3 Patterns of Creativity

S. Chandrasekhar

☛ *Look for these expressions and guess the meaning from the context*

cold philosophy — mutually sustaining endeavours
picaresque tale — cenotaph — atrophy
looked askance — prophetic discernment
apposite — hierophants of an unapprehended inspiration
interlunations of life

...**B**ut I must return to the question: why is there a difference in the patterns of creativity among the practitioners in the arts and the practitioners in the sciences? 1 shall not attempt to answer this question directly; but I shall make an assortment of remarks which may bear on the answer.

First, I should like to consider how scientists and poets view one another. When one thinks of the attitude of poets to science, one almost always thinks of Wordsworth and Keats and their off-quoted lines

A fingering slave,
One that would peep and botanises
Upon his mother's grave?

A reasoning self-suffering thing.
An intellectual All-in-All!

Sweet is the lore which Nature brings:
Our meddling intellect
Misshapes the beauteous forms of things:
We murder to dissect.

(Wordsworth)

Do not all charms fly
At the mere touch of cold philosophy?
There was an awful rainbow once in heaven:
We know her woof, her texture; she is given
In the dull catalogue of common things.
Philosophy will clip an Angel's wings.

(Keats)

These lines, perhaps, find an echo in a statement of Lowes Dickinson, "When Science arrives, it expels Literature".

It is to be expected that one should find scientists countering these views. Thus, Peter Medawar counters Lowes Dickinson by

> The case I shall find evidence for is that when literature arrives, it expels science... The way things are at present, it is simply no good pretending that science and literature represent complementary and mutually sustaining endeavours to reach a common goal. On the contrary, where they might be expected to cooperate they compete.

It would not seem to me that one can go very far in these matters by pointing accusing fingers at one another. So, let me only say that the attitudes of Wordsworth and Keats are by no means typical. A scientist should rather consider the attitude of Shelley. Shelley is a scientist's poet. It is not an accident that the most discriminating literary criticism of Shelley's thought and work is by a distinguished scientist, Desmond King-Hele. As King-Hele has pointed out, "Shelley's attitude to science emphasises the surprising modern climate of thoughts in which he chose to live and Shelley describes the mechanisms of nature with a precision and a wealth of detail unparalleled in English poetry". And here is A.N. Whitehead's testimony

> Shelley's attitude to Science was at the opposite pole to that of Wordsworth. He loved it, and is never tired of expressing in poetry the thoughts which it suggests. It symbolises to him joy, and peace, and illumination...

I should like to read two examples from Shelley's poetry which support what has been said about him. The first example is from his *Cloud* which 'fuses together a creative myth, a scientific monograph, and a gay picaresque tale of cloud adventure'

I am the daughter of Earth and Water,
And the nursling of the Sky:
I pass through the pores of the ocean and the shores:
I change, but I cannot die.
For after the rain when never a stain
The pavilion of Heaven is bare,
And the winds and sunbeams with their convex gleams
Build up the blue dome of air,
I silently laugh at my own cenotaph,
And out of the caverns of rain,
Like a child from the womb, like a ghost from the tomb,
I arise and unbuild it again.

The second example is from *Prometheus Unbound*, which has been described by Herbert Read as "the greatest expression ever given to humanity's desire for intellectual light and spiritual liberty"

The lightning is his slave, heaven's utmost deep
Gives up her stars, and like a flock of sheep
They pass before his eye, are numbered, and roll on!
The tempest is his steed, he strides the air;
And the abyss shouts from her depth laid bare,
Heaven, hast thou secrets? Man unveils me: I have none.

Let me turn to a slightly different aspect of the matter. What are we to make of the following confession of Charles Darwin?

