The Remains of Tomorrows Past : Speculations on the Antiquity of New Media Practice in South Asia

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I would like to thank **Tapio Makela** and **Amanda McDonald Crowley** for the invitation to be present at ISEA 2004 and to share with you an array of speculations about the histories of all our practices. My talk is titled : *The Remains of Tomorrows Past - Speculations on the Antiquity of New Media Practice in South Asia.* One of the origins of this talk lie somewhere in a slightly chaotic New Delhi afternoon with Amanda while she delighted us with her effervescent presence in Sarai during which I think I said something to the effect that it would be nice to throw a spanner into the proceedings of the next ISEA by talking about the role played by bamboo in the history of electronic art and new media. Ever since that somewhat frivolous and chance remark, I have been thinking about what I am going to have to say about Bamboo. Today I have to deliver. What I present today to you is one attempt at trying to live up to the word I gave to Amanda McDonald Crowley, So, this one is for you, Amanda.

The South Asia that I invoke is not a bounded space but a networked entity that straddles various cartographic imaginations in different ways. The 'New Media' that I talk about is unglamorously analog, occasionally hand powered, sometimes framed by bamboo supports and usually sheathed in organic resins, and the Antiquity I refer to (with an important exception) does not go back much beyond the nineteenth century.

Having scuttled my project with all these disclaimers I must also confess that I lost all the slides I had about 'Avatars' and the other computer science achievements of ancient Indic civilisations, from recursive coding to meta syntactical schemas to mnemonic devices and cryptography and the fact that we know that South Asian mathematicians had been working with the zero at least in the 9th century of the common era, and if that is the case then we can say - how else would there have been binary numbers if there had been no zero and so on. And if there were no binary system, there would not have been computers as we know them now, and if there were no computers there would not have been ISEA and if there were no ISEA we would not have been here, neither you with your 100 Euro tickets nor me with my tall tales.

You know how it is, put an Indian behind a lectern or on a stage and he or she will tell you how everything began in India, and how they are the reason for everything to be what it is, and the source of all wisdom on the planet, and gullible westerners will part with serious amounts of money to hear this being said provided they also have to bear with the discomfort of sitting cross legged on their butt and eat badly cooked vegetarian meals afterwards. But really, jokes apart, I did not come all the way to Helsinki to brag about ancient Indian mathematics and the significance of a number for nothing. Unfortunately that's a different kind of talk that can only be given by a different kind of person, perhaps someone who can be found more easily in California than in Delhi, which is where I live and work. So apologies in advance for not being value for money on that score.

If, despite all this you do decide to stay on, what I hope to do, is to inaugurate with you a conversation about how the new media universe that we all inhabit today, looks, feels and impacts differently, when seen from the vantage point of another, sometimes not very distant time, and a different set of latitudes. I hope to give you a slightly different picture of at least the world that you think you are familiar with, and appraise you with a history that you perhaps did not know that you had. In doing this, all I am actually inviting you to join me in is an attempt at setting right some of the parallax errors that creep into our understanding of who we are (and here by we I mean the broad community of new media and electronic arts practitioners that gather at events such as ISEA) and where we might stand.

My presentation this afternoon consists of a series of forays into a territory that my colleagues and I have begun exploring - alternative histories and cultures of technologies of communication - in Sarai - a programme of the Centre for the Study of Developing Societies in Delhi[1]. What I will offer to you are a set of speculations that log the preliminary progress of some of these explorations. Far from being a definitive account of the field, they are more the result of a tentative and very provisional set of sightings of what I think are some of the landmarks of an exciting but relatively unexplored terrain. I offer this paper as a provocation and as an invitation, in the hope that it will invite others who are far more qualified than I am to enter into a series of historical investigations of alternative global histories of new media. I am not a historian or a theorist, I speak as a practitioner, who follows with my comrades the commands of a nose perpetually distracted by the fragrance of well cooked histories. I do this to try and understand what I do.

1. Acknowledgements and Antecedents

But before I begin the presentation, I would like to acknowledge the fact that I am particularly grateful to the discussions and convesation and work that that I have shared with **Monica Narula** and **Jeebesh Bagchi**, my colleagues in the Raqs Media Collective,[2] (like everything we do in Raqs, this paper too emerges from our work as a collective, from the air we have been breathing together for the last 13 years, especially in terms of the discursive engines that propel the ideas that lie at the core of this presentation) and with **Mrityunjay Chatterjee** and **Iram Ghufran**, my colleagues in the Sarai Media Lab, and with **Ravi Sundaram**, **Awadhendra Sharan** and **Bhagwati Prasad**, colleagues at Sarai - it is the generosity of these conversations and the spirit of intellectual and creative solidarity at Sarai that accounts for the insights and ideas that have gone into the making of this presentation. I would like to flag in particular, what Ravi Sundaram has elsewhere called 'Pirate Modernity'[3] as a telegraphic, (appropriately telegraphic) and highly condensed shorthand notation that helps us inscribe the histories and practices of media culture outside the colonial metropolis of the nineteenth and twentieth centuries, and what Jeebesh Bagchi calls an ethic of 'Defiant Access' to media culture, which is the way we have had to learn to be new media practitioners. I am indebted especially to Monica Narula, my greatest critic and dearest friend, for teaching me how to think the present continous tense even as we continue to obsess about the past, and dream about the future.

The shortcomings, and oversights, wherever they occur in this presentation, needless to say, are attributable to me alone. 'The Network of No_Des' a hypertextual interpretation of the day to day life of new media in Delhi, a work produced by us at the Sarai Media Lab is something that this presentation owes a lot to. Many of the Ideas that have found their way into this presentation were incubated in the research that we were doing in the Sarai Media Lab in preparation for the Network of No_Des [4], and I would urge those of you who have not already seen it to take some time to browse through it, should you find the time to return to Tallinn - although it will be available very soon.

I would also like to draw your attention to a small but growing body of literature in the history of communications - an emerging discipline that is changing the way we think of new media, that has helped me formulate many of my ideas and questions in this field. Within the South Asian context there are magisterial technology historians like **R. K. Kocchar** [5], and a young labour and technology historian **Deep Kanta Lahiri Chowdhury** [6], both of who's recent writing I am deeply indebted to, for much of the contents of this presentation.

