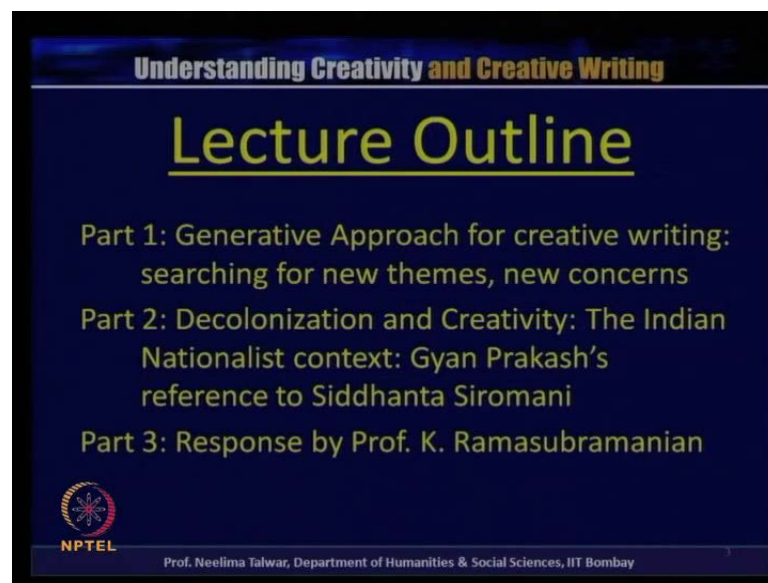


**Understanding Creativity and Creative Writing**  
**Prof. Neelima Talwar**  
**Department of Humanities and Social Sciences**  
**Indian Institute of Technology, Bombay**

**Lecture - 22**  
**Contemporary Indian Writers-The Search for Creativity (I)**

This lecture is titled contemporary Indian writers, the search for creativity. In this, we will talk about 3 inter related ideas.

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In part 1, we will look at generative approach for creative writing which we have discussed earlier also; this involves searching for new themes and new concerns. Part 2 will deal with decolonization and creativity, and we will present the views of 3 very important scholars on this subject; Gyan Prakash, Shiva Vishvanathan and Ramasubramanian. In particular we will look at Gyan Prakash's reference to Siddhanta Siromani in his book, which will of course, discuss soon. The most interesting part of this lecture is the response that professor Ramasubramanian has provided; and I hope our search will continue.

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**Understanding Creativity and Creative Writing**

**Generative Approach for Creative Writing**

- ❑ Begins with the evolving sense of self
- ❑ Erikson's psychosocial model: Identity vs. Role Confusion and Intimacy vs. Isolation
- ❑ Complex construction of the self: crystallisation of ideas, perceptions, feelings in the writing process (See lecture 3 of M1)
- ❑ Creativity in the surge of historical changes.

**NPTEL**

Prof. Neelima Talwar, Department of Humanities & Social Sciences, IIT Bombay

To begin with, let us go over our earlier discussion of generative approach for creative writing. In which we have pointed out to you that really there is nothing readymade available to anyone, who is interested in writing. And, indeed all the joy and also excitement of this process will be lost, if something is readymade. And, you just fit into a pre given formula. While, talking about the evolving sense of the self, we had also talked about Ericson's psycho social model. However, I think that kind of model offers some help, because; it talks about the universal patterns that are applicable to young people. And, how the institutions around them shape them; of course, the vitality and health of those institutions as well as the sort of creative sense of one's own self. These are very vital ingredients in the process.

However, this psycho social model does offer certain clarity, in order to help us except the kind of complex construction of the self that we undertake in the process of writing. We pointed out to you how Albert Camus and Margaret Atwood also undertook this journey in their own distinctive way. And, these are great professional writers, however; even if you are a person who wants to writes I think these are models that one should look at. But at the same time one should look at one's own inner world as carefully as possible.

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**Understanding Creativity and Creative Writing**

### A Period of Search

- Search for creativity was renewed due to the process of decolonization.
- Diversity of Indian systems of thought was rediscovered. New paradigms were generated for the vigorous process of nation-building.

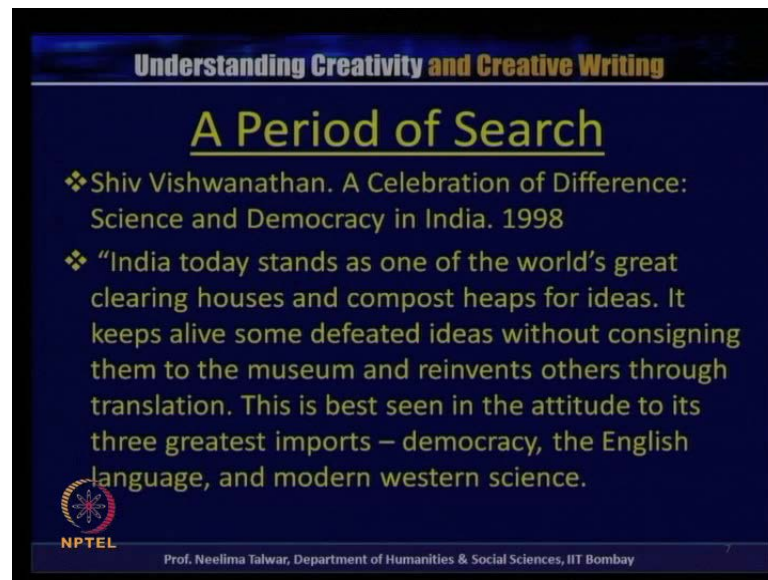
**NPTEL**

Prof. Neelima Talwar, Department of Humanities & Social Sciences, IIT Bombay

It is in this perspective. That we really want to offer you this; the view of some of the scholars in terms of our own starting point for the search. The reason I have placed it within decolonization process is related to the fact that this is the period where, the process of creativity was greatly intensified due to the kind of the question that proposed before the nation before each individual in the nation. And, it is within this frame work there I want to start with a provocative statement by Shiv Vishvanathan first. He who is a very important anthropologist of science that is how you know many people described his work. He looked at scientific institutions in India not only in terms of governmental institutions, but; a lot of ((Refer Time: 03:57)) have been undertaking.

So, let us look at what he has to say about this period of de colonization. And, this is part of our search for creativity which as I pointed out it was Renewed due to the process of decolonization. And, what it did is to help us to understand that there is this immense diversity of Indian systems of thought. And, we in a way re discovered it, because; all this systems were challenged by the British notions. And, these were notions that were calculated to really make a subservient. So, in that sense they really do not represent the western tradition in its own diversity also, it is a kind of very calculated. And, therefore we have to understand what kind of tousles ensured in this process. Now, let me move to the next slide.

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**Understanding Creativity and Creative Writing**

## A Period of Search

- ❖ Shiv Vishwanathan. A Celebration of Difference: Science and Democracy in India. 1998
- ❖ "India today stands as one of the world's great clearing houses and compost heaps for ideas. It keeps alive some defeated ideas without consigning them to the museum and reinvents others through translation. This is best seen in the attitude to its three greatest imports – democracy, the English language, and modern western science."

