

# Crow's Feather & Girl's Ribbon

## Satyajit Ray's Sense of Mathematics



### 1.

#### The Crow's Feather

Do you remember Corvus?

Every story-loving child in Bengal knows and loves Corvus. As the name suggests, Corvus is a crow. Satyajit Ray wrote a novella featuring the crow as the 'Super Hero' of a tale.

The crow used to stay in the laboratory of Professor Shonku, Ray's fictional scientist. The retired professor observed a few unmistakable signs of amazing cleverness in the behavior of a local crow and adopted him for additional training. Professor Shonku, being a polymath, had a

passion for Ornithology along with physics. Therefore, he started learning, mainly by observing the pet crow, a few of the unknown aspects of bird's intelligence. The professor called him Corvus.

Here Satyajit Ray, the storytelling wizard, had to face the challenge of making his crow more convincing. He knew that an improved authenticity of his characters would increase the appeal of his stories. The rule, Ray believed, would boost the appeal of his rational/social stories as well as his science fictions.

What could be the most effective method to enhance the authenticity of the intelligent crow? Very simple. Creating incidents.



The method Ray followed here was very simple. He described five small incidents expressing the crow's progress as an apprentice of the world famous professor. And, Ray also believed that at least one among those incidents should prove the crow's intelligence and loyalty, at the same time. For doing that, Ray simply depended on Prime Numbers. Let's quote a few lines from the story.

"... I had a clear proof today that Corvus now wants to stay away from other crows. There was a heavy shower, and after that an earsplitting thunderclap I looked out of the window and saw the simul tree outside my garden smoldering.

In the afternoon, after the rain stopped, there was a tremendous hue and cry setup by

the neighbourhood crows who had all gathered around the simul tree.

I sent my servant Prahlad to investigate. He came back and said, 'Sir, there's a dead crow lying at the foot of the tree; that's why there is such excitement.'

I realized the crow had been struck by lightning. But strangely enough, Corvus didn't leave my room at all.

He held a pencil in his beak and was absorbed in writing the prime numbers: 1, 2, 3, 5, 7, 11, 13..."

Now, let's return to our main text.

A question arises here. Why did Ray depend on Prime Numbers? Is there any special quality of Prime Numbers that can simultaneously express love and loyalty?

Let's remember something that's ludicrously elementary. Let's remember our math-mam's amusing face blurring out the techniques of factorization.

**Math-mam :** "How can we get number 6? ... By multiplying 3 and 2. Therefore, 6 is made of two factors. 3 and 2. ... And, how can we get number 7? ... By multiplying 7 and 1. Therefore, 7 has a very special quality. Number 7 always remains intact even when you try to break it into 2 factors. Therefore, it is called a Prime Number."

That was one of the earliest lessons learnt during our school going days, when we were barely 8-year-old. In short –

**A Prime Number always remains intact even in extremely difficult conditions.**

Now a reader's guess should be very simple. How? By writing Prime Numbers, the crow tries to express that his love for the Bengali professor will be everlasting. It's a promise.

How?

The crow promises here that he will never accept more than one teacher in his entire life.

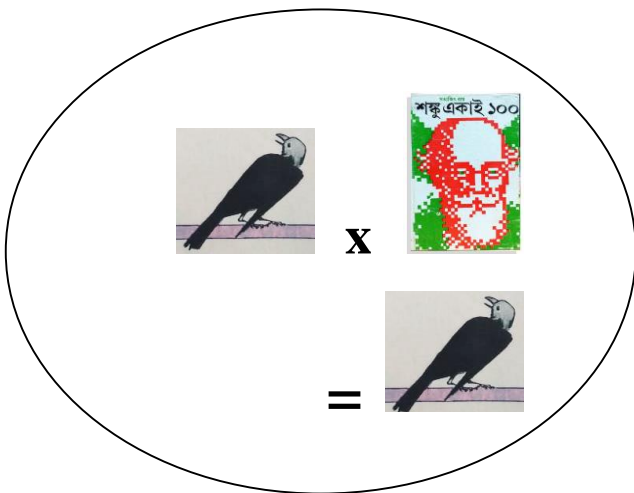
How?

Let's express the crow's mind with a number. Let's imagine that number 7 is representing Corvus.