I would also like to acknowledge the science and technology writer and journalist **Tom Standage**, who's recent book 'The Victorian Internet' [7]essays many images, facts and metaphors that I will echo today. I also have in mind the little known but excellent specialist - a Finnish historian of telecommunications **Jorma Ahvenainen** who's "Far Eastern Telegraphs" [8]published in 1981, in some senses paved the way for the cultivation of a global approach to the history of the telecommunications industry.

(I am mindful of the fact that we are in the country that Nokia comes from. And what is not often appreciated is the fact that before Nokia became the mobile phone giant that it is today, it specialized in the manufacture and installation of telegraph cables, especially undersea telegraph cables. It is no wonder then that there is a rare appreciation of the the history of the labour that goes into making the nervous system of our planet here in Finland.) What I will have to say is something that I would like to be seen in the same spirit of respect and affection for all those who laid down the grid.

You would not be wrong if you were to say that all that I have done is to eavesdrop on the history of a fascinating conversation, to morse code like taps discernible through the hum and static of the cable that connects us to the past, perhaps to the future. But then, I have always considered listening to be a most honourable calling. My speaking would be impossible had I not spent some time listening. My writing rests awkwardly on the shoulders of all the reading that I have done.

Let me quote here in my defence a somewhat unfashionable poet, someone I am happy to claim as a fellow South Asian, who, in his own day was just as fascinated by the 'New Media' of his time as he was by the adventures of orphaned adolescents in hot countries. Here is **Rudyard Kipling**, better known to the world as the man who gave us the Jungle Book, Mowgli and Kim, rhapsodising antique new media. The poem is called "The Deep Sea Cables" [9] and I want to share it with you today, because it dredges up with some drama, some might say, with fulsome sentimentality, the romance of the telegraph cable, of which I will have much to say as I go along.

The Deep Sea Cables
by Rudyard Kipling

The wrecks dissolve above us; their dust drops down from afar -
Down to the dark, to the utter dark, where the blind white sea-snakes are.
There is no sound, no echo of sound, in the deserts of the deep,
Or the great grey level plains of ooze where the shell-buried cables creep.
Here in the womb of the world - here on the tie-ribs of earth
Words, and the words of men, flicker and flutter and beat -
Warning, sorrow, and gain, salutation and mirth -
For a Power troubles the Still that has neither voice nor feet.
They have wakened the timeless Things; they have killed their father Time ;
Joining hands in the gloom, a league from the last of the sun.
Hush! Men talk today o'er the waste of the ultimate slime,
And a new word runs between: whispering, `Let us be one!'

Let us be one. Let us at least try to be one, even if not in Kipling's 'Imperial' sense. Let us at least try and see if we can share in a planetary sensibility with regard to communication practices. Let us not fool ourselves into thinking that everything that is valuable in the contemporary has a delimited cultural origin that centres on the northern hemisphere, in Europe or in North America. Let us forego claims to primacy in the history of our practices, Let us not priviledge the current moment and foreswear our debts to the past. Let us try and listen to what it might have to say.

2. The Fickleness of Novelty, and an Antidote for Cultural Claustrophobia

As practitioners of New Media, which is one way of describing anyone who works in the electronic arts, we can often catch ourselves feeling bereft of a history, compelled as if to inhabit the eye of a storm called the 'new'. We are the miscegnated progeny of the furtive couplings of the information practices and cultural processes of the past, warily looking up from our toadstool level at the tangled branches of the sheltering family tree. We are close to the roots, far from the branches, thriving on the remains of fallen ancestors, waiting our own turn to be compost for the mushrooms of the future.

Anyone who has ever had their thought or their practice tagged as in any way 'new' is destined to be nagged by the anxiety of looming obsolescence. Having lived through the roller coasters of dot com booms and busts, broadband waves and bottlenecks, dot net utopias and dot org wastelands, we, the generation that grew up in or to the internet, no when and matter where we grew up, we are all already history.

Novelty is a fickle companion; the 'New' just doesn't stay new for very long anymore. Today's killer application is tomorrow's exhibit in a technology museum. Today we have e-mail anxiety attacks; once upon a time, our hearts skipped a beat at the sudden, staccato arrival of a telegram. In Hindustani, the idiomatic mode of conveying urgency, immortalized in the plea that the distraught heroine in a village far from the nearest telegraph office makes to her lover in the distant city in innumerable Hindi films from the 1930s, 40s, 50s and 60s is - *"is chitthi ko telegram samajhkar aana"*, or "rush, consider this letter a telegram." I want you to consider what I am going to present today to be a set of hurried, perhaps somewhat disjointed telegrams. Messages tapped out with a certain urgency from a far away set of places. As I transmit them to you, I will also try to decrypt them, so that we can begin to see a few echoes and resonances across time and space.

Every time is laden with its own assorted cargo of 'futures'. Some of these 'futures' or promises, come unstuck and drift away into a temporal limbo, stuck between the tenses like odd bits of floating grammatical anomalies. They are neither *'would be-s'*, nor *'have been-s'*, but mere *'could be-s'*. I call these anomalies - the 'Remains of Tomorrow's Past'. They are what to someone in our *'yesterday'*, might have appeared as if they were capable of maturing into credible *'tomorrows''*. Thus we can see many potential futures at any given moment. Each of these futures is related to every other future that is potential, and the one that matures into a 'credible' tomorrow, is in my view, continually indebted to the others it left behind. No one 'future' can exhaust all the promises of tomorrow. And we must return to the imprisoned and abandoned futures in the past to renew our own tomorrows. This is why I insist on revisiting tomorrows past.

What is true of time, is also true of space, of geographical and cultural distance. The ideas that spring forth, as if they originated in a given space, can usually

through a process of investigation be seen to have a complex matrix of origins. Their components may derive from the commerce in ideas, concepts and innovations that is a standard incidental of cultural contact. Ideas and innovations emerge in a cultural context. A cultural context is something that I can only think of as being like a harbour or haven for ships that have berthed after travelling what we in Bangla like to call *"Shaat Shomudro, Tero Nodi"* or seven seas and thirteen rivers. Nothing comes from just one place.

