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Science, Technology and Society

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Having discussed the information society issues and illusions by David line we will now in this lecture discuss reception of modern science in India. I mean when I talk about the reception of modern science in India I mean the way modern science was received during the colonial period and currently how it is being received, I mean in the context of post-colonial. Modern science when it was implanted in Indian soil what will generally find that it elicited.

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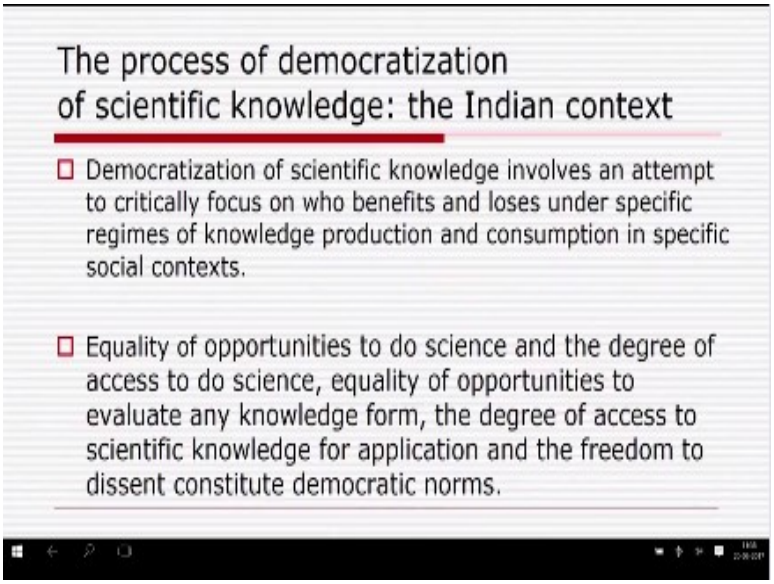

Three responses from Indian intelligence, one is acceptance secondly rejection and thirdly ambivalence we will discuss slowly what do they imply, I mean the argument is that I mean

which has been established historically that when modern science was introduced in India there was a section of the Indian intelligence here which accepted modern science in both hands. Because they could understand they could foresee the transformative potential of science and technology in the Indian context and those who rejected it there was I mean there were two sections who rejected those who believed only in theology or metaphysics they also rejected the way science was introduced modern science was introduced.

But there where another section which again thought I mean another section whole which rejected modern science in India they also thought that modern science again has been implanted in Indian context in India in Indian soil as a part of colonial dispensation and alien policy. As a consequence of which the thought it leads to the third position of ambivalence which suggests that yes, modern science was introduced in India they could foresee the transformative potential of Science and Technology in India.

But at the same time they were thinking that whether it is another ploy of the British for imperialist expensive okay, they were ambivalent whether to go ahead with Western science or not modern science okay, like Prafulla generally Hindu chemistry life and experiences of a Bengali chemist and so, okay. There are different positions when we look at the perspectives to study reception of modern science in India broadly they can be categorized under three perspectives may be the colonialist perspective, the Orientalist perspective and the nationalist perspective which has been sketched by John Bauer.

One of the preeminent scholars of history of science, but we are taking a nationalist perspective to understand this now okay, why nationalist perspective not against the backdrop of the current debates on national rather National regime a part of anti-colonial struggles okay, during the colonial in Indian context okay, but in this context we are going to discuss reception of modern science okay. I mean and as student of HTS.

I must start with the fundamental tension of Science and Technology studies in short the fundamental tension of science studies as I see it okay, is the dialectic between science for its own sake and the production of scientific knowledge that has an immediate Intel Italian values

affecting the world views values meanings interests attitudes and the corresponding accents of the scientific community which one can empirically observe. I am going to discuss reception of modern science in India by looking at a paper which I wrote maybe almost more than a decade ago. Now which was published in current science in 2006 okay, how modern science was received and how modern science was democratized in Indian context by building scientific institutions I mean okay, and sociology of science and technology I just specialty okay, has been concerned in exploring the dialectic between science for its own sake and science which has got application on aspects okay.

So signature of science as you know is a specialty that examines how and to what extent in what wage and to what extent various socio-cultural factors both internal as well as external to the worlds of science influence the production of scientific knowledge and its application. The literature suggests that the earlier conception that science is autonomous having its internal having its own dynamics having its internal dynamics unconnected with the external world external forces is no longer sustainability.

Rather what we see is that both science and technology as important forces of production okay, have been influenced by various factors ranging from social, economic, political, cultural, legal, ethical, institutional, ideological and so on that is why the divide between the internal and external worlds of science is not rigid but for us that is what we have already discussed, that is why we discussed how blue suggested that all knowledge including scientific knowledge is socially cost, okay that is a even Restivo and Wendigo hospice pointed out that the social is not only in the external social and cultural milieu or context of science.

But in the social organization of science I mean indeed in scientists themselves okay, the social what we say social is historically and democratically constituted and hence varies over time and across space okay. Then what we do, then when we say the process of democratization of scientific knowledge in the Indian context okay, what does that term mean, the term democratization refers to the way in which democratic is norms institutions and practices evolve and that be simulated both within and across national and cultural boundaries, okay.

What are the constituents of, what are the I mean when we talk about democratic norms, the process of democratization what may be the possible factors of this okay, one may say equality of opportunities to practice science to do science the degree of access to science equality of opportunities to evaluate any knowledge for the degree of access to scientific knowledge for application they may constitute democratic norms. Both the internal as well as external to the worlds of science, okay.

But I do not do this it is important to understand the freedom to decent constitute the perhaps the most important democratic norm along with the other democratic norms that we have just now discussed equality of opportunities to do science, the degree of access to do science, equality of opportunities to evaluate any knowledge for the degree of access to scientific knowledge for application and that is why it is important to understand freedom to be sent as constitutive of the process of democratization.

In this context it is there as there has been a relationship between the social responsibility in science on the one hand and the mainstream of political and social debate an action on the other. The concert what is that social responsibility in science then okay, this the concept social responsibility in science came into the literature on sociology of science in the context of the Second World War okay, historians and sociologists of science use this term, in this term social responsibility in science both in the context of war in ethics.

In particular we must begin to see the central place of the institutional and ideological role of science in maintaining and or transforming the most basic features of our democratic society okay, however democracy cannot be figured out on its figured out simply on its own terms in terms of either its argument or its vision how so ever important this might be, democracy seeks to connect okay, democracy as your value system democracy as a constitutional mandate at least in Indian context okay, democracy six to connect the universe of values with the real more power and it is essential to see what is involved in this.

It may also be useful to try to place this problem of connecting one with the other in its modern setting. Once we have begun to see all of us must decide what if anything she or he is going to do

about maintaining reforming or transforming the present order of society starting with the institutional mechanisms in which she or he is most directly involved maybe in the case of laboratories, in the case of departments, colleges, communities and so on and this lecture our attempt is to provoke a debate and action on these questions keeping in mind the context of the building and growth of scientific institutions and universities in nineteenth-century India okay.

The perspective that we are going to use that is the sociology of science and technology perspective which takes you from historical sociology. If somebody wants to understand historical sociology please read the sociological imagination by Searight Mills you can more you can look at the works of Philip a bronze, look at the works of Anthony Giddens and so on okay, what here we want to do okay, that how there was a rapid accumulation of knowledge which has characterized the development of science since the 17th century had never occurred before that time indeed okay.

