Science and Human Difference in Germany and India: The Production and Circulation of Anthropological Knowledge in Irawati Karve's Work and Legacy

Dissertation

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Abbreviations

AAA: Ancestral Austroasiatic

aDNA: ancient DNA

AMT: Aryan Migration Theory

ANI: Ancestral North Indian

ASI: Ancestral South Indian

ATB: Ancestral Tibeto-Burman

CCMB: Centre for Cellular and Molecular Biology

DNA: Deoxyribonucleic acid

DYI: Do it yourself

ISHG: Indian Society for Human Genetics

KWI-A: Kaiser Wilhelm Institute for Anthropology, Human Heredity, and Eugenics

LYST: Lysosomal trafficking regulator

NIBMG: National Institute of Biomedical Genomics

OBC: Other backward classes

PCR: Polymerase chain reaction

UNESCO: United Nations Educational Scientific and Cultural Organization

UV: Ultraviolet radiation

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Chapter 1. Introduction

1.1. Situating the legacy of Karve and the anthropological center of race

1.1.1. First opening scene: The dead in German anthropology and the troubling ghosts of race (Berlin, 2014–2021)

On 1st of July 2014, the construction work on the Free University of Berlin campus was interrupted due to a strange finding.[1] While digging the ground, a construction worker discovered an unexpected, odd combination of objects: human-looking bones and fragments, plastic and metal signs with numerical inscriptions, and an ampoule. The construction manager contacted the police, who, supervised by a forensics expert, filled seven paper bags with the objects and took them in for examination. The analysis determined that the bone remains belonged to at least 15 people and had been in the ground for several decades; the ampoule contained procaine, a local anesthetic drug invented in Germany in the early twentieth century. Following protocol, the police declared the case closed and sent the bones to a crematorium.

However, the finding and final obliteration of the human remains sparked a controversy. Very close to the site where these objects were found is the main building of the Free University of Berlin's political science department. From 1927 until 1945, this building was the Kaiser Wilhelm Institute for Anthropology, Human Heredity, and Eugenics (hereafter: KWI-A). Just a few months before the accidental discovery, a group of university students—myself included—had inaugurated an exhibition about the KWI-A's history. The exhibition had shed light on the Institute's colonial history—with its colonial collection of human remains—and narrated how that research came to work together with, and for, Nazi racial hygiene and genocide. The exhibition had also portrayed the KWI-A's founding director Eugen Fischer (1874–1967), who had done racial research in the colony of German South West Africa (today Namibia), and some of his students, including the protagonist of this thesis: the famous Indian anthropologist Irawati Karve[2] (1905–1970).

Reporting on the bones found at the university campus only after they had been cremated, different media outlets raised a possible connection between those bones and the bodies of

[1] This section is based on my own observations and on several media reports (Kühne 2015a, 2015b; Buchholz 2021; Wagener 2021; Aly 2021; Baureithel 2021).

[2] When in Germany, Karve wrote her name as "Karvé" to mark the phonetic stress on the "e" as a high vowel [e] (the name in Marathi is written as "कर्वे"). Here I decided to write her name in the most common graphic form used in English.

Jewish victims of Auschwitz, given that the extermination camp's doctors, most notably Josef Mengele (1911–1979), worked in close contact with KWI-A researchers, and human remains were sent from the Nazi camps for research in Berlin. The many press reactions brought this history to public attention, some calling the KWI-A "the institute of horror" (Wagener 2021). Just some months before, different media outlets had also reported on the students' exhibition, bringing the history of the KWI-A to public attention for the first time in many decades. This made many people question how come the university administration and the police had allowed such bones to be so effortlessly discarded before their origin—or relation to the KWI-A—was clarified, also given that the Jewish community would have opposed their cremation.

The emerging public uproar in the press and public led the university to establish a committee with archaeologists, the professor who supervised the students' exhibition,[3] and the Max Planck Society (as the successor of the Kaiser Wilhelm Society, the KWI-A's umbrella organization), which decided to undertake a further archaeological investigation on site. From 2015 until 2016, the archaeologists[4] found much more in the ground: around 16,000 fragments of human bones, bones of nonhuman animals, several small signs with numerical inscriptions, ampoules, and even a full body plaster cast containing remains of a person. The result of their five-year long osteological and forensics analysis was communicated to a large audience in an online event in 2021. There, the lead archaeologist stressed the very probable connections between those findings and the KWI-A and its vast colonial collection of human remains. The fact that the bones did not seem to have a single origin and the finding of glue material attached to the remains led the archaeologists to conclude that they were probably part of the KWI-A's collection.

In the same event, the university administration stated that no further archaeological or forensic investigation was to be done: this decision was taken also on the grounds that the consulted organizations representing Jewish and Roma and Sinti communities opposed invasive methods of forensic research. A heated public discussion ensued. Activists for the reparation of the German genocide against the Herero and Nama people in Namibia questioned the non-inclusion of representants of Black and African communities in the consultation process and stated that they would like to know the origin of those remains and possibly claim their restitution. A Roma and Sinti organization representative[5] questioned the methods of human

[3] Bilgin Ayata.
[4] The excavation and forensics analysis team was led by archaeologist Susan Pollock.
[5] Roxanna-Lorraine Witt. The following quotes by her were retrieved from the online meeting chat.

remains origins research and pointed to the haphazardness in the categories used in such research methods. She stated that "invasive research on the bone finds would objectify the bones of the people and therefore maintain the continuity of dehumanization of the deceased people by turning them into research objects, in a colonialist and National Socialist manner." She reasoned that human remains analysis cannot determine if a person were, for instance among the victims of National Socialism, Jewish and African, since such categories are not discrete—although such categories did politically split victims apart in different groups. To conclude, the activist emphasized that the return of "humanity" to the human remains should be foregrounded—and not the "supposed determinability of a specific socio-cultural/ethnic group affiliation". The debate was cut short by the conclusive—and hasty—reiteration of the university rector that all remains were soon to return to the ground: through a dignified burial ceremony. As I write this scene, the burial still has not taken place.[6]

This episode speaks for how the violent and troubling histories of colonialism and imperialism could be contingently brought to the surface, from and on the grounds of German science. Materialized in the human remains and other objects found with them, these histories of German genocides are deeply implicated in practices of the German racial and eugenicist sciences that reached their apex at the KWI-A in Berlin. The institutional unpreparedness to deal sensitively with such difficult legacies—and the university's wish to bury them again, in every way—contrast with not only the more recent attempts to remember such histories (like the memorialization project initiated by students) but also the interests of communities that have been affected by racialization and dehumanization. Therein, the discussion about the difficulties in identifying these human remains also points to the trouble of the racialized difference categories that have informed both German eugenicist policy and forensic archaeological practices. Methods of non-invasive forensic analysis done by archaeologists often include osteometric methods (i.e., measurements of human bones) which rely on categorizations that are entangled with racial classificatory systems.

This thesis examines the making of categories of difference in sciences of human diversity, especially anthropology, and explores the impact of the knowledge circulated from the KWI-A—also outside of Germany. By analyzing the knowledge-making practices and legacy of Irawati Karve, a KWI-A-trained researcher who worked most of her life in India, it investigates

[6] I could not clarify what is delaying the burial. One year after that meeting, in a public presentation by the archaeologist who coordinated the excavation and research, another scientist in the audience contested the planned burial and called for further research on the human remains.

how colonial and racial frameworks have been adapted to enact, categorize, and classify human difference—not only in Germany but also in India.

1.1.2. Second opening scene: The colonial in Indian anthropology and the racial uneasiness of "caste" and "tribe" (Pune, 2019)

The plenaries of the 2019 Indian Congress of Anthropology took place at the Pune University's imposing main building. The neoclassic building was modelled after a summer residence of Queen Victoria and Prince Albert and built to host the summer residence-office of the British governor of the colonial province Bombay Presidency (1843–1936). Since the foundation of the University in 1948—just one year after India's independence—, the building has housed academic and university meetings.[7] In one of its conference rooms, two massive portraits of Queen Victoria and Prince Albert (their names engraved on the wooden panel still visible) were replaced years ago by two paintings depicting the Maratha military leader Shivaji (1630–1680) and the Hindu monk and philosopher Swami Vivekananda (1863–2002).

Taking place in these sumptuous rooms with visible markers of colonial and post-colonial histories, the 2019 Indian Congress of Anthropology commemorated the Berlin-trained, Pune-based anthropologist Irawati Karve. A large portrait of her was set on the stage of the Congress' main activities. Many of the Congress guests also visited the Irawati Karve Museum of Anthropology on the Pune University campus, a museum whose main display contains photos and books of Karve and, underneath them, the anthropometric measurement instrument that she brought with her from Germany, an instrument that is still used by physical and biological anthropologists—some of whom presented their anthropometric research at the Congress.

The Congress also included a plenary that discussed the issues of ethics, objectivity, and coloniality in Indian anthropology. Talking about the need for tackling the legacy of colonial anthropology, one of the speakers called attention to how the ceiling of that Pune University building was still adorned with the shape of Queen Victoria's crown. He also told the story of how an elitist colonial club in Calcutta had for many years a sign that stated: "Dogs and Indians not allowed"; but, after independence and the ensuing change in the club's restrictive policy, many Indians hurried to apply for a membership, even though the offensive sign remained at the club's entrance for many more years. Another troubling aspect linked to the colonial legacy

[7] The Pune University's website describes the building as "a monumental building with a beautiful architecture" that, together with "lush green lawns adorned with beautiful fountains of the British times", make the university a "constant source of attraction to the aesthetically oriented people of Pune." See: http://www.unipune.ac.in/university_files/about_campus.htm, accessed July 13, 2022.

in Indian anthropology was language, as another speaker stressed, and addressing this issue resulted an awkward moment in the Congress: the plenary speaker stated that, since English was the colonizer's language, she would talk in Hindi; but after a few minutes, two South Indian students yelled from the audience: "speak English!" Disconcerted, she switched back to English.

The Congress was closed with the "Irawati Karve Memorial Lecture", held by her former student/colleague and retired professor Ramchandra K. Mutatkar. Mutatkar spoke about Karve's legacy and discussed how Karve contributed to a theoretical definition of caste as endogamous group. Then, he discussed the challenges of Indian anthropology today, including the increasing focus on "tribes" in India due to the European orientation of having a separate social scientific discipline to understand so-called traditional or indigenous groups. His lecture also lamented that most Indian students entering anthropology programs simply aim at passing civil service exams—exams which, first developed for recruiting employees for the colonial administration, still accept anthropology as a degree for the civil service career: this draws from when the British considered anthropology an important tool to understand and manage local populations under colonial rule.

In a nutshell, these moments at the Congress speak to the troubles coming from the deep legacies of colonialism in anthropology. Recently, renewed calls for decolonizing anthropology have echoed in many academic gatherings like this one in Pune. In this important city for sciences in India, the anthropology landscape was marked by the pioneering role of Irawati Karve. Commemorated in Pune, Karve stood as a key figure in the first decades of post-colonial Indian social sciences; however, not mentioned at the Congress was her training in a German tradition of racial anthropology—precisely: at the KWI-A in Berlin. Also not discussed was how her work on "caste" was influenced by that racial scientific school's training. While some Congress plenary speakers emphasized the cut between "European anthropologists in India" and "Indian anthropologists" to mark a post-colonial transition, the current legacy of colonialism in Indian anthropology, even when research is practiced by national scientists, has manifested as a troubling one—sometimes in ordinary and ubiquitous realms, like language, but also in central analytical concepts, like caste.

This thesis sheds light on Karve's scientific trajectory and impact—from her training in a racial anthropological school which was rooted in German colonialism to her work in India and its presence in today's anthropological and genetics research. By doing so, it brings to the fore the

problem of the colonial and racial legacy underlying scientific knowledge production about human diversity, especially about caste and ethnicity. Its aim thereby is to contribute to grasping the effects of these racializing knowledge practices as well as to decolonizing anthropology.

1.2. Research problem and questions

The two opening scenes above compose the setting of this thesis' research problem. The urge to deal with anthropology's colonial legacy point to multiple ways in which anthropologists have been and are entangled with political projects of imperialism. Thereby, the production, circulation, and political application of racializing knowledge was at center stage of the colonial scientific enterprise. Theories and methods of "race" studied the diversity of the human and classified groups of humans into discernible "races", often in compliance with political projects of subjugation, exclusion, and the drawing of borders. As the science that aimed to study human diversity, anthropology was a pivotal intellectual space in which racial theories and methods were developed, used, and also discussed and contested. In this scenario, the KWI-A in Berlin was a central node in an international network of production of racial knowledge in the first half of the twentieth century. In India, too, racial anthropology left its mark: categories used to denote difference between groups of humans in the Indian subcontinent, most notably "caste" and "tribe" (but also religion), were interwoven with racial understandings, theories, and methods, and made racialized.[8] This racial essentialization of human diversity has had world-making and material effects, both in science and politics, which call for a continued critical engagement with the legacy of racial anthropological knowledge.

Both sites in the opening scenes above are linked by an actor who contested but also circulated, produced, and adapted racial anthropological knowledge: Irawati Karve. Having studied in India and later obtained a PhD title in anthropology for her research with human remains at the KWI-A in Germany in the 1920s, Karve became one of India's most famous intellectuals. Her

[8] I apply quotation marks to these terms here ("caste," "tribe") to highlight the fact that they, as much as "race", are situatedly enacted rather than naturally given. While I maintain this perception throughout the paper, for the sake of undisturbed readability I might refrain from using inverted commas in the following sections. While still being used in official terminology, "tribe" has often been replaced by the more general term "ethnicity" or the more political affirmative "Adivasi", meaning "(ab)original" in Hindi. Throughout the thesis my use of ethnic or caste-based categories will always consider the momentary stabilization of conditions that created them, instead of suggesting their naturalization (see Tsing 2015:293n4). For a discussion on the forging of "tribe" in relation to "caste" in Indian social sciences, see S. Patel (2009:282). Further, for an analysis of how ethnicity or "tribalism" emerged in populationist thinking impulses and in the context of societal dynamics triggered by colonialism in Southern Africa, see: Mafeje 1971; Braun and Hammonds 2012:69.

research commented and co-shaped key political debates in the mid-twentieth century India, from decolonization and partition to nation-building and regional states formation. Although she is now mostly remembered for her social and cultural anthropology-focused texts, Karve's physical and biological anthropological research was central in her work and continues to be a reference in the current biological anthropology and population genetics of India. In her vast oeuvre (which counts over 100 texts), racial theories and methods played a key role. Karve's work has been taken up in many instances—although not without tensions and controversies. Today, her legacy can be seen, and is discussed, in commemorations, in the teaching of anthropology in India, as well as in molecular anthropology and population genetics research.

In this thesis, I analyze Karve's work and these different instances in which the knowledge produced by her is taken up or mobilized. I critically examine Irawati Karve's racial anthropology and its long-lasting effects in scientific engagements with, and articulations of, human difference. Through the prism of Karve's scientific trajectory, practices, and legacy, I ask: How has racialized and racializing knowledge been produced and circulated in anthropology, particularly physical and biological anthropology, and with what implications? How have categories of difference in India, especially "caste" and "tribe", been put into relation with racial theories and methods? How have differences among "castes" and "tribes" been enacted through scientific practices that rely on or build upon such racial frameworks? While exploring these questions, I am oriented towards a political horizon that lies after the following questions are tackled: How could the understanding of human diversity be otherwise? How can the ghosts of racial anthropology be laid to peaceful rest? And how can the persistent troubles of the legacy of "race" be overcome?

In the following sections, I detail my contributions' implications for larger academic debates (Section 1.3), discuss my research methodology (Section 1.4), and outline the chapters and the arguments of this thesis (Section 1.5).

1.3. Thematic departures and contributions

This thesis braids together three closely interrelated themes of academic conversations, with respective political implications, that I engage with: 1) race and racialization of human difference categories; 2) colonialism, race, and caste in anthropology; and 3) Germany-India entanglements and the transnational coloniality of race. In the three following sections, I briefly outline the terms and stakes of these conversations as well as my operationalization of concepts and envisioned contributions.

1.3.1. Race and racialization of human difference categories

Diversity and variation have been central analytical concepts to, respectively, cultural studies and biological studies of the human. Both concepts relate to differences among humans or groups of humans. To order and make such diversity or variation intelligible, humans are usually grouped according to their sameness and/or differences, which necessarily occurs through categorizations, including categories like sex, religion, nationality, ethnicity, race, or caste (Bowker and Star 2000; B. Subramaniam 2014). Thinking about difference categories and inequality, Charles Tilly (2005:111) puts it thus: "Categories matter. To the extent that routine social life endows them with readily available names, markers, intergroup practices, and internal connections, categories facilitate unequal treatment". Categories not only include and exclude people (Schramm and Beaudevin 2019), but they can also "make up people" in the first place (Hacking 1986; see also Chadarevian 2017). Such categories of differentiation of humans and their groups are embedded in processes of enumeration, categorization, and classification (Hacking 1990; Star 1991; Bowker and Star 2000; Bauer and Wahlberg 2009), processes upon which different sciences rely upon to produce knowledge about humans. Anthropology, as a science that has studied phenomena pertaining to the human in its different forms—biologically, socially, and/or culturally (depending on the subdiscipline's approach)—, has played a key role in the understanding and categorization of human diversity/variation (Braun and Hammonds 2012). By so doing, anthropologists—and other scientists engaging with classification and categorizations of human difference—produce knowledge that can have important effects on the reality of such human diversity, effects which relate not only to the scientific realm but also to social and political realities.

The world-making impact of studying and categorizing human differences has been the object of attention in many studies of science. In philosophy, for instance, Ian Hacking (1986, 1990) shed light on the "looping effect" in the co-constitutive relation between constructed category versus its social embedment/implication in such practices of classification. Social scientists and historians have also given attention to the worldmaking effects in the scientific objectification of human difference and its essentializing and reifying effects (e.g., Cohn 1987; Braun and Hammonds 2012; Bauer and Wahlberg 2009). Within anthropology, these "matters of classification, categorization, and typology" were recently called by Katharina Schramm and Claire Beaudevin (2019:277) "the elephant in our ethnographic rooms": these matters represent such a big and evident problem that they are "actively ignored or put aside to ensure business as usual." This thesis puts a spotlight on this elephant in anthropological rooms: by

shedding light on scientific practices of enactment of human differences, it examines practices of human difference categorization and classification as well as their reification effects.

The epistemological predicament represented in the figure of the elephant of categorizations and taxonomizations in anthropology is all the more pervasive given the centrality that racial theories and methods have occupied in the study of human variation. Even if now to a large extent discredited (or at least reconceived), these theories and methods infused with racial understandings were once central in the making of anthropological knowledge and have ever since influenced conceptions of human difference in and beyond the realm of anthropology, impregnating them with group-level bioessentializations. Thereby, besides evoking social hierarchizations, these racializing essentializations attribute a lot of explanatory power to bodily differences and abilities believed to be innate and hereditarian. By so doing, such racial understandings of human diversity/variation move away from looking at difference through the viewpoint of social and environmental factors that shape inequalities between human groups (B. Subramaniam 2014). As Banu Subramaniam, in conversation with Edward Said (1979), explains, "[e]ssentialism has a long legacy of being dangerous for the 'other'": Biological studies of human variation, when in co-constitution of political comprehensions of human groups differences, have played a key role in the hierarchization of groups, bioessentializing their differences and attributing social problems to the realm of the body and the biological—thus obscuring the realm of social inequalities (B. Subramaniam 2014:14).

This thesis builds upon this discussion on racializing and biologizing essentializations in frameworks to human difference. Specifically, it builds upon a large body of literature on race and racialization in the field of critical studies of science and technology. In thinking about the effects of race, or racialization, beyond—or underneath—the "conceptual erasure of race" in recent history (Goldberg 2015:152), I draw upon the work of scholars like Donna Haraway (1992, 1997), Amade M'charek (2005, 2013, 2014), Jenny Reardon (2005, 2008, 2017), Banu Subramaniam (2013, 2014, 2019), and Katharina Schramm (2014, 2015, 2016, 2020, 2021) among others,[9] who have shown how racial ideas and related technologies have been influential in different scientific fields—from anthropology to biology and genetics—and in the production and mobilization of human difference categories and units of analysis—from race, to population, and genome. Against the previously prevalent historiographic suggestion that

[9] See also: Stepan 2003; El-Haj 2007; Lipphardt 2009; Kakaliouras 2010; Wailoo, Nelson, and Lee 2012; Pollock 2012; Müller-Wille 2014; Nash 2015, 2019; Widmer and Lipphardt 2016; Oikkonen 2017; Benjamin 2018; Kowal and Llamas 2019; M'charek, Toom, and Jong 2020; M'charek and Schramm 2020; Karkazis and Jordan-Young 2020; Pollock et al. 2021; Kowal 2022.

"the idea of race" in science and, particularly, in anthropology was finally done away with in the post-World War II context (e.g., Stocking 1968), I engage with this critical STS literature to further understand the endurance of race. Specifically, this thesis builds upon understanding how *certain theories of race*—namely, those that had become more closely associated with the Nazi racial hygiene—were undermined, while "other theories of race continued to order biological studies of human diversity" (Reardon 2005:17). In fact, scientists studying human variation and evolution undertook efforts to revitalize racial approaches and re-define race in new ways, especially as the science of population genetics emerged in the second half of the twentieth century (Reardon 2005). As this new science encompassed a re-tooling and re-definition of race in populationist terms, the boundaries between "race" and "population" have remained porous (Reardon 2005; M'charek 2005), often with overlapping "practices, ideas and institutions" (Haraway 1997:230). While this STS literature focuses on North American (Haraway 1997; Reardon 2005) and Western European (M'charek 2005) contexts, this thesis contributes to this discussion by focusing on the Indian scientific context, guided by the fact that in other (however understudied) areas of the globe too, racial frameworks have had a present mark in sciences of variation. In fact, as Frank Dikötter (1998:471) contends, even racial hygienist or eugenicist ideas seemed to have had an acuter continuation in "parts of the world on the periphery of scientific research", from the South of the US and Finland to China, also long after World War II.[10]

My analysis sheds light on a historical frame (1920s–present) that has seen key debates on methods and theories related to "race". These debates happened not only in anthropology but also in other scientific fields like population genetics, both of which sciences Karve contributed to. By focusing on Karve's research on human differences as well as on her intellectual legacy, I aim to contribute to further understanding how racial knowledge has continued but also been changed and adapted. By analyzing Karve's work and legacy in India, specifically, my aim is two-fold. First, following Dikötter's (1998) call to pay attention to racial and eugenicist ideas in varied historical contexts, I contribute to apprehending the global circulation of racial frameworks to human difference. Second, I aim to contribute to the on-going scholarly discussion, as I specify in the next section, about how other categories of difference in India, most notably caste and tribe or ethnicity, have been understood in relation to, and influenced

[10] Following Dikötter (1998), a reason for this geographically patchy pattern for continuation of eugenicist ideas in science and medicine might also be that the criticism against eugenics was also louder in more central, nodal areas of scientific research. On eugenics in Latin America, see: Stepan 1991; Rajão and Duque 2014. For a brief account on eugenics in South Asia, see: Hodges 2012.

by, racial theories and methods (Robb 1995; Channa 2003; Dharampal-Frick and Götzen 2011; Mukharji 2014, 2017, 2023; Savary 2016; B. Subramaniam 2019). In other words, my goal is to further explore how and to what extent these now-ordinary categories of difference in India were historically entangled with racial theories and methods, and what the current scientific and political implications of such racialization are. Thereby, I aim to understand changes in frameworks of human difference, point out persistent problems, and suggest possibilities for ways to disentangle from the legacy of racializing knowledge. By focusing on Karve, I also shed light on a historical actor's personal involvement in debates and practices related to racial frameworks. My goal, then, is not only to reflect about scientists'—myself included—responsibility and implication vis-à-vis colonial and racial legacies in knowledge production about human difference but also to think about the scope of our agency for challenging and overcoming such legacies.

Hence, this thesis will discuss the implications of researching human diversity through categories of difference like caste and ethnicity while also striving to point at ways in which such research could break free from its racial legacies. This would include, as I will argue, a renewed attention to social inequalities (including those structured by racism and casteism) as they decisively co-constitute human differences (Fuentes 2021; Cabana et al. 2022). In this sense, building up on on-going discussions on bridging "nature" and "culture" in science (Haraway 1991, 2012, 2016; Ingold and Pálsson 2013; B. Subramaniam 2013, 2014), a further goal in this thesis is to contribute to discussions about bridging the analytical concepts of difference and inequality (Barros 2018) and about how research on human diversity and, specifically, anthropological research could benefit from better attuning to the realm of social and global inequalities.

In addition, by bringing "caste" into the center of analysis, I contribute to an incipient dialogue within critical science studies, namely, on the relation of caste vis-à-vis politics and knowledge production (Sur 2011; K. Patel 2017; A. Subramaniam 2019; Thomas 2020) and especially the complications related to caste in population genetics (Egorova 2009, 2010; B. Subramaniam 2019). I also build up on crescent discussions within the STS scholarship on what it means to examine caste in science and technology, as two panels on this topic in the last two annual conferences (2020, 2021) of the Society for Social Studies of Science demonstrated, and I want to add to the still incipient pool of ethnographies of science in India (Sekhsaria 2019). Specifically, I explore the role of anthropology in the making and understanding of caste, as I further develop in the next section.

1.3.2. Colonialism, race, and caste in anthropology

In assessments of the history of anthropology and, more generally, within social studies of science and technology, there has been an increasing attention to the entanglement between science and colonialism (e.g., Haraway 1984; Raina and Habib 2004; Habib and Raina 2007; Widmer and Lipphardt 2016; Gupta 2021). Such entanglement can be perceived not only in discursive and ideological but also in very material ways: at the same time as science often justified colonial projects, colonialization enabled the material conditions for the enterprise of European scientists in many colonized territories, including British India. As Jennifer Hamilton, Banu Subramaniam, and Angela Willey put it,

> the conditions of colonialist expansion and conquest in different parts of the world allowed for men of science to collect and circulate the stuff of scientific inquiry as well as to perform rigor by conducting comparative empirical research. Thus, both science and colonization required bodies—living and dead, human and nonhuman, wholes and fragments—in order to fulfil their mandates and to justify particular worldviews. (Hamilton, Subramaniam, and Willey 2017:615)

In the nineteenth and early twentieth centuries, the requirement of bodies was particularly manifest in anthropology and other sciences that aimed at explaining human difference based on racial frameworks. In order to confirm the unmistakably Eurocentric assumption of the biological and civilizational superiority of members of what were called European races over the colonized ones—thus often justifying colonialism itself—, human remains and bodies of living individuals of different "races" were made objects of study, compared, and categorized in not always implicit hierarchical ways (e.g., Widmer and Lipphardt 2016). For this undertaking, usual research practices comprised the measurement and quantification of living and dead body parts—in a methodology commonly called "anthropometry" (Spencer 1997; Theile 2005; Kyllingstad 2014; Mukharji 2015; Hoßfeld 2016; Roque 2018). These anthropometric methods usually relied on the use of technological instruments that were designed by European racial anthropologists, like the German-Swiss anthropology professor and anthropometry expert Rudolf Martin (1864–1925) (Hugentoble-Schwager 1990; Morris-Reich 2013; Germann 2016; Mak 2017; Barbosa 2018; Clever 2022). This thesis pays special attention not only to the histories of human remains and how they have played a role in practices of knowledge production on human difference (both in Germany[11] and India) but also

[11] For a discussion of colonial human remains and their (ab)use in scientific research in Germany, see: Stoecker, Schnalke, and Winkelmman 2013.

to how anthropometry and technological instruments (including many designed by Martin) were used by Karve and are still taught and researched within Indian anthropology today.

Anthropometry and racial theories also found fertile ground in the fieldwork of anthropologists in colonial India (Bates 1995). As Arjun Appadurai (1996:125) in conversation with Susan Bayly (1988) and Hacking (1986) put it: "Indian bodies were gradually not only categorized but given quantitative values […], increasingly associated with what Ian Hacking has called 'dynamic nominalism' (1986), that is, the creation of new kinds of self by officially enforced labeling activities." In this context, "caste" emerged as a basic category and unit of analysis not only to understand the human diversity of India but also, in the eyes of the colonial government, to order and manage it. As a result, caste was also reinforced as a category of political subjectivity (e.g., Cohn 1987).

This process of formation of caste in science and politics has been the object of a vast historiographic and social scientific scholarship. However, this scholarship often finds itself in a divisive and dead-end genealogy debate. In a nutshell, the debate is about the extent of colonialism's impact in the formation of caste. On the one hand, the postcolonial focus of much of the scholarship has underlined the effect of colonialism in the emergence of caste. In this context, the colonial government's census and its use of caste categories have been amply discussed (Barrier 1981; Cohn 1987; Appadurai 1996; Dirks 2001; Dharampal-Frick and Götzen 2011), also because the use or non-use of caste categorization in the Indian census has been an on-going matter of political and sociological discussion (Sundar 2000; Vithayathil 2018). Also in this context, much of the historiography has shed light on the impact of British scholar-administrator Herbert Hope Risley (1851–1911), an anthropologist and census commissioner who was responsible for the application of racial anthropometric methods in the large-scale "ethnographic surveys" which aimed at cataloguing "tribes" and "castes" of India for the colonial government (Bates 1995; Dirks 2001; Channa 2003; Srivatsan 2005; Fuller 2017).[12] This focus on the colonial dimension of the history of caste has suggested a great share of creative agency and responsibility to British colonialism for shaping the so-called caste system. The works of Nicholas B. Dirks (1989) and Ronald B. Inden (1986, 1990) are two emblematic examples in this regard. While the first talked in terms of "the invention of caste" in colonial India, the latter followed the framework of Said's *Orientalism* (1979) to describe how orientalist discourse has imagined and constructed "India" and portrayed it as "a caste

[12] Moreover, on how Risley "introduced the marital status of women as the primary category to understand Indian society" see Mitra (2020:86).

society". These works resonate loudly in more recent scholarship, backing also aggravated constructivist takes exemplified in the positions of Sanjoy Chakravorty (2019) and the editors of the volume *Western Foundations of the Caste System* (Fárek et al. 2017).

It is precisely in criticism of these constructivist oversimplifications that, on the other hand, the other side of the historiographic debate on caste has formed. Bayly (1995) called attention to the heterogeneity and regional specificities in the colonial science of caste, which makes such scientific enterprise hard to be harmoniously equated with political interests of the colonial state. Crucially, related revisionist critiques by Rosalind O'Hanlon's (2017) and Ananya Chakravarti (2019) have called out the postcolonial scholarship's blind spot in engaging with pre-colonial—and post-colonial[13]—realities of caste.[14] In her provocative media piece titled *Caste wasn't a British Construct – And Anyone who Studies History should know that*, Chakravarti (2019) pointedly argues that such single focus on colonialism has given leverage to an exhumation of responsibility by upper-caste individuals vis-à-vis historically persistent caste-bond privileges and inequalities. In the same direction, David Mosse (2020) recently analyzed a concrete example of political implications: Hindu right-wing organizations have deployed this postcolonial scholarship, in particular Dirks (2001), to argue that caste was a colonial invention. This argument has been mobilized to oppose any policy based on the recognition of caste: in a recent anti-casteism policymaking discussion in the UK, a campaign headed by Prakash Shah—one of the editors of the aforementioned *Western Foundations of the Caste System* (Fárek et al. 2017)—elaborated such argument to deny the social reality of not only caste (framed by him as a "colonial conspiracy") but even casteism itself. Thereby, the argument actively deviates political attention from today's caste-bound inequalities by reframing "the issue of social justice and equality in terms of the colonized and the colonizer" (Mosse 2020:16–17). This debate has high political stakes. To stay with the example analyzed by Mosse, Shah's campaign overshadowed Dalit[15] experiences of discrimination and, ultimately, successfully blocked the inclusion of caste in anti-discrimination laws in the UK. Thus, in a nutshell, the critics of this postcolonial or colonial constructivist perspective in the history of caste have, if not criticized this scholarship per se, at least called attention to the risks

[13] Following Kapil Raj (2013), I differentiate between "postcolonial" as a scholarly perspective and "post-colonial" as the historical period in after the official end of colonialism.

[14] See also Roland Lardinois (2016:429) for a critique of Inden's (2000) framework and related postcolonial takes on caste as a "colonial invention".

[15] Dalits are a social group in India that is often regarded as one of the most excluded by practices of casteist discrimination, including practices of untouchability. Meaning "broken" in Marathi, the term "Dalit" was suggested by Pune-based social reformer Jyotirao Phule (1827–1890) (see Chapter 5) as a term to encompass those regarded as "untouchables" and "outcasts" (Mendelsohn and Vicziany 1998).

in its political afterlives: after all, caste-ism also has pre-colonial origins and remains a post-colonial, contemporary phenomenon.

Moreover, other scholars can be positioned moderately along the line of fissure in the debate on the formation of caste, like Appadurai, who argued that

> Caste in India, even if it was itself a very complicated part of the Indian social imaginary and was refracted and reified in many ways through British techniques of observation and control, was nevertheless not a figment of the British political imagination. (Appadurai 1996:125)

Bayly (1995:166), too, suggested that caste could be seen as "a meeting ground between Indian reality and colonial knowledge strategy". In any case, although Bayly and Appadurai were striving to find a middle ground already in the mid-1990s, the political stakes of the debate have been updated and the scholarly discussion on it has returned in even more polarized ways, as Chakravarti's (2019) harsh newspaper response to Chakravorty (2019) demonstrates.

On a metalevel, it seems for me that this debate revolves around the problems of causality and heterogeneity in the construction of historical narratives. The divide takes place with, on the one hand, views that stress the causal effects of colonialism in shaping caste and, on the other, those that stress the heterogeneity of factors that influenced caste beyond the agency and interests of colonial actors. The debate has also been made difficult by the definitional blurriness or instability of "caste": like "race", "caste" is multiple. In other words, "caste" implies different meanings which have changed situatedly—historically and geographically.[16] This has made the terms of the historiographic discussion unstable and the less specific, the bigger the timeframe or scale.

In order to overcome these impasses, this thesis formulates a new framework to contribute to the debate on caste, power, and science. It builds upon the contributions of the postcolonial historical and anthropological literature on caste but signals a new direction for discussion. By focusing on the racialization of caste in knowledge articulations, I also take up Bayly's

[16] As I will detail in the next chapters, "caste" has been variously defined. Sometimes, caste means "*jati*", a term that, in one of its definitions (including Karve's), describes a said-to-be endogamic, or kinship-based, social group that is traditionally bounded to a linguistic region, for example "Chitpavan Brahmins". Sometimes caste is also used to mean "*varna*", a Sanskrit word that comes from Hindu scriptures and means a broader group in a hierarchical system composed of four (and in some accounts five) broader groups: Brahmins, Kshatriyas, Vaishyas, and Shudras. Dalits are outside this hierarchical system, although some accounts allege that they belong traditionally to the Hindu creed. Arguably, this *varna* system has been used by some to read a pan-Indian or Hindu reality. More loosely, caste is sometimes used in very general ways to describe hierarchical group formations in Indian society. And while "*varna*" is usually circumscribed to Hinduism, "caste" is also sometimes used to described other-than-Hindu religious groups in India. Defining "caste" is a matter of continuous scholarly debate (see Chapters 2 and 5).

(1995:214) still current call to give more attention to race in the colonial scholarship on difference in India, especially given how resurgent Hindu supremacist discourse has mobilized the vocabulary of race (see B. Subramaniam 2019; Basu 2020). More importantly, by focusing on Karve, from her training in German racial anthropology to her work and legacy in both colonial and post-colonial India, I shift the gaze on the problem in two crucial ways. First, I attend to the ways that caste and ethnicity in India have been *situatedly* enacted, reified, and racialized—also beyond the context of historical colonialism (and colonial anthropology). By so doing, I examine how national Indian anthropologists and other scientists, especially Karve, engaged in practices of scientific racial enactments of difference in India.[17] Second, by tracing transnational entanglements between German and Indian scientists, I move our attention beyond colonizer–colonized lines of entanglement, as I further explain in the next section. In addition, by examining the role of other non-British actors, particularly German actors, I build upon that postcolonial scholarship on caste by adding other transnational and colonial influences in the racialization of difference in India. In sum, while I still consider the context of British colonialism, my perspective of transnational entanglements—with this shift away from British actors—can lead a way out of the "the chicken or the egg" situation that the debate on the formation of caste has been trapped. As I further discuss in the next section, the transnational approach taken here resists single-origin (or original sin) causal narratives in racial knowledge genealogies.[18]

Above all, my postcolonial take on the debate about the racialization of difference in India aims to contribute to discussions on the colonial (dis-)continuities in knowledge production in post-colonial times. Thinking with the case of Karve, I have in mind the many anthropologists from the Global South who were trained in centers of the Global North—like myself, who took several classes in the very Berlin university building that used to be the KWI-A.[19] Primarily, I am concerned with coloniality in science and in the formation of scientists—and its impact in the enactment and shaping of human difference. More specifically, the matters of concern here are the colonial legacies in anthropology, both in the North and in the South, including in India, as we have seen in the opening scene above (Section 1.1.2) and several other contributions

[17] Thereby, I also acknowledge Olufemi Taiwo's critique in his *Against decolonisation: taking African agency seriously* (2022). However, I take the agency of Indian actors seriously while also building up on (instead of refuting) the debate about—and calls for—decolonization.
[18] In this regard, I converge with Mukharji (2019). See also discussion in Section 1.3.2.
[19] In mobilizing this binary construction Global North vs. Global South here, I'd agree with Anne Pollock (2019:14) in the assertion that, in relation to international geopolitics of science, "these binary mappings are problematic and incomplete—yet they are relevant nonetheless".

have pointed out (Hymes 1972; Lewis 1973; Harrison 2010; Devisch and Nyamnjoh 2011; Savransky 2017; Mogstad and Tse 2018; Alonso Bejarano et al. 2019; dos Santos Soares 2019; Allen and Jobson 2016; Todd 2018; Pandian 2019; Jobson 2020; Gupta 2021). By examining Karve's position, work, and legacy, as well as the contradictions therein, this thesis aims to add nuance and complexity to the debates on decolonizing anthropology. My argument pushes against the perception that the problem of coloniality in anthropology in India (or anywhere) is solved by the nationalization of the discipline after independence. Contradicting an opinion articulated for instance in the 2019 Indian Anthropology Congress described above, Karve's case shows that the problems concerning the interweaving of colonialism and science are not simply resolved when post-colonial nationals sovereignly take the reins of research in their own hands.[20] In fact, the national scientific sovereignty in the post-colonial world can be questioned on multiple levels, both in terms of research content as well as material conditions of research. While I am convinced about the importance of the world anthropologies project—which praises and promotes the post-colonial diversity of national traditions in the discipline (Escobar and Ribeiro 2006)—, I am moved by the awareness that the debate on decolonizing anthropology can take next steps in tackling difficult troubles, including our elephant in the room (Schramm and Beaudevin 2019) as well as the issue of North-South inequalities and dependency in science (e.g., Visvanathan 2006; Sundar 2014; Rajão, Duque, and De' 2014; Reis-Castro 2021). In a nutshell, by bringing the colonial histories in anthropology to the fore, I aim to shed light on the coloniality of current practices of researching human diversity. Essentially, this thesis builds upon the postcolonial scholarship here discussed and aims to contribute to discussions on decolonizing anthropology and the study of human diversity.

As an anthropologist myself, my critique is enunciated in a place of care for this discipline. Since I was formally introduced to anthropology in 2007 I have been moved by its "approach to humanity as an open horizon of displacement rather than a fixed position" (Pandian 2019:80) and by its "nurturing of openings and possibilities already present in the world and its experience" (ibid.:117). But, like many other peers and students, I am also troubled by anthropology's colonial heritage and shortcomings. Hence, the contribution I formulate here necessarily entails a looping reflexivity aimed at a political horizon. The critical historicization I trace in this thesis can hopefully be put into the service of criticizing ourselves as anthropologists and scientists of human diversity, with the care of not falling into the paralyzing

[20] In a similar vein but on a different level, see Nandita Sharma (2020) on sovereignty, nationalization, and enduring colonial inequalities in the post-colonial world order.

traps of "nihilistic relativism" (Bourdieu 2004:2) or self-destructivism (e.g., Jobson 2020).[21] In this sense, my approach meets that of other anthropologists' efforts in overcoming such troubling legacy and transforming anthropology. As biological anthropologist Augustín Fuentes argued in a recent assessment on the racial legacy in his subdiscipline, in words that could be extended to the whole of anthropology:

> Ignorance of history is dangerous. Complacency about history is dangerous. Understanding history, being aware of our complicity, is worthy, but not always easy. As scholars we need to be able to acknowledge who and what we are and have been, what our roots and ancestors look like, what they did, and how we want to either reflect or differentiate ourselves from those patterns and processes. How we interpret the world today is influenced by our histories, by our awareness of those histories and the problems and structural violence that those histories have imbued into our discipline. An active mode of interpretation and engagement with our history is critical if we are to do better biological anthropology now and in the future. (Fuentes 2021:3)

Echoing Fuentes and others, this thesis rests on the conviction that disregarding the call to deal with anthropology's entanglement with colonialism and racism will not just be insufficient to safeguard the discipline's scientific authority but will also contribute to undermining it. Such ignorance will also be hazardous—socially and politically—by allowing the repetition of harmful effects like those in which imperial projects and anthropological knowledge have worked in tight collaboration.

In this sense, my thesis starkly opposes recent (and old) reactionary positions within the discipline that attempt to brush decolonial critique aside by writing hagiographic history or mobilizing counterexamples and anti-racist figures in the history of anthropology, like Franz Boas.[22] This sort of defensive disciplinary historiography will not save anthropology from its loss of political relevance; on the contrary, this anti-postcolonial defensiveness implies missing the chance to update the discipline's responsiveness vis-à-vis the renewed global political

[21] Commenting the Californian wildfires that happened simultaneously to the 2018 meeting of the (US-)American Anthropological Association in an air-conditioned venue in San Diego, Ryan Cecil Jobson (2020) articulated different critiques in and to (US-based) anthropology in that year in his *Case for letting anthropology burn*. My reservations to his generally very compelling critical review go in the same direction as those written by Luísa Reis-Castro (2021) and Samar Al-Bulushi, Sahana Ghosh, and Madiha Tahir (2020), who call for a consideration of the geopolitics of location in the critique enunciated by Jobson's—a Harvard alumnus and tenured professor in one of the most renowned anthropology departments in the US. Writing in a journal with wide international circulation, Jobson's critique is not so mindful of how anthropological spaces have also literally burnt in the past years due to lack of funding—the reduction of Brazil's National Museum to ashes being one example (see Reis-Castro 2021:147-149). As Al-Bulushi, Ghosh, and Tahir (2020) put it, in conversation with Faye Harrison, "[i]f the appeal to 'let anthropology burn' aims to strike at the heart of the highly stratified system of knowledge production in the discipline, then the 'epistemological imperialism' [Harrison] of the US academy would be a good place to start the fire."

[22] By writing this, I also have in mind the discussions in reaction to Akhil Gupta's *Decolonizing U.S. Anthropology* (2021). On the limitations of "the Boasian fix", see Jobson (2020). See also Mark Anderson (2019) for a nuanced account on the liberal antiracism that was typical of the Boasian anthropological tradition.

urgency in discussing racism and colonialism. Instead, following Anand Pandian's (2019:117–120) ruminations on critique in anthropology, I strive to build a (self-)criticism that aims at multiplying alternatives and affirming possibilities. I also follow Laurent Loison's take on critique in history of science, as I strive to "reactivate the complexity" of the historical scientific practices analyzed in this thesis, also taking account of elements of contingency in the making and circulation of scientific knowledge.[23] By so doing, I aim to create "awareness of the fleetingness of the present" and "develop[ing] tools to criticize present science" (Loison 2016:36), oriented by the idea that if science could have been different in the past, it could still be different in the future. Thus, if we can see anthropological critique as a way to enable multiple worldlings, and if we understand historical critique as a means to question the present and learn for the future, my critique of the sciences of human diversity is set towards a horizon of different, better, and decolonial sciences.

Notwithstanding, I am conscious about the geopolitics of critique and the locus of my critical enunciation as a Germany-based scholar. While following Karve's scientific trajectory took me from Germany to India and to specific debates about the coloniality of anthropology in India, I need to stress that my critique of anthropology could also apply to many other national contexts. In this sense, although my ethnography focuses on research situations in India (as much as ethnographies generally focus on specific places), I do not intend to leave the impression that India is unique or exceptional in the coloniality of research on human difference, for it is not. Indeed the "global coloniality" (Escobar 2013; Grosfoguel 2013; Ndlovu-Gatsheni 2020) that accompanies racial frameworks in science could—and should—be problematized in different locations, despite their specificities. Further, my goal is also not to compare the developments in Indian anthropology with those of German anthropology.[24] If anything, as I develop in the next section, this thesis aims at criticizing the global impact of

[23] My take on the concept of circulation to think about the movement (and the thereby adaptations) of knowledge is oriented by Raj (2010).

[24] Although this is not the goal of this thesis, it could be interesting to think about how racial anthropological theories and methods are currently articulated in Indian anthropology in comparison to German anthropology. Following Dikötter's (1998) logic explained above, we could think that, in Germany, the post-World War II criticism against *Anthropologie*—precisely due to its entanglement with discredited eugenicist politics—led to such a level of scrutinization that physical anthropological research was highly discredited. The field eventually virtually disappeared with the name *Anthropologie* (KWI-A researchers migrated to medical and genetics research), while the social and cultural traditions in anthropological research would assemble under the umbrella of *Völkerkunde* or *Ethnologie* and only recently found the way into the now again accepted nomenclature of *Sozial- und Kulturanthropologie*—in 2017 the German Ethnological Society (*Deutsche Gesellschaft für Völkerkunde)* changed its name to German Anthropological Association (*Deutsche Gesellschaft für Sozial- und Kulturanthropologie*). This helps to explain why, different than in India (or other countries, like the US), physical and biological anthropology are usually not part of the (markedly social and cultural) anthropological curricula in German universities.

German racial anthropology with the goal of further tackling the coloniality and Eurocentrism of centers of research in the Global North.

At the same time, it is to amplify critical efforts of Indian anthropologists in decolonizing the discipline, and in collaboration with them, that I remain attentive to the continuation—as well as changes and implications—in theories and methods with a racial background, including anthropometry. As some of these theories and methods still appear—either vividly or spectrally—in Indian classrooms and research sites today (see Chapter 4), I aim to contribute to on-going discussions about curriculum change and decolonization in anthropology as much as I aim to tackle racist and eugenicist legacies in research. Thus, it is with "thick solidarity" (Liu and Shange 2018) that I "stand with" (TallBear 2014) those who persistently work against racism and casteism and their legacy, both in science and politics.

1.3.3. Germany-India entanglements and the transnational coloniality of race

The third and last main theme that I contribute to concerns the entanglements between German and Indian histories, especially in regard to the circulation of racial knowledge. This thesis is in conversation with an emerging scholarship on Germany–India connections. One of the main topics in this scholarship has been the key role of the German state and Germany as a sponsor and locus of political articulation of South Asian anticolonial activists in the late nineteenth and first half of the twentieth centuries (Manjapra 2006, 2014; Fischer-Tiné 2007, 2014; Zachariah 2013; McGetchin 2013; Raza, Roy, and Zachariah 2015; Liebau 2019, 2020; Khan 2020a). This political background is directly tied to knowledge and education, as many South Asian anti-colonial articulators were trained in German universities, which, also due to Germany's anti-British and imperialist knowledge politics, were world-leading in orientalist and Indological scholarship—Indology being the philological, historical, and religious studies of ancient India (Manjapra 2014; Jenkins, Liebau, and Schmid 2020).

In his book *Age of entanglement: German and Indian intellectuals across empire*, Kris Manjapra (2014:18) showed that, already in the nineteenth century, scientific institutions in Germany and German-speaking scholars "provided foundational support for the establishment of British colonial institutions in India", marking colonial science in India with a "German character". Other works have hinted at the Germany–India entanglements in orientalist scholarship and their implications in both Indian and German sciences and nationalisms—including National Socialism. While Christophe Jaffrelot (1995, 2007) and Anustup Basu (2020) analyzed the influence of German racial thinking, involving Hitler's own, in the ideas

of Hindu nationalist ideologues in the 1920s and 1930s (like M. S. Golwalkar), other scholars examined nineteenth century "Indomania" in Germany and showed how National Socialism was entangled with German orientalist takes on South Asian religious knowledge (Cho, Kurlander, and McGetchin 2013; Cho 2013; Kurlander 2013; Oesterheld 2013). German-Indian entanglements also play a part in the critical scholarship on the idea of the Aryan race (e.g., Channa 2003; Thapar et al. 2019). In particular, Dorothy Figueira (2002) showed how the tropes of Aryanism figured in antisemitic and racist knowledge produced by German scholars (including famous orientalists like Max Müller) at the same time as the ideas of these German scholars found ample discussion in Indian scholarship. Furthermore, a footnote in Crispin Bates' account on Herbert Risley's application of anthropometric methods to study the influence of the so-called Aryan race in Indian castes reveals an important link in German-Indian racial knowledge entanglements: Risley's re-articulations of European racial anthropology must be credited to his erudite German-speaking wife, Elsie J. Oppermann, who translated German scientific publications for him (Bates 1995:241). Building up on this scholarship, this thesis follows the hint of this footnote and explores German racial sciences' role in knowledge-making about human difference in India.[25]

"Age of entanglement" is how Manjapra (2014) termed the historical period between 1815 and 1945 due to the intensified inter- and transnational encounters beyond the colonizer–colonized dualism, particularly with German-Indian interactions.[26] My use of "entanglement" is even more general. While Manjapra comprehends entanglements in their strict sphere of political relations, I look at knowledge entanglements in their varied manifestations and beyond the realm of actors' intentions. Thereby, I am inspired by Anna Tsing's (2015) use of "entanglement" as the compass to navigate her "rush of stories" in tracing a complex web—or assemblage—of interactions. At the same time, I am mindful of Tsing's (2015:137) alert that "[e]ntanglement bursts categories and upends identities". I am also inspired by Karen Barad's (2007) quantum physics-based philosophical explorations on entanglements and attentive to her alert that "entanglements are highly specific configurations and it is very hard work […] to study them, in part because they change with each intra-action" (ibid.:74). Taking up Tsing's

[25] Bate's footnote on Elsie J. Oppermann also alludes to discussions on the invisibilization of the role of women in anthropology and other sciences (see, e.g.: Salvucci 2021). Tackling this issue has been an important motivation for this thesis' focus on Irawati Karve.

[26] For Germany-India encounters in other historical periods, see also: Bajpai, Suski, and Heymann 2016; Bajpai 2021.

and Barad's alerts means for this thesis that, as I detail in Section 1.3, the workings of entangling concepts and categories will be examined in their specific situatedness.

Similarly, I am wary of Harald Fischer-Tiné's concluding remark that

> the obsession with 'entanglements', 'flows' and 'connections' that has been characteristic of the first decade of global history writing has reached the limits of its explanatory power. The 'who-met-whom-and-where?' approach to transnational inquiries into the past needs to be supplemented with carefully calibrated probings into *the actual effects* of all this circulation and communication. (Fischer-Tiné 2014:185, emphasis mine)

Taking Fischer-Tiné's (self-)critique seriously, this thesis focuses on points of entanglement that bear crucial implications for the racialization of human difference in India. While Karve's work and legacy surely does not make up the only vector of entanglement that leads to this outcome, I argue that she, as well as other German-trained Indian physical anthropologists—including Delhi University professor Profulla Chandra Biswas (1903–1984) and Sasankha Sekhar Sarkar (1908–1969), both trained at the KWI-A—, injected a key impulse to the racialization of human diversity in India.

Furthermore, this thesis contributes to the literature on the history and impact of German scientific racism and racial anthropology, especially the KWI-A (Proctor 1990; Massin 1996; Lösch 1997; Hund 1998; Zimmerman 2001; El-Tayeb 2001; Campt 2004; Hatlapa 2007; Schmuhl 2008; Lipphardt 2012; Barbosa et al. 2018). Joining recent theses that analyzed the work of a KWI-A-trained researcher in China (Huang 2022), the legacy of Biswas in Northern Indian anthropology (Bandeh-Ahmadi 2018), and the presence of German racial anthropological instruments in South Africa (Walters 2018), this thesis contributes to grasp KWI-A's implications outside of Europe. Thereby, I am oriented by discussions on the importance of tracking transnational entanglements in the history of the sciences of human variation (Schramm, Skinner, and Rottenburg 2012; Suárez-Díaz 2016; McMahon 2019a, 2019b; Chadarevian 2022; Clever, Hyun, and Burton 2022), whereby many of these transnational historical accounts necessarily mention German actors due to their virtual ubiquity in international networks of racial knowledge (e.g., Lefkaditou 2022; Clever 2022; Hyun 2022).

In addition, while the literature about the KWI-A has focused on the entanglement of its research with the political context of National Socialism, my historical frame encompasses the background of the KWI-A's foundation in 1927. Following the KWI-A's founder (and Karve's supervisor) Eugen Fischer in his Mendelian theorization on "racial mixing" based on his

anthropometric study of colonial subjects in German Southwest Africa, today Namibia, I examine the relation between German colonialism and German physical anthropology. More, by apprehending this specific (German) colonial context of racial theory-making and its role in the racial knowledge articulations at the KWI-A, my goal is multifold. More generally, I contribute to the growing scholarship on German colonialism and its global entanglements in the spheres of politics and knowledge (e.g., Bergner 1996; Conrad 2013, 2019; Zimmerer and Bechhaus-Gerst 2013; Howes 2014; Hölzl 2016). More specifically, I want to further theorize about the intrinsic coloniality of race and scientific racism (Hesse 2007, 2016; Quijano 2009) as well as the specificity of German coloniality and its role in German racial sciences (Grosse 2000).[27] In thinking with how this specific colonial and racial knowledge formation emerged in the KWI-A and circulated to Indian settings through Karve's trajectory, I am drawing together the contexts of German colonialism and colonial and post-colonial India. By mapping these transnational entanglements, this thesis reveals a picture of the transnationalization of the coloniality of race and racialization.

In this sense, I contribute to further questioning the limits of methodological nationalism both in the historiographies of colonialism(s) as well as in the historiographies of anthropology and racialization. While Sebastian Conrad (2013) called attention to the need for "[r]ethinking German colonialism in a global age"—and to consider the German colonial influence beyond formal colonization—, Richard Vokes (2014) predicted that the historiography of anthropology would move away from "national traditions" to grasping its "many histories" through smaller units of knowledge production, like ideas and schools. As much as my transnational approach necessarily engages with generalizing national categories here—"Indian", "German"—in drawling lines of entanglement between them, the ultimate contribution that this thesis points to lies in constructing a global history of racial knowledge.

Moreover, my framework of transnational entanglements illuminates the dimension of material inequalities in science across different locations on the globe, which also have important consequences for knowledge outcomes. Inspired by Barad's philosophical exploration of entanglements in science, I aim to understand the close connection between material-technological conditions of research and their "ontoepistemological" implications (Barad

[27] Here I am also moved by Patricia Uberoi, Satish Deshpande, and Nandini Sundar's (2008) remark that we should take into account that colonialism was not a monolith. While I find the theoretical generalization on the interface of race and colonialism still helpful as an orientation, I am inclined to acknowledge that the postcolonial scholarship can further explore the specificities of colonialisms and colonial power-knowledge formations (see, e.g., Buettner 2016).

2007:409n10) in the field of human diversity research. By so doing, as pointed out in the previous section, I build up on post- and decolonial scholarship on geopolitics of knowledge (Mignolo 2002, 2011) and "academic colonialism" (Sundar 2014) to further discuss global material inequalities and dependency in North-South scientific entanglements and how they limit the sovereignty of South-based scientists. Thereby, I contribute to understanding how enduring technoscientific infrastructural inequalities shape knowledge outcomes of this field of research. This will be shown not only in the case of the transnational scientific trajectories of Karve and her research instruments (Chapters 2 and 4), but also under the light of the material inequalities and related power asymmetries that mark the dynamics of international peer validation and collaborations (Chapters 5 and 6). Currently, this is especially evident in the genomic research on populational diversity in India, where Indian scientists rely on international collaborations with better funded/equipped scientists based in the Global North. As I will demonstrate, the racialization of human diversity in India also happens through such transnational entanglements today.

1.4. Approaching the field and methods

In this section, I discuss this thesis' methodology and the immediate theoretical background underlying the chosen methods. While considerations about methods run throughout the thesis, in the following I briefly introduce my methodology along three themes: 1) my positionalities; 2) my takes in ethnography and history as I track and trace (post-)colonial transnational entanglements; and 3) grasping racialization in science.

1.4.1. Positionalities

My positionalities have fundamentally shaped my approach to this research topic and my fieldwork in situated and relational ways. As we learn from discussions in feminist critical studies of science (e.g., Haraway 1988; Harding 1991, 2008, 2015), "knowledge is intrinsically politically and ethically situated by its purposes and positionalities" (Puig de la Bellacasa 2017:41). To begin with, my interest in the questions addressed in this thesis draws from my confrontation with Eurocentrism in social sciences and with the role of Global South scientists in Europe. I grew up in Brazil, where I graduated in social sciences, a BA program that, in Brazil, usually encompasses anthropology, sociology, and political science. Studying social sciences in one of Brazil's biggest public universities in the second half of the 2000s meant also being in the midst of scholarly and political discussions about race- and class-based affirmative action policies that were in expansion (thanks to the favorable, progressive political

climate since 2003). At the same time as the skepticism about the practical applicability and social effects of affirmative action was high also among Brazilian anthropologists (many of whom seemed to be more worried about a diverse society's cohesion than its social inequalities),[28] there was a general scholarly effort in questioning the so-called "racial democracy" ideology, which portrayed Brazil as a racially harmonious society, and publicly discussing racism. As someone who went to a mostly white, middle-class, conservative schooling that reflected my family's own social position, I was confronted with my own unpreparedness to talk about these topics, and I learnt a lot from these discussions.

After my graduation, I moved to Germany to assist a research project that included field research in rural Brazil, in an isolated region where my grandparents, my parents, and I were born. Working as a sort of "native broker" to this team of well-funded German researchers, I began to reflect about positionality and financial inequalities in international research collaborations as well as on ethnocentric bias in interpretations of social reality. As I continued to study in Germany, these reflections met my confrontations with German colonial history and the absence of public reflections over it. Like many other migrants and German citizens with experiences of racialization, I was also critical about the incipience or lack of, and resistance against, discussions about racism in Germany. I vividly recall a classroom discussion, when I was still an exchange student in Berlin in 2009: white German students contested a Turkish sociology professor by claiming that there was no racism but maybe xenophobia (*Ausländerfeindlichkeit*) and classism in Germany, which did prompt some contestation by very few students in a crowded classroom. This juxtaposed with the memory of a discussion in my first semester at the university in Brazil, when a liberal economy professor argued that "we [Brazilians] are not racists"[29] and that classism was the primal marker and cause of inequality of Brazil, which triggered a heated classroom debate: many students contested him and attested to the many reasons why racism (next to classism) was overwhelmingly present in Brazil.

During my MA program in International Relations some years later, I was also often troubled by the Eurocentrism embedded in the political scientific theories taught in Berlin. In addition, many of my courses in Germany took place in the building that used to be the KWI-A, but most

[28] See, e.g., the book *Divisões Perigosas* (Dangerous Divisions) published in the year I entered the university (Fry et al. 2007).
[29] The professor's argument was based on Ali Kamel's 2006 book *Não somos racistas: uma reação aos que querem nos transformar numa nação bicolo* (We are not racists: a reaction to those who want to transform us in a bicolor nation).

of my peer students had no idea what the KWI-A was. In fact, most of my German colleagues had never dealt with Germany's colonial history in their school education.

