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Science, Technology and Society

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Stand on with the social setting of technology in contradistinction with the technological shaping sociality okay of the technological shaping of technology itself okay because HTS scholars we always try to look at the dialectical relationship between 3 force of production namely science one technological two and society three okay we always believe in the fact that science.

And technological I am not independent systems of through and did the error by product they are by products of society and we discussed in the context of newer bridge by Robert masses we have discussed in the context of the political construal of technological system we have discussed has knowledge now you are going to discuss Thomas use paper on or reflection on Thomas Alva Edison and the invention of electrical bulb electrical plate.

In the context of history of ideas and the study of problems are we all know that Thomas Edison invented electric bulb electric light, but how you did in the context of history of ideas and the study of problem solving the real world problems let us see okay in fact Thomas Alva Edison invested systems.

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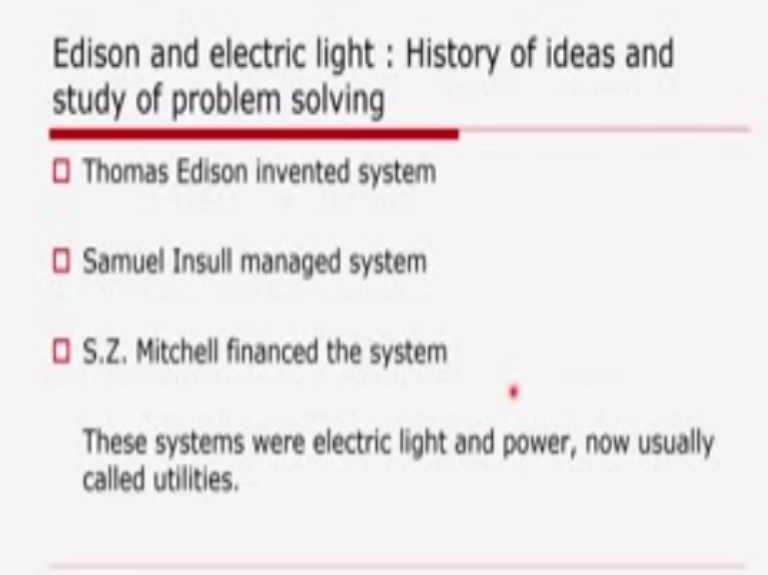

Insull Samuel insull managed systems and nature financed there expanse and these I mean these 3 systems one is related to ingestion 2nd is related to management 3rd id related to finance okay because whenever we produce something we must have some kind of implications may be social may be economic may be political may be cultural and so one and these systems what electric light and power and now usually called I mean utilities.

What is utility in economics in basic economics utility means one stratifying power of a community okay then what is a commodity is there which has got exchange value okay in this scenes we are using okay suppose if say water in a river may have more used value but diamond has more exchange value okay in this scene you want satisfying power of a commodity and Edison invented the system.

I mean these, system of electric light that took form as the papal strict generating station of the new year Edison eliminating company now it is known as consolidated Edison company insull on the other hand managed electric light and power companies that consolidated into Chicago's common wealth Edison company and S.Z. Mitchell okay he provide for the growth of large regional powers systems.

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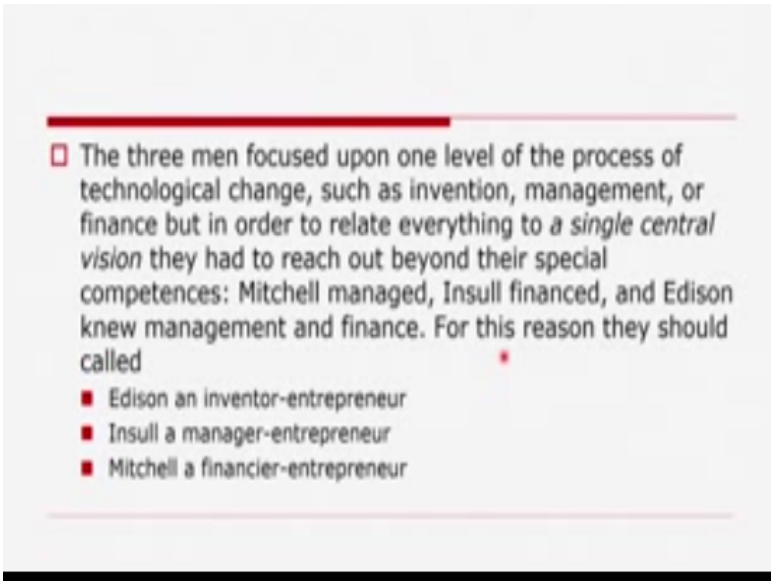