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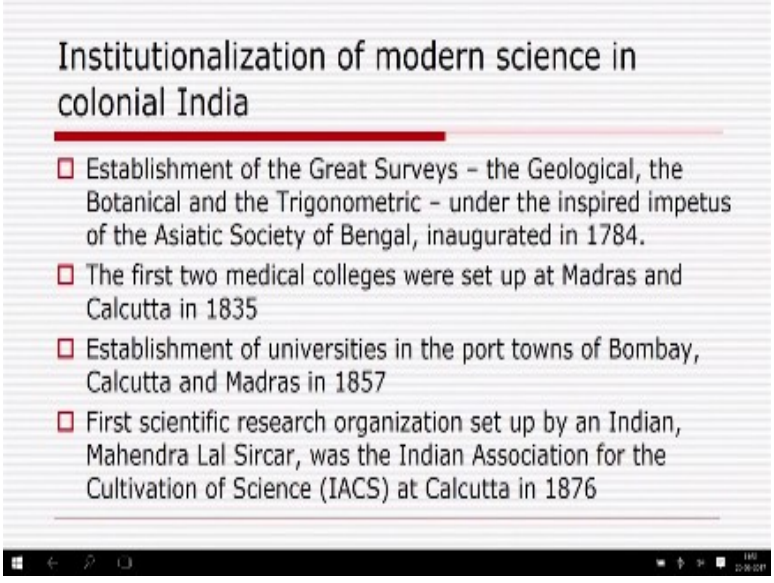

The new kind of scientific activity emerged only in a few countries of Western Europe and it was restricted to that small area of about 200 years. Since the 19th century scientific knowledge has been getting institutionalized by the rest of the world and India is was no exception to this, it has

occurred through the diffusion of the patterns of scientific activity and scientific roles from Western Europe to other parts of the world.

When you when we look at building scientific institutions I mean institutionalization of modern science in colonial India the institutional digestion of modern or Western science in India began with the development or establishment of the great servant like the geological the botanical and the trigonometric under the inspired impetus of the aesthetic Society of Bengal inaugurated in 1784 okay.

This was followed by the establishment of universities in the port towns of Bombay, Calcutta and Madras in 1857 this period also saw the consolidation of British rule in India especially with the with the failure of the first Indian war of independence of 1857. The British rule in our country was primarily based on its improved mode of production I mean when I say improved mode of products and I mean improved technology organizational abilities and so on okay. We also I mean I mean it was important for the colonial government to maintain its superiority if it were to continue its rule colonization is always inimical to any organized development of creativity amongst the colonized.

As India was a large country to be governed the British realized that it was important to have a gather of well-trained Indians in all it is including science and technology, therefore the British set up a small number of universities loosely based on the British pattern in the nineteenth century, in fact till 1850 India had only one University founded in Serampore near Serampore near Calcutta in 1818 by a group called the Danes it was primarily a geological University between 1850 and 1905 more universities were set up at Calcutta, Bombay, Madras, Alibaug, and the erstwhile undivided Punjab intending to cover the entire country.

The first two medical colleges were set up at Madras and Calcutta in1835 the first scientific research organization set up by an Indian Mahindra Lal Sarkar was the Indian Association for the cultivation of science in at Calcutta in 1876, at the end of the 19th century India had a total of six science related societies including the aesthetic Society of Bombay set up in 1804 out of which

two were professional societies namely the agricultural and horticultural society of India in 1820 in Calcutta and the Bombay Natural History Society in 1853.

However we must that modern science was not introduced in a vacuum and that some of them like our weather and astronomy were more democratized than perhaps modern science then or now, the colonial government started building scientific organizations institutions to use the knowledge generated by the institutions for gaining better understanding of the territory climate flora and fauna of the colony to administer the colony and perhaps exploit the resources in a more efficient manner.

It is against this backdrop that the first generation of nationalist scientists attempted to build scientific institutions and democratic and democratic science okay, without taking any support from the colonial government enthusiasm was shown by a section of our elites to embrace modernity okay. Modern science may also be construed as an attempt to get closer to the colonial rulers that is why in the earlier lectures we have discussed collapse of the dreams of modernity in 1970 I mean because the way modern modernity was conceptualized for a long time it was only European modernity okay.

That alternatives to European modernity multiple modalities perhaps these were not conceived of theoretically for a long time but there was resistance to one only one version of modernity or there is there was register there were there were different forms of resistance to the modernity okay on the contrary those who are suspicious of things Western or modern including modern science cannot be viewed as being opposed to democratization of knowledge or of society at large some of them at least did perceive modern sign as a part of colonial dispensation and as an alien imposition.

It was the policy of the colonial government that did not allow Indian scientists to occupy higher positions though many of them were competent it was it does hindered the process of democratization of scientific technology in India and it is in this and it was against this backdrop that the nationalist scientists attempted to build scientific institutions to democratize. Most of the research about perceptions own and reception of modern science in 19th century India focused on

the Bengal province and North India, initially however it does not imply that Indian intelligence that did not respond to modern science in other regions for example the Madras Presidency had instruments but no observatory the East India Company had established an observatory at Madras in 1870 according to kootchar, it was the first modern public Observatory outside Europe and to use today term the first modern Research Institute in India okay.

The East India Company had declared that the purpose of the Madras observatory okay, now who has to encourage the advancement of the knowledge of astronomy geography and navigation in India there were other more important things than green science such as increasing the company's revenue by improving irrigation facilities also see why poor towns were selected to create universities because you do is for the commercial benefit of the British Empire okay.

Several astronomical observations were carried out by Golding Tom and his deputy Warren both of which both of whom were trained astronomers know well the British East India Company was reluctant to encourage observations in India, I mean observatories in India okay. The establishment of the Nizamiah observatory in 1908 in the Hyderabad state shows that the Nizam’s regime was receptive and favorable towards the establishment and continuation of the astronomical observatory this was partly because Hyderabad state was never under any colonial regime Hyderabad was an independent state right.

Never the less democratization of scientific and technological development remain the mate for the millions of the country only certain social groups of the society were able to receive and respond to the introduction of modern science and technology to the Indian soil. Now the question arises that with social groups with social groups where the first who received and responded to the introduction of modern science in India of course not much work has been done on the transmission of scientific ideas between different cultures an attempt has been made to understand us to how knowledge is conceived of within the epistemological framework of one culture is received adapted and observed by another culture.