The year was 2013 and ever since the topic of colonialism, boosted up by growing discussions on racism in German society, has taken increasing space in public discourse in Germany. To confront this sensation of colonial amnesia—or "aphasia" (Stoler 2016)—in that year, four other students and I decided to make an exhibition about the KWI-A's colonial history, its implications to its racial and eugenicist research, and its current (non-)remembrance. Three of us had come from three different countries in the American continent (US, Canada, Brazil) and our perspectives on colonial history were marked by our previous personal engagements with how we had been directly implicated in settler colonialism.[30] The figure of Karve—as an Indian researcher who was trained in a blatantly Eurocentric institute and defied certain racial theories in Germany but continued to work with racial frameworks later—sparked my curiosity as much as it provided a mirror to reflect on my own situatedness, which is one that, I believe, can be relatable to many young researchers and students who come from the Global South to study in Europe.

Going to do fieldwork in India while based in—and generously financed by—German institutions, I was often read as "a researcher from Germany". At first, I was troubled by my "translocational positionality" (Floya 2008). This positional inversion made me question if the easily attachable Germanness onto my body in India—much different from experiences in Germany where I had been reminded of my foreignness—was mediated by perceptions of whiteness and its equation with Europe.[31] Sometimes, interlocutors in India were also puzzled by my dual national positionality (Brazilian and German), but such confusion often generated productive insights—also because it made my body ambiguous vis-à-vis discrete continent-based classifications of human variation (see Chapter 4). At times, the Germanness of my institutional affiliation probably contributed to granting me not only access to genetics research centers but also the valuable time and attention of their lead scientists. At the same time, sharing

[30] This should not be read as a suggestion that confronting histories of colonialism is the rule for everyone's education in these three countries, on the contrary. I am stressing here that these were personal experiences.

[31] In Germany, several times I have been reminded of my bodily differences vis-à-vis perceptions of what Germans look like. The frequency of such situations of othering have reduced the longer I have lived in Germany, which is possibly explained by the shift of other markers—language, citizenship or not, living in an almost exclusively white town (Radebeul, Saxony) or later in a much more diverse neighborhood (Neukölln, Berlin)—as they influence perceptions of Germanness and bodily differences. This also differed from experiences in Brazil, where I lived most of my life in a middle-upper class neighborhood where census workers would tick the box next to "white" to all residents of the family before we could even respond to the standard Brazilian census question "What is your race?". If anything, these shifts elucidate the situatedness of racial perceptions of difference.

my Brazilian rootedness and my relatability to Karve's position opened important doors for open conversations with Indian anthropologists. With some of them, I have sustained dialogues not only about colonial legacies in anthropology but also, more generally, about international infrastructural inequalities in scientific research. This thesis acknowledges these conversations and aims to collaborate with them by further thinking about these matters that are of concern to these anthropologists in India.

Because race-ism and caste-ism in science can be a personally conflictive topic, I have anonymized, also through use of pseudonyms and randomization of gender pronouns, some of the actors who compose the scenes that I ethnographically narrate or whom I interviewed, even though they were aware of my research endeavors. This choice also means moving away from an individualizing responsibilization for racial continuities in science. Nevertheless, interviews might indicate the name of the interviewee when they granted me permission to cite their name, especially in the passages that I try to pinpoint differences in views and locations.

Furthermore, my insights from my positionality as a Brazilian anthropologist is in conversation with contributions of other scholars from the Global South in shedding new light to discussions on anthropology (e.g., Ribeiro and Escobar 2006). Among works that make an anthropology of anthropology, I am inspired by the methods and insights in Mwenda Ntarangwi's book *Reversed gaze: an African ethnography of American anthropology* (2010). Regrettably, the scope of direct cross-regional anthropological conversations within the Global South is very limited, and this limitation is conditioned by infrastructural inequalities.[32] Although this thesis, too, is mediated through infrastructures located in Germany, I hope it can inspire further steps in putting anthropologies from the Global South in critical dialogue vis-à-vis their colonial and Eurocentric legacies, as much as my approach has paid attention to infrastructural conditionalities in the global politics of knowledge production (see Chapters 5 and 6).

In addition, reflecting about positionality was also constitutive of the conversations with family members of Karve. As some of her granddaughters have moved to North America and come to confront experiences of racialization, the interlocution with them on the topic of race-ism was very insightful. Friendships and collaborations with family members, especially with Urmilla Deshpande (Irawati's granddaughter), provided several insights. As much as they told me about many interesting personal facets concerning Karve, these relations also helped me to

[32] For a rare example of thinking Indian and Brazilian anthropologies together—and their relation to Eurocentrism—, see Peirano (1991). See also Vinicius Kauê Ferreira's work on anthropology in India (Ferreira 2013) and on South Asian social scientists in Europe today (Ferreira 2017).

hold accountability of my critical position towards her work, reminding me of the responsibility of biographical writing, as I detail in the next section.

1.4.2. Ethnography and history: tracking (post-)colonial and transnational entanglements

I came across the topic of this thesis through the memorialization project on the KWI-A that I was part of, a group of five students who, in 2014, organized the exhibition about the KWI-A with a focus on its colonial history and its (non-)remembrance at the Free University of Berlin today[33] (Barbosa et al. 2018). This thesis expands on the research I started as a part of this students' initiative in 2013. Since its beginning, my research was concerned with issues related to memory—also in methodological terms. While researching for this project I was faced with the difficulty, shared by other historians, that most of the documents pertaining the KWI-A were destroyed at the end of World War II. The ethnographic approach to the past and present that I have traced in this doctoral project entailed thinking about methods at the intersection of history and anthropology, both in practical terms—exemplified by the problem of archival erasure—and epistemological terms. In the following I trace an overview of my ethnographic methods and make some considerations on my anthropological take on history of science as well as my involvement with discussions on de- and postcolonial STS.

My ethnography comprised the gathering of different historical sources, both in Germany and India. As for research in formal archives, in Germany I consulted the archives of the Max Planck Society in Berlin-Dahlem and the archive of the Humboldt University in Berlin (former Wilhelm University of Berlin). In India, I visited the National Archives of India, in Delhi, and the Maharashtra State Archives and I examined the Irawati Karve Collection (a collection of her private books) at the Deccan College library as well as documents of the library of the Pune University's anthropology department. I also analyzed non-institutionalized archives, including Karve's family's and the former Irawati Karve Museum curator's personal archives as well as Nandini Sundar's collection of documents and texts related to Karve. While the lack of institutional archives that could ground the history of science in India led historian Indira Chowdhury (2013) to argue for oral history, sociologists-anthropologists Uberoi, Deshpande, and Sundar (2008) identified the same problem in their effort to write an Indian history of their disciplines. Like them, I take for granted the limitedness of every archive (or source) and, thus, made efforts to apprehend the history of Karve's research also through oral history by

[33] The exhibition was digitized and is available online at: https://manufacturingrace.org, accessed June 27, 2022.

conducting semi-structured interviews with contemporaries of Karve, including colleagues, students, and family members (See Appendix 1 for a full list of interviews).

In addition, I conducted semi-structured interviews and conversations with current practitioners of those scientific fields that directly deal with Karve's knowledge legacy, in particular anthropology, archaeology, and population genetics. These interviews aimed not only at grasping Karve's legacy but also understanding the heritage of racial frameworks and the difficulties and tensions in the categorization of human difference. I have maintained an extensive dialogue with professors, researchers, lecturers, and students at the two Pune institutions that Karve mostly contributed to, namely the Deccan College and the anthropology department at the Savitribai Phule Pune University (short: Pune University). While most interviews and conversations happened in Pune, I also attended and observed conferences and conducted several interviews in other Indian cities: New Delhi, Noida, Phaltan, Kolkata, Hyderabad, Kalyani, and Varanasi. In the three latter, I visited and conducted interviews in key research centers in population genetics (see Chapter 5).

My ethnographic approach also included participant observation. Besides attending and observing anthropology and genetics conferences as well as talks about Karve, a considerable share of my ethnography's time was spent in the company of anthropology and archaeology students, lecturers, and researchers in three higher education institutions in Pune.[34] I joined dozens of students in anthropology-related courses in different classes, conferences, and other university activities for one semester (2018-2019), including the MA seminar entitled "Biological anthropology: practical 2", which took place in Pune University's Osteology Laboratory, as well as the MA seminar "Biological Anthropology", which often took place in the Deccan College's Anthropology Laboratory. In both seminars I learnt how to conduct anthropometric—including osteo- and craniometric—research. This instance of learning and apprenticeship as method (Hasse 2016) was key for grasping the changes, tensions, and contradictions in methods that have been used in physical anthropology since KWI-A times and allowed me to understand them in their complexity, in and beyond their collation with racial frameworks.[35] I also joined the small team of researchers of the Pune University's Molecular Anthropology Laboratory, where I spent several afternoons over the course of a semester talking to them, observing and eventually helping the activities of a research on skin color variation among caste and ethnic groups of Maharashtra (see Chapter 6). Moreover, I

[34] Deccan College, Pune University, and Symbiosis School for Liberal Arts.
[35] For further reflections on this method and the ethical difficulties it entailed, see Chapter 4.

analyzed exhibits, and observed tours, in the Irawati Karve Museum of Anthropology at Pune university.

As for my research's timeframe, my archival research in Germany started in 2013 and continued sporadically throughout the following years, from 2018 also in collaboration with a new research team working on an institutional memorialization project about the KWI-A and led by Manuela Bauche. My fieldwork in India contained three stays that were planned to total 12 months, most of which in Pune. However, my last research stay in Pune, started in March 2020, was cut short due to the Covid-19 pandemic outbreak—which, in India, had precisely Pune as its first hotspot. Before that, my research stays took place in September and October 2017 and between September 2018 and April 2019. The conversations with students and some professors have maintained between and after my fieldworks through digital communication, not only due to the pandemic-related interruption. In planning and thinking about fieldwork, I was inspired by debates that have crystallized, among others, in Gökçe Günel, Saiba Varma, and Chika Watanabe's *Manifesto for Patchwork Ethnography* (2020). I was also encouraged by approaches for global/transnational research and ethnographic methods (Marcus 1995; Gupta and Ferguson 1997; Knowles 2004; Fortun 2009; Coleman and Hellermann 2011; Tsing 2005, 2015). My field observations—including notes to the interview situations—and reflections were kept in fieldnotes diaries, following the instructions by Emerson, Fretz, and Shaw (2014).

As for the analysis of the gathered material, I compiled and analyzed all interview transcriptions and fieldnotes in the text analysis software MAXQDA with use of an inductive textual categorization. I did the same for photos of archival material, for instance photos of hand-written notes in books of the Irawati Karve collection. Inspired by Sara Ahmed's (2004) notion of ethnography of texts, I conducted a close reading of all texts by Karve, paying attention to her rhetoric and discursive articulations, while also striving to apprehend how these texts have been taken up in further research and politics. Although I have learnt (some) Marathi, my skills in reading this Devanagari script-based language remain, at best, in a beginner's level. The work of translators, especially Urmilla Deshpande, made possible my analysis of Karve's (few) books written in Marathi. Most of her texts were written in English though and English was also the language of nearly all communication in academic and educational spaces I frequented. In addition, I conducted a close reading of texts by biological anthropologists and population geneticists researching on human diversity in India.

Overall, I am fundamentally inspired by phenomenological and material semiotic perspectives to understanding the making of scientific knowledge (Knorr-Cetina 1983; Haraway 1984, 1997; Latour 1987, 1990, 2007; Laet and Mol 2000; Mol 2002; Law 2004, 2007; Clarke 2005; M'charek 2013). This means I paid special attention to materiality in the situations of scientific practice and the ways in which different actors—material objects and technology included—are set in relationality. This perspective entails, as John Law (2004) advises, attending to the material set-up of the different scenes where I conducted participant observation and interviews. Descriptions of rooms, buildings, and other material elements that *matter* to the making of knowledge compose my ethnographic text and help us understand the situatedness of scientific and teaching/learning practices. While also observing the material, infrastructural, and financial conditionalities of research, I paid special attention to objects that played a role in the practices of scientists and lecturers—books, anthropometry manuals, measuring instruments, data logbooks, etc.—, besides human remains (including bones and DNA samples).

While such now-classic approaches within STS scholarship have contributed to enhancing our understanding of scientific practices, perhaps due to an ethnographic and phenomenological orientation many of them can be blamed for being spatially focused and relatively neglectful of historicity. Thereby, I am inspired by—and aim to contribute to—recent discussions on how to better attune to temporality in practices of knowledge-making. In particular, I am encouraged by M'charek's (2014) and Lundy Braun's (2014) takes in apprehending historicity when ideas—in their study cases, racial ideas—are materially inscribed into technology and other objects and, as a result, play a role in how knowledge circulates not only through space but also through time.[36] This resonates with Barad's (2007:43) argument that "concepts are materially embodied in the apparatus". I am also moved by Banu Subramaniam's (2014) conceptual efforts in thinking through hauntology in order to attune to the histories of racial and eugenicist ideas in current research on variation, as I detail in the next section. Further, I am inspired by the potentials of analyzing historical factors when zooming into social situations in a post-colonial context (e.g., Gluckman 1940) and by Tsing's notion of "rush of stories" as a method.[37]

[36] Here I also draw from Bernard Cohn's (1987:49) attempt to bridge history and anthropology when he states: "The past exists not only in [archival] records of the past, but survives in buildings, objects and landscapes of the present day, the observation of which assist the historian in constructing the context. The anthropological historian therefore should have the working experience of both the field and the archive."

[37] In her multi-sited, patchwork ethnography on mushrooms and capitalism, Tsing (2015:37) affirmed: "To listen to and tell a rush of stories is a *method*. And why not make the strong claim and call it a science, an addition to knowledge? Its research object is contaminated diversity; its unit of analysis is the indeterminate encounter. To learn anything we must revitalize arts of noticing and include ethnography and natural history."

If discourse and ideology, for instance, are present in every social situation (Clarke 2005), so is history. As Barad (2007:ix) puts it, "[t]the past is never finished. […] we never leave it and it never leaves us behind." In reassembling Karve's knowledge practices and outcomes, I strive to retrace and comprehend her stories, her histories, and the (hi)stories of the objects involved in her research. I examine how these (hi)stories come to matter in current knowledge-making practices that build on her legacy or use the same books and instruments she used to work with. The rush of stories and *their*/*her*/*his*tories that I draw here composes a nuanced and complex picture of the production and circulation of racial knowledge, with a focus on its colonial histories and how they come to matter and relate to post-colonial social realities.[38]

In this sense, the STS approach I am putting together in this thesis finds resonance with the efforts to configure post- and decolonial[39] STS frameworks that have been made by a growing number of scholars (e.g., W. Anderson 2002, 2009; Harding 2016; Schramm 2017; Lyons et al. 2017). Drawing on Schramm (2017), I put forward a postcolonial STS framework that sheds light on colonial histories and their presence (or coloniality) in practices of studying human difference—with the hope that these sciences and the worlds that they help to enact could also be different.

Before I discuss how this postcolonial STS approach applies to apprehending racial knowledge, in concluding this section I trace some notes on history, causality, and effect in the picture of transnational and ontoepistemological entanglements I am drawing. As Barad (2007) alerts us, thinking through entanglements implicates rethinking agency, intentionality, and causality. By summoning the histories of different human and nonhuman actors that compose practices of knowledge-making, this thesis challenges deterministic and mono-lineal historical narratives. By so doing, it also complicates assumptions of causality in history. This approach differs from hegemonic historical frameworks in fundamental ways. As historical anthropologist Bernard Cohn (1987:50) observed, historians usually work in constructing the past as "lineally and causally related to the present". This is so because "[c]hronology, the capacity to sort events, ideas, persons, and lives into before and after statements, is the basic methodological assumption which underlies the practice of all historians" (ibid.). As already stated, my narrative does not want to convey that the chosen actor in this web of knowledge

[38] In grasping knowledge encounters in post-colonial moments, I am also inspired by Helen Verran (2002). But unlike Verran, I shed light on the power asymmetries that shape this knowledge-making in post-colonial moments, as they too matter for knowledge outcomes.

[39] Instead of playing decolonial and postcolonial perspectives against each other, following Gurminder Bhambra (2014) I am more interested in drawing from the commonalities of both schools of critique.

entanglements, namely Karve, is the sole or main responsible (i.e., causal trigger) for the processes analyzed after her time. I do argue, however, that there is a series of long-running effects worth examining in the knowledge-making practices in which she was the protagonist. These effects are beyond the assessment and intentionality of Karve and other historical actors. As Barad (2007:23) proposes, "intentionality might better be understood as attributable to a complex network of human and nonhuman agents, including historically specific sets of material conditions that exceed the traditional notion of the individual." My choice of focusing on Karve nevertheless is motivated by reasons other than an attempt to produce mono-lineal causal narratives in explaining the racialization of human difference in India; by focusing on her, I want, instead, to gain various anthropological and epistemological insights about and around this process. Far from writing a hagiography, I focus on Karve's person also to foster our capacity of reflexivity vis-à-vis a particular scientist's actions, limitations, structural conditions, and contradictions. Following Marianne Sommer (2016:2) on the role of biography writing in the history of science, I take Karve's biography as a prism to better understand the political, cultural, and social situatedness and conditionalities of her practices of knowledge (see also Uberoi, Deshpande, and Sundar 2008:22–31; Fischer-Tiné 2014).

In constructing this past-and-present entanglements approach, I build upon on-going discussions in the history of science and knowledge. As Foucault (1977:143) already argued, drawing from Nietzsche, "history also teaches us how to laugh at the solemnities of the origin"—"origin" here as a translation for the German term *Ursprung*.[40] In this sense, I am not concerned with identifying the one *Ursprung* of the racialization of difference (because there is not a single one); instead, I look at different aspects of its processual "emergence" (*Entstehung*), also accounting, as Foucault defended, for contingencies in a genealogy of knowledge. I also draw from more recent discussions in history of science/knowledge (Tosh 2003; Loison 2016) and history of anthropology (Vokes 2014). Against the charges of presentism and anachronism that some historians direct at anthropologists' engagements with anthropology's history (see Vokes 2014), I follow historian Loison's (2016) defense of "critical presentism" in his project of historical epistemology. This means that, when I select aspects of history to focus on, I am oriented by the understanding that history is ultimately looked at from present-day interrogations and to point "the ways into the future", as anthropologist Tim Ingold puts it (quoted in Vokes 2014:124). Following Loison's approach also entails being careful with excessive presentisms. Besides avoiding "inevitabilism" (the most excessive use of

[40] This insight is indebted to Durba Mitra's (2020) reading of Foucault.

causal-narrative presentism), I avoid "descriptive presentism" by paying attention to how the meaning of concepts (including race) shift situationally, historically and locally (Loison 2016:33–36).

In addition, I avoid excessive judgment of historical actors (particularly Karve) based on present-day knowledge and related moral standards. To be sure, this thesis takes for granted that the racial anthropology as that practiced by Karve or at the KWI-A does not hold scientific validity today and is politically hazardous on a number of levels. By doing so, this thesis builds upon a long-standing criticism against "race" as a scientific concept to explain human differences and/or their inheritance—also due to the reifying ontological and political implications of racial frameworks vis-à-vis racism.[41] However, I refrain from labelling Karve's racial anthropology "pseudo-science" because the research done by KWI-A scientists was considered science by the established standards in that historical context. Coming to terms with this fact pushes us to reflect more seriously about current scientific standards and our own historical transience as scientists (Loison 2016). At the same time, I refrain from judging Karve morally as this would not be productive if we want to reflect about our own implications in the legacies of racial knowledge today. As much as we can distance ourselves historically from Karve, devaluing her work on moral terms—for instance by stating that her work was corrupted by her values—would be a too-easy and self-deceptive way out of the trouble of the heritage of scientific racism, as if current moral standards alone would safeguard science from continuing with such knowledge legacy.[42] Also ethically and morally, different facets of Karve's oeuvre—although not those tainted by her racial anthropological accents—can be regarded as progressive. It is the nuances, changes, and contradictions in her work and persona that makes her an insightful case to think with.

In sum, my narrative approach critically distances itself from chronological frameworks. Instead, to better apprehend both the spatial and historical circulation of racial knowledge

[41] This is certainly an on-going debate, which also mirrors many tensions discussed in this thesis and has important local specificities, especially given contextual differences of how race can structure social group categories. Nevertheless, when it comes to the validity of racial frameworks in biological and life sciences, the framework taken in this thesis is aligned to the position of the 2018 open letter signed by more than 60 scholars against David Reich's (a leading US-based geneticist) reanimation of race in genetics research (See: https://www.buzzfeednews.com/article/bfopinion/race-genetics-david-reich, accessed November 18, 2022; see also Chapter 5).

[42] I do not want to suggest that moral judgments of historical figures in science are ineffectual: they are not, and they often crystallize in recurrent debates in memory politics. However, the purposes of this thesis do not involve an assessment of whether and how Karve should be remembered.

through its material incarnations and situated (re)productions, I follow a topological approach, as I detail in the next section.

1.4.3. Grasping racialization in science

Race and racism(s) are not monoliths (Balibar 1991:40). While talking about race across a wide range of contexts might be insightful for large scale analysis, the ethnographic approach taken here implies that I will be looking at different racial knowledge practices and articulations—including racial theories and methods—in their historical and situated specificity. Thereby, I pay attention to the relational interplay of different actors that matter to the production and circulation of knowledge. This methodological attitude helps me to grasp how racial knowledge not only is resilient across time but also how it changes and adapts to changing contexts as it travels (e.g., Stoler 1997; Schramm, Skinner, and Rottenburg 2012). While I am inspired by anthropological approaches that generally refer to "race" as a relational object as it is made, unmade, and re-made in different contexts (e.g., M'charek 2013, 2014), I strive to specify it, highlighting its mutability and relationality. This means that whenever possible I choose to talk about racial frameworks, theories, and methods, in more specific terms and in relation to situated enactments of racial difference. Thereby, I am oriented by Annemarie Mol (2002) when I think in terms of the *enactment* of bodily difference in scientific settings. The same applies for "caste" in how I approach this concept and category of difference as well as the settings in which caste differences are made. In sum, looking at enactments of difference in situated settings allow me to perceive the multiple ways in which bodily differences are (or could be) scientifically enacted; at the same time, talking in specific terms of racial and anthropological theories and methods allows me to better grasp knowledge changes and adaptations as well as the racialization of difference, avoiding associative collations that are triggered by a historically loose use of the term "race".

That said, my historical reference or starting point to the meaning of "race" and "racial" when I write these words in more general terms is the conceptual definition that was hegemonically stabilized at the KWI-A in 1927, the year Karve initiated her racial anthropological doctoral training. Although at the KWI-A, too, there were theoretical discussions about race (which are especially remarkable in the laborious attempts to define "Jews" as a racial group distinct from "Germans"), race at the KWI-A was generally used to denote and explain differences between groups of people on the basis of the assumed heritability of physical and *geistig*—cultural,

mental, and cognitive—characteristics and abilities.[43] In such conceptualization, social and environmental factors had a much contained explanatory role; a wide array of different elements were understood as inheritable and naturalized. Furthermore, my use of the term "racialization" means to denote the process of use of racial methods, theories, or frameworks to produce knowledge about other difference categories or concepts, like ethnicity, population, nationality, and caste.

Moreover, my approach investigates the conditions as well as implications of the production of racial knowledge. I aim to understand how (racial) knowledge and power form and intersect. Thereby, I am oriented by Reardon's (2005) rearticulation of Sheila Jasanoff's (2004) notion of co-production of science and social order (see also B. Subramaniam 2014). While explorations on the inextricable and multiple entanglements between politics, society, science, and technology are at the core of STS scholarship—as illustrated in the Latourian maxim that "science […] is politics by other means" (Latour 1993:229)—, I turn to Jasanoff's and Reardon's simple but elucidative idiom of *co-production* to shed light on a fact that is still often brushed aside by human variation scientists who strive to maintain their position purified from the realm of politics, namely: that the work on categories of human difference will always both be informed by and affect the political and social realms. In shedding light on these interactions through the co-production prism, I focus on the multiple ways in which anthropologists and population geneticists, from Karve herself to those who have built upon her work, have been informed by social and political conditions and elaborated knowledge about human difference that impacts social reality. This approach is also in line with Barad's explorations on the notion of *entanglement*, which I use throughout this thesis and discuss in the conclusion (Chapter 7).

Moreover, the more recent decades of the historical context covered by this thesis also saw an increased invisibilization or erasure of race in science. This does not mean that the influence of racial thinking, methods, and theories has ceased (Goldberg 2015). To tackle the legacy of racial knowledge in current science, I build upon different conceptual discussions in STS and anthropology. I draw from Ann Laura Stoler's Foucauldian theorization on the "polyvalent mobility" of race to account for its adaptability to different historical contexts and, as Stuart Hall (1980) elaborated, in articulation with different material and discursive elements in post-colonial times (see also Balkenhol and Schramm 2019). To describe this elasticity and

[43] Racial understandings and scientific racism are, thus—and markedly so in the German context—intrinsically linked to eugenics and ableism. (This remark draws on contributions of anti-ableism groups in the discussions on the memorialization of the KWI-A).

adaptability of race, M'charek (2013) as well as Katharina Schramm and Markus Balkhenhol (2019) talk of race as a slippery object, while Anne Pollock (2012) writes that race has the ability to jump platforms and take on different shapes rather than disappearing.

I also draw from the notions of "absent presence" (Law 2004; M'charek, Schramm, and Skinner 2014; Balkenhol and Schramm 2019; Harrison 2019) and race as a "ghost" (B. Subramaniam 2014; Karkazis and Jordan-Young 2020). Thinking in terms of "absent presence" helps us to attune to how race comes to matter in scientific practices even when it is made invisible; it helps us grasp its fluidity, slipperiness, and "continual ambiguity" (M'charek, Schramm, and Skinner 2014:472). Similarly, the Derrida-related spectral or hauntological framework, when proposing to grasp racial and eugenicist ideas as a ghost that represents an "unfinished business" from the past (B. Subramaniam 2014), helps us make visible the legacy of racial theories and to see the unfinishedness of efforts to overcome (or erase) race in science. These concepts are tools to sense, make visible, and grasp the current legacy of the troubled histories of racial knowledge. They also help us to understand these circulations of racial knowledge through time, beyond linear time, for ghosts "reveal multiple, coexisting temporalities and the complex layering of different pasts onto fractal presents and futures" (Spooner-Lockyer and Kilroy-Marac 2021). Or, as explained by Katrina Karkazis and Rebecca Jordan-Young (2020:763) in their theorization of "race as ghost variable in science", "[g]hosts are simultaneously history and the present, not just an accretion of earlier experiences, but the palimpsest left when one tries to erase them".

In sum, my approach to grasp racial knowledge circulations in their non-linear historicity is oriented by what M'charek, Schramm, and David Skinner (2014) termed topology of race. Drawing from philosophical discussions on temporality, spatiality, and the foldability of time and space (Serres and Latour 1995 cited in M'charek 2014), the topological approach "is based on the presupposition that elements that are distant in time and space can become proximate and relevant in the here and now" (M'charek, Schramm, and Skinner 2014:472). Following a topological approach means for me that I attune to how objects embody histories and how, as they circulate through space and time, the histories implied in them might be drawn together and relationally affect the outcomes of knowledge production. In other words, I pay attention to how historicity in a scene of knowledge production is differently entailed in the human and nonhuman actors at play and how different histories embodied in them come to matter. Thinking through topology implies an understanding of history as multidirectional and non-

linear. It also helps us to delineate how entanglements take shape both in spatial and historical ways.

1.5. Overview of chapters and arguments

The present thesis is structured in seven chapters, including this one. In the next chapter (Chapter 2), I present a historical analysis of Karve's biography, scientific trajectory, and research practices, with a focus on her physical and biological anthropological work. I situate Karve's scientific training from her BA and MA studies in India to her PhD at the KWI-A in Berlin. Thereby, I zoom in on the situatedness of her research at the KWI-A and examine the historical background of the racial theories and methods that were prevailing in this Berlin institute. I then proceed to analyze Karve's work in India, with attention to how she continued but also adapted racial theories and methods to study caste, ethnicity, and religion in the Indian subcontinent. I analyze how Karve adapted racial frameworks in different sets of texts, which, taken all together, demonstrate the malleability of racial approaches to human difference. Thereby, I also provide insights into the political situatedness of Karve's research as well as its implications. I finish by discussing Karve's engagement with discursive changes regarding a preoccupation with racist effects of the use of racial frameworks in the 1950s and 1960s. Given this post-racial discursive impulse but her continued use of racial (anthropometric) instruments and methods, I finish by reflecting about the asynchronicity of changing impulses between, on the one hand, discourse and theory and, on the other, material and methodological elements in her research practices.

Chapter 3 takes us to the present and analyzes how Karve is remembered as well as how her anthropology is discussed within Indian anthropology today. I draw from my ethnography to analyze the Irawati Karve Museum of Anthropology and examine rituals of commemoration in anthropological spaces in Pune, where the commemoration of Karve contrasts with that of another Maharashtrian "anthropologist", namely Bhimrao Ramji Ambedkar (1891–1956), who, different from Karve, actively engaged in anti-casteist politics. I examine the tensions involved in this contrast as it stands for key tensions in Indian anthropological approaches to human difference, especially to the study of caste, in relation to anti-casteism. These tensions are animated by a perception of Karve's upper-caste positionality and a criticism of her anthropology's blind spots regarding caste-based social inequalities. Thinking with the present political implications of the remembrance of these two anthropologists in Pune, I discuss how research on human diversity is in an anxious co-productive relation vis-à-vis the reification of

difference categories and I point at how the anthropology of caste can be in friction concerning a political orientation against casteism.

In Chapter 4, I analyze different settings of training in anthropology today, especially biological and physical anthropology, in the institutions where Karve used to teach in Pune. I bring to the fore my observations of what I call "the awkward presence of race" by highlighting the tensions and affects that emerge when the troubling legacies of racial theories are made visible through the use of material objects like anthropometric instruments and anthropometry manuals. Having in mind the history of these objects and of the ideas inscribed in them, I also analyze situations of training in anthropometry (and reflect about my participation in them) to understand this method, including the classificatory aspects of it, how it is used in research, and with what effects. I discuss the implications of the current main application of anthropometry in research in Pune today, which is in human growth and nutrition research, and I argue that metric-biologizing enactments of undernutrition, similar to racial approaches, neglect the realm of social conditions by relegating the problem of malnutrition to the realm of the body.

In Chapter 5, I delve into the field of ancestry research and population genetics of India. I discuss how this field is marked by the so-called Aryan migration theory (AMT) and show how knowledge production about this imagined ancestral group of Aryans is entangled with German orientalist scholarship and German imperial politics. I start by situating Karve's contribution to this field of discussion, which, in response to AMT, included a theoretical operationalization of caste (as *jati*) as endogamous groups that was supposed to be the core unit of analysis in the population genetics of India. This chapter analyzes the ways and implications of how population geneticists take up Karve's biohistorical theory of caste (*jati*) differentiations to justify their sampling and operationalize their units of analysis. While grasping Karve's legacy and the changes in this field of research since Karve, this chapter analyzes key tensions in the research on the origins of human diversity in India especially in regard to racialized knowledge legacies and racializing effects of knowledge. My material semiotics perspective unexpectedly draws my attention to technological and material inequalities that shape current transnational collaborations in this field of research, which in turn have important implications to knowledge outcomes—a theme that is taken up in the next chapter.

Chapter 6 analyzes the production of knowledge on skin color variation in Maharashtra and discusses the issue of scientific inequalities and sovereignty in sciences of human diversity.

Drawing from ethnography in a molecular anthropology lab in Pune, I analyze a research project on skin color variation of castes and ethnicities in Maharashtra, which also builds upon Karve's biohistorical model of populational diversity in India. Thinking with different instances of failing in this lab research—which were conditioned by financial constraints—as well as with the unequal international collaborations that these Indian anthropologists relied on, I discuss the problem of global material inequalities in the sciences of human diversity. Then, I take a detour to analyze a demolishing criticism that one of Karve's main social anthropological books received from a gatekeeping European scholar in the anthropology/sociology of caste, Louis Dumont, who questioned Karve's (and another Indian anthropologist's) capacity of scientific objectivity due to their positionality as Indian scholars. In light of this historical controversy, I discuss the question of post-colonial scientific sovereignty, which has a two-fold connotation: sovereignty in terms of content of knowledge as well as in terms of the material conditionalities of scientific knowledge production. The first becomes evident in how research on human diversity in India is entangled with a long legacy of European scientific research on human variation; the second can be perceived in how research about human diversity in India, especially genomic research, has depended on technologies produced or located in the Global North. I conclude this chapter by pointing at the racial and colonial legacy embedded in the study of skin color variation and I discuss how this research could break free from this legacy, which would have to include an attention to social inequalities including those structured by racism and casteism.

Concluding this thesis, Chapter 7 provides some final remarks and open questions. I analyze an essay in which Karve thinks with the Hindu philosophical concept of *atma* to reflect over Nazi genocide and her implications (as well as the implications of each person) vis-à-vis the political world. Thinking of *atma* as entanglements, I take this essay as a departure point to give an overview of the different entanglements traced and tracked throughout this thesis. Thereby, I discuss the entanglements between science, society, ethics, and politics that relate to human difference. I argue that the Germany–India entanglements in racial knowledge, especially in physical and biological anthropology, have been key in shaping the understanding and reality of human diversity in India. This implies that tackling the colonial and racial legacies in the frameworks that study human diversity in India today should necessarily entail an evaluation of this transnational entanglement, which is here crystallized in Karve's scientific trajectory, research, and legacy. Thinking about how such knowledge entanglement could be topologically observed through the historical and spatial circulation of science-related objects,

I put forward a theoretical-methodological argument about the importance of expanding ethnographic and phenomenological observations of present sites of knowledge production through an attention to the past, for the past, present, and future are inevitably entangled. Further, I discuss how decolonizing anthropology (and any science concerned with human diversity) should entail better attuning to the realm of social inequalities, as human differences and inequalities, too, are often entangled. I finish by pointing at how an ethical orientation guided by justice and response-ability could provide anthropologists a more solid ground on which we can produce knowledge about difference/inequality and be responsive and accountable to the political effects of such knowledge.

Chapter 2. Karve's training in Berlin and her school of anthropology in Pune

2.1. Introduction

How can an anthropologist, who is critical of key ideas in the anthropological tradition she was trained in, adapt that knowledge and create new research approaches? How can an anthropologist, who is from a colonial setting and was trained in a Eurocentric, colonially rooted anthropological school, create new knowledge for a post-colonial setting? And how could she do that while remaining a validated member of an international scientific community that has its centers in Europe? These are some questions that run throughout this thesis and, in this chapter, animate my explorations of some key tensions in Irawati Karve's training in—and work with—racial approaches in anthropology. Karve's oeuvre is multifaceted. Having worked until the end of her life in 1970 and publishing over a hundred of books and articles, Karve researched and wrote in different fields of what she termed anthropology, fields that today would be separately identified as cultural, social, economic, physical, or biological anthropologies, as well as archaeology, sociology, history, Indology, and religious and cultural studies. Six years before her death, in her lecture *My 25 Years in Anthropology* presented to a national gathering of Indian anthropologists (see Figure 1) Karve looked back at her intellectual trajectory and highlighted two main interests that guided her research. One of them was the study of "kinship organization all over India"; the other "the extensive physical measurements of various castes of Maharashtra", covering "about 40 different castes" (Choudury 1966:xxvii). Both research interests mark the scholarly legacy left by Karve: While her writings on kinship or, specifically, her largely structural-functionalist, social anthropological analyses of the "caste system" are featured in sociology and anthropology syllabi across India today, her anthropometry-based anthropology paved the way for research and teaching in related fields (from physical and biological anthropology to population genetics).

Figure 1: Participants of the Summer School in Anthropology, Dalhousie (Himachal Pradesh, India) June 5 – 24, 1964 (Biswas and Singh 1966:NN). Sitting in the front row (fifth person from the left), Irawati Karve seems to be the only woman-presenting participant; in her left is the chair of the meeting, P.C. Biswas, who, like Karve, was trained by Eugen Fischer at the KWI-A in Berlin, Germany.

In this chapter, while I discuss both main stances of Karve's work, I focus my examination on her physical and biological anthropological research practices and articulations. The physical and biological anthropological emphasis in her research and writings not only emanates from her training in a racial anthropological school in Berlin but it also expands on a previous line of inquiry in colonial India. Such racial and anthropometry-based approaches to the study human diversity strongly marked her work as an established professor throughout the development of her own tradition of Indian anthropology.

In exploring this physical and biological strand in Karve's anthropology, I am particularly interested in how she conceived—and produced knowledge about—human diversity. I ask: How was human difference conceived and enacted in the KWI-A at the time of Karve's formation? How has she taken up such training in her consecutive working years, what did she adapt? How was Karve's take in physical and biological anthropology in Pune? How has she adapted racial frameworks to study human differences in India? Which categories of difference were at play thereby and how were they (re)conceived through Karve's frameworks? With what political implications? And how did her views on, and practices of, approaches to the study of human difference change throughout her career from the late 1920s until 1970?

To deal with these questions, I examine Karve's research approaches and situatedness vis-à-vis changing political settings and scientific debates. These encompassed key events and discussions that co-shaped Karve's anthropological imagination, ranging from India's decolonization and territorial re-structuring, a post-World War II critique of racism, to the development of molecular technologies and its impulse to a further shift from physical to biological anthropology. Paying attention to these political, scientific, and technological settings, I shed light on Karve's practices of enactment and articulation of human differences. Thereby, this chapter aims at offering a reflection over the continuation but also adaptation and change in colonially rooted knowledge, here expressed in racial anthropological frameworks; I examine the limitations in adapting such knowledge and its implications.

This chapter is structured as follows. The next section (Section 2.2) situates Karve's social and intellectual background and her formation as an anthropologist, both as a MA student in Bombay and as PhD researcher in Berlin at the KWI-A. Then, Karve's tradition of her Indian anthropology is the focus of Section 2.3. In it, I dwell upon five themes that help us understand different aspects of the tensions, as well as adaptations, of racial frameworks in Karve's research: the conceptualization of "race" and "caste" and the relationship between them, (Section 2.3.1); the framing and racializing study of "the people of Maharashtra" (Section 2.3.2); the racialization of Muslims in South Asia (Section 2.3.3); the culturalization and functionalization of caste in what Karve termed "the Hindu society" (Section 2.3.4); and the gradual shift from physical to biological anthropology in Karve's later years (Section 2.3.5). Afterwards, in Section 2.4, I examine Karve's changing perceptions, from the 1950s on, about her physical anthropological work. I discuss how Karve, although worrying about possible racist implications of her racial anthropological classifications, continued to use such racial frameworks. To conclude (Section 2.5), I propose a reflection over the tense relationship between this anthropologist's changing views on racism and her adherence to racial frameworks.

2.2. Formative years (1905–1930)

2.2.1. Upbringing and education in India (1905–1927)

Irawati Karve, born Karmakar, came to the world in 1905 in Myingyan, a port city at the Irrawaddy River in British Burma, where her father was stationed as administrator of the Burma Cotton Company, a colonial enterprise. The youngest child, a girl after five sons of the Karmakars, Irawati enjoyed a comfortable early childhood in Burma. From an early age,

Irawati went to the girls boarding school Huzurpaga in Pune, then called Poona, a city known as the cultural center of West India's Marathi speaking region and former political capital of the once vast pre-colonial Maratha empire. Intellectually and politically, Pune was for Karve an insightful and eventful city to grow up in. Pune has hosted several renowned academic institutions, which granted the city the nickname of "Oxford of the East" (Barua 2012), while also being known as one of India's "main capitals of indigenous science" due to it being a stronghold of Hindu scholarship (Lévi 1891 quoted in Lardinois 2017:433). Politically, Pune was also at center-stage of crucial national happenings, being an important base for key social reformist and nationalist movements during the colonial era. Once the stage of the famous Poona Pact—signed by Dalit representative Ambedkar under the pressure of Mahatma Gandhi's (1869–1948) protest fasting to settle a controversy over the reservation of electoral seats for Dalits—, Pune also saw the rise of a Marathi upper caste, Brahminical movement in response to the emergence of lower caste assertion (Basu 2020). More, Pune not only was the place where Gandhi was in arrest for several years but also the home city of his assassin Nathuram Godse (1910–1949), a Hindu extremist and member of the Chitpavan Brahmins, Maharashtra's uppermost caste group.

Irawati was also born into a Chitpavan Brahmin family. The Karmakars enjoyed considerably elevated societal status, belonging to the Pune social elite. Also thanks to Irawati's father's posting, the Karmakars afforded a quite modern lifestyle among the colonial elite of Pune: they built a house in the affluent Deccan Gymkhana, a neighborhood modelled after British cantonments, with playgrounds and a clubhouse in which "all the nouveau riche and modern, British educated Poonaits who were occupying high positions in the British Government" and their families played billiard, bridge, tennis, and swam in what was "one of the biggest swimming pools of Asia", as Irawati's son told me.[44] In her young years, she was known as one of the few female users of that pool and for being an athletic swimmer. She also became publicly known for being the first woman to own and drive a motorcycle in Pune (Sundar 2008).

Irawati's coming of age was marked by her independence and drive for education in a time and place in which women's aspirations were usually confined in the realm of the domestic. As Karve's youngest daughter Gauri Deshpande (1997:147-148) humorously narrates:

> My mother was determined, however, and to further her educative process she hit upon a novel idea around the age of twelve, taking advantage of her father's and her brothers'

[44] Interview with Anand Karve, Pune, 16 Feb 2019.

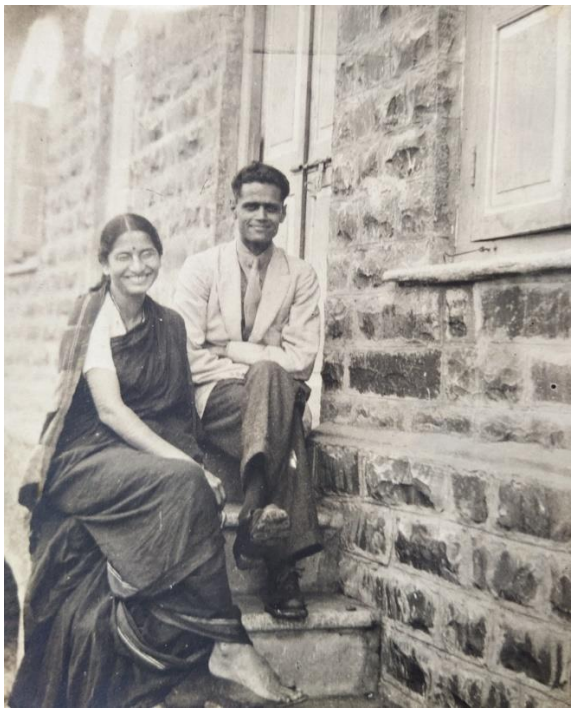
> severe handicap in being mere males. Though her father was willing to let her go to school 'until she became a woman', he was bent upon restricting her to the house after that to learn homemaking skills from her mother until he found a suitable husband for her. My mother was not about to get married at twelve. After the exam results came in and she found that she had passed yet another grade with flying colours, she proceeded to lock herself in the family bath (which, according to the ideas of hygiene then prevailing, was way removed from the house and contained heaps of firewood to heat the bath water) and refused to come out until her father agreed in the presence of all her doting brothers to let her continue one more year. With six quite helpless males worrying themselves sick over her starving to death after being without food for three whole hours, and over the presence of rats in the woodpile, and over the effect of the dark upon her sensitive mind and of the damp upon her delicate health, the battle was won even before it was joined. She continued in this manner year after year until she graduated from high school, and by then her father had so far reconciled himself to the inevitable as to agree without demur to let her go on to college. This […] was quite a rare and wonderful privilege in those days for a woman in India.

Irawati's will to education is also connected to her choice of an in-law family. She possibly met her husband Dinkar Karve for the first time when he came over her house for lunch (his parents known to be terrible cooks) or at the Deccan Gymkhana club, where he often played tennis with her brothers (G. Deshpande 1997). According to her son,[45] her will to marry into the Karve family was motivated primarily for her strong desire to pursue a post-graduate degree: she believed that, unlike most families of that time, the Karves would support a woman's academic career aspirations. The Karves were known for their progressive intellectual position as social reformers. Karve's father-in-law, Dhondo Karve, is still much celebrated in India for his pro-women's education and pro-widow's rights stances (his own marriage to a widow—a tabu within the prevailing Hindu dogma of that time—being the main reason for his ostracization among the conservative ilk of the Chitpavan Brahmins, also the Karves' caste group). Her brother-in-law Raghunath Karve became (in)famous for defending family planning and women's rights to sexual pleasure. Raghunath and his brother Dinkar had studied in France and Germany, respectively, and both endorsed their father's views. Hence, with an eye in her own plans to finish her scientific formation abroad, Irawati resisted her father's initial disapproval of the Karves and trusted her jovial relationship with Dinkar, marrying him.[46] Ironically, Karve's father-in-law turned out to be against her study stay abroad, but Dinkar helped to secure funds for his wife's studies in Europe through borrowing money from a merchant, just like his own step-mom had done for him and his brothers (G. Deshpande

[45] Interview with Anand Karve, Pune, 16 Feb 2019.

[46] As Karve's family members recount, her father was against her marriage into Karve family at first, but was convinced to change his mind thanks also to the endorsement of the Paranjpes (a progressive-minded family Karve had become friends with) and, eventually, of Karve's mother.

1997). Soon after the rather modest wedding in 1926, Karve embarked a steamship headed towards Hamburg in the port of Bombay, to pursue her doctoral degree in Berlin.



Figures 2 and 3: Irawati and her husband Dinkar Karve in the 1920s in Pune; Karve and her scooter in Pune, date unknown. Source: family archive (courtesy of Chanda Nimbkar, Nandini Nimbkar-Rajvanshi, and Urmilla Deshpande).

Before studying in Germany, in 1926 Karve had graduated in philosophy in Pune's acclaimed Fergusson College, which would later be directed by her husband. In 1928 she obtained a master's degree in sociology at Bombay University, where she was supervised by Indian sociologist-anthropologist Govind Sadashiv Ghurye (1893–1983). Like many of his contemporaries in the incipient institutional context of sociology and anthropology in India, Ghurye draw from different textual sources (including Sanskrit scriptures) and combined varied disciplinary traditions; his own intellectual approach was described as a cultural-historical sociology of India (Upadhya 2008) but he also articulated racial anthropological theories (including Risley's) to explain caste diversity in India, even though he did not conduct anthropometric research (Ghurye 1957 [1932]; see also Chapter 5).

The influence of Ghurye's syncretic style can also be seen in Karve's MA research. With the title *Ethnic Affinities of Chitpavan Brahmins*, Karve's master's thesis combined sociological, cultural and physical anthropological, philological, and historical methods to study her own caste group (Karve 1928). As I will discuss in detail in Chapter 5, the question of origins of the Chitpavan Brahmins, motivated by a widespread perception of their physical distinctiveness—

like having lighter eyes and fairer skin than other groups (Figueira 2002:121)—, receives central attention in Karve's dissertation and is explored through analyses of mythological stories as well as one racial marker, namely eye color. For the analysis of eye color variation (which composed one of the five chapters in the thesis), Karve developed a particular classificatory scale given she was unsatisfied with the scales used by European anthropologists. In her thesis, Karve acknowledges and recites the main parameters of racial elements as proposed by British colonial administrator-anthropologist Risley in his studies of castes and tribes in India, namely: cephalic index, nasal index, and stature; she quotes Risley's survey's mean measurements of these variables for the Chitpavan Brahmins, but she justifies her thesis' focus on eye color variation (she analyzed the eye color of over 3000 individuals) because this was an unexplored method and a physical marker said to be particularly distinct in that caste group (Karve 1928:51). Possibly, this methodological choice also stems from Karve's lack of training in the anthropometry or lack of access to anthropometric technology. One of the very few MA programs in sociology or anthropology at that time in India, the Bombay University's MA program under headship of Ghurye had a syncretic theoretical orientation and did encompass physical anthropology—with syllabi that included the topics "the influence of physical, biological, and other factors in social life" and "caste, tribe, race" (Upadhya 2008:221n48)—;[47] however, no training in the methods of anthropometry was offered. This pedagogical orientation might have been imprinted by Ghurye's armchair-based scholarly inclination, but it was probably also due to the scant funds of the sociology and anthropology departments in India at that time (Sabewarl 1983), which would have made the training in anthropometry—with its relatively expensive instrumentation that had to be imported from Europe—very difficult.

In this sense, it is interesting to note that while Risley's racial anthropological publications surely did not go unnoticed by Ghurye or Karve, most members of this generation of anthropologists trained in the first decade of the institutionalization of anthropology/sociology in India (1910s-1920s) did not immediately incorporate the rather expensive anthropometric methods used in Risley's large-scale and well-funded research project. In this sense, against the widespread impression left by the historiography that one could trace a linear genealogy of

[47] Although we cannot reconstruct in detail the content of the 1920s Bombay University syllabi due to scant archival material (Upadhya 2008:221), it is interesting to note that the incorporation of racial frameworks to sociological inquiry might be problematic in ways that go beyond classificatory purposes of physical anthropology as it might contribute to the racialization (or biological essentialization) of other social categories and social problems. See also Chapter 5 for Ghurye's take on caste and race.

the racialization of caste since Risley, it is my historical observation that Risley's methodology did not substantially resonated in the practice of Indian anthropologists at first. The convergence with Risley's racial methods would only happen later—also due to the impact of German physical anthropology in India via the legacy of Karve, as I will argue. Furthermore, the transdisciplinary amplitude of Karve's MA thesis' methodology attests to her unclosed monodisciplinary formation at that stage in her scientific training. Her specialization in physical anthropology and consistent training in anthropometry for the study of racial markers would follow through during her doctorate and research internship in Berlin, as this subdiscipline and methods were a stronghold of German anthropology and key to the research at the KWI-A. At the KWI-A, both Karve and another Indian student who would later exercise a key influence in Indian anthropology, Biswas, received consistent training in the racial anthropological methods of anthropometry; they would later crucially contribute to the establishment of this methodology in anthropology departments in India (see Chapter 4).

In the fall of 1928, Karve started the first of four semesters that comprised her doctoral studies at the University of Berlin. Her decision to go to Germany might have been motivated by a variety of reasons. In this institutionally incipient phase of Indian anthropology and sociology, pursuing a doctoral training in this field inevitably meant having to go abroad, Europe being the most usual choice. In addition, Karve's husband Dinkar—like many other Indian chemistry experts—had also received a PhD in chemistry in Germany, a field that Germany excelled at in that time (Manjapra 2014:52). In Germany, Karve also secured a fellowship of the Alexander von Humboldt Foundation, which provided an important financial support not only for her but also for Biswas and many other Indian anthropologists after them.[48] Furthermore, Berlin's cosmopolitanism and the social infrastructure provided by the Berlin University, which included a publicly sponsored place of gathering for South Asian students called Hindustan House, as well as Germany's antagonism vis-à-vis Great Britain made this German city an attractive site for many South Asian students who were intellectually engaged in progressive and anti-colonial nationalistic circles, like Karve and her in-laws (Khan 2020a, 2020b).[49]

[48] Interview with Pooran Chand Joshi, New Delhi, 5 Sept 2017.

[49] In the first half of the twentieth century, Berlin was an important node in the international engagements of South Asian anti-colonial activists, with political activities that both imprinted and were directly supported by the German government's strategy of *Aufwiegelung*: the instigation of political unrest across the British, French, and Russian empires (Jenkins, Liebau, and Schmid 2020; Liebau 2020). These political-intellectual networks of South Asians outlived the formal support by the German government, continuing to exist in the vibrant political scene of interwar Berlin (Raza, Roy, and Zachariah 2015). London had been an important site for Asian activists too, but the persecution of those anti-colonial articulators labelled by the British "revolutionary terrorists" by 1910 resulted in a partial shift of these political circles from there to elsewhere (Fischer-Tiné 2007, 2014). One should note, nevertheless, that Karve's in-laws were not particularly known for having openly anti-colonial views, but

Moreover, Germany was especially attractive for South Asianists, as it was considered the leading Northern country in the field of oriental studies in the first half of the twentieth century (Sundar 2008). Germany's leadership in this field of scholarship also emerged thanks to an international political background: the sponsoring of scholarship about regions led by the enemy British or French empires is tied to Germany's international relations (Jenkins, Liebau, and Schmid 2020). All these factors might have played a role in Karve's choice to undertake her PhD in Germany.

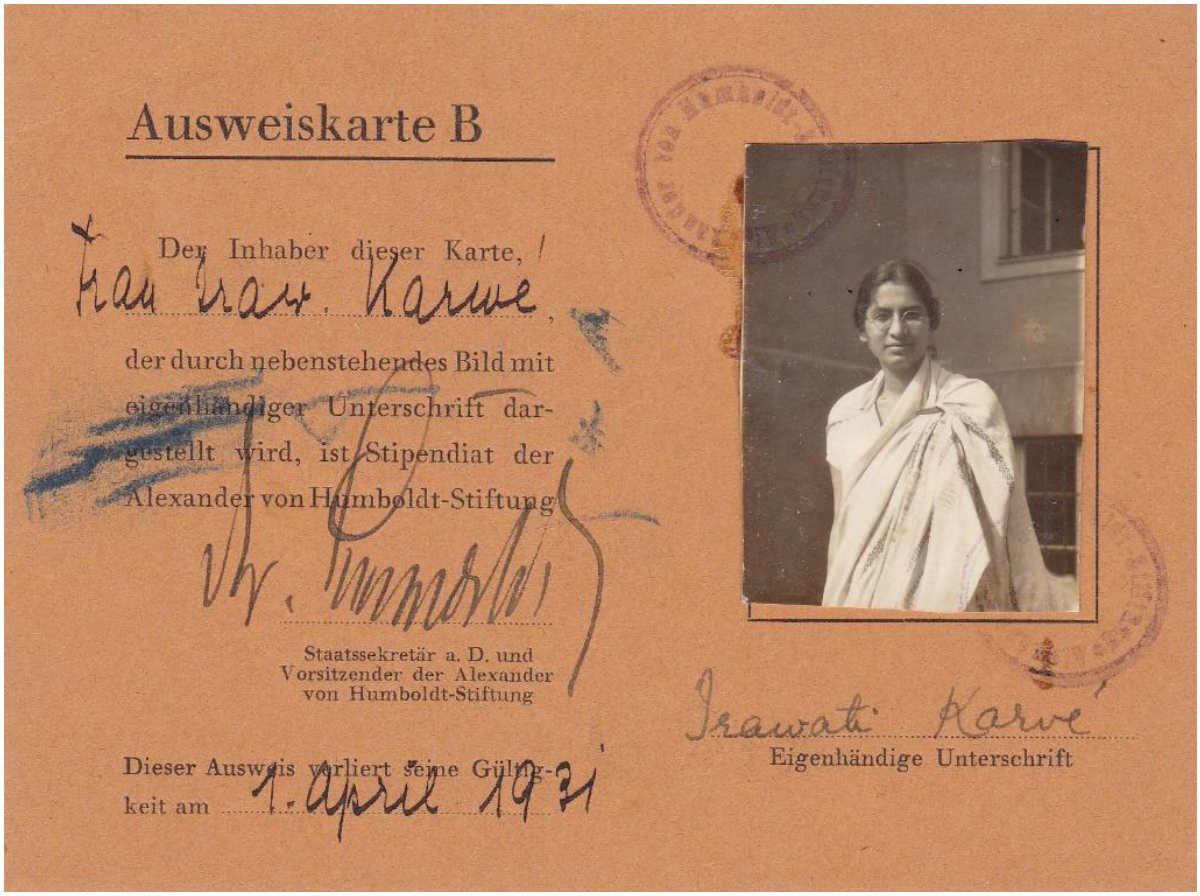


Figure 4: Karve's Alexander von Humboldt fellowship identification card. Source: family archive (courtesy of Urmilla Deshpande).

For her doctoral degree, Karve chose Sanskrit, zoology, and philosophy as minor subjects (*Nebenfächer*), while her major (*Hauptfach*) was anthropology. The anthropology formation was conducted primarily via the KWI-A. Living in the guest room of a German family in the central neighborhood of Charlottenburg (at Kaiserdamm 88), Karve divided her days between

for their social reformist engagement, with rather ambiguous positionings vis-à-vis colonial rule. As Irawati's son put it, the Karves back then were known for being "softies" and not radically anti-British (Interview with Anand Karve, Pune, 16 Feb 2019). Karve might have reflected such moderate views too, as she emphasized in some of her writings that India was historically often under some foreign rule, the British being just another chapter in this long history.

the University of Berlin in the mid-city and the newly built KWI-A in the Southwestern suburbs of Berlin-Dahlem. The KWI-A convened under the roof of the Berlin University and, as such, it not only operated research and provided research training but it also granted degrees, via its University affiliation, to doctoral students. In the following section, I zoom in on Karve's training at the KWI-A.

2.2.2. Doctoral training at the Kaiser Wilhelm Institute for Anthropology, Human Heredity, and Eugenics (1927–1930)

Karve was one of the more than 30 foreign students who developed their research at the KWI-A in Berlin. She remembers having learnt in Berlin through classes or internships with KWI-A-based lecturers Eugen Fischer, Otmar Freiherr von Verschuer (twins research expert and director of the Institute's Human Heredity Department), Hans Weinert (see Figure 8), among others (Karve 1931b).[50] The KWI-A main researchers, including the Institute's founding director, Eugen Fischer, also taught to students of the University of Berlin.

Figures 5 and 6: Left: Eugen Fischer examining portraits taken by a doctoral student advised by him, Rita Hauschild (1912–1950), in her fieldwork in Trinidad in the late 1930s. Hauschild researched on the topic Fischer built his young career upon: "racial mixture". Right: Fischer reading *The Journal of Heredity* in his office at the KWI-A, in a typically staged pose in

[50] Karve (1931b:41) lists: Grag Heller, Hertwig, Hesse, Kopsch, Krause, Lüders, Rieffert, Thurnwald, and Spranger, Trendelenburg, and Weißenberg, among others.

scientists' portraits of the time. Fischer's application of Mendelian genetics in his racial research in Namibia granted him the acclaim of "founder of human genetics" (Nachtsheim 1951 quoted in Proctor 1988:146). He also coined the German term for genetics: "*Erblehre*" (Proctor 1988). Source: Archive of the Max Planck Society, Berlin-Dahlem.