Nevertheless, we continue to suffer under many misconceptions. Such as the idea that what is new media, must always have had, and will always have a strong transatlantic, middle european, and to a certain extent, pacific rim cultural tenor. New Media is what happens, or happenned in New York, in Amsterdam, in San Francisco, in Berlin, in Vienna, in Nagoya, in Yokohama, in Seoul, in Sydney. Perhaps after this ISEA, it will also speak hopefully, in Finno-Ugric accents. It should, given that the future of new media technologies and practices may be more influenced by Linux, which began here, in Helsinki, and to Nokia, then it will be by Microsoft and Motorola. Anyway, what I am trying to say here is that the notion of a Eurocentric, or Transatlantic, or Sinocentric, or Indocentric or whatever-centric new media culture is only an illusion, because it is based on the fallacy that communication cultures arise in isolation from each other. Nothing does in the realm of culture, least of all with respect to cultures of communication. Some people would go so far as to say that nothing does at all. I am inclined to agree with this view, and with it's explanatory force and generosity, but for the moment let us stick to the narrower universe of media and communication culture.

You might ask then "that if we are to abandon our servitude to novelty and loosen the anchor of latitudes, how can we even begin to narrativize or historicize or offer any concrete explanations of what we are, how we came to be, and what we are about." Let me suggest a line of thought that might be of some help.

One way of looking at cause and origin is to pin down a time and a place where something emerges. Another way is to reveal, layer by layer, the complex web of time, space, events, processes, interactions and cultures within which that emergence is nested. To see things in this way is to emphasize a materiality of relatedness above a solipsistic, idealistic and monadic origin myth. My contention here is that it is time that the New Media cultures of Europe and North America overcame their immature solipsism, and understood that theirs too is but a provincial and provisional moment in the unfolding of the material history of communicative practices. Similarly, it is time for cyber-triumphalists, say in India, to heed the warning that just because the zero, and the idea of 'sunyata' or nothingness began being used in sanskrit texts on number theory and philosophy sometime in the first millennium AD is no reason to think that the origins of binary code lie in south Asian culture, and that therefore Indian programmers will eventually prevail and rule planet earth. (There are some people who think seriously along these lines, just because lots of Indian programmers, schooled in the computer programming assembly lines of engineering institutes in India, got lots of HIB visas to go to silicon valley). Arrogance of this sort can only need to debilitating anxiety. [10]

The liberation from having to think of yourself as unique and new, or the very origin of everything, means that you don't have to be so paranoid about ending when you have to, letting go and moving on.It also means that you dont have to hold on to cultural material as if it were your property, produced by dint of your monadic transformative authorship, but more of that later. If tomorrow all the computers in the world spoke to each other only in Finnish or Swedish, (as they do in something resembling English today at the level of higher level programming languages, at the level where the words for 'if', 'then', and 'run' become embedded in the commands we give to a machine) in homage, let us say to the cultural antecedents of Linus Torvalds (may peace be on his name), it would be neither a good thing nor a bad thing, it would just mean that a lot more people would have to learn the Finnish or Swedish words for if, then and run. Communication would not have come to some terminal end merely because the residual anglo-saxon linguistic imprint on programming culture were somewhat modified in a Finno-Ugric or at the very least more Nordic direction. Substitiute English for Finnish, Finnish for Lithuanian, Lithuanian (which is the closest European Language to proto Indo European) for Sanskirt, Sanskrit for Hindustani, Hindustani for Tibetan, Tibetan for Chinese, Chinese for Japanese and Japanese for Xhosa and you will still get computers that can talk to each other, for better or for worse. The world of new media will not come to an end. There are in other words distinct advantages to realizing that you are not the centre of the new media universe, of realizing that the domain of media practice can be productively viewed as one which is contraindicative of the idea of a centre, or of an origin.

3. Dependent Origination, The Net of Indra, the World

Wide Web and the Network of No_des

Let me try and open a window by quoting a fragment of a text written by the Bombay based Art Historian, Curator and Poet **Ranjit Hoskote**, [11]which purports to be a discussion of the possibilities of contemporary new media based art practices in India. Ranjit writes and I quote -

"The Internet is only the latest in a long tradition of metaphors enshrining the interrelatedness of all beings, the possibility of a global community. Earlier in this genealogy, there occurs one of the most spectacular expressions of a global network that draws human, non-human and divine creatures together: the image of the net of Indra, the world conceived of as a web in which every sentient being is a jewel-like node or knot. We find this compelling image in the Mahayana scripture known as the Buddhavatamsaka Sutra, or the Sutra of the Garland of Buddhas. Called the Avatamsaka Sutra for short, this Mahayana scripture is extant only in Tibetan and Chinese translations today; the Sanskrit original has been lost. Taking for its centrepiece the principle of mutually unobstructed interpenetration, the Sutra teaches that all sentient beings are to be valued and cherished equally, without regard to difference."

Let me read to you a fragment of recent English translation [12]of the 4th century AD Chinese translation entitled Hua-Yen Ching of this now lost Sanskrit text.

"Far away in the heavenly abode of the great god Indra, there is a wonderful net which has been hung by some cunning artificer in such a manner that it stretches out infinitely in all directions. In accordance with the extravagant tastes of deities, the artificer has hung a single glittering jewel in each 'eye' of the net, and since the net itself is infinite in dimension, the jewels are infinite in number. There hang the jewels, glittering like stars of the first magnitude, a wonderful sight to behold. If we now arbitrarily select one of these jewels for inspection and look closely at it, we will discover that in its polished surface there are reflected all the other jewels in the net, infinite in number. Not only that, but each of the jewels reflected in this one jewel is also reflecting all the other jewels, so that there is an infinite reflecting process occurring... This relationship is said to be one of simultaneous mutual identity and mutual intercausality."