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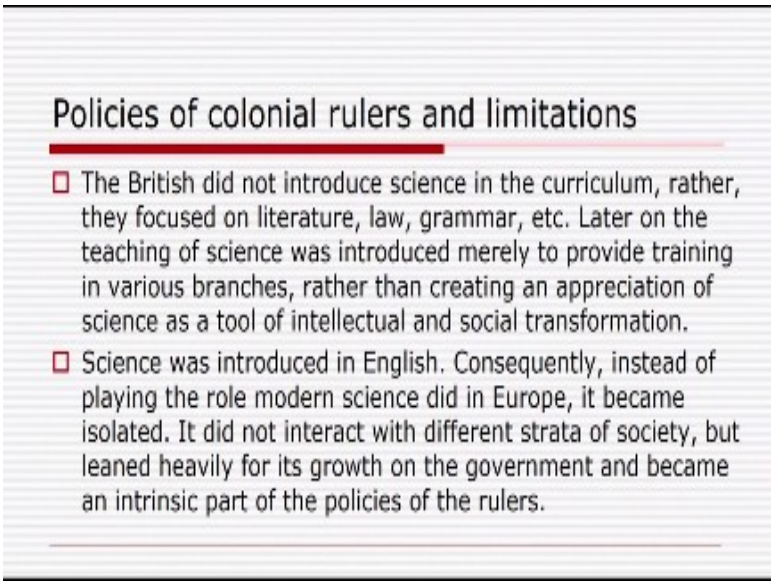

In the first half of the19th century in the first half of the19th century both Hindus and Muslims had their own elites however paradoxically it was only the Hindu elites drawn naturally from the upper castes principally the Brahmins the wythearge and the highest in the Bengal province who made contact with the British and eagerly sought after modern science which took groups in Europe as a legitimate knowledge.

Amongst the Bengali Muslims there was a much larger socially and economically infinite stratum and a corresponding similar smaller aristocracy then amongst the Hindus this fact in itself does not explain the almost complete lack of response of Muslims to English education in19th century Bengal nor where the explains based on religious outlook for the Muslim response to Muslim for the Muslim response different elsewhere in the country.

For instance between 1876 – 77 and 1885 – 86, 51 Muslims and 1338 Hindus took the BA degree in Calcutta in 1870 only two Muslims both of whom failed okay wrote the BA exam while in the same year 151 Hindus for the examination set for the examination for whom 56 received their degrees in the North in the northwestern provinces Bihar, Orissa, and old all the Muslims were in a minority the community-wide education pattern was quite opposite to that in

Bengal that is why Bengal was much advanced in terms of having inclusivity so far it is different religious groups are concerned.

Modern scientific ideas and techniques came to India in the wake of the British conquest but they faced three major limitations okay, first the scale of implantation and the degree of utilization was limited to suit the policies of the rulers. Secondly the teaching of science was introduced merely to provide training in various branches rather than creating an appreciation of science as a tool of intellectual and social transformation and thirdly science was introduced in English this is important science was introduced in English not in vernacular languages.

Consequently instead of playing the role modern sense they played in Europe okay, it became isolated in Indian context it did not interact with different state of society but leaned heavily for its growth on the government and became an intrinsic part of the policies of the of the rulers, yet there was a section of the Indian intelligenceium that believed that the British civilization represented a new approach to life and nature and Darrin led the hope for the future emancipation of India.

One aspect of this one aspect of this intellectual realization was the thirst of knowledge thirst for knowledge this led to the formation of scientific societies and institutions by Indians to provide access to modern science okay.

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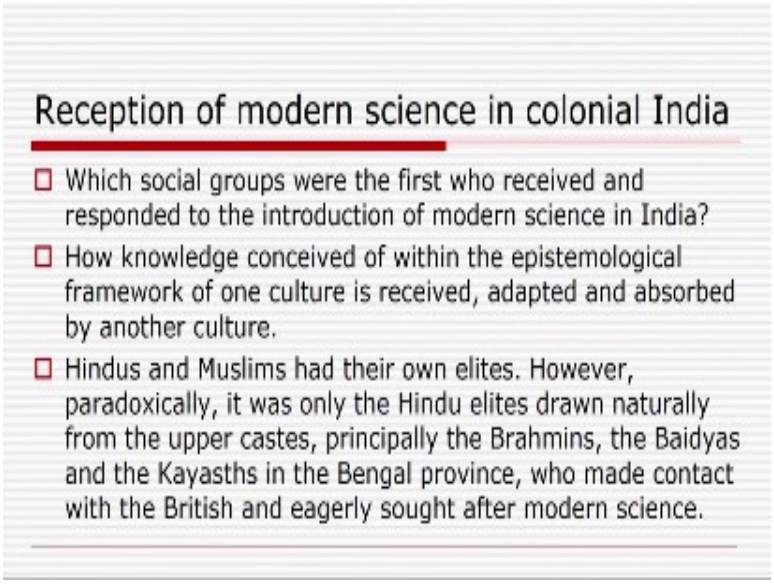

And most of the Indian intelligence here okay, or the cultural elite felt the need of important science education to Indians for exploring the new horizons of knowledge about nature and life in contrast it must be noted that when the British introduced Western education they did not introduce they did not introduce science in the curriculum rather they focused on literature, law, grammar, and so on okay.

And later on the teachings of science was introduced merely to provide training in various branches rather than creating an appreciation of science a new tool of intellectual and social transformation okay, and that is why you will find do I mean like Rahman Roy Raja Ram Mohan Roy he was very much critical of this that is why he responded to the East India Company by writing to them that no science must be introduced modern science must be introduced in the school curriculum itself okay.

For example in 1875 Richard temple the then governor-general of Bengal wrote a letter to Sir John led mayor Lawrence the then Viceroy on the rising discontent in India okay, the native intellectuals okay where quick to note of this fact and of which they were aware throughout the nineteenth century.

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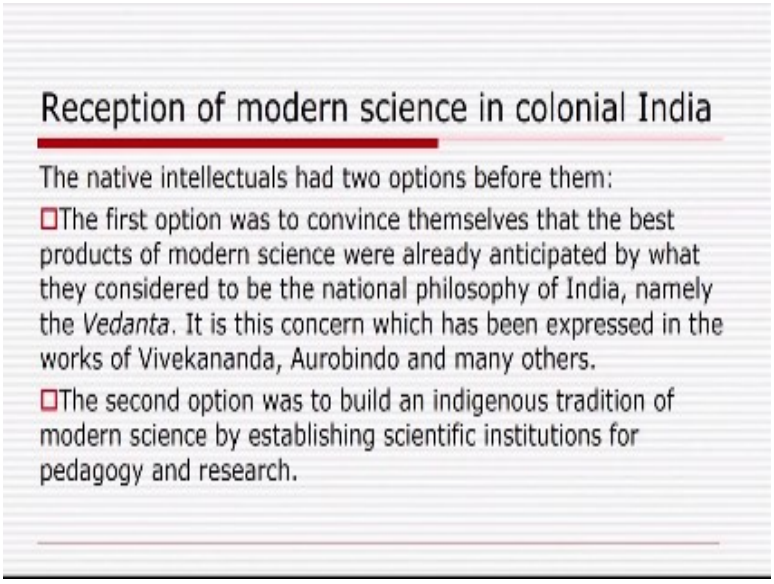

And even the beginnings of beginning of the 20th century they had they had two options before them the first option was to convince themselves that the best products of modern science were already anticipated by what they considered to be the national philosophy of India namely Vedanta, such an effort aimed at internalizing an alien system of knowledge on the one hand in exhibiting rational and empirical significance of the Vedanta thought which was treated at best as a true philosophical by the Western philosophy okay I repeat if we do not though was treated at best at best its new philosophical only by the Western philosophical world okay.