Then in this context one is same Edison has inventor entrepreneur Insull at a manager entrepreneur and mutual has if financial entrepreneur okay but for but so far as the this I mean these lectures are concern will restrict our preview to Edison as inventor entrepreneur but in but the background against the against which we are going to discuss Edison has a invertors entrepreneur must involve both Samuel Insull and mature has a manager entrepreneur and a finical entrepreneur respectively okay.

Let us see how they did and these 3 individuals okay these 3 individual namely Edison, inusll, and Mitchell focused upon one level of the process of technological change such has invention management all finance but in order to any late everything to single central visions they had to reach out beyond their special competencies Mitchell manage Insull finance and Edison new management in finance for this region they should be called Edison has an inventor entrepreneur insull has a manager entrepreneur and Mitchell has a financial entrepreneur okay.

This is very important Edison insull and Mitchell where strong holistic conceptualizes and determines solvers of the problems frustrating the growth of systems that is why if you look at the initial point which we started with history of ideas in the study of problem solving okay/.
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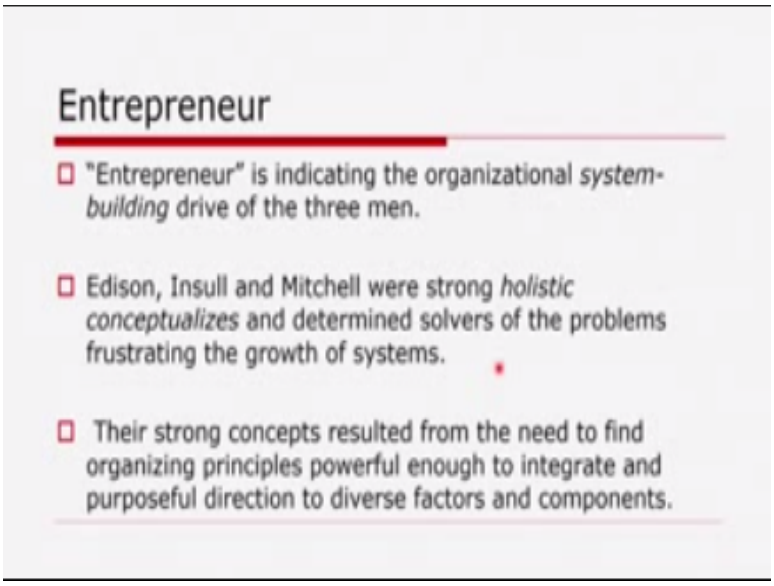

They are strong concepts okay resulted from the need to find organizing principles powerful enough to integrate and leave purposeful builders and divers factors and component the problems emerged as the system builders strives to fulfill their ultimate regions not one of them was satisfied to solve a part of the problem simple to invent or manage or finance for each believed that the inventions would not become an innovation the managerial structure would not evolve and the finical means would not bring growth unless electric light and power where viewed has a coherence system okay.

Then what is the difference between invention and innovation people may say that one message yeah both speak of the new things the difference between invention and innovation lies in the fact that in the context of innovation the aspect of market ability the aspect of industrial utility must be there in the context of invention it may not have market ability immediately but in the context of innovation it must be new at the same time it must be no obvious and it must have industrial utility okay.

Now I mean it must go to the market no I mean it must go to the market okay it must attract more and more censures that is how we will I mean that is how these 3 I mean Edison insull and Mitchell they were strong conceptualizes and they determines and they were determined solvers of the problems frustrating the growth of systems and the strong and there strong concepts resulted from the need to find organizing principles powerful enough to integrate in purposeful directions divers factors and components.

Okay and the problems emerged has a system builders strive to fulfill their ultimate regions not one of them either even Edison insull or Mitchell not any one of them was satisfied to solve a part of the problem simple or simple to the part of the problem I mean simple to invent or simple to manage or simple to finance for each belief that the inventions do not become and innovation the malarial structure would not evolve and the finical means would not bring growth unless e4lcetric light and power where used as coherent system.