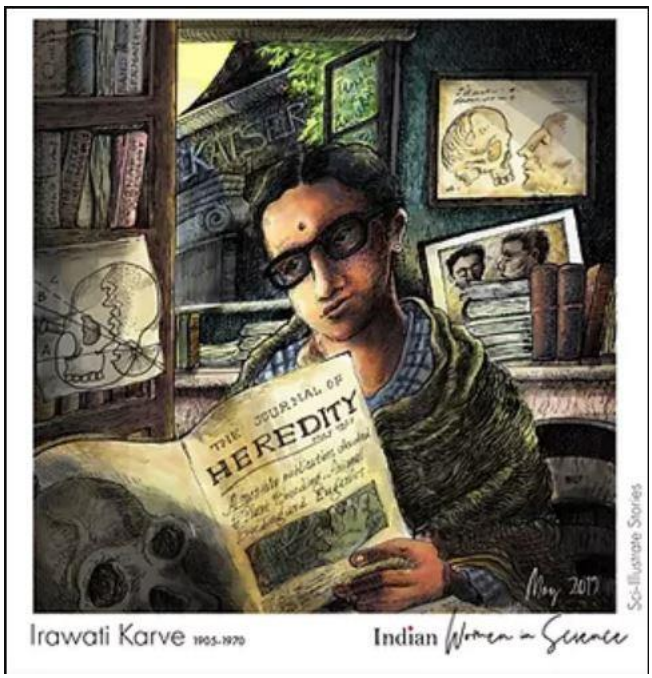


Figure 7: Caricature of Karve, probably inspired by Fischer's portrait above (Figure 6). Source: https://www.anthropologyindiaforum.org/irawati-karve, accessed November 28, 2022.

Before founding the KWI-A in 1927, Fischer had become well-known for his application of Mendelian genetics and anthropometric methods in his 1913 study of "racial mixture"—which he also called "the bastardization problem"—among Dutch male settlers, Khoekhoe women, and their offspring in the colony of German South West Africa, today Namibia (Fischer 1913; see also Barbosa et al. 2018). Fischer's work reflects the anxieties concerning the idea of racial degeneration and miscegenation in the light of Europe's colonialism, which, in the German case, found emblematic expression in the 1912 Reichstag's debate about "mixed marriages" and the juridical status of their descendants in the German colonies ("*Mischehendebatte*") (El-Tayeb 2001). This subject was taken up by several of Fischer's students at the KWI-A, sometimes with direct eugenicist consequences, including the forced sterilization of so-called mixed-race children in Germany's Rhineland.[51]

Regarding anthropological knowledge production, European colonialism in the nineteenth and early twentieth centuries provided the infrastructure not only for field research but also for the

[51] Fischer's student Wolfgang Abel researched on and recommended the sterilization of the children of French colonial soldiers and German women, which was implemented on 385 youth (referred to by these scientists as "bastards") by the Nazi government in 1937 (Campt 2004). Abel succeeded Fischer as the director of the KWI-A's anthropology department.

collection of materials to be taken back for study in the European metropoles. Besides Fischer, several other German anthropologists, often commissioned by anthropology museums, embarked on scientific missions to territories under German rule in Africa and in the Pacific with the goal of collecting ethnological artefacts, anthropometric measurements, and human remains. These would be integrated to collections for research or display in different museums and universities in Germany.

After Germany lost hold of its overseas colonies in 1919, anthropologists in the Weimar Republic (Germany, 1918–1933) faced a restriction of their transnational research networks, as they had depended on the German colonial infrastructure for their ethnographic research overseas. As a result, one can observe two developments. On the one hand, I argue, the existing collections of human remains became even more important for German anthropologists. Using anthropometric instruments and methods that had been developed for the typological division of human variation in different races, researchers could continue to undertake comparative racial research on these international colonial collections. These collections were housed by several institutions in Germany. In Berlin, the University's Anatomic Institute and the *Völkerkunde* Museum (later Ethnological Museum, today part of the Humboldt Forum) housed several collections of skulls and other human bones from different world regions. On the other hand, German anthropologists turned their gaze to Europe, shifting their attention to racialized groups within German society, which contributed to the prominence of the eugenicist and racial tradition in German anthropology (Proctor 1988). The postwar, inflation-tormented scenario in the Weimar Republic also contributed to anxieties around discourses of social decay and racial degeneration of the German people (Proctor 1988:152). These scientific developments as well as the heightened political resonance of racial and eugenicist frameworks in this historical context resulted that, "[b]y the 1920s, race had become *the* single most important concept in German anthropology" (Proctor 1988:148).

It was in this political-scientific context that, in 1922, the Prussian Council for Racial Hygiene proposed the establishment of what came to be the KWI-A. Funded by state subsidies, foundations grants, and private investors (including the Rockefeller Foundation), the Institute had its own human bones collection with over 5,000 individual pieces. Labelled "*Anthropobiologie*" in Fischer's words, the anthropology practiced at the KWI-A was at the confluence of physical and biological anthropology: it combined typology-oriented anthropometric methods and incipient molecular methods to examine human variation through a racial framework with an interest in questions of heredity. In Fischer's (1949:100a-101) view,

the different fields of research done at KWI-A should converge in a common goal of the institute: application of its knowledge for health and population policy or, in his words, "racial hygiene". This goal became evident during the National Socialist regime, when KWI-A researchers supported, in different levels from research to political consultancy, the formulation and application of eugenicist policies (Schmuhl 2008; Barbosa et al. 2018).

While Fischer was director of the KWI-A as well as professor (and, from 1933—thanks to his affinity with the Nazi party—, rector) at the University of Berlin,[52] he advised several racial research projects that measured and compared human remains, including projects undertaken by foreign students. Although Fischer (1949) claims in his unpublished post-World War II memoirs that he did not lay focus on osteometric research because he did not want to corroborate with a widespread image that this was all anthropology did, in fact many KWI-A projects composed the measurement of human bones. Craniometry and, in general, anthropometry composed important techniques with their respective technologies in the equipment, training, and daily scientific practices of KWI-A researchers.[53] A close colleague of Fischer, the German-Swiss anthropologist Rudolf Martin (1864–1925) developed several anthropometric measurement instruments in the late 19th and early 20th century, many of which were tested by Fischer and came to compose the technological equipment of the KWI-A (Hugentobler-Schwager 1990; Morris-Reich 2013; Hoßfeld 2016). Martin's (1914) canonical methodological manual *Lehrbuch der Anthropologie in Systematischer Darstellung* (Textbook of anthropology in systematic presentation) was the standard work for physical-racial classificatory measurements and was widely recited in the anthropological training in Germany and beyond (Mak 2017). While Martin's work focused on morphological or physical typological observations, his methods were added to the racial physical-biological anthropological approach further developed by Fischer and his colleagues, who put forward a concept of race that articulated both physical characteristics as well as *geistig*—cognitive and cultural—dispositions as inheritable factors (Proctor 1988; Massin 1996; Lösch 1997; Schmuhl 2008). Fischer's view on race was emblematically elucidated in his inaugural address as rector of the University of Berlin, when he asserted: "What Darwinism was not able to do, genetics

[52] A member of the Nazi party, Fischer was the first party-appointed rector of the University of Berlin (Proctor 1988).

[53] Fischer's statement written in 1949 was perhaps colored by his later years' self-enhancing selective memory; possibly, his affirmation aimed at belatedly confirming with the direction that a strand of anthropology gradually took in shifting from "physical" to "biological" in the turn of the half of the 20th century. Perhaps, even, Fischer made some autobiographical effort to distance himself from anthropological methods that became more closely associated with Nazi-inclined German physical anthropology. Such distancing rhetorical maneuvers are also observable in the writings of other KWI-A main researchers and directors (Barbosa et al. 2018).

has achieved. It has destroyed the theory of the equality of men […]. The theory of the heritability of mental as well as physical traits has finally been vindicated" (Fischer 1933 quoted in Proctor 1988:148). This assertion makes clear the understanding of race that prevailed at that place and time, the more so after the rise of the Nazis to power in 1933: understanding human differences as race meant thinking of essentially genetically inheritable differences, including mental and physical traits, and refuting the principle of human equality.

Among the foreign students who undertook their research at the KWI-A, besides students from Korea, China, Japan, Turkey, Brazil, Venezuela, and other European countries, at least two of the three students from India were supervised by Fischer: Karve and Biswas. The latter specialized in dermatoglyphics[54] during his research stay in the mid-1930s in Berlin and later founded the strongly physical anthropology-focused anthropology department at the University of Delhi (Fischer 1949:112–118; Bandeh-Ahmadi 2018). The third Indian anthropologist trained at the KWIA was Sasankha Sekhar Sarkar (1908–1969) (Schmuhl 2008:166,281). Sarkar undertook research on twins while at the KWI-A and later applied racial methods to make inferences about ancestral populations of the Indian subcontinent, authoring several racial anthropological publications in India.[55]

[54] Dermatoglyphics is the study of the variation of ridge patterns of the human skin (including fingerprints).
[55] See: https://www.insaindia.res.in/detail.php?id=N59-0703, accessed August 15, 2022.

Figures 8, 9, and 10: Photos with Karve taken around 1927-1930 in the KWI-A building, the first two probably in the doctoral students' room, the third one in the room where human remains would arrive and be catalogued before being moved to the human remains collection room. In the first two pictures, Karve is the second person from the left. In Figure 8, the man in a dark suit is Hans Weinert, curator of the KWI-A's human remains collection, with whom she probably had a practical course (Karve 1931b:41). Source: family archive (courtesy of Chanda Nimbkar, Nandini Nimbkar-Rajvanshi, and Urmilla Deshpande).

Karve's doctoral research at the KWI-A dealt with "skull asymmetries" and "racial difference". In the introduction of her published thesis, she states that she "received the assignment from Prof. Fischer of simply determining 1) if there exist differences in the [skull's] right-side and left-side asymmetry, and 2) if differences in the frequency of the asymmetry of different races occur, especially in the case of European and other races"[56] (Karve 1931b:9). In her craniometric analysis, she used several human skulls: 16 were from Europeans whereas at least 100 had been obtained in German East Africa and German New Guinea during German colonial scientific expeditions supported by the Berlin's *Völkerkunde* Museum, one of which conducted by Richard Thurnwald, who also taught Karve at the Berlin University.[57] She

[56] "erhielt von Herrn Professor Fischer die Aufgabe, lediglich festzustellen, ob 1. Unterschiede in der rechtsseitigen und linksseitigen Asymmetrie bestehen und 2. Unterschiede in der Häufigkeit der Asymmetrie bei verschiedenen Rassen, speziell bei Europäern und anderen Rassen vorkommen."

[57] Among these 100 skulls, 50 were from the Collection Czekanowski (obtained by Berlin's *Völkerkunde* Museum anthropologist Jan Czekanowski (1882–1965) on the German Central-African Expedition, which explored the interior of German East Africa, present-day Tanzania and parts of neighboring countries) (see Czekanowski 1909; Friedrich 1909); the other 50 skulls came from the Collection Thurnwald. Richard Thurnwald (1869–1954) was also commissioned by the *Völkerkunde* Museum to collect anthropometric data, human remains, and artefacts in the territories of German New Guinea, in what is today Papua New Guinea and the Solomon Islands (Barbosa 2018). Thurnwald was also a founding member of the German Society for Racial Hygiene (Proctor 1988:144).

generated numeric data from the measurement of different skull points with use of the cubic craniophor, an instrument among the many that were developed by Martin. She then calculated different craniometric indexes which were deductively connected to categorizations informed by racial typologies. From those index values, she undertook a statistical analysis of correlation, comparing the different variables in relation to the skulls, which she grouped into three different racial groups: "Europeans, Melanesians, and Negroes" (Karve 1931b).

Thus, by looking at the trajectories of the human remains measured by Karve in her racial research in Berlin, we are reminded by Ricardo Roque that the circulation of skulls was "a product and an agent" of the "ritual violence" that marked the "performance of colonial power" (Roque 2010:222). If the length of a knowledge network speaks to its power (Latour 1987), the remarkable reach of the transnational networks through which these human remains were carried through geography and time speaks to the vast amount of resources invested in them by colonial actors. In sum, both these international collections of skulls and the personal entanglement of scientists like Fischer with German colonialism point to the colonial background of this German-speaking tradition of racial anthropology.

Karve's dissertation was published in Germany in the same year she went back to India, 1931, with the title *Normale Asymmetrie des Menschlichen Schädels* (Normal Asymmetry of the Human Skull). Surprisingly to her supervisor and KWI-A colleagues, Karve's research conclusion contradicted the racial theories of that place and time: she bluntly stated that she could not observe any correlation between racial differences and the measured skull asymmetry shapes. Skull asymmetry was not a measurement of little importance to racial theories of that time: as Karve explained in a paper published later in India, it had been asserted that an overdevelopment of the right side of the skull corresponded to a more rationally developed brain, and that this characteristic was said to be observed among European skulls, while Africans were supposed to have more symmetrical skulls and thus be less rational. Instead of simply exploring the racist hypothesis that, as she emphasized, Fischer assigned to her, Karve's dissertation explored the alternative hypothesis of whether a skull asymmetry could result from an asymmetry in the spinal column instead. In this sense, instead of resting on a racial explanation, she suggested that skull asymmetry could derive from another, possibly non-hereditary and non-racial physical characteristic. She concluded that "[her] own [doctoral research] investigations carried out on the skulls of different racial groups show no such racial differences in asymmetries in structure, which may warrant the supposition that the asymmetries are a product of civilization" (Karve 1937:73).

Fischer's written evaluation of the thesis barely touched upon the actual content of Karve's hypothesis and conclusion: it briefly explained that Karve answered "no" to the hypothesis of correlation between skull asymmetry and race, and it highlighted that Karve "then raised the question herself whether asymmetries could be related to sideways curvatures of the spine."[58] (Fischer 1930). His criticism focused on the dissertation's structure and succinct format, which, he argued, was to blame on Karve's "*Fremdsprachlichkeit*" (foreign language-ness). Fischer's sparsely articulated critique is enhanced by his severe grading verdict: he evaluated Karve's dissertation with *Idoneum*, the minimal grade necessary for a doctoral student to pass their exam (Fischer 1930).

It is ambiguous whether Fischer's remark about Karve's German language level is a criticism or a remark in defense of his student. If the first is true, it is interesting that his probable uneasiness vis-à-vis Karve's thesis is expressed in a comment about her language—a language in which she read and attended courses, talked to her husband and German friends, and authored two publications (Karve 1931a, 1931b). Notwithstanding, it is clear that Karve's doctoral research results contradicted the racist hypothesis suggested by Fischer. Indeed, Karve's research at the KWI-A is a very remarkable example of a deviation from mainstream racist theories at the Institute in Berlin.

However, this did not mean that Karve *rejected* racial anthropology. Karve was trained in this interwar German, racial physical anthropological tradition, and this left an enduring mark in her further research, as much as she strove to adapt such knowledge and, later, worried about its racist implications. As the next section will show, when researching in India, she continued to engage with anthropometric methods and other racial approaches in her study of human variation and diversity, a topic that proved to be central in her school of Indian anthropology, with a strong imprint on how differences across social groups would be conceived in India.

2.3. Karve's Indian anthropology

Upon returning to India, Karve spent some years working with some teaching and other administrative duties at the SNDT University[59], a women's university—the first of its kind in

[58] "hat dann selbst die Frage aufgeworfen, ob Asymmetrien in Zusammenhang stehen könnten mit Seitwärtskrümmungen der Wirbelsäule."

[59] Short for: Shreemati Nathibai Damodar Thackersey University. As Gauri Deshpande (1997:154) narrates, the university had started from Dhondo K. Karve's and his wife Anandibai Karve's initiative in setting their home outside the city—since they could not rent a more centrally located house to live in due to their social ostracization; In their home lot, they also set up "a few huts there for […] other outcasts like themselves. From this beginning eventually emerged the women's university and an orphanage".

South Asia—founded by her father-in-law, with campuses in Pune and Bombay. In 1939, almost a decade after returning home from Germany, she was hired as a reader (lecturer) in sociology—the first woman to achieve this in India—at the prestigious Deccan College (Sundar 2008). Located in a central area of the city of Pune, the Deccan College has a special position in the intellectual landscape of the Marathi-speaking region in western India. Opened in 1821 under the name Hindu College, Deccan College is the third oldest higher education institution in India. Its campus is composed among others by an impressive Indo-Gothic style main building, the Maratha History Museum, and an imposing entrance gate that is beautifully framed by centennial banyan figs, India's national tree. The Deccan College has a long tradition as a formative site of the regional and national political intelligentsia; several of its alumni were protagonists in progressive political movements.[60] This ethos of producing politically relevant knowledge, which surely continued in the early post-colonial setting's "enthusiastic embrace of science" during Jawaharlal Nehru's national government (1947–1964) (Roy 2007:114), is clearly perceived in Karve's own engagements. Not only she strove to engage with political themes as a public scholar—having written both in English and Marathi on many different societal issues for wider audiences and participated in radio interviews (see Sundar 2008)—but her academic work also touched upon questions of crucial regional and national political relevance: from caste and women's issues, to education, language politics, and the post-independence territorial reorganization. In this period, Karve also became one of Deccan College's main professors, coming to occupy, from 1959, the position of head of one of the College's three departments, the department of sociology and anthropology[61]—a position she occupied until her unexpected death in 1970.[62] The department also shared the facilities of the new University of Poona (1949–), later renamed Savitribai Phule Pune University, where classes took place. Besides teaching several courses, Karve supervised 19 PhD theses, with

[60] Among them was celebrated independence articulator Lokmanya Tilak (1856–1920) (Interview with K. Paddayya, Pune, 20 March 2019).

[61] Karve became one of Deccan College's "three main Hindu gods", as former director Paddayya puts it, next to her coeval colleagues S. M. Katre and H. D. Sankalia, heads of the Sanskrit and archaeology departments, respectively (Interview with K. Paddayya, Pune, 20 March 2019). On the interdisciplinarity of sociology and anthropology in twentieth-century India, see: Sundar 2008; Uberoi, Deshpande, and Sundar 2008.

[62] Karve died at the age of 64 on 11 August 1970. Although her health had deteriorated due to angina and had slowed her working rhythm in her last years, her death came as a shock to her family and colleagues (Interview with Kailash Chandra Malhotra, Noida, 18 March 2019). Her former student Maxine Berntsen remembers having gone on a walk with her just a few weeks before her death, when, as usual, Karve shared her contemplations about the birds they saw on the way (Interview with Maxine Berntsen, Hyderabad, 27 November 2018).

topics ranging from village studies, family relations, caste and kinship, criminality, and physical and biological differentiations between castes.[63]

In the following five sections, I look at how Karve adapted knowledge, methods, and scientific frameworks of physical and biological anthropology to her own anthropological practice in India. Thereby, I examine the political situatedness of such practices as well as its effects.

2.3.1. Conceptualizing "race" and "caste"

While the category "ethnic" appears in Karve's MA thesis, in the writings after the completion of her doctoral degree in Berlin that category is largely absent or peripheric. Instead, at least until the 1950s, Karve engages with a clear racial vocabulary while applying anthropometric and other racial methods to the study of what she calls "castes" and "tribes" of Maharashtra and other regions of India. Before I turn to Karve's methodology and research practices in the following sections, here I will shed light on how Karve conceptualized the main category of difference that was central in her studies of human diversity in India, namely caste, in relation to race. Applying the anthropometric methods she was trained in while in Berlin, Karve builds upon the work of her anthropological antecedents in India and carries on a long work of understanding and explaining what is caste. By so doing, she often combined physical-biological anthropological and, especially after the 1950s, structural-functionalist approaches, the two strands of anthropology she focused on. Therein, the concept of race played a significant role, even when it was not spelled out or explicitly clarified.

To take an emblematic example, in Karve's book *Anthropometric Measurements of Maharashtra*, co-authored with statistician Vishnu Dandekar (Karve and Dandekar 1951), the concept of race is not explicitly tackled upon and remains largely undiscussed. The existing international scholarship on race seems to be enough as a reason for the application of a racial framework, just as the use of anthropometry is justified in Karve's book by the simple statement that the method had been used in Europe. As stated in the book's introduction:

> People are carriers of different cultures. When traits from different regions are revealed in the culture of a region, one expects a physical contact of peoples of these regions and so it was felt that the technique of carrying out studies region by region should be applied to anthropometric investigations. […]. A systematic study of the people of one region should be made in order to find out what the racial composition of a cultural region happens to be. This method is not a new one. *It was followed by European*

[63] For a complete list of Karve's PhD students and their project titles, see: Deccan College Post-Graduate and Research Institute (1971:124-125).

> *anthropologists for the investigation of races in Europe.* It was also followed in India both by Risley and Guha (Karve and Dandekar 1951:2, emphasis mine).

As the quote shows, race in Karve's conceptual framework is tightened to culture.[64] In her view at this point (1951), the study of a cultural region should be linked to the study of the physical markers, or "racial composition", of the people of that region. She references to how European anthropologists have used anthropometric methods to study "races in Europe", in addition to how physical anthropologists in India—from Risley to B. S. Guha (1894–1961)—have followed the same methods, as the justification for her application of such methodology to India and to other caste groups not yet studied (Karve and Dandekar 1951).

In Karve's books' jargon, race appears most of the time in its adjective form: "race" is translated to "the racial" and the studied groups are not "races" but "castes" and "tribes" with "racial traits" (e.g., Karve and Dandekar 1951). Each of the dozens of social groups in *Anthropometric Measurements of Maharashtra* is portrayed not only by means of the anthropometric data that she collected in different field trips over several years (and with indications of features such as skin tone, eye color, nose shape, hair, etc.) but also briefly in terms of their geography, culture, and social organization.[65] For some socially less privileged groups, especially those labelled tribes, Karve's descriptions of social behaviors also contain pejorative characterizations.[66] In this way, "racial traits" are anthropometrically and rhetorically produced and infolded to other elements for each analyzed social group, like cultural, behavioral, genealogical/ancestral, and geographic characteristics, also in a socially hierarchical manner. Via this racializing enactment of difference, the social groups selected by Karve have their defining characteristics both culturized and biologized, through her operationalization of a racial framework.

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[64] Similarly, she opens another publication in the same year with the statement: "The cultural process in India is one in which different communities live side by side, interchanging ideas and goods but not blood. […]. The anthropological evidence shows that in each cultural region there are distinct racial strata which can be correlated to social strata and that racial intermixture, though found in all regions, is not very great in depth and extent" (Karve 1951:135).

[65] The groups were: Bari, Andh, Agari, Bhandari, Bhavsar, Bhilla (Mavachi, Tadvi and others), Brahmins, Carak Brahmins, Konkan Brahmins, Burud, Chambhar, Dhanagar, Dhivar, Fulmali, Gond, Govari, Gujar, Gurav, Halbi, Halba Kostis, Khatri, Kohali, Kolam, Koli, Koli-Malhar, Korku, Kunbis Mana Kunbi, Khaire Kunbi, Marathas, Dhanoje, Mahars, Mang, Nhavi, Parit, Pathare Ksatriya, Powar, Prabhu, Pathare Prabhu, Sali, Simpi, Sonar, Sonkolis, Teli, Thakur, Tvasta Kasar, Vaisya Vani, Somavamsi Vadaval, Vanjari, Warli (Karve and Dandekar 1951:19–43).

[66] In this context, Karve stressed traits such as "fondness of liquor" and inclination to expend great amounts of money for festivities (Karve and Dandekar 1951:36). Besides phenotypical markers (like dark skin color and short stature) and religion, love of liquor seems to be one of the defining "tribal characteristics" also in Karve's later writings (e.g., Karve 1968b:15).

While the conceptual understanding of race is taken for granted by Karve, caste, for its turn, finds ample space in Karve's theoretical discussion (e.g., Karve 1958a, 1958b, 1958c, 1959a). In resonance to the consolidated international and national attention to caste in the sociology and anthropology of India—caste forming a kind of, as Appadurai (1986) puts it, "gatekeeping concept" in anthropology's theoretical attention to India—, defining caste was also a major preoccupation in Karve's theoretical efforts. In that same book, *Anthropometric Measurements of Maharashtra*, for example, caste receives a detailed conceptual discussion (Karve and Dandekar 1951:10–12). As Karve and her co-author succinctly put it: "The most striking feature of the Indian social organisation is the caste-system. A caste is a group (1) which has a definite name and (2) in which marriage is allowed only within the group" (ibid.:10). In this sense, the kinship rule of endogamy is, for Karve, the basic element that makes up a caste group. In a nutshell, "[a] caste is defined […] as an endogamous group" (ibid.).[67]

In this sense, Karve's definition of caste as an endogamous group is peculiarly driven by a physical and biological anthropological stance, reflecting her training at the KWI-A. While other scholars had tried to define caste primarily in terms of social status, occupation, or hierarchy, Karve's definition sidelines such sociological aspects and emphasizes instead the aspects of its biology and shared heredity or genetics. As such, her definition approximates to a racial understanding of caste and conforms to the operationalization of the study of caste via anthropometric methods and with an interest on questions related to heredity. Hence, Karve's take on caste stems from her preoccupation with understanding the origins of caste groups and their differentiations.

Karve puts forward a theory that caste group differentiations did not originate from a process of fission from larger ancestral populations; instead, for Karve, caste groups today correspond to many ancestral groups that migrated separately to South Asia and never fused. As these ancestral groups arrived in the subcontinent and amalgamated into the existing society while maintaining their endogamic practices, each of them came to be part of the caste system as a single caste group unit. Therefore, Karve's caste origins theory matches an understanding of caste groups as biologically and genetically distinct, an understanding that neatly conforms to a physical anthropology that takes an endogamous group as a unit of analysis. For Karve, each endogamous group, whether defined popularly as a caste or a tribal group, forms a caste group (or *jati*) and is thus the primordial unit of analysis in a study of human variation and diversity

[67] Furthermore, Karve later adds the importance of language in making up caste, highlighting that a caste group "almost never cuts through the linguistic divisions" (Karve and Dandekar 1951:10).

in India. Thus, the imprint of German racial anthropology—with its emphasis on the questions of heredity and its preoccupation with racially (culturally and biologically) demarcating discrete social groups—is perceptible in Karve's definitions and theorizations of human difference and its categories in India.

In the following, I zoom in onto Karve's research practices in the field and use of anthropometry for her study of castes in India. To highlight the political implications of such racial frameworks, I will shed light on those of her research practices that focused on social groups that she selected to represent the geographic area that she called "Maharashtra"; thereby, I pay attention to the tensions related to the delimitation, selection, and exclusion of different social groups in Karve's research, as well as to how these groups were racially and anthropometrically portrayed in relation to one another and to other Indian groups. My analysis concentrates on the knowledge articulations that culminated in two of her main books: *Anthropometric Measurements of the Marathas* (1948) and *Anthropometric Measurements of Maharashtra* (Karve and Dandekar 1951).

2.3.2. Racializing and territorializing the people of Maharashtra

A significant portion of Karve's research efforts consisted in undertaking anthropometric measurements of different caste groups especially in the region that came to be demarcated as Maharashtra. As a result of a turbulent political process of border drawings in the void of the territorial re-organization in India's decolonization, Maharashtra was officially declared a state only in 1960. But even in her research projects from the 1940s onwards, Karve already delimitated her selection of studied human groups to those that, in her understanding, made up the social, cultural, and racial fabric of "Maharashtra".

In this context, it is not coincidental that the focus of Karve's first monograph was on what she claimed to be one compound caste group: the Marathas. Although what has been called the Maratha caste had been divided in at least two major social groups, namely the Marathas (traditionally landowners) and the Kunbis (traditionally peasants), Karve grouped both as Marathas in her book *Anthropometric Measurements of the Marathas* (1948). Through this grouping, Karve operated a selection of a Marathi-speaking group that corresponded to over 40 per cent of Maharashtra's population and was geographically dispersed in different corners of what should be the state of Maharashtra. In her anthropometry-based, racial anthropological field research on the Marathas, Karve selected over a thousand Maratha men (landowners or peasants) living in different places in the then state of Bombay Presidency further east to the

then provinces of Berar, Central Province, and Hyderabad State.[68] Together, these provinces occupied an area even greater than what would become Maharashtra in 1960. This extended territorial vision of Maharashtra is also visually stated in the opening of her follow-up book *Anthropometric Measurements of Maharashtra*, where a figure entitled "Map of Maharashtra" draws a territory which encompasses an even larger area (Karve and Dandekar 1951).

In fact, Maharashtra's becoming was a long turbulent political process which faced resistance from, among others, prime-minister Nehru and Bombay elite groups in the then officially Marathi and Gujarati-speaking Bombay Presidency state. A fierce advocate for the formation of Maharashtra (encompassing the Bombay area) was the Samyukta Maharashtra Movement founded in 1956 with its stronghold in Pune. The movement promoted advocacy and protests which were often met with violent police repression, accounting for the death of more than 100 people. Several of the founders of the movement were also among the elite Chitpavan Brahmins from Pune, like Karve herself (Mukharji 2014); she was in favor of the Samyukta Maharashtra and had close contact with prominent active members (Sundar 2008). Thus, Karve's selection of the Marathas and what she also called "the Maratha region" as a focal point of her first book reflects an anticipation, or rather, a positive projection towards the formation of a Marathi-speaking state.[69]

Besides the demographic and geographic significance of this compound caste group, a political historical factor attributed to the Marathas helps to understand why Karve chose to center her research efforts on this group. The history of the vast "Maratha empire" received increased attention by Indian scholars throughout the colonial period. This was in part due to a nostalgic affordance of this empire's pre-colonial sovereignty, which gave fruit to projections of a restored, post-colonial sovereignty. The Maratha confederacy extended to a large portion of the Indian subcontinent before finally succumbing to the European colonizers in 1818 after losing the Battle of Koregaon in Pune, which resulted in the British administration annexing the last Maratha territories to the colonial state of Bombay Presidency, with Bombay as a co-capital next to Pune. Therefore, this discursive terrain of the history of the Maratha empire was

[68] Karve would contradict her own grouping of Marathas and Kunbis in one single group when she confessed, many years later, that "though unity has been achieved on the political front, as regards marriage, the Marathas marry as a rule only Marathas and not those who were formerly classed as Kunbi" (Karve 1961a:46).

[69] This is not to suggest, however, that Karve was dishonest or non-scientific in her selections and conclusions, on the contrary. As Mukharji (2014:163–64) states, commenting on the case of Karve and another contemporary anthropologist, "the relationship between the creative imagination of a scientist and the scientific conclusions she produces need not be recuperated solely through the figure of corruption and perversion of truth. […] the imagination has a range of subtle and pre-reflexive paths by which to connect a scientist's identity, aspirations and anxieties to her creative imagination".

fertile breeding ground for anti-colonial inspiration and nationalistic imaginations (P. Deshpande 2007). In addition, this large body of historiography has been interlaced with Hindu-nationalistic impulses which were fueled by an interpretation of the ascension of the Maratha empire under the leadership of Chhatrapati Shivaji in the seventeenth century as an act of heroic military defeat against the foreign Muslim rulers of the antecedent Mughal empire (ibid.).[70] Thus, discursive invocations of the Maratha history had the potential to syncretically or selectively mobilize anti-colonial, Hindu nationalistic, Marathi nationalistic, and anti-Muslim sentiments.

In Pune, Karve was situated not only in the former capital of the Maratha empire but also at the epicenter of knowledge production about Maratha history. As I describe in the following, it was through a racial anthropological framework that Karve studied the Marathas and, later, "Maharashtrians", enacting their racial distinctiveness. For her "Anthropometric Measurements of the Marathas" (1948), Karve undertook anthropometric measurements and observations on 1608 Maratha men; at first, she also wanted to include women in her sampling, but she gave up as "it proved very difficult to get women to submit to measurements", because women "generally wear their saris over their heads and do not like to bare the head for the most important measurements", besides the fact that, following the tradition of *purdah*, women of some clans were confined in their homes (Karve 1948:9). Her choice to concentrate on the measurement of male individuals followed through her research in the subsequent years. Moreover, as she details in her *Anthropometric Measurements of Maharashtra* (Karve and Dandekar 1951:44), another important delimitation in her selection of measured individuals had to do with their family ties: selected individuals should not be related through a common great-grandfather.[71]

My interviews with Karve's children, Anand Karve and Jai Nimbkar, also offered some insight in her fieldwork process.[72] Both accompanied her in fieldtrips and helped their mom register the metric data, as the help of two extra hands significantly facilitated and sped up the anthropometric data production process. Because of teaching and childcare responsibilities,

[70] The heroism of Shivaji, and often, by extension, of the Marathas, has been commemorated mostly in Maharashtra, but also nationally. The masculinist appeal of this horse-riding battle-prone leader (which much contrasts to Mahatma Gandhi) makes him a strong figure for nationalistic projections by some. (On other anti-Gandhi, masculinist memorializing projections of independence leaders among the Hindu right, see Fischer-Tiné 2014).

[71] See Chapters 5 and 6 for effects and problems of sample selection in relation to caste in biological anthropological and population genetics research.

[72] Interview with Anand Karve, Pune, 16 Feb 2019; Interview with Jai Nimbkar, Phaltan, 15 Sept 2017.

Karve often only found time for fieldwork during the short semester breaks, which meant that she had very little time in each location for research. In addition to the time limitation, Karve's research budget was very constrained.[73] When travelling to isolated areas, she was often aided by officials of the Indian Forest Service, who coerced Adivasis residing in such areas (and dependent on that government institution) to assemble in the posting ranges where Karve was temporarily based.[74] Although Karve describes the establishment of rapport for the undertaking of anthropometric measurements with relative easiness, some tension is perceptible in-between the lines:

> Collecting anthropometric measurements is a peculiar job. Among illiterate people the first response it arouses is fear mingled with curiosity. Generally a crowd gathers round to see what is going on. *The first few measurements are secured with a good deal of persuasion.* When it is found that the operation is entirely painless, everybody wants to be measured and get into the record-book. It is hard to reject those enthusiasts and spoil the jolly co-operative mood of the crowd. […] *Money presents to individuals were not offered on any occasion*. The work was done in the villages and in different localities of the bigger towns with the help of local leaders, who by their own example and exhortations persuaded the tribal people or the caste people to submit to measurements. In the case of very poor and backward people *money was given at the end of the work*, before taking leave, to buy sweetmeats for the children who were always present. This was not an inducement for measurement but a token of gratefulness for their hospitality and friendliness (Karve and Dandekar 1951:43, emphasis mine).

Karve's quote above fluctuates in tension between stating that money was "not offered on any occasion" to "money was given [to very poor people] at the end of the work", which demonstrates a conflictive thoughtfulness over the process of getting people to submit to the odd anthropometric measurements. In this sense, strategies of trust-building and persuasion seemed to be necessary for the conduction of anthropometric methods, however "jolly" the crowd was.[75]

The instruments used by Karve in the research that culminated in the here analyzed 1948 and 1951 books were: a Martin's anthropometer and its additional anthropometric calipers, a Martin's eye color chart (which she refers to by the German name *Augenfarbentafel*) and a skin-color chart designed by Felix von Luschan (1854–1924), former head of the Berlin *Völkerkunde* Museum. By that time (1940s), Karve seemed to have wanted to attune her methodology to the growing molecularizing, serology-based trend that would accompany the shift from physical to biological anthropology: she also intended to take blood samples to

[73] Interview with Kailash Chandra Malhotra, Noida, 18 March 2019.
[74] Interview with Anand Karve, Pune, 16 Feb 2019.
[75] See Chapter 4 for ethnographic insights on the anxieties related to taking anthropometric measurements.

compare blood group frequencies across caste groups, but this proved to be difficult due to technical and infrastructural problems, as well as due to reluctance among sampled persons. As she explains:

> As the years 1943 and 1944 were war years, some difficulty was encountered in getting samples, as people to tended to think that I was a recruiting agent of the government. People had also heard of blood-banks and fantastic stories of people being bled for purposes of transfusion were also current. (Karve 1948:10)

The fully incorporation of serology within her research methodology would be established by the 1950s, when she could travel with the blood group testing serum and, with help of one of her children or another research assistant, undertake the serological analysis on site in each evening after blood collection.[76]

In sum, the methods that culminated in her first two Maharashtra-focused books (Karve 1948; Karve and Dandekar 1951) consisted of measurements and indices that she picked from the long list of her personal copy of Martin's famous textbook of anthropology (Martin 1914).[77] In this sense, Karve's rootedness to a German-speaking racial anthropological school—and, simultaneously, the international acknowledgement of this school—are evident in her choice of instrumentation and measurements. She calculated several indices based on the nose, head, and other facial measurements. Displayed in several tables and graphs, such metric data occupy several pages of these and other of her books with an anthropometric approach.

Despite this profusion of metric data, it is with the aid of only a few indices that Karve tries to construct a distinct picture of "the Marathas" and, later, of other "Maharashtrians". In *Anthropometric Measurements of Maharashtra* (Karve and Dandekar 1951), the dozens of ethnic and caste groups from the region which she now—in contrast to previous publications—bluntly calls Maharashtra are anthropometrically analyzed mainly in consideration of their head and nose shapes. Karve and Dandekar clustered the analyzed social groups into "small-headed", "long-headed", and "big-headed" (an internationally acknowledged physical anthropological classification), whereas some nose forms are described by the authors as "fine" or "broad", the first term having a clear valuative connotation, in an implicit hierarchy that places Brahmins and Marathas in a high position, as exemplified in the following description:

> The Marathas *have the finest noses*—[almost indistinguishable from] a group of Brahmins […]. The other castes comprising of lower artisans and hereditary village

[76] Interview with Anand Karve, Pune, 16 February 2019.
[77] Martin's textbook is also referenced by her in these and other publications. Her personal copy of the book—with her handwritten annotations—can now be found in the Karve section of the Deccan College library.

> servants, by the broadness of their noses and slightly smaller circumference of the head, occupy a position midway between the Marathas and the primitives (Karve and Dandekar 1951:130-31, emphasis mine).

This special attention to nose shape is also present in the work of other national anthropologists and contemporaries of Karve, like Prasanta Chandra Mahalanobis (1893–1972) (Clever 2022), and relates to previous racial hypotheses of Risley, for whom "the average nasal index measured the normal physical characteristics which represented a caste/tribe's stage in the evolution towards Brahmanism" (Srivatsan 2005:1991), a caste rank that had often been associated with European racial elements, as I discuss in Chapter 5.

In further descriptions of facial and other easily visible bodily features, Karve often also extrapolates the available anthropometric data, referring to non-metric, instrument-free observations. For example, she contrasts Marathas to groups in Northern India in terms of their hairiness ("very rarely do Marathas show the hairiness of Sikhs […], they are decidedly not one of the very hairy races of the world") and general bodily features ("the Marathas have a slight build and well molded features. The tallness and stoutness of frame and the ruggedness of features of the northern people are almost entirely absent") (Karve 1948:70). Moreover, she also points out to the "[medium] thickness of the lips" of the Marathas (ibid.:71). Although this facial feature was not measured by her, her choice to highlight lip thickness might be related to its heavily loaded racializing attributions. Thus, despite having collected anthropometric measurements of different kinds, she still needed to make sense of these metric data rhetorically, constructing the picture of "the Marathas" by filling the many data gaps with some key features that were more relatable to the reader, especially the more visible facial features, in order to make her argument more visually convincing.[78]

This rhetorical strategy of resorting to descriptions of bodily types converges with what Christine Hanke's (2007:160) analysis of German physical anthropology in the turn of the twentieth century observed: the synthetic capacity of describing bodily markers rhetorically enacts the racial types that are otherwise fragmentally enacted in anthropometric data. In addition, Karve's book resorts to visuality: its appendix encompasses a few photographs to illustrate what she calls "Maratha physical types" (Karve 1948:40-41). In sum, metric data needed to be made sense of through rhetoric and visuality so that Karve could put forward an intelligible argument about the distinctiveness of the social groups she analyzed.

[78] On the relation between face and racialized visual projections in archaeology, physical anthropology, and genetics, see: M'charek and Schramm 2020; Schramm 2020; M'charek 2013.

In this sense, it is noticeable that the racial construction of a cohesive Maratha group based solely on anthropometric data is a difficult task. This difficulty becomes evident in both books here examined as some typological impasses appear in the analysis of the anthropometric values of "the Marathas" (Karve 1948; Karve and Dandekar 1951). To solve this, Karve resorts to a nuanced rhetoric. When the data suggests that there could be important differences between Marathas across different subregions, she counterbalances these differences either by stressing sameness among all Marathas or by relativizing the genetic significance of her phenotypical observations. Furthermore, when the dispersed variation pattern of the Marathas seems to suggest that they have similarities with groups of a lower social status, Karve immediately stresses other racial attributes of the Marathas which associate them with higher social status groups. For instance, the Marathas happened to have shown "a small cephalic index" (otherwise associated with the groups Karve also called "tribes" or "primitive"), but this fact is relativized with the argument that the Marathas have even "better developed noses", i.e., "a smaller nasal index", than a group of (upper caste) Brahmins. In a nutshell, the odd anthropometric variation position of Marathas is resolved by the author(s) through three strategies: stressing the sameness among different Maratha samples, downplaying their affinity with tribal groups, and associating them with other, better socially situated groups (Karve and Dandekar 1951:98). This racial elevation of the social status of the Marathas converges with the imagined position they occupied in the context of historiography of the Maratha empire and its resonance to the Marathi nationalist project.

Karve concludes her "Anthropometric measurements of the Marathas" with the following assertion: "It would thus seem as if the Marathas are a *mediterranoid* [*sic*] people who have taken up *two further elements in their racial make-up* during *their long occupation of the Maratha country*" (Karve 1948:71, emphasis mine). In this concluding remark, Karve interestingly links the Marathas to a European racial typology ("mediterranoid"). At the same time, she stresses that the Marathas have taken up other, unique racial elements that make them distinct; thereby, she racially grounds them with a long historicity to that geographical area that she also calls "the Maratha country". With this conclusion, Karve identifies the Marathas not only with a high-ranked Northern status group, but also with a native ancestry, possibly in connection to the Indian South. She grants the Marathas a place in an imaginative *heart-of-India* racial geography, at the crossroads of the often separately thought of Indian North and

South.[79] These two regions associated in European orientalist scholarship and colonial anthropology—following the famous work of Oxford-based German Indologist Max Müller (1823–1900)— respectively with two distinctive major racial groups, Aryans and Dravidians, as I will further discuss in Chapter 5.

Thus, in her research on groups in Maharashtra, Karve enacted the racial and cultural uniqueness of Maharashtrian social groups and intervened in key debates on belonging following India's decolonization and territorial reorganization. Thereby, she adapted an internationally validated racial framework—with methods and instruments of the German-speaking anthropological tradition—also to respond to national and international scholarly discussions on race and other difference categories in India that had been on-going since the colonial era. This granted a wide recognition of Karve's work, which contributed to the settlement of the debates on the formation of the state of Maharashtra. Karve's acknowledged expertise on this region resonates with the project of her extensive book *Maharashtra, land and its people* (1968b), which was commissioned and published by the government of the then newly formed Maharashtrian state. Published just two years before her passing, this book crowns Karve's project in constructing a physical and sociocultural anthropology of Maharashtra. The book contains encyclopedic efforts in apprehending the human diversity of that region through culturalizing and racializing enactments of differences among caste and religious groups. Further, Karve's work on the Marathas continues to have considerable political effects up to this date, having been cited by a 2018 government report with the goal of solving the controversy on whether all Marathas (and not only Kunbi Marathas, as it had been the case) should be granted affirmative actions.[80]

As the next section will show, religion configured another category of difference that Karve applied a racial framework to, although without use of anthropometric methods.

2.3.3. Racializing Muslims

The year 1947 witnessed not only the end of British India but also the partition between India and Pakistan, a brutal process in which religion was the main dividing line. In the spring of the same year, a few months before India's independence and partition, Karve delivered a speech

[79] Maharashtra was imagined as occupying this space between the "Sanskritic North" and the "Dravidian South" of India also in linguistic and social anthropological terms, for, according to Karve (1965:16): "The kinship terms are almost all purely Sanskritic in origin but reflect a Dravidian kinship organization."

[80] Following Karve's understanding of Maratha as compound caste group, the report facilitated the decision to extend quota policies to all Marathas (See, e.g., The Economic Times 2018).

at the First Asian Relations Conference, an unprecedent gathering of preeminent scientists and political and cultural leaders from all Asian regions—the Indian delegation including Gandhi and Nehru—to discuss the future of Asia in the decolonizing, post-World War II scenario (McCallum 1947). Karve's contribution was entitled *Racial Conflict* and later incorporated in the volume *Racial Problems in Asia* that was published by the organization that convened the conference, the Indian Council of World Affairs. In the text, Karve (1947:27) defines "racial conflict" as a "conflict between human groups where the conflict is primarily an economic struggle strengthened and intensified by all the physical and cultural characteristics which differentiate one group from the other." Here, one can see how her physical and *geistig*—cultural and mental—conceptual approach to race is still very close to a 1920s German-speaking racial anthropological conceptualization, as we have seen above in Section 2.2.

Karve's analysis of Islam in the essay is permeated with a pejorative language—with word choices including "terror", "violence", and "fanaticism" (Karve 1947:39)—that enacts and connects negative behavior traits about the biology and culture of Muslims with the history of Islam's expansion. While Karve recognizes that "India was never united under a single political power before the advent of the British", she stresses that the Brahmanical Hindu tradition has guided a sense of an Indian cultural unity (ibid.:43). For Karve, the "uninterrupted and religious tradition of thousands of years" that was accessible to "the learned Brahmin" implies that Hinduism has granted India a "deeper" "cultural unity" (ibid.:43–44). In contrast, she states that Muslims "created the first breach in the cultural unity of India" and concludes that "the Asian nations will have to agree on a population policy if racial discord is to be avoided in future" (ibid.:45,54). In this sense, Karve falls into what Sundar (2008) and Sujata Patel (2009) have suggested to be lamentably a common pattern in post-colonial Indian anthropology and sociology: the strong influence of Hindu bias rooted in an upper-caste Brahmanical position, which corresponded to many of the Indian progenitors of these two disciplines, with the effect of excluding non-Hindu groups from analyses of Indian society.

In sum, Karve's *Racial Conflict* is a demonstration of the application of a racial framework to comment on a societal division that was usually framed rather as a political, religious matter. In this sense, ideas of cultural, ancestral, religious, and behavioral differences are singled out and woven together in Karve's essay through her use of race. Importantly, perhaps due to her lack of supporting anthropometric data, physical variation is barely mentioned in this essay, which demonstrates how malleable and adaptable racial frameworks can be. The high political reverberance of Karve's racializing portrayal of Muslims in India is significant; it is marked

not only by the context of this speech—the First Asian Relations Conference—but also by the political event that it contributed to: the unfolding of the partition.

Nevertheless, Karve's negative opinions on Muslims would be drastically toned down in her later years, when her stance shifted towards more tolerant, multiculturalist views. Besides this 1947 piece, she never wrote any other text where an anti-Muslim racist stance was outspoken. Before discussing how this shift might be connected to political and scientific developments in the 1950s and 1960s, in the following section I digress from my analysis of Karve's physical and biological anthropology to briefly examine her sociocultural anthropological research on India's human diversity.

2.3.4. Culturalizing and functionalizing caste

While, as the last sections showed, a considerable part of Karve's research efforts had a stronger biological and physical anthropological focus, several of her more than 100 publications, especially in her later years, had a social and cultural anthropological focus.[81] While both strains—biological/physical and social/cultural—often converge in her books and longer texts, in this section I bring to the fore Karve's social and cultural anthropological takes on caste in India. Karve's two most cited books in anthropology syllabi in India today deal with caste with a social anthropological focus: *Kinship Organization in India* (second edition: 1965, first edition: 1953) and *Hindu Society: An Interpretation* (second edition: 1968a, first edition: 1961a).

The first book that granted her international recognition and national acclaim, *Kinship Organization in India* gives central attention to themes typical of social anthropology of that time, namely kinship and marriage rules among castes of India. While decidedly opting for the term "organization" in its title over the all-too-encompassing term "system" that was internationally *en vogue* in the social anthropology of that time, the questions examined in the

[81] Another distinct feature of Karve's anthropology of India is her discussion of the social situation of women in Indian society. This is evident in her policy-oriented *The Indian woman in 1975* (Karve 1966), a pioneering sociological diagnosis and trend assessment on the employment and education of women in India. More generally, Karve's sociology gave special attention to the sphere of the family, which can also be seen as a strategy to bring women issues to the fore of social scientific analyses (Sundar 2008). Karve's critical sensibility towards gender inequality is most recognized in *Yuganta: The End of an Epoch* (2017[1969]), the book that gave Karve wide national recognition, having won the esteemed annual award of India's National Academy of Letters and reached a readership far beyond academic circles. Easily found in most bookstores in India today, the book offers new insights to interpreting the famous Sanskrit epic Mahabharata and gives special attention to the women roles in it. Thereby, Karve sheds new light on the way these women grasped agency beyond their subjugation to men, relating the epic to current debates on social and cultural issues regarding women in Indian society, from the practices of *sati*, polygamy, and arranged marriages, to the role of women in a family.

book markedly stem from a functionalist tradition: it interrogates what keeps caste differentiations and interactions in "Indian society" together, while ignoring possible cracks or tensions within it. Karve's proximity to social anthropology was also enhanced by a renewed direct contact with European and North American scholarship: most of the book was written during her guest stay at the School of Oriental and African Studies in London in 1951 and 1952, when she had the chance to discuss it with Louis Dumont[82] and London-based Austrian social anthropologist couple Christoph and Betty von Fürer-Haimendorf; later, thanks to a fund of the Rockefeller Foundation, Karve had a chance to present the book's content on a scholarly tour across the US (Karve 1965:xi). At the same time as it is guided by a social anthropological interrogation, the book presents a mix of approaches and methods that are distinctive of Karve's take in anthropology. One of its chapters devotes to an analysis of ancient epics and religious texts—following the philological approach that permeates many of Karve's writings—, while the anthropometric methods and racial frameworks that Karve was trained in in Germany also inform some comments.

It is interesting to note, nevertheless, that *Kinship organization of India* provides some elaborations on the nexus culture–biology that signal some steps away from the prevailing understanding of it at the KWI-A as well as in her earlier works (e.g., Karve and Dandekar 1951). In the book's conclusion, she clarifies that "culture is not a thing dependent on physical heredity but ultimately a culture walks on two legs"; however, she stresses that "people who have different cultures may also be people belonging to different ethnic groups", which may provide a key to "the origin of these cultures" (Karve 1965:388). She adds: "When we study social structures we do not mix the study with speculations about races but when such a study reveals a spatial pattern, it is legitimate to seek the aid of another science and see if anything of use to us emerges from its investigation" (ibid.). Thus, here Karve makes an effort to elaborate on the relationship between geographic territory, ethnicity, race, culture, and kinship, and provides a more nuanced understanding of this nexus than she did in her more clearly racial framework-focused *Anthropometric Measurements of Maharashtra* years before (Karve and Dandekar 1951). While she seems to juggle between these different approaches, as a critical remark one could still problematize how she defends the possibility to turn to racial frameworks to understand spatial patterns of variation and, by association, sociocultural factors. As we will see, racial frameworks continued to play an important role in Karve's anthropology.

[82] See Chapter 6 for a discussion of Dumont's harsh criticism of *Kinship Organization of India*.

For its turn, published eight years later, *Hindu Society*[83] (1961a) grew out of a series of lectures on social, cultural, and historical aspects of the caste system, which she held in 1959 and 1960 in the South Asia Colloquium of the University of California, Berkeley (USA), where both she and her husband were distinguished visiting scholars. Karve (ibid.:iv) also acknowledges how the book profited from exchanges with the Harvard-based social anthropologist Clyde Kluckhohn (1905–1960). *Hindu Society* deepens the theme of *Kinship Organization of India* and follows the same syncretic approach: its second edition also incorporated a chapter with a stronger biological anthropological focus, adding to chapters with social and cultural anthropological and philological frameworks (Karve 1968a).

Karve's last scientific monograph, *Maharashtra, Land and its People* (1968b), also combines different approaches to comprehend caste differentiations in her home state. Karve's range of sociological and anthropological frameworks to understand human diversity and its social arrangements in Maharashtra is well represented in this book's chapters: one chapter focuses on the physical and biological anthropology of social groups, another tackles the "social organization" that emanates from caste differentiations, while two other chapters deal with "the family of Maharashtra" and religion in that state, respectively. With an encyclopedic character filled with tables and charts, the book seems to attempt to construct an anthropological database for Maharashtra. Therein, while aiming at a generalizable picture of Maharashtra, the different phenomena it describes is often differentiated according to the specificities of each caste, ethnic, and religious group.[84] In this way, at the same time as the book aims at ordering knowledge about human diversity in Maharashtra, it reinstates boundaries of differentiations along the lines of these categories of difference, tying them with racial anthropological observations.

Thus, the syncretic anthropological approach taken by Karve majorly draws on the differentiations of caste and ethnic groups, bringing diverse social, cultural, and biological phenomena together and flattening them against the grid of these categories of difference. As we have seen in the brief analysis of these three books by Karve, her intellectual production that has a social anthropological focus, with research questions marked by a functionalist-structuralist preoccupation, is complemented in her body of work by physical and biological

[83] The book's title's lack of mention of "India"—and choice of "Hindu" instead—reflects a critique that had started to raise in the late 1950s: sociological or anthropological analyses of caste should not reduce the Indian subcontinent to Hinduism or equate caste with Indian society (e.g., Bailey 1959).
[84] In this sense, *Maharashtra, Land and its people* remembers the approach of other atlas-like, encyclopedic anthropological approaches of that time, like George Peter Murdock's *Ethnographic Atlas* (1967).

anthropological approaches. Concomitantly, as we have seen above, Karve's books with decided racial and physical anthropological foci also encompass historical, philological, sociological, and sociocultural anthropological descriptions of the social groups she delineates.

While the merits of Karve's non-racially focused scholarship deserve attention that would go beyond the scope of this thesis, what is especially significant for our concern here are the essentializing effects of the classification and descriptions of human difference categories in her work. As Karve fills each of the analyzed caste and ethnic groups with a scientifically legitimate descriptive content, as a result she also essentializes their distinctiveness and the demarcation of the boundaries between those groups. In the fashion of functionalist anthropology that she conversed with, the picture of Indian society portrayed in her books is one structured on caste groups, which have "sharply demarcated, bounded units" (Braun and Hammonds 2012:77). As Lundy Braun and Evelyn Hammonds explain in their analysis of the "dilemma of classification" in social anthropology, "the conceptualization of populations, ethnic groups, or tribes as discrete entities suitable for scientific definition, sampling, and classification hardened in the 1930s and 1940s", the decades in which increasingly many social anthropologists theoretically conceptualized "social systems" "as closed structures with static regularities and uniformities" (ibid.:77,82). While the emergence of functionalist conceptualizations of groups and boundaries can be understood also as colonial administrative orderings of human diversity in the Indian context too, as Cohn (1987:208) explains, much of anthropological thinking in post-colonial times was shaped by such theorizations.

In addition, given Karve's rootedness in a tradition of racial anthropology, this caste groups boundary demarcation in her work also happens in terms of race, entangling culture and biology in an essentializing way. She not only weaves racial and physical anthropological comments into her analysis but also fundamentally defines such groups as endogamous groups, putting them forward as the basic unit of analysis in her work. However, Karve does not critically reflect on the generalizing assumptions embedded in such conceptualization of caste, including the main assumption: that caste groups are, as a rule, endogamous. While inter-caste marriages might indeed be the case for a small minority of families, she does not reflect over the fact that they occur and what are the effects of not accounting for them in her conceptualization of caste. Thereby, the anthropological constructedness of such categorical demarcations is left largely unquestioned and, as a result, they are naturalized and solidified; those who fall out of the rule of caste endogamy are then made invisible. While I analyze further implications of this in this chapter's final remarks (as well as in Chapter 5), the next section presents a close reading of

Karve's last scientific paper (Karve et al. 1968). In it, she and her co-author Malhotra build a biological anthropological approach to the study of the origins of caste and sub-caste (or *jati*) differentiations. It was also the research of this paper that, despite the sharp criticism it received, reinforced Karve's theorization of caste groups (*jatis*) as endogamous groups, leaving an important legacy that is still followed in population genetics today.

2.3.5. Studying the origins of caste (*jati*) differentiations through biological anthropology

Karve strove to incorporate molecular methods in her biological anthropology. In the last two decades of her teaching, Karve named her physical-biological anthropology courses also "genetic studies" (Sundar 2008), mirroring the discursive and technological developments that led to the emergence of population genetics as a scientific field. In her research, she added other methods to those recommended by the German anthropometry textbook she followed, incorporating the molecular method of blood group analysis and other methods that aimed at analyzing physical markers with hereditary dispositions. As with have seen, while serology was difficult at first due to financial and technological constraints, this method was used more frequently in her later publications (e.g., Karve et al. 1968).

Notwithstanding, Karve never broke free from a racial framework. Even as her research encompassed molecular methods, she also continued to use physical anthropological, including anthropometric, methods that were closely entangled with KWI-A's racial anthropology. This also becomes evident in the critiques of her work: the rapidly changing discursive parameters vis-à-vis not only physical anthropology but also racial theories and methods proved to leave a critical mark in the reception of her work. An emblematic demonstration in this regard can be seen in a paper she published in 1968 and in the responses that it triggered. Titled *A Biological Comparison of Eight Endogamous Groups of the same Rank* and co-authored with her student K. C. Malhotra, the paper was printed in the internationally renowned journal *Current Anthropology* together with replies by 15 reviewers from India, USA, Germany, and UK, which together build up a divisive discussion. The paper tested the sociological hypothesis that different sub-groups (or *jatis)* of the same "caste rank" or *varna* (namely, eight sub-groups of Brahmins in Maharashtra) have different ancestries, contrary to the Aryan migration theory-related hypothesis that all Indian Brahmins shared a common Aryan ancestry (see Chapter 5). The paper relied on the statistical analysis of the same seventeen measurements used in her *Anthropometric Measurements of Maharashtra*, eighteen "visual observations" comprising skin color, eye and hair color and form, and other facial features, as well as what they called

“genetic data”, which included blood groups, colorblindness, hand-clasping, and hypertrichosis (Karve et al. 1968:109–111). All in all, while some reviews of the paper were positive, many others conferred sharper criticism regarding Karve’s and Malhotra’s methods and assumptions. In the following, I analyze such critiques in closer detail.

Strikingly, the terms “race” or “racial” are completely absent in the 1968 paper text, even though some of the used methods and references have “racial” in their original name. This deliberate language choice puzzles some reviewers, as some of their comments elucidate. For instance, American-British anthropologist J. Lawrence Angel wonders, referring to Karve and Malhotra's use of a statistical method otherwise known as “coefficient of racial likeness”, whether the difference between two castes is “as large as real racial differences” (ibid.:116). In the same direction, US-based Indian social anthropologist R. S. Khare first signals an approval of the paper for not reading the analyzed differences through "ethnic" or "racial" definitions; but the compliment is taken back in the next sentence: He criticizes the paper precisely for measuring these differences through racial statistical methods, "especially the Pearsonian coefficient of racial likeness", which "demand […] clarifications" (ibid.:120). Thus, this deliberate erasure of the terms race/racial can also be read as signs of Karve’s attempt to discursively catch up with on-going international discussions about race-ism, but, as these reviews show, such conceptual erasure does not match the actual research methods, which remain entangled with racial frameworks.

Critiques regarding the methods of Karve and Malhotra’s paper questioned the soundness of anthropometric measurements and other physical traits observations as well as their genetic significance. For instance, biological anthropologist Vijender Bhalla states in his review that “[a] majority of these traits, such as hair colour, hair form, quantity of facial hair, skin colour, nasal bridge, eyebrows, etc., are extremely pliable and vary with local environmental and cultural conditions” (Karve et al. 1968:117). In the same direction, US-based anthropologist Charles F. Bennett asks: “Should there not have been some sort of evaluation of the diets of the several groups in order to see if they had any significant effect upon some of the phenotypic characters observed and measured?”—and concludes: “social behaviour and biology are perhaps more complicated than the authors have demonstrated” (ibid.:116). In sum, these and other adverse critiques in the reviews converge in a suspicion regarding the correlation between sociocultural factors and biological (genetic and phenotypic) characteristics, as summarized in R. S. Khare’s concluding remark: “the problems in translating biological distance into sociological distance are enormous” (ibid.:120).