It is this concern which has been expressed in the works of Vivekananda Eurobond and many others and the second option the second option was to build an indigenous tradition of modern science by establishing scientific institutions for pedagogy and research and this second option is sociologically significant and deserves to be discussed by reflecting on by reflecting on the building of scientific instruments in 19th century India namely the Hindu College of 1816 Delhi College of 1825 the early good scientific society of 1864 the Bihar scientific society in 1868 and the Indian Association for the cultivation of science 1876 okay.

These institutions were initiated mostly in the second half of the of the 19th as a part of the process of not nearly popular aging but also democratizing scientific knowledge in India by

creating opportunities for Indians to pursue science education okay, then let us start with the Hindu college just to start with the only people committed to introducing Western education in India.

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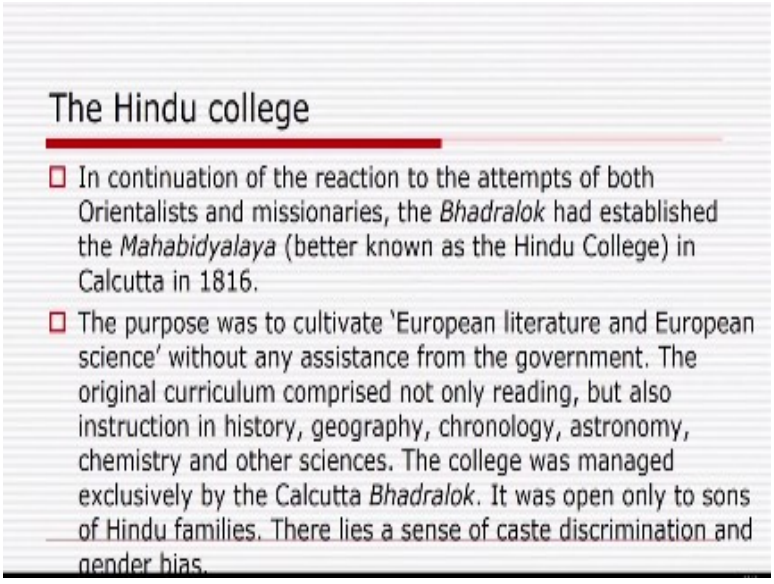

Where I mean the missionaries particularly and the evangelicals initially who wanted to use Western arts, Western philosophy, and Western religion, to read the Hindus of the moral depravity that according to them was the cause of their degeneracy. These attempts did not receive the expected enthusiasm from the Hindu subjects of Great Britain in addition there was not a way of going about importing ideas to the latter the I mean the Hindu upper caste could not be convinced of almost any of their shortcomings but they could not be called morally depraved attempts by both Orient lists and missionaries received no major of official approval consequently these attempts made little headway in stark contrast.

However a native gentleman community rose to the occasion and these gentlemen from Bengal were better known as the Bhadralok the gentleman coming Bhadralok in I mean in Bengal they are known as Boudreau okay, they had an inclination towards the acquisition of Western ideas in Western science through English language in education indeed education itself became the

hallmark of Bhadralok status the Simon Commission report observed I mean the school is one the school is the one gate to the Society of the Bhadralok I mean cool off western entries.

Within the colonial framework the conflict among the different systems of knowledge was also a conflict among the value systems however for those sections of the Indian society that first seriously took up science as a profession for example the Bengali Bhadralok okay the process of cultural redefinition automatically began. What is that cultural redefinition cultural re definition implies a prerequisite for the legitimating of the new knowledge system okay.

I mean I am trying to bank on the works of Dhru Raina, Ashier Fauna Feeb, Deepak Kumar, E Haribabu, V V Krishna and others even JPS Oberoi, JD Bernal and others to look at in continuation of the reactant to the attempts of both Orientals and missionaries the Bhadralok had established the Mahavidhyalaya better known as the Hindu College in Calcutta in 1816 the purpose was to cultivate European literature in European science without any assistance from the government.

The original curriculum comprised not only reading but also instruction in history geography chronology astronomy chemistry and other sciences the college was managed exclusively by the Calcutta Medrano it was open only to sons of Hindu families please remember it was open only to sons of Hindu families there lies a sense of caste discrimination and gender bias okay. Despite this its enrollment despite this its enrollment figures enrollment figures had touched 400/1828.

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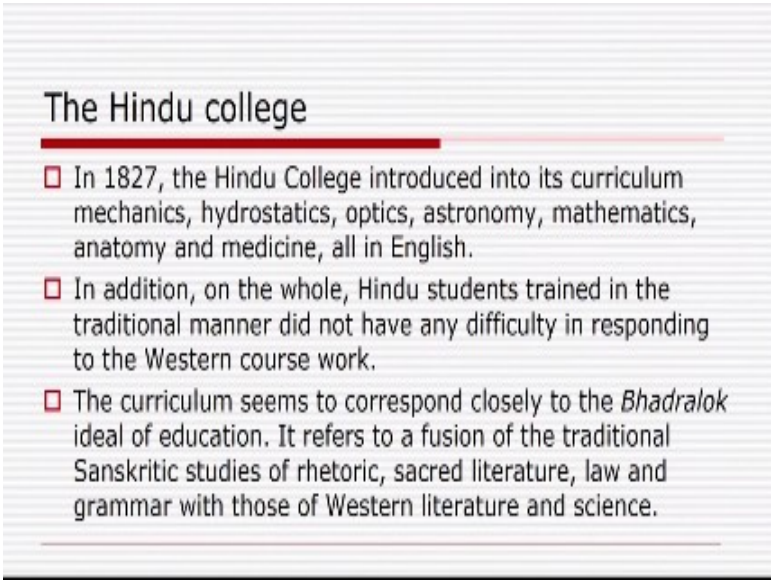

And within two decades of the opening of the Hindu College the demand for English education had led to the creation of a respectable number of English schools originating with the natives and deriving resources exclusively from them okay this. In this way the Hindu College was set up and run by the Bhadralok as a scientific institution that could not only introduce the application of modern science and technology to the Indians but also show but also show them the new horizons of life as a whole thus extending the opportunities to pursue science education and a carrier in science.

But the British were not interested please remember the British were not were not at all interested to introduce science education into the Indian soil as a part of democratizes they opened a Sanskrit College in Calcutta in 1824 to teach Sanskrit rhetoric sacred literature law and grammar to Bengali children. However this was not what encouraged the new elite I mean elite when I say I mean cultural elite through education elites through education okay.

In this regard the name of Rahman Roy Raja Ram Mohan Roy figures first it is clear that the colonial government was not inclined to introduce science education and inculcate scientific temper among the native whereas attempts on the part of the native intelligence here were to

promote precisely the activities which the colonial government was not interested okay, I mean no account of India's development to modern times would be complete without a mention of Raja Rahman Roy and a district right from Bengal whose social reforms in the 18th and 19th centuries contributed towards narrowing the gap in attitude toward Science and Technology among the Indians a term that is used these days but which was not used during the Mons Iran though it advocated though he particularly advocated it in many of his speeches and works is scientific temper okay.

I mean this scientific tip such notion of scientific input teaches us to sift the available evidence objectively and base our accents on a rational approach Rahman was a rationalist in his advocacy of reason and freedom of thought his criticism of the existing religion and its rigid practices and cost barriers was inspired by his a desire to make religion consistent with the changing world of his times.

