

The role of scientific apartheid in shaping colonial attitudes of British India's native intellectuals

Adil Ghafoor Mian

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Figure 1: Bose Institute in Calcutta

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1 Introduction

'Bose Institute was set up in 1917 by Sir JC Bose, the founder of modern science in the Indian subcontinent. It is Asia's first modern research centre devoted to interdisciplinary research and bears a century old tradition of research excellence'.

This project seeks to provide a decolonialist account of south asian science by interrogating the scientific-historical environment of colonial India at the time of its acceptance into western scientific spheres in the mid 20th century. Initially, the histories of taxonomy and eugenics are charted briefly to establish the framework of the ruling Raj. Why is it significant for a physicist to consider lofty scientific histrionics? It is to do with context, and a mission to provide an alternative to the 'objective physics' narrative, that is used to exclude non-western science. I hope by the end of this article that will be clearer.

I come to the project as a first-generation British-Pakistani person, a mahajir, an aspiring physicist, an outside south-asian collaborator who did not grow up in an Indian or Bengali community. Though history gives me multiple ties to the community spoken of, my interpretation of the scope and meaning of the project and its many subjects, such as Vedanta philosophy, and my presentations here are shaped by an outsider's perspective, so too has my outsider's perspective shaped my purpose for contributing. I recognise the violence Pakistan has enacted upon modern-day Bangladesh, and I attempt to navigate the geopolitical with awareness and respect and vow to hold myself accountable in any violence I may aid in propagating. The awareness of the aforementioned recognition has been shaped according to the introduction in Pearce 2014.

The theoretical questions to which critical formulations are instrumental are as follows:

- How did eugenics bleed over into colonial India and what shape did the practice take.
- How did ideas of western masculinity impose themselves onto colonial India, and what role did that play in marginalising native women scientists.
- How did Jagadish Chandra Bose use speculative fiction to co-opt and challenge colonial narratives.
- How does today's south asian diaspora benefit from the constructed legacy of figures such as JCB, especially the continuation of the middle class 'effeminate Bengali' colonial model citizen persona.

The project, in addition to the article, has two additional components:

- A zine on colonial (Indian) masculinity
- A podcast on 'the father of modern Indian science', Jagadish Chandra Bose's short story titled 'Palatuk Toofan'

2 Scientific Apartheid

Keywords: Taxonomy, Eugenics, Phrenology, Genetic Regression

I would ask you to sit through, if present, the feelings arising from what may seem like superfluous language. Scientific apartheid is used as a description of de-facto and institutional segregation of peoples on the basis of race, class, ability, sex and ethnicity achieved using the systematic rationale of the scientific revolution and resulting scientific method, as created and propagated by particular scientific spheres. The typological framework is limited as such in this article, but of course the definition encompasses more categories given a broader context.

Through the language of linear invention that contemporary scientific discoverism is accustomed to I will build an elementary (scientific) timeline of the route to the derogatory 'effeminate Bengali' sociopolitical narrative, highlighted in Section 3. But, it is important to be wary of originist theoretics, and their role in displacing a cultural zeitgeist for a singular phenomenon. My unfortunate abetting of this stereotypical and stagnant presentation rests on a lack of time, so I only hope to illuminate scientific cultural markers as gateways for further reading.

A brief timeline of scientific apartheid

- At 28 Carl Linnaeus publishes *System Naturae* in 1735, and further procures his purchase as a genius in the taxonomy world through his binomial classification system, e.g. 'Homo sapiens', an example of his contemporary botanist's nomenclature practice for a plant - "Gramen Xerampelinum, Miliacea praetenui, ramosaque sparsa panicula, sive Xerampelino congener, arvense, aestivum, Gramen minutissimo semine" is later reduced to *Poa bulbosa* (Headrick 2002). Humans are classed as animals, against the vehemence of populist creationist beliefs, but rest at the zenith of earthly hierarchy, justified by the 'Nosce te ipsum' ('Know Thyself') anthropocentric narrative. The following geo-reductions are used to classify humans (Charmantier 2020):

1. Europaeus albus: European white
2. Americanus rubescens: American reddish
3. Asiaticus fuscus: Asian tawny
4. Africanus niger: African black

Finally in 1758 Linnaeus uses the Hippocrates' humours to complete this masterful scientific endeavour and establish the genesis of scientific racism by attaching attributes, such as temperament and form of governance, amongst others, to the four peoples. In this the non-westerners suffer as depicted in Table 1. Throughout the next century the fields of phrenology - the study of skull sizes as dictators of mental cognitive function and

physical ability, and anthropology - an older tradition that finds new wind from the former, continue the pursuit of biological determinism laid down by Linnean theory. This all builds towards the foci of eugenics, which is explored here instead for its position as a valid hard scientific endeavour.

| Species | Temperament, Posture | Governance |
|------------|----------------------|------------------|
| Europaeus | Choleric, straight | Customary right |
| Americanus | Sanguine, muscular | Rites |
| Asiaticus | Melancholic, stiff | Opinions |
| Africanus | Phlegmatic, lazy | Choice (caprice) |

Table 1: Linnean Classification of Homo sapiens. (Linnaeus and Race, 2021)

- In the latter half of the 19th century Francis Galton, cousin to Darwin, begins developing a grassroot ideology of genetic superiority (eugenics), his beliefs identify genetic elitism as a solution to particularly Aryan socioeconomic ailments. Galton's imagination, sadly steadfast, engineers a utopia in which the genetic elite occupy high-class society and with infinite inertia remain as benefactors of the privileges of society. On the other hand the genetic under-class are stripped of the possibility of lineage through government mandate, and failure to comply renders peoples as 'enemies of the State' (Galton 1873) In response to Galton's proposed organisation which manages, in part, bureaucratic affairs for databases on local society's hereditary make-up, Darwin writes, "Though I see so much difficulty, the object seems a grand one; and you have pointed out the sole feasible, yet I fear utopian, plan of procedure in improving the human race." (Darwin 1873) Francis Galton becomes *Sir* Francis Galton in 1909. This proposed casteism, swimming in more obtuse modernist ableist legislative practice, culminates as a pebble throw with ripples travelling far and wide in conjunction with the British empire and endangers, via class-warfare, particularly neuroatypical people. Throughout the 20th century the ripples turn to tsunamis and, described briefly, find purchase in:

Britain and America, an obsession with biological destiny and genetic regression permeated social-statistical theories in the 20th century; this obsession was contextualised as societal welfare, and therefore, as a measure of extrapolated individual social worth. I highlight on 4 scientists who developed statistics in the direction of essentialist geneticism, particularly as I learnt to embody their equations, as most contemporary and 20th century physicists will have, without ever being asked to consider their motivations. All 3, with Shockley as exceptional, also taught at UCL to some degree.