> Up to the age of thirty, or beyond it, poetry of many kinds, such as the works of Milton, Gray, Byron, Wordsworth, Coleridge and Shelley gave me great pleasure; and even as a school boy I took intense delight in Shakespeare, especially historical plays... I have also said that formerly pictures gave me considerable, and music very great, delight. But now, for many years, I cannot endure to read a line of poetry; I have tried lately to read Shakespeare and found it so intolerably dull that it nauseated me. I have almost lost my taste for pictures or music... My mind seems to have become a kind of machine for grinding general laws out of large collections of facts but why this should have caused the atrophy of that part of the brain alone on which the higher tastes depend, I cannot conceive.

Or consider this: Faraday discovered the laws of electromagnetic induction and his discoveries led him to

formulate concepts such as 'lines of force' and 'fields of force' which were foreign to the then prevailing modes of thought. They were, in fact, looked askance by many of his contemporaries. But of Faraday's ideas, Maxwell wrote with prophetic discernment

> The way in which Faraday made use of his idea of the lines of force in coordinating the phenomenon of electro-magnetic induction shows him to have been, in reality, a mathematician of a very high order—one from whom the mathematicians of the future may derive valuable and fertile methods. We are probably ignorant even of the name of the science which will be developed out of the materials we are now collecting, when the great philosopher next after Faraday makes his appearance.

And yet when Gladstone, then the Chancellor of the Exchequer, interrupted Faraday in his description of his work on electricity by the impatient inquiry, "But after all, what use is it?" Faraday's response was, "Why, Sir, there is every probability that you will soon be able to tax it". And Faraday's response has always been quoted most approvingly.

It seems to me that to Darwin's confession and to Faraday's response, what Shelley has said about the cultivation of the sciences in his *Defence of Poetry* is apposite

> The cultivation of those sciences which have enlarged the limits of the empire of man over the external world, has, for want of the poetical faculty, proportionally circumscribed those of the internal world; and man, having enslaved the elements, remains himself a slave.

Lest you think that Shelley is not sensitive to the role of technology in moden society, let me quote what he has said in that connection

> Undoubtedly the promoters of utility, in this limited sense, have their appointed office in society. They follow the footstep of poets, and copy the sketches of their creations into the book of common life. They make space and give time.

Shelley's *A Defence of Poetry*, from which I have just quoted, is one of the most moving documents in all of English literature. W.B. Yeats called it "the profoundest

essay on the foundation of poetry in the English language". The essay should be read in its entirety; but allow me to read a selection

> Poetry is the record of the best and happiest moments of the happiest and the best minds. Poetry, thus, makes immortal all that is best and most beautiful in the world; it arrests the vanishing apparitions which haunt the interlunations of life,..
>
> Poetry is indeed something divine. It is at once the centre and circumference of knowledge; it is that which comprehends all science, and that to which all science must be referred. It is, at the same time, the root and blossom of all other systems of thought.
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> Poets are the hierophants of an unapprehended inspiration; the mirrors or the gigantic shadows which futurity casts upon the present; the words which express what they understand not; the trumpets which sing to battle, and feel not what they inspire; the influence which is moved not, but moves. Poets are the unacknowledged legislators of the world.

On reading Shelley's *A Defence of Poetry*, the question insistently occurs why there is no similar *A Defence of Science* written by a scientist of equal endowment. Perhaps in raising the question I have, in part, suggested an answer to the one I have repeatedly asked during the lecture.

About the Author

S. Chandrasekhar (1910-1995) was a distinguished astrophysicist and Nobel Laureate. He was a Professor Emeritus in the Department of Astronomy and Astrophysics at the University of Chicago. He received many awards and wrote several books. *Truth and Beauty* from which 'Patterns of Creativity' has been taken is a collection of seven lectures addressing aesthetics and motivation in the pursuit of science and contemplates patterns of scientific

creativity. The extract is from The Nora and Edward Byerson Lecture titled 'Shakespeare, Newton and Beethoven, or Patterns of Creativity'.