That that attitude is even more relevant today as the influence of science and technology on our lives in increasing rapidly okay, and in and we all know if you if you want to read the way he wrote to I mean when the British went on opening science Sanskrit colleges Ramon in his all to commerce address, so the 11th of December 1823 pleaded for the instruction of European sciences he pained he wrote like this that as the improvement of the native population I mean Indian population is the object of the government it will consequently promote a more liberal and enlightened system of instruction embracing mathematics natural philosophy I mean I mean enlightened more rational more liberal more enlightened system of instructs and embracing mathematics natural philosophy I mean natural philosophy I mean science right.

We have discussed earlier okay only in 19th century were well coined the term science we have already discussed this okay, chemistry and Anatomy with other useful sciences which may be accomplished with the some proposed by employing a few gentlemen of talents and learning educated in Europe and providing a college furnished with the necessary books instrumental and other apparatuses and in 1827 the Hindu College introduced into its curriculum mechanics hydrostatics optics astronomy mathematics anatomy and medicine all in English then almost half of its 91 students opted to study these though they were not compulsory subjects.

In addition on the whole Hindu students trained in the in the traditional manner not have any difficulty in responding to the Western coursework and indeed the curriculum seems to correspond closely to the mother look ideal of Education it refers to a fusion of a fusion of the traditional Sanskrit studies of our rhetoric sacred literature law and grammar with those of Western literature and science okay.

When you when you look at this when you when you look at these the Bengal province okay I mean the in Bengal you will find that Hindu College nowadays known as Presidency College I mean presidency University now, Hindu College and the significant and the role played by the Hindu College in democratizing science and we must understand this which is even relevant today let us now shift our attention to from Bengal province to the the northern province I mean the Delhi College okay now it is known as the University of Delhi okay.

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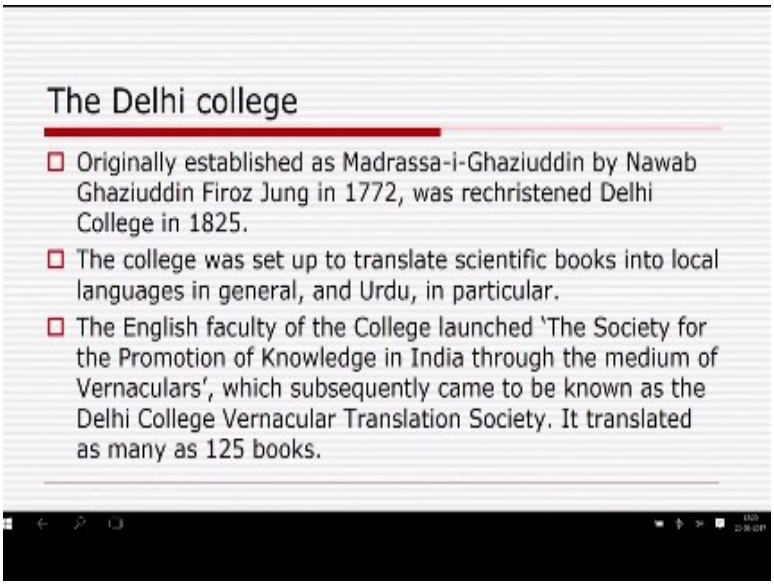

I mean Delhi College played a significant role in the dissemination of modern science it was originally established as Madrassa –i- Ghaziuddin by Nwab Ghaziuddin Firoz Jung in 1772 was rechristened Delhi College in 1825 okay, the college was set up to translate scientific books into

local languages in general, and Urdu in particular okay. The Oriental Department of the college carried out studies in modern education through the medium of Urdu 1835 when the new British policy veered away from the concept of modern education through Indian languages Delhi College took a bold stride in the reverse direction okay.

The educational committee was created the educational committee was created to translate into Urdu scientific books then taught in European schools the English faculty of the college launched the Society for the promotion of knowledge in India through the medium of Vernaculars which subsequently came to be known as the Delhi College Vernacular translation society and it translated as many as 125 books these included chiefly Greek classics person works and scientific treatises in to Urdu all these were translated in the space of about 20 years the Society for stirred a rich and multifaceted education and transformed Urdu in what from a language of poetry to the transmitter of Western scientific idea okay.

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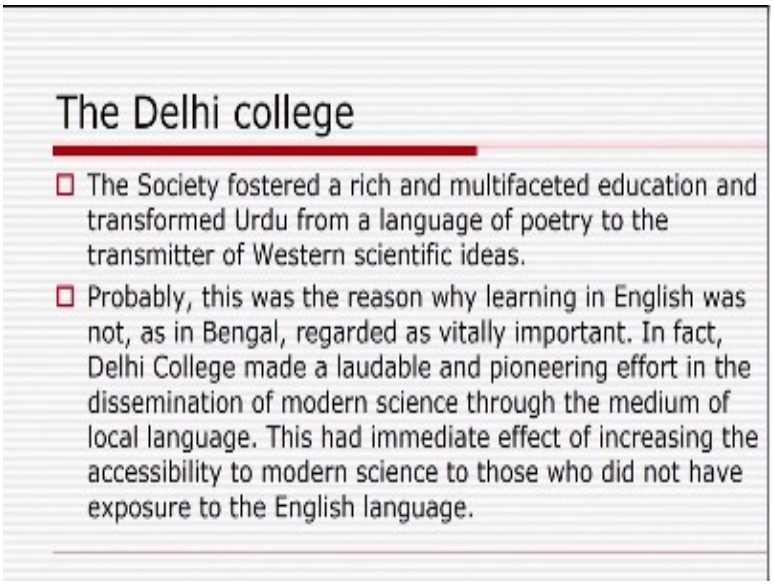

And the new emphasis the new emphasis on Western science attracted several young minds and in a short span Delhi College had produced a few geniuses like master Ram Chandra okay his work on different culture his work on differential calculus was published and noticed in Europe

Master Ram Chandra was not only an erudite scholar of Delhi college but also became a prolific teacher at the college, he started a paper in would do called the Howardel Nagerin now which played an important role in the dissemination of modern science in India he also edited two more of dailies earliest Urdu newspapers mean namely the Muhabbahind and the Keronous the sethen the Muhabbahind aimed that wide readership whereas Keronous sethen later published various articles on scientific subjects.

Delhi College had a well-defined school curriculum which included a local language on to this were drafted European philosophy and students at Delhi college so clear-cut incline s and towards the scientific rather than literary education in Bengal a suddenly literary enthusiasm for the newly discovered English novelists and poets swept everything else away for translations into local languages some I mean some European teachers like you know good throws a Frenchman and Springer a German will be remembered for their sense of involvement.

Probably this was the reason why learning in English was not as in Bengal regarded as vitally important, indeed Delhi College made a laudable and pioneering effort in the dissemination of modern science through the medium of local language they said an immediate effect of increasing the accessibility to modern science to those who did not have exposure to the English I mean to the English language okay, and so on and the within northern province you will also find the Aligarh scientific society which is now known as Aligarh Muslim University sir Syed Ahmad Khan okay established the Aligarh scientific society the attempt was in the form of establishment of the society Aligarh scientific society in1864 it was not only an attempt in importing scientific knowledge but also an effort in the direction of socio-cultural change in India.