1 - This story can begin with Karl Pearson, a friend of and financially supported by Gaston, Pearson is a celebrated mathematician with research

ties to UCL. Pearson becomes known as the founder of mathematical statistics, and statistical genetics.

Superior and inferior races cannot coexist; if the former are to make effective use of global resources; the latter must be extirpated (Pearson and Moul 1925).

At the turn of the 19th century he develops statistical techniques to describe evolution and inheritance, detailed in a set of eighteen papers titled 'Mathematical Contributions to the Theory of Evolution'. (Farrall 1975). For example, Galton observed that the reduction of height through direct paternal genetic inheritance, without selective breeding, would demonstrate a successive regression pattern of $z/3^x$, where z is, in inches, the deviation of a superior population from an original population's mean stature, and x is each sequential generation. In trying to provide a solution Pearson includes instead further lines of patrilineal ancestry, including the grandfather, great-grandfather and so on. By taking into account n normal variates he develops a multivariate theory that deals with multiple correlation coefficients for each distinct level of ancestry, hoping to prove that Galton's concern of regression can be addressed by focusing on selective breeding further up the predecessor chain. This biological essentialist query was the impetus for the beginnings Pearson's famous multivariate analysis theory. ¹

1. Example taken from Karl Pearson and Statistics: The Social Origins of Scientific Innovation - Bernard J Orton, pg 9-10

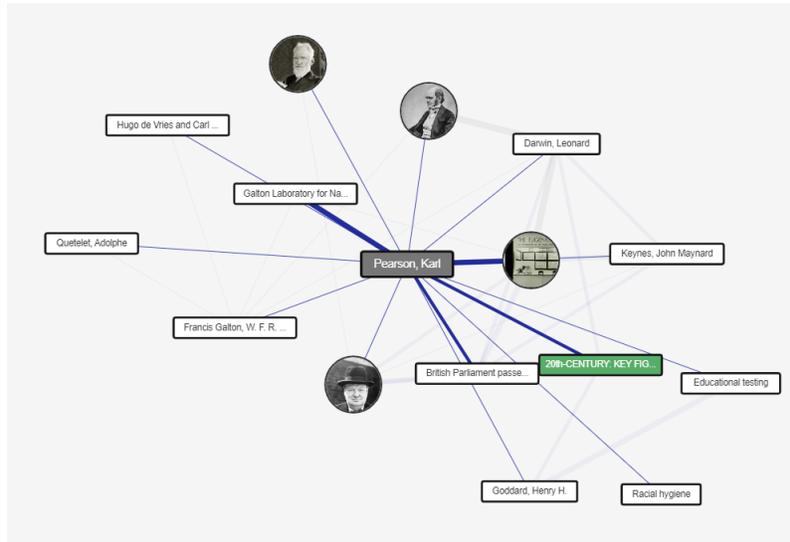


Figure 2: Connective mapping of Karl Pearson based on eugenics ideology. From top to bottom, George B. Shaw, Charles Darwin, British Eugenics Society and Winston Churchill, sourced from Eugenics Archive (<https://eugenicsarchive.ca/>). I recommend this website thoroughly as an in-depth, regional and accessible tool for the study of eugenics.

2 - Charles Spearman in his seminal work in 1928, 'The Abilities of Man' establishes a universal metric of intelligence, g , by further developing correlation theory. He uses test datasets, an example depicted in Fig 3 to prove the following mathematical axiom (Spearman's Tetrad Criterion):

$$r_{ap} * r_{bq} - r_{aq} * r_{bp} = 0 \quad (1)$$

Where the matrix entries, r , correspond to 'correlations between mental tests'. By taking the determinant of a 2x2 correlation matrix, and proving that it satisfies the criterion, he believes to have demonstrated that such datasets prove his model, of which g is a primary parameter. The variable g is defined as one which varies from individual to individual, but remains the same for any one individual with respect to all the correlated abilities, thus acting as an objective barometer for intelligence comparison.

The fallibility of the test, the details of which are out of the scope of this research, is proven later on (Goldstein 2012). It is also of further research interest to look at the validity of the test categories. Is it a fair assumption that there exists a global objective 'intelligence' when the findings of g are based on euro-centric test data and culture? An example of such data can be found in the recognition by participants of synonyms and antonyms in English passages (Spearman 1927). Nonetheless, it is work he teaches at

UCL, until his retirement in 1931, as evidence for inherent difference in abilities between groups of people.

| | | Oppo- sites. | Com- pletion. | Memory. | Discrim- ination. | Cancel- lation. |
|------------------------|---|-----------------|------------------|---------|----------------------|--------------------|
| Opposites | 1 | | .80 | .60 | .30 | .30 |
| Completion | 2 | .80 | | .48 | .24 | .24 |
| Memory | 3 | .60 | .48 | | .18 | .18 |
| Discrimination . . . | 4 | .30 | .24 | .18 | | .09 |
| Cancellation | 5 | .30 | .24 | .18 | .09 | |

Figure 3: Example correlation dataset from Spearman’s ‘The Abilities of Man’.

3 - British-American scientist William Shockley, instrumental in the design of transistor technology and founder of Silicon Valley, uses IQ tests, of which Spearman’s work on g was the basis, to propagate the narrative that black Americans suffered from “intellectual and social deficits” and the major cause was “hereditary and racially genetic” in origin (Shockley and Pearson 1992).

4 - Ronald Fischer, championed by Richard Dawkins as the “greatest of Darwin’s successors” for his work on successful mathematisation of natural selection, cements his legacy in the canon of 20th century British genius’ by developing various population genetic theories, such as the 1915 sexy-son and the runaway hypotheses (Fisher 1915). Additionally, the field of Machine Learning becomes embedded with his blueprint due to his work on Maximum Likelihoods and Linear discriminant analysis. Fischer’s discriminant allows training of algorithms that best separate two datasets of varying type, signal and background for example, by using a linear combination of features. In 1950, following World War 2 it is impressed upon UNESCO to consider its position on eugenics: an address is written under the title, ‘The Race Question’. An excerpt argues that current scientific understanding doesn’t provide evidence for inherent genetic variance relating to intelligence. Fischer is consulted, and he amends the passage, partly due to fear of uncontrolled miscegenation, as such:

Available scientific knowledge provides ~~no~~ a firm basis for believing that the groups of mankind differ in their innate capacity for intellectual and emotional development, seeing that such groups do differ undoubtedly in a very large number of their genes (UNESCO 1952).

