrium between themselves, a creative interchange of both ideas and materials. Rabindranath, more than anyone else, realised the opportunities that lie in store for India as a national meeting-place between the East and the West. And despite frequent disappointments as regards his own countrymen and the British community in India, he never gave up hope that, out of the cultural and political chaos of the present, a new enlightenment may come which would lead human beings towards a sane and creative civilisation in which both the East and the West would have their due share. A healthy assimilation of a foreign culture, that is of foreign attitudes of mind and beliefs, can and should infuse new blood and new strength into the people:

“Though our assimilation of it (European culture) is imperfect and the consequent aberrations numerous, still it is rousing our intellectual life from its inertia of former habits into growing consciousness by the very contradiction it offers to our mental traditions.”⁹

There are many instances in human history of great philosophers and sages who felt within themselves the inner urge to communicate their thoughts through the medium of education. The realisation of Rabindranath’s political and social ideals had to start with the individual, the child. He had to take the growing human being out of his narrow context of contemporary society and isolate him from all political contagion. He furthermore had to instill into him an awareness of social and political conflicts by letting him live his own life in utter individual isolation and yet within the framework of a community in which, the ‘dharma’, the unity of spiritual life, was continually emphasised. His social consciousness had to be sharpened by coming in contact with the strength of foreign cultures, and yet his personal self should never be chained down to narrow party politics and discipline. Santiniketan, in this sense, was never meant to be an escape from politics; it rather represents Rabindranath’s own political courage of conviction, and his unshakable

belief that, above and beyond the nation, there are human relationships that will create a new social outlook, a new creative urge of the people, a new 'dharma'. —Reprinted from *Triveni*, January-March, 1942

¹ Tagore East and West, 1935, p.51.

² Letters to a Friend, 1928, p. 66.

³ "International Relations," A lecture delivered in Japan (Viswa-Bharati Quarterly, Vol. II/4, Jan.1925).

⁴ Aldous Huxley: Ends and Means, 1937, p. 255.

⁵ Aldous Huxley: Ends and Means, 1937, p. 58.

⁶ Ibid., p. 225.

⁷ "Civilisation and Progress," in Talks in China, 1924, p. 135.

⁸ Letters to a Friend, p. 62.

⁹ Ibid., p. 100.



Readers' Mail

Sir

The article on Prof. N. V. Subba Rao garu is very informative. Starting from early education to D.Sc. by research in Andhra University has been chornalized very systematically. Mention was made about his contributions to Natural products research. Prof. N. V. Subba Rao and his students did research work not only on Dalbergia, Derris and Mundulia sps. but also conducted research on Tephrosia sps. also. His group has isolated and characterized several new 12a-hydroxy rotenoids which were hither to considered as artefacts. They proved that they are not artefacts but real natural product.

Prof. N. V. Subba Rao, as local secretary, meticulously organized the Indian Science Congress at Osmania University in 1967. This article will certainly spark the interest of younger generations.

Prof. P.N. Sarma

Professor of Chemistry (Retd.)

Osmania University

Dear Editor,

Let me at the outset thank the editorial board of Triveni for publishing an article on my teacher, Principal and my men-

tor late Professor NV Subba Rao Garu. This article authored by Prof PSN Reddy and Prof CV Ratnam Garu has given an excellent description and insight into biography, academic achievements and contributions of Late Subba Rao Garu to the academic world. I am happy to note that the authors have made efforts to consult late. Subba Rao's children and thereby article has incorporated several details about Prof Subba Rao Gari family background and how he has come up in his life from a modest beginning. I was a student of BSc Special, a brain child of Subba Rao Garu, and it is a UG program in OU science college. This UG program helped thousands of students. Of Telangana area of the then AP. After my MSc course I was selected as faculty member in the department of Zoology. At that time I made a courtesy call on my principal late Subba Rao Garu in his office., There he suggested to me to complete at the earliest my PhD and told me that a science teacher especially in the university is. always a learner and asked me to keep myself abreast with changing information. Such Principals are very rare and therefore OU Science college established high standards in academics and research.

In his sudden death in 1976 the university has lost a committed and learned teacher, administrator and a researcher. My Humble satsang Pranams to great scholar who always lives in our hearts.

Prof P. Umamaheswar Reddy

Prof. of Zoology (Retd.)

Osmania University

A Letter of Gratitude and Remembrance

Dr. Nanduri Subbarao Garu

More than six decades later, I remember with profound gratitude the kindness Dr. Nanduri Subbarao Garu showed me at a decisive moment in 1964.

After securing 67% in B.Sc. Geology from New Science College, Hyderabad, I sought admission to M.Sc. at Osmania University but was denied for want of a Mulki (Domicile) Certificate. I was compelled to join Andhra University.

At this critical juncture, my elder brother approached Dr. Subbarao Garu. Recognizing my merit and potential, he personally recommended my case to the Vice-Chancellor of Osmania University for a special seat.

That single act changed the course of my life. It enabled me to pursue MSc Geology and latter on M.Sc. (Tech.) in Applied Geology (Geophysics) and ultimately led to a career with NABARD,

UNDP and FAO in India and abroad.

Great lives are often remembered through the lives they quietly transform. I offer my humble tribute and enduring gratitude to the sacred memory of Dr. Subbarao Garu.