A related confluence of criticism in the reviews of Karve and Malhotra's paper regards the paper's assumption of equivalence between social group and biological group or, in other words, the assumption that caste groups are endogamous. For instance, reviewer Charles F. Bennett asks: "Should there not have been an assessment of the actual rigor of past and present endogamous behaviour?" (ibid.:116). In the same direction, US-based scholars Kenneth A. R. Kennedy and Mary M. Kennedy explain in their review:

> We feel that social groups are not necessarily valid entities for biological comparison. The problem is complex, since caste in India is socially definable on different levels […]. These various conceptions of caste unity, when applied, do not result in the recognition of identical populational groups. Before we can validly compare the social groups we refer to as "castes" further work needs to be done toward the establishment of a meaningful level of comparison. (ibid.:120)

This comment by the Kennedys also points at a key problem in the population genetics of India, as I will discuss in Chapter 5: defining the unit of analysis or what counts as a population in India. Interestingly, Karve's definition of caste as endogamous group has been taken up by a later generation of population geneticists rather uncritically to justify their classifications and operationalize sampling decisions (see Chapter 5), even though, as the Kennedys remark, such definition might be based on the flawed (or understudied) assumption. In their paper, Karve and Malhotra argue that their assumed hypothesis is right, namely: that different *jatis* of Brahmins in Maharashtra must have been endogamous for a long time and have different origins. Despite the many critical reviews that questioned this argument on multiple levels, Karve and Malhotra's hypothesis was wrapped up in a generalizing argument about the endogamy of all *jatis* in India and included in Karve's second edition of *Hindu Society* (Karve 1968a), a book that has been cited by key population geneticists working on India to justify their choice of *jatis* as units of analysis (see Chapter 5).

In a nutshell, Karve and Malhotra's 1968 paper and their reviews demonstrate signs of discursive instability regarding racial frameworks, which reflects international discussions within anthropology that would resonate more widely in the whole second half of the twentieth century, as I discuss in further detail in Chapter 5. Karve's effort to add other (considered-to-be) genetic variables to her anthropometric methods did not escape criticism by the reviewers. The critiques also pointed to the racial genealogy of some of methods used in the paper and at her genetic-biologizing assumptions regarding caste. In sum, the sharp criticisms tackled Karve's implicit and oversimplified associations between heredity and sociocultural factors—

a feature in Karve's work that is close to the racializing frameworks of the German physical tradition she was trained in.

In the following section, I continue to analyze how such discursive tension is perceptible in Karve's work and reflections. Particularly, I pay attention to her situatedness vis-à-vis the changing discursive and historical contexts to look at how she reflected on possible racist effects of her physical and biological anthropological approach, as well as her post-World War II ruminations about her rootedness in a German physical anthropological tradition.

2.4. Karve's later years and reflections about the past

How did Karve (re)position herself and her work on race and caste vis-à-vis changing scientific and political landscapes of the mid-twentieth century? In this section, I tackle this question while also interpreting her own family's experiences with racism as well as her past experiences as a student in Germany.

The topic of racism surely did not pass by situations lived by Karve's family when abroad. For instance, Karve's daughter Gauri, who as a teenager lived in California with her parents when both were visiting professors in Berkeley, recounts that she was advised by orientation counsellors to wear her so-called ethnic clothes because this would be a way for "dark-skinned foreign students" to avoid being mistaken by Mexicans and mistreated with the prejudice that this nationality often received in the US (G. Deshpande 1997:159). Gauri explains that following the advice clearly did not help, and her experience probably did not go unnoticed by the Karve couple, who had a hard time parenting her teenage daughter abroad (ibid.:159-160).

In turn, Irawati Karve's own reflections about her experiences in foreign countries are rather scarce in written record. Looking back at her Berlin years, Karve left two pieces of evidence regarding uneasy situations: one being a tragic confrontation with anti-Semitist violence, the other a personal experience as a foreign student/researcher being silenced by European professors and colleagues. The first was a story that Karve sometimes retold to her family members but never wrote about, yet it took narrational shape in Urmilla Deshpande's novelistic rendering, which I reproduce below:

Berlin, Weimar Republic, October 1929

"Student altercation ends in tragedy" in small print on an inside page of the newspaper was not surprising to anyone. The stock market took up the headlines, and the first several pages. Irawati sat staring at her landlady, wondering how to answer her. Her cup began to rattle on the saucer and she put it on the table. Finally she blurted, "Alright? How can I be alright?

After what has happened? What I saw? How can we sit here and eat cake and drink coffee as if—as if—nothing happened? My God, do you have no heart? He lived here for two whole years, Did he mean nothing to you?" She regretted it immediately. Before she could apologize, Gudrun spoke.

"Irawati, there is nothing more to talk about. Nichts. Nothing. Do you understand me?"

Irawati understood. She was shocked, but not surprised. Everyone had turned their eyes, and face from what had happened, and what was happening. They were not pretending, they were genuinely closing themselves off to it all, they were protecting their own hearts and minds, and perhaps, by doing so, their own skins. A Jewish boy had been murdered, thrown out of a window, and she knew, and everyone in the building knew it was no accident. But he would be forgotten, intentionally and carefully. She would have to remember him, all by herself. She thought the trauma of the incident would not allow her to, she thought her mind would fight to forget, but that day was clear to her. The chemistry of fear had somehow sharpened her smell and hearing, though the recollection of what she saw had a hallucinatory, dream quality to it. She supposed she was shell-shocked, like the beggar outside. That poor incomplete soldier, missing limbs, fingers, incomplete, inside and out. This poor country, so cornered, so hounded, what was to become of it. The despair was not on the periphery, not at the edges of the eye, it was right there, you had to turn away from it, to hide it from your sight. No, she had not forgotten that day, not at all. It was only two days ago, but not in two decades would she forget.

The wood banister had slid under Irawati's palm as if it was moving rather than she, slipping backward into the past, the past that she would long for after that day, she would wish for the thing that happened to go back into un-happening. She knew, before she began that hurried descent down the stairs, she knew, as floor after floor was left high behind her, as she neared the shock, the sadness, the fear, the blood and death that would confront her, she knew that if she went there, she would be forever changed. She knew, but it was already too late, it is always too late. Arjun knew it, before Krishna told him, it was too late. We go where we have already been, again and again, a snake eating its tail, time in the universe, we, small, helpless, swallowed and spat out, swallowed and spat out, feeling everything, incapable of changing the beginning, the end, the middle. All we can do is feel it, and she soon would.

Irawati had come crashing out of the building, and not expecting the crowd to be so close to the entrance, and unable to stop herself, had run into the man standing by the body. He almost fell, and recovered himself, and let her get to the front to look. Someone had already covered him in a sheet. Green vines trailed over the mounds and valleys of his ever unmoving body, a row of neat stitches on an old rip in the fabric ran over the knuckles of his right hand. Irawati looked up, to the building, to the window he had fallen from. The window they had thrown him from. Her eyes, blurred by shock and confused by the urgent deafening beat of her horrified heart, could not focus, and all she saw was indistinct white faces turned to her. She had shivered and drawn her shawl tight around herself, and still looking up, imagined they knew who and what she was. She looked down then, at the sheet fluttering at the edges of his remains, and sticking in the viscosity of his life-juices, and tried to think of something else that remained of him, something more precious, that he had left behind in her memory. Her mind wouldn't go back, to the laughter, to the moments they had had together, it was stuck, here on the pavement.

But then, there it was. The morning before. They had passed on the stairs. He was in a hurry. But perhaps he knew then, what was to come, and that it was too late anyway. Perhaps he knew, and had left that behind with her: his smile.

(U. Deshpande, forthcoming)

The marking incident of the Jewish young man who fell from a widow to his death took place in a university building in Berlin, as Karve's family members remember from the story that she—after 1945, probably in comment to the Holocaust—told them.[85]

Karve's own written reflections about her time as student in Germany are condensed in one single footnote, which is short but very telling. The footnote is inserted in a chapter, added to the second edition of her book *Hindu Society* (1968a), that explores a comparison between caste and Western societies' social differentiations. The footnote is placed after a sentence in which Karve mentions that two male anthropologists, one European (Louis Dumont) and another North American (Gerald Berreman), had recently written comparisons between caste and other hierarchical structures in other societies. Written 40 years after the experience it narrates, the footnote transmits a long memory of a marking frustration and resignation about being silenced in academia:

> The author [Irawati Karve] remembers vividly how Germans and Englishmen refused to see any comparison between the institutions of the primitive people and their own institutions. Every time the author, then a student or a much younger teacher, suggested such a comparison it was brushed aside. After this experience one learnt to keep one's thoughts to oneself. (Karve 1968a:179n4)

Karve's comment addresses the resistance of European scholars against the relativization of an anthropologically constructed otherness—here expressed in the category "primitive". When she says she was "a student or a much younger teacher", she stresses the (young) student versus (older) professor hierarchy, but underlying in the comment is her gender and non-European origin—in contrast to "the Germans and English*men*" who "refused to see any comparison" suggested by her (emphasis mine).

Furthermore, the footnote's reference to Karve's time as a student in Germany—and her long-remembered uneasiness with the situation of being "brushed aside"—alludes to her doctoral research under Eugen Fischer. As much as her reflection offers an insight about her standpoint—as a young Indian woman and student, who, at least initially, dared to speak up in class—, one can then speculate about how her differentiated standpoint might in that moment and site in Berlin have contributed to her critical research results. In this sense, it might indeed not be a coincidence that she was both the only woman of color in the research staff of the

[85] Interview with Jai Nimbkar, Phaltan, 15 Sept 2017.

KWI-A and the only researcher who encountered a finding that negated a racist hypothesis, a hypothesis which had been assigned to her by Eugen Fischer.

Moreover, although none of Karve's writings addresses the direct connections between German racial anthropology and Nazi policy, based on other clues we can understand that, by the end of her life, her position towards her intellectual rootedness in Germany was at best ambiguous. On the one hand, her proximity to the KWI-A can be grasped on a personal level. In the 1950s—decades after her doctoral studies—she was still fondly remembered by KWI-A directors as a close student and colleague: She was mentioned in two letters by Fischer to Verschuer as a member of their "circle" of researchers at the KWI-A who should be part of an invitation list for a party that would commemorate the KWI-A's opening anniversary (Fischer 1952a, 1952b, 1952c). Verschuer planned this party to coincide with Fischer's 80th birthday in 1954 and Karve sent Fischer cordial birthday greetings then (Karve 1954b). Five years later, in the occasion of Fischer's 85th birthday, she sent Verschuer a short anecdote about Fischer (which should compose a collection of birthday messages to him) in which she praised him with the sentence: "He was scientific in his teaching, exacting but kind as a guide and always had a deep humanity" (Karve 1959b). She also recommended her son Anand, when he was studying in Germany in the late 1950s, to pay home visits to Fischer and Verschuer.[86] On the other hand, she never attended that KWI-A-nostalgic party and, in fact, according to her family, she nurtured some resentment vis-à-vis Germany due to its Nazi crimes: She felt upset by her former Berlin host family's resigned apathy regarding Hitler's ascension and decided to never go back to Berlin.[87] Verschuer also wrote letters to Karve on the occasion of trips of his friends to India, but she did not meet them (Verschuer 1965); a reencounter between the two seems to have never taken place. Perhaps the only written record of Karve's views on the Nazi genocide is in her personal essay *All that is you* (1992), in which, although she does not refer to racial

[86] In Germany, Anand also met the "Gypsiologist" and KWI-A alumnus Adolf Würth (1905–1997), who reacted with joyful surprise when he found out that Anand was Irawati's son—the two possibly met in Berlin (Würth started to work for Fischer in 1931). In his studies in Germany, Anand had classes with racial anthropologist and anti-Sinti and Roma eugenicist Sophie Erhardt (1902–1990). Through Anand's contact, Erhardt got in touch with Karve and went on a research trip to Pune; but upon returning to Germany, Erhardt told Anand that Karve had "very strong opinions" and reported having had arguments or misunderstandings with his mother (Interview with Anand Karve, Pune, 16 Feb 2019). Although I cannot reconstruct such misunderstandings, it is possible that they happened due to Erhardt's close affinity with Nazi eugenics, which would also demonstrate Karve's critical stance. In the post-World War II, both Würth and Erhardt were accused of being complicit in the assassination of Roma and Sinti people, but the court proceedings against them were dropped (Strauß 1998).

[87] Karve only went to Germany on her way to a guest research stay in the UK, when she visited a family friend of hers and her husband's in Leipzig (Interview with Jai Nimbkar, Phaltan, 15 Sept 2017) and she might have visited Germany again with her husband and daughter Gauri on their way to Berkeley in 1959, but then, too, they did not plan to stop in Berlin (D. Karve 1959).

anthropology or the KWI-A, she does narrate her sorrowful philosophical confrontation with her feelings during the Eichmann trial (see also Chapter 8).

Another clue, however, can be telling about Karve's contact to critical assessments of racial science and Nazism: She possessed the book *Die Rassenlehre des Nationalsozialismus in Wissenschaft und Propaganda* (The racial doctrine of National Socialism in science and propaganda) by Karl Saller (1961), a German physical anthropologist who was close to Rudolf Martin but disagreed with the racial-genetic turn set in motion by Fischer's *Anthropobiologie*. Saller's book criticizes the Nazi support, and application, of racial anthropology and eugenics.[88]

Overall, while these scant personal clues can be seen as signs of Karve's confrontation with the implications of racial theories in Nazi politics, they cannot offer us a clear conclusion over Karve's position vis-à-vis the KWI-A in a post-World War II scenario. They cannot be taken as a turn against, or away, the use of racial frameworks either. As Reardon (2005) explains, the post-World War II scientific reassessment of race only condemned *certain* racial theories (namely those which were closely associated with Nazism), while many other racial theories and frameworks continued to be further used or adapted, often in ambivalent ways. In this sense, just like Saller wrote the 1961 Nazi-critical book that Karve had in her bookshelf, he also coauthored the new editions of his professor Rudolf Martin's racial physical anthropological textbook *Lehrbuch der Anthropologie* after Martin's passing (e.g., Martin and Saller 1966). In other words, despite, post-1945, having become critical of *some* racial theories that he associated with Nazism, Saller continued to prescribe the use of anthropometry for the study of racial markers in the physical anthropological tradition of Martin, carrying the German-Swiss anthropologist's legacy.

Similarly, Martin's wife, Stephanie Oppenheim—a Jewish survivor of the Theresienstadt concentration camp—also re-published her late husband's canonical racial textbook in the 1960s (see Morris-Reich 2013). While I cannot access Oppenheim's takes on her deceased husband's work, both her and, especially, Saller's proximity to Martin's anthropometry-based and racial taxonomical physical anthropological work in a post-World War II context suggests that these historical actors did not perceive a connection between the racial frameworks implied in Martin's oeuvre and the racist politics that reached an apex in Nazi Germany. If a Jewish

[88] The book is in Karve's bookshelf—today part of the Deccan College library—and contains a handwritten dedication to her saying "With my very best wishes for 1962!" by someone who signed as "D. Ilse".

concentration camp survivor re-publishing a major textbook about anthropometry-based racial anthropology sounds like tragic irony, this contradiction can only be easily perceived from the historical vantage point of today. While the self-distancing narrative of "the Nazi misuse of science" might also have played a role here—as it did after the war in defensive declarations by most KWI-A directors, including those who actively participated in Nazi eugenics policy implementation like Fischer and Fritz Lenz (Barbosa et al. 2016; Barbosa et al. 2018)—, what I want to highlight at this point is that the self-assurance with which Saller and many other anthropologists had as they continued to work with anthropometry and racial approaches is a sign of how the conceptual and taxonomic frame of race was not seen in connection to its far-reaching racist political consequences. In fact, Martin, too, highlighted in his publications that his goal was strictly methodological—and did not imply racial theoretical elaborations (Martin 1914, 1925, 1929), even though there are several hierarchical racial connotations in the classifications deployed in Martin's (and Saller's) famous textbook (see Morris-Reich 2013). In sum, this attempted purifying separation not only between method and theory but also between science and politics has played a role in the persistence of anthropometry (see Chapter 4). As a result, these scholars' racial framework was only insufficiently questioned by them—when it was questioned.

In this sense, it is not surprising that, while having become critical of the racial hygienist and genocidal politics of Nazi Germany as well as of *some* racial theories, Karve continued to articulate certain racial frameworks and use racial methods. For instance, Karve rejected the theory of racial—biological and hereditary—determinants of criminal behavior that once prevailed in Germany and other European settings (Karve 1992; see also Sekula 1986), but, as this chapter has shown, she continued to use anthropometry for the establishment of racial differences between castes and ethnicities. Unpacking the nuances of this pool of racial theories and methods in its historical complexity is key to understanding the adaptability, resilience, as well as the continual ambiguity of racial frameworks.

Notwithstanding, some clear signs of Karve's shifting perception regarding racist implications of racial theories can be seen in the changes of her discursive articulations and pedagogic tools. In her teaching, she incorporated the 1951 UNESCO publication on race as a basic reading to discuss race and racism with students (Sundar 2008:383). By the 1960s, Karve's take on religious diversity clearly gravitated towards values of tolerance and cultural relativism, in line with the slogan of "unity in diversity" that strongly echoed within India's first post-colonial decades under prime-minister Nehru's government (1947–1964). In her book *Hindu Society*,

for example, Karve (1961a) comments the "the Hindu-Muslim quarrel" in a way that starkly contrasts to her 1947 anti-Muslim text. First, she states that "[t]he main sociological problem in the political, cultural and economic fields today is that of making room for manyness while not jeopardising the oneness" (Karve 1961a:132). Then, she argues that no group can "claim to have more right to be called Indian than another group. The Muslims have contributed to what we call our culture and civilization" (ibid.:155). A similar and emblematic example is her 1963 lecture *Racial factor in India*, which she concluded with a praise of inclusive multiculturality:

> Our history shows in every century new people have come and made India their home. […]. It is a fascinating subject for study to try to find out what we are—Indians as a whole, but it is entirely wrong to imagine ancestries and base claims on territories as somehow one's own. All those who are in India today, who feel it is their homeland are Indians. […]. The society we want to build is not a Hindu society or a Hindi society but a multi-cultural, multilingual society which has knowledge of one another's culture and has decided to live and work together in comradeship (Karve 1963:9).

In this sense, in the last decade of her life Karve discursively strives to accommodate Muslims in her racial conceptualizations of "Indians" and to emphasize that whatever racial and cultural differences articulated in her scientific framework should not give leverage to exclusions in terms of national belonging. She praises the multiplicity of Indian society and argues one should accommodate such multiculturality in the fostering of a sense of national unity.[89]

Furthermore, while, as we have seen, her 1968 paper with Malhotra completely omitted the terms "race" and "racial", a more explicit sign of concern regarding racial frameworks can be seen in her last extensive anthropological book, *Maharashtra, land and its people* (1968b). The book's long chapter on anthropometric physical anthropology is opened with the statement that "[a] racial analysis does not involve any kind of presumption about values", followed by an explanation that head-size does not correlate with mental ability (Karve 1968b:9). Following physical anthropology's international shift of interest by that time from static taxonomizing towards questions of evolutionary adaptation (Brooks 1998; Mikels-Carrasco 2012), she contends that "all people have proved their biological worth by surviving up to the present in this world. They are all able to do various functions efficiently and so in the description and

[89] In the concluding paragraph of *Hindu Society*, Karve (1961a) praises how multiplicity in Indian society grants different ways of realizing ethical values and argues for finding a way of national unity that can be concomitant to communal membership. Commenting on the tension between group subjectivity and national unity, she writes: "In the attempt to build a new sense of unity, group-life is viewed with suspicion, but smaller groups are necessary for people for the immediate warmth of fellowship. […]. Would it not be better to ask ourselves the difficult question of how to foster a feeling of unity without unnecessarily suppressing the multiplicity?" (ibid.:166)

analysis that follows, no people need to feel that they are discriminated against" (Karve 1968b:9). Here, Karve links the question of biological variation to an evolutionary framework, while stressing that the evocation of such physical differences should not be hierarchically valued.

Nonetheless, Karve (1968b) still confers a great deal of interest to the examination of racial anthropometric factors in *Maharashtra, land and its people*—the book that is her broadest publication on Maharashtra—, again with special attention to skin color and head and facial shapes, without an expressed interest on the questions of adaptation and evolution. In this sense, in this and other texts written in the last decade of her life, she seems to recognize that the use of a racial comparative approach might lead to racial discrimination even though, at the same time, she continues to rely on such approaches even if just for the sake of taxonomizing human variation. Therein we can perceive a tension between using a racial framework and being concerned about its possible racist effects, or, on another level, between using classificatory frameworks and worrying about negative sociopolitical implications of such classifications. As I will discuss throughout this thesis, such tension persists within anthropology, leading, in India, to crucial debates on the anthropology of caste.

Thus, while Karve has demonstrated some rhetorical engagement with a critique of race-ism and its theories, she continued to use the same instruments, methods, and approaches that are centrally attached to racial frameworks. This mismatch between discourse and practice—and between theory and method—is a sign of both the beginning of a slow-paced discursive change and Karve's willingness to catch up with such changes at the same time as the methodological instrumentation has not changed. Hence, Karve's rootedness to an internationally acknowledged tradition of racial anthropology with its center in Germany and rooted in German coloniality, as well as the ideational continuity alive in the durable material objects (instruments and books) she worked with, halted her—and many other fellow anthropologists—from synchronizing their discursive and theoretical anti-racist stance with their research practices.

2.5. Final remarks

This chapter has explored how and with what effects anthropologist Irawati Karve employed and adapted racial anthropological approaches to study human diversity in India. In terms of her intellectual formation, we have seen that in her BA and MA studies in India she was exposed to different disciplines, from Sanskrit philology and philosophy to sociology and

anthropology, all of them leaving their mark in her MA research, which comprised an interdisciplinary study of her own caste group, the Chitpavan Brahmins. In her MA thesis, Karve also devoted a chapter to the observation of the variation of a hereditary physical marker, namely eye-color, in the fashion of the physical anthropological interest on human variation. Further, Karve's skills in physical anthropology were further developed during her PhD in Berlin, where she was taught in the anthropometric, racial anthropological tradition of the KWI-A. Her affinity with racial frameworks was marked by her training in this German school of racial anthropology and eugenics, where race was commonly conceptualized as a physical-biologically and *geistig* (spiritual, cognitive, intellectual, and cultural) hereditary force. Although Karve had a differentiated stance on some racial theories—as her doctoral thesis' unexpected conclusion exemplifies—, and even though her understanding of race, as well as of the biology–culture nexus, might have changed throughout the five decades of her working life, her further research in India continued to articulate racial frameworks to grasp human variation and diversity.

This chapter also brought to the fore the political situatedness of Karve's training and intellectual practices as well as their further political outcomes. We have seen that, while the KWI-A was tightly entangled—materially, personally, and discursively—with German colonialism and later National Socialism, this Berlin school of thought was also embedded in an international network of physical anthropology in and beyond colonial routes. Embedded in a discourse of anxieties concerning racial degeneration, the set of racial ideas developed in Germany using human data and human remains plundered in colonial territories placed emphasis on conceptualizations of human difference that put forward essentializations and hierarchizations with crucial—and tragic—political consequences, as Nazi policies of racial hygiene clearly demonstrated. Racializing notions about human difference then found fertile ground especially there where the political setting reinforced them and vice-versa, in a co-productive dynamic of "swirling interaction of ideas, beliefs, and practices" (Harries 2007:3). Such colonially rooted racial knowledge was carried further, outliving colonial rule itself, also due to the work and legacy of anthropologists active both in colonial and post-colonial times. While racializing articulations on human difference had started to become commonplace in the colonial anthropology of India, Karve, along with other Indian contemporaries who were trained in Germany—like her KWI-A peer Biswas—, gave a new racializing impulse to anthropology in post-colonial India.

Similar to Biswas', Karve's use of racial approaches granted her, especially between the 1920s and 1950s, international validation and scientific legitimacy, and then national recognition, making her one of India's most famous anthropologists—even though her continuous use of anthropometric methods would also lead to sharp criticism by the international anthropological community in the late 1960s. Anyhow, both Karve and Biswas came to occupy key positions in anthropology departments in India's topnotch educational and research institutions; both KWI-A trained anthropologists marked a generation in India's post-colonial anthropology and left an indelible legacy in the discipline in the country.

As we have analyzed the political, discursive, and technological continuities and changes that marked anthropology in the time Karve was scientifically active (1920s–1970), we have looked through the prism of Karve's biography and work to think about an anthropologist's personal positioning vis-à-vis changing impulses in relation to racial and other anthropological classificatory practices. My analysis of Karve's situatedness has shown that her scientific imagination was not only attuned to the heated political debates of that time in India (from partition to state formations), but it is also a result of her social and political positionalities. These can be marked by different factors with situatedly varying degrees of relevance and impact. We have considered, for instance, her elite, uppermost-caste positioning (as a Chitpavan Brahmin), her rootedness to Hinduism, her Pune location, her language group (Marathi) subjectivity—all of which played a role in her work on Maharashtra as well as in her anti-Muslim racist utterings. We have also considered how her non-European, Indian origin might have been significant to her scientific conclusions in Berlin that nullified a hypothesis of correlation between race and skull shape.[90] Thus, the biographical attention taken here has enabled us to consider how such personal and political elements that compose a scientist's situatedness plays a role—in varying degrees—in the relational practices of making and articulating knowledge about human difference.

Furthermore, we have seen that, towards the end of her life, Karve often evoked a multiculturalist stance and emphasized her anti-racist views. Mirroring an international critique of racism and a national appraisal of "unity in diversity", this tolerant and inclusive stance

[90] Moreover, Karve's gender position, besides contributing to her pioneering sociological attention to gender inequalities (see footnote 81 above), might also have been relevant to her conclusion against the hypothesis of the correlation between skull shape and race, since craniometric theories often presumed an analogy between "inferior races" and women (Stepan 1986).

greatly contrasts with her openly anti-Muslim racist utterance in the 1940s, as her following statement in 1963 exemplifies:

> Race, religion, caste all lead to mutual prejudice which in the modern setting can be translated into race-jingoism but I emphasise again: we [Indians] are all thorough mongrels who have been thrown together and must learn to lessen our prejudices and live together. (Karve 1963:10)

However, acknowledging racial classifications' risk of triggering prejudice, as she did in the 1960s (see also Karve 1968b), did not impede Karve from writing in a racially essentializing manner about ethnicity, religion, and caste. This continuation, I argue, was propelled by Karve's rootedness in this German tradition of racial anthropology and by the material resilience of the scientific objects—books and instruments—that, as they sustained still (even if decreasingly) internationally acknowledged racial theories and methods, continued to shape Karve's research practices. Contrary to what a historiography of race in science has suggested, a post-racial impulse in science only accompanied *some* ramifications of the growing critique of scientific racism in the post-World War II (Reardon 2005); in this sense, the rejection of racial frameworks was never fully accomplished in physical and biological anthropology as in many other sciences that study humans, on the contrary: racial frameworks still occupied a central stage in some traditions of disciplines that study human differences for a long time throughout the 20th century.

Therefore, Karve's rhetoric re-alignment to anti-racist discursive shifts—visible in her outspoken worry about negative impacts of racial anthropological classifications—only partially impacted her research practices. This halted, incomplete alignment between discourse and practice also stems from her adherence to racial scientific theories and, principally, methods and their instrumentation that were to a large extent internationally acknowledged, even if to decreasing degrees in the last years of her life. Although Karve did adapt her arguments and erase "race" from her last physical/biological anthropological paper (Karve et al. 1968), the early twentieth century's Berlin school's racial anthropological ideas are solidly inscribed in objects like books and instruments that she, among many other anthropologists around the globe, researched with. In these objects lies the potentiality of what they were designed to do, namely: to enact physical markers that composed understandings of race. These technological devices and material containers of knowledge played a key role in the situatedly relational practices of making scientific knowledge about human differences, informing research questions, assumptions, hypotheses, methods, and outcomes. Today, as we will see in a following chapter (Chapter 4), these books and instruments are still being used in the Pune

anthropology departments that carry on Karve's legacy, maintaining on-going tensions around the role of race in understanding human diversity.

In sum, my close reading of the racial anthropological articulations in this chapter has illuminated how historical, sociocultural, biological, and anthropometric data are situatedly enacted, mobilized, and rhetorically woven in Karve's scientific practices. We have analyzed the particularities of the approaches involving racial frameworks used by Karve in four sets of analyzed texts in the Sections 2.3.2, 2.3.3, 2.3.4, and 2.3.5.: the first relying strongly on anthropometrically manufactured data to enact and analyze "the people of Maharashtra"; the second on historical and cultural arguments to elaborate an anti-Muslim racist-nationalistic argument; the third centered around social and cultural anthropological approaches to understand the "caste society" but combined with racial observations; and the last relied on anthropometric and other physical markers to confirm the hypothesis that caste groups (*jatis*) have different ancestral origins and have been endogamous. The stark contrast between these approaches demonstrates the malleability of race (Balkenhol and Schramm 2019). As Stoler (1997:200) puts it, racisms have managed to, in different contexts, "wrap themselves around heated issues" and "descend upon political pulse points", and this is precisely because of the adaptable ways in which race has been enacted in relation to biological, behaviorist, historical, and cultural elements that situatedly make up perceptions of human difference.

In terms of their political implications, we have seen that Karve's racial frameworks were a direct intervention into key "heated issues" in India. Through her work, Karve directly intervened in debates regarding questions of belonging in the light of both India's and Maharashtra's nationalistic projects. Through racialized depictions of Indians and Maharashtrians she fostered particular imaginations of both India and Maharashtra, articulating Indian and Maharashtrian identities based on racial, physical and cultural, markers. Her books about the region that would become the state of Maharashtra enacted anthropometric and other data that put forward a distinct racial image of Maharashtra's social fabric, with special praise of the Marathas, a group that had been situatedly associated with a history—and a future project—of regional and national, Hindu and anti-Muslim, political sovereignty. Moreover, her 1947 essay on Muslims in India relied not on anthropometric data but on the mobilization of behaviorist and historical arguments to construct South Asian Muslims as a racially inferior and dangerous Other, as a racial and genetic group that was at odds with the cultural integrity of the new Hindu nation. Alongside other Indian intellectuals (see Jaffrelot 1995), Karve's rearticulations of transnational racial understandings to nationalistic projects in India

contributed to add a racial impetus to the political discourses amidst India's decolonization. In this way, Karve's racial interpretations of Indianness and Maharashtrianness in these works corroborated with casteist, anti-Muslim racist, and Hindu supremacist sentiments, which have had a long life (or several lives) in India's political worlds before and after her.

More broadly, an implication of Karve's work has to do with the understanding of human difference in India. As we have seen, moved by a racial and physical anthropological preoccupation with the question of heredity, Karve conceptualized caste (*jati*) and tribe as endogamous groups and, based on this characteristic, as the primary units of analysis of biological anthropological and genetic research. More generally, Karve's enactment of "the racial" in castes, tribes, and religious groups, and use of these categories, especially the first (caste), as the basic unit to understand diversity and explain society in India, has the impact of cementing such differences in a racially essentializing manner. Although Karve, especially in the last decades of her life, might have had more nuanced, perhaps even critical, understandings about race, the effects of her use of anthropometric and other racial methods to grasp and order human variation in India have taken root, beyond her personal intentions.[91] In sum, as we will explore in the following chapters, her work contributed to a racialization of caste, ethnic, and religious—besides national and regional—belonging in India, leaving an impact and legacy that corroborates with an biologically essentialized (anthropometrically reified) understanding of diversity in India along static boundary demarcations of caste. This legacy animates key tensions in anthropology in India today, as the following chapter (Chapter 3) will discuss.

[91] On the mismatch between scientists' nuanced understandings of social dynamics and the effects of their use of flattening functionalistic approaches, see Braun and Hammonds (2012:82).

Chapter 3. Remembering Karve: Memory politics and anthropology at the crossroads of caste and anti-casteism

3.1. Introduction

Through her writings and public anthropologist persona, Irawati Karve left a present and visible mark in Indian anthropology, especially in Pune. Her work has been cited widely, her texts are present in anthropology and sociology syllabi across India, an anthropology museum is named after her, and she has been commemorated nationally and locally, especially in the two institutions where she worked in Pune: Deccan College and Pune University. However, during my ethnography in Pune it quickly came into my attention that the memory of Karve is not only controversial, but it also animates key tensions around human difference that are at the core of Indian anthropology. In this chapter, I ask: How is the figure of Karve present in Pune today? How is she and her work remembered and how does this remembrance connect to current discussions about human difference categories, especially caste, within Indian anthropology? And how does it relate to wider political tensions that emerge due to caste? How does it relate to political discussions about caste and anti-casteism in India?

As I will show in the upcoming three sections of this chapter, the frictions triggered by the memory of Karve take place along three overlapping axes of tension, all of which revolve around the same core: caste—and different takes on how anthropology should deal with this category of difference called caste. Section 3.2. discusses the first axe of tension, which relates to an interpretation of Karve's own caste positionality and her anthropological frameworks to study human difference in India, especially caste and ethnicity. I analyze the different ways Karve is remembered in Pune, with special attention to controversies that took shape regarding references to Karve in the Irawati Karve Museum of Anthropology and in the office of the head of Pune University's anthropology department. Given that Karve was a Chitpavan Brahmin, the memory of her is connected in some cases to this upper-caste group, which feeds crucial tensions around the politics of caste positionality and diversity that mark conflictive institutional environments in Pune. More importantly, the controversies regarding the institutional remembrance of Karve in an anthropology department also relates to a critical positioning vis-à-vis the structural-functionalist and racial accents that marked her production of knowledge on human difference in India. This becomes clear in the analysis of the following tension. This second and interrelated tension (Section 3.3) emerges from the poles that overlap

with the commemoration of, besides Karve, another intellectual of her time: Bhimrao Ramji Ambedkar (1891–1956), a key historical figure in Indian national politics and an icon for Dalit and anti-casteist mobilizations. The commemoration of this Maharashtrian Dalit and anti-casteist idol is pitched to counterpoint the commemoration of the Maharashtrian Brahmin sociologist-anthropologist, both figures occupying the center stage of celebratory rituals in anthropology spaces in Pune. While Ambedkar's intellectual approach to caste was vocal about the inequity and injustice of the caste system, Karve was relatively silent about caste-based social inequalities. Instead, Karve's anthropology of human diversity in India enacted physical-biological differences of caste and ethnic groups and shed light on the structure and functionalities of caste differentiations, emphasizing how caste—as a kinship organization system—led to societal and national cohesion. I discuss this in Section 3.3 starting with an ethnographic account of a celebration scene—a ritual of commemoration of Ambedkar at Pune University—and I show how this political icon is remembered in articulation with anthropological anti-casteist frameworks. Lastly (Section 3.4), these tensions interrelate and overlap with a crucial quandary in Indian anthropology: how to study caste and, at the same time, engage with anti-casteism. Such tension relates to a core predicament in anthropological epistemology, one that relates to Schramm and Beaudevin's (2019:277) image of the elephant in the room of anthropological epistemology (see Chapter 1), and which can be translated in the dilemmic question: how do we intellectually engage with categories of difference and human classifications while working against their objectification and its ensuing (negative) side-effects? Section 3.4 discusses this question against the backdrop of the politics of caste and anti-caste(ism) in relation to anthropological frameworks of difference and inequality.

This chapter explores these tensions by bringing to the fore ethnographic accounts of these practices of remembrance, including their material and discursive form, as well as conversations and interviews with different actors participating in these practices, including anthropology lecturers, students, and museum curator. By discussing these tensions, I aim to think further about how anthropology relates to key problems in the production of knowledge about human difference, and how it could be otherwise. In concluding the chapter, I reassess how these debates about the present and future of caste relate to anthropology's past and how this relates to Karve's remembrance.

3.2. Remembering Karve

Karve has been remembered and memorialized in various anthropological spaces and public events in her hometown Pune. She is often mentioned in academic events celebrating Women's Day and regularly commemorated on her birthday at both Pune University and Deccan College. In 2007 the Deccan College organized the "Professor Irawati Karve's Birth Centenary Seminar" (Walimbe, Jogleklar, and Basa 2007), with presentations about her life and legacy by anthropologists, archaeologists, historians, and population geneticists including leading scientists Partha Majumder and Kuramasamy Thangaraj (see Chapter 5). I also observed her commemoration in the 2019 Indian Anthropology Congress: the congress closed with the "Irawati Karve memorial lecture", which revered Karve's legacy and took place in a stage setting that encompassed a large portrait of Karve adorned with marigold garlands (see Chapter 1). Karve's name features in a list of doctoral alumni printed on large plaques hanging on the wall of the staircase leading to the Pune University's anthropology department: the list displays the students' names and titles of the doctoral projects that she supervised. She is also featured in the syllabi of anthropology and sociology courses: The Anthropology MSc curriculum of Pune University contains at least one class about her in the obligatory first-year course "Indian Anthropologists"; her books *Kinship Organization of India* (1953, 1965) and *Hindu Society: An Interpretation* (1961a, 1968a) are listed as mandatory readings—the latter was also read by archaeology students in the Deccan College. Her *Yuganta: The End of an Epoch* (2017[1969]) is read by students in various programs in the humanities and social sciences. The memory of Karve, then, is kept alive in the intellectual space of Pune through varied engagements with her work.

The celebration of Karve has most clearly materialized, and been made permanent, in the Irawati Karve Museum of Anthropology at Pune University. Opened in the 1980s, the anthropology department's museum was renamed after Karve following the suggestion of her former student Mutaktar (by then head of the department) and vote in a faculty members' meeting. The rebranding ceremony on December 15th (Karve's birthday) 1993 was marked by the opening of a temporary exhibition about Karve's work and life.[92] Later, a permanent piece on Karve was added to the museum: A two-meter tall, four-sided wood and glass cabinet containing objects, pictures, and texts related to Karve which stands in the middle of the first

[92] The event was visited by guests like former students and family members and was covered by local and national media (Bokhare 2014).

room of the Museum. The side of the cabinet facing the museum's entrance contains a poster-sized portrait of Irawati Karve, which is right above the display of a Rudolf Martin anthropometer that Karve brought with her from Germany. The exhibition cabinet displays several other pictures of her, a few of her poems in Marathi, and small texts on her work and life. It contains samples of her books *Hindu Society* and *Yuganta*, other small essay books in Marathi language, a poem in Gujarati language, and a xerox copy of her published PhD thesis (1931b).

The Irawati Karve Museum of Anthropology receives occasional media attention (e.g., Bari 2019) and many visitors—thousand per year as estimated by the department. While I was frequenting the building, the Museum often received school excursions (with children from 8 years old), conference attendees, and visitors to the university itself. A few times department staff took guest scholars (including me) for a museum tour, and every day anthropology students have to pass through the long museum hall to get to one of the main seminar rooms. Students were trained to guide school excursions through the museum, for instance on the popular open campus event "Science Day". While visitors' curiosity was often directed to the many tools and artefacts from different social groups in India or to the bones of humans and other primates in the evolution section, the Irawati Karve cabinet always drew comment during the guided tours.

Figure 11: Irawati Karve cabinet containing, on this side, a biographical text, her portrait, a picture of the Irrawaddy River, and a Martin anthropometer in the Irawati Karve Museum of Anthropology, Pune. Photo taken by me.

Figure 12: Gathering of visitors guided by an anthropology student (blue t-shirt) around the Irawati Karve cabinet in the Irawati Karve Museum of Anthropology, Pune. Photo taken by me.

At the same time, the commemoration of Karve triggers tensions regarding caste and anthropology. The Irawati Karve Museum of Anthropology presents a nodal point of crystallization of the tensions ensuing from different perspectives on Karve's work and persona—the latter often read through caste positionality lenses. As the former museum curator explained in interviews with me,[93] the development of the museum has depended heavily on the department headship's disposition concerning not only the role of ethnological museology but also, especially since the rebranding, their relation to Karve's figure. According to him, the Karve-relatedness factor became clear after he decided to install the permanent exhibition about Irawati in 2010: from the inauguration of this permanent exhibition on, the cleaning of the museum premises was stopped, and the department headship largely ignored the museum's maintenance. The curator had to secure funds for a cleaning staff and for other infrastructural requirements through directly addressing the university administration (Bokhare 2014:107). Ten days after his retirement, the curator got to know that the anthropology department had dismantled the entrance exhibit of the museum, which was composed of the museum's (new) name in big silver letters, Karve's portrait, and a small installation containing a representation

[93] Interview with Narendra Bokhare, Pune, 25 Mar 2019.

of her physical anthropological work including a human skull. The whole glass wall with this installation was taken down and its objects put away. When I first visited the museum in 2017, the museum was undergoing restoration and the anthropology department was under new headship. The new head ordered that the original entrance installation be reinstalled as before. When I asked the curator why the former department head had ordered that entrance piece dismantled, he simply pointed to the professor's Dalit and Buddhist positionality. In his response, the curator also articulated a critique of caste-based affirmative action and asked me "You know the caste politics in India, right?", before adding pejorative comments to that professor's caste group's political mobilization. Thus, the museum curator dismissed any validity of an intellectual criticism of Karve or of the memory politics around her in that anthropology department. For him—a member of a relatively upper caste group—, the politics of caste positionality was enough reason for the professors' decisions regarding the visibility of Karve in the anthropology museum.[94]

Figure 13: Entrance wall (rebuilt in 2017) of the Irawati Karve Museum of Anthropology, Pune.

[94] Interview with Narendra Bokhare, Pune, 25 Mar 2019.

This museum entrance-reshaping controversy adds up to a previous episode of anxiety involving the commemoration of Karve in the anthropology department: On the occasion of the museum's rebranding in 1993, the museum curator also put up a portrait of Karve on the wall behind the department head's desk, with the authorization and sympathy of the head of department then; but a new department head who took the office many years later decided to take the portrait down on the grounds that the department should not be "worshipping only one person".[95] Again, that decision has been criticized and interpreted as politically motivated due to that professor's caste positionality, which was exacerbated by the allegation that the same professor used to keep an Ambedkar portrait in their office.[96]

Hence, as both these controversies show, the discussions around the shape and extent of the remembrance of Karve is ingrained in caste politics. Thereby, Karve's caste positionality and the readings of the caste positions of the anthropology professors involved in these controversies play an important role. In this sense, the memory politics around Karve's figure takes place on a ground of anxious institutional politics that is percolated by tensions concerning politics of difference.

Beyond the anthropology department, caste politics has been a major topic of conflict at the Pune University more generally. According to Donald Kurtz's (2009) historical and ethnographic institutional study, caste has been "the primary cause of the history of conflict in the Pune University." Kurtz acknowledges that "in modern institutions caste becomes augmented with class interests, alliances, patronage, institutional affiliations, and other factors"; therefore, "caste divisions involved in [university's] politics are not clear cut. They never are." But, in sum, the competition for university posts and other government positions has been fueled by rival caste sentiments that pervade the political history of Maharashtra. The top-down establishment of Pune University in 1924 shook the power dynamics in the region's institutional educational landscape, with conflicts emerging along the lines of caste. This was so because this new university should work through affiliations with both rural colleges and city colleges and each kind of college was run by a different caste group: most rural colleges were run by Maratha groups whereas city colleges in Pune had been led by a demographically small Pune Brahmin elite, almost exclusively Chitpavan Brahmins who "were firmly in control

[95] Interview with Shantanu Ozarkar, Pune, 27 Mar 2019.
[96] Ibid.

of the region's cultural, educational, political, and religious institutions" (Kurtz 2009:38).[97] As a result, disputes between caste groups have continued to influence politics at the Pune University.

In this scenario, the memory of Karve may be affectively colored by opinions conjured by her caste positionality, opinions which may vary relationally according to the interlocutor's caste position. Her caste affiliation as a Chitpavan Brahmin is well-known and has also been conjured in remembering her work and persona. This evocation of a scientist's caste positionality is not so unusual in studies of science of India, as Abha Sur criticizes:

> [c]aste affiliations of scientists are routinely and rather unthinkingly flaunted to establish their cultural identity with little concern that caste differentiation is necessarily a hierarchical and oppressive system. Caste identities are always proclaimed approvingly for the privileged castes to underscore their successes and diffidently for the so-called lower castes invariably to account for some of their perceived limitations. (Sur 2011:35)

The problem with the way that studies of Indian science have treated caste lies in the fact that, as Sur (2011:56–57) continues, "[s]ince scientists in India are overwhelmingly from the 'upper castes,' these studies, perhaps unwittingly, end up venerating caste, in particular the brahmin caste, as a signifier of intellectual acuity". For Sur, such lack of critical reflexivity in the treatment of caste in studies of science results in the prominence of Brahmins in Indian science being left unquestioned and, therefore, "caste hierarchies are too often both naturalized and legitimized" (ibid.).

Karve's Chitpavan Brahmin positionality has sometimes been evoked as an exaltation. For instance, at the Deccan College's "Irawati Karve's Birth Centenary" (2007), her son opened the conference with a talk that started positioning his mother in relation to their family's caste belonging. He argued that the Chitpavan Brahmins "excelled in all fields and dominated the social life of Maharashtra" between 1850 and 1950, which was "the century of Chitpavan Brahmins", and linked this caste group's cultural and political prominence to the fact that, in face of British rulership, this caste "community wanted to show to the world that it had not given up the leadership of Maharashtra" (A. Karve 2007:15). According to his speech, his "mother was born in the middle of this period into a Chitpavan Brahmin family and was immensely proud of it" (ibid.). Regardless the accuracy of Karve's caste pride (as there are no

[97] Kurtz (2009) places the historical background of this conflict between Marathas and Brahmins for governmental power 350 years ago, which revolved around the political rearrangements following the fall of the Mughal empire and was invigorated during British colonial rule (Kurtz 2009).

clear signs of Chitpavan-Brahminical pride in her writings), the articulation of this statement in an official commemorative ceremony is remarkable. Given how the attribution of "leadership of Maharashtra" to a caste group conjures a high political stake in that state's politics, the speech exemplifies the conflict potentiality of Karve's caste positionality.

Furthermore, besides caste positionality politics, the controversies surrounding Karve's remembrance stem from an intellectual critique of her anthropology. A key aspect of contention regarding Karve's work regards her frameworks to study human difference and the politics that they imply. As we have seen in Chapter 2, Karve's blatant Hindu nationalistic and anti-Muslim racist commentary in the 1940s (Karve 1947) and her occasional pejorative remarks about so-called tribal groups are two examples of aspects in her work that have been criticized: At times, different interlocutors also explained these flaws in Karve's work in connection to her caste positionality and historical context. But, more fundamentally, Karve's writings on human diversity in India generally lack a critical articulation on the inequalities and injustices that correlate with the difference categories of caste and ethnicity. This is a key aspect of contention vis-à-vis her work, which gets exacerbated when contrasted to the vocally anti-casteist efforts of other scholars like Ambedkar. The two main accents in Karve's anthropology—her physical-biological anthropology (marked by an adaptation of racial frameworks) as well as her structural-functionalist social-cultural anthropology—might have had a specific predisposition to overlook caste inequalities and injustices, while highlighting and essentializing those caste differences in culturalizing, biologizing, racializing, and/or functionalizing ways.

Under this light, one can also understand the interventions in the anthropology museum in Pune as a critique of Karve's work: Especially given that the physical and racial anthropological accents in Karve's research were materialized through vivid representations in the museum (both through the anthropometric measurement device and in the entrance's installation containing a human skull), the attempts to change the museum could be read not simply as a caste positionality-based reaction (as suggested by the museum curator) but also as a critical response to Karve's anthropological frameworks and their essentializing and naturalizing enactments of caste.

Thus, the remembrance of Karve permeates politics of human difference, especially caste, in India as well as discussions on anthropological approaches to difference. Her commemoration at the anthropology department is not only tinted by situated perceptions of caste positionality (amidst an institutional scenario made tense by caste politics) but it is also informed by an

intellectual discussion on the implications of different anthropological takes on human difference and inequality. These issues become most clear when analyzed against the backdrop of the commemoration of Ambedkar in the same anthropology department, which is the theme of the following section.

3.3. Commemorating another anthropologist: Ambedkar

On my usual way to Pune University's Ambedkar building—the building where the anthropology department is located—I often admired the imposing Ambedkar statue on a neatly kept garden. As I learnt, the tall bronze sculpture standing on a pedestal was erected in 2014 for Ambedkar's 125th birth anniversary and depicts him with the constitution of India in his left hand and the right arm raised with index finger pointing ahead—the usual pose of many Ambedkar statues across India, marking his key role in the drafting of post-independence India's constitution. Ambedkar is commemorated at Pune University both on his death anniversary and birthday—the latter a national holiday since 2015 and officially "Knowledge Day" in Maharashtra since 2017.[98] Among other disciplines, he also studied anthropology at Columbia University under Alexander Goldenweiser (a mentee of Franz Boas), which informed his writings about caste and untouchability as a historical formation (Cháirez-Garza 2021). However, Ambedkar is not usually portrayed as an anthropologist, but as a jurist, economist, politician, and social reformer (Krishnamurty 2020). Author of the speech that was turned into the book *Annihilation of Caste* (2016 [1936]), he's widely known for advocating against untouchability and caste-based discrimination and for the rights of those who face caste-based oppression, most notably Dalits, the social group he belonged to. He has been described as a person "who, more than any Indian national leader, mobilized a social and political, institutional, and legal response to social exclusion and injustice and put in place constitutional safeguards" (Mosse 2020:4). In the 1950s, Ambedkar also started the movement of conversion to Buddhism, which was followed by hundreds of thousands of Dalits as a way to abdicate Hinduism-bonded purity beliefs and related caste-based discrimination practices.

In the morning of December 6th, 2019, on my way to an anthropology class, I noticed that the surroundings of the imposing Ambedkar statue looked very different: a ceremonial white carpet

[98] A Government Resolution issued in 2017 by the Maharashtrian Government stated that April 2014 should be celebrated as Knowledge Day; "According to the resolution, all district collectors have been instructed to ensure that Dr. Ambedkar's photo is garlanded at 10 a.m. every year, followed by a programme explaining the importance of the day. The Assistant Commissioner for Social Welfare in every district has been given the responsibility to organise programmes with speeches on subjects such as social science, history, anthropology, and political science" (The Hindu 2017).

and several rows of chairs covered in white fabric were placed on the square. In the anthropology department, the first-year anthropology MSc students were sitting in a classroom, waiting for their class to start. One of the department's secretaries abruptly opened the door and, in Marathi, told us students to come to the department administration office for a "function". Ten students and about 15 staff (mostly administrative and maintenance workforce) crowded in a circle inside the stuffy room. I stood at the door and across the spot where the circle made a gap: there, on the wall, was hanging a portrait of Ambedkar. I asked a student what was happening, and she whispered to me that the function was a commemoration of Ambedkar's death anniversary, "a national hero", she explained. The ceremony started with members of the administrative staff adorning the portrait with a garland of saffron, yellow, and orange marigolds.

Four lecturers and another staff member held speeches during the ritual. The first was in Marathi and emphasized Babasaheb[99] Ambedkar's defense of the values "fraternity, liberty, and equality", words the speaker repeated several times, in English, before finishing up with a large smile and the statement "he is everything for me!" The second lecturer to speak, a biological anthropologist, emphasized Ambedkar's admiration for "the power of knowledge" and described his impressive library turned into a museum in Mumbai. The third speech was by a PhD student who stressed that Ambedkar was "an architect of modern India" and a "hero for the whole nation". She contended that some people like to claim that Ambedkar worked for "one group or another", but, she explained, "Ambedkar always said 'First and foremost I am an Indian', so he is really a hero for the whole nation!" The last and longest speech was by a social anthropology professor. She started by acknowledging the people in the room who were not English speakers, looking at the administrative and cleaning staff, and announced that she would alternate between Marathi and English. For ten minutes, she talked about Ambedkar, starting by his engagement for the "uplifting of women": Ambedkar strongly advocated for the right of remarriage and other rights for women, "he empowered them!" She then mentioned his contribution to equality and, alternating between the two languages, delivered a speech that encapsulates the key tension treated in this chapter:

> We have started just a few years back, four or five years ago, celebrating Dr. Babasaheb Ambedkar's Jayanti [anniversary] in Pune at our department, and before that we had organized the national seminar "Dr. Babasaheb Ambedkar as an architect of modern India"—and as an anthropologist as well. So we declared him as an anthropologist because, again, what is the story [Translates this to Marathi]. By discipline he is an

[99] Marathi for "Respected Father".

> anthropologist; his first thesis he has submitted in, I think, in... [two staff members in the room say "1916"] 1916, yes, it was an anthropology seminar and he submitted in anthropology. So he contributed a lot, not only as a social thinker or social reformer to Indian society and culture, but he has contributed as an anthropologist and therefore OFICIALLY, you know, we celebrate his birthday and death anniversary. We have a course on Indian anthropologists and [looking to the students] you'll study him officially, you'll study him as a... of course, you know, many things... what theories he contributed as an anthropologist… Today I just wanted to convey to all students specifically: *anthropologists were the first in the world who rejected the concept of race and race-ism* [looking at me]. To the rejection of that time, that race was a myth, to say it properly is not a joke, but then the anthropologists did that! They reject the racial superiority, *so we anthropologists should reject the concept of caste*. We have to be daring to say that *caste is a myth, so that all are equal*! So basically, the rejection of discrimination is not that because of the economic structure but it's because once caste is attached to a person... So I think the basic situation in India, what arises today, even in the 21st century, it is just the reason of what hierarchy we have. And my PhD students and I have done a lot of research on this... But… [continues slowly, in a serious, low tone] *people are not ready to leave caste*. [pause] They say [screaming]: "We want caste! We don't want casteism. But we want caste!" […]. You know this is the mentality of Indian people. […]. So, basic difference in our caste system is that whoever goes up, people first find out how is his or her caste and how she is there, and from that, and then they start commenting on that person. So my suggestion is: we should reject the concept of caste, of caste system. Rejection in a practice, in our mental thinking that is needed, because your ethnicity first goes with what [former speaker] has conveyed, that Ambedkar was the first person to say that "First and lastly I am an Indian". [She then explains with examples how her "ethnicity" is contextual according to the geographical scale of her location, whereby the question of which caste she belongs to is only addressed within Maharashtra]. So this is what I want to convey today, that we will believe on being a human being first. Because what Ambedkar has given is the message of humanity. And just because of that only he has embraced Buddhism, because the basic principle of Buddhism is humanity (emphasis mine).

At the end of her speech, the audience clapped timidly. Then, students and staff, one by one, paid their respects to Ambedkar's picture: in the fashion of a templar ceremony, they took off their shoes and walked towards the icon's portrait, placed a saffron-colored flower beneath it, pressed their hand palms together with thumbs close to the chest and closed their eyes for a few seconds. All lecturers did the same, including the biological anthropologist, who made the hand gesture also over his head and mouth. Right after he joked about the Hinduness of this motion—although Ambedkar converted to Buddhism. A few students did not participate in the flower-giving practice. Later, sitting at the canteen, I asked a student why he was one of those unwilling students, he responded, succinctly, that he did "not believe in rituals". In discussion with another student, he explained to me that while Irawati Karve gives the name for the anthropology department's museum, "Ambedkar" is the name of the building where their

department is, therefore there is another statue of him in the building's front garden. That statue, too, was draped with several floral garlands and wreaths that day.

Figure 14: Ambedkar statue at the Pune University's Ambedkar building. Source: Photo taken by me.

In India, the commemoration of Ambedkar evokes conflicting issues. While it has fueled political debates on caste, religion, and nationalism, in this micro-scale at the anthropology department it reveals tensions that accompany practices of Indian anthropologists in relation to caste. On the one hand, the anti-casteist engagement that marked Ambedkar's political and intellectual work was highlighted by the professor's speech and put into connection to anthropology's own task, which, according to her, is rejecting the concept of caste and

overcoming caste-ism, in parallel to anthropology's contribution to debunking race as myth. On the other hand, the professor admits that "people are not ready to leave caste" and that, despite their rejection of casteism, caste remains an important factor in a person's subjectivity or "ethnicity"—including to her own when she is in Maharashtra.

At the same time, in the discursive articulations during the ritual, individual caste positionalities—including Ambedkar's—were actively omitted, and so was the fact that he actively worked for the rights of Dalits and for caste-based affirmative action policies. Instead, as one of the speeches showed, Ambedkar was depicted as a hero for the whole nation.[100] In this sense, national unity, adorned with the (also Buddhist) principles of humanity and equality, appears as a common horizon for a post-casteist society. Concomitantly, the social anthropology professor sees the goal of a post-casteist society as corresponding to anthropology's own anti-casteist task.

At the same time, the caste-based (Dalit) identification that marked Ambedkar's activism and underlies his commemoration can be perceived as standing in tension with such post-casteist orientation. Here one can see a similar dilemma to other contexts of anti-racist discourses: a tension between strategic essentialism (which highlights differences and inequalities) and something like colorblindness (which affirms universalism and commonality). Ambedkar's pro-Dalit affirmative strategy sits uncomfortably next to nationalistically universalizing efforts in their common goal of a society free of casteism.

This tension also underpins caste positionality politics within the university and becomes especially clear in the contrast between Karve and Ambedkar—starting in the contrast between their respective caste positions. This is exemplified in the following interview passage, when a Brahmin lecturer commented on the Ambedkar ritual at the anthropology department:

> Ambedkar is also an icon of a particular caste. So it gets celebrated essentially not because he is important or because he did some work but also because we have to show affinity to him. It's kind of a show […]. [But], you know, for example, in [the

[100] Unintentionally or not, this nationalistic framing of Ambedkar converges with sustained Hindu nationalist efforts to domesticate his anti-Hindu status quo-defying pro-Dalit affordance while molding his image according to Hindu nationalistic ideas (Teltumbde 2018). At the same time, the horizon of a post-casteist society is not articulated in Hindu nationalist discourses; instead, as mentioned in Chapter 1 and discussed further below, Hinduism-affine upper-caste political actors negate the current existence of casteism in order to deflect the association between Hinduism and the discrimination against Dalits and other lower caste groups. Furthermore, this Hindu nationalistic domestication of Ambedkar is also a reaction to Ambedkar's call for all Dalits to convert out of Hinduism in order to escape casteism, which has created a tension vis-à-vis the long-standing political efforts of maintaining a Hindu majority in the Indian polity by engulfing religiously ambiguous Dalits under the Hindu fold (Viswanath 2015), this also being reflected in how anti-conversion legislation has been formulated in several Indian states (Mosse 2020:5).

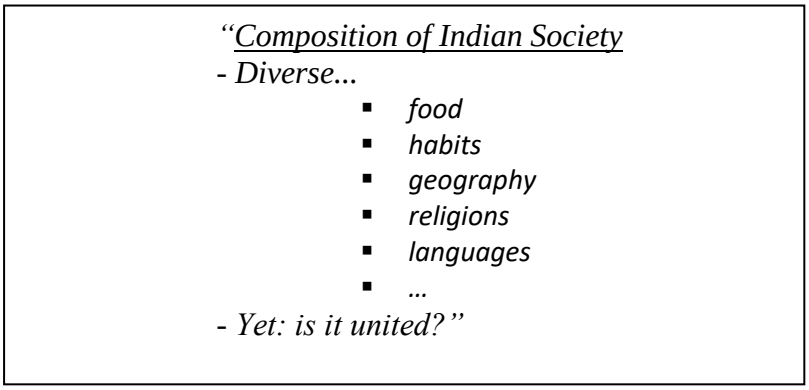
> department's] building, which is named after Ambedkar, if there is a celebration and I am absent, I would be made comments on because of my caste, which is upper caste, like: "He is of an upper caste Brahmin family and he didn't turn up". If I turn up: "Oh the Brahmin also turned up, he understands the legacy". […] And essentially the message given by him or the science or the constitution or his ideas are completely ignored. That's why I am not all with celebrations. But we have to keep a decorum on sometimes. (Interview with an anthropology lecturer [anonymized], Pune).