The metaphor of Indra's net can be found dispersed in several texts (written in Sanskrit and Pali) across the Buddhist canon, though it's most cogent expression is in the *Avatamsaka, Flower Garland* or *Hua-Yen* text. Other Buddhist sutras that refer to this net are Maharatnakuta Sutta (where we come across a modified version of Indra's Net in something called *Maudgalyayan's Net*) and in the *Nidanavagga* section of the *Samyutta Nikaya (The Book of Causation* or the *Connected Discourses on Causation)* and in the *Kaccanagotta,* the *Digha Nikaya* and the *Brahmajala Sutta* (where it is referred to as the *'Supreme Net'*). We do not have texts for all of them, we know some of them through citations, or dead hyperlinks, if you will, in other texts)

The survival of the image and metaphor of Indra's Net as it is exprssed in the Garland Sutra is itself a function of the properties of an ancient net that transmitted signals back and forth between different nodes in the ancient Buddhist world. The *Hua Yen* school, (which had Tibetan and central asian antecedents) gave rise to *Hwaom* school of Korean contemplative mysticism, which in turn is the parent of the *Kogen* tradition in Japanese Zen Buddhism. What is crucial to know here is that the first iteration of the source code, if you like, of this piece of software was lost in the very space where it was created, and what survived were rescensions, which flourished elsewhere.

The South Asian subcontinent became over time, inhospitable towards Buddhism, and like much else in Buddhist culture, little remained at the locus of so called origin. However the presence of many other nodes in the network, ensured that the signal could continue to be transmitted. Notice the parallel I am drawing here between one of the design impetuses that led to the creation of communication system that we now know as the internet, that communication would route itself around a failure, or fault in any one node in the network, and the history of the transmission of a metaphor in Mahayana Buddhism.

It is no wonder then that **Tim Berners Lee**, [13]echoed the metaphor of Indra's Net, quite consciously, in his conception of the world wide web. It had come to him as part of the unitarian heritage that he had grown attracted to. The Unitarians had long had strong affinities with dissident strands in south asian philosophical traditions, and the Universalist Unitarians [14], the denomination that Lee was to

eventually adhere to, had in particular a history of using the Indra's Net metaphor to construct an image of an interdependent universe, and to imagine an ethic of mutuality and reciprocal relatedness.
Let me quote Tim Berner's Lee to make this relation more explicit ;

"...In an extreme view, the world can be seen as only connections, nothing else. We think of a dictionary as the repository of meaning, but it defines words only in terms of other words. I liked the idea that a piece of information is really defined only by what it's related to, and how it's related. There really is little else to meaning. The structure is everything..." **Tim Berners Lee**, **'Weaving the Web'**

Or again, in an address called **"Hypertext and Our Collective Destiny"** Tim Berners Lee writes, in 1995 -

"People need to be part of the fractal pattern. They need to be part of organisms at each scale. We appreciate that a person needs a balance between interest in self, family, town, state and planet. A person needs connections at each scale. People who lack connections at any given scale feel frustrated. The international jet-setter and the person who always stays at home share that frustration. Could it be that human beings are programmed with some microscopic rules which induce them to act so as to form a wholesome society? Will these rules still serve us when we are "empowered" by the web, or will evolution give us no clues how to continue?

Look at web "home pages". "Home pages" are representative of people, organizations, or concepts. Good ones tend to, just like people, have connections of widely varying "length". Perhaps as the web grows we will be able to see fractal structure emerge in its interconnections. Perhaps we ought to bear this in mind as we build our own webs. One of the reasons that the web spread was that the hypertext model does not constrain the information it represents. This has allowed people to represent topologies they need. We have found that people love to use trees, but like to have more than one, sometimes overlapping. We have found they need structure and involvement at all scales."

It is perhaps in this spirit that we in the Raqs Media Collective began writing what came to be a text called the **'Concise Lexicon of /for the Digital Commons'** [15]in 2002. We were nor aware of the image of Indra's net in the Garland Sutra or of its invocation by Tim Berners Lee, but an entry that we made for the word 'Nodes' is resonant with both the vision of Berners Lee, and of Indra's Net, and I cannot resist begging your indulgence to quote the complete text for the entry, also because it serves as a conceptual foundation for the Network of No_des installation that is showing in Tallinn:

***"Nodes** : Any structure that is composed of concentrated masses of materials which act as junction points for the branching out of extensible parts of the overall system may be described as nodal. The concentrations or junctions being the nodes. A nodal structure is a rhizomic structure, it sets down roots (that branch out laterally) as it travels.*

Here, nodes may also be likened to the intersection points of fractal systems, the precise locations where new fractal iterations arises out of an existing pattern. A work that is internally composed of memes is inherently nodal. Each meme is a junction point or a node for the lateral branching out of the vector of an idea.

In a work that is made up of interconnected nodes, the final structure that emerges is that of a web, in which every vector eventually passes through each node, at least once on its orbit through the structure of the work. In such a structure it becomes impossible to suppress or kill an idea, once it is set in motion, because its vectors will make it travel quickly through the nodes to other locations within the system, setting off chains of echoes and resonances at each node that trace a path back to the kernel of the idea.

These echoes and resonances are rescensions, and each node is ultimately a direct rescension of at least one other node in the system and an indirect rescension of each junction within a whole cluster of other nodes. Nodes, when written, perhaps erroneously, as 'no-des' gives rise to an intriguing hybrid English/Eastern-Hindi neologism, a companion to the old words - 'des', and 'par-des'. 'Des' (in some eastern dialects of Hindi, spoken by many migrants to Delhi) is simply homeland or native place; 'par-des' suggests exile, and an alien land. 'No-des' is that site or way of being, in 'des' or in 'par-des', where territory and anxieties about belonging, don't go hand in hand. Nodes in a digital domain are No-des."

What we are trying to do here is to argue for a different logic of spatiality. Not one that does not require a map, not one that does not admit to difference, but which at the same time refuses to construct a causality, points of origin, arrows of progress, hierarchical evolutionary schemas that converge towards the manifest unifocal

destiny of the history of the industrialized world, or a hoary point of origin in a mystical orient. Instead, we are trying to argue for a world of intercausality. Where different immanences separated in space and time emerge and subsist in relation to each other. We must learn always to be both more specific, and more general at the same time. Interdependence, or dependent origination is not only consistent with a rigorous philosophical materialism that sees strands, strings, knots and webs everywhere where other visions might see isolated entities, but also demands that we actively pursue relationality as an ethic in order to protect the signals that we create from a kind of self absorbed autarkic metastasis that accompanies any attempt to construct a siege of the self by the self. Dependent origination, which the Hua-yen school termed *fa-chiai yuan-ch'i* (which in turn suggest itself as an echo of the Sanskrit expression *dharma-dhatu pratitya-samutpada,* translated either as the *"interdependent arising of the universe,"* or, perhaps more accurately, as the *"interdependent arising which is the universe...")* is the lens through which I want us to see the spatial-cultural and temporal encounters which eventually led to the internet. To do this we will have to jump several centuries.