Understanding the Text

1. How does Shelley's attitude to science differ from that of Wordsworth and Keats?
2. 'It is not an accident that the most discriminating literary criticism of Shelley's thought and work is by a distinguished scientist, Desmond King-Hele.' How does this statement bring out the meeting point of poetry and science?
3. What do you infer from Darwin's comment on his indifference to literature as he advanced in years?
4. How do the patterns of creativity displayed by scientists differ from those displayed by poets?
5. What is the central argument of the speaker?

Talking About the Text

Discuss in small groups

1. 'Poets are the unacknowledged legislators of the world'.
2. Poetry and science are incompatible.
3. 'On reading Shelley's *A Defence of Poetry,* the question insistently occurs why there is no similar *A Defence of Science* written by a scientist of equal endowment.'

Appreciation

1. How does the 'assortment of remarks' compiled by the author give us an understanding of the ways of science and poetry?
2. Considering that this is an excerpt from a lecture, how does the commentary provided by the speaker string the arguments together?
3. The *Cloud* 'fuses together a creative myth, a scientific monograph, and a gay picaresque tale of cloud adventure'—explain.

Language Work

1. How do the words in bold, in the lines below, illustrate the poet's ability to convey criticism cryptically?

   Our **meddling intellect**
   Misshapes the beauteous forms of things:
   We **murder to dissect.**

2. Explain the contradiction in the similies, 'Like a child from the womb, like a ghost from the tomb'.
3. Explain the metaphor in the line: 'Poets are ... the mirrors of gigantic shadows that futurity casts on the present'.

Suggested Reading

'Literature and Science' by Matthew Arnold.

☞ *Read and enjoy the excerpts from an interview given by S.Chandrasekhar to* Deccan Herald *(23 January, 1994 issue).*

QUESTION: You came to America in 1936. Do you think you would have achieved what you did had you stayed back in India?

CHANDRASEKHAR: In a narrow sense, the answer is NO. There were better facilities for work here. I was also disconcerted with science politics in India. I was very sensitive and I desired the mental peace to do science the way I wanted.

Secondly, how can one evaluate scientific achievement? It is not a personal accomplishment. I had many students and collaborators. Science has to be an integrated effort. Otherwise, it would be too narrow.

Q: Who was your earliest mentor? And who influenced you most in your career?

A: I had no mentor. And nobody influenced me. I wrote my thesis on my own. I have always been alone. This is not criticism. It is the character of my work.

Q: Do you recall your mother and her attitudes which may have shaped yours?

A: Yes, I recall a particular incident which revealed my mother's extraordinary awareness. I was hardly ten years old, when she woke me up one morning and said, "Do you know Ramanujam is dead? It has come in the newspaper."

The very fact that she realised that Ramanujam's death was an important event showed her enlightenment in these matters. Her attitudes did influence me a great deal.

..cont.

Q: Has your wife been a great support to you in your scientific career?

A: I have mentioned Lalitha in my book, *Truth and Beauty*. My biographer, Kameswar Wali, has also written a whole chapter on my wife. [Suddenly, with a smile] Do you know the American press called that the best chapter?

Q: Have you, at any point of time, regretted your decision to leave the country of your birth?

A: There is no point in regretting or being happy over decisions you have made. I think it's irrational to regret the past anyway. You must reconcile yourself to the life you have chosen and lived.

Q: Do you enjoy teaching?

A: I always integrated teaching with research. They support each other.

Q: What is it that makes Indians achieve more in this country (America) than in India? Do you think it could be the academic climate?

A: I wouldn't judge achievement by awards. The quality of science in India is good too. But I remember in the 1930s the great scientists of that country were in the universities. But today it is not so. And, that is a loss.

Q: Has your personal life been complete and happy?

A: That you should ask Lalitha—may be I could have given more. [Pause] I don't believe that a scientist—a true scientist—can ever have a complete personal life. [Pause again] I sometimes wonder whether all that I did and accomplished in my lifetime—was it really worth it?

. . .

Kameswar Wali later interpreted this comment as: "When Chandra asks—Was it worth it? — he is not being negative. It is just an awareness, another dimension of realisation which dawns as one get older.