In this sense, the anti-casteist politics evoked through Ambedkar is permeated by, and in tension with, a perception of caste as a key marker of positionality. Given that Karve's upper caste positionality is well-known and given how she is strongly associated with anthropology in Pune, the celebration of Ambedkar at that department seems to be articulated in a way that both parallels and contraposes him to Karve. On the one hand, he is framed as an anthropologist and a proto-feminist ("he empowered women!"), thus putting him on the same ground as two characteristics often associated with Karve. On the other, his blatant anti-casteist activism and (even when omitted) Dalit positionality places him, through this celebratory framing, on an oppositive political and social end vis-à-vis Karve.

In the next section, I draw from observations in Pune anthropology classrooms to further discuss how the wider societal and political tensions related to caste and anti-casteism are present in Karve-inspired anthropological approaches to caste today.

3.4. Indian anthropology at the crossroads of caste and anti-casteism

In one of the anthropology-related courses I visited in Deccan College, the reading of Karve's *Hindu Society* (1968a) was suggested to the students as an additional reading for the syllabus topic "caste and tribe". In the class that introduced this topic, the lecturer—an anthropologist who had confessed to me being a big fan of Karve's work—spoke about "diversity in India". The lecturer listed several factors in which India is so "diverse", writing the following on the blackboard:



The lecturer then asked the students: “Though we are diverse and yet we're united; why and how?” As the room remained silent—as it usually did when the lecturer was not speaking—the lecturer went on to talk about family functions and how they bring people together; she explained that family moved to kinship that moved to caste and concluded: "Caste is the basic element of Indian society. […]. If you want to be a social member of India, you want to be a member of caste. Good or bad, this is what unites us." Surprisingly, a student broke the usual student silence and exclaimed: "And caste is what divides us too!” Stunned by the student’s intervention, the lecturer defended herself saying that she did not support the caste system—just as she did “not support smoking”, “yet people do smoke—and: it used to be considered good, today it is bad.” She mentioned that even the Islamic rulers and the British at some point understood that they should not disturb the caste system—otherwise it would lead to social instability, like the 1857 revolt in East India. "So, in the past caste system was [considered to be] good, today it is bad", she added, concluding the class.

This debate between the anthropology lecturer and student over caste demonstrates a longstanding tension in social anthropological approaches to difference and inequity in society. The professor suggested the concept of unity as an interrogation to start a discussion on the social cohesion of the diversity in the Indian subcontinent. As in most nation-building projects and indubitably so in the Indian case, unity has been at the core of nation-building-related anxieties—even before but most severely following the country’s independence in 1947, which was marked by the traumatic Partition with its religious clash. The “unity” slogan still animates nation-building-oriented memory politics in India, the most hyperbolic example being the recent erection of the “Statue of Unity”, the world’s tallest statue, commissioned by Indian prime-minister Narendra Modi to represent a politician who articulated the independence and Partition process.[101]

However, the anthropology lecturer’s attempt to answer the “diversity versus unity” impasse through an understanding of caste as a system of social order and cohesion was challenged by the much younger student, who blamed caste for conflictive intranational divisions. This clash between lecturer and student in the anthropology classroom makes apparent contradictions between different anthropological approaches to caste. On the one hand, we have a structural-functionalistic anthropological paradigm under which both the lecturer’s position and an

[101] The 182 meters-tall Statue of Unity was commissioned by Modi in 2013 to mark his tenth year as the chief minister of the state of Gujarat and inaugurated in 2018 amidst many critiques (Kidangoor and Colony 2018). The statue represents Vallabhbhai Patel (1875–1950). On Patel’s role in the post-independence and partition process, see Menon (1957).

important portion of Karve's work can be understood, where the analytical focus lies in understanding what keeps a society (or "social system") glued together, cohesive, and functional in relation to its internal differentiations. This paradigm reached its apex in the mid-20th century and is observable, e.g., in Karve's *Hindu Society* (which composed the course's syllabus) and many other social anthropologists' writings about what they called "the caste system"—many of them Brahmins or Europeans who, like Louis Dumont and many Orientalists before him, worked closely with Brahmin informants and Brahmanical literature (Michaels 2020). On the other hand, on the student's side we have approaches that shed light on the problems underlying caste-ism, like casteist discrimination and segregation and structural inequalities enhanced by caste differentiations. Such caste-critical approaches converge with Ambedkar's call to "annihilate caste" and its current resonations, as we have seen in the anthropology professor's speech during the Ambedkar commemoration ritual. As Mosse (2020) explains, the claim to overcome caste, when asserted by Dalits and other groups oppressed by casteism, usually evokes a self-empowering, aspirational castelessness that reclaims their common humanity, following Ambedkar's emphasis on the value of equality. It's under this light that—to give another example of monumental memorialization practices—a new Ambedkar statue, planned to be India's second and the world's third tallest statue, is under construction in Mumbai: its name will be "Statue of Equality" (Mahamulkar 2019).

At the same time, other claims against the idea of caste have different conditions and implications. Diametrically opposed to the Ambedkar-inspired anti-casteist mobilizations lie the post-caste arguments that have been mobilized by Hindu nationalism-inclined and usually upper caste-belonging groups (Mosse 2020). As mentioned in Chapter 1, both in and outside of India, for instance in the UK, these groups have blocked anti-casteist legislation on the basis that the concept of caste is a fabrication of colonial anthropology and holds no social truth.[102] Thereby, they have evoked post-colonial and anti-orientalist scholarship, including historical anthropologist Dirks' (2001) famous book on caste and colonialism, to deny the existence of

[102] The debate on the anti-casteist legislation plan in the UK ended with that government's decision to not include caste in UK equality law based on the argument that this "risked promoting, creating or entrenching ideas of caste or heightening caste consciousness" (Government Equality Office 2018:5 quoted in Mosse 2020:19–20). For Mosse (2020:20), given how upper caste groups mobilized against this law, this decision "bends toward the protection of upper-caste community spaces and away from those seeking protection from discrimination".

caste as an analytical and tangible object and, on a further rhetoric step, to render casteism ungraspable by the law (Mosse 2020:17).[103]

Both kinds of claims to overcome caste necessarily engage with anthropology's take on caste. In other words, both the Ambedkar-inspired abolitionist anti-casteism and the Hindu nationalist negationist post-casteism mobilize anthropological knowledge to formulate their arguments on how to approach (or not approach) caste-ism. Despite coming from disparate social milieus and with opposite political ends, both deal with epistemological questions regarding the worldmaking effects of the intellectual enactment and articulation of this category of difference. While Dalit activists and intellectuals follow Ambedkar's intellectual tradition by pointing at the historical formation of caste to denounce the privilege-securing and power-driven functions of this category of difference,[104] upper caste Hindu right groups have denounced the anthropological constructedness of caste as false—labelling it a fabrication of colonial anthropology—with the aim of emptying out caste of any ontological meaning and invalidating any policy that operates on the recognition of caste. At the same time, whereas Dalits mobilize for rights and resources by reaffirming their caste position and experience of casteism—and might thereby engage in strategic caste essentialism—, the claims that nullify the reality of caste can also be "deployed against [Dalits] in elite-dominated domains" either to negate their experiences of caste-based discrimination or to oppose caste-based affirmative action (Mosse 2020:25). Hence, as Mosse sums up,

> These disputes around caste are about how "the social" is made available for public debate and especially for the law; they concern the categories of description and analysis […]. As Dalits and upper castes enter epistemological debates over categories of description on opposite sides, they engage with anthropology, whose subject of enquiry—the social world—, it is increasingly clear, is no longer independent or unaltered by its terms of description and debate. (Mosse 2020:29)

Thus, these tensions around the ontological implications of different intellectual and political articulations of caste pervade discussions over the role of anthropology in India. More generally, they demonstrate not only a political concern over the effects of varied anthropological frameworks on difference and inequality, but also the high stakes of the study of caste vis-à-vis the public and the political. This interplay of anthropological knowledge and politics also demonstrates the co-productive dynamic between the politics of (anti-)caste-ism

[103] Similar debate happened around the question of whether casteism should be discussed in the UN's "World Conference against Racism, Racial Discrimination, Xenophobia and Related Intolerance" in Durban in 2001 (see Chapter 5).

[104] See also discussion in Chapter 5 about how Ambedkar and other anti-casteist intellectuals put forward a differentiated take on theories about caste origins.

and the production of scientific knowledge about diversity and inequality in India. In addition, these tensions in anthropology's takes on caste(-ism) mirror the tensions in the memory politics in the anthropology department described in this chapter. As we have seen, they become especially visible in the commemorations of Ambedkar and Karve.

3.5. Final remarks

"[R]emembering is not a replay of a string of moments, but an enlivening and reconfiguring of past and future", writes Barad (2007:ix). Remembering and commemorating the dead is a way to engage with the present and future. As Banu Subramanian (2019:14) puts it, "[t]o understand the Indian past is to enter time warps in which the 'silent and evasive' pasts come to the fore in contemporary India." Such "time-folding warps" are also evident in the ways those two historical figures have been commemorated and referenced in the scenes analyzed in this chapter, whether in commemorative rituals, museum spaces, or in the classroom. Thereby, the evocations of Irawati Karve and Bhimrao Ramji (a.k.a. Babasaheb) Ambedkar also implied different visions about caste in the present and future. In this sense, much more than telling who these two intellectuals were, the practices of remembering them tell a lot about the contemporary politics around the different themes that their lives and works are perceived to relate to.

The commemorations of Karve and Ambedkar are intertwined with present-day university department politics and differing anthropological traditions and frameworks to understand human diversity and social inequalities. Implicated in both realms is a politics of difference, articulated especially through categories of caste—but also of religion and gender—, which permeates most power contestations in India. Such politics is also at the core of anthropological practices, as the discipline in India has been commonly practiced having such categories, especially caste and ethnicity, as basic entry points or units of analysis.

In sum, these tensions come to fore in the commemoration of Karve and Ambedkar on different levels and with different ramifications. As we have seen, they manifest in the fissures between different anthropological frameworks to caste. Depending on the framework, caste can be read either as an element of diversity and social cohesion (like in the racial physical-biological and social anthropological traditions followed by Karve) or as a marker of inequity permeated by social injustice (in the intellectual tradition constituted by Ambedkar). Within the latter framework, a further ramifying tension takes place between different approaches to address caste inequalities and casteism, where calls to debunk caste as a myth coexist with strategies

of strategic essentialism and caste-based affirmative action. This tension is further charged by a friction between anti-caste movements and the role of caste for political subjectivities, as the anthropology professor's speech during the Ambedkar ritual showed. At the same time, this Ambedkar-inspired impulse to demystify and overcome caste anxiously coincides with a diametrically opposing post-casteist approach which is very different from Ambedkar's politics: Hindu nationalist upper caste groups have mobilized anthropological knowledge to argue against any politics based on the recognition of caste differences and inequalities, denying the existence of caste-ism altogether. All and all, these tensions show the politically co-productive force of anthropological frameworks to diversity, (in)equality, and national or societal (dis)unity, which, in Karve's work and in Indian anthropology in general, take prominent shape in the production and articulation of knowledge about the difference category caste.

Chapter 4. Enacting anthropometric differences and the awkward presence of race in today's Indian anthropology

4.1. Introduction

Before my first fieldwork trip to India in 2017, I contacted several anthropology, sociology, and history of science professors in the country to present and talk about my research project—which by then I framed as "Karve's making of race and its legacy in India today". One of the e-mail responses gave a preview of some irritations I would encounter in the field: A senior professor wrote to me that "race" was an outdated concept and that I, therefore, should consult my adviser to come up with a new research topic. Although I also met more nuanced and understanding reactions to my (naively quite suggestive, perhaps arrogant-sounding) initial research topic's framing, I now read that senior professor's strong reaction—and the reactions of others who negated any racial legacy in Indian anthropology today—as signs of a critical stance towards, or self-distancing from, a troubling legacy in anthropology. "Race", according to many of them, was not a term anthropologists used anymore and should not inform the objects of anthropological research. In addition, according to some professors, the fact that race does not inform social group categories in India—unlike in the US or Brazil—results in a more widespread perception of the scientific inaccuracy of race in its biological register.

However, after an initial round of conversations in my first fieldwork stay, I was also surprised to find out that the anthropometric methods—which in mainstream European historiographic accounts are commonly associated to late 19th and early 20th century racial anthropology—were not only referenced in the Irawati Karve Museum of Anthropology but also strongly present in anthropology departments' research and curricula in India. A specific situation that I observed in the 2019 edition of the Indian Congress of Anthropology (see Chapter 1) provided an emblematic example of the tight association between anthropology and anthropometry, in a setting that reminded me of both India's and anthropology's colonial past. The Congress' main activities took place in Pune University's main building, which, as we have seen in this thesis' second opening scene (Section 1.1.2), has many traces of its former function as a colonial government building. While the few hundred participants of the Indian Congress of Anthropology were slowly returning from the tea break into the main conference room, a lecturer of the University's anthropology department went on stage and repeatedly asked for

everybody's attention. He waited at least half a minute until the hall was quieter and then with a theatrical voice he said into the microphone that he had a "*very important* announcement" to make: "The book we just launched in the inaugural function, 'Beginners' Manual of *Anthropology*' [*sic*], is being sold outside, so please visit the counter." Several students or young anthropologists queued up during tea breaks to acquire a copy of the book. However, the advertised book was in fact called "Beginners' Manual of *Anthropometry"*, not "Anthropology" (Juvekar et al. 2019, emphasis mine). In this sense, the Freudian slip-like mistake of the event co-host and the fact that this was the only book launched or sold during the two-day Congress emblematically demonstrate the relevance and conspicuousness of anthropometry in anthropological circles in India. In different anthropology and archaeology programs that I joined and observed in Pune, the methodology is an integral part of the students' training: it is taught in different obligatory courses over one or two semesters. As I have observed on visits to different anthropology departments and in conversations with anthropology lecturers and students, anthropometry indeed occupies an important place in the anthropological research and education in India.

Given this scenario, this chapter interrogates not only the association between anthropology and anthropometry, but also the association—and envisioned dissociation—between certain racial theories of physical anthropology (which are relegated by some to the past) and anthropometry as it is practiced today. I ask: How are the theoretical racial approaches that once sustained anthropometry present—or made absent—when anthropometric methods are used today? In other words, what is left of anthropometry when (or if) its racial theoretical underpinnings are stripped away from it, and what does that leave us with? Is this ever possible? And what are the worldmaking effects of anthropometric enactments on/of human bodies? If "[t]his combination of measurement (of skulls and living people) formed the empirical matrix through which colonial knowledge-making around race evolved" (Schramm 2020:6), I explore whether and how coloniality and racialization might be still embedded in the potentiality of such bodily measuring practices, and with what effects. Just as the university and anthropology in post-colonial India have come to occupy very solid structures of colonialism—also quite literally, as the Congress setting above shows—and aim to change these colonial structures, the question that animates this chapter is whether, to what extent, and how the anthropometric methods used today have diverted from the racial theories that created them, and what are the implications of their current use.

"Methods", as Mol (2002:155) teaches us, "are not a way of opening a window on the world, but a way of interfering with it. […] Studying methods empirically, then, generates another understanding of what they are. No formal guarantees, but specific mediators, interferences." In Mol's (2002) sense of the term "enactment", in this chapter I am concerned with the realities enacted through anthropometry, and not simply on whether the representations created anthropometrically are inaccurate, biased (Stepan 1986), or "mismeasured" (Gould 1981). Methodology also relates to assumptions and arguments of the theoretical realm. Scientific methodologies might historically travel through books, instruments, and people on wave lengths that can be relatively independent to—and further-reaching than—the credibility of the theorical background once attached to them (see Braun 2014). Combining an attention to historicity (while keeping an eye on the racial and colonial legacies of anthropometry) with an ethnographic openness, I analyze both change and continuation, as well as continual ambiguity, frictions, and contradictions in the practices of anthropometry and their taxonomical affordances.[105] Through this approach I aim to grasp different outcomes and effects of such scientific practice—including its racializing and biologizing effects, which come about in contingent ways.

In this sense, thinking about the theoretical underpinnings of a methodological development can reveal the tensions around the effects of using certain methodologies—especially when the theory that once supported them no longer holds sound scientific validation. Such asynchronicity, as I will show, is observable in the case for anthropometry and its racial theoretical foundation. Although those who currently use anthropometric instruments in India might overlook anthropometry's connection to—or implication in—racial theories,[106] by exploring the tension between the historicity of a set of theories and the presence of a related set of methods, I aim to shed critical light onto the possible racializing implications of the persistent practice of body metricization in research about human difference.

To examine the relationship between racial theories and anthropometric methods, this chapter delves into the teaching and learning of anthropology in three different institutions in Pune, with special attention to practices involving anthropometry, which includes not only the

[105] Due to this chapter's focus on anthropometry as method, discussions on human remains will not take center stage here. To be sure, these discussions are crucial to the debate on decolonizing anthropology as well (see e.g., Kakaliouras 2012; Stoecker 2013; Stoecker, Schnalke, and Winkelmann 2013), but they will here only be touched upon in relation to the problem of classification and racialization of difference.

[106] Interview with Shaunak Kulkarni, Pune, 19 Sept 2017; Interview with B. V. Bhanu, Pune, 20 Sept 2017; Interview with Barun Mukhopadhyay, Kolkata, 28 Jan 2019.

measurement of living humans (i.e., somatometry), but also in the measurement of human remains bones or osteometry (encompassing craniometry). In the following section (Section 4.2), I narrate and discuss five emblematic sets of ethnographic situations in which race appeared in university settings. I elaborate the notion of an "awkward presence" of race to highlight the discomfort and irritations caused by the haunting resilience of racial ideas in the teaching of anthropology in India today, which will be clear in the subsequent sections. In Section 4.3, I first present the instruments, books, and spaces that composed the scenes of anthropometric enactments I observed (4.3.1), then I discuss two main components of these practices of teaching-and-learning anthropometry: the training of the touch (4.3.2) and of the comparative vision (4.3.3). Then, I discuss how classifying plays a role in this methodology (4.3.4). In Section 4.4, I analyze justifications for this pedagogy and the current main uses of anthropometry, including forensic anthropology and studies of human malnutrition. Finally, I conclude this chapter by discussing the implications of anthropometry and its metric-biologizing effects and I reassess the question of the entanglement between method and theory (Section 4.5). Thereby, I also revisit my methodological discussion on (post-)colonial history and ethnography of science, and I elaborate a contribution towards the discussion on decolonizing anthropology in India.

4.2. The awkward presence of race

As we have seen in Chapter 1, STS scholars have elaborated different concepts to grasp the history and presence of racialization in science given the slipperiness and fluidity of race. These include the notion of race as absent-presence and topology of race (M'charek, Schramm, and Skinner 2014) and race as a ghost (B. Subramaniam 2014; Karkazis and Jordan-Young 2020). If India is a "a country where ghosts, souls, and spirit worlds remain alive" (B. Subramaniam 2019:32), in Indian anthropology the ghosts of race are a living presence. The obsolescence (or erasure) of race—which I was alerted to by that senior professor via e-mail—revealed itself as not fully accomplished. Quite the contrary: race is certainly an unfinished business. In the anthropological classrooms I visited in Pune, race was awkwardly present: sometimes exasperatedly hidden, nervously brushed aside, or impatiently resisted; sometimes confessionally exposed or floating in the room's air in an uncomfortable silence. It often generated confusion or questions—but also complicit smiles—among students and lecturers. In the following, I present five sets of situations of race being awkwardly present in spaces of anthropology teaching in Pune.

Situation #1: At the end of class, I asked the biological anthropology lecturer what was going to be the topic of next week's class and explained that I would not be in Pune by then. She widened her eyes at me, and, after a second of hesitation, she announced loudly to the whole class: "it's going to be about race!" While students were already standing up to leave for the break, she very loudly announced that they needed to read the texts about race and come prepared for a discussion in class. "*You* [students] will be talking about race, *don't make me talk on that*!" she added, in a very assertive and serious tone. A week later, after I came back to Pune, I asked the students how the class on race went. They said the lecturer was quite nervous because they showed up to class unprepared; She then made them watch two parts of the 2003 US documentary series *Race: The Power of an Illusion*. This lecturer's anxiety about deconstructing the concept of race—debunking it as a fallacy—was in tension with the anthropometry methods she also taught (as we will see in situation #5 below), which possibly resulted in her difficulty in talking about race with the students. At the end of the semester, one of the optional questions in the students' exam would be: "Write a short note on race and its fallacy".

Situation #2: The usual lecturer of another anthropology-related course in the same institution was substituted by two different lecturers. In a class, the first substitute lecturer offered the following definition of "ethnology", in contrast to "ethnography": "ethnology is when you make a further analytical step, when you try to classify them. [...] for example, 'mongoloid', 'negroid'—you divide them in terms of races, which is nowadays not very nice but we as anthropologists know it's a reality". I looked around the room and saw that some students seemed to look hesitant, but the classroom remained silent. Some weeks later, the other substitute lecturer started the class by asking the students to define some key terms, including "ethnology". One student answered that "ethnology" was "the study of human behavior and culture, also in comparison to biological terms." The lecturer responded: "Ethnology is the study of human race and races". Again, the students reacted with silence: they seemed to be hesitant to react and confused—perhaps because such racial definition of ethnology clearly contradicted what they had learnt from other lecturers, including the lecturer of situation #1.

Situation #3: During a class in the course on anthropometry, the topic was dermatoglyphics—the study of variations of the ridge patterns of the human skin. I asked the lecturer if one could use dermatoglyphics to understand differences between populations. The lecturer and students started speaking at the same time, over each other, all reacting to my question. Then, to sum up, the lecturer and two other students tried to explain to me and the rest of the class that "no,

fingerprints are environmentally determined" and the distribution of fingerprint patterns occur across all populations. Another student sitting in the back of the classroom intervened and said that there were studies saying that in the case of "mongoloids" a certain fingerprint pattern is more prevailing, but this had not been sufficiently proven. To this, another student showed the lecturer a page of a xeroxed text supporting the colleague's affirmation, which showed a table that indicated a correlation between fingerprint patterns and racial groups (divided by "mongoloid", "caucasoid", "negroid"). The lecturer gave in and said: "yes, in the case of mongoloids there is some evidence of some racial difference in this fingerprint". The xeroxed text was from the book *Outlines of physical anthropology* (B. Das 2008), published for the first time in 1961 and now in its 26th edition, having been reprinted 34 times and as recently as 2018. I later found out that the book's author, a Bengali anthropologist called B. M. Das, like many other physical and biological anthropologists from the Delhi University anthropology department under Biswas,[107] was an Alexander-von-Humboldt Fellow in anthropological and genetic institutes in Germany in the 1960s and 1970s before becoming a professor in India.

Situation #4: After class, I went to the cafeteria with Stanzin, a fellow student. As we walked through campus under the relentless late February sun of Pune, Stanzin talked about his hometown Leh in North India and explained that people there looked "different". I asked what he meant, and he answered: "mongoloid, you know?" Not sure what to respond, I tried to formulate the most ambiguous "hm" I could do. A week later, in the same cafeteria, I sat to have breakfast—chai and poha—with a group of students. One of them, an archaeology student from Northeast India, told us what had happened to him the night before: a campus security guard mistook him for another student, who came from the same region of India, and reprehended him for something that the other student had done. The student telling the story joked: "it's not because we are mongoloids that we are the same!" The others in the group laughed at the joke, but one of them, still humorously, called out: "don't say this racist term!" Here, we see some tension in the use of a racial category: while some students might consider it racist (and possibly offensive), other students—who, in Pune, experienced being othered—even apply it from themselves.[108]

[107] Interview with Pooran Chand Joshi, New Delhi, 5 Sept 2017; Interview with Subhadra Channa, New Delhi, 7 Sept 2017.

[108] It is worth noting that such outdated-sounding racial categories have simply been substituted by continental categorizations in other contexts. For how this categorical slippage is perceived in the context of population genetics, see M'charek (2005).

Situation #5: Holding a skull in her left hand, the lecturer explained to the class that specific tooth bottom formations could be observed in specific populations. She suddenly realized that there was a misplaced tooth in the skull she was holding. “Somebody must have glued it in the wrong spot!”, she shook her head in honest disapproval, while students laughed. She continued to explain that there were some populations in which the bones of the forehead remained separated; hereditary characteristics like these were helpful to identify certain populations. A student asked: "So, with these observations, can you identify the racial groups?" She raised her voice and responded assertively: "That word is not used anymore. *Ethnic group*s! With these observations we can identify populations, or: *ethnic groups*". She went on to show something on the skull, and the student who raised the question exchanged a complicit sardonic smile with another student, silently mocking the docent’s strong reaction. In another class about craniometry, the same lecturer quickly corrected herself when she said “racial groups”, by saying: “ethnic groups!”

In sum, the five sets of situations portrayed above demonstrate different stances of awkwardness in which race, often in the form of racial terms and ideas, was manifest in (or near) university classrooms in Pune. We can see that, in the first situation, the lecturer’s exacerbated preoccupation in avoiding the pitfalls of “the myth of race” led her to a situation of anxious aphasia,[109] in which she made use of a pedagogical tool (the documentary film) to speak on her behalf. This was the same lecturer who, in situation #5, again reprehended the use of the term “racial” (also by herself), correcting it for “ethnic” or “populational”, albeit still relying on craniometric methods of comparisons among groups—methods that, in the books that she and others used, were connected to racial theories and terminology. Thereby, students seemed to spot both the fragility of substituting “race” by “ethnicity” and the nervousness implied by such fragile correction, responding with cynical—but silent—humor. This points to how the unfinished business of race will not be easily undone by vocabular substitutions or euphemistic maneuvers.

Furthermore, I have observed different situations in which the lecturers’ semantic re-articulations *around* race were hindered by the knowledge of the often reprinted and xeroxed books their students were reading. Situation #3 emblematically exemplifies the mismatch between, on the one hand, the efforts of some lecturers in overcoming certain racial ideas and,

[109] My use of the term aphasia is inspired by Stoler’s (2016) notion of colonial aphasia, which she uses as an alternative to the terminology of “forgetting” to describe the occlusion, and the silence around, colonial history in France and especially in regard to its racial register.

on the other, the claims that the books articulated. In this case, the anthropometry lecturer eventually bended to the book's authority to settle a controversy about a racial idea in front of the confused classroom. This illustrates the discursive power and ontological potential that can emanate from an authoritative scientific text, which in this case was materialized in an old and widely circulating textbook written by an Indian anthropologist with German scientific training. In this sense, similar to what I discussed on the case of Karve (Chapter 2), the lecturers' push for a discursive change on the matter of race was halted here by a discourse that was inscribed in an authoritative scientific object 60 years ago. As M'charek (2014:30) reminds us in conversation with philosopher Michel Serres, "objects not only give a material basis to social relations, they also *capture* history and make it slow down." Thus, the long lives and circulation of scientific objects like books, when they are considered authoritative holders of knowledge, also help us grasp the resilience and contingency of racial ideas.

But if some anthropology lecturers felt unease vis-à-vis racial terminology and ideas when these were articulated in the classroom or spotted in printed form, other lecturers demonstrated the opposite stance. As situation #2 in the classroom shows, race here was less of a specter and more of a lively present-day assertion, summoned by the lecturers who insisted on definitions of "ethnology" that reaffirm the bond between this discipline and the history of its practice in India (and elsewhere). Such definitions reinstate the racial typological thinking and terminology used, for example, by Risley's "ethnology" more than a century ago (Risley 1891), but which still linger on and shape students' perceptions of human difference and of themselves, as shown in my interaction with the student from Leh in situation #4 (one of several in which students dealt with racial typological terms). The awkwardness in situation #2 in the classroom is manifest in the mismatch between students' and lecturers' views on anthropology, as well as in the silence that invariably fell in the classroom after the lecturers' race-summoning interventions. Anthropologists might be aware of the perpetual self-questioning and conceptual refashioning in their discipline, so it might not come as a surprise to the anthropologist-reader that different colleagues might have different understandings of what "ethnology", "ethnography", and "anthropology" are; nevertheless, these contradictions and tensions provoked by this awkward presence of race—and by its conceptual, definitional entanglement with the name of a discipline—are striking. If anything, the sets of situations portrayed above demonstrate the definitional blurriness of key terms related to anthropology. But, more importantly, they also show the sticky entanglement between racial thinking and perceptions of what anthropology is and does.

In the following section, I delve into how the methods of anthropometry were taught and learnt in biological anthropology classes in Pune.

4.3. Teaching, learning, and enacting anthropometric differences

Right after I first met a group of students of the master's degree in anthropology of the Pune University, one of the students gave me a long tour of the campus and the department building. Telling me about her bachelor's degree in anthropology in another university in Northern India, she complained that there were too many courses dealing with biological anthropology, like forensics and seminars "with labs, etcetera". When I asked her what she learnt in these courses, she smiled, her eyes lighted up, and she spoke excitedly: She said they also learnt to operate the anthropometer and different calipers (she named several types of calipers), they also learnt how to measure nasal index, and cephalic index so they could determine if a skull was "bracephalic, mesaticephalic, or dolichocephalic". Then, she looked at my head and said: "Now I want to see what kind of skull you have!" Later, she offered me a guided tour of the physical anthropological section of the Irawati Karve Museum of Anthropology, which was next door. We spent a while in front of the primate skulls' glass shelves as she performed the role of an exhibition guide. With a serious voice and relying on typological classifications, she explained the different shapes of the different exhibited skulls.

The student's excited eloquence on physical anthropology and craniometric taxonomy derived from the knowledge she acquired not only in her previous studies in North India but also in courses on osteology she had taken in Pune a semester earlier. As I would observe throughout my stay in Pune, her ability to operate anthropometric instruments and to measure, compare, and classify human skull shapes was something she and her peers had been taught.

In this section, I delve into different aspects of the training of anthropometry and the enacting of anthropometric differences in university classrooms or labs in Pune. I start below by situating the classroom laboratory spaces and describing the instruments and human remains stored in them as well as my ethically anxious insertion in such spaces (Section 4.3.1). Then, I dedicate two sections for two aspects of learning and teaching anthropometry: training the touch (4.3.2) and training the comparative eye (4.3.3) and, finally, I discuss the theme of classification in anthropometry (4.3.4).

4.3.1. Anthropometry labs, anthropometric instruments, and human remains

I joined the students' apprenticeship in the practices of measuring human bodies and bones in two sites, one in each two institutions where Karve used to teach in Pune: the Pune University's "Osteology Lab" and the Deccan College's "Anthropology Lab". The door of the Osteology Lab faces the entrance of the Irawati Karve Museum, in the basement of the University's Ambedkar Building. As one passes the door frame of the Lab, one is greeted by two articulated human skeletons standing in tall glass cupboards in a small anteroom that opens to a 30m² room with a blackboard, long tall laboratory tables, and another articulated human skeleton. The room's back wall is fully taken up by large cupboards with metal frames and glass fronts. On top of them is a row of 14 sculptures of human busts, displayed next to each other in such a way that the eye instinctively looks for differences among them. Two white plaques stand in front of two of the busts, one with the tag "NEGROID RACIAL GROUP", the other "MONGOLOID RACIAL GROUP". As I would learn later, these busts used to be displayed in the Irawati Karve Museum of Anthropology, which is just next door, but they were shifted from there some years ago after a professor's request—who considered them obsolete—, onto the lab cupboards.[110] Now, these busts loomed above us as we stood in the room, and, with their silent and ghostly—but very material—presence, they overlooked the anthropometry classes in that university. The cupboards upon which these busts are placed also stored numerous metallic gadgets—anthropometric measurement instruments of different kinds—and several human bones.

Human bones and anthropometric gadgets also abounded in the other site where I participated in anthropometry classes, the "Anthropology Lab" of the Deccan College. This lab's anteroom is also the office of the professor responsible for the lab; the wall behind her desk is adorned with a framed picture of a younger version of herself measuring a skull with a spreading caliper. The main room of the lab, a 20m² space, has a large, tall table at the center, surrounded by old wooden cupboards crammed with measurement instruments and human skulls and other bones. Although small, this room is considered by some the best osteological laboratory in India. When the professor welcomed me to join the course of biological anthropology that began in early January 2019, I did not expect to be presented with human skulls and anthropometric instruments right on the first day of class. On that day, I joined six other students sitting around the lab table in the center of room, waiting for the course instructor to arrive, and we quietly

[110] Interview with Narendra Bokhare, Pune, 25 Mar 2019.

observed the room we were in. As soon as she arrived in the lab, the lecturer quickly took out four skulls from a cupboard and placed them on the lab table. A few students took them in their hands and examined them curiously, while the lecturer took out several spreading and sliding calipers and laid them on the same table.

Impressed by the ordinariness in which those skulls were being handled in that "anthropology lab", I immediately felt an unease. My first reaction, which I now understood as a strategy to mitigate my ethical nervousness with the situation, was to ask the instructor where the skulls came from. I guess I hoped that the knowledge about the history of those remains, to whom they belonged, or how they were obtained, would put me in a less conflicted spot—assuming (hoping?) that their provenance would not match the contexts of violence and injustice that marked the history of colonial human remains collections and colonial anthropology. But the lecturer confessed that she did not know the exact answer to my question and added in a serene and joyful tone, in response to my apparent anxiety, that those skulls must have come from the medical college. In that moment, I took her answer as a pass for my ethical self-doubt, as I understood by then that the access to human remains for anatomical educational purposes was a procedure that, albeit also subjected to ethical deliberations, much differed from colonial contexts in which human remains were looted. However, the question of the provenance of those skulls still haunted me at times, and when I repeated the interrogation some classes later, the professor responsible for the lab shared that those very same skulls were already there when she did her own training at the College, so they must have been there much before, perhaps since the 1970s. While this ethical unease haunted me throughout my participant observation,[111] I decided to continue my apprenticeship in anthropometry particularly because I still wanted to remain open to understanding this method beyond the historical record that associated it with racial anthropology. In other words, I paused the historical and ethical condemnation of anthropometry, giving it the benefit of the doubt (and careful to not project any perhaps specifically European ethical bias onto that scientific situation in Pune). Aware of

[111] Through further research I found out that most human remains used in educational institutions in India were "unclaimed" bodies and that India even exported remains to colleges in other countries, like Libya, where bodies could not be obtained from the local population due to religious-ethical impediments (Habicht, Kiessling, and Winkelmann 2018). This knowledge does not solve my ethical unease, given that most unclaimed bodies came from the poor and mentally ill, a fact that I remembered from public discussions in Brazil, where historical research denounced the mistreatment and death of said "mentally ill" patients and the subsequent commercial trading of their remains to medical colleges, which took genocidal proportions during the Brazilian dictatorship from the 1960s until the 1980s (Matos-de-Souza and Medrado 2021). Ethical reconsiderations around this issue also led to the International Federation of Associations of Anatomists' recommendation in 2012 that only "donated bodies" be used for anatomy teaching and research (Habicht, Kiessling, and Winkelmann 2018).

this ethical tension, I aimed to grasp, ethnographically, possible other, non-racializing uses and effects of this method.

On that first day of class in the "anthropology lab", the lecturer quickly introduced the method and explained "the Martin and Saller craniometric index system", which we would be using for the measurements and indices taught in the course, an index system that stems from Martin and Saller's anthropometry textbook (1966; see Chapter 2). She then distributed a 5-page form to each student (including me), with a list of all measurements and indices that we would take of a skull. At the top of the first page, we filled in the "specimen number", our name, and date. My specimen number is 4, a rather not-so-big skull if compared to the skull picked by the student on my left, who smiled a lot while examining the big skull in his hands. The students, including myself, worked in pairs. With a skull in one hand and a caliper in another, the instructor quickly demonstrated how to take each of the first five measurements of the list, which were grouped as "Length measurements on Neurocranium".[112] Using a caliper, she only showed each measurement once; I was anxiously hoping my lab partner would be better than me at memorizing the different measurement points. Other students also found it difficult to remember all the bone points and which caliper to use to measure the imaginary line between those points: while we were doing our exercise, we often asked the lecturer again what each measurement meant and how to do it. The lecturer handled the class straightforwardly, with the confidence of someone who has done this several times; only for one or two measurements (out of dozens of them) she had to consult a book with drawings where all the measurements were listed (See Figure 15 below).

[112] The measurements were: Maximum cranial length (1) g-op, "Glabella inion length (2) g-i", "Nasion inion length (2a) n-i", "Glabella lambda length (3) g-l", "Nasion opisthion length (5-1) n-o", and "Length of foramen magnum (7) o-ba".

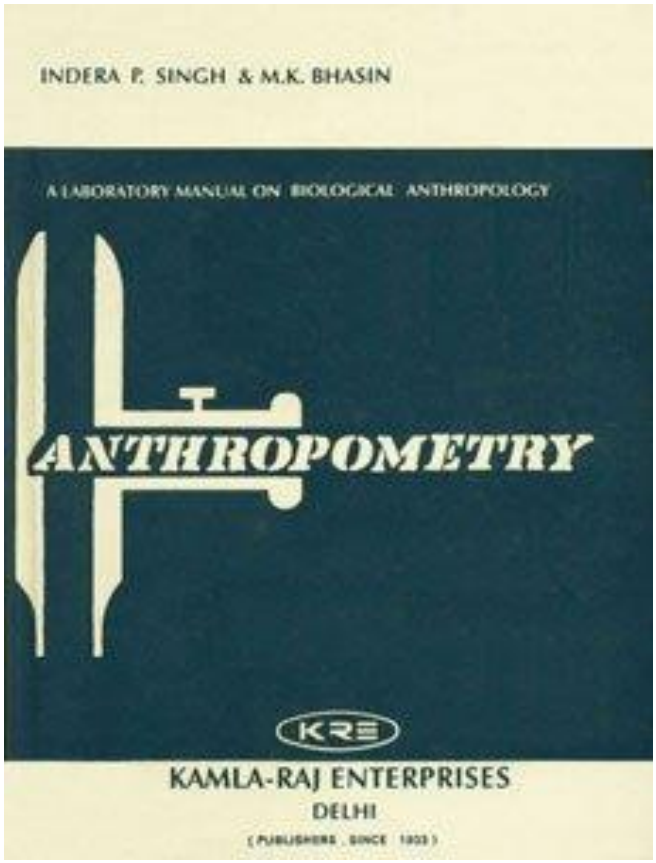


Figure 15: Cover of anthropometry textbook used in anthropometry classes in at least two different universities in Pune.

The book, *Anthropometry: A Laboratory Manual on Biological Anthropology*, was used in the anthropometry courses both at Pune University and in the Deccan College. The book was first published in 1968 and last in 2008. Its authors Indera Paul Singh and M. K. Bhasin dedicated the book to their teacher Biswas, who also wrote the foreword; Karve and Martin are featured in the references. The book is basically a translated summary of Martin's famous *Anthropologie* textbook, which was possible also thanks to Indera Paul Singh's German language skills and training in physical anthropology in Germany in the early 1950s.[113]

Besides the textbook, the legacy of German physical anthropology was also present in the instruments used in the anthropometry courses. In my first visit to Pune University's Osteology Lab, a professor showed me several instruments that followed Martin's design: a cubic craniophor (the instrument used by Karve in her craniometric research in Berlin), an anthropometer or anthropometric rod, besides the instruments I first handled in the craniometry classes at the Deccan College: a spreading caliper and a sliding caliper. In addition, the professor showed me three objects with clear engraved signs of their German origin. The first was a black leather covered case that contained a hair color and hair texture chart, with an

[113] Interview with B. V. Bhanu, Pune, 20 Sept 2017. The *Beginners' Manual of Anthropometry* (Juvekar et al. 2019:19) also credits Martin for the measurements listed in Singh and Bhasin's book.

imprinted mark of the piece's fabrication in Kiel, Germany. This piece was famously designed and popularized by Eugen Fischer, and I had found the same instrument in the files about the German anthropologist in the archives of the Max Planck Society in Berlin. The other instruments were also used by Karve (see Chapter 2): The second instrument was a two-piece skin color chart with 36 colors designed by Berlin-based anthropologist von Luschan; The third was an eye color chart, with an engraving on the back of its metallic box: "Augenfarbe-Tafel nach Rud. Martin und Bruno K. Schulz, [address] München", abbreviated German for "Rudolf Martin's and Bruno K. Schulz's eye-color chart, [address], Munich". Once part of the standard equipment in this racial anthropological school, these three instruments are not used in the training of students anymore, the Pune professor noted; especially useful for the anthropometry classes were the calipers and anthropometric rod, as I would see in the following months.

In sum, this assemblage of anthropometric measurement devices—among working and retired ones—demonstrates two aspects that relate to the history and geography of these instruments' circulation in relation to racial anthropology. First, it shows how certain instruments are more used today than others, which might have different reasons. Some instruments might have stopped being used because they have been associated with certain theories of race that are deemed outdated or locally less relevant (like the eye-color chart: after Karve's Mendelian elaborations on the eye-colors of Chitpavan Brahmins [1931a], no other anthropologist in Pune devoted their research to studying eye-color variation). In addition, instruments might lose applicability as they are considered more difficult to handle or teach to students: as I learnt from a lecturer, this was the case of Martin's cubic craniophor, which was never taken out of the lab cupboards during the classes I participated in. Other instruments have been supplemented by a new technology with the same purpose: for example, the skin-color chart was substituted by a photometric device, which was used in the current research on skin-color variation in Pune, as I will show in Chapter 6. But even then, all these instruments are still materially present in the spaces of anthropometry training, where they have been stored and accessible to students. As such, these retired instruments are seen by students and faculty as historical artefacts in the history of physical and biological anthropology, materially bolstering the case for the historical value of anthropometry. This is not irrelevant for the continuation of the teaching of anthropometry: in fact, the status of anthropometry as a "historical method" in anthropology was per se a justification for the continued importance of this method in syllabi, as I will discuss later.

Second, this assemblage of anthropometry objects in the Pune labs makes evident the links to a transnational network of a tradition of physical anthropology that once had its central nodes in Germany. We can see this in the imprints attesting to the provenance of the instruments as well as in the clues about the anthropometry books and their authors' intellectual background (B. Das 2008 [1961]; Singh and Basin 1989 [1968]). While I argue throughout this thesis that this transnational linkage has been made stronger through the training of key Indian anthropologists in Germany, like Karve and Biswas, as well as a generation of anthropologists after them, others have shown the global capillarity of German racial anthropology through the material manifestation of its instruments in other places, for instance in South Africa's Stellenbosch University (Walters 2018). In this example, given the context of higher sensitivity towards racism in post-apartheid South Africa, the recent "re-discovery" of these instruments in "dusty store cupboards" in that university space has triggered considerable public repercussion, with discussions that linked the instruments to scientific racism and eugenics (Newling 2013; Robins 2013). Thus, these instruments, especially the ones that were most obviously designed to measure specific traits that are now—as a result of the popularization of racial sciences—widely understood as racial—like skin, eye, and hair colors as well as hair texture—, manifest a present bond to the ghosts of racial anthropology (Walters 2018).

In connection to these instruments' origins, another relevant aspect regarding the assemblage of anthropometric objects in Pune has to do with the political economy of the transnational circulation of racial knowledge. As we have seen, the influence of Martin is perceptible in the lists of measurements, the textbook, and in the instruments used in class. A few of the instruments in both laboratories in Pune were purchased directly from Martin's home country of Switzerland, where at least one company still fabricates craniometric and somatometric devices in the original Martin design, advertising them as having "the highest levels of Swiss quality craftmanship" (see Figure 16 below).

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Figure 16: Excerpt from webpage of Zurich-based distributor of Martin's anthropometric devices, a Swiss services company that is specialized in Asian markets. Source: https://www.dksh.com/global-en/home/technology/product-search/anthropological-instruments, accessed November 4, 2020.

The price for these original anthropometric instruments can be very high, especially given the often-shrinking budget for such costs in anthropology departments in India. This has led to different manufacturers in India replicating Martin's design and selling their instruments for a

much more accessible price.[114] In some cases in the past, the instrument would be manufactured in India and sent back to Europe due to legal reasons before being sold in India again, which meant an enormous increase of the price: the royalties paid to the European companies, added to the transportation costs, were often much more expensive than the fabrication cost in India.[115] In another case, a Pune-based anthropology professor tried to adapt an expensive instrument and commissioned its production to a local manufacturer, but found the result disappointing.[116] On different occasions, the anthropometry lecturers lamented about the high prices of the original, often better-quality instruments, which could hardly be afforded by their university departments' small budgets. Aware of these structural constraints, professors sometimes angrily reprehended students for their clumsiness or "lack of care" in handling the anthropometric instruments.[117]

Thus, the financial question in the production and circulation of anthropometric technologies point to an important aspect in the global geopolitics of this field of knowledge. While I will further discuss this issue in the next chapter, here we can already see that Europe's once centrality in the production of racial knowledge corresponds today to the direction of the money flows in the global markets of anthropometric devices. Despite some local efforts in adapting—and improvising the production of—these technologies, the continued fabrication of expensive Martin's "original design" instruments in Switzerland attests to an asymmetrical relation, in which Indian scientists' sovereignty is compromised by their dependency on a European knowledge tradition, with the material—and intellectual—costs that this entails.

In a nutshell, in this section I have shown different materials that composed the spaces of teaching and learning anthropometry in Pune. Exploring the presence and history of different objects, we have seen different links of this practice to a tradition of physical (racial)

[114] Interview with B. V. Bhanu, Pune, 20 Sept 2017.
[115] As a lecturer explained, this transnational boomerang trajectory used to be the case of the harpender skin fold calliper, a somatometric instrument that is now produced and directly sold in India for 10% of its former price.
[116] An anthropometry instructor told me that she commissioned someone in Pune to manufacture an instrument called osteometer, an instrument used to measure long bones like the femur. The plan was to copy the expensive original foldable design so that she could take it with her in field trips to archaeological excavations. However, the local manufacturer used massive wood, making the instrument much heavier than the light original design. The lecturer is now used to measuring bones with a simple measuring tape. She lamented that importing original instruments is very expensive and her institution does not have the money for that: "our budget is in thousands—of rupees", she joked (one euro equaling ca. 90 rupees at that time).
[117] On one occasion an anthropology professor who was passing by the osteology lab stormed into the anthropometry class and angrily called out the students for placing the measuring calipers on the table in an inappropriate way: the instrument's scale component should be facing the table, he said, otherwise the instrument would eventually bend and its accuracy would be permanently compromised, and this had already happened to some of them as students of previous semesters "did not take care".

anthropology that was once strong in Germany. We have also explored questions related to the ethics of human remains and the global geopolitics of science. While this section relied on historical reconstructions to sense such ghosts of race and make them clearly visible, in the following I will analyze situations of anthropometric training with increased attention to how human bodily differences were enacted and with what effects.

4.3.2. Training the touch

Touching has a prominent role in the practices of physical anthropology and anthropometry. In the colonial history of those practices, scholars have offered different conceptualizations on instances of touching in the con-*tact* (Pels 1999) between anthropologists-anthropometrists and studied subjects. While some scholars have highlighted the invasiveness and violence of, for instance, the practice of producing facial casts on colonized bodies (Berner, Hoffmann, and Lange 2011), others have discussed the mutual difficulties and tensions of the measuring practices in such colonizer-colonized encounters (e.g., Schüttpelz 2005). Pointing to such difficulties, Geertje Mak (2017) calls attention to how the touch—of bodies and instruments—had to be standardized to secure a sense of objectification of anthropometric methods.[118] Following the work in Dutch New Guinea of a physical anthropologist who was instructed by none other than Rudolf Martin in the beginning of the 20th century, Mak (ibid.:328) discusses how the training of the touch had the goal of obliterating "subjective embodiment" and "enact[ed] a particular version of 'race'". The historian reminds us that Martin—worried about the comparability of anthropometric data crafted by so many anthropologists in colonized territories around the globe—invested his career in a universalist endeavor of standardizing physical anthropology. The German-Swiss anthropologist devoted hundreds of book and article pages with meticulous descriptions on how to handle the instruments and locate the measuring bodily points through use of sight and touch. For each instrument and measurement, Martin wrote lengthy descriptions of bodily movements, both for the anthropometrist and for the positioning of the person being measured.[119] On the reverse side, one can say he was aware

[118] On the ideal of mechanic objectivity in anthropometry as a counterpoint to a researcher's subjectivity, see also Hanke (2007:153–154).

[119] This is perceptible, for example, in his descriptions of his most famous instrument (re)design, the anthropometer, and of how it should be used to measure a person's height: "To have their body measured the individual has to stand up straight against a flat surface, either leaning with buttocks and back (not the back of the head) against a wall or stake or without touching the surface, naked or in very light underwear, without shoes. Their heels should also touch the wall. The axes of the feet should be directed slightly outwards. The arms should be stretched as much as possible and should hang down beside the body with the palms flat against the side of the thighs. If there is no flat surface the individual has to stand on a low box or perhaps on an assembled portable board of no less than 70 cm square which should be perfectly horizontal; to be checked with a spirit level. If there is no vertical surface, you should observe the full stretching of the body very keenly and position the

of the volatility of the anthropometric method and of the risk of undermining comparability—therefore the importance of standardizing the anthropometric touch and tact.[120]

The difficulties in training—and embodying—the anthropometric touch to reach the envisioned mechanicalness of this method became evident during my apprenticeship in Pune. As my peers and I learnt to take measurements on human bones and bodies and submitted our own bodies to measurements, we felt the importance of—and great nervousness around—fine-tuning the touch to a precise anthropometric movement. In the following, I examine two main aspects of the training of the touch in anthropometry courses: a) the standardization and urge to (a seemingly unattainable) precision in the touch; and b) the affects involved in such difficult touching, which ranged in different facets of nervousness, from excitement to unpleasantness and pain, often mediated by laughter and humor.

The touching and handling of the different instruments took a considerable part of the anthropometry training. The lecturers usually started each class by introducing the instruments, taking time to explain each instrument and their different numeric scales, and shared some practical tips on how to use them. For example, when introducing the spreading caliper, a lecturer explained that one should place each of the two pointy edges respectively on the left and right thumbs, so that we could have more control over the movement. Tips like this proved to be very important in handling the instruments in the way that was envisioned by the method, as this could have a considerable effect in the numeric outcome of the measurements.

But learning to handle the instruments with precision was not easy. The difficulty in handling these instruments became apparent already in my first anthropometry class: while I held the skull #4 in my hands and my class partner operated craniometric measurements on it, the caliper fell from her hands and got dismantled. Failing to reassemble it at first, we were then helped by the lecturer and another student who taught us how to do it.[121] Furthermore, in one of the first classes of the other anthropometry course I attended, the difficulty in handling the anthropometer (Martin's most famous design) was perhaps analogous to the length of Martin's very long descriptions about how to use it. In that class, we mounted the anthropometer rod to

anthropometer for measuring body length not in the front, but behind the individual" (Martin 1914:104, translated and quoted in Mak 2017:337).

[120] As Mak (2017:337) puts it, Martin's "precise prescriptions and order of where to put hands and instruments in relation to the measured person, how to move, where to look, together with the demands for continuous practice, were clearly meant to make these acts into a blind, automatic routine which would be the same for every anthropometrist, in any situation. The touching of measurer and the measured had to be mechanized."

[121] At the same time, the instrument's capacity to be easily re-assembled might also account for its long circulations and historical success (see Laet and Mol 2000).

take three different height measurements: from iliac crest (or highest part of the pelvic bone) to floor; from acromion (or highest pointy end of clavicle) to floor; from middle finger as the arm stays along the body to the floor. A student holding the rod exclaimed: "It's hard to keep the rod straight!" The lecturer and the students talked about how there was no appropriate spot in the lab room for that—one would need a straight floor next to a long free wall, which was not available in the crowded little room. It took five students to operate that instrument: one measured, another held still while being measured, a third took notes of the measurement numbers, another held the rod (as there was no wall), a fifth moved the caliper on the rod, while the two latter read out loud the measurement and located the measurement points on the measured body. Later that day I asked the instructor how one would achieve precision in the measurements in fieldwork in rural areas, for example, where many houses were circular and probably did not have even flooring: they agreed that such measurements would be very difficult then.[122]

Besides the difficulty in handling the instruments, finding the precise bodily points to be measured proved to be quite complex. A lot of emphasis in the observed anthropometry courses was placed in training the anthropometrist's touch onto the measured body in order to locate the bodily points to be measured with the precision envisioned by the method. Throughout the courses the lecturers gave many practical tips on how to use touch and vision to spot the specific measurement points. In some cases, the boundary between the cultural and the biological on the body was collapsed: for example, to locate the ophryon point on the head, she explained that "it's right there where the women place their *bindi*", the colored dot worn on the forehead by many Hindus and Jains, including the lecturer herself. I joked: "what if they don't have a *bindi*?"; some students laughed. For other measurements, she would explain how to locate the bodily points in relation to a piece of clothing aloft (e.g.: "watch the sewing thread for this exact shoulder point"). She often used the thinnest student in the room as a model, onto whom she would touch, identify, and show the points that established the beginning and the end for each linear measurement. In addition, she precisely described hand or finger movements that she would use to identify the points. These examples demonstrate the importance of training the touch to achieve the level of precision required by the standardized method of

[122] Later, the lecturer also alerted that the unevenness of the floor could also affect head measurements. This also relates to Hanke's (2007) observation on the logics of anthropometry-based physical anthropology: the mechanical objectivity envisaged by this method did not solve the perspectivity problem.

anthropometry, and how much effort had to be placed in solving this issue by the lecturer's pedagogy.

Moreover, the requirement of precision in anthropometry was also at odds with affective bodily reactions that accompanied the practices of measuring or being measured. Learning how to navigate this bodily encounter sensually and affectively in the anthropometric practice proved to be quite important for the method's precision. In this sense, the instructor taught us how to bodily approach the "measured subject". The measured person should not move during the measurements (which, as I was measured, felt very difficult). Therefore, some tips were shared on how to avoid that the measured person would get uncomfortable and move. In one class, the student being measured was supposed to stand still but, nervous and holding in her laughter, moved a little bit. "She is getting conscious! Don't make the subject conscious!"—the teacher screamed, friendly, but serious. That day she gave us a hint that she would repeat several times throughout the semester: "Always take the measurements from the back side! Otherwise, subject gets conscious!" The instruction of measuring a person from their back was also prescribed by Martin (1914:132–133). But another interesting aspect that becomes evident through the repetition of this hint by the anthropometry instructor is how anthropometry envisions and needs an immobile body to be measured, one that is best measured when it does not "get conscious". In this sense, we can think that, similar to the anatomist, the anthropometrist envisions a human body that is devoid of consciousness, one that should not react to the practices of measurement.

However, if the unpleasantness of being measured was not verbalized, it was often bodily translated into anxious smiling, laughter, nervous sweating, and occasional screams of pain, which often disrupted the envisioned precision of the measurement. My own memory of these classes in which I was measured is filled with the bodily memory sensation of having my flesh and skin being uncomfortably touched, pressed, and pinched by many different metallic and cutaneous surfaces. These affect and bodily sensation accounts of these anthropometric measurements complements the (rather sparse) archival record of reactions to anthropometric measurements since colonial times, adding to the reports of unpleasantness and pain suffered by the measured persons (e.g., Berner 2011).

The unpleasantness of measuring was especially striking when we got to measure "body fat", a measurement that required a precise coordination between holding the instrument (which operated by pressing chunks of folded skin and subcutaneous fat) and clock-time counting.

This measure, as we learnt, was particularly relevant for the study of human nutrition. The lecturer instructed us how to measure "four internationally known skinfolds" on the basis of which we could calculate body fat. She carefully explained how to use and read the instrument and gave a lot of instructions on how to take measurements: how to find the measurement height in the arm, step by step how to identify them, which hands to use and where on the measured person's body, how to handle and hold the instrument in a specific angle in relation to ground, how to place it on the skin, and even how to count to five in a standardized way. If one needed to repeat the measurement, one should wait two minutes, because fat changes shape when pressed.

Despite all these instruction efforts, the numbers produced by these body fat measurements—and of many other measurements—varied greatly depending on the measurer. The lecturer asked the students not to copy from each other's measurements, so we could verify if there was variability among our own measurements and, indeed, the results did vary a lot. In addition, the overall performance of the students' in a practical test demonstrated the difficulty of the task of memorizing—or embodying—all the precision movements that were required to undertake the measurements: with a few exceptions, students got bad grades. "We freaked out because there was so much to study", a student whispered to me in the class after the exam, while the lecturer, with a serious face and pointer finger raised, held a long monologue in Marathi, with long silent breaks, commenting the students' poor performance in the first practical test. Despite the meticulous instructions given during the semester, the students often got confused about which kind of caliper had to be used (often mistaking between spreading or sliding caliper), they had difficulties finding the measuring points, or obtained disparate metric results from the measurements. I was not present for the exam, but from my observations in the classes I could easily imagine their difficulty.

Overall, my observations in the anthropometry courses confirms the historical record and critiques of anthropometry by attesting for the difficulty in achieving the measurement precision envisioned by the anthropometric method (see Theile 2005). In the craniometric classes too, the measurement results varied depending on how and where the caliper was placed on the skull, or on the kind of caliper used, or on which person operated it. Accordingly, the produced numbers also differed. In sum, the metric enactments of the methods taught in these courses were contingent on a series of conditions. Clearly, all this indicates the instability of the method and the precariousness of the precision and standardization envisioned by the

anthropometric methodology was evident in my apprenticeship. In other words, it shows the contingency of variability of the anthropometric enactments.

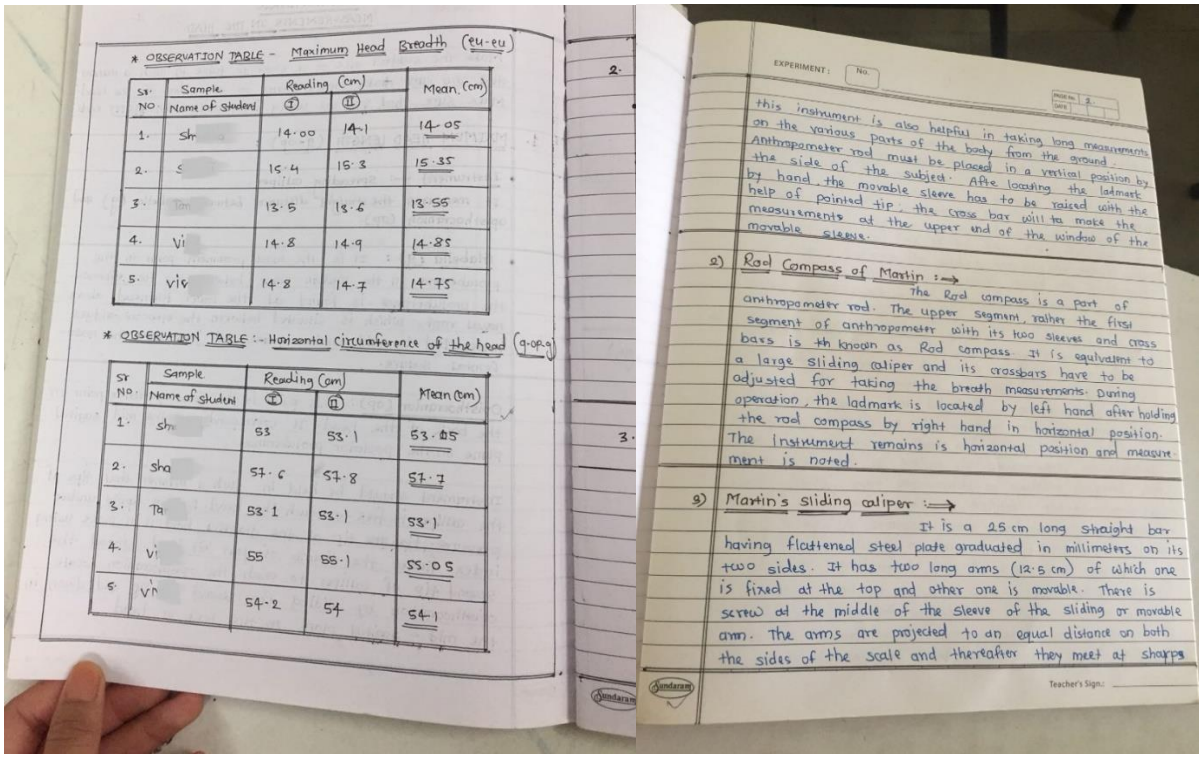
As a result, there were several situations in which impasses with differing numbers emerged in the classroom. But there also were different instructions on how to solve those impasses. Recurring to comparisons and eliminating deviant records in order to come to "normal" numbers were important strategies to stabilize the metric imprecision of anthropometry and key constituent steps of the method. In the next section, I will discuss how comparing was taught and learnt in these classes.