He proposes *voluntary* sterilisation in the UK and shares correspondence with, and vouches for, the political redemption of a German eugenicist, Otmar Freiherr von Verschuer, whom himself proposed for mandatory sterilisation programs during his work under the Nazi regime. Verschuer also intellectually fathers Josef Mengele, the Angel of Death, who’s role

is highlighted in the following text (Bodmer et al. 2021). Fischer maintains an academic distance from racial eugenics, but advocates for other scientific apartheid based laws.

It is important to note that most of these men who belonged to the Eugenics Society are considered, in one way or another, to be the fathers of modern statistics in the 20th century. They had varying interests in propagating the evolution of statistical analysis. Spearman was a professor of psychology at UCL and considered it his primary motivation and with Fischer it was biology and inheritance. The success of the movement can, in part, be attributed to the interdisciplinary practice of its proponents. They also had quite differing opinions on eugenics, with Spearman holding more tolerant beliefs towards neurodiversity for example, than his contemporaries. There are dissenting voices within the practice, in that way eugenics can be considered not a uniform belief, but a framework. Yet, it stands that the attribution of superior genetics to moral, mental and physical wellbeing of society was the bed they all made and laid in.²

Nazi Germany, personified by Josef Mengele. He performs various human experiments and operates as the chief physician in Auschwitz, practicing Germany's branch of eugenics of Racial Hygiene. For the mission of proving the Aryan's hereditary superiority, regardless of environment, his experiments focus on young twins. He embodies a genteel persona drenched in dissonance as described by a former Auschwitz inmate doctor:

"He was capable of being so kind to the children, to have them become fond of him, to bring them sugar, to think of small details in their daily lives, and to do things we would genuinely admire ... And then, next to that, ... the crematoria smoke, and these children, tomorrow or in a half-hour, he is going to send them there. Well, that is where the anomaly lay" (Lifton 1985).

I believe it is vital to understand the activity of this dual-persona to truly understand the reality of colonial horror.

China and its need for counter-imperial - British and Japanese - mechanisms, which finds a home in Social Darwinism. The theory argues that the *strong* (ambiguous) are witness to prosperity in various societal affairs, including economics and politics. Interestingly, throughout the early-mid 20th century the leading voice on Chinese eugenics (yousheng, 优生学), Pan Guangdan does not advocate a "turn against any sensible concepts from sexual morality, marriage, love, family, reproduction and childrearing" (Chung 2014).

The rationalisation is different than in Europe, the axioms are less entrenched in genetic elitism, as long as interference with the production of

2. The term 'geneticist' replaces eugenicist in many texts, an example can be found on Fischer's Wikipedia article. It is of interest to historical accuracy to be wary of this attempt at contemporary moral redemption.

better Chinese, capable of standing against the masculine west, is unencountered. In this way the retroactive stigmatisation of post-WW2 eugenics is historically inaccurate. A Chinese eugenicist operates with pride as an instrumental knowledge-maker on the interests of nation building and the national psyche, the term had sociopolitical clout. Further in time space is created for synonymous Racial Hygiene laws as epitomised in the genocide of the Uighur's.

South Africa, which rapidly industrialises eugenics as a neo-apartheid class and racial containment tool. Project Coast - a bio-chemical warfare (CBW) program is exposed in the late 1990s, and Dr. Schalk Van Rensburg confirms that a large proportion of research at a subsidiary arm of Project Coast was engineered towards anti-fertility research and the development of an infertility vaccine, particularly to reduce pregnancy in female soldiers, contain birth rate in refugee camps, and to deliver the vaccine along racially motivated vectors to target black South African populations (Singh 2008). This form of scientific moral disengagement from practitioners, pertaining to genocide, always betrays an underlying political culture that actively de-prioritises the welfare of particular communities. Project Coast was established by the Minister of Defence, and scientists recruited under a comfortable financial blanket along with the venture of innovative research. This was not a de-facto experiment, operating on the fringes of scientific intellect, as evidenced by the project lead's trial in which he self-represented and was, not surprisingly, acquitted of all charges in April 2002 (Jackson 2015). The Manhattan project is analogous in many ways.

If the success of these theories became even more explicitly dominant than it is, what kind of world would we, and following generations, inherit and inhabit? Who would be eliminated for the righteous cause of genetic superiority?

As a physicist I would like to further comment on the work of Pearson, Fischer and Spearman. Their eponymous tools I have used throughout my undergraduate physics career, without ever learning of their origins, of course hidden particularly well in my chosen field due to its 'objective' nature. Hidden here denotes primarily the British colonial construct of erasure of its empirical past in the UK academic systems, as well as, to a lesser extent, the unconscious bias of individual educators. Even when such history is illuminated, the counterpoint is commonly that of separating the art from the artist, i.e. the admittedly ugly actions of the scientists do not reflect on the tools they developed to enact them. Interestingly, Pearson himself distanced his theoretics, and the field of eugenics, from the practitioners' personal beliefs.

“we firmly believe that we have no political, no religious and no social prejudices . . . we rejoice in numbers and figures for their own sake . . . to find out the truth that is in them” - Pearson (Pearson and Moul 1925).

I would like to offer two considerations:

(1) Let's assume the null hypothesis, that there is no link between aforementioned-like researchers' prejudices and their highlighted conclusions. We can then conclude that either there is fault in their method, or that the communities they talk about are truly as they proclaim. The former is unacceptable by contemporary science, as such methods are ubiquitous in our practices. Therefore we are to believe that a person from a lower class background, a background which itself can fluctuate tremendously, as it does for most migrating people, is on average statistically below the intellectual standard in comparison to wealthier communities? Or that if we are to be brought into contact with the white man, naturally the equilibrium should shift to positions of master and slave as argued by Pearson (Pearson 1905). If this makes you question, and I sincerely hope for you that it does, then we must go back to the erroneous nature of theirs, and currently our methods, and investigate them, and their basis of intelligence further.

