This Day relenting God  
Hath placed within my hand  
A wondrous thing: And God  
Be praised. At His command,  

Seeking his secret deeds  
With tears and toiling breath,  
I find their cunning seeds,  
O million murdering Death. (Ronald Ross ‘In Exile’ 1-8)

These verses from the poem “In Exile” by British scientist, novelist, poet Ronald Ross, and recipient of the Nobel Prize for Medicine in the year 1906 are discreetly inserted in the beginning of Amitav Ghosh’s *The Calcutta Chromosome* (1996). The quasi-heroic tone with which Ross gears himself to take on the ‘the million murdering death’ springs from the confidence instilled in soldiers and scientists alike with the burgeoning sentiment of Imperialism in the Victorian times. The much celebrated genius and toil of the scientist is about to realign with scientific knowledge to empower him to take on the evil of disease. And if one reads this as a harangue of a white scientist located in a colony, the purpose certainly seems just more than the power of science- it is also the white man’s power as a saviour of disease afflicted populations in the new world.

The purpose in drawing attention to these lines is equally to underscore the fact that even though science became a prominent feature of the Victorian society, the discourse of science was still fashioned by a largely theological worldview. For the
longest time the Victorians saw a national debate on the repercussions of accepting Darwin’s thesis and replacing the creation of God with the theory of evolution. This conflict coexisted with the burgeoning colonial expansion. The Victorians were also witness to the gradual shift from a romantic view of nature (discussed extensively in the previous chapter) to a far more aggressive, Utilitarian view that sought to extract material benefit from nature. Trade of plant based products viz- tea, tapioca, rubber, cotton, jute, spices and opium dominated the world trade flow and slowly but surely gave the world another vocabulary to talk about nature. Amitav Ghosh’s Sea of Poppies (2008) and River of Smoke (2011), the two titles of his Ibis trilogy, essentially expose this new vocabulary about nature and man’s unabashed exploitation of its resources to further his material gains. If one looks closely at the economics of opium trade starting with the forced plantation of opium in the Indian hinterland to its sale in reluctant Chinese markets one is able to deconstruct Victorian economics that was exploiting both nature and man for its material gains. It is this triptych that the present chapter seeks to explore with reference to the evolution of science as a discipline during Victorian times: the Colonial encounter, the view of nature and the utilitarian ethos that began to dominate the ideological worldview.

In the following sections an attempt is made to understand the complexity of the Victorian times that saw the emergence of the Utilitarian ethos in the wake of the expansion of the Empire: how this economic climate affected the growth of science as a discipline, specifically its treatment of nature as an exploitative resource for trade. The Victorian era is also viewed in this study as an epoch, which owing to these advances in science and colonial expansion has left behind the legacy of unabashed exploitative practices, both economic and ecological. We also explore the rise of several race theories owing to the twin effect of rapid expansion in new worlds as well as the ‘scientific’ ardour to theoretise. Further, the discussion moves to an exhaustive analysis of Amitav Ghosh’s novels particularly, The Calcutta Chromosome (1996), The Sea of Poppies (2008) River of Smoke (2011) and The Circle of Reason (1986) to see these dynamic factors create a fascinating backdrop against which the science of the day unfolds through an array of characters fashioned by Ghosh’s inimitable pen and an expansive imagination.
Victorian Times: Empire Touches its Pinnacle

By the 1840’s the Romantic vein in British science was definitely waning and was being replaced by a more utilitarian ethos. Since that indeed was the spirit of the Victorian age and the glory of empire touched its pinnacle, every institution was seen from the point of view of its contribution to the cause of the empire. The love of nature with which the Romantics were replete to an extent that they declared that it was better to be a ‘pagan’ than a Christian who has lost all feeling in the mad materialistic race were gradually marginalized by the ‘new’ world. The Victorians had no such apologies; they were drunk with the idea of progress.

The Victorian period in history is taken from the accession of Queen Victoria in 1837 to her death in 1901. There was a sudden spurt in population- between 1801 and 1871, the population of England had nearly trebled from eight million to twenty-two million people. The new industrial towns like Manchester and Birmingham became the centre of this population concentration and there was a shift from old rural life to urban city life. According to Abrams this period ‘was a time of rapid and wrenching economic and social changes that had no parallel in earlier history-changes that made England in the course of the nineteenth century, the leading industrial power, with an empire that occupied more than a quarter of the earth’s surface. The pace and depth of such developments while they fostered a mood of nationalistic pride and optimism about future progress, also produced social stresses, turbulence and wide spread anxiety about the ability of the nation and individual to cope, socially, politically and psychologically with the cumulative problems of the age.’ (178)

The fact that the Victorian Age was the time of social unrest was compounded by the launch of Charles Darwin’s The Origin of Species (1859) which created deep psychological unrest amongst people whose centuries-old belief in religion and Bible was questioned. While the new theory unsettled the age-old patterns, at the same time there were sections of population which deemed it more comforting and convenient to stick to tradition blindly. Mathew Arnold expresses this quandary of the Victorian age in his poem ‘The Scholar Gypsy’ (1853):
O born in days when wits were fresh and clear,
And life ran gaily as the sparkling Thames;
Before this strange disease of modern life,
With its sick hurry, its divided aims,
Its heads overtaxed, its palsied hearts, was rife—(301-5)

There is palpable a nostalgia for the simpler times of the past when new
theories had not complicated the simpler beliefs. There is a lament, for the present
times have brought with them materialism and the ‘disease of modern life.’ In another
poem, ‘Dover Beach’ (1867) Arnold talks of the ‘sea of faith’ which was full and is
now retreating leaving ‘the vast edges drear/ And naked shingles of the world (II. 27-
28) wherein the reference is to the Darwinian thesis for having muddied the ‘sea of
faith.’ The imagery gets more sordid towards the conclusion and he portrays the
struggle of the masses which resonates well for the complexity of Victorian times:
‘Swept with confused alarms of struggle and flight /where ignorant armies clash by
the night.’ (II. 35-37)

However, at the same time the expansion of the empire abroad indicated to the
Victorians an exciting idea of progress. And even though the Victorians were riddled
with many theological, social and economic issues, the one idea that redeemed the
situation for them was the idea of progress. The price of progress did not matter.
When Marlow in The Heart of Darkness (1902) enters the office of ‘the company’ to
join his new job, he finds it rather gloomy and foreboding. Conrad has tried to
underscore the gloominess of the minds of the traders who saw material benefit as the
only goal through the architecture of the office. The plain greed of the company gives
a murkiness and sordidness to the office which is ‘as arid as a desert’ where
ironically, the only redeeming factor —‘because one knows that some real work is
done there’ (14 ) is the colored map of the world splashed with different hues on the
British dependencies:

Deal table in the middle, plain chairs all round the walls, on one end a
large shiny map, marked with all the colours of the rainbow. There was
a vast amount of red- good to see at any time, because one knows that
some real work is done there: deuce of a lot of blue, a little green,
smears of orange, and, on the East Coast, a purple patch to show where the jolly pioneers of progress drink the jolly lager-beer.

(Conrad 14-15)

This ‘real work’ that is heartening for Marlow is nothing but the expansion of the overseas Empire. This is indicated on the gargantuan map of the world displayed on the office wall, by the use of different colours marking the new territories conquered. This he then refers to as the ‘progress’.

Another area which has attracted legitimate attention in recent times is the impact of mechanisation and industrialisation on ecology in the wake of colonial expansionism. Timothy Morton (696) has dealt with the ecological imbalance the Victorian times spawned. The exigencies of the needs of the ever growing monster of the Empire wreaked havoc with the ecosystem and original farming practices of many communities. The forced cultivation of crops was a prominent feature of colonial expansion as it was in the sale of agricultural products like cotton, indigo and later tea and also opium that the British made their fortunes. According to him these were the times when ‘intense war, plunder and slavery spread on earth. Monocultures appeared: infeasible ecosystems where business produces only one crop. Ireland was the test case, its potatoes were transplanted from South America. In the resulting potato famine, countless people died or emigrated to America. Language blanketed places from Kingston, Jamaica, to Calicut, India as ‘Spice Islands’, ‘the Indies’. This alone indicates how Europe was thinking. English, Portuguese and French psychic and political maps of the world included special open empty places (empty of society and /or Western Social norms), soaked with desire, producing goods spontaneously, a fruit machine in permanent jackpot mode.’ (699)

This aspect of Colonial ecology sprung from unilateral trade practices that also in some ways directed the science of the day to improve fund of human knowledge about nature, which in turn could be utilized for business profits. The barren landscape of the Indian hinterland explored by Amitav Ghosh in *Sea of Poppies* where nothing grows but opium is indicative of this rot that had set in during these times. The forced farming of opium on Indian farmers is well depicted and brings out the disadvantages for the small farmer as well as the impact of monocultures such as
these on the soil and ecology of the region:

In the old days farmers would keep a little of their home made opium for their families, to be used during illnesses, or at harvests and weddings; the rest they would sell to the local nobility. Back then a few clumps of poppy were enough to provide for a household’s needs, leaving a little over, to be sold; no one was inclined to plant more because of all the work it took to grow poppies...such punishment was bearable when you have a patch or two of poppies – but what sane person would want to multiply the labours when there were better, more useful crops to grow, like wheat, dal, vegetables? But those toothsome winter crops were steadily shrinking in acreage: now the factory’s appetite for opium seemed never to be sated. Come the cold weather, the English sahibs would allow little else to be planted; their agents would go from house to house forcing cash advances on the farmers and making them sign asami contracts. (30)

If placed alongside the Romantic view of nature, the Victorian view appears far more manipulative of ecology and farming practices in order to ensure the profitability of trade.