They must constitute a coherent system I mean inventions management as well as finance okay based focusing up on system directing at attention to these individual through presided over there growth it is imperative to identify stages in the history of electric light and power that is why whenever we talk about technology we must be able to reflect on the social history of technology.

This is very important otherwise there is no point in studying technology because technology whenever we talk about technologies always it is social technical system around 1880 when Edison flurries electric light in power where clearly in the invented stage and he is represectives of many other leading inventors like Thomson, stand live test law I mean isull rouge to prominent about one quarter century later I mean in the past decade of the of the 20th century.

After the technology had been shaped and managing large utilities was and even greater challenge has a result the names of utility heads like John Laid, and Insull dominate the induct. In the 1920's events and managements remain important but regional systems enhanced organized and managed by holding companies dominated the sin and the individuals like mutual stone Webster and again itself where per-eminent.

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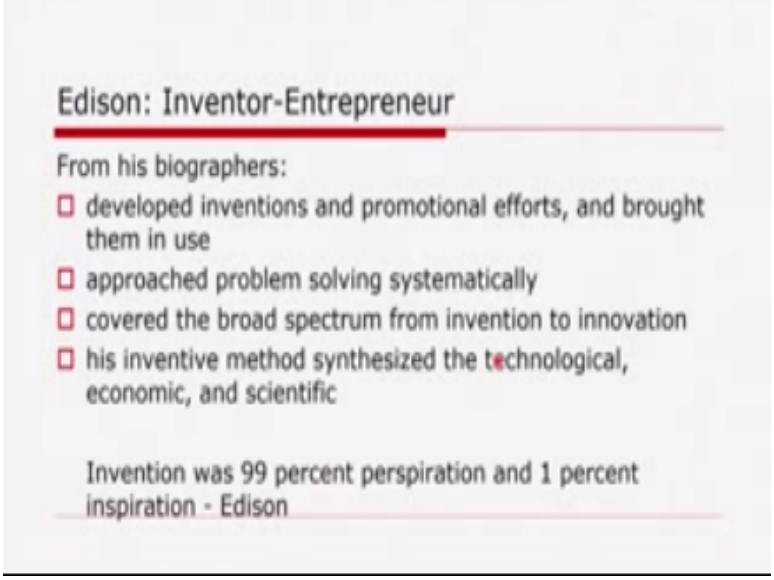

But for our purpose we are going to discuss Edison as an inventor entrepreneur okay, we are no I mean inventor entrepreneur Edison as an inventor entrepreneur by keeping the other two Insull as a manager entrepreneur and Mitchell as a financer entrepreneur okay, this is very important. Edison what we get to know from his biographies I mean what we come to know from his biographers reflection on Edison's life.

Edison was not a simple tinker hunting and then trying his way to new inventors, he said that he was no genius of heroic propositions invention he explained interestingly was 99% perspiration and 1% inspiration he is more scruples and better informed biographers portrait him as more than an inventor they describe his engineering activities as he developed his inventions and his promotional efforts as he brought them into use.

His note books give evidents that his concepts where gold and give best they go beyond the territory of invention when I say I mean they go to the real of both management as well as finance. Edison's activities covered the board spectrum from invention to innovation I mean market, finance, management okay, he approached problem solving systematically and his incentive methods synthesized three things, one is technological second the economic and third scientific.

In his early days Edison was contained to invent a quarter plates telegraph a telephone transmitter I mean that is receiver was a necessary after thought for regimes of competition or some other component of a technological system. Someone else of course not Edison integrated

those components into a commercial system rate which was red deter the ultimate consume target, customer based.

After Edison moved to manure part to establish his research laboratory in 1876 and when he decided to introduce a system of electric lighting in 1878 he reach was far more extended and sweeping. He was ready to preside over the introduction on the market of a complete system of technology synthesizing components of his own invention. As an inventor entrepreneur Edison co-ordinate a theme of electricians, mechanics and scientists and co-operated with associates concerned about the financial, political and business problems affecting the technological system as a whole okay.

After conceiving in general and sweeping terms of a system of indentation lighting in the fall of 1878 Edison announced his french gel with a fun fair in the New York sun on the 20th of October 1878. Always good newspaper copy he told reporters of plans for underground distribution in names from centrally located generators in the great cities predicted that he is electric light would be brought into private houses and simply substitute it for the gas burners at a lower cost.