**NPTEL**


Prof. Neelima Talwar, Department of Humanities & Social Sciences, IIT Bombay

Let me look at Shiv Vishvanathan point of view which he expressed in the celebrations of difference on essay titled, sub titled science and democracy in India which is published in 1998. Do look, I have a look at this full essay, because; there is always this difficulty that when you extrapolate a statement, it takes on a slightly different color. But I think, what he points out is very important although he has own inimitable style which some time provokes a lot of discussions and I think it is intended to do so. He says India today stands as one of the world's great clearing houses and compost heaps for ideas. It keeps alive some defeated ideas without consigning them to the museum and reinvents others through translation. This is best seen in the attitude to its 3 greatest imports; democracy, the English language, and modern western science. So, two of these things we are already invested in. And, the third to I think we are part of the democratic process.

So, then he goes on to say; for Indians these were not alien ideas to be handled with suspicion, but; celebrations which they had to be internalize and reinvent for themselves. So, that is why; the trouble is these ideas said to be internalized and reinvented. Indeed the confidence and openness with which India greeted and scrutinized science constitute one of the most fascinating chapters in the encounter between science and democracy. A very thought provoking an important idea indeed we will actually build on this essay further in the next lecture also. So, I hope you would have time to read this essay carefully and

start reflecting on some of the observations through your own experience of these institutions.

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**Understanding Creativity and Creative Writing**

## **Science in Modern India**

**Gyan Prakash's historical study**

- The British attempt to consolidate its power through the European idea of modernity. India's living traditions of diverse and sophisticated discourses of knowledge and philosophy. Translation of modernity in the colonial context through the notion of science.
- A sign of modernity: Science's cultural authority as legitimating sign of rationality and progress.

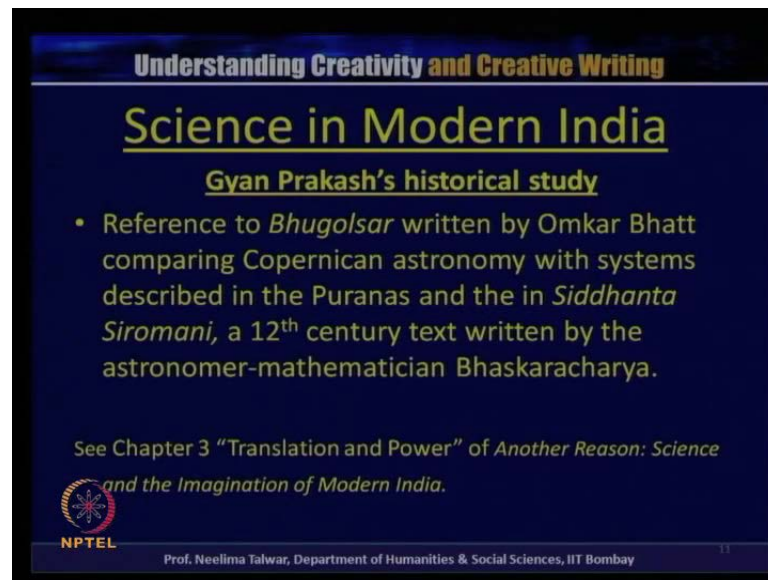
*Another Reason: Science and the Imagination of Modern India*

Prof. Neelima Talwar, Department of Humanities & Social Sciences, IIT Bombay

The next caller whose work we are looking at is Gyan Prakash; who is a very important historian. What he has done in this famous study title another reason science and the imaginations of modern India is to look at the place of science as a discipline, as a metaphor, as an idea in modern India. He tries to reveal through historical evidence; the British attempt to consolidate its power through the European ideas of modernity. And, also he you know sort of suggested this guy was a kind of imposition.

So, it was a lot of tussle between what we knew and, what we were, we had, we in told to look at more seriously. So, in the process, the process of translation ensured which got connected to science as a sign of modernity. And, therefore; there was a kind of cultural authority of science as a legitimating sign of rationality and progress. So, what I have done is actually extrapolate a particular text from the third chapter part 1 of Gyan Prakash's book. So, that we can try and understand the implications of some of the ideas.

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**Understanding Creativity and Creative Writing**

## **Science in Modern India**

**Gyan Prakash's historical study**

- Reference to *Bhugolsar* written by Omkar Bhatt comparing Copernican astronomy with systems described in the Puranas and the in *Siddhanta Siromani*, a 12<sup>th</sup> century text written by the astronomer-mathematician Bhaskaracharya.

See Chapter 3 "Translation and Power" of *Another Reason: Science and the Imagination of Modern India*.

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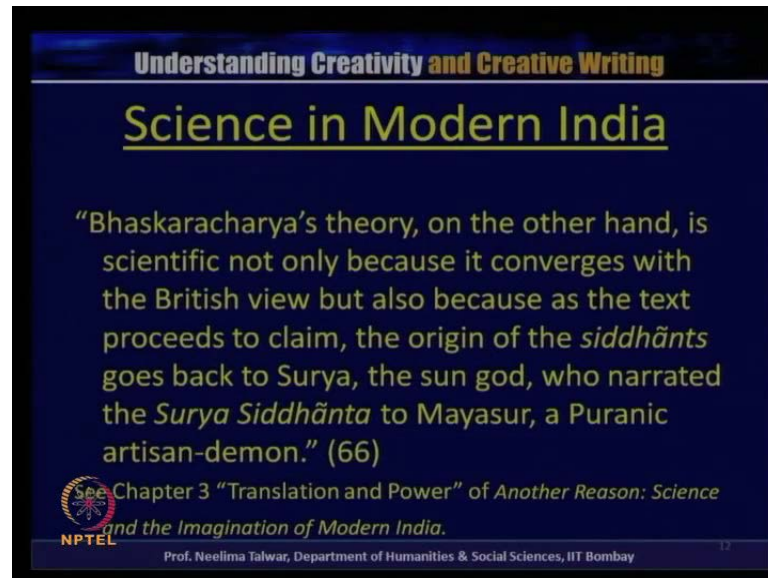
Now, the particular reference that we are making here is to goals are which was actually written in 1841 by Omkar Bhatt. Let me give you a bit of the context for this writer; there was an English gentleman who introduced on an experimental base this whole idea of starting a secular class room. In which actually the Siddhantas were thought in order to teach mathematics and astronomy. And, he thought it and he thought it through this very important ancient text, but; he brought it to point where, then the students were introduced to the ideas of Copernicus, Newton and Galileo. There by Sunbow suggesting although Siddhantas are very useful, but; at the same time, because; they also often club with the Purana's. The Purana's are really not important they are insignificant, because; there are really contain myths and historical legends that take you away from scientific learning.

So, this seems to be the kind of ethos in which lot of controversy were generated when people began to see what will concern was doing. And, the particular person we are referring to Omkar Bhatt. He wrote this pamphlet in Hindi in which the teacher and the student they discussed some of these ideas. And, I think the teacher is trying to prove the superiority of the western scientific system. Now, of course, I would like you to read original in detail in order to understand it fully, but; at the same time for our purpose we will extrapolate this particular statement from a Gyan Prakash. This particular statement is not made by either the teacher or the student, but; by Gyan Prakash. Who says while, presenting these different conceptions of the earth; the text declares its commitment to



scientific understanding. So, this is with reference to (Refer Time: 10:38), it does not dismiss the seize Vyas. But describes the Purana's which he narrated as great poetry and wonderful sketches of gods play though not Science.