**Darwin: The Victorian Conflict**

The complexity of the Victorian times was evident in the reluctance with which Darwin’s theory was first expounded by the man himself and later, the difficulty with which it was accepted by people at large as an alternate view.² It displaced the very basics of their Christian belief in the divine genesis of man. The idea of divine antecedents of man was replaced with the idea of evolution and as mentioned before, the Victorian society found it reprehensible to live with the possibility of having an ape for an ancestor. It is important also to understand the Victorian sensibility towards science in particular. Like Janet Browne says: ‘Apes or Angels, Darwin or the Bible, were burning topics for Victorians’ (1). She further describes the climate of Cambridge University during these times:

This natural theological standpoint dominated Cambridge teaching across the board...and formed the cornerstone of Cambridge natural
science. The Christian God, it was said, had created the world in which everything had its place...theological doctrine, in this regard, was fully integrated into the political and social ethos of the most influential men of the early years of the century. (18)

Gradually, however, the tacit understanding that society reached was that the Biblical story of genesis was symbolic in import and the nature manifest in the bounty of nature and the infinitesimal changes that are brought about over the span of time could also be understood in the light of God’s intervention. According to Bernard Cohn, the Victorians believed the world to be ‘divinely created, knowable in an empirical way and constitutive of the sciences through which would be revealed the laws of nature that governed the world.’(4).

It is profitable to look at Darwin’s life and career carefully because it embodies the difficulties of the Victorian times rather well. Darwin had voyaged around the globe aboard a British surveying ship, HMS Beagle in the years 1831-36 and had been enamoured by the sheer diversity of plant and animal life he saw. (Browne 20-21) On board he collected elaborate samples of birds, insects, fossils, vertebrates, invertebrates, fossils, rocks, marine organisms and plants which he would religiously keep dispatching to London. He gradually formulated and was convinced about the theory of evolution and kept extensive notes outlining it. The only deterrent he faced in publishing these proceeds was that the academia which was still entrenched in a Biblical worldview and largely controlled by the Church would react adversely to his argument. He realized the implications of a proposal like this which would not only revolutionise the biological sciences but also challenge the theological views entrenched in the British life and institutions. He kept this theory under wraps for a long time and realized the need to exercise caution.

In this detail of Darwin’s life is captured the dilemma of the Victorian times itself- which was ready to move forward on scientific lines, but was held back by the powerful belief in God it had learnt to revere as the supreme authority and also the absolute finality with which issues such as these were held by the church and academia which was almost its appendage. Many argue that the repeated bouts of ill health Darwin suffered during this time had a deep psychological basis where he was
tormented by the conflict that resulted in his proposal that was essentially pointing at an organic rather than a divine origin of life. As his biographer Janet Brown says:

Darwin certainly experienced the fear of rejection mingled with a high anxiety that his life's work might be damned or ridiculed and that his evolutionary theory was, in effect, murdering the God of the ancients. If such feelings were tightly controlled in the Victorian domestic context then it seems entirely possible that Darwin should find the only way to express his alarm was through undiagnosed- sub-clinical disorders. (48-49)

*The Origin of Species* was launched in a hurry and in the published form Darwin had cut down large portions of the original text and made absolutely no mention of the origin of human life per se. There was a tacit assumption that the world had been created by the supreme creator: in this he found a resolution to the conflict that was consuming him from inside-out. The point that one can make is that the English society was unsure of giving up its Biblical moorings in favour of the theory of evolution. The rationale of discussing Darwin’s biographic details at length is to attempt to understand the grip religion had on the institutions and culture that was producing science. These facts enable us to better understand the fallacious Oriental argument which has tried to cast the cultures of the colonized lands as religious as opposed to scientific. The impact of religion on the ‘culture of knowledge’ producing a scientist like Darwin too is to be seen more critically. While the evangelical grip on science continued to exist, equally the idea of nature as manifestation of the Divine slowly gave way to a far more material view.

**Utilitarian Economics and Technology**

The economics of the Victorian times drew its fundamental spirit from competitive ethos. James Stuart Mill’s Utilitarian ethic driven by the *laissez-faire* trade aimed to achieve the ‘greatest happiness of the greatest number.’ The emphasis on self-interest and competition as the legitimate means to the end was instrumental in ushering in the era of unrestrained free trade. Even though the benevolence palpable in the ‘greatest good of the greatest number’ was convincing on rational grounds, the *real politik* of the day and the greed of the powerful ensured that it worked towards greatest good not of the greatest number but of those who were the
most powerful. That this policy was selective in its reach is more powerfully understood in the context of Colonialism. The Western powers used the tenet of free trade where it suited them and hid behind an extensive scaffolding of bans and embargoes where it didn’t.

Amitav Ghosh’s *Sea of Poppies* and *River of Smoke*, display the hideous underbelly of this economics. These books lay bare the secrets of the tripartite Opium trade wherein Indian farmers were forced to grow opium which was processed in the factories or ‘carcannas’ set by the British and the expensive end product sold in the Chinese market at exorbitant rates.

According to Ghosh the memory of the Opium trade was purged by history because the practitioners were typically Victorian businessmen-thoroughly genteel who expunged the memory wholly. (Interview with Sheela Reddy 2002) These books expose the spirit of Utilitarian competition, where nations locked themselves in a struggle to control the world’s silver and bullion. Benjamin Burnham, (*Sea of Poppies*), a quintessentially Victorian trader figure based in Calcutta embodies these several contradictions of these contentious times. Outwardly a devout Christian who practices the extreme penance of self flagellation and takes upon himself the responsibility of rearing and imparting religious education to Paulette who is rendered an orphan after her father’s death, he is at the same time a dealer of Opium. On one occasion, he gets into an argument with another British official and the following dialogue ensues:

‘Indeed Mr. Burnham?’ It was Mr. King, speaking from the other end of table.

‘You are evidently greatly solicitous of human life, which is undoubtedly a most commendable thing. But may I ask why your concern does not extend to the lives you put in jeopardy with your consignments of opium? Are you not aware that every shipment you are condemning hundreds, maybe thousands of people to death?

Do you see nothing monstrous in your own actions?’
‘No, Sir,’ answered Mr Burnham coolly. ‘Because it is not my hand that passes sentence upon those who choose the indulgence of opium. It is the work of another, invisible, omnipotent: it is the hand of freedom, of the market, of the spirit of liberty itself which is none other than the breadth of God.’ (River of Smoke 463)

Through this dialogue one can understand the complexity of the Victorian times which had embraced the competitiveness and benefits of free trade but still clung on to a theological worldview which they unabashedly used to shirk ethical responsibility to the nebulous shoulders of the ‘invisible, omnipotent.’ According to Janet Browne it was common in these times to use the argument from the Darwinian debate to legitimise the competition that flourished in free-enterprise Victorian economy. Darwin’s ideas were being welcomed by industrial magnates and manufacturers. She quotes the instance of several businessmen, rubber barons who masterminded the development of North American industry, especially JD Rockefeller and railway owner James J. Hill who used ‘survival of the fittest’ as their catchphrase. They believed that the strongest and the most efficient company would dominate the markets and others would perish. A welfare state would encourage unfit people and the balance of population and means would get disturbed, a Malthusian idea that resurfaced with the backing of the new theoretical paradigm.

Metropolitan Science in Victorian Times

Having looked at the phenomenon of ‘romantic science’ as it existed in the late eighteenth and early nineteenth century in the last chapter, it will be profitable to now look at the ascendancy of Utilitarian ethos in the Victorian times and how that, in turn affected the direction that science took in these times. There was an attempt to understand the ‘culture of knowledge’ with reference to the romantic times and the subsequent direction that it gave to the science of the day in the foregoing discussion. One can now attempt to understand the metropolitan influences in the Victorian context to see the progress of science in this light.