Dr. K. S. Viswanatham

General Manager (Retd.), NABARD

Former International Consultant –

UNDP & FAO

Prof. N.V. Subba Rao

A Life that is a Textbook

I joined the Department of Chemistry, Osmania University in 1988, twelve years after the demise of Prof. N.V. Subba Rao. I never had the fortune to see him and be a student. He had left us in 1976. But in the halls of the Chemistry Department and Osmania University, his presence was still alive in the labs, in the library, in the stories of my teachers, and in the very way we were taught to do chemistry those days. He was the teacher of my guide, Late Prof. Srimannarayana (G.S.N.) Through my guide, he became my Acharya.

My first personal bond with him was very unusual and very emotional. When I came to the department in 1988, I saw his portrait picture kept in a corner in a state of disarray. The glass was dusty; the

frame was fading. I could not just walk past. I decided to repaint his portrait based on that old photograph. It was a deeply rewarding experience for me. Day after day, as I tried to capture his face, his eyes, his towering personality and the man with intellect, I felt so close to him. Even from a faded photograph, his personality had a sway on me. That painting was not just art for me- it was my first initiation into his legacy. He is a strong influence on me even today.

His life is a textbook, as our teachers used to say. My guru, the Prof G.S.N. often explained to us how Prof. Subba Rao as a young student under Padma Bhushan Prof. T.R. Seshadri, FNA, FRS at Andhra University was intensely inspired and passionate in research. Prof. Seshadri, the most eminent natural product chemist of India, was his guru, and from him Prof. Subba Rao learnt not only chemistry but the discipline of classical structure elucidation degradation, synthesis, logic, and absolute rigour.

Prof. G.S.N. would recall the golden days of natural product research under Prof. Subba Rao and the thrill it offered. Those were days when there was limited availability of spectroscopy. There was no routine NMR, no mass spectrometer at the click of a button like present days. Structure determination was done by brainpower, by intuition, by painstaking

ing chemical degradation and by elegant synthesis. To guide 27 Ph. Ds and publish over 300 papers in that era, with those limitations, shows his authority. He was an authority in natural products chemistry, respected all over India, with close professional contact with great scientists like Prof. Seshadri and Prof. R.B. Clapp of Brown University, Providence, USA.

Our teachers often explained to us how Prof. N.V. Subba Rao enriched Osmania University through COSIP and SAP. They told us that he believed that “only teaching makes people realize what was understood.” To put that belief into practice, he worked hard to get the UGC to sanction the College Science Improvement Programme University Leadership Project (COSIP-ULP) in 1970-71.

I vividly recall when Prof. N.V. Subba Rao Memorial Lectures were conducted in our time. Several eminent chemists like Prof. Goverdhan Mehta, Dr. Asima Chatterjee - first woman D.Sc. in India, Dr. Sukh Dev, Dr. R.S. Kapil and others visited our labs and delivered lectures. I recall how Prof. G.S.N. used to conduct and coordinate those lectures and involve research scholars, including me, in organizing them.

I was personally inspired to pursue natural products and organic chemistry for over 35 years until my retirement and

his enduring legacy. I learnt natural products and organic chemistry research from his papers on heterocyclics and Cleistanthus collinus etc.

I am blessed to have the acquaintance of Dr. Subba Rao's daughters and family like Dr. Lakshmi B garu, Dr Suma garu and blessed for getting this opportunity to write this piece.

I hope we revive Prof. N.V. Subba Rao lecture series again to inspire the next

generation of Chemists from Osmania University. That would be the true tribute - to take his idea of science to society further and continue his legacy.

I am always inspired and bow to his lotus feet.

Acharya Devobhava.

Dr K. Nagaiah

Chief Scientist (Retd.), CSIR-IICT,
Hyderabad.



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THE EVOLUTION OF CHESS

The Inception of Chaturanga

The roots of chess trace back to the ancient Indian game Chaturanga. This early version of chess, played on an 8x8 grid, served as a battle simulation incorporating elements of Indian military.

6th Century



The Birth of Modern Chess

As chess spread into Europe in the Middle Ages, the rules were further modified to create the game we know today. Around the late 15th century, the powers of the queen, bishop, and pawn were significantly expanded, leading to faster, more dynamic gameplay.

15th Century



The Rise of Computer and Online Chess

The later part of the 20th century saw the development of computer chess, culminating in IBM's Deep Blue defeating the reigning world champion, Garry Kasparov, in 1997. In the 21st century, online chess platforms have popularized the game globally, while advanced chess engines like Stockfish and AlphaZero have changed how players study and understand the game.

21st Century



19th Century

The first international chess tournament was held in London in 1851. This period also saw the standardization of rules across different countries, facilitated by the establishment of chess organizations.

The First International Chess Tournament

7th Century

With the spread of Islam into Persia, Chaturanga was adapted into a game known as Shatranj. This version of the game began to resemble modern chess more closely, though the movements of pieces and the rules differed.

Evolution into Shatranj



TAGORE IN DEVOTIONAL TRANCE

*A picture from "Gurudeo in my Vision" album by S.N. Alandker; G.D. Art (Bom.)
(From Triveni Sep. 1946, Vol. XVIII, No. 3)*