(2) These statistical methods have shaped stationary and narrow categories, and plastered themselves onto communities that are inter-diverse and evolving, as detailed in 'Superior' by Angela Saini. By using such fixed psycho-sociological terms in scientific contexts we are inherently enabling discrimination, the very kind of de-evolution of people's self improvement that the eugenicists that created these elementary separations argued for. For example, creating both the category of a 'lower-class black' person, and then developing the kinds of statistical zeitgeists with negative capital that we currently have around that label with, can require more than a lifetime's labor just to close the deficit created by such inventions. (In this way the arguments of eugenicists are a catch-22.) I currently do not possess such statistical expertise to propose alternatives, but I do think science could benefit from the extrapolation of the methods of Bayesian statistics for example, useful in at least offering transparency in the biases and confidences assumed in interpreting data. However I think the onus is not on students but on the respective experts to do the work, firstly in recognising racialised science from all the body of work that establishes praxis of ethics and care, and secondly in providing transparent efforts in alternative methods of teaching to alleviate the oppression such education presses upon diverse student bodies. At this point in time I don't think it is useful to propose complete abolishment of current scientific practices, but labor needs to be invested on methods of ethical pedagogy and a recognition and implementation of the history of science. The term history of science itself should be redundant, as if one accepts definition of science to relate to betterment of **human** life, then the history of science is science itself.

3 Colonial India's position in the western intellectual sphere

Keywords: Coloniser and colonised, effeminate bengali and manly british, circus and subversion, badralok, western south asian masculinity

I acknowledge here that my understanding, particularly, of the Indian caste system is not embodied in a lived experience, and my theoretical understanding derives itself from the hard labor of Indian indigenous and diasporic knowledge-production.

The frameworks with which one can interrogate and understand the British Raj's character in colonial India are as plentiful as the amount of stolen artefacts in the British Museum. I will ground the analysis of colonial India in control; control enacted primarily through information gathering and eugenics. By understanding the works of Carl Linneaus and like-scientists, and the British phrenologists and eugenicists, one can understand how the British empire prided itself on its moral consciousness through scientific apartheid. Bringing its superior genetic intellect to the colonies, expending labor in civilising indigenous savagene-ness, and establishing extensive taxonomies throughout India proved a mountainous task, epitomised in colonial idioms like 'The White Man's Burden'³. The act of taxonomy went hand-in-hand with the census industry to produce one of the largest (mis)information campaigns in recent history, simplifying India's ethnographic structure into the 5 categories of caste-ism, which exists so much as the contemporary understanding of the caste system as a strict and regimented structure throughout time. This practice of course is fuelled from the statistical culture of genetics discussed in Section 2.

If we take a series of castes... and arrange them in order of the average nasal index, so that the caste with the finest nose shall be at the top, and that with the coarsest at the bottom of the list, it will be found that this order substantially corresponds with the accepted order of social procedure. - H. H. Risley, Commissioner of the 1901 census in india (Van 2006).

The role of the colonised and the coloniser is not fixed (Mrinalini 1995). The power relations between the two must exist, or must possess a momentum of actualisation, in some form within the oppressed society, particularly to take root as they did in colonial India. Therefore, it's important to consider, what kind of sociopolitical identities existed in mid-19th century India, and how the ecology was terraformed for the sacrosanct inception of British colonial ideology into Indian soil, and why that transformation of caste, justified by colonial science, took the form it did.

3. The burden is seen financially materialised in the emancipation of British slave owners in 1835. After the abolition of British empire's explicit slave trade industry, Parliament granted £20 million to compensate slave owners for lost labour and asset, and the money borrowed was only paid off in 2015 largely paid for by the British taxpayer (Office and Commission 1835)

By inquiring into the banks of history to understand the roots of colonial India's domination practice, we can begin to understand Indian scientists' varying alignment and disruption of colonial scientific ethos; this relationship aptly encompassed by the metaphor of transplant shock. Transplant shock denotes the potential rejection of a plant to thrive when implanted into foreign soil, due to a number of stresses, such as nutrient composition, of such an uprooting process. The story can begin with imperial and indigenous hysteria related to a struggle against ideological transplant in soil composition of caste, class, gender and imperialism, i.e. with chappatis and greased bullets in the 1850s. This historical formation then allows us to place the Indian scientist with a more emphatic and nuanced understanding later on.

3.1 Chowkidarh, Chappati and a Bullet

The connective tissue that moved the sovereign power of rule on India from the East India Company (EIC) to the British Crown can be spatially and temporally pinpointed to the First War of Independence in 1857. High taxes in Bengal (from which Robert Clive, EIC's governor, becomes the richest 'self-made man' in Europe), loss of land and imposed segregation of Indian society based on imperialist caste based dogma fosters a rage in native people.

The context of this reprisal against the East India Company is established by viewing the environment around the three titular characters of the Chowkidhar, the Chappati and the Greasy Bullet, with an orientalist British lens primarily. Here follows a short historical-fiction story where I treat the British imperialist's reaction to the production of Chappati by the Chowkidhar, and its baffling distribution (and velocity of) by the 'lower-caste', as a uniform mass without specificity to reenact the amorphous nature of the incident. And as an exercise in treatment of the British as a homogeneous machination, the aim is to narratively portray the same treatment that machine constructs of an amorphous, unspecific Indian ethnography, in an attempt to highlight the loss of information when this happens. When the character contradicts itself, it is to portray the variation of voices embodied in the entity.

Early 1857

British Imperialist (Dr. Gilbert Hadow): There is a most mysterious affair going on throughout the whole of India at present(...) No one seems to know the meaning of it. It is not known where it originated, by whom or for what purpose, whether it is supposed to be connected to any religious ceremony or whether it has to do with some secret society. The Indian papers are full of surmises as to what it means. It is called the chapati movement.” (Pal 2016).

Chowkidarh: Dear, since I had been stationed in Lahore, things were not so much busy. Though on my patrol along the Mozang Bazaar, I had often found myself fighting the aroma of fresh cooked chappati. One lazy day I followed the sweet and spicy thing to the shop, and I saw that the pricing was five for only two aanas? I thought the owner mad! ”How can you run a business like this?” I asked him, and he smiled, and proudly and swiftly pointed at the appreciation certificate frame adorned in floral garland. ”We don’t compromise on quality or recipe bhai saab”, he replied. ”The customer comes because we cook with the tradition, the recipe haven’t changed since my father opened this shop, no matter where our customers are called to, they come back for the quality and consistency”. I could not help feeling him a good man, and bought from him nearly every afternoon thereafter. But, here is the point, as I was leaving to my post in the north, I visited him one last time to say Khuda Hafiz. He handed me a theli of out of the furnace chappati and a note in my hand and told me, “When you cook it yourself, first give it to your children”.