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And, then he goes on to say; that Bhaskaracharya's theory on the other hand is scientific not only it, because; it converges with British view, but; also because as the text proceeds to claim, the origin of Siddhantas goes back to Surya, the sun god, who narrated the Surya Siddhanta to Mayasur, a Puranic artisan-demon. So, while reading this text in order to understand the zest of this period, the demands of this period. I was somewhat you know, captivated by this reference to Mayasur and I did not really have a way unpacking this allusion at all, because; I am thought really well worse with the text or history of science in India in those stages. Therefore, what we did is to request one of our colleague's Professor's Ramasubramanian to actually, see if some of a takes in terms of the mythic theme.

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**Understanding Creativity and Creative Writing**

## Indian Imagination

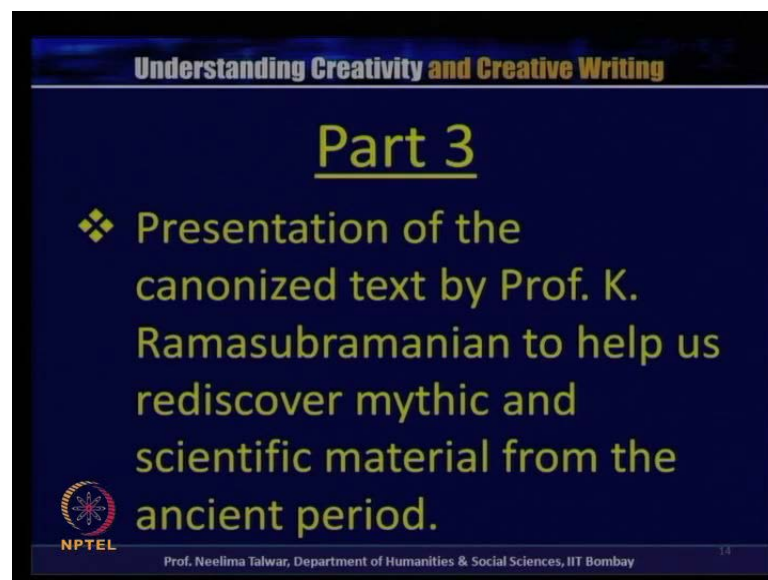
- Mythic themes such as the story of “Surya, the sun god, who narrated the *Surya Siddhānta* to Mayasur, a Puranic artisan-demon” are intriguing as they evoke multiple associations including the association of makers, fabricators with “demons”.
- New readings of ancient myths for our creative search.

 Jayan Prakash's *Another Reason: Science and the Imagination of Modern India*.

**NPTEL** Prof. Neelima Talwar, Department of Humanities & Social Sciences, IIT Bombay 13

And, also its multiple association including the association of makers, fabricators with demuns, indeed what he thought about it.


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**Understanding Creativity and Creative Writing**

## Part 3

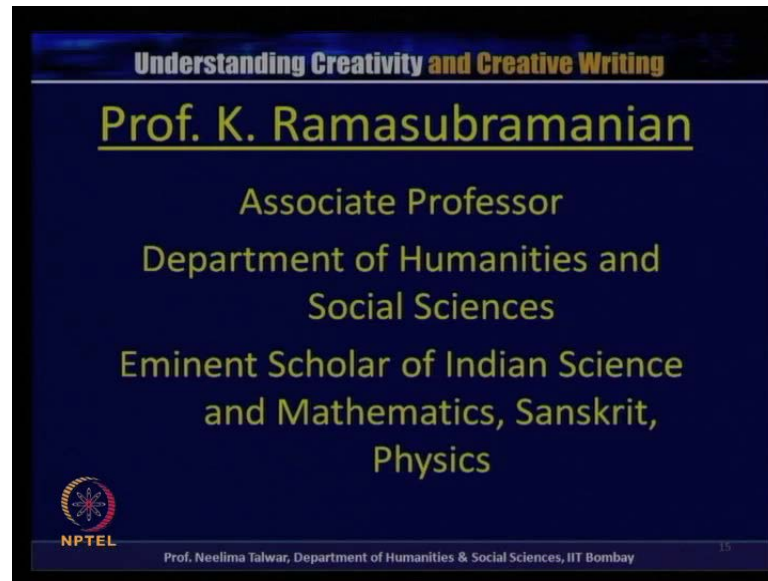
- ❖ Presentation of the canonized text by Prof. K. Ramasubramanian to help us rediscover mythic and scientific material from the ancient period.

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And therefore, we indeed of very happy to have him here, he would respond to this elusion and, also the frame of reference in terms of science and, scientific ideas and, different aspects of how these were conveyed in the ancient period under discussion.



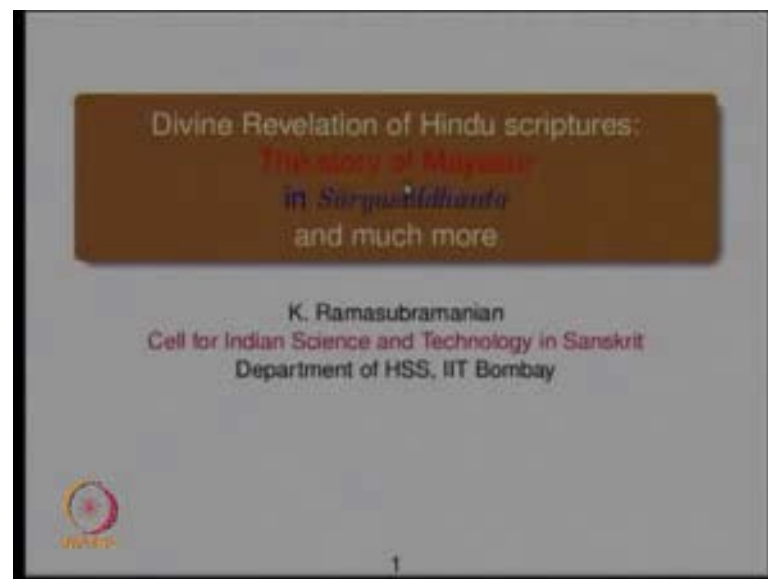
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So, we have the Privilege of having Professor Ramasubramanian who himself is the scholar of Indian science, mathematics, and Sanskrit. He will unpack the solution for us an indeed. And, I think this will act to our journey in extremely significant ways. We will take a further discussion after his conversations with you.

Thank you.

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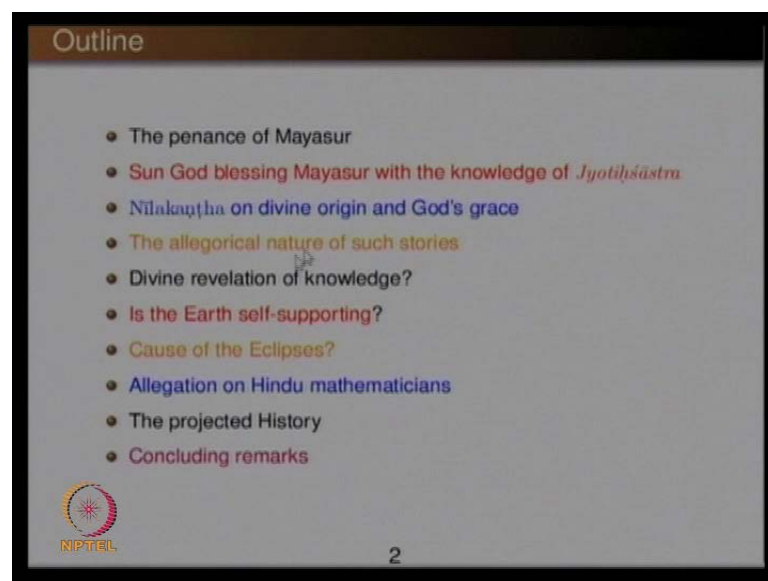


So, the Reason past some efforts have been made by historians to try, and understand how the Indian society try to integrate the modern science along with their own sciences.