And confidentially asserted that he is central station would furnish light to all houses within a circle of half a mile, he spoke not only for regime you can descent lamp but of other investors components of his system such as meters, dynamos and distribution invents. A month earlier he had written privately of his concept have struck a bone enzyme electric light indefinites of division of light.

He was in essence sharing his moment of inspiration with associates and radios of the sun New York sun newspaper, he had no generator, no promising in tendence and lamp much less a system of distribution there where at least a year away. Edison however had the concept let me quote what he said, he said I have the right principle and I am on the right track but time, hard work and some good luck or necessary too it has been just so all so in all of my inventions the first step is an intuition and comes with a burst and the difficulties arise.

These things gives out and then that bugs as such little faults and difficulties are called so themselves amongst of intense watching study and labor request it before commercial success or failure is such an list but he had the right principle, he was on the right track. From his

biographer is what we learn that he I mean Edison as an inventor entrepreneur he develop inventions and promotional efforts and brought the main use.

He approached problem solving systematically I mean the first step is intuition okay, second I mean with the burst and then difficulties arrange these thing gives out and then that, okay I mean whenever you look at a particular invention by an inventor entrepreneur namely Edison okay, it covers the broad spectrum from invention to innovation I mean he is inventing methods synthesized all three components as we have already discussed technological, economic and scientific okay.

His biographer's also report that Edison had a general concept of his system in the fall of 1878. For example, frenches gel who joined Edison as a laboratory assistant in November and who later published remissness of the manure part days recall that in October 1878 12 months before the construction of a practical incandescent lamp and the announcement of his basic generative design let me quote here that Edison and his plans figured out as a great general figures out his battle strategy before his first canoeist find, first rule, first norm his find.

The secret according to gel of his accomplishments lay in his earlier vision far in urbans of realizes. Obviously as a determent conceptual as a Edison conceptualized so order dizzily and a mark up on the invention of an entire system because he had a laboratory and staff to do draw. He integrated the individuals I mean he integrated the experts and facilities with his concept just had as he did the technical components, okay by synthesizing all these three technological, if you look at this technological economic and scientific components, okay.

At Menlo Park there was a hierarchy of systems his note book show that he assigned to his mentor park electricians, mechanics and scientist problems associated with the various components of the system when I say various components I mean various parts of the general problem. The broad concepts where generally I mean where generally developed by Edison himself as an inventor entrepreneur okay, the individuals experimented they experts experimented and calculated within the rubric of his guidelines.

Among those to whom he turned often in the first two years of work on the electric light system where obtain gel bachelor and quiz and analysis of the first 200 of the laboratory note books which began in November 1878 and covered the years of 1879 as well as 1880 indicates that Frances often figured most often in the experimentations as well as calculations. Frances often

did a literature search for Edison in the fall of 1878 in New York City before he joined at Menlo Park just before taking up residence there in December often asked if Edison wanted him to continue this search in posted in the united states of America because the Berlin summary of progress infringes since 1857 and an indexed to moving the aniline where there.

Edison link his expirations to invent the system in a field of technology cultivated by scientists as well as electro science to be filled if we grew if we drew upon science after reinforced in supplemented Edison in this regard Edison systematic approach ignore disciplinary boundary it that is why whenever we talked about science technology and society we do not restrict ourselves to a particular discipline.

That is why when we initiated our discussion in the initial lectures that it is STS science technology and society in a many disciplines we borrow ideas from philosophy of science history of science sociology of science so on and Edison's systematic approach thus ignored are going beyond disciplinary boundaries today we would say that it was the problem not disciplinary he was he is approaches problem oriented not discipline oriented.

As characterize as a scholar and gentlemen by his planar Menlo Park companies he had studied at Philips academy and over and Ellen at Burleson University in Germany okay I mean Edison council business and financial advisor recommended him to Edison knowing of his need for a free system mathematics.

Jell said that whatever optimum and rewarded on was executed purely mathematical manner and any angular at oxford integral and differential calculations they differently equations after concentrated at development of dynamo for the system jell appears frequently in the notebooks in connects and with lamp filament investigations he also came to Edison jell also came to Edison in November or December of 1878 on the recommendation of laurel okay.

As a junior scientist as a he had rate every scientific paper one could find and has a young man he became a great admirer of Edison's, Edison's inventions Edison lights Edison's research laurel whole general counsel for western union employed jell as an office boy and arranged for into taken apprentice score in the western union repairs of jell also attentive coupon union evenings studying chemistry, physics.