In the spring of 1829 Thomas Carlyle wrote his influential tract Sign of the Times in which he claimed the demise of Romanticism and the beginning of the ‘Age of Machinery.’ (Holmes 436) In this essay he attacked the dehumanising effects of
utilitarianism, statistics and the science of mechanics and opposed the world of sciences to that of art, poetry and religion. He claimed that the contemporary scientists were fast losing touch with nature and were practicing a more derivative science: ‘Scientists now stand behind whole batteries of retorts, digestives and galvanic piles and interrogate nature, who shows no haste to answer.’ (Holmes 436)

By the turn of the century the aim of biological sciences was not to catalogue dead animals and plants but to understand the inner workings of living, breathing bodies. This break from the past symbolized a major move away from observational natural history towards a more experimental, laboratory based form of investigation. What earlier went under the nomenclature of natural history branched out into more specialized fields and most of these fields came to be practiced indoors under controlled laboratory conditions. Similarly emphasizing this shift, Herschel in his book *A Preliminary Discourse on the Study of Natural Philosophy* (1851) shows how by the 1830’s, science had shifted from the rolling outdoors to the confines of a laboratory. Science had moved from classification of types to understanding of the minutiae of the insides of the specimens. Herschel raised fundamental questions about the value of scientific enquiry and the place of scientists in a society in an influential manner. Science had thus reached a stage in English society where it was now possible to do some self-reflection about it.

Carlyle also claimed that the progress of science had destroyed wonder and in its stead substituted quantification and enumeration. The hitherto held view about nature as being a sacred entity that was to be studied to unravel the divine design was now replaced by a competitive urge to exploit nature for material benefit. This interestingly also translated into the iconography of the times. Holmes elaborates that it is also at this time that the troubling image of nature as a ‘shy, reluctant, persecuted female who is physically assaulted by a male science begins to appear.’ It slowly begins to replace the older Romantic image of a mysterious and seductive nature...who is infinitely more powerful than her merely human practitioners and questioners. The twentieth century feminist criticism (e.g. Anne K. Mellor, *A Feminist Critique of Science* [1988]) has also identified this ‘rhetoric of assault, molestation, penetration and even rape of nature by science’ that developed consciously and subconsciously at this time.

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In other art forms he gives the example of the French artist Louis Ernest Barrier whose bronze statue *Nature Unveiling Herself Before Science* (1890) that expresses a similar change in the power equation between science and nature. (discussed by Holmes 436) Carlyle attacked the ascending utilitarianism, statistics and mechanics as the dehumanising factors that was out to rob science of its earlier ‘purity’. He refrained, however from mentioning the growing phenomenon of Colonialism as a factor that was not only being promoted by the use of mechanical science and technology but also driving the nature of science in a different direction. (436) The annexation of vast tracts of lands outside Europe had won also for the continental scientists an additional epistemological space. (Cohn 4)

For the Romantic scientists with an intellectual belief in ‘argument by design’ there appeared no contradiction between science and religion. Science was a gift of God and its purpose was to reveal the wonders of his design. This was the essence of the purpose of science as promoted by the likes of William Paley in his *Natural Theology* (1802) with the evocative analogy of the Divine Watchmaker. (Holmes 450) However with the growing public knowledge of geology and astronomy and the recognition of ‘deep space’ and ‘deep time’ people began to understand Biblical account of genesis as only metaphorical and not literal. According to Holmes, in the 1830’s the attempts of geologists to unravel the processes behind formation of rocks implied that the earth was of an antiquity hitherto unimagined. The age of earth was now a millennia old, something that reoriented the minds of the young generation completely. In the telling phrase of J.A. Froude, ‘the intellectual lightships had broken from their moorings.’ ( quoted by Scott 5). Patrick Scott shows how this new understanding of ‘deep time’ comes out through Tennyson’s poem *In Memoriam*:

There rolls the deep where grew the tree,
O earth, what changes hast thou seen!
There where the long street roars hath been
The stillness of central sea. (Section CXXIII)

That is why Darwin’s *On the Origin of Species*, when it appeared in 1859 had such an impact. What it demonstrated was that there was no divine creation of species…the process of evolution by natural selection replaced any need for
‘intelligent design’ in nature. Darwin had indeed written a new Book of Genesis. (Holmes 451)

This was also the time when the term scientist came into currency. Holmes goes into the details of the circumstances in which it was coined. The British Association for the Advancement of Sciences was an organisation formed to counter the difficulties some of the fellows felt while being a part of the Royal Society. William Whewell, while chairing a meeting of the Association held at Cambridge in June 1833 got into this discussion with none other than Coleridge. The poet who was sixty at this time actively participated in all the sessions. In his latest book *On Church and State* (1830), he had included the men of science as an essential part of what he called ‘the clerisy’: the diffuse body of thinkers, writers, teachers and opinion makers who make up the intelligentsia or informing culture of the nation.’ (449) It was during a meeting at the conclave of the BAAS, that general consensus was formulated on using the term ‘scientist’ where the other competing choices were Philosopher or Savant. Whewell himself proposed that ‘by analogy with ‘artist’ they might form ‘scientist’ – and added that there could be no scruple to this term since we already have such words as economist and atheist.’ The term scientist came in the general usage pretty swiftly after this and was adopted by the Oxford English Dictionary in 1840. (Holmes 450) With these changes happening with the alignment of central notions vis a vis genesis, the antiquity of the earth and a more popular role for the man of science in that it needed a new nomenclature to refer to, science came to be entrenched more powerfully in public life and imagination than ever before.

The Colonial Encounter, Victorians and Science

The scramble of sorts to taxonomically identify and classify specimens from plant and animal life also reached a crescendo during these times. Cohn calls this the ‘Victorian encyclopedic quest for total knowledge.’ (4) It was another stroke of fortune that it happened to coincide with colonialism. So when Cohn argues that in invading the colonies, the Imperialists were not only invading a territory but an epistemological space as well (4), his reference is to this unique opportunity offered by history. Coupled with this was the fact that the great age of empiricism had descended in the West by this time and for them any peoples and lands they conquered could be represented as a series of facts and as a result could be governed
better. It is important to look at this stage of Western science carefully because there is a certain evolution and growth that happened in the procedures and approach of Western science as a practice and the period of this growth coincided with colonialism. So if science was a tool of Empire, Empire became the laboratory of science, this is one of the most important insights of this study.

Another important idea to be placed at this juncture is the commonly accepted view that Britain in its conquest of India unwittingly bestowed it with scientific and technological advancement. The level of scientific advancement in the West at this point is looked at more critically. At this stage the colonial encounter gave the western science a huge fillip. For the metropole the colony was a huge laboratory, India was the virgin land which could yield enormous amounts of data for verification of the many theoretical paradigms that were being discussed. In saying that the imperialists unilaterally introduced science and technology to the Indians is to overlook two key facts: One, Western science was not imposed on a country which had no scientific tradition of its own, so it must have displaced some tradition to take its place, two is a very common fallacy of projecting a current understanding of phenomenon in the past. Western science at the time of colonialism too was in a state of flux and its introduction into the colonies went hand in hand with its growth as a discipline. It is important therefore, to understand that what entered in the colonies as Western science for the amelioration of colonies was not western science as we know it today. Western science made forays into the colonies at a certain stage of its development, colonialism also shaped and influenced its later manifestation. If looked at another way and in a much more direct fashion, apart from furnishing vast tracts of land for collection of data, there were scores of Indian scientists, helpers and laboratory staff without whose participation, colonial science would have never achieved these milestones and furthered its progress due to the abundant novel natural life specimens that the colonies offered to the inquisitive colonial scientist. The colonies provided the infamous ‘elbow room’ for experimentation unavailable in Europe. (Prakash 46).

There is no doubt that West at this point saw advancements that gave it a material edge and coupled with aggressive economic theories of the time was able to subjugate large parts of the world. It was the mastery of those who possessed an instrumentalist knowledge of nature over those who did not. However, the West was able to produce significant advances while being located in the colonies. The
discrimination, however always remained between the theory of the metropole and the data of the colony. This is the one ‘guiding assumption’ Bernard Cohn makes in his research on the British conquest of India in the 18th and 19th Centuries: that metropole and colony have to be seen in a unitary field of analysis (Cohn 4).