4.3.3. Training the comparative eye

A crucial step of the anthropometric method is the registration of the data generated from the measurements. A constitutive part of the training in anthropometry was how to register and control these metric data enacted from measurements on body parts. In a later moment, these data can be used for the calculation of prescribed anthropometric indexes[123] and for further computations that translate individual measurements to those of groups of people, generalizing them and establishing a categorical bond between measured individual and group of people.

The instructors in the anthropometry classes put a lot of emphasis on how to register and compute the anthropometrically generated data. In the classes I participated, each student was instructed to keep a logbook throughout the semester. On the logbook the students wrote down descriptions on how to find the bodily points, and how to use the instruments. More importantly, it's in the logbook that all produced numbers were registered: for each measurement, the students drew tables and diagrams where they could note down the numbers they enacted on different students. After each class, the instructor checked and evaluated each individual logbook.

[123] Martin described hundreds of anthropometric indexes in his Textbook (Martin 1914), many of which are also featured in Singh and Bhasin's (2008 [1968]) anthropometry book as well as in the more recent manual by Juvekar et al. (2019).



* OBSERVATION TABLE - Maximum Head Breadth (eu-eu)

Sr. No.	Sample Name of Student	Reading (cm) I	Reading (cm) II	Mean (cm)
1.	Sh	14.00	14.1	14.05
2.	S	15.4	15.3	15.35
3.		13.5	13.6	13.55
4.	Vi	14.8	14.9	14.85
5.	Vik	14.8	14.7	14.75

* OBSERVATION TABLE :- Horizontal Circumference of the head (g-op.c)

Sr. No.	Sample Name of Student	Reading (cm) I	Reading (cm) II	Mean (cm)
1.	Sh	53	53.1	53.05
2.	Sha	57.6	57.8	57.7
3.	Ta	53.1	53.1	53.1
4.	Vi	55	55.1	55.05
5.	Vi	54.2	54	54.1

EXPERIMENT: No.

this instrument is also helpful in taking long measurements on the various parts of the body from the ground. Anthropometer rod must be placed in a vertical position by the side of the subject. After locating the ladmark by hand, the movable sleeve has to be raised with the help of pointed tip, the cross bar will to make the measurements at the upper end of the window of the movable sleeve.

2) Rod Compass of Martin :→

The Rod compass is a part of anthropometer rod. The upper segment, rather the first segment of anthropometer with its two sleeves and cross bass is th known as Rod compass. It is equivalent to a large sliding caliper and its crossbars have to be adjusted for taking the breath measurements. During operation, the ladmark is located by left hand after holding the rod compass by right hand in horizontal position. The instrument remains is horizontal position and measurement is noted.

3) Martin's sliding caliper :→

It is a 25 cm long straight bar having flattened steel plate graduated in millimeters on its two sides. It has two long arms (12.5 cm) of which one is fixed at the top and other one is movable. There is screw at the middle of the sleeve of the sliding or movable arm. The arms are projected to an equal distance on both the sides of the scale and thereafter they meet at sharps

Teacher's Sign:

Figure 17: Two pages of a student's logbook in anthropometry class, the first with tables with fellow student's head measurements values and mean values, the second with descriptions on Martin's instruments. Source: Courtesy of student, photos taken by me (names were digitally erased).

The visualizations of metric data in tabular and graphic form are important for several reasons. As Veronika Lipphardt and Marianne Sommer (2015) note, the technologies of visualization that granted the "diagrammatic renderings" of diversity played a crucial role in physical and molecular anthropology (see also: Hanke 2007; Müller-Wille 2021). A key role of the visualization of the data is the facilitation of further computations and comparison of large amounts of data, which are key for classifications (Hanke 2007:45–46). As the students learnt in class, the first step to be taken on basis of the tabular visualizations was the double-checking of numbers that, in comparison to other numbers for the same measurement, were much out of the expected. This could allow a second (or third) attempt to take the measurements that had sparked any doubt. In some cases, these outstanding numbers were simply excluded.

Comparability and the controlling of measurement numbers through the taming of outstanding results was emblematically evident in the following classroom situation. The lecturer first explained how to measure abdomen fat and then split the class by gender: male and female students had to do the measurement separately. While the female group waited outside, in the lab I found very difficult to "feel" with my fingers whether the portion of the student's abdomen side that I was grabbing was indeed just fat or if there was also muscle. I was curious—and

anxious—to see how my measurements were in relation to other students'. Anuj[124] was the first to take the measurement of the fat the side of my abdomen: He grasped carefully with his fingers on the spot to be measured; he then found the measurement of 8.4. First, I was surprised (and somehow relieved) that this measurement of mine was so low, especially when compared to other students (I saw that another student's was 13.4). I commented on this out loudly, and the lecturer replied: "Europeans have better distributed fat". Before I could react, she asked me, in a confirmation tone, where I was from, and I explained that I was from Brazil, but, yes, I had European roots, mostly Iberian Sephardic as far as I could tell, and indigenous South American roots too. To this, she quickly replied "so: yes". Three students discussed about my low measurement, comparing it with their own measurements. Then, a second student repeated the measurement on me. His hand movements on me felt more confident and less careful than Anuj's, which made my abdomen red and bit hurt. He arrived at a new value that was almost three times higher: 24.4. The students and the lecturer discussed this difference. To solve the controversy, the instructor then took a third reading. Her measurement on me produced the number 12.8; we settled on her value, and students wrote it down on their class logbook. I was a bit surprised that this value was almost the same as the other student, who, or so I thought, looked like he had more abdomen fat than I do.[125]

Thus, this situation in the anthropometric course entails three key aspects that I discuss in this and the next sections: 1) comparability; 2) the active and processual enactment of numeric values (here through the remeasurement and selection of the mean value) and the construction of "normality"; and 3) the ahistorical bodily vision in anthropometry, which is here observable in the way that the instructor simplified the description of my historically deep-running family genealogy and classified me in a single present-day continental category. While I will explore this latter aspect in a subsequent chapter section, in the remainder of this section I discuss the first two.

As for comparability: If only anecdotal in the situation above, the instances of comparability—and the feelings accompanying them—that arose from visualizing the data of different measured bodies was very pervasive in the anthropometric classroom. Comparing each other's measurements was also accompanied by a sense of humor, sometimes fostered by the lecturer herself. Such humor sometimes worked to disguise nervous situations—or to make them more

[124] Pseudonym.
[125] Later that day I would decide to join the local gym.

socially bearable, sublimating negative affects, as anthropologist Donna M. Goldstein (2003), drawing from psychoanalysis, reminds us.[126]

In other situations in the anthropometry courses, humor and laughter brought to the fore implicit hierarchies in the comparative perceptions of the measurements. One example of the unveiling of classificatory hierarchies through humor happened in a craniometry class. In that class, we calculated the nasal index from skulls and read their values out loud to the lecturer who then told to each number, reading from a table in a book, if each cranium's nose was classified as broad, medium, or thin. The skull I was working with, specimen #4, was classified as medium. When another student read his number out loud, the lecturer responded, in a slightly mocking but careful tone: "yeah… that's a broad nose!", making all students smile or chuckle. In this situation, we can see how humor was deployed as a non-verbal comment to the negative associations with the racialized feature of nose breadth.

Measuring noses has long played a key role in anthropometric comparisons and racial classification in the Indian subcontinent, at least since Risley's effort to measure noses as a key variable to determine the Aryan ancestry of caste groups (see Chapter 5). Interestingly, "nose breadth" was the only measurement that sparked a measurement refusal in a class: a student from a country north of the Indian border shyly asked the lecturer to be exempted from the measurement. Analogous to what Savannah Shange (2019), Audra Simpson (2014), and Schramm (2005) have written about ethnographic refusals, this instance of anthropometric refusal in the classroom is per se very telling. Given the popularized association between racialization and this facial feature or between a "broad nose" and an inferiorized racialized position, we can understand the student's refusal to be measured as a micro-act of resistance against being put in such a racialized position. Later in that same anthropometry class, as I became aware of the spirit of comparability in class and of the lecturer's quick classification reflexes (as she promptly classified me as European), I personally hoped that my measurements would contradict the racialized expectations embedded in the method. But I was frustrated and embarrassed when the lecturer, after observing a measurements table, loudly stated that I was the student with the "the finest nose". Here, too, in the description of nose breadth variation, the commonly used word choice that is in binary opposition to "broad" is not incidental: "fine", just like "normal", is not devoid of an evaluative connotation. The semantics of anthropometric

[126] In her work on laughter in violent and structurally strenuous living conditions of women in a Rio de Janeiro's shantytown, Goldstein (2003:10) writes: "humor […] does open up a discursive space within which it becomes possible to speak about matters that are otherwise naturalized, unquestioned, or silenced."

classifications in this case reflect the hierarchical values connected to racialization, by which positive connotations tend to be contained in terms used to describe characteristics associated with said superior racial traits.

Furthermore, the making of numeric values in the anthropometric courses is considerably insightful for a critical understanding of the anthropometric enactment of difference. In the class in which my abdominal values were measured, as in many other classes, a crucial component in the enactment of anthropometric numbers was evident: comparing measurement numbers in a table and spotting those that seemed to be "deviant" or "abnormal" was something the students were taught throughout the courses. With this step, errors were meant to be identified and tamed, sometimes through remeasurements, somethings through statistical maneuvers where mean or normal numbers were identified or computed.

What both influences and is confirmed by this numeric taming is a sense of normality. The idea of "normal" plays a key role in anthropometric enactments. For instance, in a class, after a student measured my body mass index (BMI), I asked if that number was good or bad, and, as she hesitated to respond, I also asked if there was an ideal number. Two students and the lecturer responded, in a joyful and orchestrated manner: "there is no good or bad". "There is no ideal, there is *normal*", added the lecturer. This situation speaks for the centrality of "normal" in anthropometric and the (dis-)associations between "normal" and "ideal". In order to understand how the idea of "normal" relates to the enactment of anthropometric differences, in closing this section I will unpack the effects of this concept in my anthropometric apprenticeship, in conversation with a literature that critically analyses anthropometry and statistics.

In statistical sense, "normal" is commonly understood today as the "symmetric distribution where most of the observations cluster around the central peak and the probabilities for values further away from the mean taper off equally in both directions" (Frost 2020:61). Oriented by this idea of symmetric distribution, extreme values in both tails of the distribution are considered to be unlikely. Interestingly, the theme of symmetry was also entailed in the lecturer's expectation concerning what was *normal* or not in the measurement of lines that occur on two sides of the body. In some situations in osteometry class, we had to repeat the measurements on students when there was a disparity between left and right. According to the instructor, in an arm-to-floor height measurements for example, "up to 1cm difference is ok! If more, the measurement is wrong!" Besides pointing out a selection bias oriented by

morphological symmetry, this instruction demonstrates how *normality* in the anthropometric practice was connected to an idea of symmetric body normativity.

Both symmetry and a sense of ideal configure the background of a sense of normality. Regarding the association between "normal" and "ideal", Hacking's (1990:165) explanation on how "our modern usage of the very word 'normal' evolved in a medical context" is clarifying: people were considered normal if they conformed to the central tendency of social and personal laws (which are a matter of probabilities) while those at the extremes were pathological. Following the popularization of this idea of normalcy as healthy in 19th century French positivist social sciences, "normal" became a placeholder for something that is to be achieved, with the positive connotation of "ideal" and corresponding to progress.[127] It also became commonly understood as a synonymous for "typical" or "usual" (ibid.:161).[128] Also in early 20th century German physical anthropology, typological racial classifications operated on basis of an association between normal and types, where a normal distribution of selected markers informed the identification of a racial type (Hanke 2007). Thus, oriented both by symmetry and idealness, the anthropometric sensibility, aiming at arriving at mean values or types, was trained in a way to spot and eventually exclude "abnormal" numbers.

But this configures part of the problem that relates to the effects of "selection" in anthropometry: due to a bias produced by an orientation towards normality, abnormalities tend to be actively de-selected.[129] In Chapter 2, we have seen that Karve, too, consciously de-selected numbers—and bodies—that fell out of the normally expected for those groups those bodies were supposed to stand for. As a result, the range of possible deviance is sharply diminished not only in further statistical generalizations but already in the process of measurement. Therefore, this controlling for abnormalities has a crucial further (side-)effect: the range of normality itself is reduced. Similarly to what Mol (2002) noted in the calculations of disease risk statistics, this sort of corrective practice has the effect of establishing a spiral loop towards *normality* in anthropometric calculations. In this fashion, as numbers that fall out

[127] This association of normal and ideal differs from a eugenicist orientation in anthropometry that was put forward by Francis Galton: in such racial hygienist view, the other-than-normal values that were associated with positive traits were the ideal values that eugenicist interventions should aim at (Hacking 1990).
[128] Therefore, today, as Hacking (1990:163) puts it, "[o]ne can, then, use the word "normal" to say how things are, but also to say how they ought to be. The magic of the word is that we can use it to do both things at once. The norm may be what is usual or typical, yet our most powerful ethical constraints are also called norms."
[129] This insight draws from Nancy Leys Stepan's (1986) elaborations on selection bias in physical anthropology. She explains that "anatomists and anthropologists unself-consciously searched for and selected measures that would prove the desired scales of human superiority and inferiority" (Stepan 1986:272).

of the expectedly “normal” tend to be tamed or discarded, the effect of this circular movement is a contraction of the “normal” range.

Such contraction of the “normal” in anthropometry is not inconsequential. In fact, its ontological consequences are particularly salient given how normalcy, in anthropometry, is co-shaped by an idea of body symmetry and body normativity. Although the anthropometry lecturer gestured towards a strict mathematical sense of “normal” when, during a class, she emphasized the separation between “the ideal” and “the normal”, it is hard to separate the term from its compelling and loaded valuative connotations. This was also perceptible in several instances in class when students were anxious about their own bodily measurements falling far of the “normal” values. Thus, the normalcy in the anthropometric enactments of the body is both influenced by and reinforces an idea of body normativity. One effect is the tendency towards exclusion or invisibilization of the “abnormal” and the “asymmetrical”.

Yet comparisons were not simply done to eliminate error and produce normality. As the next section will discuss, making numbers and comparing them is intrinsically linked to another essential step within the anthropometric method: categorizing and classifying.

4.3.4. Categorizing and classifying

The enactment, tabular computation, and comparisons of anthropometric data go hand in hand with their categorization, grouping, and classification. During the anthropometry courses, while numbers were profusely enacted and computed, thinking in categories for further comparisons took place often instantaneously. In this section, I will discuss the relation of anthropometric enactments vis-à-vis continental and national categories, with attention to some effects of this process as well as its racial legacy. Examining this will help us reassess the question of the dis-association between theory and method in the uses of anthropometry. I will conclude by looking at other kinds of categorization and classifications at play in the anthropometry courses.

Instantaneous classification with use of continental and national categories happened, for example, in one of the first anthropometry classes I participated in. Right after I was measured with the anthropometric rod, a student joked: "We Indians measuring a European! It's usually Europeans who measured Indians!" While I admired his perception about asymmetric relations in the history of anthropometry, I felt like I needed to contradict his remark about my position, but another student was faster: "Well, he is not European... Right?" and looked at me for confirmation. The instructor, who was watching the whole scene, pointed at me and exclaimed

"Look! His earlobes are closed!" All fifteen students gathered around me and stared at my ears; some touched their own ears comparing them to mine. Pointing at the student next to me, the lecturer said: "Yours are open!" I looked around and glimpsed at everybody's ears. I spotted that the other non-Indian student—the one who later would refuse to have her nose measured—also had closed earlobes, so I told everyone about it, but the lecturer contended: "No, hers is just a bit open...", which intrigued me (I was quite sure they were closed). "Are closed earlobes a European thing…?", I asked, testing the lecturer. "Yes, it's recessive! We Indians have open earlobes!", she responded. "What about indigenous South American people?", I asked. She said she didn't know.

Thus, in this anthropometry course situation, we can see that a hereditarily determined bodily trait (earlobe shape) was singled out not just to operate a distinction from one person's body to the rest, but, through associating bodies with group categories, to also mark a distinction between two whole (sub)continental groups of people. In this move, Indianness is defined with a certain trait (putting the only non-Indian South Asian person in the room in an uncomfortable classificatory position) and contrasted to Europeanness, where I was supposed to fit. Thereby, Indianness gets biologized in certain physical traits and, as a result, those who do not fit in the picture mobilized by the assertion "*We Indians* have open earlobes" are relationally othered, excluded from a normal/typical biological Indianness.

In other classroom situations, the quick tendency in giving in to a continental classification as an explanation for certain physical traits was in clear tension to other theories about heredity. In one class, for example, this resulted in contradictory remarks about the relationship between hereditarian and environmental factors in determining bodily difference. In this class, we learnt about stature estimation based on human bones and the professor said that change of nutrition has caused an increase in stature. I commented that I could see this clearly in my family, as I am much taller than my much older siblings and my parents. Then, we compared average heights between India and Brazil, she laughed about her short stature and commented on mine: "yeah, Europeans are taller".

As the two situations above exemplify, different anthropometry lecturers repeatedly insisted on classifying me as European as an explanation to a perceived or enumerated difference, sometimes contradicting other theories that explain bodily difference. Contrary to what I first thought, this was not just caused by a confusion based on the fact that, although I introduced myself as Brazilian, I was enrolled in a German university. Rather, classifying my body as

European is a reduction of complexity entailed in the many ways bodies and, by classificatory extension, groups of people can be perceived and anthropometrically enacted to be different. This is guided by an urge to classify according to existing categories which were, in these classroom situations, (sub)continental categories, regardless my own doubts about this classification given how my ancestry does not fit easily in a single discrete continental category. In this sense, taxonomizing my body in such a way was a shortcut to a classificatory scheme that disregards complex genealogies and only considers a set of physical traits (including stature, nose breadth, and earlobe shape in this case). Thus, the anthropometric method enacts a set of data from a present body, which can be in tension with other historical or genealogical knowledge about that body and its ancestors. In other words, the picture apprehended by anthropometry and its ensuing classifications is temporally static and ahistorical.

At the same time, anthropometry and its accompanying categories serve, therefore, a classifying function that establishes a relational link between individual and group. As Mak's (2017:344) historical analysis of anthropometry points out, "the descriptions and measurements as such, disconnected from such a comparative scientific program, do not 'tell' much". Without assembling data and establishing comparisons, the method has no function. As "enumeration requires categorization" (Hacking 1990:6), the profusion of numeric data enacted by anthropometric measurements needs to be assembled and organized in categories so that further classifications and comparisons can take place. In this sense, anthropometric data per se do not have much descriptive or explanatory value before being conglomerated and clustered, categorized and classified (Mak 2017). If any "'classification system' is a set of boxes (metaphorical or literal) into which things can be put to then do some kind of work—bureaucratic or knowledge production" (Bower and Star 2000:10)—, the two classroom situations above demonstrate the knowledge work implied in the classification of anthropometric numbers in continental or national categories.

Before I discuss other kinds of categories at play in the anthropometry courses, it is worth pausing on the historical relation between continental categories and race in order to unpack the relation between anthropometry and racial theories. The mobilization of continental categories in anthropometry points at how such classificatory scheme has been enmeshed in racial typologies which, since Linnaeus' indelible taxonomy, have continental correspondents (Müller-Wille 2015). Linnaeus' universalizing ambition in classifying human diversity along the four continents of the planet was later taken up by racial anthropological classifications.

Similarly, Martin also had a universal scale in his determined anthropometric methodological standardization and classificatory endeavors: his "ambition of worldwide overview and comparison" was connected to "the idea of a universal eye, an imaginary, neutral place from which 'all races' could be discerned by comparison" (Mak 2017:344,337–338). Accordingly, the grouping of large amounts of anthropometric data collected around the globe—and often through colonial networks—had to rely on classificatory parameters, which were often informed and justified by racial theories. In the Ostelogy Lab, the busts and their "racial group" classification tags overlooking the anthropometry courses stood on top of the anthropometric instruments' cupboard as a reminder of the connection between this method and the racial theories that informed such classification.

At the same time, Martin decidedly refrained from discussing any theoretical questions related to racial classifications (Morris-Reich 2013; Mak 2017). The German-Swiss forefather of international anthropometric standardization declared that his endeavor was purely methodological, disjointed from any theoretical ambition. Martin's publications focus on the practice of making anthropometric measurements and do not provide any textual elaborations on the concept of race (e.g., Martin 1914, 1925, 1929). Reinforcing the argument I introduced in Chapter 2, I underline that it might be precisely thanks to Martin's avoidance of explicitly tackling racial theories that his textbook and its long-reaching translations have long outlived post-racial impulses in anthropology: The seemingly methodologically focused vast inventory of measurements explained in these books has made anthropometry resilient and malleable to changing theoretical configurations. Nevertheless, many tables and graphs in Martin's textbook clearly demonstrate that the sampling and classification of anthropometric data was based on racial groups, just as the textbook's visual typological representations also imply a racial thinking (Morris-Reich 2013). Thus, the racial thinking imprinted in such classifications used by Martin clearly demonstrates that, although perhaps not explicit, his anthropometric methods were tightly enmeshed in racial theories of that time and place.

Furthermore, the association between method and theory in the case of anthropometry and race comes to the fore in different stances beyond Martin's books. This was also evident in other books used in the anthropometry courses, as I have discussed above with different classroom situations. It is also striking that the book launched in the anthropology conference in Pune, *Beginners' Manual for Anthropometry* (Juvekar et al. 2019), does not ever mention "race" or racial categories in its elaborations on the goals of anthropometry but contains all the key measurements that were once widely used to enact racial difference, like nose length and

breadth. In sum, although there is a range of malleability in the purposes and effects of anthropometry, the ideas imprinted in very material and long-living anthropometry books, for example, keep that connection to its racial discursive root alive, even when such connection is silenced or forgotten.

Therefore, one might ask if the classifications done via anthropometric data could ever scape the fate of its embedment in the historical context of racial anthropology. Although, in theory (as one lecturer maintained), one could group measurements anew to form new categories of bodily differences, the anthropometry courses taught us students to classify body measurements according to a pre-existing physical anthropological classification. In other terms, the students were taught to deductively fit the produced numeric data in standardized categories. For example, we learnt that skull shape variation is per physical anthropological convention classifiable, among others, in dolichocephalic (cranial index[130] under 75), mesocephalic (cranial index between 75 and 79.9), and brachycephalic (cranial index over 79.9). Here, one could question to what extent the correlation between these values and pre-conceived racial or continental groups played a role in determining the establishment of those value margins in first place: it is likely that the numeric ranges of these three categories were determined to mark differences that would correspond to continental racial groups. As Hanke (2007), for instance, shows, certain measurement standards in craniometric standards were often manufactured to highlight what were preconceived as racial differences. More, one could also ask which kinds of racial theories made the cranial index such an important measurement: Racial theories that associated mental abilities and cranial size knowingly played a key role in the attention to skull shape (Stepan 1983).

In sum, a large extent of the standardized classifications taught in these courses can be traced to Martin and his intellectual context of colonial and racial anthropological research. Given the implicit or explicit entanglement of Martin's methods and the ensuing racial classificatory work, the late 19th and early 20th century racial theoretical background over which the anthropometric methods were developed is brought to the fore. This becomes evident in the anthropometry course situations in which the continental classifications are mobilized to explain human difference in static ways, disregarding complexities of history, genealogy, and environmental factors: The human differences enacted by anthropometry and pressed against

[130] Cranial index is calculated using the ration between what is considered the maximum width and length of the skull.

its accompanying grid of racial or continental categories put forward a specific and biologized picture of Indianness and its others.

Nevertheless, not all categories articulated in anthropometry textbooks and courses correspond to racial, continental, and national sorts. In contrast to those measurements that were classified in continental or racial categories, the role of pre-existing social categories is perhaps less significant in the classification of shapes that are not mainly attributed to specific social groups or hereditary factors, for instance for those measurements that have been established as markers of sex/gender as well as measurements of growth and nutrition. The latter usually divide individuals into categories according to established notions of "normal growth", "undernourishment", and "obesity". In the following section, I shed light on how teaching anthropometry has been justified in these spaces of anthropology education and discuss how anthropometric methods have been applied in anthropology research in Pune. As we will see, similar to the other classificatory uses of anthropometry discussed in this section, studies of growth and nutrition also operate via the production of temporally static and biologizing enactment of human difference.

4.4. Justifying and Applying Anthropometry Today

If not to do the work of enacting and classifying difference according to racial frameworks, what is then anthropometry used for? What else justifies its teaching today? In this section, I will discuss different reasons articulated for the continuation of anthropometry in the anthropological education in Pune, starting with the two main purposes: 1) forensic anthropology and osteoarcheology and 2) studies of human growth and nutrition. Then, I comment other justifications of anthropometry and discuss the authority of quantification as a self-fulfilling purpose in anthropometry.

4.4.1. Forensic anthropology and osteoarchaelogy

Osteoarchaelogy, as the use of bone analysis techniques to interpret human bones found in archaeological excavations, and forensics, as the use of techniques to identify the individuality of a dead human body and its traces, were justified as the main goals of the osteometry course taught at the Deccan College. These goals were specified by the lecturer in the last day of that course. On that day, I had first asked her if, through the measurements, one could say that a skull was from a specific part of India, to which she responded negatively, alleging that there were too many factors that would influence that. After I asked her what they used these

measurements in India for then, she finished the class taking a skull in her hands and summarizing what should be, according to her, the basic take-aways from that course: assessing the age and sex of a skull. In front of the class, she examined the skull according to a xeroxed page from Singh and Bhasin's book (1989 [1968]), with a table. She explained that there were six measurements to be observed in the sex assessment, including mandible shape and shape of angle around the eyes, and each was to be classified in a scale from 1 to 5. All students received a sheet with an empty table for these six points; my skull (specimen #4) scored either the values 3 or 4 in all five measurements; so, according to the table, it was probably a female.[131] While I started to grasp my feelings about the sex assignment to that skull, the lecturer went on to explain the dental differences between adult and children: the more the molars look "used" the older the person probably was, etc. She then added an explanation of how we could infer stature according to the length of certain bones, like the femur. I then asked her why it was important to estimate the age, stature, and sex of a skeleton when found in the archaeological field. She (an experienced archaeologist) answered that these are the first things that the public or the media ask about when a skeleton is found; "So it's just a way so people can relate somehow to the skeleton", she added.

What makes human skeletons "relatable"? Although I wondered why the public would be so interested in knowing about the stature, sex, and age of a found human body, at the same time I caught myself immersed in thoughts about the identity of the skull tagged as "specimen #4", with whom I had been working throughout that anthropometry course. I now started to imagine what that person—whose skull was now in my hands—would have looked like. Simply by classifying that skull's person's sex and knowing that those lab skulls were possibly obtained from "unclaimed bodies", my mind was undertaking imaginative associations that led me to images of women I had seen in the streets of Pune. Since having successfully sublimated it after the first class, a sense of ethical disconcertment with that craniometric practice haunted me once again. My uneasiness was added by the embarrassment of realizing how quick my mind undertook further associations following the categorical work of that craniometric practice, filling the many gaps of visual elements that constituted a person beyond their "sex". Further, as I write this text revisiting my fieldnotes, I am challenged by how a sense of re-humanization took place in my relation towards that skull once I "knew" their "sex". At the same time, this experience made me understand the lecturer's and other archaeologists' reliance

[131] Hanke (2007:33) explains that this graduation of values alongside a spectrum to determine sex of race can be situated in the "flexible normalism" that characterized a strand of physical anthropology from the early 20th century, in a move away from all-too static typological notions of sex and racial differences.

on such categorical work to tell "relatable stories" about human remains to the public. Thus, in forensic anthropology for archaeology, the metrics of the measured body parts are used to estimate some characteristics of that body, or at least a few characteristics that are socially relevant ("to the public and media") that can be guessed according to such classification; these basically are, according to the professor: sex, age, and stature.

However, at the end of that same craniometry class, the lecturer made an observation about skull #4 that once again shook my reconstructive associations about its personhood and humanity. She said that my skull might also not have been an adult: based on the observation of the teeth, specimen #4 could as well have been a teenager of any sex. This again shook my imaginative reconstruction, leaving me with an odd feeling of categorical uncertainty and helpless ignorance. This interlocking of age and sex in craniometric classifications relates to what Hanke (2007:79-80) also observed about race and gender estimation in early twentieth century physical anthropology: Because it was assumed that both sex and race mark the body, one was supposed to know a skeleton's sex to define its race, and one needed to know its race to define its sex. In this way, in the osteometric enactments of race and sex, one category plays a role in the constitution of the other; both are interlocked in a circular co-constitution. "Age" seems to add to such categorical circularity. As the lecturer explained, analyzing different body parts of skeleton can lead the way out of the doom loop of such categorical impasse. But this work might be hard if it is only based on few individual pieces of a person's skeleton. Therefore, almost if less "human", disarticulated individual bone remains hardly have identifiable markers of "public relatedness"—if a person's skeleton is personally relatable to others through markers like race, sex, age, or stature.

Moreover, after writing on the tentative re-enactment of skull #4's sex and age, I have come across Karve's (1949) short story *Janmantarachi bhet* (An encounter across time[132]), which remarkably relates to my own observations in the craniometric practice. Narrating in first-person an archaeological excavation in Gujarat, she poetically describes her sudden restlessness in the night after she found the skeletons of what were classified to be two men (one with signs of a violent death) and a dog, and then, describing the continuation of the excavations two days later, she found the skeleton of a person whom she classified as a woman. She writes:

[132] Other possible translations from the original Marathi title could be: "Life distance's meeting", "Encounter across lives", or "Encounter between incarnations".

> The leg bones came free first, and we suspected human remains. We put the laborers at a distance and worked with small tools around the perimeter of the bones to expose and free the skeleton whole. I had had a feeling from the moment I saw that leg bone. And now I was sure.
>
> "Since that dog I've felt we'd find a woman, and now here she is," I said. […].
>
> "Are you sure this is a woman?" she [a student] asked me, "How do you know?"
>
> I explained it to them all—the smallness, the lightness of the hip bones, certain characteristics of the skull […]. I bent over the skeleton and cleaned it carefully, with a pick, a small knife, and brush, without disturbing a single bone. Those bones were seeing the sun after being blanketed in earth for fifteen thousand years. This woman, like the man [found earlier], was buried with her arms across her chest, legs bent, turned on her side. But unlike the man, who spanned a large space, she was so very tiny, she took up only a tiny space. I cleaned out all the bones of the body and my hands turned toward the head. It was such a tiny head. It seemed so delicate. My mind took notes, like a machine as my fingers moved on her smooth skull.
>
> "The back of the skull is distended, the forehead somewhat narrow."
>
> My pick worked on the eye sockets, and they were soon clean.
>
> "The nose bones, the nostrils below, they seem wide. The nose would have been squat and broad. The cheekbones are small."
>
> My hands were at the jawbone. The bone was yellow-black, just like the earth. But when the brush touched the jaw the teeth were exposed, they shone in the bright sunlight. My heart was thudding. I could hear my colleagues' voices as though in a dream.
>
> "Wisdom teeth are not seen, she was very young," my mind noted mechanically, automatically. But my conscience was filled with a fantastic restless fervor. I saw pupils moving in those eye sockets. I saw those teeth shine in a smile of recognition. My fingers were engaged in the work of cleaning that narrow tapering jaw, but my heart spoke to this pile of bones, "Are you me then? Are you me?" (Karve 1949:19, translation by Urmilla Deshpande)

Karve's own fieldwork ruminations are very telling about the enactments of osteoarcheology and forensic anthropology as discussed in this section. Firstly, they demonstrate the classificational circles in which sex and age categorizations of human remains are blurrily entangled. Moreover, they point to how such categories are tied to the reconstruction of a skeleton's humanity: After categorizing the skull and other bones through craniometric classifications, she started to even see "pupils moving in those eye sockets", mirroring herself at the imagined person who was once, more than thousand years ago, alive in those bones. In this sense, however limited, entangled with racial frameworks, and problematic, the categorical work promised by these physical anthropological classifications opens up imaginative and

affective space for more relatable projections of personhood onto the human whose remains are anthropometrically analyzed.[133]

4.4.2. Studies of Growth and Nutrition

Besides its use in forensic anthropology, anthropometry was justified in the anthropological teaching in Pune for its use in studies of human growth and nutrition. In one of the anthropometry courses, students were taught that body fat measurements, besides the BMI, are used to establish if the measured person is undernourished or obese; in addition, head circumference and other height measurements are also said to indicate undernourishment.

The increased use of anthropometry for measuring human nutrition by anthropologists in India has emerged in a conjuncture in which both hunger crises and a post-racial push in social sciences have converged. As for the first, different anthropology professors I interviewed in India highlighted the context of severe hunger crises in India in the mid-twentieth century: The Bengal famine in the 1940s—resulting in the death of circa 2 million people—and the Maharashtra drought and famine in the early 1970s, as well as the earlier history of famines in colonial times, led to increased governmental attention to this problem, which called into action the use of physical anthropological parameters to measure undernourishment on human bodies.[134] Internationally, this converged with the widespread recommendation and standardization of anthropometry to measure malnutrition, which, according to Joël Glasman (2020), was pushed by a post-World War II urge to impartiality in the management of humanitarian action and by the Biafra famine. Simpler and cheaper than biochemical methods, a set of few anthropometric measurements was pragmatically recommended as a methodology to diagnose malnutrition in children and youth (ibid.). Adding to Glasman's assessment, I argue that this turn of attention to malnutrition by physical anthropology in the post-World War II corresponds to the time in which racial frameworks associated with anthropometry were put under critical light. If anthropometry-trained anthropologists in India—and elsewhere—were increasingly discouraged to use that method for purposes that were associated with certain discredited racial classifications, it is to expect that anthropometry would have been increasingly used for the measurement of other bodily differences. The built material and intellectual infrastructure for anthropometry—including the availability of anthropometric

[133] On the problem of the legacy of race in contemporary forensic practices in relation to criminal investigations, see e.g.: M'charek, Toom, and Jong 2020. The problematic entanglement of these methods and racial frameworks is also relevant in studies on human remains for their repatriation (Fruendt 2018)

[134] Interview with Pooran Chand Joshi, New Delhi, 5 Sept 2017; Interview with Kailash Chandra Malhotra, Noida, 18 Mar 2019.

instruments in anthropology departments—contributed to the re-purposing and continuity of such methods. As a result, as an anthropology professor explained in a class in Pune, by the 1980s anthropometry was primarily used for the study of human growth and nutrition. More recent data on malnutrition attest that the picture on nutrition in India is still alarming: Nearly half of all children in India are considered underweight due to malnourishment and each year almost a million children die before one month of age; more than one third of the world's malnourished children live in India and, according to the Global Hunger Index 2017, India ranks 100 in a list of 119 countries (Narayan, John, and Ramadas 2019). Thus, the continuation of the issue has maintained the relevance of this method's area of application.

Anthropometric studies of nutrition and growth on children take a considerable parcel of research efforts in Indian anthropology. At Pune University, not only there is an obligatory course on growth and nutrition in the anthropology MA program, but there have also been several ongoing and many completed doctoral and master's research projects on this theme. These students' projects usually focused on anthropometric assessments. Many projects selected children of a specific region or even a specific school, some focused on specific tribal communities as these seem to be disproportionally affected by hunger, while many projects seemed also to lack a justification for choosing their specific research location, as if an anthropometric diagnosis of malnutrition was justified anywhere in India. In the 2019 Indian Congress of Anthropology, within the several paper sessions listed in the program as "biological anthropology", the majority of presentations were heavily based on anthropometric methods, mostly for studies of nutrition.[135] In addition, in government-led research, anthropometry for the study of nutrition has also been applied since the 1990s in the National Family Health Survey conducted by the National Ministry of Health and Family Welfare, consolidating the attention to the study of body shape in public policy.[136] Thus, anthropometry is today still a solid method in Indian anthropology and its dominant field of application is in the studies of human growth and nutrition.

From what I have observed at the Pune University and at the 2019 Indian Congress of Anthropology, such studies on undernourishment by Indian anthropology students consist

[135] While most of these attested values of undernourishment, there is also a growing obesity problem in India. As Karve's student and anthropologist R. K. Mutatkar put it in his preface to the *Beginners' Manual of Anthropometry* (Juvekar et al. 2019:9), "[w]hile malnutrition is a big issue, termed as 'National Shame' by the national leaders, childhood obesity is becoming a public health problem in urban areas".

[136] In this national survey and in most of the presentations of research projects I saw, measurements of height and weight were the only measurements applied. Few projects actually encompassed other measurements in their methods, like skin-fold measurements.

fundamentally on anthropometry-based diagnosis of malnutrition, whereas the other many possible aspects related to this issue are largely ignored. Most of the projects I encountered in this field in India do not try to analyze, for instance, the conditions of hunger beyond the scope of the biological human body. Before I discuss this aspect in this chapter's conclusion, in the following section I present other justifications and applications for anthropometry.

4.4.3 Other justifications and applications

According to the *Beginners' Manual of Anthropometry* (Juvekar et al. 2019), other justifications of anthropometry today are based on its application in fields that range from Ayurvedic practices, ergonomics, sports sciences, to orthopedics. The manual also states, without any further elaboration, that anthropometry "is useful in the field of Eugenics" (ibid.:25). In the anthropometry courses I participated, nevertheless, among all these uses cited in the Manual, only ergonomics was briefly mentioned.

However, at times the sheer existence of anthropometry seemed to justify its perpetuation. This was perceptible not only in the courses I took but also in other academic situations. For example, at the 2019 Indian Congress of Anthropology, a student from a Northern Indian university presented her on-going research which basically consisted in examining the proportion between arm length and height across different gender and age groups; but, curiously, when she was asked by the audience about the purpose of her research, she simply could not answer. To help her out, an audience member suggested that her research could perhaps be useful for ergonomics.

Despite pointing out a student's lack of preparedness to explain the purposes of their anthropometric research, the example above brings me to ponder why anthropometry is so appealing to students of anthropology in India. Thinking with Appadurai (1996:117), we could think that in this anthropometric research case, too, "the significance of these numbers [is] often either nonexistent or self-fulfilling". While Appadurai connects the spreading of "numerical habits" and the popularization of practices of enumeration, classification, and domestication of bodies to India's colonial administration, he recognizes that "the colonial gaze and its associated techniques have left an indelible mark" in India, and "[p]art of this indelible heritage is to be seen in the matter of numbers" (ibid.:124,134). Numbers also evoke scientific legitimacy, as Hanke's (2007) analysis of early 20th century physical anthropology argues: the use of anthropometry and statistics in this subdiscipline is also to be understood as a strategy of scientific validation. Thus, this historical and political scientific context adds to our

understanding of the inertia and resilience of anthropometry as I have discussed throughout this chapter. Quantifying the body, or enacting bodily difference through metric data, seems to present here at times also as a self-fulling justification for the use of anthropometry.

Nevertheless, within the staff of the anthropology departments where I participated in anthropometry courses, I also met different opinions on anthropometry. Even among those with a biological anthropology specialization, some said they were dissatisfied with the anthropometry-focused syllabi and the continued teaching of *some* measurements, like those of dermatoglyphics. They also expressed the opinion that the method could still be taught if contextualized as "a historical method" and if lecturers would explain, by use of references to Franz Boas' work for example, that anthropometry could be used "to show that races don't exist".[137] While such opinions demonstrate nuances and textures in the discursive web around anthropometry in India today, they also reaffirm the historical entanglement between (physical and biological) anthropology and anthropometry. Justifying the teaching of anthropometry due to its historical value shows the weight of history in marking a discipline's research practices. It also points to the difficulty in re-imagining disciplinary conventions and departing from the path of the material and intellectual infrastructure that once erected them.[138]

4.5. Final remarks

In this chapter, I have analyzed the training in—and applications of—anthropometry in Pune and inquired about the entanglement and possibilities of disentanglement between this methodology and racial theories that once gave leverage to it. Thinking with the material assemblage of the anthropometry courses—which included textbooks, human busts with racial classification tags, human remains, and instruments—and the classroom situations co-lived by students and instructors, we have observed several instances in which such entanglement was manifest. Paying attention to the historical circulations of those objects and of the anthropologists with whom they also circulated, especially Karve, we have attested the different ways in which such scientific practice in India bears its connections with the racial anthropology once centrally located in German-speaking sciences—connections which, up to

[137] Interview with Shantanu Ozarkar, Pune, 27 Mar 2019.
[138] A Pune University anthropology professor expressed hope that the department would eventually decide to revamp the syllabus and rethink the anthropometry courses but also recognized the personal and structural difficulties in such a process.

this date, financially benefit the locations in Europe from which anthropometric technologies are exported.

We have also seen that race is sometimes absently present. This was evident in many classroom situations and, for instance, in the *Beginners' Manual of Anthropometry* (not "*Anthropology*"!), which was successfully launched at the 2019 Indian Congress of Anthropology: the textbook deliberately avoids any mention of "race" and "racial" but seemingly carelessly mentions "eugenics" and teaches all the measurements that are strongly associated with racialized markers, like nasal index. As I continue to discuss in the next chapter (Chapter 5), this measurement has a long history in racial research in India, although nose shape in fact has no clear application in health research (the field that the Manual claims to contribute mostly to).

But race is also vividly present and triggers affective responses. Paying attention to affect in the classroom has cleared our view to note that, in many other situations, race manifested in awkward ways, resulting in frictions and tensions—but also laughter and silence—among students and teachers. This awkward presence of race in the anthropometry classrooms is a manifestation of the stretching connection between method and theory, or, precisely, between anthropometry and racial theories. While anthropometry is still being taught and partly reappropriated for uses other than racial classifications, the racial theories that once sustained it have been to some extent discredited. The resulting imbalance between the resilient methods and the discrediting of the related theories culminates here in situations of awkwardness, especially when the mark of racial theories is spotted in the material elements with which students and teachers learnt to enact anthropometric difference.

In addition, to counterbalance the risk of getting blinded by the weight of history or the sight of ghosts, I have dwelt with anthropometry ethnographically and examined different stances of the anthropometry courses. Contributing to historiographic reconstructions on colonial anthropometry, we have seen that the practice of anthropometry today still results in discomfort and occasional pain especially to those being measured. We have also seen that the precision that the method requires is virtually unattainable, which adds to the many arguments on the inaccuracy of the method (e.g., Gould 1981) and helps us understand how it relies on further technologies and practices of comparison, computation, and approximation in its making of numbers.

Furthermore, we have seen different possible effects and implications of anthropometry. Regarding its numeric enactments, we have seen that the method operates on circularity, which

is often shaped by, and at the same time enhances, a sense of (body) normativity. Additionally, thinking through the case of anthropometric refusal—when a foreign student refused to let her peers measure her nose, a body part often associated with racial classifications and body normativity—, we have seen that the anthropometric distinctiveness and sameness enacted by this method can lead to forms of group making, encompassing inclusion and exclusion of individual bodies, and is in compliance with biologizing reenactments of existing social groups, often with national and continental proportions ("our Indian bodies are like this", "your European bodies are like that"). Thus, relationally, the anthropometric practices enact a biological archetype for Indianness—as well as, potentially, for any other social group they aim at—that is informed by and reassures the legacy of racializing frameworks and past racialized enactments of Indianness.

Moreover, I have examined the uses of anthropometry today, beyond racial frameworks. We have seen how anthropometry, in the way that it is taught and applied in Pune, is mainly relevant for osteoarcheology and forensic anthropology, on the one hand, and studies of human growth and nutrition, on the other. As for the first, we have seen how the measurement of human bones takes place in combination with classifications that aim at making human bodies more "relatable" to the public, even though such categorizations are sometimes interlocked in an unescapable circularity (for instance, between sex and age). For its turn, the topic of growth and nutrition has come to occupy a large space in (biological) anthropological research in India, responding to the severe matter of malnutrition in the subcontinent and filling the void left by the demise of blatantly racial frameworks. As a result, anthropometry has remained a central method within Indian biological anthropology. In the Pune University too, several research projects dealt with the topic of human growth and nutrition. This has configured an intellectual conjuncture in which students and lecturers spend enormous effort and time in the training of anthropometry so that human bodies can be anthropometrically studied to attest their malnutrition.

In closing this chapter, I propose a reflection about the implications of the widespread use of anthropometry in human growth and nutrition research, thinking about what gets highlighted—and what gets shadowed—by the focus implied by such scientific method. In this field of research, the numbers enacted by the anthropometrist's measurements configure a snapshot diagnosis of the measured person—and the groups they might be summed up to or classified under. In a state (Maharashtra) and country (India) with a remarkable historical and present record of famine and hunger, it is striking that the most widespread anthropological—and

indeed scientific—approach to this matter of concern is through anthropometry. In some cases, as one research project at Pune University testified, the bodily measurements were methodically complemented by a survey about "food habits". But apart from "food habits" and quantifiable bodily shape, which other spheres of the problem of hunger are rendered unknown or invisible by such an anthropometry-based anthropological approach to malnutrition? As the object of matter is projected onto—and enacted through—individual body shapes and their metricization and, in some cases, a person's "habits", which dimensions of the problem get eluded? When the anthropological gaze is trained to see in a certain way, what is unseen? What is ignored and left unknown, and with what effects?[139]

Drawing from Didier Fassin's (2007) sociological-anthropological theorizations on HIV/AIDS in South Africa, we can think that many instances of suffering, from disease to hunger, that leave an enduring mark on human bodies are socially produced or enhanced. As he puts it, "inequality in the face of death […] is first and foremost inequality in life". If, as an anthropometry lecturer in Pune maintained, "until today, there are places in Maharashtra where 40% of children die due to malnutrition", we can think that the unequal rates of child mortality due to "malnutrition" (as a euphemism to "undernourishment" or "hunger") relate to inequalities of life which are socially produced. What the lecturer's geographical circumscribing of the problem ("places in Maharashtra") eludes here is that social inequality in India, though also in correlation with space, is heavily structured on bases of social difference—with caste, religious, and ethnic as well as class segregation playing a key role—and fundamentally impacts the chances of a child's access to appropriate nutrition and survival.[140] Such inequality is also deeply historical: Social and economic exclusion and marginalization in terms of religion, caste, and ethnicity runs deep in the subcontinent's history and social fabric (Siegel 2018). In this sense, the undernourished bodies that the anthropometrist freezes into numbers carry, in Fassin's (2007:268) terms, "the imprint of the before": they embody history and the social world around them. However, in India as well as elsewhere, "efforts to reduce suffering have habitually focused on […] repair of individual bodies", while "the social origins of suffering and distress, including poverty, and discrimination, even if fleetingly recognized, are set aside" (Lock 1997:210 quoted in Fassin 2007:189). Compliant to this global trend, anthropometry-based anthropological assessments of malnutrition entail and reinforce a reductionist biologization of a complex social and

[139] I am thinking here in terms of agnotology, as the study of ignorance, in relation to this problem; therefore, I draw from an understanding that ignorance and knowledge are co-constitutive (Klinkert 2021).
[140] For non-urban areas, environmental factors also have an impact on the problem (Kanwal et al. 2021).

historical issue. The biologizing focus of anthropometry, also when added to a culturalizing gaze, results in research projects suggesting, e.g., "education about food habits" as a solution to the issue, like some researchers' presentations in Pune argued; thereby, as long as the social and economic factors of this problem remain unattended by anthropology—as they have been in current research, as far as I have observed—, such anthropology misses the chance to tackle the more profound conditions that lead to the gloomy scenario of India's record in hunger.[141]

While such metricizing-biologizing enactment aims at translating a problem in the relatively authoritative idiom of numbers to be used for policy formulation, the conditions of this persistent problem remain thereby ignored. Adding to Fassin's argument for the need of a theory of the embodiment of history and the social world, I argue that not only history but in fact a more general sense of temporality and processuality (including social conditions) is left out of the picture of such temporally frozen, diagnosis-based anthropometric take on malnutrition. In a country where striking historical social inequalities persist and poverty abounds, this is not unimportant. Enacting the diagnosis of undernourishment through metrifying the body—and, complementarily, explaining it by "habits"—is not only perilously reductive but also obscures more fundamental ways to circumscribe and address the problem, both scientifically and politically. Particularly, it is striking that the *conditions*—in the sense of "life embedded in the economic and social reality" (Fassin 2007:273)—that produce hunger in the first place are left out of the anthropological framing of the problem. If any scientific discipline has its foci and enacts a particular reality at the same time as it produces ignorance on what is out of its framing, anthropology's usual foci on the realms of "culture" (for cultural anthropology) or "body" (for physical and biological anthropology) comes at the cost of ignoring other—from social to structural—elements that condition the lives of the people anthropologists work with. Such sub-disciplinarily induced narrow focusing—and the resulting lack of attention to other, often more urgent aspects of a problem or of a community's needs—have often been criticized in re-assessments on anthropology and its subdisciplines (Fassin 2007).[142]

[141] In similar fashion, Jitendra Narayan, Denny John, and Nirupama Ramadas (2019) spend several paragraphs to explain that children's malnutrition in India is "caused" by their mother's malnutrition, not explaining what causes the mothers' lacking nutritional security in first place.

[142] I also draw from Sebastián Gil-Riaño's (2021) presentation on cultural anthropologists' non-engagement with the arduous social conditions of indigenous people in Paraguay due to the subdiscipline's focus on culture and linguistics, which also led to erroneous conclusions. In commenting on how anthropologists could not "see" the revolution and armed conflict in Peru, Orin Starn (1992) had come to similar conclusions.

In sum, some aspects of the racializing work anthropometry was designed to do is also perceptible in these anthropometric accounts of human growth and nutrition. If we can define racialization as a process of enactment of human differences in a de-historicizing, biologizing, and essentializing way that folds together different elements such as culture, social behavior, cognitive abilities, phenotype—including facial characteristics, skin color, and bodily metrics—and heredity, the anthropometric enactment of human difference, even if for nutrition diagnosis, repeats some key ingredients of the reductionist formula of racialization. Hence, the de-historicizing effect, with its obscuring of social conditions, of the metric-biologizing approach to hunger runs the risk of leading to similar essentializing effects as anthropometry for racial classifications.

In articulating this chapter's concluding critique, I am mindful of discussions within anthropological arenas in India, in which different voices have called for decolonization of the discipline and for curriculum reform (see Chapter 1). As anthropology in post-colonial India has come to occupy spaces erected and cemented by colonialism, the materiality of coloniality is present—ghostly or very vividly—in many different forms. The same applies to the legacy of racial anthropology and anthropometry. Anthropometry still occupies a central place in Indian anthropology research and curricula; passing it on as a tacit knowledge and skill to enact human differences takes as much effort in training the students' gaze and touch as it takes space in the anthropological education in India. It also affectively infuses the students' imagination of what anthropology *does* in the practice: students referred to the name of an anthropometry course, called "Biological Anthropology Practical II", simply as "Practical". Hence, with this chapter I intended to argue that historically assessing such legacy and resignifying, transforming, or even discarding it in today's practice of anthropology might be difficult but key to decolonizing the discipline and coming to an anthropological knowledge that can enable more inclusive and liberatory worldmaking in post-colonial contexts of enduring inequalities. Thus, and aware of discussions in Pune about the need to reform the anthropology curricula, I have written this chapter with the hope that my analysis can be a contribution to conversations in this direction.

Lastly, if I am to circle back to reflect on my own methods in this thesis, I would add that my observations about the lack of attention to temporality and process in the anthropological study of malnutrition also attest to ethnography's—and, in general, anthropology's—still uneasy inter-disciplinarily relationship to history. This realization underlines my methodological argument and decision to pay attention to historicity, also in the examination of scientific

methods, in critical complementation to Mol's (2002) ethnographic approach as discussed above. Inspired by Braun (2014), M'charek (2014), B. Subramaniam (2014), and Schramm (2017), I maintain that spatially intricate but often temporally flattening STS frameworks can further profit from an increased attention to temporality and historicity, especially when dealing with the legacy of coloniality in science. In the following chapter, I continue to dwell on racial and post-racial approaches to temporally vast and complex phenomena, namely ancient migrations, including the so-called Aryan migration, as they are studied through molecular methods by population geneticists and anthropologists in India. While the present chapter has examined the political economy of the international circulations of anthropometric instruments, the two following chapters (Chapters 5 and 6) further elaborate on the global political economy of technology in science, more precisely of DNA analysis technology, in order to reflect about the sovereignty of Indian scientists in this field of inquiry and the arrested decolonizing potentials in anthropology.

Chapter 5. Ancestry and population genetics since Karve

5.1. Introduction

Scientific and political discussions about human diversity in India have long simmered around the search for the origins of human differences in the past. How did differentiations among social groups come about, how did the so-called caste system emerge, do the different social groups in India have different ancestries? Are caste groups in different regions of India related? These are some key questions that have long preoccupied intellectuals working in/on India.

In dealing with these questions, Karve and many other scholars before and after her time have focused on the so-called Aryan migration theory, earlier mostly known as Aryan invasion theory. Theories about an Aryan people or race would reach a prominent role in Nazi ideology, and, in fact, they have a long genealogy that entangles Germany and India: it was chiefly the work of German Indologists that theorized and popularized ideas about Aryan ancestry, often in an imagined dichotomy with another racialized group, whether Jews in Germany or so-called Dravidians in South Asia (Figueira 2002). Accounts of the Aryan migration theory encompass the idea that an ancestral group of people known as Aryans migrated from Eurasia down to India a few thousands of years B.C.E., encountering (or conquering) at least one other ancestral original population, known in some accounts as Dravidians. According to many different versions of this model, Aryans and Dravidians have been differently defined as *linguistic*, *racial* and/or *ancestral* groups that shaped the diversity of current populations in the Indian subcontinent: many human groups usually in the North of India are identified with an Aryan or Indo-European ancestry/language/race (depending on the model's version), while many groups in the South with the Dravidian. Many locate South Asia's caste differentiations with the incoming Aryans, regarded as today's uppermost caste groups like Brahmins.

The Aryan migration theory (AMT) became an "obligatory passage point" (Latour 1987:132) in inquiries about ancestry and the peopling of India. Debates on the AMT emerge from time to time, including in Karve's work in her late years, when molecular methods—and the emerging field of population genetics—started to play an increasing role in such lines of inquiry. While AMT had been laid to rest in the past, the development of new DNA analysis technology from the 2000s onwards reopened this debate. As much as old research technologies can be used to gain new insights in new research fields—as we have seen in the previous chapter with the case of anthropometry in human nutrition research—, STS scholars

have also demonstrated that new research technology is often put forward with the hope that they can reveal "the truth" about old questions (Reardon 2005; Oikkonen 2017; B. Subramaniam 2019). The enthusiasm about new DNA technology is exemplified in the quote below, written by a widely read Indian science journalist:

> our understanding of deep history has changed dramatically in the last five years or so. Large stretches of our prehistory are being rewritten as we speak, based on analysis of DNA extracted from individuals who lived thousands or tens of thousands of years ago. Many 'facts' that we took for granted have been proved wrong, and many questions left dangling in the air as historians, archaeologists and anthropologists argued it out among themselves have been given convincing new answers – thanks to the recently acquired *ability of genetic scientists* to successfully extract DNA from ancient fossils and then sequence it to understand all that bound people together, or distinguished them from each other. *If technology had not matured to the level it has*, scientists would not have been able to *make the discoveries* they are making today. […] *Six years ago, we did not know when the caste system began, but now we can zero in on the period with a fair degree of genetic accuracy* (Joseph 2018:7, emphasis mine).

However, the data and its interpretations in this new population genetics of India are highly controversial. Geneticists, anthropologists, and archaeologists have fiercely discussed the underlying theoretical models, sampling methods, as well as foundational definitions of ancestral or populational groups. With the recent rise of Hindu nationalism, this new research refueled and reignited heated political debates about diversity and inequality in India, and, more specifically, about the relation of casteism to the AMT (Egorova 2009, 2010; B. Subramaniam 2019). One emblematic example in this regard was seen in the controversy sparked by the 2001 article *Genetic Evidence on the Origins of Indian Caste Populations*, first-authored by Utah-based geneticist Michael Bamshad. Based on a technology that traced ancestry in distinction between paternally inherited Y-chromosome and maternally inherited mitochondrial DNA, the paper asserted that European or West Eurasians *males* migrated to the Indian subcontinent and, once there, either happened to get to belong to upper-caste groups or formed a caste system hierarchy in which they got to be at the top.[143] With this argument, the paper confirmed a key assumption in some versions of the Aryan migration theory, namely that the Aryans were either the direct ancestors of upper castes or that they were responsible for the birth of caste differentiations as known today. Multiple interpretations of the paper's arguments flourished in its public rearticulations. Some takes picked on the Europeanness or foreignness of the origins of upper caste individuals and therefore of the caste system itself, while some responses read the evidence of an Aryan Y-chromosome lineage as a sign of this male mass migrations'

[143] For a critical assessment on gender and notions of kinship in population genetics, see Nash (2015).

sexual violence against indigenous women in the subcontinent[144] (Egorova 2009, 2010; Neelakandan 2017; Benjamin 2018; B. Subramaniam 2019). Emblematically, anti-casteism activists mobilized Bamshad's article (including the racially loaded terminology contained in it) to sustain their plea for the inclusion of caste-based discrimination as a discussion topic in the United Nations' 2001 World Conference against Racism. This in turn sparked a heated intellectual and political debate in India on the relation between race and caste, racism and casteism. While Indian anthropologists were divided on both sides of this debate (pro and against the understanding of casteism as a form of racism), the Indian government—and Hindu nationalists—successfully blocked any mention of caste in the proceedings and outcomes of the World Conference (Thorat and Umakant 2004; Natrajan and Greenough 2009; Egorova 2009, 2010; Benjamin 2018; B. Subramaniam 2019).