Another member of electric lighting team was Charles batchell, batchell Charles batchell to filled out the Edison system for he was in ingenious master craftsman and whose experimental techniques and mechanical attitudes aptitudes kept in Edison's right hand batchell was so intimately involved with Edison in all of his works that is absence from laboratory was invariably signal for Mr. Edison to suspend level.

John crazy who was in charge of the Menlo park machines of also plays the measure role trained in Switzerland find that mechanics he could adeptly construct Edison various designs with nothing more than rough sketches he like I mean crazy just like batchell had been with Edison in new York before they establishment of Menlo park laboratory.

It is very important to understand Edison as an inventor entrepreneur he is the conglumerison of many other experts many other individuals I do not want to Edison in any sense but Edison and his electric light must be examined the context of this kind of social history of technological systems many other where assigned to work on various components of the evolved in electric light system okay.

For example a formal officer in the Austrian telegraph call builds stimulus in system with batteries for generators find were for the distribution system and register for the load jell reported that loss of conducted networks at his finger tips the names of some other Edison pioneers to make it possible for him to invented and develop an entire system include Olsson art head hammer and so on okay including bowyer.

The availability of this varied talents experts helps explains the character of Edison concept of the system that is why when we said it invented this system okay or manage the system or mutual financed the system okay these kind of invention of that particular system is very much encompasssive okay further more there you are supported by they were also supported by a broad area of expensiveness and tools chemical apparatus scientific instruments and electrically equipments in the Menlo park laboratory complex.

The major reason for the establishment of the Edison electric light company in October 1878 was to acquire funds for additional laboratory equipment and new workers like after an jell obviously the common characteristics of Edison he is experts I mean this kind of various talents that he was associatively with okay and the laboratory with set by the systematic demanding endeavor at Menlo park.

There was more than system there was an community as well Edison chose Menlo park because the isolated rural setting insulated the staff from the distractions of an urban environment like new York Edison and other members of the community bought or rated farm houses after an brought his bright to an compatible house provided with new Edison light others lead to at Mrs. Joydul Hossain nicely appointed boarding house located at sort what from laboratory compound okay.

That means undoubtedly country and the environment was well order they were scores of undoubts about the character of life in the laboratory okay if one wants to read one can read even laboratory like by but that is an another thing okay that which there are scores of undoubted repeat about the character of life in the laboratory including the count of late our breaks.

On these occasions the pipe organ at the end of the labs second floored since the working days sometimes extended nearly 24 hours it can we assume that Edison was willing to charge the expensive the system they community and the style of invention were essentially Edison few witnesses or historians challenge the conclusion that the organizing genius was Edison's yet there was one individual appears to have closely advised Edison on financially political matters.

Edison laid down the guidelines for bachelor optimum the laboratory but laurel often laid Edison when the problems involved all straight or new York city politicians Edison how well did not step back inverse himself in technology and scientific programs and leave the element of politics to laurel the correspondence of that Edison always at a prominent role in the financial and political systems.

Because of his knowledge of the world of legal business and financial affairs laurel strains complemented Edison laurel took up the practice of law new York city and act as the council to the US express company well he was also the legal advisor to the financial entrepreneur in 1866he became general council of the western union telegraphic component.

A position that brought Edison and he together in connection with telegraph important will discuss IPR intellectual property rights towards the end of the lecture this lectures laurel was one of his those who persuaded Edison to turn to electric light having observe the sensational

publicity given to the introduction of the Paris in 1878 Edison to enter the field and offered to raise the money Edison needed to expand Menlo park.

Not only did he advised not only did he advised Edison he often encouraged the inventor in 1878 that the income from electric lighting pertains would be fulfilled and Edison to said to you of forever to enable you to build in formally in working laboratory such as world needs and as never seen at the time the only buildings in the Menlo park were the laboratory building the carpenter's of and the carbon said there were no message from library or office.

We have shortly forward Edison gave laurel free hand for this negotiating the forth coming electric lighting pertains and establishing business and society and entrepreneurs that home in abroad let me quote here as he said go ahead I shall agree to nothing from his nothing to any person living the whole matter doing. All I want to present is to be provided with the funds to push the right rapid because the inventor entrepreneur Edison wanted United States of America under light, 24 x7 even when the sun sets.