**The Calcutta Chromosome: Victorian Science, Indian Climes**

*The Calcutta Chromosome* by Amitav Ghosh written in the year 1996, the recipient of the Arthur C Clarke award, conjures the milieu of Victorian times and explores the troubled relationship between Western and Indian science and scientists. Why the author chose the genre of thriller to make his point about the existence of an alternate science could be to essentially ensure a level of involvement of the reader in the text so that Antar’s and Murugan’s quests inevitably becomes the quest of the reader. And towards the end when in an appropriate dénouement the complex connections and linkages are resolved one by one, it does not give the reader a sense of satisfaction, rather a feeling of gnawing fear of the possibility of such a cult being so close at hand that the possibility of the reader being unwittingly and unknowingly a part of the network is much too real. It stretches the imagination and makes you want to carry on the quest in the real life. Since Ghosh is able to achieve this effect on the reader’s mind he is successful in making this point.

Ghosh sets the story in this charged Victorian milieu and depicts a struggle around owning and appropriation of scientific research. The book also hints at the existence of alternate science(s) that could have possibly existed around this time. It is fascinating that the book should move through three centuries to tell the story of the English scientist, Ronald Ross. Many popular critics have compared the book with the very popular *Da Vinci Code* (2003) by Dan Brown in which the reader is taken through a continental hunt for signs of an alternate Christianity, signs of which have been masterfully concealed inter alia, in paintings of Leonardo Da Vinci.

However, amongst other objectives, the one aim in writing this book is Ghosh’s intent in conveying the flip side of the import of Western science into India. The book opens sometime in the near future where a New York based Egyptian scientist Antar, stumbles upon the remnants of an old disused I-Card. His quest to know more about the owner brings back memories of his colleague L Murugan. An Indian yuppie, he was an amateur scholar on the British scientist Ronald Ross, the
British scientist credited with the identification of anopheles as the vector of malaria. Given his deep knowledge of the circumstances in which Ross worked, Murugan feels that something was amiss in the British scientist’s laboratory. Building on cues he collects and collates over a long span, he arrives at the conclusion that Ross was no genius but was pushed into the direction of this understanding by some individuals who were petty laboratory assistants and menial workers.

Upon landing in Calcutta, Murugan undergoes some extraordinary experiences and gets to know that these workers in Ross’ laboratory were actually part of a much larger network of people connected with a secret society. It was an underground science society which according to Murugan was way ahead in its understanding of the nature of malaria and was involved in working out transference of a certain what Murugan refers to as the ‘Calcutta Chromosome’ from one body to the other. The route of this transference is the asexual fluid exchange when patients of syphilis were treated with artificially induced malaria. The novel traces the adventures of Murugan in Calcutta trying to track down people and phenomenon connected with the society. Through an examination of these connections, Murugan arrives at the insight that this secret cult was way ahead of the continental scientists. He talks about their discovery of a gene that could achieve the feat of inter-personal transference and immortality. Their presence is shielded by a pact of silence honored by its members. Ghosh has, through the novel pointed, out the possibility of the existence of an elaborate science culture in India that was decimated with the introduction of the Western science.

Ghosh creates a pacy narrative that flits between three centuries to unravel the filigree networks that connected the shadowy Indian characters and the British scientist hogging the limelight. What emerges out of the novel as a fundamental concern is the utter neglect of what existed in India as science and later, also the racial discrimination that Indian scientists faced in the highly structured ‘colonial science’ service dominated by the British.

The point Ghosh is trying to make is to quietly subvert the idea of dominance of the British scientists with Indians reduced to the level of menial workers in the laboratory. Ghosh’s Ross is not a genius but a kind of pampered, gullible son of a General who tries his hand at poetry and sundry professions before being pushed into Indian Medical Service on the father’s insistence. The passages in which life of Ross
is recounted by Murugan are full of deprecating humour. Murugan lays bare the minutest details of Ross’ life and presents a character who has stumbled into the field of medicine because his father pushed him into it and who gets into Malaria research quite by chance and is very slow in responding to the many cues that are spread out before him. In thus constructing Ronald Ross, Ghosh is creating a foil to the reverential scientist figure delineated in the conventional biographies of these times. The author shows a possibility of the existence of an alternate system of science which is repressed and unrecognized.

Ghosh reveals that reading through Ross’ memoirs, he sensed the presence of a shadowy character who was a permanent fixture in the backdrop of Ross’ laboratory. (Chambers Interview 31). This man was identified as Lutchman - a lab boy who did innocuous jobs like maintaining lab equipment and sweeping the premises. However Ghosh says that Ross was naïve enough to admit at certain places in his memoirs of the bearing he had on the outcome of the research. Lutchman is a character that springs up in varied avatars as one important member of the cult. Through Ross and the many avatars he seems to embrace, the book presents its critique of the Western idea of stable individuality. Individuality is one area that has been sacred to the West and by showing Calcutta Chromosome as the facilitator of immortality at the expense of individuality is an important idea in the book. His multiple identities exist not only across time periods which he has achieved owing to the Calcutta Chromosome, but his name Lutchman can be pronounced in a variety of ways. He is first introduced as a lab boy pottering around in Ross’ laboratory. He doubles up as a domestic help who runs errands for Ross and thus has access to his personal space.

On a visit, one of Ross’ friends, J.W.D. Grigson, a linguist notices the fact that Lakhan is a variation of the name which is rendered differently depending on the area one is in: so it could variously be pronounced as Lakhan, Lutchman, Lakshman etc and this specialist knowledge gave him enough reason to believe that he was not from these parts. When he confronts Lutchman on this, the latter does not give a satisfactory reply, rather, gets cagey and aggressive. Later in his persistence to get to the bottom of the truth he follows him to the servant quarters and notices a gleaming railway lantern lying on the window sill of his room. When questioned about its presence, Lutchman asks him to follow him if he wanted the answer. He follows
Lutchman on the railway track and is almost killed by the approaching train. So terrified is he with this incident that he decides to leave the matter and there and then proceed out of Secundrabad on the next available train. Through the incident what becomes clear is that there were forces at work that did not allow Grigson to get to the bottom of the truth as far as Lutchman’s identity and affiliation with the secret society was concerned.

Lakhan resurfaces later through the writer Phulboni’s narrative—he had written a set of stories about him called The Lakhan Stories. In one of these, he is presented as the Dalit orphan who finds refuge at the railway station and upon finding opposition from the upper caste manager is almost killed. He, however, turns the aggression back on the railway manager and gets him killed instead. Years later when Phulboni visits the same railway station as a young trainee and chooses to stay all by himself there he undergoes an almost surreal experience. Here Lutchman’s gleaming lantern resurfaces and appears to move around supernaturally. The dust laden mat which he finds there bears an imprint of a hand with one thumb missing. Lutchman, the lab boy of Ross too had a thumb missing. Conflating the detail of the missing thumb with the fact that he is shown to be a low caste is powerfully reminiscent of the ancient Indian story of Eklavya from the Mahabharat. The low caste tribal boy beseeches the guru Dronacharya, who is the guru of Pandavas to be his guru in the sport of archery. On his refusal, he makes his clay statuette and takes him on as his guru. Upon getting to know of this, the guru asks him to be paid his guru dakshina. The guru would not settle for anything less than Eklavya’s thumb, so as to render him powerless in front of his favourite kshatriya pupil Arjun.

This story underscores the fact that it takes a sacrifice of a low caste Eklavya for a high caste Arjuna to emerge. Ghosh, by bringing in the angle of the low caste Ekalvya hints at the discrimination spawned by the power structures as far as dissemination of knowledge is concerned. Like Eklavya, these people are not part of the mainstream Western knowledge systems and create their own parallel academy in the shadows. Whether it is Mrs Aratounian who is a white woman in Calcutta or the statue makers of Kalighat, these people exist on the fringes of the Calcutta society.

Lutchman makes yet another appearance as Lucky, in the part of the novel set in New York of the future. Here he appears as the companion of Tara, who is Antar’s
neighbour. He comes across as a constant companion, a fact that launches Antar into a speculation as to what really is the relationship that the two share. He doesn’t have any clear answers till one day when there is a squall that wrecks destruction in Tara’s apartment. From his apartment window Antar sees Lucky cleaning the mess and later when Tara comes in doing an elaborate genuflection. It is at this point that the relation between them comes out clearly as one between guru and acolyte. Tara indeed is an avatar of Mangala the high priestess of the gnostic cult we have been introduced earlier in the book.