Sir Syed started his career as a clerk with the East India Company in 1838, he qualified three years later as a sub judge and served in the judicial department at various places Sir Syed Ahmed Khan had a versatile personality and his position in the Judicial Department left him time to be active in many fields his career as an author in Urdu started at the at the age of 23 which religious tracts in 1847 he brought out noteworthy book author Hashanah did I mean monuments of the great on the antiquities of Delhi okay.

He becomes by establishing schools at Moradabad in 1858 Guipure in 1863 and a more ambitious undertaking was the foundation of the Aligarh scientific society in 1864 which published translations of many educational texts and he stood bilingual journal in Urdu and English, the society the Aligarh scientific society translated around 40 European books dealing with history political science geography material O G electricity algebra geometry calculus hydrology era culture and so on okay.

It is important the objects of the society where to translate into such languages as may be in common among the people, secondly to search for and publish rare and valuable oriental works no religious work will come under the notice of the society.

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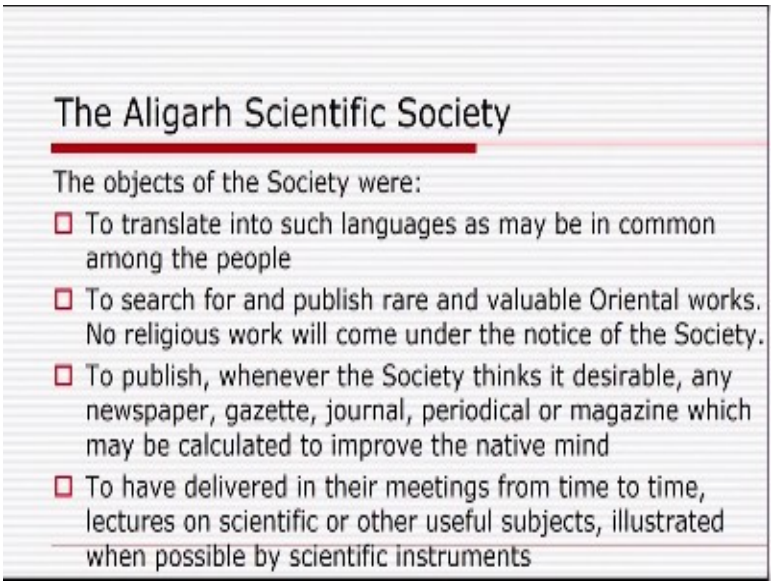

The society was absolutely secure ok to publish whenever the society thinks it desirable there any newspaper gadgets journal periodicals or medicine which may be calculated to improve phonetic mind to have delivered in their meetings from time to time lectures on scientific or other useful subjects illustrated when possible by scientific instruments okay. From these these objectives it is clear that the society was highly secure in alcohol it completely eliminated

religion from its purview which was something rare during the 19th century the society also had certain political objectives okay, it sought to foster and encourage the growth of an enlightened public spirit the society also wanted to introduce improved methods of agriculture in India.

So that the economic conditions of the people might improve the activities of the society may be classified into four parts one translation of Western literature into the into the local Indian languages okay secondly practical attempts to popularize and democratize mechanized farming thirdly delivering lectures on topics of common interest and fourthly highlighting the socio-political problems of the country okay.

They had they had I mean we did they had a library or reading room of its own the books were mainly donated to the society by different Indians as well by foreigners Sir Syed Ahmad Khan himself donated a large number of books to the library the society subscribed to44 journals and magazines in 1866 of those 18 were in English and the rest in Urdu Persian Arabic as well as Sanskrit okay and moving from the Aligarh scientific society to the Bihar scientific society okay.

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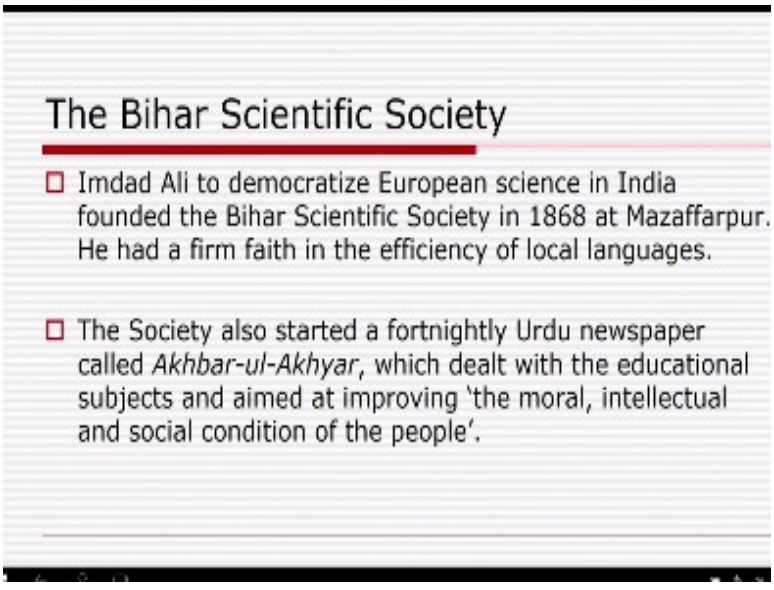

I mean the Imdad Ali established the Bihar scientific society okay to Democrat at European science in India in the Imdad Ali was not opposed to English education but he emphasized that the society should not bring in religion into the scope of its inquiry he was a deputy collected he had started publishing pamphlets and then a regular journal at attacking Taji Wole Acolock and calling on Muslims to boycotts or some Sir Syed Ahmed reform movement in dissolves was of the opinion I mean Imdad Ali was of the no opinion that Indian students did not acquire properly the knowledge of Western science and technology when it was taught through the medium of foreign language consequently they failed to transmit adequately their newly acquired scientific knowledge to their countrymen for lack of suitable expressions in the Indian languages okay.

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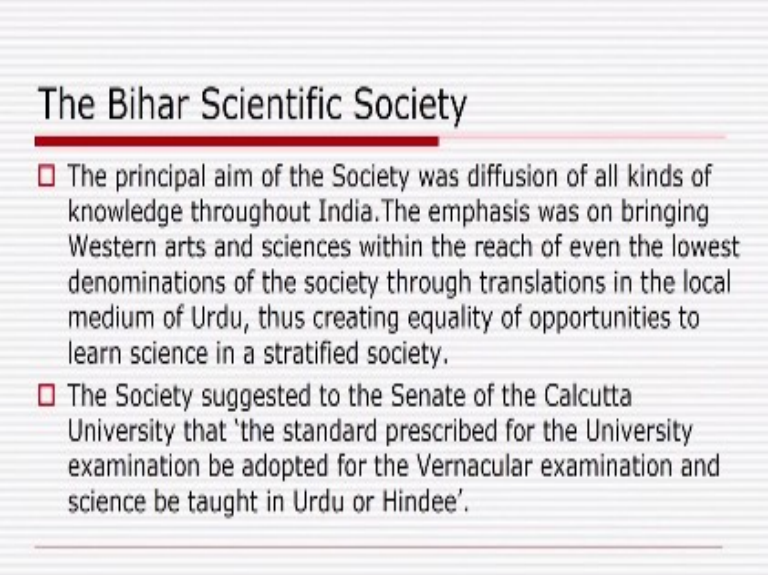

I mean I mean for the purpose of spreading European scientific knowledge through the Indian languages ended early founded an association in 1868 at Muzaffer port called the British Indian Association later the I mean the later the name was changed to the Bihar scientific society and the principal aim of the Bihar scientific society was diffusion of all kinds of knowledge throughout India. The emphasis was on bringing Western arts and sciences within the reach of even the lowest denominations of the society through translations in the local medium of food do thus creating equality of opportunities to learn science you know in a stratified society.