Sadly, as you are too well aware I am yet able to return. But I have been making the recipe when I can... The secret is in the khameer and the masala but I have not yet got it right, I tell you the owner is a jadugarh! I thought this small thing might cheer you up for my absence, here it has made the rising tension easier to bear, I look to receiving from you when you are not so busy, give my blessings to the kids and to the susraal. Yours,” (Rizwan 2020).

Anachronistic Historian: It is said that the Chowkidarh carries with him the mysteries of the night. Mark Thornhill, magistrate of the town of Mathura, who did some investigating and found that chapatis were travelling up to 300 kilometres every night – everywhere from the Narmada river in the south to the border with Nepal several hundred miles to the north. This mysteriously rapid distribution of the humble chappati was enough to convince him that something was going on. The baffled British, already anxious of unrest and like a headless chicken, gave various conjecture, the popular opinion of the chappati revolution heralding a call to revolt against colonial rule (Pal 2016).

Delhi Policeman (Mainoddin Hassan Khan): A young constable came to me from Pahargunge, indeed as if he had seen a churail, breathing bloated like a horse. He talked at length of revolution, that it was the revolt of the backward Jati. Of seeing sprawled slogans and curious exchange of the Chowkidarh. I will have none of it. I told him to interrogate any culprit propagating this nonsense.

The British Sahib will not be the victims of the conspiracies of the revolutionaries, Inshallah.

Anachronistic Historian:

Uttam kheti, madhyam baan, nirivadh chakri, bheekh nidaan

The slogan mentioned in the Delhi policeman's book, *Khodang Godur* (Mutiny Game), is an idiot expressing the desire, effort, and frustration among rural folks of lower caste for upward social progression. It translates to: Excellent farming, medium arrow, uninterrupted job, begging diagnosis (Rubi 2016).

Brahmin (Nana Saheb): Of the Brahmin my father was, of his kiln am I the adopted heir. My blessings are plenty onto my people. Yet, treachery has been the nature of conduct of the British. He denies me my heirlooms through his doctrines and seeks to further desecrate my empire. Fine. I will speak the language he understands. They say Nana's suzerainty will reach as far as the Chowkidarh's chappati, for that is its message. If Hindu Maratha or Musalman behave as per the traditions of their caste or community, they too will be part of the kingdom to come (Kulkarni 2018).

King of Delhi (Bahadur Shah): Bone meal, they seek to convert Hindustan to Christianity by feeding her adulterated flour with bone meal from cows and pigs. This is another page in a book of treacheries. I call you to remain steadfast in your faith.

As long as there remains the scent of Iman in the hearts of our Ghazis,
so long shall the sword of Hindustan flash before the throne of London
(Vinayak 2014).

Chowkidarh: Abey ye gadhe log, baat karte hain revolution revolution, agar roti sai itni phat thi hai phir teen saun saal hum log kya darhe hua behte hain? Chalo lagate hain hum aag inke niche.

Anachronistic Historian: History tells the Chowkidarh that they know not whether their action is purposeful or not, but it does not matter, in the Chowkidarh, and the impoverished like them, an ember is enflamed, fuelled by projections of the Colonialist, the Dalit, the Brahmin emperor, Mughal king and more.

British Imperialist: Oh! I am tired of such basic commodity, to the senses it only has the privilege of food on sufferance. I must urge for more British bakeries for our men based in such lacking mofussil areas.

Brahmin: Agreed! Make no mistake, we do not break this bread with the Sepoy and the Chowkidarh. Our lot is not with the Ayah, or them. I invite you, honoured genteel, formally to dine with me, and alleviate yourself from this ache. My meals are served with rice first, and of course, are consumed using the finest ever-silver (Doctor 2013).

Anachronistic Historian: As William Dalrymple notes the chappatis never seem to have reached Delhi.

Anachronistic Historian: Rare documents of the revolt of 1857 indicate that by March 5, 1857, the chapatis had reached far and wide – from Avadh and Rohilkhand to Delhi.

Anachronistic Historian: Thus, long after the chapattis reached their northernmost point of Meerut, there was another northwards distribution from Kanpur to Fattehgarh

Anachronistic Historian: Opinions were divided as to whether the bread came from the east, near Calcutta, or from Avadh in the north, or from Indore, in the centre of the country. Opinions are divided even now, whether the chappati revolution was a revolution at all, or just a reflection of the British empire’s colonialist anxiety.

Mid 1957

Anachronistic Historian: Instructions from the Infantry Manual for the Sepoys on reloading the Enfield rifle-musket go as follow:

“1st. Bring the cartridge to the mouth, holding it between the forefinger and thumb, with the ball in the hand, and bite off the top, elbow close to the body. 2nd. Raise the elbow square with the shoulder, with the palm of the hand inclined to the front, and shake the powder into the barrel. 3rd. Reverse the cartridge (keeping the elbow square) by dropping the hand over the muzzle, the fingers in front of the barrel, and place the bullet into the barrel nearly as far as the top, holding the paper above it, between the forefinger and thumb.” (Irish 2021).

Anachronistic Historian: A rumor began spreading like wildfire among the sepoys that the British had contrived another diabolical plan for breaking their beliefs and defiling their religion. The British had introduced a new Enfield rifle that came with greased paper cartridges. To load the gun, the cartridges had to be torn apart by teeth, because the soldier’s hands were full, so that the powder it contained could be poured down the barrel of the gun. The paper cartridges, where the gunpowder and the bullet came packed with, were greased with tallow or lard. Tallow comes from the fat of cows, a sacred animal for Hindus, while lard was fat from pigs, an animal that Muslims do not eat. Although the East India Company ordered that all cartridges issued to the Indian sepoys be free from grease, the troops were convinced the Company was plotting to defile them (Dash 2012).