4. Laying the Foundations of an Empire built on Information : Surveying and the Computer in 19th Century India

The 19th century in India is a great laboratory of information technologies. The demands of administering a vast, differentiated territory, with a mind boggling diversity of cultures, customs, religions, languages, types of land use and terrain, led the nascent East India Company state to evolve new technologies of harvesting and processing information. [16]

Apart from founding numerous surveys of India (the geographical, geological, anthropological, archaeological, metereological and botanical), representatives of the colonial administration founded learned societies, like the Asiatic Society of Bengal, where later, with local elites, they set about mapping everything that could be mapped.

A key feature of this new apparatus was the computer, [17]which in those days was not a machine but a human being, a surveyor, a person entrusted with the task of interpreting and performing calculation operations on large sets of data, the lowest cog in the apparatus of information specifically deployed as power.

The enormous quantity of census data, linguistic surveys, maps, revenue records and other kinds of compressed information created what could be considered the world's first processed info sphere. Remember, that the drive to generate information in a space like India was in many ways much more intense than back in the colonial metropolis. Not only was there large amounts of information, this was also information that needed to be interpreted and made sensible to an alien power.

For instance, the needs for administering court records and the evidentiary uncertainties attendant to witnesses and the difficulty of the recognition and inscription of what the colonial administrator thought was the bewildering sounds of 'native names' led to the first systematic attempts to create a science of identification through fingerprinting. The most important pioneers of fingerprinting, **Herschel** (1858) and **Edward Henry** & **Aziz ul Haq** (1895) [18], were all administrators in 19th century Bengal, separated by a few decades. But it was their methods that ultimately give rise to biometrics and contemporary identification and surveillance technologies.

The computer, (still a person) had to make the data speak, had to create relationships that eventually could be used to make decisions. The task of surveying land, undertaken by the great trigonometric survey of India was crucial to mapping and calculating gradients, which in time would underpin the construction of railway lines and a telegraph network. One information grid was the layer on which another information grid could be knitted, and at the heart of this apparatus was the nineteenth century computer.

5. Beyond the Reach of Monkeys and Men : O' Shaugnessy and the Telegraph in India : Innovation, Imitation and Intellectual Property 1

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The first proposal to build a telegraph network in India was submitted by one **Adolphe Bazin** to the Asiatic Society in June 1839. The proposal, which Bazin termed as a plan to build an 'Electro hydraulic telegraph for effective correspondece between Calcutta, London and the rest of the world' may well have been the first cogently articulated desire to build a transcontinental communication system using electricity. The proposal was as impractical as it was elaborate and ambitious. And a subcommittee that included an Irish doctor by the name of **William O' Shaughnessy** rejected the proposal, arguing for a simpler system, more suited to local conditions. O' Shaughnessy in particular, pointed out the problems of humidity and moisture in the damp, rain fed climate of Bengal, that any plan like Bazin's which counted on using non insulated 'common electricity' would have to overcome.

O'Shaughnessy was an active member of the Asiatic Society, and avid correspondent and contributor to its journal and involved in several technical initiatives as an enthusiastic amateur. He had developed his own photographic process and built a camera, besides having the distinction of being the person to write a detailed pharmacopia for Cannabis Sativa Indica (20), a herb that has played a very important role in the history of human communication, and introducing the many medicinal and recreational usages of its products, the substances hashish and ganja, to the western world as a committed medical researcher.

O' Shaugnessy, perhaps inspired by the mind expanding properties of the substances he was consuming, was already interested in using electro chemical conductivity for communication. Electricity, it must be remembered was viewed almost as an 'occult and esoteric elemental force' well into the late nineteenth century, and any number of the electrical pioneers of the Victorian Age, right up to Nicholas Tesla were also dabbling in what today we would consider strictly X Files material. O'Shaughnessy, the stoned Irishman in damp Calcutta, was building electromagnetic motors, batteries and conductors in 1835-36, and was involved in the construction of a 1,000 cell Mullins battery. In a letter to the Secretary to the Goverment of Bengal, O'Shaugnessy described himself as the man 'who in 1837 declared an electric telegraph to be a practicable thing… and proved it to be so in 1837 (we know, because he documented everything he did, including his daily experiments with Hashish) He goes on to record that the reward for his preliminary experiments was 'universal ridicule for the advancement of such visional and impracticable ideas' and it would appear that his breakthrough in electromagnetic communication came in May 1839 and he described his experiment in September of the same year in The Journal of the Asiatic Society. In this paper titled *'Memorandum Relative to Experiments on the Communication of Telegraph Signals by Induced Electricity'* [21], he mentions a previous experiment in which he had 'fallen into the error of indulging prematurely in dreams of useful results, and of reasoning unguardedly from the model to the machine.'

There is one intriguing possibility that I cannot but resist speculating on, and if it is not fact, then it makes for intriguing and to my mind delicious fiction. We know that O'Shaugnessy was an active member of the Asiatic Society. We also know that the Asiatic Society was the kind of place where you would have learned discourses on Buddhism or some ancient Sanskrit text one week, and a proposal to cure Malaria or reform the postal system or demonstrate the benefits of cannabis or make electrical dynamos the next week. Is it possible that O'Shaugnessy in his wanderings in and out of the Asiatic Society, would have chanced upon a discussion of Indra's Net? We know that Unitarians had become interested in Buddhist tenets by the middle of the nineteenth century, and that the first Buddhist philosophical text to be published in English was in an American Unitarian journal called the Dial, in 1844. We know that the metaphor of Indra's Net was much discussed in Unitarian circles, and that there was a strong Unitarian connection to Calcutta, through the Boston East India Trade at about the time that O'Shaugnessy was in Calcutta. Is it possible then that the visions of the telegraph and the metaphor of Indra's Net had somehow coalesced in one of O'Shaugnessy's hemp smoke filled damp Calcutta aftenoons? It remains a tantalisingly plausible possibility. Perhaps something that someday should make its way to a 'wirepunk' science fiction novel set in nineteenth century Bengal. I suppose we will need a different kind of engine to crank that one out.