If so, Corvus (number 7) must have been created by multiplying 2 integers.

$$7 \times 1 = 7$$

**i.e. Corvus x The Professor = Corvus**



What would have happened if Corvus had written Compound Numbers (instead of Primes)? ... **4, 6, 8, 9, 10, 12 ...**

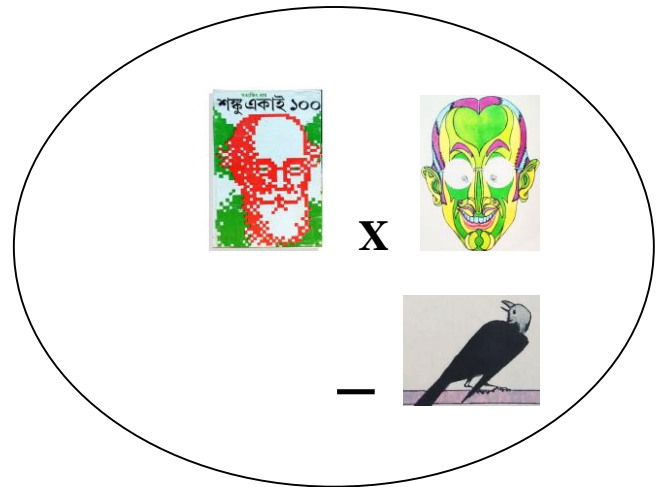
In that case, Corvus would have been represented by number 6 (instead of 7).

Let's assume that number 6 symbolizes Corvus. If so, Corvus would have been created by multiplying 2 numbers.

$$3 \times 2 = 6$$

**i.e. The Scientist x The Magician = Corvus**

i.e. if we express this through Ray's drawings, what we get is this –



It indicates that Prime Numbers and Compound Numbers symbolize two different schools of parenting.

Single Parenting and Double Parenting.

In the second case, Corvus would have spent 6 months with the Bengali professor and the remaining 6 with the Chilean magician.

Corvus himself did not approve the second possibility.

And the Bengali professor understands that the crow's love for him will remain constant as he won't accept a second teacher in his entire life.

Now, a question arises here. Was the special quality of Corvus expressed through a tangible incident? If not, referring to Prime Numbers would have been proven to be a whimsy.

In the second part of the story, Argus, a magician as well as a billionaire, visited Professor Shonku after dinner. Argus, the brazen billionaire, unhesitatingly expressed his desire to purchase Corvus from the Bengali scientist. How did the crow respond? The pet crow emerged from his cage and promptly switched off the table lamp to convey his strong aversion to accept a new teacher.

The strange incident proves that Ray deliberately used Prime Numbers to convey the crow's true nature. The crow's indivisibility was proven via various incidents till the end of the story.

This is a testimony of Ray's interest in mathematics. It's now apparent that Ray nurtured in his heart a 'Sense of Mathematics' that clandestinely inspired him to instill clarity into his stories meant for children. If so, he had surely applied various other mathematical models in his films as well.

Let's try to find out at least another mathematical model used in a Ray film. We will return here to his film-making roots.

2.

## The Great Grandfather's Clock

'Pather Panchali' is inarguably Ray's most celebrated film. All the reasons behind its success haven't yet been discovered. Did Ray himself reveal any of the secrets?

Satyajit Ray once wrote a line divulging one of the strongest yet simplest reasons of 'Pather Panchali' being so triumphant around the globe.

**RAY** : " [In 'Pather Panchali'] ...the story was made to progress along a curve that rose and fell in a succession of contrasted episodes." (*Sight & Sound, UK, Autumn, 1982*)

In the sentence quoted above, Ray clearly describes a curve that rises and falls perpetually. Does the description, once again, remind us of our school-going days? Does it remind us of something comically 'elementary'? [Sherlock Holmes, as you know, loved the word 'elementary'.]

Let's remember our High School math teacher's eyes glittering behind the thick glasses of his specs. (It was a rumor that the power of his specs was minus 15!) What did the tutor, traditionally harassed by his own students, teach us using nearly the same description quoted above from a Ray article?

Yes, the **SINE CURVE**.

That's what our teacher was painstakingly trying to teach us. The stressed lines of his face indicated the importance of the particular curve in the functioning of the universe.

Ray used one of the simplest possible descriptions of a Sine Curve to express one of

the major reasons of Pather Panchali's unending success. He only avoided mentioning the mathematical term which might have sounded a bit childish in an otherwise serious essay, 'Under Western Eyes'. One thing Ray had very clearly admitted here. What's that?