Ghosh conflates some details from Ross’ memoirs which are true with a fictional subplot of the existence in this time of the Gnostic cult, and worshipped silence as deity. We are paradoxically introduced to the cult through a long paean to silence by the celebrated writer Phulboni:

The silence of the city has sustained me through all my years of writing: kept me alive in the hope that it would claim me too before my ink ran dry. For more years than I can count I have wandered the darkness of these streets, searching for the unseen presence that reigns over this silence, striving to be taken in, begging to be taken across before my time runs out. The time of the crossing is at hand, I know, and that is why I am here now, standing in front of you: to beg- to appeal to the mistress of this silence, that most sacred of deities, to give me what she has so long denied: to show herself to me...’ (p 28)

The occasion is an official ceremony where the Vice President is facilitating the writer. Such is the rambling nature of the speech he delivers, that even the Vice President is found nodding on the chair. It is a comic yet fair depiction of the scores of such semi-official seminars that are organized in India as a kind of obligation on the part of the state. These mostly turn out to be dull, dreary affairs that people attend only out of sense of requirement. When Mrs Aratounian is watching television in the presence of Murugun, who has come to rent a room in her guest house, she switches it off in disgust, she says about the telecast of the programme: ‘It’s one of those beastly functions where everybody makes speeches.’ (107)

What follows is a queer exchange between Mrs Aratounian and Phulboni- the latter beseeching the former to be accepted as a disciple through parts of his public
speech being aired on television. All along however, the situation is lost on Murugan. The speech that he listens to in Mrs Aratounian’s presence is meant for her but he obviously does not realise this. These are moments when Murugan is close to the uncovering the Mrs Aratounian’s identity as well as that of the secret organization he knows in his subconscious mind to exist. These also record the varied reactions to a cult which could exist but is not taken any notice of, with the Vice President nodding. His unceremonious nap in the middle of the function is symptomatic of the larger ignorance to this alternate reality. Phulboni, the celebrated writer seems to have had a brush with the secret organization as a young man and has ever since desired to be a part of it. His longing is like that of a desperate acolyte seeking the acceptance of a guru. Earlier, in an impulsive moment he had related his experience to Sonali’s mother, a celebrated actress, his lover. This had done him in and through this speech he really gave expression to this repentance and asks for forgiveness. Mangala, is the high priestess of the cult and she traverses the space of three centuries in various avatars of her namesake in the anterooms of Ross’ laboratories, Mrs Aratounian, the Armenian owner of Dutton’s Nursery and Tara, Antar’s neighbour in New York. It is about the same soul which has, through the power of the Calcutta Chromosome, been able to traverse lifetimes to emerge in a new body every time.

Ghosh chooses to pitch the people of the secret cult in utter silence. At one level it helps because the silence of the cult becomes a reason for its seeming absence. However, apart from imparting secrecy to the cult, he also somewhere makes them appear more ‘oriental’ than was required. Where, for instance was the need to introduce the entire semiotic of blood and gore when it comes to the decapitation of the pigeons used in experiments by the cult. In contrast are the ‘gentlemen scientists from Europe’ who seem to rely on well stained slides. The mix of chanting and elaborate religious rituals along with their practice of science and medicine is again playing to the western image of the orient. In the episode where the American scientist Elijah Farley visits Cunningham’s laboratory, he discovers the unnatural behaviour of the laboratory staff. His conviction leads him to the discovery of this ‘other science’ being practiced in the anterooms while Cunningham is absent. He is left in the laboratory in the presence of Lutchman and Mangala by Cunningham with a promise that they will procure the slides he is interested in examining. He has a feeling that something is amiss in their behaviour and they somehow want to dissuade

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him from viewing the right slides. His worst fears turn out to be true when their images are captured on the surface of a steel tumbler while he has his back on them:

...his eyes were arrested by a scene that was now unfolding behind him. The assistant, who had gone over to fetch a tray of slides, was whispering with the woman in the saree. It was soon clear that it was he, Farley, they were talking about: the distorted reflections of their faces seemed to take on a grotesque and frightening quality as they nodded and pointed across the room. (124)

It is this perspective of Farley looking at the images on the glass that Ghosh seems to have adopted to tell this tale. It is oblique, at times it is also distorting, imparting a grotesqueness to the picture. While one can argue that this fits in wonderfully well with the thriller-suspense thread in the book, it can equally be claimed that it does some amount of damage to the political claim about the presence of science and rationality in pre-colonial India. The story of science in India is presented but soaked in the imagery of blood and gore, antechambers and secret passages revealed in smoky prayer rooms filled with heartless acolytes on a mission. However, on the other hand, Ghosh has lent mystique to the phenomenon which could work in his favour because he, in his own way, has compellingly directed attention of the readers towards 'Indian science.'

By juxtaposing the story of malaria research and an actual scientist and his lab boy with the esoteric going ons of this mysterious sect he creates a breath taking pacy narrative that moves between silence and knowledge, science and non-science. He makes a fundamental point of the subaltern contribution to science, the unveiling of which is as treacherous as giving voice to these silences with which the book is replete.

However as the narrative progresses this clutch of handful of people at Ross' laboratory seem like a part of a bigger network, by the end such is its extent that all the principal characters are unwittingly in its grip. What Ghosh could be trying to insinuate is also the presence of a larger, organized reaction against Western science which had not only taken on an extremely instrumentalist orientation but also, inspite of its avowal of universalism, undertaken exploitation of the colonies as a collaborator of imperialism. The mention of societies like Theosophical society and Spiritualist
society is a pointer in this direction. Both these were India-based societies that were vehement critics of the culture of materialism that western science had ushered in at the cost of denial of other phenomenon. They claimed that in doing so Western civilisation was headed in the direction of crass materialism. They intended to right some of these follies and go back to ancient religions of Hinduism and Buddhism as sources of a holistic worldview. Even though these societies, despite their enthusiasm, remained marginal and esoteric, it is vital to consider them as representing some sort of a reaction to the excesses of western science and its astronomical ascent at this time.

 Convention of Scientist’s Biography Reinvented

At the same time, coming back to Ross’ verses, one is also aware of the larger ironic underpinnings in making these verses reverberate in a text that essentially subverts the notion of a teary eyed and toiling genius figure of a scientist that became a part of the popular lore of Nineteenth century. Claire Chambers in her essay (2003) which deals with Ghosh’s debut novel The Circle of Reason (1986) elaborates upon the popular trend of the writing of scientist’s biographies where they were shown to be hardworking, sacrificing figures who toil hard for the sake of humanity. Scientists’ biography has also been discussed with reference to Romantic science in the last chapter where it was argued that it represented a genre that was best able to magnify the romantic ideal of individuality and creativity. However with the growth of colonialism, these biographies begin to highlight the notion of a scientific personage working for the larger good of humanity and science as a discourse of power. The discourse of science for the imperial Englishman was a part and parcel of the civilizing mission that had brought him to the colonies. Science, apart from being understood as a series of breakthroughs, at the same time, came to be viewed as a power discourse.

The central argument in this thesis is that science in the colonial times was projected as a part of this cultural superiority and it became a very powerful medium for the domination of the colonies. The apologists for the empire will still argue that if there is one contribution that the British have genuinely made towards the colonies, it is in introducing us to modern science and technology. They will argue that the realm of science is a neutral, apolitical world where amelioration of humanity is the only
aim. Related with this broad idea is the influence of science as a cultural discourse at the time of colonialism and the gradual hegemony of Western science as the system over other possible alternatives. When we shed the discourse about science that constructs the progress of science from a western perspective, we begin to see the domain of science as yet another politically fashioned arena which has excluded the contributions of other cultures and civilisations.

Especially with reference to the convention of the writing of scientist’s biography, the one contribution that can be credited to the Romantic Spirit is the importance ascribed to creativity. Personality becomes a vital site at which to understand the evolution of the expression of creative spirit. One way of doing this was to revisit the creative personage’s stages of life from childhood to maturity and construct a biography.

As mentioned before, scientist’s biography became an important genre and came to an exquisite flower by the Victorian times. David Brewster, at this time (1) began to write Isaac Newton’s first ever biography. Biographies such as these were celebratory in tone and reconstructed the lives of these special men who were endowed with a divine gift of creativity. One reason for the spread and growth of the genre was the spirit of popularizing science amongst lay people. For the first time in history, science and scientific debates were being circulated in circles beyond the confines of the Royal Academy. At home these biographies helped popularize scientific concepts and the protégés of science, while abroad they drove home the absolute need to introduce science as the liberating force and even though colonialism was at best slavery, these biographies dangled, like a carrot, the possibility of salvation from problems societal and political if, like religion, one could go all the way with science through these men of exceptional foresight and ability.