The Bihar scientific society suggested to the senate of the Calcutta University that the standards prescribed for the university examination is adopted for the Vernacular examination and science be taught in Urdu or Hindi okay. I mean science was democratized by translating from different language systems especially English to different vernacular languages okay.

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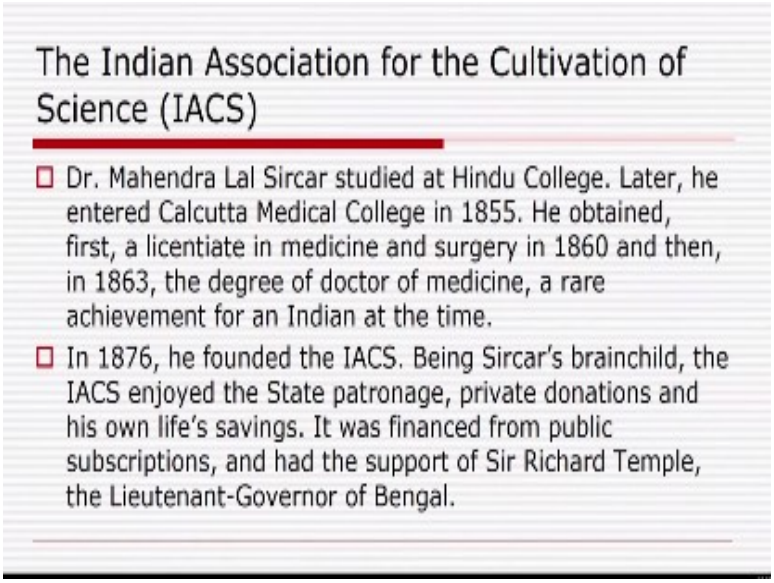

In Victorian England the Royal Institution of London served the served as a scientific home for a host of scientists like Davy, Faraday, Tyndall, and Huxley, and after Faraday's death James Dewar it was a place for visiting scholars who spent short periods as thinkers as workers in its laboratory the Royal Institution of London was one of the important components of the institutionalizes institutional infrastructure for science in Victorian England on the other hand calculator had no on the contrary Calcutta had no such institution during the 19th century thus even while science evoked interest in the capital British of capital of British India I mean Calcutta okay.

There was not yet an institutional ambience that would induce Indians to practice things to do sights the reputation and character of the Royal Institution of London and how you had however

secured the imagination or at least Dr. Mahindra Lal Sarkar I mean Sarkar was born in the same year1838 in which Rahman passed away okay, he was potentially a Ligety of the new learning he studied at Hindu College later he entered Calcutta Medical College in 1855which has established the formidable course of studies in the sciences circuit truly became the torchbearer of the spread of scientific education after the demise of Ramon, Mahindra Lal Sirkar was thus predicts I mean he was a product of the Hindu college that had borne witness to the event of learning science education.

He obtained foster license yet in medicine and surgery in 1860 and then in 1963 that degree of Doctor of Medicine a rare achievement for an Indian at that time in 1869 Mahindra Lal Sirkar began broaching the project of a National Science Association to the public through pamphlets letters to the editor of the Hindu patriot and public addresses, in 1876 she founded the Indian Association for the cultivation of science okay, I mean being Sirkar's brainchild the Indian Association for the cultivation of science enjoyed the state patronage private donations and his own life's savings it was financed from public subscriptions and had the support of Sir Richard temple they left the then left union governor of Bengal okay.

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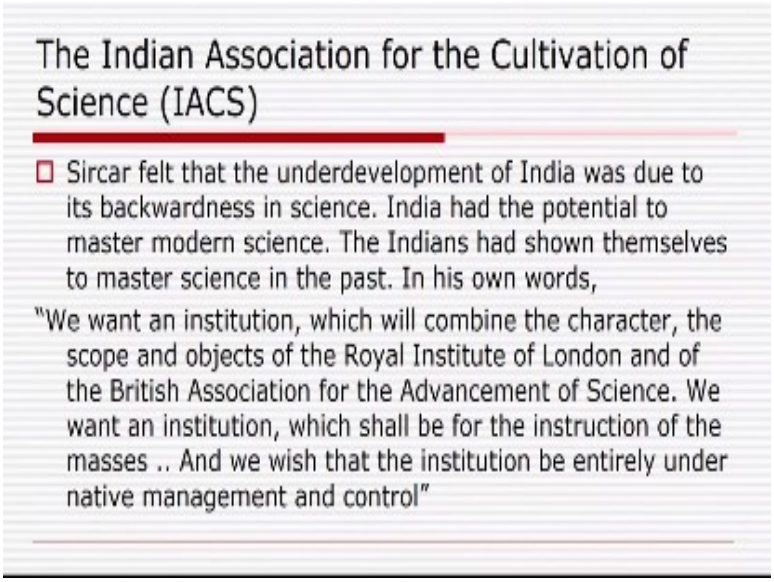

I mean and during that period the Indian I mean I mean you know a Sirkar during that period Sirkar felt that the under development of India was due to its backwardness in science India had the potential to master modern science the Indians had shown themselves to master science in the past in I mean the way he wrote we want an institution which will combine the character the scope and objects of the Royal Institution of London and of the British Association for the Advancement of science.

We want an institution which shall be for the instruction of the of the masses and we wish that the institution be entirely under netic management and control not British management but the native management and control okay, it is very important to understand this okay and I mean he decided that Indians are Mahindra Lal Sirkar are desired that Indians should cultivate science not only for economic betterment but also for their region of course of after persistent efforts he succeeded in establishing the Indian Association for the cultivation of science in 1876 later the Indian Association for the cultivation of science okay evolved into a world-famous Research Institute it had a lecture all by 1884 and a laboratory was constituted in 1891 with donations from the maharaja of Vijayanagaram at that time.

It organized a series of lectures by Prafulla Chandraray Jagadish, Chandra Bose or Satoshi Mukerji Pramat Noth Bose father Lafont and many other distinguished scientists it is best known for its sponsorship of the work of C V Raman physicist who was later awarded the Nobel Prize for the discovery named after him the Raman effect, if we if we critically review I mean if we have a critical overview of the activities of all these scientific institutions starting from the Hindu College the early good scientific society the Bihar scientific society and the Delhi College the Indian Association for the cultivation of science if you look at this only Indian Indian Association for the cultivation of science could manage to survive okay this shows how a man of unusual drive and determination Sarkar watch.