So, in this connections some study has been made with regard to the observations made by certain authors around 19 century where in. so, they try to see how we will be able to sort of integrate the ideas that emerge from modern science with ideas have been represented ancient scriptures, particularly scientific scriptures related to astronomy and mathematics.

So, in this connection I would like to say a few observations which have been made by some modern historians. So, where they try to interpret the motion of divine revelation that one finds in many of the Hindu scriptures. For insistence one of the most important text in Indian astronomy is Surya Siddhanta so, which actually begins with the story of Mayasur receiving the knowledge of motion of planets on the sun god itself. So, we will try and understand what this divine revelation means; and, how this divine revelation has been understood by Indian astronomers themselves.

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So, I would like to present this; he starts with the description presence of Mayasur, and how the sun god reveals the knowledge of Jyotishsastra so, to Mayasur. And, then we proceed with the interpretation of what one means by Devine origin and the grace of god. Then, we will see that this knowledge for say is though it is ascribed to Devine being so, how do the Indian astronomer as well as philosopher try to understand what this Devine revelation is. And, then so, we move on a specific topic where in, a question is being raised; earth is an heavy body, all heavy bodies are falling in space so, does the earth

stand on its own or is it suppose to fall is it Does not requires some supporting agency. And, how the notions of eclipses have been considering then astronomers and then we see certain allegation which has been made on astronomers, and mathematician, and then we conclude few remarks.


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**The penance of Mayasur**

- One of the well-known texts in Indian Astronomy, namely *Suryasiddhanta* commences with the episode of Mayasur:

अल्पाविष्टे तु कृते मयो नाम महासुरः ।  
रहस्यं परमं पुण्यं जिज्ञासुर्ज्ञानमुत्तमम् ॥  
वेदाङ्गमग्नमखिलं ज्योतिषां गतिकारणम् ।  
आराधयन् विवस्वन्तं तपस्तेपे सृद्धरम् ॥

- मयो नाम महासुरः – the great artisan-demon by name Maya
- जिज्ञासुर्ज्ञानमुत्तमम् – with an urge for the supreme knowledge
- ज्योतिषां गतिकारणम् – of the cause of the motion of the luminary objects
- तपस्तेपे सृद्धरम् – performed severe austerities
- आराधयन् विवस्वन्तं – pleasing the Lord Sun

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So, coming to the story of Mayasur so, Surya Siddhanta actually begins with the following words. So, after praying his obviations to god so, then he starts with the story of Mayasur wherein he describes the penance done by Mayasur [FL]. So, these are the second and third verses of Surya Siddhanta. So, wherein he says there was Asura called Mayasura. If you were trace mythology so, once finds in Ramayana so, this Mandodari wife of Ravana is suppose to be the daughter of Mayasura. So, [FL] so, Mayasura though demonic he was endured with great skills and therefore, people call him Artisan.


So, Artisan then Maya; at one point of time he was so curious to know how the planets are moving in the sky so, how things are understood, so, he says [FL] the poet says [FL] actually means, a craving for knowledge. [FL] he wanted to attain supreme knowledge. And, therefore; he did severe austerities [FL]. So, the reason for doing this quinine is to obtain the [FL] to understand the gathi is basically motion. So, [FL] so, [FL] actually means a certain branch of knowledge wherein they study the luminary objects per sake. So, there is a common miss understanding in the term [FL] refers to astrology which is

not quite true. So, [FL] the very word [FL] springs from [FL] so, basically study of luminary objects.

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**Blessing Mayasur with the knowledge of *Jyotiḥśāstra***

- The text *Sūryasiddhānta* proceeds with the story as follows:  
विदितस्ते मया भावः तोषितस्तपसाह्वहम्।  
देवां कालाश्रयं ज्ञानं ग्रहाणां चरितं महत्॥  
न मे तेजःसहः कश्चित् आख्यातुं नास्ति मे क्षणः।  
मदंशः पुरुषोऽयं ते निशेषं कथयिष्यति।  
इत्युत्तमान्तर्द्धे देवः समादिश्यांश्चात्मनः।  
स पुमान् मयमाहर्दं प्रणतं पाञ्चलिस्थितम्॥
- तोषितस्तपसाह्वहम् – being pleased with your penance
- देवां कालाश्रयं ज्ञानं – will bless you with the knowledge that forms the basis for the 'time'.
- ग्रहाणां चरितं महत् – the great story [related to the motion] of the planets
- आख्यातुं नास्ति मे क्षणः – do not have even a moment to take off to explain to you

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So, it proceeds the text proceeds [FL]. So, the story basically goes like this so, the sun god so, [FL] sun god apparently so comes then reveals himself to Mayasura and then he says I am praised by your penance. So, [FL] and I also understand reason for which you have undertaken these austerities. So, I am going to reveal you the knowledge. [FL] so, this very interesting statement which has been made here, [FL] the term Kala has various connotation. So, Kala actually refers to the god of death, Kala actually refers to time, so on, and so forth. Here the word [FL] is what is being stated. So, the notion of time what we have 11:30, 12:30 etcetera is all based upon the motion of planets actually, it is time per sec is an extremely intricate the concept where physicist are gapping and we do not have a clear understanding till day.

So, it has various connotations, but; here we will limit our notion of time to those which are defined with the motion of the celestial objects. In fact, the notion of the year that we have has to do the earth around the sun or as proceeds by the sun to move around the earth once and so on. So, very notion of the moon, lunar month and so on and so forth is basically, defined with the celestial objects. And, therefore; we find this description [FL] so; it is primarily the motion of the celestial objects that actually gives us the notion of

time. If the period we have to change, the rotational period of the earth we have to change so, then the 24 hours will be no more 24 hours and so on.

So, any way [FL] is basically [FL] and the sun god so, as the episode goes, the sun apparently tells Mayasura that if you were to approach anywhere near you then you will be no more existing you will be burnt. Therefore, you will not be able to bare the heat there fore I will employ somebody else to reveal this knowledge to you. And, this person reveals the knowledge to Mayasura and so on and so forth. So, this is how the story goes, but; this concept of Devine revelation is not something found in surya Siddhanta alone. So, this will be found in many of the text in many disciplines as well in the Indian scriptures. So, how do people understand in the Indian tradition itself, what the Devine revelation means.