Ghosh in The Calcutta Chromosome (1996) subverts this idea and more importantly situates the scientist figure within the larger project of colonialism. The book, at one level, is a farcical biography of the celebrated English scientist Ronald Ross and in a way writes back to the Victorian biographies. It exposes the reality of Ross’s worth as a scientist which is much celebrated in such biographies. It also situates Ross in the grid of Colonialism to show how that indeed is another layer in understanding science, discovery and knowledge in these times. Through Murugan, an
amateur scholar on Ross, the reader gets to know that Ross made the choice of joining
the elite Indian Medical Service quite by chance. His father who was a celebrated
General in the British Army had some role to play in his appointment. Ross in these
passages where his childhood and youth is revisited is shown as a less than competent
young man who had drifted into research as this is the ‘hot’ bastion of the day and
‘this is where the future lay’- in other words, guided by typically utilitarian
considerations. Then in the role of a scientist he is shown to be under the influence of
his menial Indian laboratory staff without knowing it. On more occasion than one he
cuts a sorry figure where the many goings on in his own laboratory are unknown to
him and he becomes the butt of many jokes doing the rounds. These details coalesce
into a farcical biographical sketch as a counterpoint to the many biographies that
circulate about the scientist. And Ghosh’s rendering of Ross’ life is also not without
ground because it was based on the scientist’s own memoirs. One can go to the extent
of making a presumption that Murugan must have been exposed to one such
biography as a child which must have kick started this process: however he comes
across as a committed even though eccentric scholar who has gone beyond the
conventional sources to piece together the life of Ross: much like the author himself
who admits in an interview to have gone to the memoirs of Ross in order to
reconstruct the private and unknown aspects of Ross’ life. (Chambers Interview 31)
Murugan, Indian- American yuppie, with his typical turn of phrase is a very
interesting post-colonial quarter to retell Ross’ tale in an irreverent yet thoroughly
entertaining manner:

Picture this: here’s this guy, a real huntin’, fishin’, shootin’ Colonial
type, like in the movies: plays tennis and polo, goes pig sticking: good
looking guy, thick moustache, chubby pink cheeks, likes night-out
every now and again…wasn’t sure what he wanted to do with his life
for the longest time: sort of thought he’d like to write novels…hell, this
isn’t working out like I thought, let’s try writing poems instead. But
that didn’t pan out either and then Pa Ross who’s this big general in the
British Army in India, says to him, “And what… do you think you are
doing Ron? …there’s this outfit …the Indian Medical Service. It’s got
your name on it. (47)

The son ends up in the British dominated elite Indian Medical Service and
then meanders his way somehow to the top. He is shown to rely on the extensive work done by continental scientists like Laverne, Pasteur and Koch in building up his own thesis of anopheles as the carrier of malaria. Further he is virtually a puppet in the hands of the people who run his laboratory. His discovery of anopheles as the vector for malaria is based more on hit and trial and cues dropped by his laboratory staff than the result of any brilliant insight, as is perpetrated in all the conventional biographies.

Similarly Vallery-Radot’s biography, *The Life of Pasteur*\(^5\) reverberates in the text of *The Circle of Reason* (1986) and the protagonists Balaram and Alu revere the dead scientist and this book, it turns out, is the only source of some semblance of peace in their life which is full of turmoil. Every time the uncle and nephew read out of the book, the otherwise stoic Alu is moved to tears. The book vividly describes the trials and tribulations the scientist had to face in the process of making his sterling contribution as the inventor of vaccination. The book follows an interesting trajectory and falls into the hands of various characters. It is presented by Balaram to his childhood friend Dantu alias Hem Narain Mathur, the socialist who, in turn presents it to his daughter, Dr Venna. Alu after decades of living in the Middle East finds himself face to face with Dr Venna by chance. He discovers the book on her book shelf and he finds himself drowned in a flood of nostalgia. ‘Why Mrs Verma’, he said ‘this is only real brother I never had.’ (427) It is also revealed to the readers that it was this book that had a role to play in deciding the course of Mrs Verma’s life as a microbiologist. ‘My father told me that microbiology was Pasteur’s heritage and that I was to keep it alive.’ (427) Mrs Verma displays a certain rancor in talking about the influence books wielded on her father.

They (books) ruled over him: for him that book case had all the order the world lacked. I used to think it was love, but I know better now. He was afraid: afraid of the power of science and those books of his, afraid that if he disowned them they would destroy him’ (427)

The tyranny of this kind of knowledge and the hold it has had on the minds and souls of the likes of Balaram and Hem Narain Mathur is at last put to rest when Alu capriciously returns the book to Dr Verma. She too does not want it and suggests that they offer it in Kulfi’s funeral pyre. ‘Maybe we could give it a funeral too?’ she said. Pasteur’s biography becomes a reminder of the fact that science in the colonies
came with some kind of civilization value attached to it. It is a call to reassess these very values that science proclaimed to bring to the colonies. It is a very post colonial moment in the novel when *The Life of Pasteur* is confined to flames.

Pasteur is idolized by Balaram and in an outlandish act, he douses the entire village in carbolic acid with a view to banish germs and disease. He sees Pasteur as the scientific genius who worked and took risks for the amelioration of mankind. For a man who as a young man abandoned journalism for good upon meeting the Curies, his checkered life is deeply influenced by scientists who touched his life in so many different ways. It is wholly ironic too in the way his whole world which he has erected as a counterpoint to the world of Budhadeb is consumed by flames. His life stands for reason inspired by the likes of Pasteur and in his zeal to reform the ills spawned by Budhadeb he erects his own institution as opposed to the decadent selfish example of the former’s school he had first joined as a teacher. This school embodies his conviction that the purported ‘march of reason’ shall triumph. However, unfortunately, his convictions are those of the mimic men, and in a superbly magic realist mode Ghosh makes the point that Western knowledge if mimicked would always remain flawed. The only redeeming factor is Balaram’s ability to integrate indigenous weaving as a module in the curriculum of the school, but sadly the overarching theory he believes in is borrowed straight from the West and it is this that becomes his hamartia.

**Anthropology and Race Relations**

An interesting connection that should be worked upon for purposes of the present discussion is an understanding of how science viewed race in Victorian times. This understanding can be a vital entry point to further talk about many of these connections with colonialism. The rise of Anthropology as a discipline which went hand in hand with colonialism also shows the enthusiasm with which the West was attempting to give a ‘scientific’ basis to the understanding about other cultures it was annexing. Many of these theories pretending to be scientific incorporated the inequality of races and subordination of ‘inferior cultures.’ Amitav Ghosh as an anthropologist working toward his doctorate discovered at the leisurely pace of his research that what was passing off as an empirical piece of work was actually beset with deeply ingrained racial prejudices.
Anthropology as a discipline grew hand in hand with colonialism and was copiously informing and in turn being shaped by colonial exploits of the imperialist nations. While the need for a discipline like anthropology to grow at this point was primarily to enhance ‘scientific’ information about the conquered races, there was inequity inherent in the orientation of its practitioners from the very beginning. (Chambers Anthropology 5) The most obvious reason for the fillip the discipline got in these years was the overwhelming need of the colonisers in drawing up extensive racial and socio-cultural records of the colonised people. For traditional Anthropology the culture under study is by default a ‘primitive’ one. The observer-participant researcher proceeds with this view of the people he comes to study and almost always tries to understand their behaviour according to the preconceived notions such as these. The ethnographies, as a result, are one sided, biased, if not patronizing, in their tone. In addition to this the experience is entirely the researcher’s side of the story. James Clifford goes on to argue that ‘the historical predicament of ethnography’ is the fact that it is always caught up in invention, not in the representation of cultures’ (quoted by Chambers Anthropology 5). She further adds that ‘Far from being a transparent reflection of how other people live, then ethnographic writing translates, selects and fashions its subjects…this process is never innocent, but is always embedded in existing power relations.’ (Chambers Anthropology 5).