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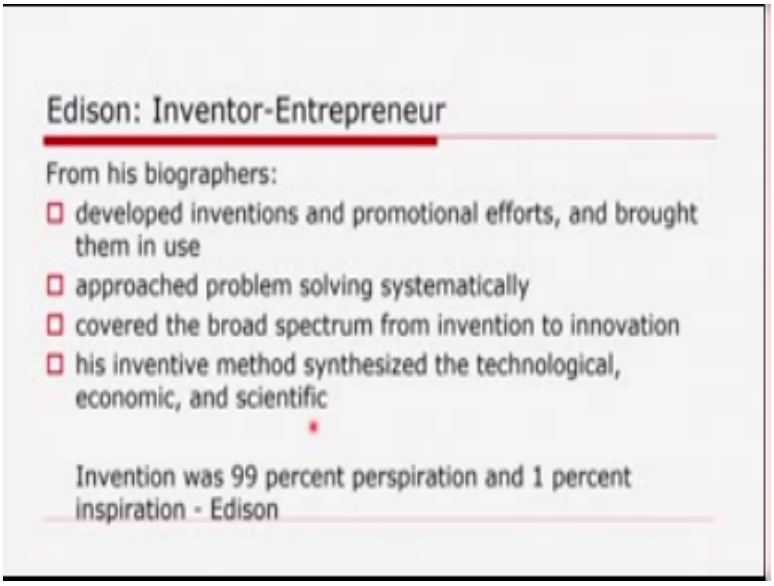

He had closed contacts with the new financial political world he is law officers where on the 3rd floor of the building working closely with is long time an Italian financial engineers and partner Morgan from drug. His skill and effectiveness in dealing with the politician and political problems is conveyed, in December 1879 arranged lobbing extra. The objective was to obtain a

franchise allowing the Edison illuminating company to lay the distribution system for the 1st commercial Edison writing system in New York City.

Behind the opposition of some New York City elder man laid gaslight interest and lamplight who might be thrown out of what by the new intendance light. A special train brought the male elder to Menu Park behind the opposition of New York City elder man lay gaslight who might be thrown out of what by the new intendance light. A special train brought the mayor elder man to park in the dusk they saw the tiny lamps.

After a 2 hour demonstration and his staff some pointedly complained of being thirsty which was signal for the group to lead up to darken the 2nd floor of the laboratory. Light suddenly went on to disclose the famous Edison and the Edison case in due time the franchiser was granted, the franchise was as necessary for commercial success as a well working dynamics okay. the organization was meant for the companies formed by Edison in connection with the electric light system.

Here it is important to emphasize that the precise time character of the companies manifested Edison determination to create a coherent system and his willingness to broad spectrum of technological change. The 1st company formed that is the Edison light company was essentially a means of funding Edison inventing activity and obtaining the return of investment by cell or license on the system throughout the world.

The Edison electric illuminating company of parent Edison electric light Company, the Edison electric illuminating company build the 1st commercial Edison system with it is central generating station New York City which was started in 1882. Edison invented and developed all measure components for the integrity system. The boiler and the steam engines he had also to establish the Edison to build.

Edison electric tube company to make underground conductors and the Edison lamp works to turn out intent ended in the lamps and haunt it. He entered into partnership with bulb man in accompany to produce various accessories, not only the Edison the pivotal during the earlier year, she personally supervised the construction of station in these companies Edison was an engineer and manager but the focus and the commitment for him remained invention.

Solve the real world problems, supplemented and complimented by staff and by the particular resources of Edison solved the problems associated with technological change and various levels and in a systematic integrated way. Approach to problem solving clearly demonstrated however in the invention of light, Edison could not conceive of the technology as a distinct from the economics at least when engage to electric plate system. After intuiting the project he read deeply about gaslight from the central station.

Also he conversed the potential lighting market in the Wall Street in New York where new intended to locate his 1st central test. His book showed that he analyzed the cost of operating the wall light generators that he had acquired for test purposes. From the available literature Edison also determine the cost of operating lighting system, laboratory notes reveal that he was especially concerned about the cost of copper hope to reduce it to.

1878 Edison estimated that the physical plan need for one intendance is system would require capitalization of 11$ at that time. At the interest rate of 10% this investment of 300 hours a year, the person per lamp would have to be more than 3.66m/h. Edison was clearly thinking moving the context of capitalistic system. The book that he was a simple inventor tinkering with gadgets, there on page after page is concepts engineers' experimentation and sustained and close economical.