O'Shaugnessy's place in the history of telegraphy is an object lesson in the theory of dependent origination. His tragedy if you want to think of it that way, or his great good fortune, if you want to think of it that way, amounted to the fact that he was working at a time pregnant with telegraphic experimentation. O'Shaugnessy's telegraphic work is exactly contemporaneous with the work of **Samuel Morse** the person usually credited with the invention of the electric telegraph, and the morse code. The difference is the fact that Morse wanted to, and could patent his 'inventions' and O'Shaugnessy, sat dreaming about the possibilities of what he called 'sympathetic flesh telegraphy' where the human skin itself, because of its conductive properties, is used as a transmitter and a reciever of electrical signals.

Indeed his earliest prototype visualizes a telegraph operator with his finger against a needle, sensitive to a series of micro electrical responses that he learns to read as discrete elements in a cipher connected to the English alphabet. In doing this O'Shaugnessy was trying to teach the body how to read, how to communicate, and though we can speculate about how influenced these ideas were by his hashish induced trance states where he reports a heightened level of sensate awareness, what is certain is that his experiments were probably some of the earliest exercises in 'wearable' new media, where the telegraph receiver was in a sense an extension both of the nervous system as well as of the epidermis itself.

O' Shaugnessy wrote in his *'Memorandum'* and I quote - *"The delicacy of the impressions of touch transcends the sensitivity of all other senses. The eye and the ear are liable to distraction by casual sounds or phenomena, while the attentive touch knows no interruption."* He goes on to say - *"the most perfect sympathy is practicable between the signalists, and that as fast as the signal can b e felt, in short, with little less velocity than the articulations of language or writing of stenographic characters, this silent but thoroughly intelligible and still most secret of correspondences can take place. "*

Here was O'Shaugnessy, in Bengal, dreaming up and realizing a full fledged telegraphic infrastructure, from wiring, to insulation, to code, to transmission, to reception; and there was Samuel Morse, at the same time doing similar things, across the 'seven seas and thirteen rivers' on the campus of the University of New York. One node in the net of indra, reflecting the electric excitation of another node, far away in the system, constructing between themselves what we in the Raqs collective would be happy to call a network of no_des.

Morse and O'Shaugnessy both claim to have made their first electro telegraphic transmission experiments in 1837, Morse goes on to patent his invention, stoutly denying that he had *'learnt in histories of the telegraph in India anything crucial to the development of the electric telegraph in India from the physicist* **Joseph Henry'** [22]. It is important to know that O'Shaugnessy too, comes to know of what Morse had done only after 1839, by which time he has successfully demonstrated his telegraphic experiments by constructing a line that used iron rods and bamboo supports in the Calcutta Botanical Gardens. Subsequenlty, once he gets to know what Morse had wrought, O'Shaughnessy, in a bid to avoid the complicated business of being trapped in the labyrinth of patent suits, sought to devise a completely independent technology, using materials and skills available to him in Bengal. The intellectual property regime, while it priviledged the primacy of Morse's claim, based on a principle of the priority of a first past the post vis a vis the filing of patent applications, also ensured that O'Shaugnessy was forced to consider a set of options that we would today recognize as being 'appropriate technology'.

Crucially, O'Shaugnessy works in a totally collaborative frame, his key interlocutor is a man called Shib Chandra Nandy, who sent out the first signal in the first officially endorsed major telegraph transmission between Diamond Harbour and Calcutta, supervised and organized by O'Shaugnessy in 1852. People like Nandy would have played a very crucial role, as O'Shaugnessy totally relied on local initiative and technological acumen. His instruments were manufactured by Calcutta watchmakers and toolsmiths. The original design incorporated elements both from the indigenous metallurgical tradition as well as the metropolitan urban mechanical skills that had been established in Calcutta. The inventiveness with which terracotta pipes and other local materials were used for insulation, the forging of iron rods in local smithys and the use of bamboo, date palm, madras cotton, locally produced silk and a host of other indigenous materials could not have taken place without considerable dialogue between O'Shaugnessy, Nandy and a host of Bengali craftsmen. Deep Kanta Lahiri Chowdhury in his fascinating monograph which I am drawing extensively on for this section of my presentation, writes,

"From curious crowds and far seeing businessmen, to metal workers and mistris (a kind of craftsman), a broad spectrum of the indigenous population was very much a part of O'Shaugnessy's telegraph project. Iron rods were easily available and cheap bamboo was abundant in Bengal. These measures were not just economical at this juncture but were original in doing away with insulators, non conductors and winding apparatuses needed in a wire system. His telegraph used a different code and initially imposed a series of very small electric shocks on the operator to transmit the message. He also came up with another unique invention ; he used a two and a half mile stretch of the Hooghly river, in place of wire to complete a circuit. He was one of the earliest to experiment with a system of using water as a conducting medium for electricity. His experiments with rivers led him to conclude that only two wires were sufficient to maintain long distance communication, and if water came between them, then only one line would be sufficient to complete the circuit."

Once again, this is of crucial importance, because in using water, O'Shaugnessy

anticipates in his own way the great leap forward in the telegraphic girdling of the earth, the use of undersea cables - but more of that later.

O'Shaugnessy's vision saw the realization of miles of overhead telegraph lines cutting across the firmament of India to link an entire subcontinent, from the humid riverine delta of Bengal to the dusty plains of north India, across the rocky deccan plateau of peninsular India and into the far north west frontier bordering Afghanistan. The telegraph had conquered, what O'Shaugnessy had called in his memorandum, the desolate howling wilderness of the Indian interior, by hanging just out of reach of both monkeys and men. I quote Lahiri Chowdhury again: "The great gulf between the bustling hubs of colonial and mercantile commerce like Calcutta and Bombay and the interior or hinterland was physically and visually illustrated by the telegraph and its high poles which rationally transected the countryside. Most of the basic structure was built with remarkable rapidity after 1852, and by 1856 the first telegraph network of over 4,000 miles was in place."