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**Nilakanṭha on divine origin and God's grace**

- Nilakanṭha Somayāji (c. 1500 AD), one of the brilliant astronomers of the Kerala school, in his seminal work *Jyotiṛmīmāṃsā* observes:

ननु तपोभिः प्रसन्नो ब्रह्मा आर्यभट्टाय भगणपरिध्यादिकं  
ग्रहगणनसाधनभूतं सङ्ख्याविशेषमुपदिदेश। तदुपदिष्टं पुनरार्यभट्टः  
सर्वं यथोपदिष्टमेव दशभिः गौतिभिः निबबन्ध इति  
केचिन्मन्यन्ते। तस्य कृतः परीक्षणं, ब्रह्मणः सर्वज्ञत्वात्,  
राग-द्वेषाद्यभावाच्च, अवितथत्वनिश्चयात्, इति चेत्

- तपोभिः प्रसन्नो ब्रह्मा – Brahma, pleased with the penance
- सङ्ख्याविशेषमुपदिदेश – instructed Āryabhaṭa the revolutions numbers, etc.
- तस्य कृतः परीक्षणं – why should that be examined?
- ब्रह्मणः सर्वज्ञत्वात् – Brahma being omniscient
- राग-द्वेषाद्यभावाच्च – also being free from likes and dislikes

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So, let us take the example of a Nilakanta. So, Nilakanta was an astronomer so, who lived around fourteenth, fifteenth in fact, fifteenth sixteenth century that was the exact period. So, he was brilliant astronomer in Kerala School where, in he contributed significantly to the improvement of the planetary model. So, considering this particular passage from surya Siddhanta, as well as the passages which have been interpreted differently by different people right from the work of by Arya Bhatt which was in fifth century.

Nilakanta discusses at link in very interesting text called essentially [FL] means enquiry; enquiry into decline of the science of celestial objects. So, [FL] is the title of the text. so, wherein he asks this text [FL] is a very interesting passage which actually, helps us in trying to understand the kind of methodology which Indian astronomer adopted. It is a very important thing to understand today so, there are 2 things which emerge from this particular passage. One is, is it necessary for us to attribute something to divine origin for the knowledge to be valid forever.

So, is it necessary for us to call it scientific only if it is Devine revelation or do we describe these Indian scripture are scientific at all, if at all they can be described. So, all these things emerge from this. So, for this particular context for instance in the recent studies which have gone also so, the kind of struggle which these historians seems to have undergone or academicians in trying to understand the academicians who were there in nineteenth century trying to sort of integrate the modern science into their society.

So, this passage is extremely useful in trying to understand that. F or instance in one of the recent studies which has been made by Gyan Prakash. So, he tries to sight certain text called Bhugolasar by Omkar Bhatt which has been written around the middle of nineteenth century. So, this Bhugolasar is the title indicates so; Bhugola is basically earth, sphere the earth in the form of sphere. Sara is essence of it so, the motion which is being described. So, in the Indian scripture one finds that sun moves around the earth. So, of course, this is what one can do so naked eye observations this is the best thing that can be done.

So, here, so whereas the modern Copernican modern astronomy. So, which starts with rather Copernicus around the time of Copernicus so, it presents the picture wherein, the sun is at the centre and the earth moves around that. So, how do we understand this with the picture which has been depicted in the Indian scriptures? And, in the Indian scriptures as we find so, it has been revealed by sun god himself. So, how can this go wrong so on and so forth. So, there has been a certain confusion which has been there in trying to integrate this modern picture with the ancient pictures, with the pictures given by the ancient scriptures.



So, in this context so, Bhatt for instance so, in his Bhugolasar tries to present certain picture so wherein he says that knowledge as revealed by Bhaskaracharya in his Siddhanta Siromani in scientific ((Refer Time: 24:46)) we find certain things which are described in Siddhanta Siromani which are in concordance with what has been revealed in the modern science on the one hand. And, it is also scientific for the reason that is has been revealed by the sun god himself so on and so forth. So, what does one really mean by revelation of knowledge by Devine grace? So, this is where it goes.

So, the question [FL] is to please,[FL] to lord. Arya Bhatt so got this knowledge from Bramha. And, for instance in Surya Siddhanta we find the knowledge is revealed through sun god. So, if it has been revealed by divine people so, why he said that we need to revise them at all. So, this is the question that student posses. So, [FL] means why should that be examined? Why should that examine this question arises, because; Bramha is considered to be omission. So, anything that revealed by omission has to be valid forever. And, also for the reason for that the description about Bramha is [FL] so; he is being free form likes and dislikes. Of course, one can be omnitioned and of course, one deceives other. So, one can give a wrong information. So, Bramha is also free from likes and dislikes and, whatever that had been revealed by Bramha to Arya Bhatta should be valid forever so, if that is so, why we said to examine this at all.


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Nilakanṭha on divine origin and God's grace

- Nilakanṭha befittingly replies this query, which incidentally clarifies the concept of *Isvara-prasada* as understood in the tradition.

मन्द, मैवम् । देवताप्रसादः मतिवैमल्यहेतुरेव । न च पुनः  
ब्रह्मा आदित्यो वा स्वयं आगत्य उपदिशेत् ।

- मन्द, मैवम् – Oh! dull-witted, you are not supposed to think so.
- देवताप्रसादः मतिवैमल्यहेतुरेव – The grace of Lord is only means for acquiring a clarity in thinking.
- न च पुनः ब्रह्मा आदित्यो वा – Neither Brahma nor the Sun God
- स्वयं आगत्य उपदिशेत् – would themselves appear [in person] to reveal the knowledge.

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So, then Nilakanta tries to reply this query in a very interesting way. So, he explains very important concept which one calls Devata prasada. In fact, if one looks into these Indian texts so, this Devata Prasada means; this has been received by divine grace that what it really means. What is this Devata prasada mean; so, Nilakanta says [FL].

So, when we say Devata prasada it essentially means; that this person acquires certain clarity in thinking. So, an understanding emerges only in person keeps on contemplating on something and in the process of contemplation obviously; there will be various thoughts which will come to us. So, and one will be defiantly in a confused state and till one gets resolved. And, this resolution that takes place because of a certain clarity which emerges in thinking is what one calls [FL] in fact he goes on further and says [FL].

So, is a very important statement so in Arya Bhatia for instance it is said that Bramha reveal the knowledge in surya Siddhanta as he stated earlier. So, it is stated that this Mayasura got it directly from sun or the one who was employed by sun. So, what does one understands this. So, this does not really means that this Bramha or the sun god directly going to come in front of you and then present the knowledge to you. So, it is not what is meant by Devata prasada. So, Devata Prasada is [FL]. So, it is essentially certain clarity in thinking which emerges, because; of certain contemplation which this person does or Meditation this person does, whatever, it is.

So, the point that I am trying to drive in here is so, one need not call a work scientific, because; it is revealed by divine. Beings one need not call it scientific, because; it has to be eternally in fact the very notion of science is it is something it is going to change continuously. So, if at all you call it as scientific so, it is questionable. So, it is not that it is taken for granted forever and therefore, it is scientific. But this kind of a conclusion is has been there so, it is what brought out by some of this authors. And there are different reasons for that so, which will you see if, as we progress further.


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**The allegorical nature of such stories**

- The insertion of such episodes are **purely allegorical** in nature, and in no case should be taken at face value.
- For instance, *Adi Śaṅkara* while commenting on *Upaniṣads* explains on various occasions the purpose of the episodes.

‘ब्रह्म ह देवेभ्यो’ इति ब्रह्मणो दुर्विज्ञेयतेति: यन्नाधिक्यार्थः।  
समाप्ता ब्रह्मविद्या यदधीनः पुरुषार्थः। अत ऊर्ध्वं अर्थवादेन  
ब्रह्मणो दुर्विज्ञेयता उच्यते।  
तत्र आख्यायिका विद्यास्तुत्यर्थाः।

- यन्नाधिक्यार्थः – [this is] to convey the enormous disciplined-effort involved [in understanding the truth]
- अर्थवादेन – by means of an allegory
- दुर्विज्ञेयता – the difficulty in understanding
- विद्यास्तुत्यर्थाः – to praise (convey the importance) of the knowledge

 Appears at the beginning of the *vākya-bhāṣya* of *Kenopaniṣad*.  
Appears right at the beginning of the commentary of *Kaṭhopaniṣad*.