For Ghosh as a trained anthropologist working at a leading university of the West, these insights were disturbing to say the least. During his field work in Lataifa in Egypt Ghosh was extremely uncomfortable with such guidelines and felt that the Egyptian people were equally participating, to the extent that if he did not articulate their side of the experience it was going to be a one-sided, hegemonic exercise. There was also a more disturbing fundamental presumption of the culture under observation as being a ‘primitive’ one. He realized that he possibly could not voice his experiences in the manner he had ‘felt’ them, and this feeling was partly that of an ideal, naïve young student who starts with very little idea of what research entails but more significantly the rift between what he truly experienced as a researcher on the one hand and what he was ‘expected’ to experience, notice, make much/little of, and finally transcribe on paper. He was able to see the political design behind the ‘scientific’, empirical edifice of anthropology. In an interview with Claire Chambers he elaborates on this:
I’m not a theoretically minded person at all, but the reason why I stopped doing anthropology and I knew I had to stop as soon as I finished my PhD, was precisely because anthropology was creating a kind of hegemonic voice. It was an authoritative voice, an authoritarian voice, and all the time I was in this village I never had this sense of authority. And essentially this is because I’m an Indian....Yes, I was as much an object of study to them as they were to me. And I wanted to capture that reality.’ (Chambers Interview 29)

His awareness of this aspect of discipline formation finds an expression in many of his works. Even though *In an Antique land* (1993) is more in the vein of an ethnography and takes the readers through Ghosh’s experiences on the field in the Egyptian village, like his other books he conflates the classic ethnography with history, political and cultural reportage. Ghosh admits that the book essentially is a result of the many layered and complex experiences he had with the Egyptian people and also his constant desire to break free of the rigid ‘empirical’ parameters he had to adhere to as a researcher. *In An Antique Land* was an attempt to project the story from the other side. As Chambers says: ‘...Ghosh is anthropologised by locals rather than the other way round: his language, customs and cultural practices are defamiliarised by contempt and incredulity of his supposed subjects of study.’ (Chambers Anthropology 6) To the radical reformist anthropologist this was a sterling attempt and Clifford hailed Ghosh as ‘breaking new ground’ in Anthropology. The field work was geared towards his PhD but there was a very limited and prescriptive content he could put into his dissertation, the rest which was equally important took the shape of this book.

While Anthropology has already seen a questioning of these assumptions from the inside, it is fruitful to really look at it from the point of view of how anthropology viewed race in the nineteenth century. This gives us an interesting perspective in the present discussion because one important dimension of this study is the view about races fostered by science at the time colonialism was making headway.

The Victorian Age was time of great flux and change. While sciences were progressing in leaps and bounds, there is also a more fundamental change in the world view. The Darwinian thesis about the descent of man from apes as an act of evolution
was a challenge to the hitherto Biblical explanation of man springing from divinity itself. What is assumed commonsensical is that advances in science lead to a decrease in misrepresentation about races and cultures. However, as Loomba states, taking into account works of Stepan and Gould that ‘...far from being an objective, ideology free domain, modern Western science was deeply implicated in the construction of racist ways of thinking.’ (56). She further quotes Mary Louise Pratt:

As far as the question of race goes, the discourse around this time indicated that since the colour of the skin did not change with movement to new locations, it was therefore an immutable biological and natural difference. However, ‘science did not shed any of its conceptions about inferior races: thus, race explained not simply people’s skin colour but also their civilization and cultural attributes. ‘Nature’ thus explained and linked black skin, a small brain and savagery! (Loomba 57)

And precisely because scientific ‘objective’ discourse was gaining a kind of pre-eminence in society at this time, its findings were considered to be value-free, therefore these notions were all the more difficult to challenge. *The Origin of Species* (1859) put forth the doctrine that struggle for success was the driving force behind natural selection and by extension in economics and social sphere. The notorious doctrine of ‘social Darwinism’ took the idea of success to justify social and economic policies in which struggle was the driving force. Herbert Spenser’s catch phrase ‘survival of the fittest’ was well suited to describe economic expansion, rapid adaptation to circumstance and colonization.

**Phrenology: Balaram’s favourite Subject; Alu: Phrenology’s favourite subject**

Apart from *In An Antique Land*, Ghosh’s tryst with critical view of western science especially in its construction of race finds expression in his apprentice novel *The Circle of Reason* (1986). In this he expatiates on the use of phrenology by Western science and its subsequent uncritical adoption by the colonised countries. One can also see why Ghosh picks on a pseudo-science like phrenology to make this point: the uncritical and unquestioning adoption of western science and its practices by the protagonist Balaram is ironic because it has not only supplanted the existing
indigenous practices but made Indians into objects who would be racially profiled using this ‘knowledge.’

Nachketa Bose, alias Alu, the central character in the novel is nicknamed so because of the uneven shape of his large head. His uncle, Balaram, with his unusual interest in the subject of phrenology showers all his reluctant acquaintances with his analysis. Alu, orphaned after his parents died in a car crash is sent all the way from Calcutta to Lalpukur to live with Balaram and his wife Toru Debi. Balaram had discovered phrenology when he chanced upon a second hand book ‘Practical Phrenology’ at the College Street book shops. He had taken an instant liking to the ‘science’ which could help practitioners understand psychological traits based on the shape and size of human head. What started as an engaging distraction for the young man soon developed into an obsession and he started carrying out this analysis on all and sundry. When Alu lands at his house he runs inside and emerges with his giant calipers ‘...an instrument (for measuring skulls), with three arms of finely planed and polished wood, each tapering to a sharp point at one end and joined to others by a calibrated hinge.’ (5)

He had designed it himself and got it made in Calcutta at considerable expense. When he saw Alu’s head it was like a collective display of all the features phrenologists read about- ‘...it was like sitting down for a wedding feast after years of stewed rice.’ (9) His head abounded with a profusion of bumps and knots and troughs, each more aggressively pronounced than the next and scattered about with the absolute disregard for the discoveries of phrenology.’ (9) Balaram looked at Alu’s head and made mental formulations about the possible psychological, mental and emotional characteristics that the boy could be endowed with. It was a mix of observation, interpretation, a bit of guess work and elaborate description. Balaram’s interest in the ‘science’ was a matter of curiosity for the villagers who would at times approach him to know the fate of a newborn based on his skull shape just like they would approach an astrologer. At first his calipers could be intimidating but in due course, people would come to accept it as a harmless means that fed his science.

It is important to contextualise the practice of phrenology that became rampant in Victorian times. Peter Van Der Veer, in his book Imperial Encounters (2001; 2006)
argues that in the Victorian times, science played a decisive role in the legitimation of dark theories of racial difference, criminality and social relations. It is important to see this point in juxtaposition with the discussion in the previous chapter, of the Romantic science represented by William Jones. Just how this language centric understanding of cultures and races of Romantic times was now being replaced by the immutable idea of physical attributes is emphasized by Van Der Veer. He argues that the sympathetic view of Sir William Jones who used comparative philology and the concept of Indo-Aryan languages to expatiate on his ideas of race, language and culture was gradually marginalized by the Utilitarians and Evangelists who begun attacking Hinduism. According to Van Deer, these attacks became racialised with the rise of Comparative Anatomy and saw a high point with the publication of Robert Knox’s *The Races of Man* published in 1840. In the understanding of race relations, language was replaced by biology and racial essentialism became hegemonic. (137)

The introduction of Darwinian evolutionary theory strengthened the already present idea of the gradation of monkey to black man to white man. Evolutionary thought further legitimised the search for the missing link between monkey and the white man in other races. Imperial attitudes towards colonized people were thus linked to evolutionary biology. (145) According to Van Der Veer there is little to suggest that Darwin was a racist at heart but he shared the racial thought of the time and did not use his evolutionary ideas to transcend them.

In this milieu, comparative anatomy or phrenology became the most important empirical element of race science. It became a ‘scientific’ vehicle for providing empirical support for the belief that European race was superior to all others. It worked on the principal that by measuring the shape of the skull one could ascertain the internal structure of the brain and thereby determine racial and individual differences in intelligence, temperament and morality. Phrenology was extensively applied at home and colonies and head shape was assumed to be the stable indicator of racial difference. The use of phrenology strengthened the ‘European’s’ conviction that they were destined to be the masters of humankind and served as a means of reminding bright and uppity African and Asian subordinates of their proper place in the larger scheme of things.’ (Adas 296) The chronological approach was well suited to the static approach to the study of human types that dominated thinking on race in
Victorian times. Emphasis on the shape, size and topography of the skull in determining racial characteristics lent a sense of permanence to the development of races. It was deterministic to the extent that it put limits on the possibility of intellectual and scientific advancement of Non-European races.