The tumultuous repercussion of this paper first-authored by an US-based population geneticist sharply exemplifies the political affordances and contingencies of new genetics' takes on old questions about origins. It also illuminates how this scientific field has inherited the social and political trouble of the racial legacy that it builds upon. As the methodologies and sites of enactment of human difference seem to have shifted to the molecular scale, various scholars have called attention to how racialized notions of difference tend to be reinscribed to the molecular and genetic levels (e.g., El-Haj 2007; Wailoo et al. 2012). While novel DNA technologies have increasingly refashioned the idea of material evidence for a series of old questions about human diversity (Oikkonen 2017), in India the debates about the Aryan migration theory and the origins of caste difference have been re-evoked through new genetics evidence, "bringing the entanglement of the social and the biological to the fore" (Sur and Sur 2008:205). This emerging field of DNA research on human diversity in India follows the path of a line of inquiry that has been tied up with racial frameworks. Consequently, old tensions regarding biologically essentializing effects might reappear in new ways. At the core of these tensions is the problem of how to define what counts as significant difference between humans and of how to delineate—and sample—groups of humans, which is a problem that accompanies the use of categories such as "population" or "caste" as well as terms like "Aryans" and gets exacerbated with the broad temporal framings opened up by new technology of ancient DNA. In this scenario, the articulation of new knowledge about human genetic diversity can give leverage to novel discursive affordances regarding difference and sameness between social

[144] This stirred up caste-based resentments and other historical anxieties concerning sexual violence, which disproportionally affects socially minoritized—often lower caste and Dalit—women (see: Rao 2005; V. Das 2007).

groups, particularly when the articulated differences and their categories are connected to deep-running social inequalities with high political stakes.

In this chapter, I unfold the genealogy of a thread of knowledge that Karve centrally contributed to and which has been animating scientific and political discussions for more than a century: the questions about origins, including the Aryan theory, in research on human diversity in India. I ask: How has past and present difference between groups of humans in India been conceived? To what extent is the genetics-based study of human variation and ancestry in India entangled with racial frameworks? Specifically, how is it entangled with racial knowledge networks with nodes in Germany? And what role did Karve play in this? Further, how has this research been entangled with the political sphere and with what implications? To what extent does it have racializing effects?

The following section (Section 5.2) situates Karve's work and legacy in this field of research. How has this anthropologist produced knowledge about ancestry in India? How have racial frameworks played a role in her practices and outcomes? And how does Karve play a role in current genetics research in India? I show how Karve's model on the emergence of caste in India was inspired by racial anthropology and how her model still sustains decisions about how genetic data should be grouped and sampled. As this chapter will show, Karve's model continues to play a key role in how population geneticists understand and operationalize human difference in India, and this has important consequences to the understanding of caste in India.

Then, Section 5.3 unpacks the research about ancestry and origins in population genetics of India since Karve. It does so by analyzing a variety of materials and situations of scientific practices and discussions. In Section 5.3.1, I follow anthropologist and Karve's closest student K.C. Malhotra in a conference of the Indian Society of Human Genetics, which he co-founded in the 1970s, and from there I examine current research practices in the field as well as its key tensions. These tensions centrally revolve around the questions of how human difference is defined and which human body materials are analyzed (Section 5.3.2), how the unit of analysis "population" is delineated (Section 5.3.3), how categories of difference are unmade and remade (Section 5.3.4), and how to sample (Section 5.3.5). Further, I analyze how these questions are complicated not only by the deep temporal frame of ancient ancestry research but also by the enormous geographical frame of the pan-Indian scale articulated by these scientists when they study "India" (Section 5.3.6).

By shedding light on the science and politics nexus in population genetics, I bring to the fore the shortcomings of these scientists' understandings about the entanglements between their science and the politics imbued in the issues of diversity and inequality. I show that knowledge production and political mobilization around the idea of "Aryans" have constituted in a vector of Germany-India intellectual entanglements, which, as the topological approach followed in this thesis will elucidate, might reappear in unexpected ways. I also show that the racialization and biologization of caste and ethnicity in India might continue to be reinforced through population genetics research, and this has high stakes in the current configuration of the politics of social inequalities and national cohesion in India, which is marked by a resurgent Hindu nationalism.

5.2. Situating Karve in ancestry research

5.2.1. The Aryan question before Karve

Inquiries about the migration of so-called Aryans to what is now the territory of India have been replete with ambiguities. "To identify the Aryan is to search for that which remains elusive", opens Indian historian Romila Thapar (2008:xi) one of her several books on the topic (Thapar 2004, 2014). She explains that defining the entity called "Aryan" has been a problem since it was referred to for the first time a couple of centuries ago (Thapar 2019). "Whether it was defined as a label for a language or for a people, the problems [about its definition] grew because in both cases it was assumed that the primary historical requirement was to establish firmly the location and the origin", which has so far not been achieved (Thapar 2019:vii). "In the public mind", explains Thapar (2008:1), "[t]he meaning of the term [Aryan] remains a bit vague and arbitrarily conflates race, ethnicity, culture, language, religion and geography". We will see that, similar to "race", as much as the term "Aryan" might be vague, it has also been remarkably elastic and has therefore given rise to different interpretations and rearticulations in public and scientific discourses.

The association between language and race in this Indian ancestry debate can be traced back to nineteenth-century orientalist scholarship with a key participation of German intellectuals. At that time in Indology, research on the Aryan question focused on the study of ancient scriptures in Sanskrit language, like the Vedas, that are considered by some as foundational to

Hinduism.[145] These were seen by Indologists as paramount sources for interpreting societal dynamics (Inden 1990; Figueira 2002; Mitra 2020). An iconic author in this tradition of scholarship was the widely read German orientalist and Oxford professor, Friedrich Max Müller. Müller was a student of the German professor and Sanskrit scholar Franz Bopp (1791–1867), whose work trained an internationally leading German school of Indology that emphasized comparativist approaches and a search for the common origins of European and Asian languages (Manjapra 2014). Based on his studies of one Vedic scripture (which he famously translated for European audiences) and theorizing on the similarities between Sanskrit and European languages, Müller gave scientific leverage to an already existing Aryan migration narrative, popularizing it: He elaborated that Sanskrit speaking Aryans moved from somewhere in Eurasia down to India *en masse*, in approximately 1500 B.C., conquering the aboriginal, so-called Dravidian languages speaking peoples of the subcontinent (Thapar 2008).[146] Building up on the widespread perception that South Indians generally have darker skin color tones than North Indians, Müller often used the word "race" to describe these two language-speaking peoples and, based on some evidence found in Vedic texts, asserted that the Aryans described the people they encountered in the subcontinent as "noseless" and "dark", which he interpreted as racial, physical markers (Channa 2003).[147] Along these lines, Müller suggested a racial distinctiveness and ancestral origin of the speakers of Indo-Aryan languages (the Sanskrit-related modern languages spoken from Maharashtra to more northern areas of the Indian subcontinent), which he contrasted to the Dravidian languages mostly spoken today south of Maharashtra, in the Indian South (Channa 2003; Sur 2011). The binary racial contrast between Aryans and Dravidians runs parallel to the contrast, also drawn in Müller's writings, between Aryans and Semites; in both binary constructions, the Aryans stood as an idealized ancestral people, over which eugenicist, nationalistic (and masculinist) mythical phantasies

[145] The Vedas are believed to have been composed between 1200 and 600 BCE; during the late nineteenth century, the Hindu reformist movement Arya Samaj, for example, argued that this literature "should be regarded the sole basis of Hinduism" (Fischer-Tiné 2014:xii).

[146] Before Müller, in the late eighteenth century, "Sir William Jones had first mooted the idea of a racial difference existing between northern and southern Indians, and between high and low castes, but his theories, particularly that of the so-called 'Aryan invasion', were only weakly supported by linguistic and archaeological evidence" and had not yet achieved "widespread popular acceptance" (Bates 1995:233). For Müller, part of this ancestral group of Aryans also migrated to Europe; he argued that Europeans and Aryan Indians shared a common ancestry. This European–Indian commonality narrative also dressed British colonization of India with a discursive justification (Bayly 1995; Figueira 2002; Sur 2011).

[147] Trautmann (1997), however, mistrusts the nineteenth-century European Indological overemphasis on the portrayal of the original, non-Aryan inhabitants of India as barbaric, dark, and snub-nosed; the historian-anthropologist claims that Vedic texts actually do not support these contentions: darkness of skin was not an important marker in these texts and the original inhabitants met by the Aryans were also described as wealthy and powerful opponents, not barbaric (see also Channa 2003).

would be projected, not only in India but also, notoriously, in Germany (Figueira 2002). In a similar vein to his teacher Bopp, Müller's idealization of Vedic texts and of the Aryans as the ancestral people of the Aryan Germans can be understood as an expression of German Romanticism, which had the German national formation as the background and was marked by a nostalgic search for the roots of Germanic peoples (Figueira 2002; Thapar 2008).

Müller's work, in turn, inspired the racial classifications of Risley, who, as we have seen in Chapter 1, was responsible for directing and formulating a methodology for government surveys on castes and tribes of British India, to which he included a series of anthropometric methods. Risley claimed that through anthropometry one could distinguish between Aryan and non-Aryan descent among different caste groups. For Risley, the migration of Aryans was at the root of the preserved diversity of Indian populations: He attributed the institution of caste endogamy to the Aryans' wish to maintain their racial distinctiveness. As he explained in a conference in London, the idea of a "community of race […] is the real determining principle, the true *causa causans* of the caste system" (Risley 1891:259). In this sense, he contested prevailing sociological theories that attributed the cause of the caste system to differentiation based on socioeconomic occupation. Instead, Risley elaborated a causal nexus between a sense of racial distinctiveness and the endogamy of caste, arguing that the "primitive principle of taboo" of marriage among different social groups "came into play when the Aryans first came into peaceful contact with the platyrrhine [flat-nosed] race which we may […] call Dravidian"; "this principle derived its initial force from the sense of difference of race as indicated by difference of colour" (Risley 1891:260). Risley grounded this thesis both on his anthropometric measurements and Vedic sources. Inspired by Müller, Risley placed a strong emphasis on the measurement of nose shape, which he enacted through the anthropometric measurement of the nasal index, a measurement that is still very present in anthropometric training in India, as we have seen in Chapter 4. The shape of the nose was the central variable in Risley's taxonomy, as this allegedly mirrored key social differentiations and racial origin: For Risley, the higher the social status, the "finer" the nose, and the higher the "Aryanness" of the measured Indian person. Other important racial observations in his methodology related to stature, shape of the head, and skin color, although the latter was not measured in practice because it was, as Risley (1891) admitted, hard to measure. In sum, Risley elaborated a taxonomy which prescribed that "the people of India" could be racially classified mainly in two types: Aryan and Dravidian (Risley 1908 quoted in Malhotra and Vasulu 2019:64). Thus, like Müller's, Risley's racial typological reasoning was shaped by a two-race historical model that considered Aryans as the

major migrating group to the interior of India, which was before inhabited by groups that could be racially classified as Dravidians (see Sur 2011).[148]

Thanks to his government authority status, Risley's ideas had wide circulation.[149] In fact, they are still commented and built upon, as a recent publication co-authored by Malhotra demonstrates (Malhotra and Vasulu 2019). At the same time, they were always discussed and even contested by many, including Müller, who later questioned the use of racial anthropometric methods to study the distinction of modern descendants of Aryans and Dravidians. In a *mea culpa* inflected address, Müller acknowledged that he allowed himself "occasionally the freedom to speak of the Aryan or the Semitic *race*" but meant "thereby no more than the people, whoever and whatever they were, who spoke Aryan or Semitic languages", without ascribing physiological characteristics to them (Müller 1891:180, emphasis mine). Although Müller had suggested the equation of racial and language groups in many previous texts (Thapar 2008), in response to Risley the German Indologist advocated for a strict separation between what he called "a phonological race" and a "ethnological race"[150], cautioning against the collation between language and anthropometrically observed physical appearance (Müller 1891:179); he also emphasized that "[r]aces can change languages" (Müller 1899:450).[151]

Thus, this friction between Müller and Risley can be understood as a debate on how to define the matter of the human difference that allegedly emerged from the Aryan migration to the Indian subcontinent. In this debate, the signifier "race" was filled with different meanings, with distinct methodological and disciplinary accents. This demonstrates the uncertainty and flexibility of this category of difference: For some, "race" meant an ancestral and/or language group; for others, it meant a group with inherited physical markers that correlated with social and cultural differences. 120 years later, this debate still haunts the study of human diversity

[148] A third, less present racial type in the subcontinent was what Risley (1891:258) called "of Mongoloid descent", but he stressed that this type was essentially a frontier element, with little influence in India's interior. Later he elaborated a typology that included other four types as results of these three main racial types (see Malhotra and Vasulu 2019).

[149] Risley had a remarkable scientific prominence, also in Europe: in 1910, after his civil service in India, he was elected the president of the Royal Anthropological Institute of Great Britain and Ireland (Fuller 2017).

[150] Risley (1891) had called his combination of racial, anthropometric, and ethnographic methods in India a "ethnology of India".

[151] Müller even wrote a long letter to Risley, in which "he tried to exonerate himself from the mischief produced by employing the terminology of comparative philology in an ethnological sense" (Figueira 2002:45), stressing that "terms" such as "Aryas, Shemites, […] Dravidians, […] Bantu races […] have nothing to do with blood, or bones, or hair, or facial angles, but simply and solely with language" (Müller 1888:245 quoted in Figueira 2002:45). However, as Figueira (2002:45) puts it, "[o]f course, Müller spoke too little and too late".

and ancestry in India, as we will see in the analogous discussions among anthropologists and population geneticists, later in this chapter.

Risley's work would also be discussed by following generations of Indian anthropologists, including Karve and her supervisor Ghurye. Ghurye elaborated on the racial community aspect of Risley's theorization on Aryanness and caste, linking race to present-day caste differentiations. The Bombay University sociologist-anthropologist argued in his famous book *Caste and Race* (Ghurye 1957 [1932]) that caste endogamy was based on the attempts of upper-caste Brahmins (who according to him were incoming Aryans, with an ancestral Nordic racial origin) to keep their racial purity. Ghurye based this argument on the interpretation that "*varna*", the Sanskrit word that describes the four main ranks of castes, also meant "color", which he attributed as a sign that this *varna* differentiation corresponded to skin color differences. In this logic, the four *varnas*—Brahmins, Kshatriyas, Vaishyas, and Shudras—had different skin color tones.

In sum, Risley's, Ghurye's, and many other scholars' racial articulations on the Aryan migration thesis composed what Thomas R. Trautmann summarizes as a "racial theory of Indian civilization":

> This is the theory that the light-skinned, Sanskrit speaking Aryans clashed with the dark-skinned indigenous peoples of India, speaking non-Indo-European languages, whom they conquered. The sequel was the creation of the caste system, understood (in this perspective) to be the enduring constitution of Indian civilization, keeping the peoples of India separate from one another in respect of marriage, specializing each in respect of economic production, and joining them through economic exchange (Trautmann 2019:272).

In turn, anti-caste intellectuals criticized some aspects of this racial theory of Indian civilization but not necessarily the Aryan narrative or the racial framework embedded in it. Whereas Ghurye—himself a Brahmin—stopped short of questioning caste and the principle of racial purity, anti-casteist intellectuals like Ambedkar (see Chapter 3) and Jyotirao Phule[152]—both of whom were also from Maharashtra—theorized on the Brahmanical origin of caste endogamy with the goal of criticizing it. Instead of justifying the institution of caste by Brahmins, Ambedkar and Phule denounced it, blaming the *invading* Aryans' Brahmanist racist thinking for the intentioned caste segregation and inequality in India (O'Hanlon 1985; Figueira 2002; Channa 2003; Thapar 2019b; Hiwrale 2020; Hofbauer 2020). Thereby, these and other anti-

[152] Jyotirao Phule (1827–1890) was an education rights activist and also the husband of activist and poet Sivatribai Phule, to whom the institutional renaming from "University of Pune" to "Sivatribai Phule Pune University" in the 2000s was a homage.

casteist intellectuals still articulated the Aryan migration theory in their writings, even ascribing upper-caste communities with Aryanness both in the sense of origin and racial traits. By doing so, they could argue that these invading Aryans (as the ancestors of today's upper castes) oppressed—and, through instituting rules of caste like endogamy and untouchability, segregated themselves from—the original inhabitants of India. Still according to this account, these original inhabitants of India are the ancestors of those who today suffer the most from caste segregation and occupy low-status positions in Indian caste society, namely low-castes, Dalits, and Adivasis. In this way, these theories of origins of the caste system, while anti-casteist in their political orientation, tend to confirm long-standing racial frameworks in the search of the origins of difference among these Indian social groups.

As a result of these scientific and political debates on ancestry and origins in India, up to this date Aryan migration stories carry very high political stakes that are inevitably bond to caste-related anxieties. As we will see later in the chapter, these anxieties also accompany today's genetics research that built upon these stories of migration to India.

5.2.2. Karve's articulations on the Aryan question and her legacy in genetics studies

Perhaps inevitably, the much-debated Aryan question found resonance in many of Karve's writings on human diversity in India. She supported the claim that "[a]round 2000 B.C. the Indo-European speaking people were on a move southwards [to India] and westwards [to Europe]" (Karve 1961b:149); but this is as much as she would agree with the previous generations of anthropologists and Indologists working on the Aryan issue. Karve also theorized about the origins of caste and ethnic differentiations in India but came to different conclusions than Ghurye, Ambedkar, Phule, Risley, Müller and others. Based on new evidence from archaeology, as well as her own anthropometric, serological, social anthropological, linguistic and Indological analyses, Karve's own articulations on the issue left an important legacy for ancestry research today: She formulated a framework for circumscribing the unit of analyses that should be—and in fact is still—used in population genetics research in/of India. As I will explain below, her model has been taken up by many in the field up to this date, from many Indian anthropologists to internationally known geneticists like David Reich.

The Aryan question is already discussed in Karve's first papers after her return from Berlin, for instance in her anthropometry-based study of her own caste, Maharashtra's uppermost Brahmin group, *Ethnic Affinities of the Chitpavans* (1933), a paper that expands on a former article published in the German *Zeitschrift für Morphologie und Anthropologie* that she had

written while in Berlin (Karve 1931a). Theorizing on the origins of Chitpavan Brahmins based on her assessment of their eye-color variation and Mendelian pattern of inheritance (in the fashion of her German supervisor Fischer) as well as on mythology from ancient texts, Karve concludes that the male ancestors of this West-Maharashtrian upper-caste group must have arrived from the North (probably on a ship, as the myth of Parashurama goes),[153] while the first female ancestors were probably Dravidian speaking women brought to them from Gokarna, a town today south of the Maharashtrian border.

Karve's theorization on the origins of this group of Brahmins is interesting in at least three aspects that I will discuss throughout this chapter. First, concerning the relation between hereditary markers (eye-color) and the interpretative framework (based on a mythological story), it is interesting to note that the first can only be made relevant if interpreted through the latter. In this sense, Karve uses the mythological narrative to interpret the anthropometric data, or, in fact, she analyses the anthropometric data to confirm the migration story hypothesis from the myth. This shows how research on ancestral migrations needs a narrative structure in order to connect, analyze, and make sense of the data on physical or biological variation. This is a common pattern in population genetic studies too, as I will discuss below: without a convincing narrative or (hi)story-based model, one cannot draw coherent conclusions from the genetics data. As we will see, population genetics of India still draw on ancient Sanskrit scriptures. But as these texts are also seen by many today as the sacred scriptures of Hinduism and, by some accounts, as mythical rather than historical, their invocation in scientific hypothesis building often causes polemic and reinforces a Hindu-centered take on India.

Second, just as the incoming first male ancestors of Chitpavan Brahmins are not necessarily subsumed to the one "Aryan invasion" other scholars wrote about, Karve claimed that the peopling of India took place through different waves of immigration, including different inflows of Aryans. Probably as a result of her collaborations with archaeology colleagues at the Deccan College,[154] Karve stated that "people have come to India continuously from outside for over last three or four thousand years. […] Every few centuries different folks and tribes came and settled into India. Each ruled for some time to be overthrown by indigenous rulers or

[153] The same arrival story is also articulated by a Jewish group in Maharashtra, the Bene Israel, in their origins stories, which point out to a possible shared ancestry with Chitpavan Brahmins (Parfitt and Egorova 2005; Egorova 2006). Karve did not comment on this coincidence, but, with an appetite for taxonomizing racial types that was typical of early twentieth-century physical anthropology, she compared Mediterranean, North African racial types with the physiognomy of Chitpavans, stressing their similarities.

[154] Archaeological evidence after the mid-twentieth century suggested that there were several smaller migrations from the North West down the South of the subcontinent (Joseph 2018; Thapar 2019).

some newcomers" (Karve 1961b:144–145). Arguing against opinions that stressed the foreignness of Aryans, Karve (1951) agreed with a thesis that both Dravidians and Aryans might have come to India around the same time, Dravidians consolidating in the South and Aryans in the North.[155]

The third interesting aspect in Karve's theorization on the origin of West Maharashtra's uppermost caste group relates to her conclusion that the "Chitpavan Brahmins of today thus seem to be a mixture of the northern Indo-Aryans and the southern Dravidians" (Karve 1933:144). Karve associates the "lighter-eyed element" observed in Chitpavans to an Aryan ancestry, while the darker shades in the eye-color (which she observed with a higher occurrence among Chitpavan *women*) is attributed to the Dravidians; to that she adds some data from cultural traditions and kinship terminology and organization, evidence which, all together, confirmed her hypothesis taken from the myth that those incoming Aryan men married Dravidian women. In this way, Karve puts in check former theories on the racial purity of Brahmins. More, she stresses that her use of the terms Aryan and Dravidian does not imply "that the two races were pure and unmixed" (Karve 1933:144); she argues the Aryans "maintained an active intercourse with the Iranians after colonising India", while the Dravidians were living "among the negroid pre-Dravidians centuries before and after the Aryan immigration" and thus "could not escape racial mixture" (ibid.:158). While this association between Aryans and Iranians on the one hand and, on the other, Dravidians and "negroid" still follows a hierarchical racial pattern, this was less present in Karve's last decades when her work gravitated towards multiculturalism. In the "unity in diversity" tone that mark some of her late writings (see Chapter 2), Karve emphasized how India and Indians are made up of different racial and cultural influences. She condemned how "portions of [India's] populations cherish some aspects of the past and reject others", adding that:

> The Dravidians deny and denounce everything 'Aryan' or 'Sanskritic'. The northerners forget that nobody knows what racial mixture the Vedic people represented and that we all are mongrels. The pre-Dravidians, the Aryans, the Dravidians, the unknown speakers of [the Austroasiatic] languages, all have contributed to our physical and cultural make up and it will not do to forget any of this ancestry or reject parts of it. Every one of us is all that. It will not do to hate our past or be ashamed of it. (Karve 1961a:156)

In sum, there are at least two important interrelated implications from Karve's conclusions on the relation between caste and Aryan ancestry which will shape her legacy to population

[155] Karve credits this thesis to Christoph von Fürer-Haimendorf (see Chapter 2).

genetics of India. As I will explain, the first is the assertion that caste is not a Brahmanical or Aryan construction; the second is the historical model according to which the peopling of India occurred in such a way that India today can be seen as a multitribal society composed of different endogamic groups. This model implies that the unit of analysis in genetic studies of India should be each caste social group on the level of *jatis*, which, according to Karve, are endogamous (e.g., Chitpavan Brahmins), and not a whole caste rank grouping or *varna* (e.g., all Brahmins in India). As for the first implication of her conclusions, Karve directly contradicted her M.A. supervisor Ghurye as well as Ambedkar and Phule in their formulation that the endogamy of the caste system emerged from the Brahmins' wish of Aryan racial purity. Arguing against Ghurye, she stated that that the Sanskrit term "*varna*" did not primarily mean "color", but "class" or "order", concluding that "[i]t is wrong to suppose that the *varna* system arose out of a consciousness of racial distinctions as indicated by skin colour" (Karve 1961a:53). For Karve, Brahmins are not racially pure or purely Aryan, nor were the Aryans responsible for installing the rules of caste endogamy and hierarchy. She argued that the different groups that would be later known as castes and tribes were already living in the subcontinent "in spatial contiguity but in comparative social separateness" before the immigration of Aryans (Karve 1961a:69). For her, elaborations on the *varna* system found in an ancient Sanskrit Vedic text that prescribed the four-caste rank differentiation were simply a theoretical abstraction of the Aryans who wrote that text: Their writings about *varna* were a product of the Aryans' interpretation of an already existing patchwork of occupationally differentiated endogamic groups, and not a Brahmanical invention of a social system to secure racial purity.

As an analytical parenthesis, one could ask, nevertheless, to what extent Karve's dissociation of the origins of caste from Vedic texts—and therefore from Aryans and Brahmins—comes from a stance of Brahmanical or Hindu defensiveness. As we have seen in Chapter 2, Karve has been described as a Hinduism-affine Brahmin who, especially in the context of Indian independence, worried about national integration and preservation of Hindu culture. If we go down that political spectrum and bring it to a more recent context, Hindu supremacist groups have welcomed any scholarly evidence that contradicts the idea of an Aryan invasion, especially because the writing of Hindu sacred scriptures, and by extension the birth of Hinduism, is credited to these same Aryans. Similarly, the expurgation of responsibility for caste segregation from the Aryans (as they are seen as the first carriers of Hindu religion) is equally appealing for political positions that align with Hindu nationalism. Anyhow, regardless

of its political background, Karve's view on the origins of caste is crucially interlinked with her model of caste diversity and ancestry and it has been taken up uncritically by key population geneticists and thus continues to shape genetics research.

The second point in Karve's theoretical elaborations is that, since something like caste (or *jatis*) existed before the Aryans, the social groups that are now understood under one of the four caste-groups or *varnas* do not necessarily share the same ancestral origin: different Brahmin groups, for example, might be composed of different incoming groups who just so happened to inhabit the same socioeconomic occupation in a forming society (e.g., priesthood)—and were later interpreted by the Vedic text to be of the same *varna* (as "Brahmins"). Karve (1961a) explains that she first came up with this hypothesis after her anthropometric studies of caste groups in Maharashtra (Karve and Dandekar 1953), which found out that different subregional groups of Brahmins were anthropometrically different. Later, Karve tested this hypothesis in an anthropometric and blood group-based research with her student Malhotra. While many critics pointed to methodological and theoretical flaws in the publication following this research (as we have seen in Chapter 2), based on it Karve argued that Brahmin groups in Maharashtra might have had different ancestries following from different waves of migrations (Karve et al. 1968; Karve 1968a). In other words, Karve sees the root of the diversity of castes and tribes in India as a result of many migrations and the *lack of fusion* among diverse incoming groups, and not—as Risley had suggested—as result of fission or separation of a few original groups. As she explains, different caste groups in one region should not be visually understood as "a jig-saw puzzle" that forms the coherent picture of a caste system, but rather like "a patchwork quilt" of different incoming ancestral groups that did not fuse, each retaining its relative separateness (Karve 1961a:61,66). In a nutshell, Karve's vision of diversity and ancestry in India is analogous of a "multitribal society", where "[d]ifferent units live separately in endogamous, semi-autonomous cells" (Karve 1961a:60,61).

The implication and main legacy of Karve's ancient history vision for the field of population genetics was the suggestion that the unit of analyses of these genetic studies should be the subregional (sub-)caste groups—also known as *jatis*—and tribes, and not the whole *varna*. In this logic, a population genetics studies should consider, for example, Chitpavan Brahmins as a populational group to be sampled, instead of clustering, to continue with the example, all Brahmins in Maharashtra or in India as a populational unit. Likewise, it would not make sense, according to this model, to sample groups according to a region or language (e.g., all Maharashtrians or all Marathi-speaking people). Thus, Karve's model gave a historical

confirmation to the hypothesis that caste and ethnic groups on this *jati* level are endogamous and that they should, therefore, be the unit of analysis in questions of heredity and ancestry. According to different anthropologists whom I interviewed, this model was Karve's most important contribution to populational genetics and biological anthropology.[156] As we will see in following section, Karve's model informs the sampling procedures of leading scientists in the field of population genetics of India.

However, while Karve's model has been taken up somewhat uncritically and in a pan-Indian generalizing way by later generations of population geneticists, it draws from a particular scientific situatedness of Karve and contains important flaws. Besides the essential critiques articulated by the reviewers of her and Malhotra's article (who, as we have seen Chapter 2, were critical of her collation of race, biology, and social groups), more generally we can observe a tense circularity in Karve's model: it relies on the assumption that *jati* groups are and have been endogamous—an assumption is at the same time a theoretical hypothesis and methodological operationalization. In other words, at the same time that her choice of *jati* as the unit of analysis in genetics research is a historical hypothesis (namely, that each *jati* has a different ancestry), it relies on a methodological operationalization (where *jatis* are the chosen unit of analysis) which, as a consequence, produces research results that confirm the historical hypothesis. The self-confirming circularity in this relationship between hypothesis and sample selection has been observed by different critical studies of statistics (Hacking 1990) and particularly of racial anthropology (Hanke 2007) and it is also observable in current population genetics research, as I will discuss below.

Furthermore, as the genealogy traced in this section has shown, we can better understand Karve's model when we examine it in its entanglement to both scientific and political discussions, in connection to the situatedness of her scientific trajectory and practice and her political standpoint. As such, Karve's model represents a particular response to issues concerning caste, ethnicity, and religion-based inequalities as well as national unity in mid-twentieth century India, with envisaged political affordances. Her model is also rooted in a anthropometry-based, German school of racial anthropology, where, like in Fischer's research in Namibia, ancestral groups are imagined and delineated so as to understand human variation in a Mendelian fashion. Although neither the political connections in Karve's elaborations nor their German racial anthropological rootedness are acknowledged by biological

[156] Among others: Interview with Mohan Reddy, Hyderabad, 13 Mar 2019; Interview with Shantanu Ozarkar, Pune, 27 Mar 2019; Interview with Manjari Jonnalagadda, Pune, 30 Oct 2018.

anthropologists and population geneticists today, understanding these entanglements is relevant to comprehend how current molecular research about the origins of diversity in India continues to follow a troubling intellectual legacy and, as a result, might have particular (racializing) political resonances.

In the following section, I continue to explore how Karve's model of the origins of diversity in India has been picked up and further (re-)articulated—or contradicted—in the current production of population genetics knowledge, having in mind both the political context of Karve's research situatedness as well as the political entanglements of population genetics research today. As the question of origins including the Aryan question remains alive and unresolved in the Indian scientific and political debate, I will examine which scientific and political tensions still animate the difficult definition of human difference in population genetics of India, and how anthropologists are inserted in such debate, starting with an ethnographic description of a debate scene that had Malhotra as a main actor.

5.3. Origin questions in today's population genetics of India

5.3.1. An anthropologist in a genetics conference

Around 5pm of a January weekday, the Kolkata railway station was bursting with people as I found my way towards the track where the regional train to the nearby town of Kalyani would depart. I was going to the 44th meeting of the Indian Society for Human Genetics (ISHG), India's biggest annual genetics conference, which in that year (2019) would take place at the University of Kalyani and the adjacent National Institute of Biomedical Genomics (NIBMG), founded in 2009. On the platform, anxious about embarking alone a train to a destination I had never been, I approached a distinct group of people—young adults, wearing smart-looking clothes, and each holding a three-day trip sized luggage and a long tube that I assumed to contain a conference poster. As I sat with them in a corner of the train that soon became so mercilessly crowded that I could only talk to the person sitting right next to me, we both chatted about our PhD projects. She, a medical doctoral student from Mumbai, explained that her research involved giving genetics counselling for parents of intersex children: Her molecular analysis aimed at assisting the family to take a decision in assigning their child's gender as male or female (which often was revealed to be contrary to what they first thought). The precise genetics analysis, according to her, gave the child some security about their (re-)assigned gender. One among almost a hundred posters at the Conference later, her research sparked a lot of attention. Her research also shows a facet of genetics research that I would observe at the

Conference and in conversation with population geneticists: with the help of new genetic technology, these scientists strive to deliver "molecular truths" about a person's body—or a whole group of people—and this can have profound implications to a person's or people's identity and subjectivity.

I spent most of the time at the Conference in company of anthropologist Kailash Chandra Malhotra, who was one of the founding members and twice president of the Indian Society of Human Genetics. Malhotra trained in Delhi with KWI-A-alumnus Biswas. Biswas directly appointed Malhotra for a research assistant/lecturer position with Irawati Karve in Pune.[157] Researching and teaching in Pune in the 1960s, Malhotra became Karve's closest student and last co-author before she died. When I met him for the first time in Kalyani, I was delighted by how his joyful personality matched his incredibly prolific emoji use on WhatsApp, where we had been in touch and still are today. As I talked to Malhotra throughout the three days of the Conference, it would become clear to me that his professional position—as an anthropologist (with no prefixed adjectives)—was a very rare one among the several hundred conference attendees, most of whom identified as geneticists, biologists, statisticians, and biomedical or health researchers.

The Conference started in the university's aula magna with a sumptuous inaugural ceremony which involved Vedic chanting and the lightening of a massive chandelier. The opening ritual was followed by a commemorative prize to honor Malhotra for his foundational work in the Society. The prize was given to him with a warm handshake by the Conference host and leading scientist at the NIBMG, Partha Majumder. In his acceptance speech Malhotra highlighted the role of anthropologists in Pune to the creation of the Indian Society of Human Genetics (ISHG): He told the full auditorium how the idea of the Society emerged in the late 1960s among a circle of intellectuals in Pune and then in Bombay, propelled by the proliferation of new genetics clinics across the country, and inspired by the Indian societies of anthropology, physical anthropological, ethnography and folklore, and dermatoglyphics, which already existed. He finished the speech with a confession: "I examined the conference's program and, I must say, I understand very little now, because in the phase I was most involved we were dealing with different tools and different tissues, and now this has moved ahead. Wonderful!" Although he recognized and appeared to welcome such changes, I gathered the impression that the octogenarian anthropologist's wonder regarding new research technologies and bodily

[157] Interview with Kailash Chandra Malhotra, Pune, 23 Feb 2019.

objects seemed to be ambivalent, mixed with suspicion and hesitancy. This would be clear in my many conversations with him and in his reactions to some presentations at the Conference, for instance in the opening plenary.

The Conference's opening plenary included a presentation by Jeff Wall, a California-based biostatistician and geneticist, whose research was on the "admixture" of modern human groups with the ancient DNA of a hominin (or "archaic human") species: the Denisovans. The Denisovans are known from very few remains discovered in a cave in Siberia and later in another one in Tibet. The first molecular research that proved this "new" extinct hominin species' genetic distinctiveness was made possible in the late 2000s thanks to new technology that could extract and analyze DNA from two single finger-fragment and tooth fossils. Supported by the new theory that archaic humans (including Neanderthals and Denisovans) interbred with Homo Sapiens, the Californian geneticist tested the correlation between Denisovan genetic ancestry with different Indian groups, categorized by caste and language. In his conclusion, he asserted that his "results are consistent with a model where an ancestral South Indian population" had "relatively higher level of Denisovan ancestry mixed with later Indo-European speaking migrants"; these Indo-Europeans "entered South Asia from the northwest" and had "lower or no Denisovan ancestry". In conclusion, the biostatistician affirmed that "different castes/tribes in India derive different proportions of their ancestry from these two main groups", which he—like many other population geneticists today—called, and often simply by their acronym, "Ancestral North Indian" (ANI) and "Ancestral South Indian" (ASI). In the Q&A that followed Wall's presentation, Malhotra was the first in the auditorium to request the microphone: He questioned the model's focus on only two ancestral groups and—although the organizers tried their best to cut him off with the excuse of "the time limit"—he explained to a nervous audience that there are four major distinct *linguistic groups* in India: Indo-European [or Sanskritic], Dravidian, Tibeto-Burman, and Austroasiatic speakers; the fact that the latter was represented in the Californian study by only a very small sample of one single group (out of 36 "endogamous groups" that speak Austroasiatic languages) was equally questionable. Reacting with some disconcerted stumbling at first, the presenter tried to justify his sampling decision by affirming that they could not find a lot of differences between Dravidians and the sampled Austroasiatic speakers and a reason for this might be that "language*"* is not necessarily the same as "genetic ancestry*"* as populations might change language. Malhotra insisted that anthropologists in the past have shown that Austroasiatic speakers have certain phenotypic traits that speakers of other languages in India

do not possess, to which the geneticist politely replied that it would be interesting to tie analysis of genetics and phenotypic traits in the future.

Later, at a conference break, while I stood in a circle of people that included Jeff Wall, he reacted with shy reticence as he was asked by a latecomer how his presentation went. An Indian colleague filled the silence: "His presentation was criticized by Malhotra!" and, dismissively, reassuring the Californian colleague, chortled: "Ah, he is an old-school anthropologist, you know?"

The conference's opening dinner took place in the just inaugurated buildings of the newly expanded National Institute of Biomedical Genomics. While students took selfies with the realistic sculptures of the British and North American molecular biologists Francis Crick and James Watson overlooking their "discovery"—the double-helix shape of DNA, here in the form of an enormous shiny sculpture—, Malhotra sat by himself in a corner. "All that big research based on the analysis of *one* finger!", he said to me, commenting on the plenary presentation on Denisovan DNA. Later he told me with some resigned bitterness that, although he still occasionally publishes in the field (e.g., Malhotra and Vasulu 2019), for several years now he had lost the passion for population genetics and biological anthropology; more recently, he has devoted his attention to the anthropological study of environmental issues.[158]

By following Malhotra—an octogenarian anthropologist trained by both Karve and another KWI-A-alumnus—at this human genetics conference, we can see changes as well as some key tensions in the research on human diversity and its origins in India. While the trend of molecularization has formed an established common ground in such communities of scientists (in India as elsewhere), it continues to be further developed towards the genomic level as long as the promise of always evolving technology continues to hold the hope for deeper truths. As a result, anthropologists that are now associated with "old-school" approaches to diversity can feel out of place (or out of time) in such circles.

At the same time, as the debate between Malhotra and Walls showed, there is still a sense that paying attention to phenotypical variation can still be important to the interrogations of population geneticists. Further, these conference scenes show that the definition of the unit of analysis of population genetics is far from calmly settled: it is still debatable which markers are more important in defining what is a "population" in the population genetics of India. In

[158] As Banu Subramaniam (2019:130–132) noted, Malhotra also published a controversial paper in which he presents an ecological interpretation on the origins of caste differentiations (Gadgil and Malhotra 1983).

addition, from a geopolitics of knowledge point of view, it is remarkable that scientists like Walls can have a prominent presence in this Indian human genetics conference: although the North American biostatistician had never published on Indian populational history and seemed unsure about definitions of difference and related sampling decisions in his research about the Indian subcontinent, his well-resourced lab in California has the genomic technology that can provide authority in this increasingly genomicizing field of research.

In the following, I will continue to discuss these conference observations as I situate and examine six key interrogations: a) the question of where, in the human body, human difference is to be studied: whether in the phenotype or genotype; b) the question of how to define and operationalize the unit of analysis of human difference in the past or, in other words, the question of what is a "population" in the population genetics of India; c) the construction of new categories of ancestral difference, like "ANI" and "ASI", and whether they are just new framings for problematized old terms like "Aryan" and "Dravidian"; d) questions about the practice of designing and collecting samples in genetics research in India; e) the trouble of multiple temporalities in population genetics; and f) the problem of defining the spatial scale of "India" in population genetics that aim to put forward generalizing assertions about India.

5.3.2. Of what is made the matter of the difference that matters? The phenotype vs. genotype debate

The first plenary of the conference of the Indian Society for Human Genetics in 2019 started with an enthusiastic presentation by the leading scientist from a genetics institute in China who emphasized the importance of "always including phenotype data" in genetics research, as "it's now known that the gene is much more mutable" than previously thought. While the full auditorium applauded the presentation, Malhotra whispered to me with a sardonic laugh: "phenotyping was left aside for a long time, now it's back!" In a later plenary, the Chinese scientist provoked some nervousness among the attendees when he repeatedly asked a young Indian population geneticist after her presentation whether she could talk about phenotypic differences—like "average stature"—among the populations she studied, to which she first anxiously said that she did "not want to comment on the phenotype" and finally explained, sidestepping the question, that such traits are highly influenced by environmental factors and therefore not genetically relevant.

This conference scene shows a key tension in genetic approaches to human diversity: the difficulty in establishing what and where is the matter that matters for the study of hereditary

human differences. This uncertainty translates into the binary genotype and phenotype: the first only observable through molecular methods with a gene-level reach, the latter meaning the morphological traits or physical appearance. To which degree the first influences the latter, or to which degree the latter tells something about the first, has been an object of study and contention, whereby many geneticists for a long time have denied the connection between the two and focused on the first (El-Haj 2007). This debate has been further weighted by concerns about the legacy of race and racism in genetics and its political implications. In this sense, the Indian geneticist's wish "to not comment on the phenotype" might speak for the discomfort regarding race-ism: As, before the emergence of population genetics, racial definitions of difference usually focused on the exteriorly visible and anthropometrically enacted traits (including stature), the young population geneticist's reaction reflects how the discipline she had just been trained in avoided the matter of the superficial, skin-deep differences. While the two geneticists in the scene appear to have a different take on the issue, the retired anthropologist sitting next to me in auditorium laughed at the irony of the historical twist: Anthropometric techniques—which he, trained by Karve and Biswas, once used to work with and were later discredited by many geneticists—might now be relevant again in the study of the origins of human diversity. If discredited by many geneticists in the second half of the 20th century, we know observe "a return the phenotype" (M'charek and Schramm 2020).

The friction around the binary phenotype versus genotype stems from discussions about the meaning of "race" and about what concepts, methods, and human body fragments should account for the study of human diversity. As pointed out in Chapter 1, these discussions can be traced back to the mid-twentieth century: In the post-World War II's push for a consideration of the racist implications of researching human variation, many researchers strove to undermine those theories of race that had become more closely associated with the politics of Nazi eugenics (Reardon 2005). A key theoretical development in the post-World War II was the dissociation of the tie between culture and biology/heredity, which had been prevalent in eugenicist racial theories (Haraway 1997). At the same time, this theoretical move was pushed by new tools and methods with a molecular reach that were being discussed in interdisciplinary arenas, including by scientists in the emerging field of population genetics and (physical and biological) anthropologists (Reardon 2005). Based on the assumption that phenotypic differences were rather recent adaptations in the long history of human evolution, geneticists often disagreed with archaeologists and physical anthropologists who, for instance in the Second UNESCO Statement on Race (UNESCO 1951), still defended the explanatory power

of visible physical traits for understanding the origins of human diversity. Reardon (2005:41) calls these frictions between physical anthropologists and population geneticists a "disciplinary turf war over who had the right tools and concepts for studying human variation."

However, these discussions did not mean that these researchers of physical human variation would give up race as an object of study. Instead, they tried to refine the definition of race and tune it to the recent techno-methodological advances in genetics and statistics that set the stage for the emergence of molecular biology (Reardon 2005:61). Population geneticists, especially, hoped that the objective truth about race could be found in the level of the gene and was, hence, invisible to assessment by "the man on the street" (Cavalli-Sforza 1989 quoted in Reardon 2005:53-54). This view would be endorsed against the backdrop of what by the 1960s became a "persuasive belief that the eradication of racism depends on the deliberate nonrecognition of race", further endorsed by a 1980s political and discursive push in the US for a so-called color-blind society (Pascoe 1996 quoted in Reardon 2005:55). This conceptual and, above all, methodological move, in these scientists' view, should be enough to not legitimate discrimination, which they regarded as a phenomenon of the social, political world. According to this logic, if a neat separation between science and politics (or between science and ideology) was maintained and if the right tools were used, objective research about human variation could go on (Reardon 2005).

The matter of human difference has continued to be discussed across disciplines since the mid-twentieth century. This unresolved issue has found acute expression again in the 1990s debates that famously unsettled the ambitious Human Genome Diversity Project[159]—which in contrast to its advertised neutral intentions was effectively accused of colonial "vampirism" by indigenous activists, contributing to the project's arrested success (Reardon 2005:158; Sommer 2016). In addition, the debate at the 2019 Conference of the Indian Society for Human Genetics shows not only that the issue has still not come to a final resolution but also that a neat separation between genotype and phenotype was in fact never cemented across disciplinary lines. Just like scientists in the field of biological anthropology—like Karve, Malhotra, and a younger generation of anthropologists in Pune—strove to incorporate molecular methods to their study of morphology, some population geneticists today are arguing for a "comeback" of the phenotype, bringing the old troubles of race back to the naked-eye visible fore.

[159] The Human Genome Diversity Project was a large-scale research venture initiated in the 1990s (See: Reardon 2005; M'charek 2005).

This long-standing tension points at two issues related to the unresolvedness of the legacy of race which will be further discussed in this chapter. First, it shows the difficulties of disciplinarily induced fragmentation of the human body for the study of human diversity: The idea of a binary phenotype versus genotype—whereas physical anthropologists concentrated on the first and population geneticists on the latter—in fact never solidly held. At the same time as biological anthropologists also strive to account for the genetic markers, the clashes between these disciplines demonstrate that neither phenotype or genotype seem to be able to account alone for a satisfactory understanding of human diversity. More, this demonstrates the limits of relegating the study of difference to the molecular level, pointing out that a final resolution for the troubles of race will hardly be met through invisibilizing it or taking it out from the realm of the exteriorly visible (see also: El-Haj 2007; Reardon 2008).

Second, the liveliness of this tension points at the fragile artificiality of the separation between science and the social political world. As Reardon (2008) puts it, the non-recognition of the co-production of both realms—science and society; natural order and social order—leads to a "perpetual return of crisis" attached to the trouble of race. This is not only illustrated in the conference scene, but also recently in the controversy started by a leading North American population geneticist, David Reich, whose work on the Aryan issue will be discussed below. Pushing for a reconsideration of race within genetics, Reich's opinions were met with resistance by dozens of other scientists who, in response, stressed that the existence of genetic differences between groups of people "does not mean that races are natural biological categories" (Kowal and Llamas 2019:95). In a *New York Times* article, Reich (2018b) had written:

> I have deep sympathy for the concern that genetic discoveries could be misused to justify racism. But as a geneticist I also know that it is simply no longer possible to ignore average genetic differences among 'races'.

Interestingly, Reich's argument has a very similar structure as the ones voiced by leading KWI-A racial scientists who, in the post-World War II period, self-defensively claimed that their science was "misused" [*missbraucht*] by politics at the same time as they reaffirmed the scientific objectivity of their past research. For example, former lead of the KWI-A's eugenics department Fritz Lenz wrote in a letter:

> I have sympathy also for the chimpanzees and gorillas, and I'm very sorry that they are facing extinction like so many other species, and the so-called primitive peoples too. Also the fate that has befallen millions of Jews is very painful to me; *But all this cannot*

> *determine that we should consider biological issues other than purely factually* (Lenz 1951 quoted in Klee 2005:366, emphasis mine).[160]

In a nutshell, this conceptual framework of neat separation between the social (political and ideological) and the natural/biological orders obfuscates the key question that animates this section: The matters of human difference are not *per se* an entity of the natural order alone; conceptions and perceptions of difference, even when scientifically established, are also socially constituted (Reardon 2008; M'charek 2005; Oikkonen 2017). As we will see in the next section (5.3.3), this also played a role in another key conceptual debate in the field: of how to define what a "population" is.

5.3.3. What is the unit of analysis of human difference? Defining "population" in the population genetics of India

What is a "population"? Although "population" is the core unit of analysis in population genetics, this question is still reason for intense debates in this field of research. As we have seen in the scene of the 2019 Conference of the Indian Society for Human Genetics, Malhotra disagreed fundamentally with Walls on how to circumscribe a population for the study of human diversity in India: While the retired anthropologist stressed *language* as a core element in delineating the boundaries of an ancestral populational group, the North American biostatistician believed populations can change languages and thus suggested the concept of genetic ancestral group as a way to operationalize an unit of analysis; and while Malhotra emphasized the existence of four major ancestral groups corresponding to four language groups, Walls worked with a binary model of ancestral Indian populations—North Indian (ANI) and South Indian (ASI)—which to a certain extent overlap geographically with two language groups. This discussion scene was an emblematic reenactment of an on-going fundamental debate in population genetics of/in India. As different scientists told me,[161] this field of research in India has been split over this issue in two major scientific groups. Malhotra's position, on the one side, is aligned with that of his former colleague Partha Majumder, one of India's leading population geneticists and chief scientist at the NIBMG. On the other side, Walls' position is based on the work of an international group of researchers that involve Harvard population geneticist David Reich and microbiologist Kumarasamy Thangaraj (Centre for Cellular and Molecular Biology, Hyderabad, India), both of whom have

[160] That said, I need to stress the limits of this analogy: Scientifically and politically, the positions of Lenz and Reich (who was born into an Ashkenazi Jewish family and son of the first director of the US Holocaust Memorial Museum) are dissimilar in fundamental ways.

[161] E.g.: Interview with Shantanu Ozarkar, Pune, 27 Mar 2019; Interview with Mohan Reddy, Hyderabad, 12 Mar 2019; Interview with Gyaneshwer Chaubey, Varanasi, 09 Mar 2019.

co-authored several widely cited publications in the field, including a paper on how an Indian population has switched language families without changing its genetic makeup (Chaubey et al. 2008). How a "population" is defined plays a fundamental role in research outcomes regarding human diversity and ancestry questions in India. Before I head to analyzing the formulation of the categories ANI and ASI (Section 5.3.4) and the ways in which sampling of "populations" is done in practice (Section 5.3.5), in this section I will analyze how these leading population geneticists have defined "population" in their research about India. I will shed light on how different factors like language, caste, ethnicity, and endogamy come into play and how Karve's work has been mobilized to solve this debate.

The question of how to define a population in the population genetics of India is better understood if we consider how, decades ago, the same question was emblematically addressed in the making of the controversial Human Genome Diversity Project. After long debates within the Project, as M'charek (2005) and Reardon (2005) show, the criterion of language was chosen as the main factor to establish boundaries between human populations. This choice was in part based on the theoretical assumption that language is a key cultural barrier that keeps human groups from interbreeding. But, perhaps more importantly, defining populations by language was also considered more pragmatic than the other option defended by another faction within the Project, which would have preferred a more inductive, cline-based approach: to collect samples according to a geographic grid and to cluster populations according to the distribution of pre-selected genetic markers, relatively independent of social categories. The final decision was weighted by the fact that this geographic grid method would have been timely and financially too costly; hence, the language factor in defining populations prevailed (Reardon 2005; M'charek 2005).

As a result of these discussions and further pragmatic considerations, population geneticists in the Human Genome Diversity Project developed a special interest in researching what they considered to be "isolated populations", i.e.: populations that due to geographical or cultural barriers had been in isolation and interbreeding for several generations. While the focus on isolated populations became central in the Human Genome Diversity Project, this empirical turn to studying "isolates" had taken up as an international trend since the 1920s, as old notions of racial purity were adapted to new Mendelian and Darwinian ideas of evolution.[162] As Lipphardt (2014:55) explains, "the concept of population as the principal unit of human

[162] Sommer (2016:326) also contends that the turn to indigenous isolated populations in the Human Genome Diversity Project is "associated with a certain nostalgia of purity".

diversity was based on an evolutionary understanding of population" and "rested on the assumption of periods of 'reproductive isolation'". By the 1950s, the sociological-anthropological concept of "endogamy" was then appropriated by geneticists, perhaps as more human synonym for "inbreeding", to "account for the isolation status of groups they wanted to sample" (ibid.:56). By that time, the diversity in Indian society had been largely theorized in racial anthropology and was now being studied by functionalist anthropological accounts in terms of its "kinship organization" or "caste system" (by which marriages within a caste community or *jati* were often considered to be the rule), notably in the works of Karve (e.g., 1953), as we have seen. As a result, geneticists relied on these anthropologists, and particularly strongly on Karve's work, to construct a picture of India as a society formed by endogamous groups. As the Bombay-based scientist L. D. Sanghvi, a co-author of Karve[163] and co-founder of the Indian Society for Human Genetics, framed it: "the Indian caste system is the grandest [...] genetic experiment ever performed on human populations" (Sanghvi and Khanolkar 1950 quoted in Lipphardt 2014:56). In this view, the "caste system" and by consequence the genetic isolation of India's endogamous groups made the country a paramount site for population genetics research.

These debates essentially shape how geneticists working in India today define "population" in their research. Both Reich and Majumder have mobilized Karve's anthropological and historical theorizations on the endogamy of tribes and castes in India to justify their way of defining and sampling Indian populations. In general, as Lipphardt (2014:58) explains, geneticists often relied on experts from other disciplines to find "biohistorical narratives that would narrate the supposedly social and hence reproductive isolation" of the studied social group, to stabilize it as a unit of analysis. It was based on a reading of Karve that Majumder articulated that "since the vast majority of Indians practice Hinduism and follow the Hindu caste system", a major factor in the maintenance of genetic diversity in India has been the rules of caste endogamy or, in his geneticist terms, "the strong restrictions imposed on gene flow by the cultural traditions of the country" (Majumder 1998:108). In a nutshell, Majumder highlights *language* and what he frames as *ethnicity*—by which he means: belonging to an endogamous tribal or *jati* group—as the two main determinants of genetic difference in India. Therefore, he maintains, following Karve, that sampling of populational groups for population genetics research in India should primarily consider these two elements.

[163] See: Sanghvi, Balakrishnan, and Karve 1981. Sanghvi was a doctoral student of the North American geneticist Theodosius Dobzhansky.

For his turn, David Reich also visited Karve's theories to justify his approach to defining and sampling Indian populations. In his science bestseller book, *Who We Are and How We Got Here: Ancient DNA and the New Science of the Human Past*, Reich (2018a) grants Karve's theories an extensive commentary. In a section in which he discusses the "antiquity of caste" (ibid.:140–146), he writes:

> How the *varna* and *jati* relate to each other is a much-debated mystery. One hypothesis suggested by the anthropologist Irawati Karve [1961a] is that thousands of years ago, Indian peoples lived in effectively endogamous tribal groups that did not mix, much like tribal groups in other parts of the world today. […] The tribal organization was thus fused with the system of social stratification to form early *jatis*, and eventually the *jati* structure percolated up to the higher ranks of society, so that today there are many *jatis* of higher as well as of lower castes. These ancient tribal groups have preserved their distinctiveness through the caste system and endogamy rules. (Reich 2018a:142)

After discussing Karve's hypothesis, he contrasts it with "an alternative hypothesis", namely that of postcolonial historian-anthropologist Dirks (2001), who, according to Reich's oversimplified account, would have maintained that caste "endogamy was not practiced in ancient India, but instead is largely an innovation of British colonialism" (Reich 2018a:142). Suspicious of Dirks' hypothesis, Reich explains how Karve's model inspired his first research design with Thangaraj and informed their sampling procedures according to *jatis*, which, as he recounts based on Karve, should have been endogamous since ancient times. Reich explains that, following Karve, his first research with Thangaraj compared DNA samples of 250 *jatis* and showed that "strong population bottlenecks", probably due to caste-related endogamy rules, could be read in "*a third* of the groups [they] analyzed […], implying thousands of groups in India like this" (ibid.:144, emphasis mine). Extrapolating what they interpreted as evidence of endogamy in just one third of their sample, Reich generalizes his findings to an all-Indian scale to confirm Karve's model. Thus, it is through Karve's anthropological and biohistorical theories that Reich suggests a solution for the problem of how to define and sample "populations" in population genetics research of India. He concludes:

> People tend to think of India, with its more than 1.3 billion people, as having a tremendously large population […]. But genetically, this is an incorrect way to view the situation. […]. The truth is that India is composed of a large number of small populations. (Reich 2018a:145–146)

Therefore, Karve's model seems to have tackled what is perhaps the Achilles' heel of population genetics: the question of how to define the unit of analysis in this field of research or, in other words, how to define what counts as a "population", and how to sample it (see: Haraway 1998; Reardon 2005; M'charek 2005; Oikkonen 2017). Furthermore, as we can see

in Reich's account, this resolution is also a product of population geneticists' practical and rhetorical efforts to define and stabilize the basic categories of their scientific analyses.

Moreover, different concepts of populational difference are simultaneously at play in the field of population genetics. Often the racial legacies of this field in India come to light when racial categories are mobilized. Majumder's population genetics of India, for instance, is constructed over categories that go beyond the reference to language or "ethnicity": References to continental groupings, racial terms like "Caucasian" and "Mongoloid", as well as nationalities, all of those inform his argumentation on the distinctiveness of the Indian populations that he studied. Thereby, different levels of categories come together, even in one single sentence, for instance when he writes: "55 diverse *endogamous Indian populations* […] form a genetic link bridging *Caucasian* and *Asian populations*" (Majumder and Basu 2015:8, emphasis mine). Majumder's use of racial categories might also be connected to the fact that he, before being able to research with DNA analysis technology, used the methods of blood groups and anthropometry and applied the classificatory grid of racial physical anthropological typologies to study populational diversity in India (Majumder 1998).

Similarly, M'charek (2005) also noted a pattern of profusion of elements that inform the definition of populations: In her observations of human genetics research practices, she has counted at least seven different versions of population at play—sometimes also contradictorily.[164] In any case, as M'charek highlights, population is not a natural category or an essential, pre-existing object; any version of population is situated and relationally enacted through technologically assisted scientific practices, which can be diverse (Oikkonen 2017). In particular, M'charek (2005:170) observes that genetics research practices that trace a lineage or genealogy to understand human migration history tend to *naturalize* population a priori instead of questioning how a population could be clustered anew. A crucial issue that M'charek (2005:174) calls attention to in the definitions of population—and key to the interrogations of this chapter—is that naturalized versions of population might have very similar essentializing effects as race.

Thus, as we have seen in this section, *endogamous groups*, like any *population*, are "not natural nor essential" entities, but rather "matters of practice" (M'charek 2005:49). Establishing and

[164] As M'charek (2005:50) explains, at times, for instance when categories like "Caucasian" are mobilized to talk about a population, population seems to be "nothing but another term for race"; other times, populations are equated with national boundaries, while in other cases populations are clustered according to a set of genetic markers.

stabilizing “endogamous groups” requires population geneticists to undertake several theoretical and methodical efforts, as I will show further below in the discussion of sampling practices (Section 5.3.5). In the following section, I continue to discuss the definition of categories of difference in population genetics of India by shedding light on the formulation of the categories ANI and ASI by David Reich and colleagues. Visiting this category-making story will elucidate how population geneticists’ practices are entangled with the political weight of the essentializing effects of their research.

5.3.4. ANI colliding with ASI, or Aryans conquering Dravidians? Making new categories of difference for an old debate

Recently, the categories Ancestral North India (ANI) and Ancestral South Indian (ASI) have become a common place in scientific and media discussions on the origins of Indians. These terms came out for the first time in a 2009 paper in *Nature* by Reich, Thangaraj and co-authors and have been an integral part of the vocabulary of population genetics of India ever since (e.g., Moorjani et al. 2013; Haak et al. 2015; Narasimhan et al. 2019; Basu et al. 2016). If, as Venla Oikkonen (2017:204) puts it, “any claimed connection between a present population and a hypothesized past population always arises from a specific chain of technological interventions and discursive acts", in this case, too, the hypothetical ANI and ASI populations relied on inventive—rhetorical and practical—efforts by these scientists. In this section, I will examine Reich’s book *Who We Are and How We Got Here* (2018a) in closer detail in order to illuminate how the construction of difference categories in his research about India was ultimately interlinked with certain political considerations. In a first person-scientific narrative, Reich describes with intimate details how his cooperation with the CCMB in Hyderabad started and how his team, to solve an impasse with CCMB chief scientist Thangaraj and other Indian collaborators, came up with forging the terms ANI and ASI. As I will discuss, Reich and colleagues attempted to overcome the political weight of older categories by forging new ones that seemed to be more conformant to the current political status quo; by so doing, they produced research results that are complicit with (Hindu) nationalistic political framings and other discourses of Indian national integration.