Anachronistic Historian: The governor of the Bank of England has tested the resilience of the new plastic British £5 note by dipping it in to chicken curry. He says, jokingly, that it is the most severe test. The Bank of England tweets: ‘There is a trace of tallow in the polymer pellets used in the base substrate of the polymer £5 notes (England 2016). A petition is launched to disuse tallow in

the banknotes, supported by vegans, vegetarians and certain religious groups. Some Hindus are extremely concerned for it violates a key virtue in their faith of Ahimsa: the practice of non-violence that applies to all living things. A Muslim man submits a live question: “Can I make prayer with a £5 notes in my pocket?” (Ulama 2016).

Indian Sepoy: Brothers, the dagger is no doubt English, but no other hand except our own is stabbing us with it. If we rise then success is certain, and we are bound to be victorious from Calcutta to Peshawar, let him taste the grease of his own bullet (Sunderlal 2018).

British Imperialist: Not only in the districts beyond the Ganges but in those lying between the two rivers, the rural population had risen... and soon there was scarcely a man of either faith who was not arrayed against me (ibid).

Indian Sepoy: Down with the English Raj! Victory for the Emperor Bahadur Shah! (ibid).

Anachronistic Historian: An excerpt from a novel, *Women Hereos and Dalit Assertion in North India*, by Badri Narayan reads:

When depicting the revolt of 1857, show Jhansi, and show
Jhalkaridevi cutting off the heads of the British,
Wearing the dress of a Kshatrani, roaring like a tiger
Ramesh Chandra Baudhh, *Jai-Jai Bhim Mahaan*, Songs of BSP, Cultural
Publisher, Lucknow)

Dalit: I will be witnessed, with a sword in one hand and the British’s head in the other, and in me the woman’s army will see a commander. The queen, Rani of Jhansi, of the Maratha princely state fights alongside me, and heeds me for advice, and with love, to safety I will lead her (Narayan 2021).

British Imperialist: I will set fire to the village! I will surround the men, women, children, and cattle! Let them come rushing out of the flames and I will fix my aim at their blackened eye (Sunderlal 2018).

Anachronistic Historian: On the 18th of June the British Imperialist executed 800 villagers within 3 days by hanging on the neem trees (ibid). An account from a village Sanyasi on the 22nd details effuse from the base of a particular neem, noticed initially by a native child. “A rich-scarlet substance flows intensely and dissipates, lingering in engravings formed from the pressure.” Eventually, the account details, the red glow outlines what reads to be a prayer in Hindi.

The Neem Tree: Mere bhagvaan, mujhe vishvaas tha ki mere bhoomika poshan mein se ek hai. Taubhee, mere daaliyon se khun behta hai, aur main apane parishram ke phal ke bina banjar rah gai hoon. Mere bachche aik ghaddar ke naam par ek-doo sare ko shaheed kar rahe hain, ye ghaddar jo unka naam kee

pecheedagee bhee nahin samajh sakata. Main unke sarahadon aur jaatiyon ke baare mein nahin jaanti. Bachon kae jubaan kaat dee gae, aur baki netaon ko maar diya gaya ya nirvaasit kar diya gaya. Bas, tamanna hai aap unhen Kali Maan kee shakti ka aashervad den aur unase atyaacharee kah mutthee utha len. Taaki meree pattiyaan phir se mere bachchon ke bharan-poshan ke lie phal den.

Anachronistic Historian: The translation is as follows. "My lord, I believed my role to be one of nurturing. Yet, my branches bleed rivers of red, and I am left barren without the fruit of my labor. My children make martyrs of each other, in the name of a traitor who cannot even comprehend the complexity of their names. I do not understand their borders and castes. Many of the children's tongues have been cut, and what was left of their leaders has been executed or exiled. Simply I wish you bless them with the strength of Kali Maa and lift from them the tyrant's fist. So that my leaves may bear fruit for the sustenance of my children once again."

Anachronistic Historian: Of course, The 1857 First War of Independence was started by Mangal Pandey.

Anachronistic Historian: It was also started by the King of Delhi, Bahadur Shah II.

Anachronistic Historian: How could I forget! it was also the Dalit teacher of Pandey, Matadin Bhangi (Narayan 2021).

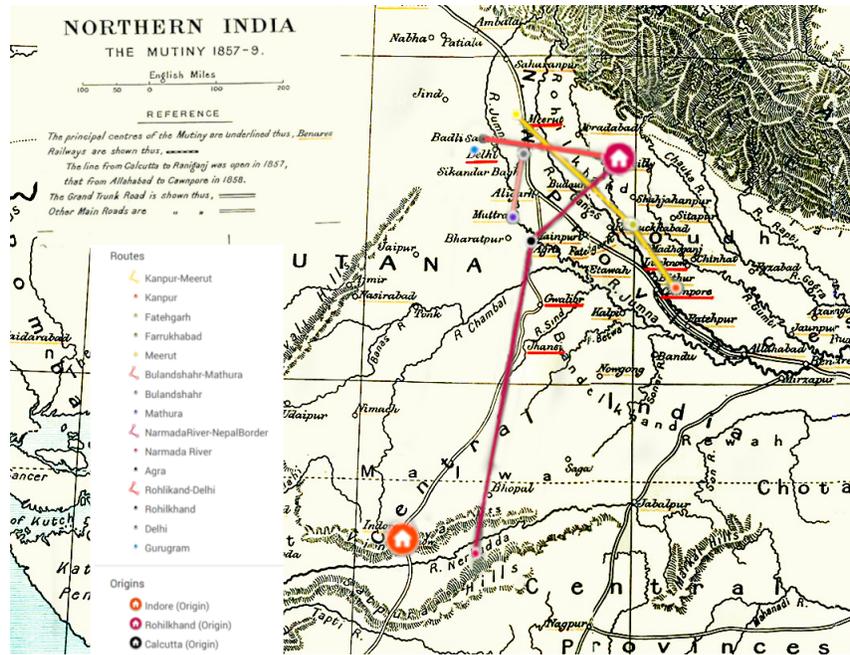


Figure 4: A map depicting the Chappati revolution diffusion routes in coloured lines, superimposed on the foci of uprisings of the 1857 First War of Independence. The map is constructed by merging a google map onto a 1912 map titled 'North India: The Mutiny 1857-9' (Emerich et al. 1924). Further information and references used to construct the chappati diffusion routes are detailed on the google map (https://www.google.com/maps/d/u/0/edit?mid=1FAOUCj4QAdF_NniorhFKjNcyMoGf3Pqe&usp=sharing)