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And, one more point that I wanted to drive in here is; the episode which are found so, in some of these works are purely allegorical in nature. So, this has been very clearly stated not necessarily on the works on astronomy, but; in some of the most profound works which have been created in philosophy as well. For instance Adishankara himself so, while trying to comment upon some of these [FL] so, in 1 or 2 instances, in few instances he actually says so for instance in [FL] so, while describing certain story which has been revealed in the [FL]. So, he says [FL] so, where in it is stated that this knowledge is something superfund and it has not even been understood by some of these divine people.

So, what does one understand by this statement; that it is not understood by divine beings. It only means that the effort that is involved in trying to understand is enormous [FL]. So, Arthavada is certain turn which is used in Sanskrit to mean something which is allegorical in nature one should not take it upon at face value that is what one means Arthavada. So, then we have also a statement in [FL] are write at the beginning Shankara makes [FL] akhyayika means [FL] akhyayika has an episode which is presented [FL] in order to surprise the important of knowledge so, this particular episode has been integrated with this [FL]. So, it should not be just taken on it is face value.


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**Divine revelation of knowledge?**

- Though belief in God's grace, is almost an all pervasive feature of Indian society, there was no confusion regarding the role played by the grace.
- Grace is NO substitute for hard work in gaining knowledge.
- In fact, in the very long astronomical tradition, at no point of time do we find an astronomer detaching the burden and easily shifting it to the shoulders of God, Fate, Fortune, etc.
- Nilakantha describing about his teacher observes:  

पञ्चपञ्चाशद्वर्षकालं निरीक्ष्य ग्रहणग्रहयोगादिषु परीक्ष्य  
समदृग्गणितं चकार ।
- Aryabhatta towards the end of his work says:  

सदसज्ज्ञानसमुद्रात् समुद्धृतं देवताप्रसादेन ।  
सज्ज्ञानोत्तमरत्नं मया निम्नं स्वमतिनावा ॥

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So, this message that one gets from all this is; so, though belief in God's grace is almost all pervasive feature of Indian society at no point of time there was any confusion among them. That this knowledge is directly gained by some divining being and therefore, you need not work towards it. So, grace is no substitute for hardworking gaining knowledge. So, this has been extremely quick clear. And, in the very long astronomical tradition so, as we find at no point of time people say that something meant wrong so, I am not responsible. So, something else is responsible they just taking upon the burden upon themselves. And, in fact if people were to completely believe in divining grace then, there was no need for these astronomies or any of these people in the medicine field, aurveda are whatever field to work hard to gain this knowledge.

In fact in one of his works Nilakanta describing about his grand teacher Parameswar he says [FL]. So, he make this statement so, [FL] means he worked continuously for 55 years so [FL] having made crucial observation then, [FL] so, having examine so, all the result that he has obtain over these years so, then he composed a certain work. So, the message is so this Devata Prasada has nothing to do with divining being coming in front of the person and revealing the knowledge.

So, in fact Arya Bhatta himself towards the end of the work he says [FL] is most important statement. So, is a political description of what Arya Bhatta did so, towards end of the work he says so, there has been this version of knowledge in front of me when he

say the ocean of knowledge there are write thing there are wrong things. So, what he did was to Plunge into this ocean. So, I pant into this ocean so, by means of boat and the boat is none other then, in my own Intellect. So, pledging into this ocean through my own intellect how do I get this right knowledge. So, we can choice anything therefore, he says [FL] so, through the grace of god so, that actually means to the clarity which I got to meditation excreta. I was able to pull out the right knowledge. So, [FL] so, this what understands by divine revolution.


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### Is the Earth self-supporting?

- There are descriptions in some of the *purāṇas* to the effect that the Earth is supported by a tortoise, a serpent, etc.
- All these views are based upon the premise that heavy objects cannot stand in space without a support.
- While scrutinising these views, Bhaskaracarya in his *Siddhāntaśiromaṇi* observes:<sup>3</sup>

**मूर्ती धर्ता चेत् धरित्र्याः, ततोऽन्यस्तस्याप्यन्यस्य प्रवृत्तानवस्था।**  
**अन्ये कल्प्या चेत् स्वशक्तिः किमादौ किं नो भूमेः साष्टमूर्तेः**  
**मूर्तिः ॥**

- **मूर्ती धर्ता चेत् धरित्र्याः** – If some tangible object must be there for supporting the earth
- **प्रवृत्तानवस्था** – proceeding along similar lines we will end up in an infinite regress
- **अन्ये कल्प्या चेत् स्वशक्तिः** – If at the end you have to think of a self-supporting entity ...

 *Siddhāntaśiromaṇi, Golādhyāya, chap. 2, (Bhuvanakosa), verse 4.*  
9

So, coming to certain other issues which are discussed in some of these texts in presenting the history; so, one often find several statement which are somewhat in felicities so, with the reference to the contribution made by the Indian. So, in this contest I just wanted to for instance Gyan Prakash. So, he coats in certain passages from [FL] which has been cited by Omkar Bhatt in his own work. And, the something which finds in many other works so, in history. So, this is an important question which could come up to any bodies mind so, after all if once find heavy body. So, heavy body falls towards the earth. So, one may so in common mans far length one can say it is falling down.

So, when you say falling down so, down so with reference to something which you have defined as up in space this geometrical up and geometrical down. And, heavy body cannot be suspended on its own in the space and therefore, it falls towards the earth. So, if this were the case then obviously, earth also being very heavy body. So, where does it

stand in space? So which is the kind of question that the raises. So, there one finds certain descriptions, in some of these Purana's that it is sort of supported by some hood of the so on and so forth.

So, this kinds of description in Purana's so, this is this where the kind of when with we talk of so, this creative writing and various things which one speaks of. So, there are varies ways of describing things for instant even today in common parlance so, we said that this computer has been effected by virus, when you make this statement; what has system virus has to do with myself being effected by viral infection. So, these are all terms which are used in varies contest in varies connotations. So, that a part so, here so this question that arises so, how we said that the earth is supported. So, this could I have been explain to some people, some stage and it supported by Elephant, it is supported by ((Refer Time: 36:00)) so on so forth. It is supported by tortoise; these are all certain poetic descriptions of certain things which one finds in Purana's.

So, in a text on astronomy so, how is this astronomer have perceived so, this is a very interesting question so which has been post. And, Bhaskara so he traces to answer this not only answer a Bhaskaracharya, even earlier astronomers have responded to this question. So, since Bhaskaracharya's Siddhants Siromani is considered to one of the most performed words and this has been sited often varies historians. So, we will just to read this words which is given in Bhaskaracharya's Siddhanta Siromani and, kind of argument that he presents so, to explain so, after all when one says so, that there is something called proof. So, what is a really proof? So, proof is certain argument is presented by somebody in order to convince someone else. So, the very notion of proof where is from discipline to discipline, it varies from time to time is something it will one needs understand.