Notebook 1 and 20 what you suggest one of his biographies in that probably 1880 as 30 pages calculation. I mean for example his 30 pages of calculation probably under Edison instruction about the cost and the income of the central station applying 10000 lights at that time. These were probably an anticipation of the pearls system we build in. his ambition was to see New York City always within light.

These were probably an anticipation of the pearl straight system to be build in city by the time the calculation were made knew enough from experimentation and literatures such as presume that steam engine could supply 816 lamps. Therefore they needed about 1200hp for the 10000 lamp system to house these power plant they estimated and iron structure or building that would cost 8500$ at that time 1880.

He predicted that the steam engines and dynamos cost 50000$ there were very expensive after calculation they estimated 57000$ and ultimately if you look at it came to almost $1,00,000 I

mean or infact estimated minimum income from 10000 installed lamps they calculated at the time more than 1.5lakh. these are very important I mean whenever you talked about invention, entrepreneur you must able to speak management as well as mind.

When you switch from invention to innovation you must keep these things in mind, calculation like these where as much a part of Edison invention and development of lighting system as it is overly published and well to find the lamp. As matter of fact the search for the lamp was conditioned by cost analysis like the way we calculate it. It is know that Edison was determined to discover a high resistance lamp in the contrast to low resistance.

It is not widely realized that he is determination was a logical deduction from cost analysis to explain this we must consider the cost analysis once more and also introduce science. We shall demonstrate that Edison method of invention and development in the case of electric light system was the blend of the economics technology is experiment design and science in notebooks pages of economical calculations are mixed to pages reporting of experimental data and among these one encounter reasoned application and hypothesis formulation based on science the way these is originating packet line as much in his synthesis as in his exploitation of the research facilities utilization of this facilities at group okay this I mean there may be there are many calculus okay to solve the deli bale that the current.

But the current was needed to light the instances so how was one to reduce I mean to solve this dilemma Edison try to synthesize again the three component technological economic and scientific okay want to reduce the current in order to lower conductive losses Edison realized that he could compensate and maintain the level of energy transfer to the lands by raising the voltage parts then he brought ohms law into play ohms law I mean resistance is equal to voltage divided by current okay it is the eureka moment from him in which philosophy what we learn that arc metrics used this term eureka I have found it, I have been invented.

Now I have know it I mean it was the eureka moment for he realized that by increasing the resistance of the inductances land phenomena he raised the voltage in relationship to the current in that case resistance was the value resistance between the voltage and current okay hence it is time consuming search for high resistance melamine but the notable invention was the logical detection the familiar was the hunted and try of that while the essence of Edison reasoning seems clear from the available what huge try to do huge I mean what hear to find in his note books or

elsewhere when he realized that high resistance allow him to achieve the energy consumption beside in the lamp.

And at the same time keep low the level of energy loss in the conductors and economically small the amount of coppers in the conductors in an essay attributed to Edison and send to Henry for at his requesting 1926 Edison stated that in the fall of 1878 he had experimented with carbon Flaminius but that the major problem with these was that low resistance he absorbed that in a lighting system the current require to light then it great numbers would necessitate such large copper conductors for men's and.

So on that the investment would be probated and absolutely un-commercial in other words an apparent remote contribution the amount of copper used for the conductors was really he commercial tax of the problem he provided better evidence that about the time of origins of its high resistance conception stating that about Dec 1878 that he was engaged as mathematics young man named Francis otter the figures prove that an electrical lamp must have at least 100mh resistance to complete commercial with gas Edison.

Then set that he turned from carbon to the various metals in order to obtain a filament of high resistance continuingly along these lines until about 979 when he had a platinum of great from his because gas had been driven out of it there by increasingly infeasibility Edison then established a high resistance fragment between December 1878 and 1879 metros that Edison wanted a high resistance land as early as October 1878 and has reached these conclusion by listening about the engaged system of electric light that also states that Edison listen to the essential of this system by applying joules and ohms law Edison listening can be illustrated with a simple example using a approximate abounded of values by 1818 he obtained a carbonized paper filament with resistance 130ohms volt to about 70 to 80 ohms heated you wanted 100 ohms.