3.2 Complexity to Simplicity

As depicted in the short-story, multitudes of behaviours were encompassed by societies in different empires, classes, sex, ethnicities and languages, and religion within Hindustan. Muslim law enforcement officials and the intellectual Brahmin caste positioning as sympathisers and surrogates of the British empire; the lower-class chowkidarhs acting as an untraceable agent inspiring great fear in the pontiff; native Mughal, Marathi, and adopted Brahmin emperors leading the First War of Independence revolt, along with a women faction of warriors with a Dalit women occupying a violent and erased historical position amongst the queen. There is an orchestra of untold stories across the Hindustan sub-continent, of which the tale above only touches the surface. Yet there has been an incredible reductionism in our contemporary understanding of such histories, from a complex system of interwoven tales to a simplistic narrative of religion and caste structures. This change of rigid sociopolitical and religious structure does reflect a real shift in Indian society during occupation, the question is

how much of a role did the English saheb play in orchestrating the change and instating a never-moving narrative around the Hindustani people?

After the War of Independence there was a general understanding that the British Raj needed to understand its colonial subject better, so the transformation occurs chiefly by the caste-system. The complexity of this subject stipulates a great offense on my part if I pretend to deconstruct it in this paper, nor do I believe it can ever be accurately described, especially in text, by an outsider. Instead, I will highlight the main mechanisms of caste construction, its reasons and evidence against its place in Indian society as a fixed historical nexus. I will assert one point however, the British Raj saw the caste system as familiar and exploitable, and imported scientific apartheid and taxonomical reasoning to aggravate intercultural relationships, similar to the methodology behind Scramble for Africa. The sociopolitical Brahmin structure, that is and continue to be superior in social status, monopolised and took ownership of, amongst many other facets of Indian society, anthropological complexity and intellectualism. Identity traumas continue to be engineered as vectors for maintaining power over the Hindu populace.

Caste and census:

H. H. Risley, British India's leading anthropologist, as quoted in the beginning of the section talking about the 'nose index', wrote:

the caste system, itself, with its singularly perfect communal organisation, is a machinery admirably fitted for the diffusion of new ideas; that castes may in course of time group themselves into classes representing the different strata of society; and that India may thus attain, by the agency of these indigenous corporations, the results that have been arrive at elsewhere through the fusion of individual types (Roy 2020).

To achieve this Risley conducted an incredible breadth of information extraction from indigenous people. The idea was to enumerate (count) caste using local knowledges and British taxonomy. Yet, due to a need for a simple national identitarian marker there was much confusion from the indigenous populations and the imperial surveyors. "Between 1871 and 1872, the data on caste were so scattered and regional that there was no national coherence. Yet, by 1921, caste was imagined to represent India's natural national social hierarchy" (Walby and Haan 2012). This asserts to the powerful established culture of western statistics in the 19th century. The London Statistical Society, founded in 1834 trained colonial state administrators in census making, and was instrumental in the first Indian national census design (ibid). In 1871-72 the first attempt at a national survey presented results that would lead some ethnographers to argue against caste as a parameter for social reorganisation, results that would lead to conclusions of caste being as prominent amongst Mahomedans and Christians as the Hindoos(ibid). Some argued this association was in part by converted Hindus trying to escape the caste system. All in all 3,208 castes were identified from the 1871 survey, some of which are highlighted in Fig 5.

Classification of Castes during the Census of 1871-72

| North Western Provinces | Central Province | Bengal | Madras |
|------------------------------|-------------------------------|---|---------------------------------------|
| 1 Brahmins | 1 Brahmin | 1 Superior castes | 1 Priests |
| 2 Rajputs | 2 Agriculturists | 2 Intermediate | 2 Warriors |
| 3 Buniyas | 3 Pastoral castes | 3 Trading | 3 Traders |
| 4 Other castes of Hindoos | 4 Artisans | 4 Pastoral | 4 Agriculturists |
| | 5 Merchants | 5 Engaged in preparing cooked food | 5 Shepherds and pastoral castes |
| | 6 Scribes | 6 Agricultural | 6 Artisans |
| | 7 Small traders | 7 Engaged in personal service | 7 Writers and accountant castes |
| | 8 Servants and labourers | 8 Artisan | 8 Weavers |
| | 9 Manufacturing castes | 9 Weaver | 9 Labourers |
| | 10 Mendicants and devotees | 10 Labouring | 10 Potmakers |
| | 11 Dancers, etc | 11 Occupied in selling fish and vegetables | 11 Mixed castes |
| | | 12 Boating and fishing | 12 Fishermen |
| | | 13 Dancer, musician, beggar and vagabond | 13 Palm cultivators |
| | | | 14 Barbers |
| | | | 15 Washermen |
| | | | 16 Others |
| | | | 17 Outcastes |

Figure 5: Caste stratification based largely upon occupation in the 1871 Census. Variation in regional categories owes to the specific writer's methodology (Samarendra 2011).

This complexity of course did not appease the taxonomical psyche. The difficulty in 'visualising India' through caste can partly be explained by the etymology of the word itself and the failure of the mapping of its connotations to Indian multiplicity. In the first place 'caste' was a foreign word pre-colonial Hindustan, and so too were its connotations (ibid), as evidenced by the comments on the census by the Secretary to Government:

A really scientific and sound classification is hardly possible in the face of the general ignorance of this subject which prevails among the people themselves, the frequency with which the same caste is called by different names in different places, and the tendency to confuse caste with occupation in the lower classes (Walby and Haan 2012).

Enter Risley. In his celebrated work of 1901 'The Tribes and Castes of

Bengal' he argues that the exact method of caste analysis should have roots in race, and therefore physical characteristics, "which have yielded valuable results in other parts of the world". This would also flirt with the upper class 'Aryan' caste as he explains:

Such an analysis would, it was thought, be regarded with approval by the leaders of the Hindu community in all parts of Bengal, among whom both the orthodox and the advanced lay considerable stress upon the purity of their Aryan descent: it would appeal in some measure to scientific men in Europe, and the results would command whatever political value may attach to the demonisation that a given population either is or is not composed of homogeneous ethnic elements. (The Tribes and Castes of Bengal - H. H. Risley.)