So, what acts as proof at one point of time will no more was accepted proof different point of time, more evidences have been procured or we have certain devices which have been invented to proof much deeper in to the aspects and so on. So, this being the case; so, during his time so, which is around twelfth century so, this is very interesting passage which one finds in Bhaskaracharya's. So, he says [FL] so, this occurs in Goladhyaya of Bhaskaracharya's Siddhanta Siromani. The question that he asks is [FL] dharitri is earth. So, [FL] if you say there should be some time object which is supporting the earth in space.



Then, the next question that arises is whatever be the ((Refer Time: 38:25)) object so, that has be supported by something else and so on so forth. So, where will end up? We will end up in finite regress. So, at some point of time you have to say that something which is else supported. If you say that the entity is self supported so, what is so special about that why not assign to first entity itself. So, that is what he saying [FL] swashakti on its own if it can get supported so, it does not depend on nothing else. So, this if you can to some entity some point of time then, why not be ascribe of earth itself. So, this is a kind of argument which he gives. So, but this is not quite convincing, but; the point is that you will not to be able to find a solution by saying it is supported by it is (Refer Time: 39: 14) by so, these are all stories. So, which have been constructed to explain to some people or some point of time, but; this is not something which trends scrutiny.

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### Situation of the Earth

- While offering reasoning in the same vein, Bhāskara (b. 1114 AD) observes:<sup>4</sup>

आकृष्टशक्तिं महौ तया यत् खस्यं गुरुं स्वभिमुखं स्वशक्त्या ।  
आकृष्यते तत्पततीव भाति समे समन्तात् क्व पतत्यियं खे ॥

The Earth is known to be possessing the power of attraction (ākṛṣṭa-śaktiḥ). All the heavy objects in the sky are attracted towards it by this power. That is why, the objects are indeed found to be falling. This phenomenon is uniform (samam) all around (samantāt) the Earth; [This being the case,] if this (the Earth) itself were to fall [being unsupported] where would it fall (go and settle) in the space?

- Thus clearly according to the Indian astronomers, the Earth stands in the space self-supported.



Siddhāntaśiromaṇi, Golādhyāya, chap. 2, verse 6.

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So, that is what Bhaskara says. He further goes on and then says [FL] so; this is a very interesting passage. And, sometimes this is also grossly misinterpreted by some people. So, this something which one needs to be understood, there are some people so, who tries to study some of these instance pictures and they get excited as the keep reading them. And, then the moment the final something which is similar to what has been expressed in modern science and they said so, whatever has been stated in modern science in which is there. Sometimes they got the extent of saying that they find some term which is similar to what is the modern science so, and then they say so, that is the whole theory is there in ancient science, the ancient Indian science.

So, the boy I will just site one example in fact a few years back was in IIT Madras listening to a seminar presented by mathematics professor so, he went to the extent of saying, that there is something called string theory so, in modern physics. So, he went to the extent of saying that in Bhagavad-Gita we find, string theory described. I was taken awake this statement so, but; then he tries to himself by saying by slitting a sloka so, wherein he says so, we find a statement in Bhagavadgitha [FL] the term sutra means a string. And, therefore; we find terms string so, and therefore, we have string see in Bhagavadgita.

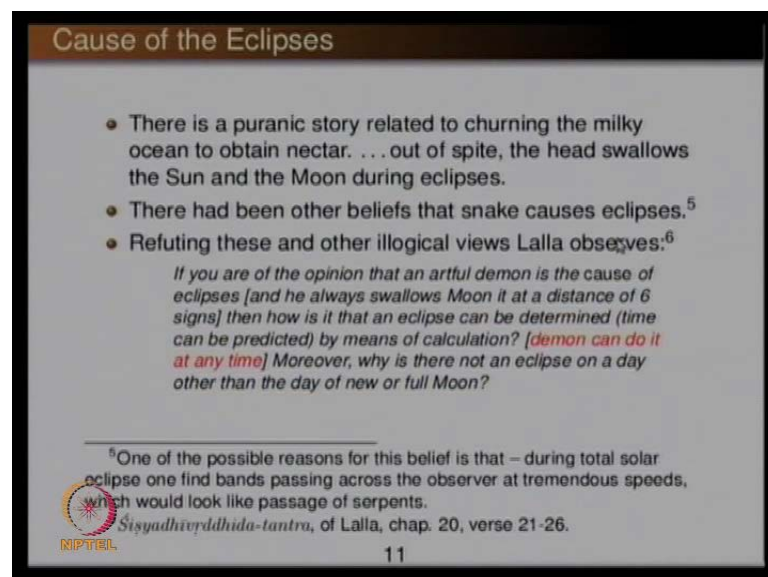
So, people think that they are some justice to ancient science there is going to be counterproductive. So, when one looks into ancient text one has to be all the more crosiers. And, here why I mentioning this is, because; so there is a term [FL] so, [FL] is a certain force, [FL] means a certain force which is attractive in nature. So, one should not immediately jump to the conclusion that Bhaskaracharya's has no gravitational theory. So, this is absolutely wrong.

So, which is what some people try to do and, it is injustices to both modern science as well as ancient script this what I want to say. So, here [FL] it is a very interesting argument which is presented Bhaskaracharya's so, which is I thought I will explain this words. Suppose you think of the earth so, it is well known to Indian autonomous it can be easily understood to vary means to why the earth has to be spherical in nature. So, this has been understood from the period of even Arya Bhatta. Arya Bhatta himself described it to be the spherical and there are reasons. So, which have been sub given by this astronomers which will be as valid today as it valid it in those days and so on.

So, here that earth is spherical in nature which is spherically understood. So, given that now, one posed the question earth were to fall so, where will it fall? So, why should, why at all you feel that earth has too fall so, there is because; it is a heavy object. Now, any heavy object falls above to bellow so, it falls down. So, imagine another observation setting in California which is directly opposite to some path in India so, there also this see something foreign towards him so, what is up and what is down. So, for him these up so, for the fellow in California that will be down that is the kind of argument with which is Arya Bhatt, a Bhaskara gives here. See so, from the fact that one observe that all object are attracted to as earth one conclude that there is a certain force of attraction towards earth. Mahi, mahi means pruthvi.

So, the word come in space means an object which is in space, which is object heavy, towards it, of because of the force of attraction. So, which it has attracts any heavy object towards it. So, since it is been attracted we feel that it falls. So, then he says this phenomenon is true all around the earth so not necessarily here. Therefore, so whether you are in India are you are sitting somewhere in California which is directly opposite to some location India so, diametrically opposite point also experience that they are pulled towards it. And, therefore; there is nothing like so, up and down. So, were earths can go up and down? For this argument so, this object where will it fall? So, this is the kind of present argument that he presence.

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**Cause of the Eclipses**

- There is a puranic story related to churning the milky ocean to obtain nectar. . . . out of spite, the head swallows the Sun and the Moon during eclipses.
- There had been other beliefs that snake causes eclipses.<sup>5</sup>
- Refuting these and other illogical views Lalla observes:<sup>6</sup>  
*If you are of the opinion that an artful demon is the cause of eclipses [and he always swallows Moon it at a distance of 6 signs] then how is it that an eclipse can be determined (time can be predicted) by means of calculation? [demon can do it at any time] Moreover, why is there not an eclipse on a day other than the day of new or full Moon?*

<sup>5</sup>One of the possible reasons for this belief is that – during total solar eclipse one find bands passing across the observer at tremendous speeds, which would look like passage of serpents.  
*Sisyadhividdhida-tantra*, of Lalla, chap. 20, verse 21-26.