The **flexible form** of an apparently gentle film depends on **inflexible rules** of mathematics.

In other words, **Inflexibility gives birth to Flexibility.**

The relationship between the two is undeniably paradoxical. The particular paradox intensifies the emotion being generated in the spectators.

All of the Ray creations, from his earliest illustrations done for his father Sukumar's school stories 'Pagla Dashu' to 'Agantuk', his final film, bear the witness to this particular paradox. The lenient and compassionate surface of his art is born on the foundation of a hidden stringency.

Let's try to plot a few of the incidents of 'Pather Panchali' along the progress of a Sine Curve.

From 'Pather Panchali', we all can remember the scene showing the brother and sister running through the vast meadow that has now been turned into a wavy white field due to the abundance of tall Dandelion flowers blooming around. But, was that enough? A pair of happy children couldn't have created the troughs required to create a true Sine Curve on which Ray's screenplay progressed. If so, what else did Ray add to the scene for obtaining his desired Curve?

Ray pulled near a couple of highly contrasting elements.

**The laughing children and the dying aunt.**

Ray juxtaposed the couple of incidents like three differential gears, two small and one big.



The happy children are representing the small gears while the dying aunt is representing the big. The big gear is rotating slowly while the small ones are rotating fast.

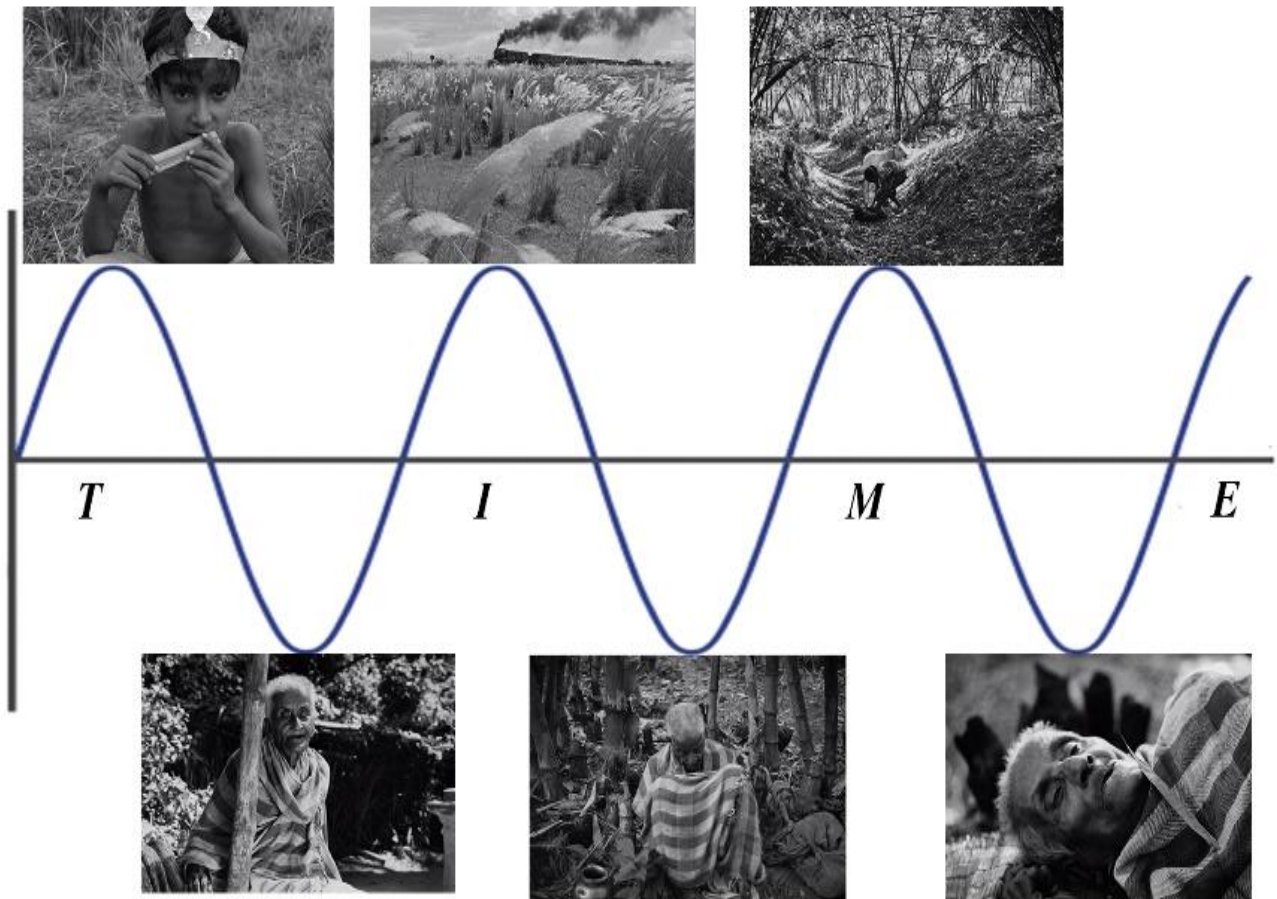
Three gears help each other move. Separated, they are ineffective.