They desiring a land with can be power equivalent to gas he found that this filament required in presenting units the equivalent of about 100volts this meant that the product of voltage across the land when the current must equal 100 volts since the resistance was 100 ohms the current had to be 1amp because joules law the heat energy was equal to the product of the c2 and the resistance I mean that we know that was the resistance we discussed resistance was equal to voltage divided by current okay I mean if you look at these to summaries today's lecture I mean we started with

Edison and electric light in terms of the social history of ideas and the social history of technology.

And the study of solving the real world problems how that was combination of three systems I mean inventions, management as well as finance that is where Edison is known as inventor or manager and mutual as a finical entrepreneur, entrepreneur indicates the organizational system building driver of these three genius edition and mutual were strong political conceptualize and determine solve the problems frustrating the growth of systems they are strong concepts resulted from the need to find organizing principle powerful enough to integrate in purposeful direction to diverse factors and components what we learnt from his barographs from Edison biographers that the invention and development.

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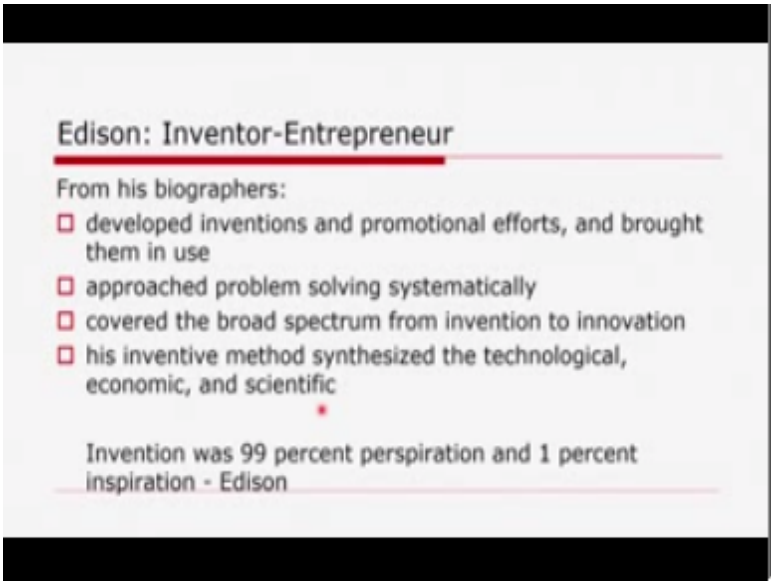

Of the inventor light seems to have been the leading gauge of Edison's systematic approach after the character tics of the lamp where is established then the problem of energetic design was generally defined the generator for instance set to supply 100volts for the parallel world where inventor lights and amplitude equal to the number of lamps times approximately 1amp the relationship between the generated and lamps was determined by the decision to where the lamps in a parallel with in turn resulted from the need to keep the system voltage at a safe level.

And to keep possible operation of the lamps independent of one the Edison system was involving like a drama with a cost of developing interacting ideas in October 1879 the sense month in

which he found the first practical fragment Edison announced the generated for his system other components fallowed in September 1882 the system begin to supply lights for the wall so destruct with the opening of the of the Edison electric eliminating company in the age of central station in condition writing it bigger so the moderation of public thereby we witnessed the modern age of public electricity supply I mean that is how the modern age of public electricity supply had opened in a what we found from his biographers that the way Edison has invented entrepreneur how he developed invention and promise on leopards.

And brought that a huge he approached problem solving in a systematic manner he covered a broad spectrum from innovation invention to innovation I mean you have not trying to create something new but also you are trying to create something new for the market for the consumers of the end users he is incentive method synthesized three components that is the technological the economy and scientific and that is how he said that the kind of into Edison that invention was 99% in 1% okay still gone with the social setting of technology in contribution with technological settings of society and technological setting of technology itself in the lecture we fallow we are going to provide more examples on the social setting of technology.

But the dilative relationship between technology science and society must be kept alive for the debates to continue because our real world problems they involve controversies if controversies remain then our debates must remain even if we thing that our we are done with controversies but we must debate those controversies we must try to debate in the controversies over time across space okay in the lecture to follow what we are going to do we are going to provide more and more examples on the principle of this social stepping of technology or the methodical cannons of social steeping of technology okay.

And then I mean before we move on to how science today how scientific knowledge in India today external from turn into an intellectual property from public resources we will also discuss reception of modern science in India in the lectures to fallow but before getting into before getting involved in critical discussion on science and technology in India we will provide more examples to substance ate our view point our perceptive on the relationship between technology science and society I mean our perceptive on social setting okay.

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