Phrenology, as a facet of scientific and empirical advancement ironically reinforced racist thinking. In the middle decades of the nineteenth century many advocates of racial difference highlighted African and Asian deficiencies in scientific acumen as a case in point. (146) According to Van der Veer, the implication that one could read an individual’s character without the access to disciplines of soul searching developed in the church had democratic implications. It became a popular preoccupation amongst amateurs and enthusiasts even in circles outside the scholarly and professional world. A spate of ‘Phrenological Societies’ were inaugurated in Britain at this time culminating with the founding of Phrenological Association in 1838. It was considered a ‘useful knowledge’ that could assist reform. George Combe’s *Essays on Phrenology* (1819) greatly popularized the subject. In 1822, Raja Rammohan Roy sent twelve Indian crania to Edinburgh which were investigated to show that ‘acquisitiveness and secretiveness’ were well developed among Hindus. Roy’s skull was also studied after his death and was found to show ‘dignity of character.’ (Der Veer 146) According to Adas “No aspect of what Nineteenth Century Europeans considered the scientific study of human types had a greater impact on popular attitudes than phrenology. It left its mark on the fiction of this period, from the bump on Pere Goriot’s skull, indicating that he would make a good father (Balzac, 1834) to Dr Mortimer’s surprise at finding that Sherlock Holmes had a dolichocephalism skull with “such well marked supra-orbital development.” (Adas 294) By the last decades of the nineteenth century, it had become a “marketable object of mass culture with booths for head reading found at British sea side resorts.” (294)

Race science reflected the extreme prejudices of the Victorian society and ironically got a fillip with the emergence of Darwinian science. Evolutionary views gave powerful backing to those who wished to partition society according to ethnic differences or promote white supremacy. Universities and museums accumulated collections and skulls from all over the world for scientists to measure cranium capacity (thought to be an indicator of intelligence) and deviation from the supposed
ideal Caucasian type. (128-29) The seeds of the notorious theory of Aryan superiority over other races were being planted and the world was to subsequently witness the worst attempt of eliminating a whole race using this argument.

Darwin’s theory of struggle for survival put forth the suggestion that there was a struggle for existence amongst nations and races. ‘The Survival of the Fittest’ was used to support notions of inbuilt racial difference and appeared to vindicate the imperial scramble for colonies. Janet Brown takes the example of Tasmania where the conquest and the subsequent termination of the aboriginals was seen as natural and befitting. (107) Karl Paerson (1857-1936) claimed in 1900 that ‘no one should regret that a capable and stalwart race of white men should replace a dark skinned tribe which can neither utilise its land for the full benefit of mankind nor contribute its quota to the common stock of human knowledge.’ (quoted by Browne 107) Likewise, the branch of Eugenics grew strong at this time. Francis Galton, one of the proponents believed that civilized societies tended to prevent natural selection by preserving the ‘unfit’ by the use of medicine, charity, family or religious principals, whereas in a state of nature such people would die. The worst elements in society were the most fecund, he said. And the state ought to intervene actively in preventing them from reproducing their kind. (107) These ideas were steadily making a headway throughout America and Europe - many eugenicists believed passionately in using ways and means of improving society and promoted parochialism, nationalism, chauvinism and prejudice. Browne contends that ‘while Darwin’s *The Origin of Species* can hardly account for all the racial stereotyping, nationalist fervour and harshly expressed prejudice, there can be no denying that the impact of providing a biological backing for human welfare and notions of racial superiority.’ (108)

Looking toward the import of phrenology in the colonies, especially India, Gyan Prakash in ‘Another Reason: Science and Imagination in Modern India’ takes the case of Edgar Thurston, who was appointed the superintendent of Madras Central Museum in 1885. According to Prakash, he remained in chair till 1910 and expanded the museum. He also was a colonial ethnologist and pursued his interest in anthropometry with unusual enthusiasm: ‘... he kept his calipers and other instruments handy, using them on native visitors to the museum, sometimes paying them, sometimes not.’ (22) The findings of Thurston’s observations are contained in
his book titled ‘Castes and Tribes of Southern India, 7 Vols,’ considered a classic of Victorian Anthropology. Another instance that Gyan Prakash quotes is that of Kali Kumar Das, the Bhadralok intellectual, founder of the Calcutta Phrenological Society set up in 1845. Das’ focus was in regenerating popular interest in the science of phrenology. (22) The character of Balaram seems to have been modelled on one or all of these men.

Another reference that is so reminiscent of Balaram and Thurston both is concerning Marlow’s journey to Africa in Conrad’s ‘Heart of Darkness.’ When Marlow is approved for a job with ‘the company’ he has to undergo a medical examination- ‘just a formality.’ The doctor felt his pulse and then asked him if he would let him measure his head. ‘Rather surprised, I said yes, when he produced a thing like calipers and got the dimensions back and forth and every way taking notes carefully. ‘I always ask leave, in the interest of science to measure the crania of those going out there,’ he said… ‘I have a little theory which you Messieurs who go out there must help me prove. This is my share in the advantages my country shall reap from the possession of such a magnificent dependency. The mere wealth I leave to others.” (Joseph Conrad, *The Heart of Darkness* 16-17).

In Phrenology and its application one sees the curious commingling of a staunch faith in empiricism and scientific measurement on the one hand and racial prejudice inflamed to a limit on another. It is this dichotomy of the establishment of scientific principles in the backdrop of colonialism that Ghosh wants to unravel. Certain procedures had validation of science and were used at this time to intensify racial difference. Through Balaram’s characterisation the irony of the matter is further strengthened because here is a man who has picked the science of phrenology, uncritically and second hand- through a discarded book in a second hand bookshop, and has imbibed it without reasoning. He has adopted the very tools of his master that were used at one time to colonise him.

My purpose in juxtaposing these references is to be able to trace the antecedents of the pseudo-science of phrenology and its relation with the project of colonialism. Sciences like phrenology were a resultant of the influence of, inter alia, Darwin’s theory of evolution according to which nature shows diversity not because
of some divine design but because species have undergone eons of evolutionary processes to arrive at this phenomenal diversity. This, however willy-nilly gave credence to the belief that some races are inherently superior than others. ‘Scientific’ Studies showing stable and rigid differences peaked at this time. This belief along with the combined popularity of empirical means of data collection led to practices such as the one shown through the examples quoted above.

Amitav Ghosh’s The Circle of Reason, however set in Post-Independence India talks about phrenology as a left-over pseudo science that has been lapped up by an unsuspecting Balaram. And as iterated before, it is an important detail that he finds the book at one of the several second hand book shops dotting College Street. Phrenology, used as a means for racial profiling was extensively used as a means to justify the inherent biological superiority of white over subjugated races. Later it was used as a theoretical paradigm in Psychology through which psychological traits could be predicted on the basis of shape and size of the crania. One way in which it was used and abused was in its prediction of a criminal tendency. It is to this use Balaram puts his ‘knowledge’ in predicting a criminal tendency in Bhudadeb’s new born son. Balaram’s love of phrenology is doomed from the very beginning because it comes with the ignorance of those colonised who did not question western knowledge but only mimicked it. The Circle of Reason is an exploration of the effect of western science on Indian society. This ‘scientific’ knowledge was not only pseudo but represented the area where the so-called disinterestedness of science got inextricably aligned with the forces of colonialism in scientifically justifying subjugation of certain races by others.

This discussion endeavours to place two of Ghosh’s texts: The Circle of Reason and The Calcutta Chromosome in the context of Victorian times that were witnessing the ascendancy of western science as well as colonial growth. In his apprentice novel, The Circle of Reason, one can see the ironic use of phrenology as a pseudo-science used by the protagonist Balaram purportedly to fight corruption, much in the vein of claims made by science to take on superstition and unreason. However, ironically the very science he endorses turns out to be flawed. His weapons of resistance turn out to be the very same tools that have been used to colonise him by the white master at another time. He will have to redefine his knowledge and not
uncritically accept that which is handed to him with lot of promise. Both these books show the brilliant subversion of the genre of scientist’s biography. The preceding discussion shows the political intent in the power inherent in this discourse of science and Ghosh’s attempt to take on it in very different ways in both the texts. An attempt is also made to unearth the larger intersection of science and colonialism in the Victorian times that played out in far more interesting ways than is readily conceivable.
End Notes:

1. Wordsworth echoes this sentiment powerfully in the sonnet ‘The World is too Much with Us’:

   The World is too much with us; late and soon,
   Getting and spending, we lay waste our powers:
   Little we see in nature that is ours... (1-3)

   ............
   It moves us not...Great God! I’d rather be
   a Pagan suckled in a creed outworn;
   So might I, standing on this pleasant lea,
   Have glimpses that would make me less forlorn: (9-12)


3. *laissez-faire*: free trade

4. *Guru Dakshina*: is an ancient tradition unique to India. It signifies the special acknowledgement made by a student to a teacher in the form of a gift or at times a special task performed by the student.

5. Vallery- Radot (1886-1970) was French physician and grandson of Louis Pasteur. He wrote his biography, *The Life of Pasteur*


7. College Street Book Shop, Calcutta: is a 1.5 km long street in Central part of the city. It is dotted with many higher educational institutions, including the iconic...
Presidency College (now University), book stores and other establishments like the Indian Coffee House. It is considered as the convergence point for intellectual activity by the residents of the city. It has earned the nickname *Boi Para* (Colony of books) owing to the existence of many bookstores. Sourced from Wikipedia.