One can see, I hope, the shifting role of coloniser and colonised, as the upper-class natives' interests are considered significant in caste-construction. Risley wrote to the Director of the Natural History Department of the British Museum for guidance on the character of his measurement and apparatus, to which he replied:

I entirely agree with you that physical characters are the best - in fact, I may say the only true - tests of race, that is, of real affinity. Language, customs, etc., may help or give indications, but they are often misleading. Therefore the physical examination which you propose to make of the tribes of the Indian empire will be most important (The Tribes and Race of Bengal, H. H. Risley).

He then goes on to suggest facial features (shape of the nose, mouth and cheeks), not cranium proportions, as 'wonderfully characteristic of sub-races'. One can also see the lineage of scientific apartheid rationale justifying a colonialist agenda of control. Risley was divisive amongst his peers, most agreed with his anthropometric views, yet some found it difficult to rectify with caste. William Crooke, another ethnographer, argues that physical indices, such as the nasal index, show no usefulness as markers of caste, and that caste can only be explained by a 'community of function or occupation' (Fuller 2017). By the early 20th century the lens of the imperialist and the natives most predominantly magnify caste; for the former it allows for nationalisation of an 'infinite number of mutually exclusive aggregates' (Risley) and for the latter a Brahmanist ideology of just theocratic superiority. This construction results in the contemporary rigid 5-tier caste society in India, and can be made apparent by idiosyncratic census culture. Pre-caste-centric-census southern India was inhabited marginally by Brahmans; 'yet, by 1911, 1,778,685 were listed in southern provinces. And in many cases caste names had to be illuminated to the natives by the British, such is the case with the label of Rajputs plastered onto the indigenous tribe of the Syals, whom were largely unaware of the term (Walby and Haan 2012).

A legislative example of resulting caste demonisation culture is epitomised in the **Criminal Tribes Act** during British rule. A series of legislations on communities whose ancestors were 'criminals' that engineered social reform by restricting the rights of tribes with 'criminal tendencies'. The British colonial government was able to implement such morally infantile and bereft laws as the constructed caste-system was built to be a control-utopia for simple legislation, justified by the intellectual culture of social Darwinism and biological determinism that proliferated the empire in those centuries, propped up by the esteem of western science. Included amongst particularly targeted were gender non-conforming communities, who were already suffering from criminalisation of non-heterosexual relations under a previous colonial law, section 377.

Since inception of the 'ethnographic state' created by the British (Sanjoy 2019) there have been intellectual and physical action by natives against such stratification. Caste abolishment movements, particularly led by the Dalit communities have fostered a counter-culture to the idea that the caste system, which propagates that Hinduism is the fundamental Indian religion, is the glue holding India together. B.R. Ambedkar, the writer of India's constitution, himself from a Dalit family, contended Mahatma Gandhi's position of re-moralisation of the higher-castes with respect to the lower-castes, in his seminal work 'The Annihilation of Caste'. Mahatma at one point argued that the caste-system was necessary (redacted) and only a re-orientation of the relation between the castes in terms of social ideals was required. Ambedkar, attracting much ire, remained a staunch believer in caste-abolishment, arguing that the power relation cannot be redeemed liminally (Ambedkar 2013).

I signpost the names of Dalit writers who write about caste here as an attempt in making space as a person seeking to disavow knowledge-making about marginalised communities. I believe to know the effects of apartheid it is necessary to listen to communities marginalised most, the following writers represent that tribe most affected by the nationalist Indian agenda pillared by discussed British efforts:

- Dr Babasaheb Ambedkar - Annihilation of Caste.
- Meenakshi Moon and Urmila Pawar. We Also Made History: Women in the Ambedkarite Movement (1989)
- Anoop Kumar - Founder of Nalanda Academy
- Article - 12 books that form the arsenal of Dalit writing (<https://caravanmagazine.in/books/twelve-books-dalit-writing>)

It is evident, even in such a preliminary analysis, that colonial science had been the tool of oppression in occupied India. If divide and conquer could ever be summarised, it would be through the anthropological based stratification led by colonial administrators. Now that the essence of early 20th century caste ecology has been established, we will attempt to observe how western masculinity was weaponised against native non-elite intellectuals and scientists.

3.3 Bhadrakok

Emerging in the 19th century was a group of native intelligentsia, a subset of whom in physics specific rumbled with nationalist and colonial policies to find a base of scientific endeavour for their people. The Bhadrakok in physics spanned caste and class and faced the edifice of power colonial and national power which fed discrimination by various axes of identity. Bhadrakok, in this case, were a group interested in self-empowerment, and divorce from not only the British intellectual genteel but also the prevailing caste constrictions of the Brahmin elite as knowledge-makers.

However, the construction of the **effeminate Bengali** caricature by the colonialists and indigenous elite manicured an intellectual sphere of shame particularly for participating non-Brahmin natives. Misogyny has always been a major writhing root through which the imperial (scientific!) intellectual ego has tried to implant itself in the sexist frameworks of its colonies, and gender violence allowed the manipulation of Indian intellectual zeitgeist based on the gender binary. I believe this betrayal of scientific knowledge pursuit by emasculating AMAB (Assigned Male At Birth) people is best portrayed visually. Therefore, I have made a zine to establish the context in which scientists like Jagadish Chandra Bose and Bibha Chowdhury operated in as Bhadrakok, and further a podcast to examine Bose's relationship with his identity as a scientist under colonial India.

The zine and at podcast can be found at:

Zine: (<https://issuu.com/adil.gmian/docs/lillfn>)

Podcast:

I invite you to engage with this more unusual form of production with an open mind and treat it with academic integrity as one would any academic production. It is important that we allow for diverse modes of productions to exist in academia to combat elitism and class-based prejudices.

4 Limitations

Due to circumstances related to time and health aspects of the project could not be considered in enough depth, particularly the report sought to provide a counter-narrative to 'objective' imperial science by exploring Jagadish Chandra Bose and Bibha Chowdhury's work with the ethos of decolonial analysis as proposed by Raj Kapil, and therefore argue for more ethical pedagogy in HEIs.

There was another ambition to practice anti-elitism and anti-imperialist pedagogy as an effort of active intellectual decolonisation. This would have included accreditation of indigenous ideas and labor; transparency in relation to the evolution of this project and employing a fundamental care in the way this project, and therefore this article is written, as another practice in decolonial scientific research and communication. I feel this was not carried out in a satisfactory manner, such as the lack of transcripts for the podcast. These ideas will hopefully be explored with due respect when time is freer.

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