In fact so considerable was this achievement that a compendium of technical information called the *'Telegraph Manual'* [23]written by one **T.P**. **Shaffner** and published by the New York firm of Pudney and Russel in 1859 described the Indian telegraph system as *"the most extensive in the world"*. So if you were looking for connectivity in 1859, India was the place to be.

Who or what is O'Shaugnessy? A maverick backwater genius, as the Telegraph Manual would have us believe, architect of the most impressive communication network in the world at that time, or, a narcoleptic charlatan, an imitator, a transmitter of received ideas? (as the Morse camp would have us know him). Perhaps a bit of both. Clearly, O'Shaungessy moved from ignorance and originality to a full awareness of Morse's work. Awareness led to two responses: at first, an ingenuous adaptation, a form of reverse engineering designed to subvert the intellectual property regime by choosing to remain outside it, and at it's margins. This is O'Shaugnessy's most creative phase. Complex factors are at work here; local ingenuity operates in tandem with a keen appreciation of reverse engineering, encouraged by the looser, intellectual property regime of the colonies. In other words, the fresh winds of a 'Pirate Modernity' act as a stimulus to an extraordinary burst technological adaptation and improvisation. O'Shaugnessy absorbs every despatch, every piece of technical news he reads, obsesses about the latest news from the world of conductivity and electricity, and refuses to be put down by his so called defeat to Morse in the race to the telegraph patent. He learns what he can, and improves upon Morse's invention in a manner that is particularly suited to the damp and natural electricity of the Bengal countryside, and is at the same time resonant with what we will come to recognize as the the download, improve, circulate ethic of free and open source software culture. There may be an element of imitation here, but it is the most innovative form of innovation. If ever there was a hacker of the telegraph system, O'Shaugnessy , in his marijuana haze and with his incessant curiosity, was one.

I want to quote here a couple of passages from Donald Cardwell's *Fontana History of Technology* [24] on the virtues of imitation.

"Imitation means innovation, which, in turn, often stimulates invention. This is the lesson of medieval Europe in its first phase; the lesson was later exemplified by Britain in the seventeenth century, and by Japan at the end of the nineteenth century. Imitation is not, as may be supposed, an indication of inferiority. For an invention to be adopted - imitated - in a different community, that community must have reached about the same level of technical competence as that of the originating community; and, moreover, the adopting community must obviously be willing to learn...

A willingness to imitate, or adopt, inventions made by foreigners, is the first step towards the creation of an inventive and technically progressive society. We suppose that the process worked like this; town and village craftsmen - blacksmiths, coppersmiths, wheelwrights, millwrights, masons, carpenters etc. faced with demands to make imported inventions, began with slavish imitation, then learned how to use local local materials or processes and how to modify the inventions for local needs ; quite possibly for needs never envisaged by the original inventors. This means that the technicians make original inventions themselves; in any case they extended the range of their own skills and increased their own capacity to make inventions. "

Just to take this line of argument, let me quote for you another slightly more obscure text,

" The truth is, that the natives (of India)] are the best apes for imitation in the world, so full of ingenuity, that they will make any new thing by pattern, how hard soever it seem to be done; and therefore it is no marvel if the natives there make

shoes, boots, cloaths, linen, band, and cuff, if our English fashion, which are all of them very much different from their fashoins and habits, and yet make them all exceedingly neat. "

This is a English traveller whom we know only as a certain Terry, writing in a popular seventeenth century travelogue titled simply -*'A Voyage to The East Indies'*[25].

Had O'Shaugnessy, like so many English and Irish expatriates of his generation, lost in *'the desolate, howling, wilderness of India'*, gone native, become one of the *'best apes for imitation in the world'*, one of the more ingenious monkeys who had somehow managed to clamber up a branch in a tree high enough to snatch off a piece of telegraph wire ?

Perhaps, but soon enough, the monkey began to perform as was demanded of him by his masters., O'Shaugnessy abandoned his monkey tricks, lay aside his ingenuity to become a myrmidon, a secrecy obsessed lackey of the communication apparatus of the British Empire in India. What lay behind this transformation? Exhaustion, demoralization, paranoia, a lack of recognition, the shame of having come 'after' Morse - we can only speculate, we only know that most of all, O'Shaugnessy became lost to himself and that the telegraph that he was so passionate about became (with the Telegraph Act of 1854), a state secret. Unauthorized entry into a telegraph office anywhere in India was declared a serious offence punishable by rigorous imprisonment (this law continues to be in operation today, and influenced every other piece of communication related legislation, down to the ones governing the internet and mobile telephony). The information state in India was born, which effectively put paid to all further efforts at independent technological creativity, and O'Shaugnessy was its earliest victim, even as he was one of it's progenitors.

Later, as the demand for standardization, and homogenization grew apace with the desire to cover more and more of the terrain within a set of mainly military imperatives, we witness the overturning of the originality of O'Shaugnessy's early design interventions. He becomes in a sense the destroyer of his own work. He totally imitates (this time having duly paid obeisance to the requirements of the patent regime) what is happening in the metropolis and creates a structure that is robust, but entirely a replica. Gone is the improvisation, gone are the bamboo poles, the epidermal ecstasy of decoding telegraph messages by touch, the iron rod and the local enterprise and initiative. Instead we have a telegraph culture shrouded in secrecy (protected from natives, lest the imitating apes create their own versions and start tapping messages to each other), under the helm of an O'Shaugnessy increasingly obsessed with ciphers, encryption and steganography.

It is this structure that helps the British East India Company 'keep India' in the wake of the sepoy mutiny of 1857. When the speed of the telegraph wins the day over the ubiquity of the mythic round cakes of unleavened bread that were used as an encrypted cipher, apparently to spread the news of the uprising in the Bengal Army through the length and breadth of India. Apocryphally, a rebel about to be executed is reported to have said, pointing to the telegraph wire - *"it is that accursed wire that strangles us…"*[26].