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So, the message is they presented certain arguments with their only limited understanding; what is called gravitation today? One should not simply jump to the conclusion that because he uses the word [FL] Bhaskaracharya new gravitation as Newton understood. So, there are other instant of an Indian Astronomy also where in there are descriptions of eclipses so, where in one may find that a head Rahu Ketu and so and so forth. But these are again very similar to Mayasura receiving the knowledge of the motion of planets directly from the sun.


So, this stories are not accepted by Astronomers so, in fact the argue strongly and logically as to why this story cannot be taken as explanation for a certain physical phenomena which is happening around. So, the simple question that one can raise to a

person who believes that some Asura comes and follows the sun so, if an Asura is certain human being so, with certain bad quality or you can call Devatas follows whichever it is. So, the problem is so, we have a free will to do so, what we want to do and therefore, nothing can Prevents from swallowing any time we want to swallow. And, therefore; this eclipse which is certain phenomenon which happens only with certain physical condition satisfy so, cannot be the act of a human being who would like to perform things as an when he likes. So, since it is periodic and it can be predicted so, any human activity cannot be predicted.

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**Allegation on Hindu mathematicians**

- Continuing with the reasoning Lalla observes –
  - In a solar eclipse, people at different parts (of the Earth) observe different portions of the Sun eclipsed. Some do not see the eclipse at all. Knowing this who can maintain that an eclipse is caused by Rāhu?
- These arguments are purely based on logical reasoning.
- Notwithstanding this, some historians opine:<sup>7</sup>
  - They (Hindus) delighted more on tricks, than in the thoughts the mind could produce, so that neither Euclidean geometry nor Aristotelian logic made a strong impression upon them. ...
- Such statements are not only misleading but also, to a great extent, obscure the contribution of a rich tradition.

 C.B. Boyer in his *History of Calculus and its conceptual Development*, p. 61-62.

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Therefore, these are all things which will not be accepted and will not hold water the kind of explanation that demon comes and swallows so on. So, finally, I would like to point out of few quotations and this is very important to understand, when we try to study the Indian science. So, particularly history a very important historian who writes about the development of mathematics from ancient times to modern times his name is C B Boyer. So, when he tries to write a text on history of calculus and it is conceptual development.

So, the remark that he makes the Hindus delighted more on tricks than, in the thoughts the mind could produce. So, that neither Euclidean geometry nor Aristotelian logic made strong impression on them. So, he sort of dismisses you this is what it looks like so, Hindus delighted more on tricks so, I making this statement just to convey an important point

that in the Indian tradition thinks have been othered in the form if we look at the ancient texts 2000 year back the style of writing was Sutra and it is be very trust in nature. There is a also another reason has to why people had to write in such Trish form so, the knowledge was orally and therefore, if you have keep things in memory. So, we do not have any devices.

So, in those days and then so, whenever we want we can pick up that then read. So, this came much later so being oral tradition so, things were sort of memories. And, therefore; so, you keep them in ((Refer Time: 48: 12)) possible it does not mean that the teacher did not explain the phenomenon to the thought. So, they when they say the delighted more on tricks so, this kind of statement is primarily based up on looking at some of these primary text which have been very trusting nature. But not, looking into the commentary is which actually explain. The kind of rational which they had into trying to arrive in result so, when the result is sort of presented, you do not how they worked in that. So, I am therefore, some of the historians have been looks like in therefore, the make this kind of statements. And, this have been repeated by so, many people.


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**Infelicitous Remarks**

Patrick Moore observes:<sup>8</sup>

- The Chinese ~~were~~ careful sky-watchers ...
- Mesopotamians, Babylonians ... ~~did~~ regular observations ...
- Egyptians ~~were~~ remarkable people capable of carrying out very accurate measurements
- Greeks ~~were~~ the first to change the astronomy from a mystical cult into a true science
- The Vedic priests in India believed the world to be supported upon twelve massive pillars ... serpent floating on limitless ocean. ~~One cannot help feeling rather sorry for the serpent.~~

**Stops!** – as if it is the be-all and end-all of Indian Astronomy.

 The author of over 60 books in Astronomy born in 1923.

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And, I just want to site a few more examples; so, in the context of astronomy for instance they say chainees were careful sky watches. Mesopotamian, Babylonian regular observations, egiptience were remarkable people kept will of caring out very accurate measurements; Greeks were the first to change the astronomy from the vesicle into true

science. So, when he comes to describe about the Indian contribution he said the vedek in India believed the world to be supported upon 12 massive pillars. Serpent floating on limitless ocean, One cannot help feeling rather sorry, for the serpent. So, in this saying this is a book which has been author by Patrick more who has return it does not does not of works on astronomy.


So, this person so when he trying to describe the contribution of varies civilizations. So, coming to India he just dismiss that by simply coating some statement which is found in purana and not that is where I just cited the sloka Bhaskaracharya's. So, when these people have dismissed the idea but, we supported we something else. So, he stops that easy be all an end all of Indian astronomy. So, in trying to a study the contribution of a certain civilization is extremely important.

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**Concluding Remarks**  
History vs. Myth-making

Finally, again, I would like to conclude with the words of Claude Alvares<sup>9</sup> –

- All History is elaborate efforts in myth-making. ...
- If we must continue to live with myths, however, it is far better we choose to live with those of our own making rather than by those invented by others for their own purposes.
- That much at least we owe as an independent Society and Nation !!.

 In his introduction to *The Indian Science and Technology in the 18th Century*, Other India Press, Goa.

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That one tries to get into not only some of these source which are return thus form, but; also commentary which have been authored much later and finally, I would like to conclude with certain statement which has been made by Claude Alvares so, which I found very interesting. So, he says history is all efforts in with make it so, it is true in the sense that she will not able to find out what was happening 1500 years back we get some text on bits of information and we try to integrate them and present of whole picture. So, these efforts which is made in historians. And, making in such efforts some miths will also be there so which have to be accepted and therefore, he says so, if we must continue



to leave it myths however, it is for better the choice to leave with those of our own making rather than those invented by others for their own purposes. So, that much at list we as independent society and nation. So, making the statement, because; so, there has been certain purpose for we certain studies have been made particularly for the Indian context. So, this books which are authored so, to try see how the modern science was accepted in the Indian society. So, this is the very important thing that one needs to understand for one to have a success in trying to force certain a different system of education in so into a certain continent so, there are various tricks is which have been adopted.

So, which I will not be getting into, but; the point is that is what Cloud Alvares means invented by others for their own purposes. This is how certain things have been written and, whatever has been written has been simply expected for various reasons and therefore, it is important for one to present the history of once own nation by there want people inside of some form alien so, who has not understood how the fabric here is beep.

So, with these few remarks so, I would (Refer Time: 52:40)) thank you. Thank you so much, professors Ramasubramanian for this exegesis as I said in earlier it will indeed add to our journey and our debates and discussion. And, I think finally, to more creative writing a I do one to finally, say that our attempt in this session has been link to a new writer search for form an fresh themes. We are greatly interested in locating the connection between creativity and knowledge building, science and technology our cultural context of our rich possibilities not only for this discipline also for creative writing. So, this is the journey that will under taken for now.

Thank you.