Therefore, the dying aunt would have been ineffective without the laughing children playing around her. This is Differential Gear System. You came to know about Differential Gears when you used to play with your great grandfather's alarm clock in the silent afternoons.

And, let's come to the point of the Sine curve. The running children are creating the crests of the Sine curve while the old and helpless aunty is creating the troughs.

Let's draw a clear Sine curve by plotting the joyful incidents and the tragic incidents.

We will get the **Sine curve** drawn below –



Just a fleeting look at the above **Sine curve** suggests that the screenplay of 'Pather Panchali' derived its heart beats from mathematics. Other elements – literature, music, social history and so on – are evidently flowing through the veins of the film. But these vital fluids are being pumped by a healthy heart made of mathematics.

In short, 'Pather Panchali' would certainly have lost much of its life-force had it not been willfully laid on a Sine curve.

It suggests that creativity can often be a conscious process. It is applicable to all human beings. At least one cannot totally deny the possibility. The diagram above indicates that what Ray wrote in Sight &

Sound about the artistic applicability of a Sine Curve was right.

The Sine Curve shown above also helped Ray control the space-time of the film. How?

### 3.

## The Baby Girl's Ribbon

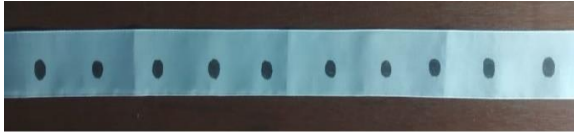
Now, for a lucid understanding, what we need is a metaphor. Something lovely and simple should be chosen. What can it be?

Why not a baby girl's ribbon? Let's imagine that all the major incidents of the

original novel are embedded as black dots on the ribbon.

How can we achieve it?

Let's plot, say, 10 dots on a white ribbon representing the original novel, Pather Panchali. Each dot represents, say, one incident of the novel.



Now, something magical was done. Metaphorically speaking, what Ray did was very similar to folding the ribbon randomly.

Now let's pierce a long needle through the folded ribbon.



As a result, the black dots plotted on the ribbon are coming close to each other. Most of the dots are now overlapped, due to the sudden shrinking of the blank spaces left between them.



What does the shrinking do? Shrinking of blank spaces caused the consequent reduction

of the internal timings. As a result, many incidents were made to occur simultaneously. For example, Apu-Durga's train watching and the old aunt's death occurred in the same morning (on the same day).

But did Ray really do that?

The question is really irrelevant here. Why? Does a tree know what he/she does in the day is called 'photosynthesis' by the two legged animals? Yet, for a better understanding, the two legged ones have given the long and strange sounding name "Photosy ... etc." People's thoughts are given names for 'their' benefits, not for the benefit of the trees. Following the trend, why can't we give a new name of the script writing process used in Pather Panchali?

Let's call it

### **THE FOLDED RIBBON.**

What Ray really thought while applying the above method cannot be clearly known. In an effort to understand the method better, why can't we devise a simple metaphor?

Metaphorically speaking, it was made possible by an intentional shrinking of the Sine curve on which the story was floating. Thus the contrasting incidents overlapped.

And the overlapping of two incompatible incidents intensified the emotional understanding of the film.

Let's introduce a new indoor game, 'The Folded Ribbon'

**Image Courtesy:**

The diagrams used in the essay have been created with illustrations by Satyajit Ray.

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- *Ujjal Chakraborty, artist and teacher, is an internationally recognized Ray Scholar and National Film Award Winner in 2010 for writing The Director's Mind, a book on film making.*
  - *Snehasish Mistri is a B Tech in Computer Science and Engineering. He is also a professional cinematographer and a maker of educational short films.*