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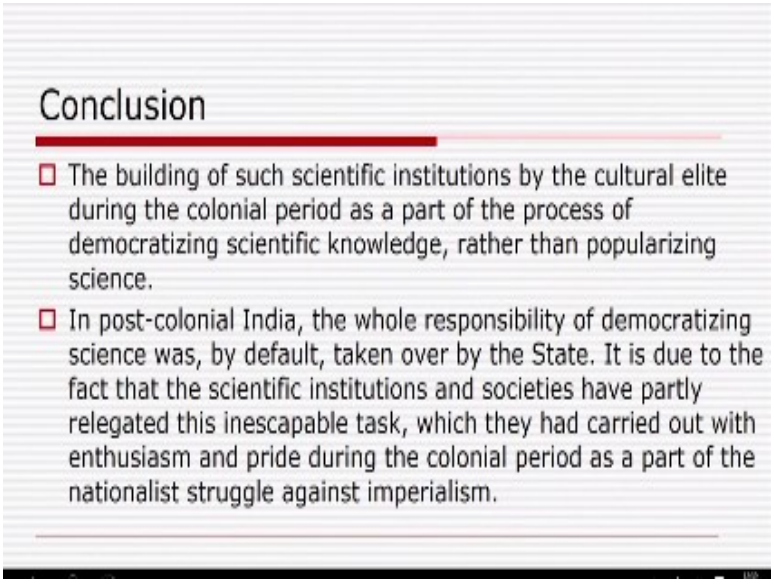

The Indian Association for the cultivation of science grew from strength to strength and celebrated its centenary in 1976 as the National Institute of Science is it remains some monument to the memory of Sarkar who passed away in 1900 and for the in any the Indian Association for the cultivation of science okay as visualized by Sir car was an institution for the masses with full audience participation where any lower of science could come and work the way it was felt necessary by the scientist being Binger National Association created entirely by private donation the Indian Association for the cultivation of science did not have any government control.

But it met with some resistance the Hindu orthodoxy thought that the ISCS the Indian Association for the cultivation of science was attacking the Hindu at the traditional Hindu teachings a large section of the public also felt that this kind of pursuit of abstract science had no meaning for a poor country like India.

The cry of the day was utilitarian science but mine results are cars Unser reply response watch without scientists how can one have science as I see it the historical the historical survey then in the twentieth century you have seen the Indian Institute of Science Bangalore the Tata Institute of fundamental research in Mumbai and many CSIRO laboratories many universities came up who

try to pursue science education in India but the historical survey indicates that that democratization of scientific knowledge okay in terms of access to modern scientific knowledge creation of equality of opportunities to do science and so on.

In the colonial period began to occur not because of the colonial government but in spite of the colonial government okay intelligence they are drawn from different religious groups.

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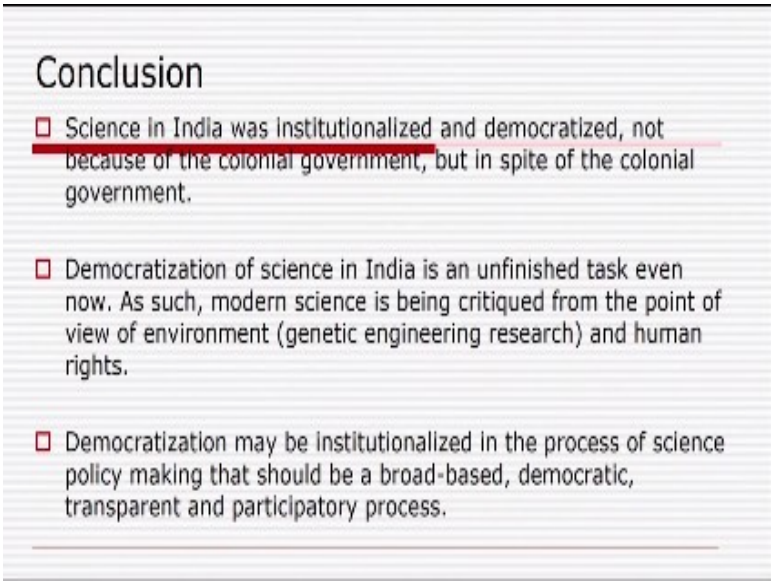

Realize the significance of modern science for material and cultural transformation of India and attempted to democratize science in their own way by establishing scientific institutions and using the local or vernacular language as the medium of democratic ideas, here I would like to see the building of such scientific institutions by the cultural elite during the colonial period as a part of the process of democratization of scientific knowledge.

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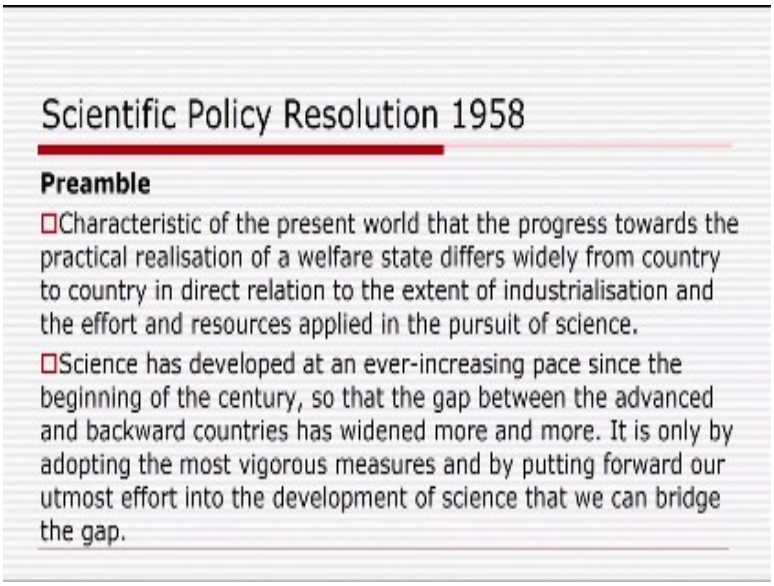

In post-colonial India which we will discuss through the science through some different science policies in India in the lectures to follow that how in post-colonial India the whole responsibility of democratizing science was by default taken over by the state it is due to the fact that scientific institutions and societies have partly relegated this inescapable task which they had carried out within to the enthusiasm and pride okay during the colonial period as a part of the national struggle against imperialism okay democratization of science in India is an unfinished task even now as such modern science is being critiqued from the point of view of environment I mean genetic engineering research and human rights activations okay.

The process of democratization ought to address these questions okay democratization may be institutionalized in the process of science policy making I mean which must be which should be abroad-based democratic transparent and participatory process as there is a Chinese saying that you know tell me and I will forget to me and I may remember and involve me and I will understand this participation the genetic participation local participation is important so far as the question of democratization of scientific knowledge is concerned and to what extent science has

been democratized in Indian context can be seen can be examined by dwelling up on different science policies in Indian context okay.

Starting with the scientific police policy resolution of 1950 eight then we will discuss the technology policy statement of 1983 then we will discuss the science and technology policy of 2003 then we will discuss the science technology and innovation policy of 2013 okay but before discussing science technology and innovation policy of 2013 I mean while discussing will also discuss different aspects of patenting IPR regime I mean briefly to make sense of what counts such innovation today I mean how developing countries including India have become or her have compliance with the US dictated international patent regime okay in the lectures to follow will have detailed discussions on science policies in India, thank you.

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