The wire's stranglehold over India is complete by 1857 and a resurgence of creative thinking about technologies of communication is kept in abeyance until a strange echo of the patent controversy surrounding O'Shaugnessy's early telegraphic experiments comes to surface in the early years of the next century, but more of that later.

6. The Creation of a World Information Grid in the Nineteenth Century : The Global Telegraph Network : C & W History and The Cable Ship

By the middle of the 19th century, the spectacular success of Indian telegraphy had demonstrated the viability of a communication grid that spanned large distances, went through large stretches of inhospitable terrain and spanned a very diverse set of geographically, and culturally distinct communities. The military usage of the telegraph was repeated almost immediately after the Indian mutiny of 1857 during the Crimean war, which also saw the birth of the first wired despatch of news from the battlefront. An international communication space marked by unprecedented speed was taking shape. It could be argued, that India in a sense was the laboratory in which this had been rehearsed. In this telegraphy was not alone; fingerprinting, anthropometry, and census techniques were all either initiated or perfected in India and in a sense all four of these techniques, which encompassed

between them all the informational technologies of knowing, classifying, enumerating and transmitting knowledge about human beings, were the foundations on which a global political economy and polity with information at its very core could emerge.

In fact I would go so much as to hazard a statement to the effect that our current conditions, the circumstances of our lives in the twenty first century, which see such intense contestations over the harvesting and transformation of information into commodities, property and state assets, over identification and surveillence, and the increasing industrialization of communication and the media, are nothing if not the legacy of what might have begun taking shape, among other places, in the humid, electrically charged air of nineteenth century Bengal. To understand our present, we need to retrieve this past, and that is why, the remains of tomorrows past, and the task of speculating about the antiquity of new media in South Asia is, or at least ought to be, an urgent item on the agenda of anyone who has anything to do with new media today.

The first intercontinental telegraph link was transatlantic cable (which did not work very well) laid in 1858. A year after the Telegraph had saved India for the British Empire, and only six years after O'Shaugnessy's experiments with telegraph wires and large water bodies. Efforts to lay an improved cable between Great Britain and North America continued till 1865, and definitive success was finally achieved in 1867. The link between India and Britain came soon after, in 1870.

Incidentally the revolution in undersea cabling is itself made possible by the discovery of the insulating properties of a resinous substance called Gutta Percha, which is a rubbery byproduct of the Gutta Percha tree which grows in South East Asia, especially in the Malay peninsula. Large Gutta Percha plantations in Malaya worked on by Tamil indentured labourers from South India, produced the sticky substance that protected the signals under the sea. The information revolution of the nineteenth century was built with their labour, as it was with the labour of the sailors on the great cable ships.

By 1870 the co-ordinates of a westerly axis that joined Europe to North America, and an easterly axis that joined Europe to India, had laid the foundations of a global information age. Once this had been accomplished it was only a matter of time before the earth had been spanned. The South Asian subcontinent was crucial in this process. While Great Britain controlled the seas, German telegraph interests opened out an overland telegraph route, through Eastern Europe, Russia, Turkey, the Caucasius, Iran and Afghanistan to India. The race to India, by sea or by land, was the attempt to get to the first pit stop before moving on to Singapore, to Indonesia, to Australia and to China. This expansion was mirrored by a series of spectacular mergers and acquisitions which gave rise to the first true information transnational corporations of our age .

In 1872 the Eastern Telegraph Company owned 8,860 miles of cable, owned or rented 1,200 miles of landline; had 24 stations and two repair ships. Its capital was £3,397,000 and gross annual revenue was £376,900.

By 1877 the British Indian Submarine had 60% of telegram traffic to India and 80% from India to China, Java and Australia. In 1887 the Eastern owned 22,400 miles of cable and had 64 stations. Its capital was £5,900,000 and gross annual revenue £650,971.

In 1878 a Joint Purse agreement between the British Indian, the Indo-European and the Indian Government was made. Let us briefly go through a set of images that I downloaded from the webpages of the history of the Cable and Wireless Corporation that dramatize the unfolding of this global network. [27]

By the time of the First World War, the Eastern operated six out of the nine lines of communication with India and the Far East. During the war, the upsurge of traffic and inoperability of the Indo-European land-lines which passed through enemy territory led to traffic with India and the Far East being transferred to the Eastern Telegraph Company. In all of this, the Indian landmass played a key position both because of a well established culture of technological expertise in telegraphy, a class of 'operators' who were familiar with the processing of information and with the English language, (these were the successors of the earlier 'computers') and the peculiar geographical position of the Indian subcontinet, bifurcating the Indian ocean, and becoming the key node that could connect Europe, Africa, South East Asia, East Asia and Australia. Without the telegraph being what it was in India, the world information economy and the first layer of a global new media space would never have become so active, so extensive, so quickly.

Clearly this expansion in communicative capacities was not being done to spread world peace; it was a function of what Marx would call "capital fashioning the world

after its own image ". It helped co-ordinate the temporal substratum of the functioning of global capitalism, so that ships could move smoothly, exchanging information about their co-ordinates through the telegraph (and later radio, and today GPS devices). This is what helped create a global market, helped to see currencies as mutually translatable, and on occasion, as in 1857 in India, in Crimea, and in the case of the Zimmerman telegrams, the leakage of which drew the United States into open conflict with Imperial Germany, even as it also proved to be a most important weapon of war.

The telegraph was not an innocent communicative device, and yet, it also created the first networks of virtual resistance, as telegraph workers (many of whom were women) began to constitute themselves into online communities of protest. The early consolidation of international feminism has a lot to do with the facilitation of communication between different regional and national sections by women telegraph workers. This is especially true of the rise of feminism in Scandinavia, where, for instance in Norway, the earliest feminists were actually telegraph workers [28]. Similarly the great pan Indian telegraph strike of 1908 [29] which stretched from Burma to Afghanistan was an instance of an embryonic virtual community that transcended class, race, religion, caste and gender to focus on oppression and resistance in the work place.

It is important to understand this because today's information infrastructure, which is as much a weapon of war as it is a force for peace, as much as tool of protest as it is one of power, as much a playground for the imagination as it is the arena of the stock market as what the teleg

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