In his bestseller, Reich (2018a) introduces the chapter about his population genetics research in India by addressing the old central question in the field: Aryan ancestry. He starts by lamenting that the idea of Aryans coming into India has been “difficult to discuss in an objective way” because it “has been seized on by nationalists in both Europe and India”—“including Nazis”—and blames what he calls the “politicization” of the question for the

regrettable fall of the "Aryan *invasion* theory", a term that he would have otherwise preferred (Reich 2018a:125, emphasis mine). Although he acknowledges the lack of archaeological evidence that would support this invasion theory, he defends that evidence from genetics can solve the debate on ancient migrations to India, a country which he frames as a "land of collisions": just like a tectonic collision formed the Himalayas, he argues, "India today is also the product of collisions of culture and people" (ibid.:126).

Contradictorily, Reich's reading of the Aryan migration as a "invasion" is at odds with Karve's take on the issue, although he appropriates a key aspect of her model to justify his sampling decisions. The Aryan invasion theory fundaments Reich's assumption that populational turnovers were common in ancient history. This assumption also underlies his article that was considered the "big bang" of aDNA, which had the title *Massive Migration from the Steppe was a Source for Indo-European Languages in Europe* (Haak et al. 2015). Many archaeologists (including some who co-authored the article) are critical of the grand narrative of "massive migrations" of the article, fearing that it was hastened to too big conclusions that would summon the ghosts of German nationalistic archaeology, most notably the controversial school of "settlement archaeology": This archaeology school started with Berlin-based professor Gustaf Kossinna (1858–1931), who equated the idea of a "people", or Volk, with language and archaeological culture; Kossinna propagated the idea that the Germanic people had Aryan migration origins, which in turn strongly influenced Nazi imperialism (Arnold 2006; Lewis-Kraus 2019). As a result of overcoming "settlement archaeology", the post-World War II "new archaeology" has ever since focused on much more processual and local prehistories—at least until Reich's reanimation of Kossinna-esque ideas (Lewis-Kraus 2019). Here, too, we see a topological folding between German imperial-nationalistic knowledge and knowledge about Indian ancient history.

Besides this turn back to grand narratives of populational turnovers, Reich seems also to push for a "comeback" of the phenotype in his take on race as well as in his descriptions of human diversity in India. In his bestseller book, he describes his perception of human diversity in India with a generalizing description of how a "stroll down the street in any Indian city makes it clear how diverse Indians are" and is "a visual testimony to mixture" (Reich 2018a:127). He writes:

> Skin shades range from dark to pale. Some people have facial features like Europeans, others closer to Chinese. It is tempting to think that these differences reflect a collision

> of peoples who mixed at some point in the past, with different proportions of mixture in different groups living today. (Reich 2018a:127)[165]

The ideas of a great "mixture" or "collision" underlie a central assumption in Reich's modelling of population genetics of India. As he re-articulates the Aryan invasion theory in his work, his model of ancestry and admixture of Indian populations is informed by the binary of Dravidians versus Aryans, even though this assumption is not clearly laid out in his papers or book. As the India chapter in his book progresses, the argument that comes to the fore is that the binary division of Indian populations simply inductively emerges from the genetic data. Reich argues that it was with use of a new DNA analysis technology which "had just recently become available in the United States but was not yet available in India"[166] that the Indian DNA samples brought to him personally by Thangaraj could be analyzed in Harvard; the analysis showed a "gradient of variation" in which today's Indian groups (sampled as castes and tribes) seem to present different degrees of admixture between two poles: a West Eurasian-related ancestral population and another very different pole that is more prevalent in the southernmost inhabitants of India, where Dravidian languages are spoken (ibid.:132). He called this gradient "the Indian cline", as the graphic representation (see Figure 18 below) that supports his argument shows.

[165] Similarly, Reich, Thangaraj, and co-authors open their 2009 *Nature* paper by referring to how anthropometry-based racial studies in mid-twentieth India showed that human variation in the country is structured along lines of ethnicity and geography; they argue that later molecular methods have confirmed these results (Reich et al. 2009:489). This also demonstrates the embeddedness of population genetics models in the legacy of anthropometry-based anthropology.

[166] The technology in question here is the single nucleotide polymorphism (SNP) microarray (Reich 2018a:130).

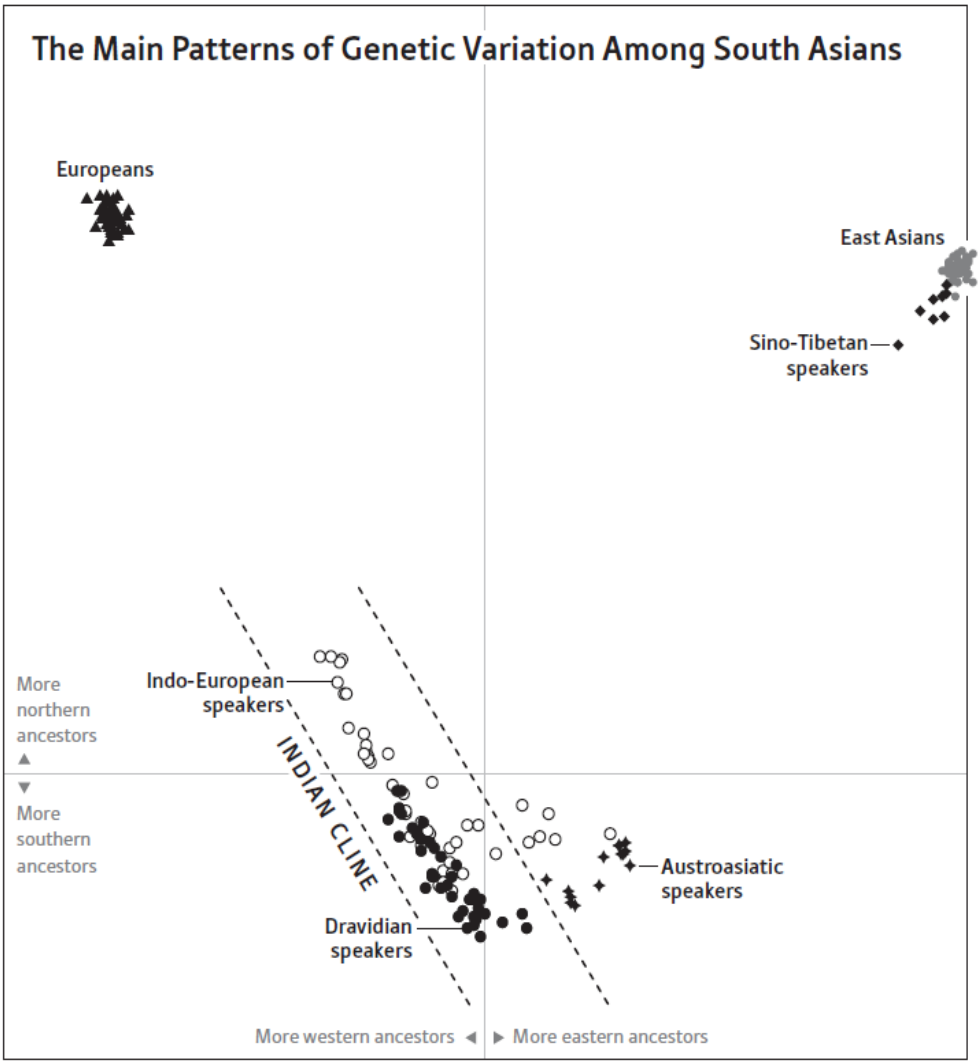


Figure 18: Reich's graphic representation of the Indian Cline of northern and southern ancestry. Source: Reich 2018a:131.

Interestingly, the graphic representation above is shaped to conform a cartographic correspondence: The numeric scale omitted, the populational groups fall onto the graph in a way that roughly matches geographic distances on a world map, reinforcing the idea of a correspondence between genetic similarity and spatial proximity; those groups of Indians outside the "Indian cline", especially Austroasiatic and Sino-Tibetan speakers, are also left outside Reich's model.

As Reich (2018a) narrates, he and his Harvard colleagues did not initially have the categories ANI and ASI in mind; at first, they worked with the category "West-Eurasian" to describe the ancestral population (also called Aryan) that to a large extent genetically matches those who today speak Indo-European languages. But then, during what he calls "the tensest twenty-four hours of [his] scientific career", he was pushed to review the terms articulated in his genetics

model for India: After he presented the results of his DNA analysis in a meeting with his collaborators at the CCMB in Hyderabad, Thangaraj and other Indian colleagues "seemed to be threatening to nix the whole project" (ibid.:134). According to Reich, Thangaraj opposed the use of the term "West Eurasians" because it would suggest that West Eurasian people migrated *en masse* into India, a conclusion which, as the Indian colleagues "correctly pointed out", admits Reich, his "data provided no direct evidence for" (ibid.). The Indian colleagues reasoned that, instead, "there could have been a migration in the other direction, of Indians to the Near East and Europe"; they therefore preferred to frame the relation observed in Reich's data as "genetic sharing" instead of precipitately asserting a direction of ancestry in which a foreign West Eurasian population is ancestor to current Indian populations (ibid.). Facing this confrontation, Reich writes that he "felt that we were being prevented by *political considerations* from revealing what we had found" (ibid.:135, emphasis mine).

However, it was only after thinking about and around those "political considerations" that Reich came up with the following solution to the clash between the Harvard-based team and the Hyderabad group of scientists: The categories of ancestry needed to be reframed to conform to what Reich called the "cultural resonances" of their research (idem). This meant that the new categories should not suggest the idea that present-day Indian groups had a foreign ancestry.

Reading between the lines of Reich's book reveals how the current political context of Hinduism and nationalism in India was crucial to his conceptual maneuver in rebranding these ancestry categories as *Indian*. This political background is present in Reich's narration through the allegory of a national Hindu festivity that marks the scene in which he reflected upon the effects of his research and was enlightened with a solution to the clash with his Indian collaborators:

> That evening, as the fireworks of Diwali, one of the most important holidays of the Hindu year, crackled, and as young boys threw sparklers beneath the wheels of moving trucks outside our compound, [my Harvard colleague] and I holed up in his guest room at […] Thangaraj's scientific institute and tried to understand what was going on. The cultural resonances of our findings gradually became clear to us. So we groped toward a formulation that would be scientifically accurate as well as sensitive to these issues.
>
> The next day, the full group reconvened. We sat together and came up with new names for ancient Indian groups. We wrote that the people of India today are the outcome of mixtures between two highly differentiated populations, "Ancestral North Indians" (ANI) and "Ancestral South Indians" (ASI) […]. The ANI are related to Europeans, central Asians, Near Easterners, and people of the Caucasus, but we made no claim about the location of their homeland or any migrations. The ASI descend from a population not related to any present-day populations outside India. We showed that

> the ANI and ASI had mixed dramatically in India. The result is that everyone in mainland India today is a mix, albeit in different proportions, of ancestry related to West Eurasians, and ancestry more closely related to diverse East Asian and South Asian populations. No group in India can claim genetic purity. (Reich 2018a:135)

It might not be coincidental that Reich's eureka moment of sensibilization towards the cultural and political resonances of his work in India—as well as the inspiration to the subsequent creative category-making—happened within the strident soundscape of Diwali, which is in fact the only Hindu holiday that is celebrated all over India and not only by Hindus but also by different religious and non-religious groups. By adding the adjective "Indian" to the categories of difference that convey the ancestry of present-day Indians, the collaborating teams of scientists truly Indianized or nationalized the reference point of that difference, in addition to deciding, at first, to not pinpoint the geographical "homeland" of that ancestry, which could fall, depending on the temporal reference, outside of current Indian borders. By separating language-based difference categories from ancestry, the researchers put forward a sense of distance between the existing groups of today and their ancestors,[167] but, at the same time, this distance is counterbalanced through the geographical reinforcement that both ancestral groups are *Indian*.

This nationalization of difference is reinforced by the conclusion that Reich draws from that category-making meeting with Thangaraj: no group in India can claim "genetic purity", all Indians are mixed. Here, one can sense the scientists' carefulness in striving to prevent their research to give leverage to political claims of genetic distinctiveness within India, unlike Bamshad et al.'s paper and other works that had used the category "Aryan" and ended up being mobilized by difference-based political claims that were articulated most notably by Dalits and indigenous minorities. Thereby, Reich and Thangaraj's argument is similar not only to other genetic imaginations of national unity in mixedness, as science studies scholars have observed in different national contexts, for example in Latin America (e.g., Kent, Santos, and Wade 2014; Olarte Sierra and Díaz del Castillo 2014; Kent et al. 2015); their argument also conforms

[167] In this regard, Reich's formulations are similar to the logics of genetic admixture mapping research in the US, as observed by Rajagopalan and Fujimura (2012). Like in the US where present-day racial groups are thought to have a correspondent ancestral group (where "black" matches African ancestry, and "white" European ancestry), in India language groups informed here the building of ancestral groups: Reich and colleagues estimated ANI and ASI frequency differences based on differences between samples of Indo-European and Dravidian speakers; in this move there is a circular reasoning, wherein a correspondent ancestral group is temporally dislocated from a present-day grouping, and the genetic makeup of that present day group is assumed to correspond to the ancestral group.

to Karve's insistence, in the 1960s, in emphasizing that all Indians are mixed or, in her terms, "mongrels", as we have seen in Section 5.2.2.

Thus, while Reich seemed to worry about *certain* political and cultural reverberances of his work about India, he and his collaborators re-articulated population genetics knowledge that would achieve *certain* political affordances. Specifically, they hoped to convey genetics categories and conclusions that would conform to the idea of unity in Indian nationality. At the same time, they continued to investigate the same issues that had been discussed since and before Karve's times, with the same sampling strategies defended by her, as we have seen earlier in Reich's reading of Karve. In publications after that tense meeting in Hyderabad, Reich and his co-authors continued to analyze their genetic data of castes and tribes to, via the new ancestry categories ANI and ASI, discuss old questions related to the origins of human diversity in India (Reich et al. 2009; Moorjani et al. 2013; Haak et al. 2015). For example, in their first joint publication, Reich, Thangaraj, and co-authors aimed at pinpointing the time of the beginning of the caste system (framed by them as a drastic reduction in genetic admixture) and they, albeit avoiding the word "Aryan", strove to locate the existence of ANI-related genetic markers in different Indian populations in the Indian North and South (Reich et al. 2009).

In sum, Reich continued to explore the same questions addressed by Karve and others in the population genetics in India but aimed to shed new light on them through new technologies and ancestry categories. Possibly, it was also due to their avoidance of loaded terms like "Aryan" or "invasion" and thanks to the Indianization of difference categories that their paper, although drawing conclusions similar to Bamshad et al.'s (2001) publication, did not spark explosive political controversies, unlike Bamshad's. Particularly, the use of ANI and ASI and the emphasis on admixture made difficult this time for Dalits, Adivasis, and other groups suffering casteism to claim that dominant upper-caste groups in India had a foreign ancestry. The mobilization of such a claim would be semantically and discursively more difficult due to the nationalizating affordances of Reich and Thangaraj's terminology and conclusions. In this sense, their paper was much less threatening to the political status quo in the current context of the mainstreaming national unity claims that have been tightly enmeshed with Hindu nationalism.

Thus, Reich's pretension of politically unthreatening—and politically undisturbed—"purely factual" scientific objectivity seems to be, in fact, never accomplishable. This case is another

demonstration of the entanglement of the political and the scientific in population genetics: it shows that genetics research that aims at constructing knowledge about a nation will ultimately be important to the politics of its respective national context, as such research can deliver deep biological-historical narratives that feed group-making processes and related political subjectivity (Oikkonen 2017); by doing so, population genetics research deals with very crucial elements related to nationhood and national belonging.

Furthermore, in terms of its impact, Reich and Thangaraj's research was intensely debated both in the media and among population geneticists. It also received a collegial but crucial criticism from Partha Majumder, who said Reich and Thangaraj's model was too "simplistic" (Majumder and Basu 2015:9). In a nutshell, Majumder criticized Reich and Thangaraj's research for their sampling selections and argued that their use of the "hypothesized ancestral populations" ANI and ASI was too limited due to its important exclusions: Austroasiatic and Tibeto-Burmese speaking groups were outlined in the model formulated by the Harvard–Hyderabad geneticists (Majumder 2018a:973–974; Majumder and Basu 2015).[168] Moreover, the limitation of Reich's binary model is not only grounded in the binary legacy of the Aryan (vs. Dravidian) debate, but it might also be due to the sake of methodological pragmatism: the statistical methods of population geneticists work better in a model where only two ancestral populations are considered in the mix.[169] Critical to this, Majumder and his co-authors (Basu et al. 2016) eventually appropriated of the use of ANI and ASI but incremented this model by expanding the sampling reach and adding two further ancestral categories to their mix of calculations of genetic admixture: Ancestral Austroasiatic (AAA) and Ancestral Tibeto-Burman (ATB). As I will explore in the subsequent section, the question of how and which populations should be sampled is a core—and fragile—point of contention in the population genetics of India. To solve this problem, key population geneticists (including Majumder and Reich) rely on Karve's model to fundament their decisions.

5.3.5. How to sample in practice?

As I was traveling in Hyderabad's brand-new elevated train system on my way to the Centre for Cellular and Molecular Biology (CCMB), one giant billboard at a busy crossing sparked my attention: It portrayed a fair-skinned woman, probably in her mid-40s, wearing ostensibly

[168] More specifically, in response to how the media questioned the categories ANI and ASI, Majumder (2018a:973-974) stressed that these are "hypothesized ancestral populations" and explained that they were constructed with new statistical methods.

[169] For an analysis of how such population genetics' statistical model often relies on two populations, see: Rajagopalan and Fujimura 2012.

expensive jewelry and a fine dark-red sari with golden embroidery, elegantly leaning against a velvet-textured chaise lounge. One out of countless fashion commercials targeting the affluent classes in Indian cities, this one wouldn't have sparked my attention if it weren't for the phrase printed in giant letters: "RETHINK ETHNIC". I got off at one of the newest stations of the train line, which happened to be right in front of the CCMB's campus. While employees waved their institutional card to make their way through the secured gates, as a visitor my entrance was only granted after I filled a form listing all items inside my bag, probably a security measurement to protect CCMB's valuable DNA archives and technological infrastructure. Mirroring how national science policy in India has devoted much more generous funding to specialized research centers over university-based laboratories (see Sekhsaria 2018), CCMB's campus was similar to the NIBMG and quite different from the many public university campuses that I visited in India: Its garden is lush and well-kept, its main building has spacious green courtyards, walls adorned with modernist paintings, and well-maintained elevators. In the third and topmost floor of the CCMB's main building, Thangaraj received me in his spacious office with a courteous smile. He invited me to sit on the couch where I could admire the collection of scientific journals containing his articles displayed on the coffee table, the 2009 *Nature* issue (which contained his feature with David Reich) on top of a pile (see Figure 19 below). With an experienced hospitality, he offered me green tea and gave me a tiny mineral water bottle from a fridge that contained dozens of tiny mineral water bottles. Later he told me that, just that very same week, he received a visit from an US-based company that was interested in acquiring DNA samples from CCMB's famously numerous freezers, a kind of request that he was now used to declining also due to legal impediments: following an anti-neocolonial principle of genomic sovereignty, India and other countries in the Global South have severely restricted the international travel of DNA samples collected in national territory (Benjamin 2009; Reardon 2017:73).

Figure 19: Cover of *Nature* Volume 461 Issue 7263, 24 September 2009, with the title heading: "Meet the ancestors: Indian population history from gene screening". The 13 red dots on the Indian map represent the locations of the sampled groups in Thangaraj and Reich's research.

After an interview in which Thangaraj, very wary about media controversies, was carefully reticent or precisely vague in his answers to most of my questions, I was escorted by two of his PhD students who showed me around in CCMB. They praised the comfort and privacy of CCMB's students hostel facilities, which greatly contrasted what I had seen at the public colleges and universities in Pune and elsewhere. During lunch in the sterile campus canteen, we talked about our PhD projects, and they could barely hide their puzzlement about my research: "But which population you're working on?" or "But what is social science used for in medical research…?" were some of the questions they—otherwise very confident in their habitus—disconcertedly asked me, which I now read as a sign of the lack of interdisciplinarity with social sciences and humanities in their scientific training. They also told me that collecting DNA samples is a crucial but very difficult step since many "uneducated people" are unwilling "to contribute to research"; one of the students explained that, therefore, she will have to establish a cooperation with a hospital, where samples will be collected for her genetics research on cancer.

After my day-long visit to the CCMB, Thangaraj hospitably organized his chauffer and institutional vehicle, an air-conditioned SUV with a "Govt of India" license plate, to drive me to the Department of Genetics and Biotechnology in the nearby but desolate looking Osmania University campus. There, I met biological anthropologist B. Mohan Reddy in his tiny, improvised looking, shared office. He explained to me that sampling is a crucial problem in

population genetics research of/in India. Echoing what several other Indian anthropologists had told me, Reddy stressed two main reasons for his critical stance. First, there is a statistical inference problem due to scant sampling: Several population geneticists construct very ambitious and generalizing conclusions on India's past based on a very limited number of sampled groups or of sampled individuals within each group. Second, there might be a problem in the practice of samples collection. CCMB's DNA archive relies on the labor of young students who usually collect samples in their hometowns or sites of (MA and PhD) research; this predatory "shark approach" in sample collection, as another anthropologist put it,[170] has granted CCMB a steady increase of DNA samples, but allegedly it is questionable whether the practice of sample collection follows important criteria. These anthropologists worried especially about the criterium of "pedigree" or "four grandparents rule": It would be important to trace up the genealogy of each person giving out their sample, instead of just relying on their self-declared tribal or caste (*jati*) group affiliation, to make sure that that individual is of "pure" descent or does not have—in *at least* 2 generations prior to them—a background of admixture with other social groups. Thus, although Thangaraj did not confirm this suspicion, some anthropologists questioned if CCMB's DNA samples are in fact representative of endogamous, admixture-free caste and tribal groups.[171] While such pedigree-orientation takes place in many comparable research projects in other places in the world, it is worth examining which problems emerge in the specific sampling practices in India, where so much emphasis is placed on the assumption that caste groups are endogamous—an assumption that Karve's work majorly contributed to. In the following, I analyze these two points of critique vis-à-vis sampling in the population genetics of India.

5.3.5.1. Limited sampling, ambitious inferences, and categorical slippages

The problem of sampling is one that could be raised in several articles in the population genetics of India, including in Bamshad et al.'s 2001 emblematic paper. As discussed above, the controversial paper co-authored by the Utah-based geneticist constructed very generalizing assumptions on the ancestral relations between "the upper castes" and "West Eurasians", but its sampling consisted of genetic material of only 265 males from eight caste groups—all from one single district in the Central-South of India.[172] Despite the small and localized sample, in

[170] Interview with Shantanu Ozarkar, Pune, 27 Mar 2019.
[171] Interview with Shantanu Ozarkar, Pune, 27 Mar 2019; Interview with Mohan Reddy, Hyderabad, 12 Mar 2019.
[172] The eight caste groupings analyzed in the article mix *varna* and *jati* categorizations (they were: Brahmin, Kshatriya, Vysya, Kapu, Yadava, Relli, Mala, and Madiga); all were collected in the district of Visakhapatnam in the state of Andhra Pradesh. Only individuals who "were unrelated to any other [caste] subject by at least three generations were considered eligible to participate" in the sampling (Bamshad et al. 2001:1001).

the course of the paper the authors simply refer to caste rank (as *varna*) as if the sampled individuals could refer to all related castes in India—based on the (doubtful) assumption that the sampled caste groups were representative of an all-Indian reality. In this way, the few Brahmin individuals sampled in that one location, for example, came to represent all upper caste individuals in the whole subcontinent.[173] The limitations of this paper's sampling were also discussed in a response paper by Majumder, who argued mainly with Karve's understanding of the origins of caste diversity to criticize Bamshad. Majumder wrote:

> Bamshad et al. have chosen to study caste populations drawn from a restricted geographical region of India. They have rightly emphasized the need to replicate their findings. This is absolutely essential because, as Karve (1961) [in her book *Hindu Society: An Interpretation*] has noted, "it is not generally realized that the caste society in a sense was a very elastic society." […]. Karve's work has also indicated that each of the different Brahmin castes in Maharashtra probably has a different origin. Thus, the origin of caste populations may not be uniform over the entire India geographical space, and it is crucial to undertake studies to replicate Bamshad et al.'s findings. (Majumder 2001:932)

Thus, Majumder mobilized Karve's interpretation on the social constructedness of caste ranks (or *varna*) and the biological and ancestral differences among subcaste groups (or *jatis*) from a same *varna* to criticize Bamshad et al.'s uncareful groupings of caste samples.

Possibly because, as an anthropologist in Pune explained to me, the "overgeneralizations based on [Bamshad's paper] still haunts this field"[174], after that controversy over Bamshad's arguments, most population genetics papers that aimed an all-India conclusion made some effort to expand the geographical area covered by their samples. More, since this controversy geneticists have tried to converse with anthropological knowledge in order to better sustain their sampling decisions and use of categories.[175] It is in this context that key population geneticists like Reich and Majumder both directly refer to Karve's historical model to structure their samples according to smaller endogamous groups (or *jatis*) and not, like Bamshad did, more general caste ranks or *varnas*.

However, the representativeness of sampling in population genetics of India after Bamshad still often raises doubts and discussions. For example, Reich and Thanagaraj's 2009 paper consisted of samples of a dozen castes and tribes, each with a different geographical location that, taken together, were sparsely distributed across India, as one can see in the red dots on the

[173] Other slippages and clustering between sampled communities were also problematic in the paper (Interview with Shantanu Ozarkar, Pune, 27 Mar 2019).
[174] Interview with Shantanu Ozarkar, Pune, 27 Mar 2019.
[175] Interview with Shantanu Ozarkar, Pune, 27 Mar 2019.

India map on the cover of *Nature* (see Figure 19 above). But their sampling was again considered too limited by Majumder, who called attention to the exclusion of Austroasiatic speaking groups in their analysis. While population geneticists still discuss with each other about sampling, biological anthropologists like Reddy maintain that, especially given the ambitious statistical inferences in this field, the sampling in population genetics of India papers is generally too small in number of individuals.

The limitations in sample size in this field might have different reasons, from the difficulty in collecting samples to, and perhaps more importantly, the technological difficulties in processing and analyzing genetic material. As for the latter, the transnational collaboration between Thangaraj and Reich is very telling: CCMB arguably possesses the vastest collection of Indian DNA samples—accounting for more than 300 groups and 18,000 individuals, as Reich (2018a:129) admiringly noted—but, despite being one of the most equipped research centers of its kind in India, by the time of my visit it did not have the infrastructural conditions to undertake the kind of genome wide analyses that Reich's laboratory can afford to do. Therefore, and also due to India's genomic sovereignty legislation, Thangaraj had to personally take the number of samples that he could travel with him to Harvard (Reich 2018a:130). In this sense, the technological and DNA material-based interdependence in this scientific collaboration plays a key role in its research outcomes.

Although Reich and Thangaraj's team has increasingly added more samples to their research after their first joint publication in 2009, doubts regarding sampling continue to be raised. Their following research that resulted in a paper published in 2013, for instance, encompassed at least 70 groups, of all major Indian linguistic families (Moorjani et al. 2013). Nevertheless, after the process that they call "sampling curation", their analysis only considered 45 groups that fall in what they call the "Indian cline", i.e., in the hypothesized ANI-ASI spectrum, so again excluding several sampled groups that are mostly speakers of Tibeto-Burman and Austroasiatic languages (ibid.:426). In addition, the rhetorical construction of their paper repeats a similar problem in Bamshad et al.'s controversial paper: the slippage from *jati* to *varna*, or, in other words, from localized caste group to a national category of caste rank. By constructing generalizing claims, the authors collapse geographically localized difference into a pan-India assertion of caste difference. Thereby, the representativeness of their sampling could again be put into question. To exemplify: Although the few sampled Brahmin (upper-caste) groups were all located in one single state in the North of India, as the paper progresses and the authors only refer to caste groups as their general *varna* or caste rank without indication of their geographic

location, the reader is persuaded to believe that, as the argument goes, all Indian upper-caste groups generally have significant genetic similarities with Europeans. It's only under close inspection that one can understand that such a claim could not possibly be generalized to, for instance, Brahmin groups outside the North of India, as these were not sampled in the research. This methodical slippage is quite striking, also because of the existing evidence on significant differences between groups in the Indian North and South. Given the ambitious claims that their paper puts forward and the political implications of caste-related ancestry research in India, these slippages in group categories and abstractions in scale that elide geography are far from being inconsequential.

It was also due to scant sampling that population genetics research has continued to be fiercely discussed in the Indian media, to the point that serious doubts have been cast to the objectivity of this whole field of inquiry. These growing critiques have triggered a defensive response by Majumder (2018a), who stepped into the public debate to save the positivist-scientific reputation of his population genetics peers and himself. In a direct reaction to these newspaper debates, Majumder downplayed the critique directed at limited sampling: Although he noiselessly acknowledges that his peers' sampling could be more inclusive and representative, he counterbalances this flaw by emphasizing the "mathematical and statistical rigour in population genetics" ("possibly the most quantitative of all biological sciences"!) and the advancements in technology, which will lead to "larger data sets" and to ever "more reliable and robust" inferences (Majumder 2018a:971,975).[176] While Majumder admits that "there is really no last word in most empirical sciences", he places a lot of hope in the assertion that "inferences get more robust as more data are collected and analyzed using more refined methods", methods "that have been refined over 50 years and still continue to be refined" (ibid.:972).

In this sense, Majumder resonates the technoscientific discourse that has accompanied population genetics since its inception in the mid-twentieth century: As we have seen in Section 5.3.3, this discourse is marked by the belief that with the right tools and techniques one can get at ever more objective pictures of the origins of humans and their differences (Reardon 2005).

[176] Majumder (2018a:976) rebuked a comment by a journalist who claimed thousands of communities had to be sampled if such research was to be robust; for the geneticist, just a better representativeness in sampling, which could be expanded and "made by statistical designs", allied to the quantification of "uncertainties", would be enough. However, different anthropologists maintain that the critique of scant sampling could also be directed at Majumder's research (Interview with Shantanu Ozarkar, Pune, 27 Mar 2019; Interview with Mohan Reddy, Hyderabad, 12 Mar 2019.). See, e.g., Basu, Sarkar-Roy, and Majumder (2016:1595) for an insight in the limitedness of the sampling in Majumder's genomic research.

The quantitative approach of population genetics since the time of its emergence can also be understood as this field's wish to distinct itself from, and be a harder science than, cultural anthropology's take on human evolution (Sommer 2016:288). As the molecular, statistical, and computational technologies in the field have always been further developing, critiques to the shortcomings and gaps of this field of research are often deflected with promises of technological advancements and subsequent data expansion (Reardon 2017). In this move, the resolution to fundamental critiques like the ones about sampling is postponed, relegated to a promissory future when more data will be available. At the same time, sampling's categorizations and procedures—as well as general assumptions underlying the kinds of questions asked by population genetics—are largely left unchallenged. Unquestioned, the "ethnic", "tribal", or "caste" categories articulated in such sampling designs are not susceptible to rethinking. And neither is the assumption that these sampled groups are endogamous.

5.3.5.2. Practices of exclusions in sampling "endogamous groups" and their implications

While critiques regarding small sampling size and representativeness have been evident in the debates about population genetics of India, a much less discussed issue relates to the kinds of exclusions made in the practices of sampling. As we have seen, different biological anthropologists interviewed by me raised questions as to whether the DNA samples of castes and tribes used by population geneticists were in fact only collected from individuals whose "pedigree" or genealogy is composed by ancestors who were all of the same caste or tribe. This "purity" verification procedure during sample collection would be important to, according to this logic, assure that the collected genetic samples can in fact "speak" for the allegedly endogamous (caste or tribal) groups that they aim to represent. In this logic, this endogamy verification would be especially important when the sample size is small, because, as Majumder (1998) also wrote earlier, even a small amount of admixture would be genetically very significant if the population is small. While taking genealogy or pedigree of a person is a method that anthropology students in India are usually trained in, anthropologists raised doubts whether, for example, CCMB students collecting samples (or the hospitals with which those students often cooperate) were aware of such method.

However, the suspicion raised by these anthropologists has been dismissed by the population geneticists I talked to. Indeed, several articles in the field of population genetics of India explicitly report their methodical efforts in "purifying" or "curating" their sample or, in other words, deselecting DNA samples with an immediate "mixed" background or an outlying

genetic makeup. This can be done right at the DNA sample collection and/or later in the DNA analysis. For example: Bamdshad et al. (2001) stated that they observed the "four grandparents rule" in sample collection (according to which all grandparents of the DNA sample donor had to be of the same ethnic or caste group), Reich and Thangaraj stressed that their analysis excluded individual samples that were genetically-statistically outlying from others of the same group (Moorjani et al. 2013). While I cannot investigate the suspicion raised by anthropologists in further detail here, this methodical and categorical anxiety regarding the "purity" or endogamicity of sampled castes and tribes deserves further attention. In the following, I discuss the assumptions and implications of the issue of ex-/in-cluding samples of individuals whose direct ancestors do not fit into the expectations of the premise of endogamy of caste and tribal groups in India.

As we have seen in the previous sections, the premise that ethnic and caste (*jati*) groups are endogamous draws from Karve's historical and anthropological theory of *jati* origins and has been the pillar for the definition of this level of social grouping as the primary unit of analysis in population genetics of India. Accordingly, sampling in population genetics of India has largely relied on the premise that the sampled groups have been genetically isolated for a number of generations.

However, the endogamy of castes and tribes is not only a premise, but also an effect of sampling procedures in population genetics. As showed above, the practices of curation of sampling aim at purifying the sampled groups from individual samples that stand out in terms of genetics or genealogy. Similar to what we have seen in Chapter 4, individuals that fall out of the expected "normal" (to use that statistical term) of their respective endogamous group are excluded from sampling or from the further analysis. Thus, this presents a process of a circular reasoning in which the data is filtered in a way that the data analysis results confirm the embedded assumptions.[177] In this sense, if the outcomes of population genetics research of India produce a picture of an endogamic society in which castes and tribes have been genetically distant from each other, this picture is largely amplified by both the assumptions and sampling procedures of that research, precisely because individuals with an inter-caste/inter-tribal or inter-ethnic mixed background have been systematically excluded from sampling and analysis.

[177] For a critique of circular reasoning between social and biological categorizations in modern India, see: Mitra 2020.

At the same time, the conclusions of population genetics research about India have often identified inter-caste/inter-tribal "admixture" to a longinquus historical past. As we have seen, many population geneticists of India, from Majumder to Reich and Thangaraj, have thus been moved by the discussions on Aryan migration and the origins caste. Tackling these questions, they have used historical and anthropological models, including Karve's, to make sense of their immense body of quantitative data. What several of their papers came to conclude was that the genetic material of the groups they sampled show a pattern of similarity (i.e. shared genetic material) according to which they infer that some thousands of years ago there was much more "admixture" or "interbreeding" than across today's sampled groups (e.g., Thanseem et al. 2006; Moorjani et al. 2013; Basu et al. 2016). In other words, the groups these geneticists have sampled (and "purified" through sampling) are (also due to the effect of such purifications) considered to be more genetically different from each other today than their ancestors were some thousands of years ago; this is because, according to these geneticists, they might share the same groups of ancestors, who lived in an ancient time of "widespread mixture" (Moorjani et al. 2013:430).

Taken together, this production of population genetics knowledge about the origins of diversity in India presents a historically twisted conjuncture: Inter-caste or inter-ethnic relations are assumed and—due to sampling curation—confirmed to be inexistent in current times, while a far-away past in which "mixture" happened is genetically identified. Thereby, "mixture" is relegated to the long-gone past, prior to the subdivisions of caste groups. This argument of past mixture or shared ancestry has been emphasized by Reich also due to considerations of his research's "cultural resonances", as he put it (Reich 2018a:138). As we have seen, Thangaraj, Reich and their collaborating teams opted to emphasize that "ancestral *Indian*" populations all mixed in the past and all Indians are therefore mixed. In fact, the theme of "widespread mixture" in an ancient past runs through Reich's recent popular book, in and beyond its chapter on India (Reich 2018a).

What could then be the political affordances of such a societal and historical picture produced by this population genetics of India and, specifically, by the effects of its sampling curations? Although there are several contingencies that set the possible political implications of knowledge about human genetic difference, in concluding this section I want to speculatively explore this question.

On the one hand, Reich's emphasis on mixture in the past seems to work as a discursive strategy against certain appropriations of population genetics knowledge: it works like an antidote to political claims of genetic difference. The reception of Reich's book in North America, for example, has fomented arguments against the reparative territorial justice demands of indigenous peoples, based on the idea that the deep histories of shared DNA ancestry invalidate claims based on group difference (see, e.g., Motamed and Veinoitt 2021). Considering that, as Majumder (2018a:972) too has argued, "[o]f course, if we go very far back in time, all populations will converge to a single common ancestor",[178] this kind of common ancestry arguments can be used to undermine claims of difference by minoritized groups, most notably claims to identity and legal rights by indigenous peoples in (post-)colonial states, as Kim TallBear (2013) observed (see also Kowal, Radin, and Reardon 2013). In this line of ancestral difference-erasing argumentation, the temporal frame of origins histories is moved to a point prior to the emergence of genetic differences that mark the human differences that matter socially and politically in present times. We can thus expect that in India, too, as Sundar has noted,[179] the claims of indigeneity put forward by tribals or Adivasis, as well as any claims of pre-Aryan endogeny in India by other groups, will not find resonance in the arguments articulated by Reich and population genetics colleagues. As we have seen, in 2001, anti-caste Dalit activists took up Bamshad's conclusions to call attention to historical caste injustices and articulate that India had been invaded by male Aryans who installed themselves on the top of the hierarchical caste system they created. Now, Reich et al.'s emphasis on the "all Indians are mixed" argument seems to work actively to disarm such a claim of deep-running biological differences and interconnected historical social inequalities (Moorjani et al. 2013; Reich 2018). By shifting the temporal frame of reference to a time of admixture, Reich and his colleagues in India seem to have calibrated their arguments to prevent the appropriation of their research by political claims that question the status quo and defy the unity of socioculturally diverse post-colonial nation-states.

On the other hand, what this kind of argument, therefore, might give political leverage to are the nationalistic claims of a pan-Indian unity rooted in the idea of a long (enough) gone past of

[178] As Oikkonen (2017:192) also explains, "[t]he adjustment of temporality is an important way in which difference and sameness are made: by zooming in or zooming out, different patterns of sameness and difference emerge."

[179] Because Adivasis are largely non-Hindu, Sundar (2021) explains that the current Hindu supremacist government challenges claims of Adivasi indigeneity in terms of primal arrival, as such claims would challenge the assertion that India is the homeland of Hinduism.

shared genetic ancestry.[180] As we have seen, these claims are in line with the state-political prevailing Hindu nationalism discourse in India today. While Karve also articulated a sense of a pan-Indian unity in her late work, the unity argument now articulated by these population geneticists is different from hers in one key aspect: For post-1950s Karve, national integration in post-partition India was to be achieved through a consciousness of multiculturalism by which all different social groups reach a harmonious unity through the appreciation of their diversity; for Reich, Thangaraj, and Majumder, it seems that a peaceful national integration should come from a sense that all Indians have a shared genetic mixture and ancestry. In a nutshell, the first argument (later Karve's) was in line with the motto "unity in diversity", while the second (the population geneticists') tends towards a sense of "unity in sameness". Thus, for these population geneticists, current biological differences are to be relativized through the idea that modern social groups were biologically similar or part of the same ancestral group in an ancient past, making India, in their words, "a genetic *melting pot*"—to use a loaded phrase that has been replicated by Indian scientists (Majumder and Basu 2015:1).

But with regards specifically to sampling, there is an implication that both population geneticists and biological anthropologists (who worry about population geneticists not curating their samplings well enough) seem to be oblivious to: the reifying effects of their data curation practices. The picture that gets amplified by their inevitably reductionist sampling is one of an India where caste and tribal groups are in present times genetically and biologically clearly distinct from each other. Through their practices of exclusion in sampling, they (re)produce a vision of societal system in which inter-caste and inter-tribal kin-making relations have either been the exception or non-existent in present times and at least since modern history. This narrows the picture of genetic diversity within each sampled social group, which can have important consequences, for example, as STS scholars working in the US and Germany have shown, in terms of contested indigenous identities and biomedical research outcomes (see also: Lipphardt and Pfaffehuber 2021; Bolnick 2021; R. Smith 2021). Furthermore, it corroborates with an ossified view of caste difference that is grounded in the two anthropological traditions that Karve excelled in and combined: not only in the colonial and post-colonial racial anthropology of human diversity in South Asia, but also in the structural-functionalist anthropology that overemphasized the rules—and overlooked the many exceptions and tensions—of what has ever since been called "the caste system". Not only in Karve's work but

[180] This argument, which is usually articulated in these papers' conclusions, works to tone down their papers' arguments about the history of different migrating groups to India.

also more generally, both racial and functionalist approaches in (physical and social) anthropology have tended to convey a solidifying picture of static and discrete populational groups (Braun and Hammonds 2012).

The fundamental problem here is that, while these bioessentialized views on difference in India are also embedded in current state policy, they are at odds with the reality of the increasingly many who have an inter-caste or inter-ethnic family background. As a result, crucial political anxieties emerge. The archive of popular cultural products is rich with narratives that convey the angst of inter-caste/ethnic families: From Bollywood to less commercial filmmaking, Indian films provide countless examples, like the much-debated box office record *Sairat* (2016): A tragic love story between a girl from a powerful Maratha family and an Adivasi boy, *Sairat* ended with a brutal comment on the "honor killing" cases in Maharashtra that had made headlines a few years before (Joshi 2016; Vidushi 2015). Furthermore, one recent example of political conflict resulting from unclear mono-caste belonging, to stay in Hyderabad, was the national controversy that ensued from the doubts on the caste status of the Dalit PhD student Rohith Vemula. Vemula's fierce anti-casteism activism was labelled "anti-national" by state authorities that later accused him of tricking Hyderabad University's caste-based affirmative action because of his alleged inter-caste background. The allegation rested on the assertion that Vemula's mother had been adopted from a Dalit family and raised by a non-Dalit foster family of the same caste as his father, making Vemula's caste status ambiguous; on-going juridical discussions about how to determine an inter-caste couple's child still have not been completely settled (Manoj 2021). The pressure inflicted upon Vemula ultimately led to his suicide in 2016, sparking protests across India.[181] Thus, these tragic examples demonstrate the stakes of bioessentialized views of caste and ethnic group belonging, to which biological research that is premised on the endogamy of these social groups corroborates.

In sum, the sampling of "castes, "tribes" and "ethnicities" in the current population genetics of India is not only entangled with the racialized legacies embedded in this science's methodologies, theories, and assumptions, but it is also immediately relevant to the politics entrenched with the difference categories it mobilizes and (re)produces. In addition, I have shown that shifting the temporal frames of the past which population geneticists look into has decisive impact in their research outcomes and arguments.

[181] The accusation rested on the fact that Vemula's mother had been adopted from a non-Dalit caste family and raised by a Dalit foster family (Teltumbde 2017; deSouza 2016; Chatterji 2016).

In the next section, I discuss the issue of temporality in relation to spatiality in the population genetics of India. While keeping the focus on the bioessentializing effects of population genetics and the politics of the Aryan debate, I will examine the temporal mismatch between the deep-historical framings unleashed by aDNA and the rather recent spatial boundaries of India.

5.3.6. Where is "India" and since when are Indians "Indians"? Time and space in difference and national(istic) framings

In articles that deal with the genetics of populations living in the Indian subcontinent, we often encounter assertions like this one by Majumder (2018b:7): "India occupies the centre-stage of human evolution". Before committing his efforts to study COVID-19, the chief scientist of the National Institute of Biomedical Genomics dedicated, among his many publications, one single article in plants genetics. In it, Majumder justified his choice to study the beautiful "sacred lotus" (*Nelumbo nucifera*) by emphasizing its "iconic significance in *two major cultures* of the world: Hinduism and Buddhism" (2016:351, emphasis mine). These examples in Majumder's work demonstrate not only that, just like most scientists, population geneticists gather their research questions and problems from "the social and political concerns of their time" (Sur and Sur 2008:210). They also illustrate the intersections of methodological nationalism and religion in this field of research: In population genetics, the idea of "India" often sets the temporal and spatial frames that direct the analytical gaze, and this is often in intersection with the realm of religion, as the conflation of culture and religion in the quest to define Hinduism (as Majumder's quote above illustrates) has been tightly entangled with the imagination and constitution of India itself (Inden 1990; Basu 2020). In this section, I explore how population genetics with a focus on India is in difficult tension with the questions: where (and what) is "India"? And since when are Indians "Indians"?

"Where" and "when" questions are crucial in population genetics, as space and time are key factors in how this field of research grasps human diversity. In the evolutionary paradigm that not only Majumder (2018a), as we have seen in the previous section, but most population geneticists follow, geography is the surface onto which temporality produces differentiations among groups of humans. In this logic, the fissure of populations and the movements of ensuing subpopulations across space entail the means through which the time of evolution (as group-level genetic differentiation) takes place (Oikkonen 2017). In this light, as Oikkonen (2017:223) explains, "different kinds of temporal ties to the past arise" depending on which technologies are mobilized to "different levels of temporal 'resolution'" and also "[d]epending

on whether the focus is on global, continental, national, or regional genetic variation." In the case of India, the indeed continental scale of the national territory encompasses a level of plurality of human diversity which poses a challenge to any scientific enterprise that aims at producing a coherent picture of India and Indians, whether in human genetics or social sciences. In addition, there is another temporal problem when population geneticists focus on a nation: "nations have emerged as ways of conceptualizing difference and sameness quite recently and thus do not fit well within the dynamics of transcontinental and cross-regional migrations that organize human evolution" (Oikkonen 2017:199). This is easily observable in the Indian case: As the (still contested) borders of India were drawn only in 1947 "amid the violence of the partition of what had been British India" (B. Subramaniam 2019:147), research about the pre-historical origins of Indians and their immense populational diversity is at odds with the deep-temporal focus and the inevitable pre-nation-state spatial gaze implied by this line of inquiry.

A further complication for the research on the deep past of India and Indians is concomitantly a methodological and a political one: it lies in the contrast between, on the one hand, the relative temporal brevity of the spatial contours of what is now the state of India and, on the other, the extended temporalities and spatialities implied in (hi)stories that are considered formative to "India". India's modern-colonial nation-building history contrasts with a legacy of intellectual engagements with ancient past stories—however mythical or real; religious or historical, or both—one example being the study of Vedic scriptures and other ancient Sanskrit literature. As we have seen, since orientalist and Indological scholarship in the eighteenth and nineteenth centuries, these texts have been considered as authoritative sources of the study of "India" and of what was then termed "Hinduism" (Inden 1990; Mitra 2020). But the (hi)stories contained in these scriptures took place both within and outside current Indian borders and in temporalities that defy the modern sense of historical time. The loaded and often conflicting meanings attributed to these narratives make any (pre-)historical and population genetics interrogations about "India" and "the Indians" an extremely complex undertaking (B. Subramaniam 2013, 2019; Sur and Sur 2008; Egorova 2009, 2010). As Banu Subramaniam (2019:147) explains,

> most stories of India's prehistory are necessarily regional and include the histories of its neighbors. The much-celebrated glories of the Vedic period include areas that are now in Pakistan and Afghanistan. The origin stories of the Indian nation constantly elide the tensions of historiography, creating a unique national prehistory in which regional and global histories are deeply entangled.

In addition, Vedic and other Sanskritic texts that have often been mobilized as sources of pre-historical origin stories of India have concomitantly been canonized as foundational texts to Hinduism, further entangling notions of "India" with mythic deep temporalities of a glorious ancient past. This overlap is not coincidental: imaginations of the Indian nation are interlocked with constructions of Hinduism as a uniform, pan-Indian, and primordial religion and tradition, conglomerating the immense diversity of sects, Gods, and believes within this newly constructed container "Hinduism" (Thapar 1989; Inden 1990; Basu 2020; Mitra 2020). While anthropological and orientalist scholarship played a key role in subcontinental essentializations of Hinduism and Indian society and their co-constitutive entanglement—as exemplified in Karve's racial and sociocultural anthropological texts (e.g., 1947, 1961a)—, this knowledge legacy was taken up by different Indian activist-intellectuals who elaborated ideas associated with the broader discourse of Hindu nationalism. With the background of anti-colonial activism and pan-Islamic mobilizations in the first half of the twentieth century, Hindu nationalism ideologues like the influential Chitpavan Brahmin politician and writer Vinayak Damodar Savarkar (1883–1966) paved further ground for thinking India in terms of "Hindutva", or Hinduness, in the motto of "Hindu, Hindi, Hindustan" (Jaffrelot 2007:5).[182] As Savarkar (1989[1923]) and his ilk wove together culturalizing, territorializing, and racializing elaborations to answer the question "Who is a Hindu?", a sense of pan-Indian Hindu ethnic nationalism emerged "from the superimposition of a religion, a culture, a language, and a sacred territory" (Jaffrelot 2007:14–15). In the logic of Hindu nationalism, all these meaning-imbuing attributes conflated into "Hinduness" were seen as pillars for Indian peopleness and nationhood in congruence with the space of the Indian subcontinent (Basu 2020), in the fashion that Karve's anti-Muslim and racist speech of 1947 exemplifies, as we have seen in Chapter 2. In Hindutva's discursive field, the idea of an ancestral holy land was grounded in the scriptures that associated the territory of the Indian subcontinent with the homeland of the Aryans: The Hindus were seen as the descendants of the Aryans, the writers and protagonists of Vedic texts. As Savarkar (1989[1923]:85) declared: "All Hindus claim to have in their veins the blood of the mighty race incorporated with and descended from the Vedic fathers." This racial and religious association between Hindus and the glorious times of the Aryans of the Vedas infuses Hindutva with a profound weight of timeless tradition and bonds it with a familial-reproductive

[182] Basu (2020:26) defines Hinduism and Hindutva within the Hindu nationalist discourse as follows: "the Hindu nationalist phenomenon, exists between two conceptual poles: Hinduism as a denominational religion, and Hindutva as an ideology of cultural or ethnic nationalism that ostensibly is not reliant on a single faith but that reserves the sovereign right to arrange different Indian beliefs along a spectrum of normalcy and pathology."

temporality (today's Hindus being the children of the Vedic fathers of the past). At the same time, Hindutva discourse defies a linear historical narrative, for, as Banu Subramaniam puts it,

> [t]ime-folding warps are one of the critical ingredients of Hindu nationalism. Hindu nationalists bring the past and present together into one seamless story of past sutured to the present, with a firm excision of the middle years of colonialism and conquest, in particular the histories of Islam" (B. Subramaniam 2019:14).[183]

Furthermore, if the "national future is premised on the proper appreciation of the past" (Oikkonen 2017:97), the location of Aryans and, thus, the roots of Hinduism within the space of India imbues the Hindutva discourse not only with nostalgia but also with a sense of territoriality that holds the promissory future of the nation.[184] In sum, the multiple temporal and affective affordances granted by the figure of the Aryans in association with the roots of Hinduism in India are key to the imaginations of a national belonging in which Hindutva is seen as the country's *Leitkultur*, the leading cultural bearer that grants social cohesion to the nation.

Therefore, the on-going aggravation and mainstreaming of Hindu nationalistic discourses since the rise of a strident Hindu nationalistic government under prime-minister Narendra Modi (2014–present) amplifies the political stakes of research about Aryan migration. The anti-Hindu and, by association, anti-national potentialities in arguments that challenge the sacred territoriality and origins of Aryans and their descendants substantiate the political explosiveness of scholarly articulations and activist mobilizations of Aryan migration/invasion theories, as we have seen. According to the Hindu nationalist take, the Aryan invasion theory "is a colonial conspiracy that erases India's glorious precolonial history" (B. Subramaniam 2019:150).[185] While the Hindu nationalist movement has welcomed archaeological and anthropological arguments, like that of Karve, that, instead of a single massive migration, there

[183] To think about how these Hindu nationalistic appropriations of the past happened against the background of colonialism, Dipesh Chakrabarty's (1992:18) observation is enlightening: "Colonial Indian history is replete with instances where Indians arrogated subjecthood to themselves precisely by mobilizing, within the context of 'modern' institutions and sometimes on behalf of the modernizing project of nationalism, devices of collective memory that were both antihistorical and antimodern." He adds: "History as a knowledge system is firmly embedded in institutional practices that invoke the nation state at every step" (ibid.:19).

[184] As Partha Chatterjee (1993:18), thinking of how Indian nationalism was premised on European epistemologies of nation-building, puts it: "Modern European intellectual fashion not only decrees that a nation must have a past, it also demands that it have a future. Have faith in the historical progress of man, it preaches, and history will not let you down." On the temporalities of Hindu nationalism, see also: Basu 2020; B. Subramaniam 2019. On nostalgia and genetics knowledge, see: Sommer 2016; Oikkonen 2017.

[185] See also Basu (2020:78) on Hindutva ideologue Golwalkar's refusal of the Aryan invasion idea as a British plot. This Hindu nationalist argument finds resonance with the postcolonial argument that the orientalist framing of the history of the Aryan migration(s) as a mass invasion and conquest can be construed as a justification of British colonialism, making the European rule of South Asia just another imperialist episode in the history of the subcontinent (see Trautmann 2019).

were several smaller migrations from the North West down the South of the subcontinent (B. Subramaniam 2019), it is, thus, also not surprising that those alternative accounts that suggest that the heartland of Aryan civilization was in India (and that the Aryans migrated from there toward Europe) have still been articulated in some scholarly circles—both in India, as we have seen in Reich's account of his tense meeting with the Hyderabad scientists, and in Europe.[186]

Furthermore, we can see in these intellectual—and political—attempts to apprehend India in national terms that this enterprise is made possible through severe essentializations and exclusions. This, I argue, can be paralleled to current population geneticists' attempts to encompass their data and arguments for a pan-Indian scale. Both fields of knowledge-making can be blamed for reductionism. But as reductionism might be inevitable when such a large scale and the diversity encompassed in it are mobilized (as it is in most intellectual apprehensions of any larger object), it might be interesting to ponder what kinds of exclusions and what kinds of inclusions are accentuated in such reductions and with what effects. In other words, in the remaining of this last section on population genetics of India, I ask not whether this field of knowledge can only work through reductions or not, but: What is brought to the fore when its reductions take place? And, again, which future political affordances are thereby opened up, which are foreclosed?

As for Hindu nationalistic accounts of India, the exclusions in these discursive articulations are now clear: those of faiths deemed villainized or incompatible with Hinduism, most notably Muslims or, like the colonizers, Christians, do not fit the framework of Hindutva; yet, in many Hindu nationalist accounts, religions like Buddhism, Sikhism, and Jainism have been accommodated within an expanded idea of the Hindu fold;[187] the diverse faiths of groups labelled "tribal" are by some accounts also roughly engulfed in the broader scope of Hindutva (Basu 2020). Thereby, different groups and populations, including those that were not interpellated by Hindu nationalism, were or have been incorporated or enclosed in the nationhood's contours of Indian-Hindu nationalism—also violently and through settler colonial strategies, as the cases of Kashmir and Andaman Islands show (Junaid 2019; Sen 2017).

[186] Currently, the most notorious European proponent of the "out of India" Aryan migration theory is the Belgian Hindutva supporter and author Koenraad Elst. Elst's openly Islamophobic positions have been rearticulated by White supremacists in Europe and referenced, for instance, in Norwegian terrorist Anders B. Breivik's manifesto (Nanda 2011).
[187] Although not without tensions, as for instance Aviral Anand (2021) argues.

As for population genetics apprehensions of India, we have seen throughout this chapter's section several reductionisms at play with important consequences. They take place for instance in the stabilization of human group categories, which, especially given the deep temporalities of this kind of analysis (most notably since new genomic technology), need to be temporally frozen or put in relation with scientifically fabricated ancestral populational categories—and this is often a laborious undertaking for population geneticists. Severe reductionisms also take place in sampling strategies: we have seen that groups that are not primarily associated with ideas of the Indian Hindu nationhood, like speakers of Tibeto-Burmese and Austroasiatic languages or Muslims, are often excluded, while groups that fit within caste categories of the "Hindu society" (to paraphrase the title of Karve's 1961 book that is often mobilized by geneticists) are always encompassed in populational accounts of India. In this sense, the sampling selections of population genetics research of India analyzed in this chapter are not so in line with what that sociologist Steven Epstein (2007) has called "the inclusion and difference paradigm" in biomedical research in the US, but, instead, and conforming to mainstream Hindu nationalistic accounts of India, they often exclude minoritized social groups. Thus, also because Indological and anthropological comprehensions of "India", including Karve's, have been interlocked with Hindu nationalistic constructions of "India", population geneticists aiming at generalizing assertions about "India" are likely to repeat the exclusions implied in pan-Indian frameworks.

Therefore, the somewhat inevitable reductionism of both the Hindu nationalism-inclined intellectual production and the population genetics of India results in the creation of a picture of India that brings certain groups to the fore, while excluding, invisibilizing, enclosing, or assimilating others. The hardly commensurable social, cultural, and biological diversity of human groups living under the roof of the "Indian national" is thereby met with a coherence seeking effort of *domestication*[188]: this human diversity is flattened or simplified through the national scale of the interpretative grids of this India-framed genetics knowledge. Thereby, the once politically celebrated "unity in diversity" slogan leaves room for "unity in shared ancestry" or "unity in sameness" discursive accents that are engendered in the biological ancestry-based works of population geneticists like Reich and Thangaraj, which reinforces—and is co-constitutive of—Hindu nationalist visions of India. As we have seen in the previous sections, these population geneticists have carefully manufactured the "unity in shared biology" rhetoric as means to mitigate possible status-quo defying political impacts of their

[188] See: B. Subramaniam 2019:147; Oikkonnen 2018:163.

research. However, they concomitantly aim at domesticating conflictive affordances that, based on arguments of difference and inequality, could possibly lead to more inclusive futures, as exemplified in the mobilization of genetics knowledge by anti-casteist activists in 2001. In this way, the pan-Indian biological-familial portrait fabricated in these biologizing comprehensions of India has analogous limitations to that of a biological family: if, from a queer critique perspective (e.g., Anzaldúa 1987), one could think of the heteropatriarchal biological family as a space where male authority-centered and adultist structures enforce norms, secure privileges, and defuse conflict, in light of the "unity in shared ancestry" biological renderings of India, too, groups that see themselves outside the pan-Indian national family ideal have great difficulty in operationalizing biohistorical claims to differ and challenge the cohesive future of the nation-state. In other words, the linear familial-reproductive temporality articulated in population genetics knowledge that frame "Indians" as having a united genetic ancestry might have a disciplining effect to the unity-defying difference-based political claims.[189]

As we have seen, anti-caste activists and intellectuals have mobilized the results of Bamshad et. al.'s (2001) article that stress the Europeanness of upper-caste groups to substantiate the arguments that Aryans and their upper-caste descendants have a foreign origin while minoritized caste and ethnic groups were endogenous to India. In fact, Dalit intellectuals still mobilize such arguments in their critical assessments on the origins of caste (e.g., Yengde 2021). The debate on Aryan migrations is far from settled: just in 2019, a *Science* paper published by Reich, Thangaraj, and other 116 co-authors again touched upon the most contentious aspects of this issue, this time avoiding the word "Aryan" by mobilizing its equivalent ancestral group "Yamnaya Steppe pastoralists", but again resurrecting the argument of linkage between male (i.e. Y-chromosome) "Steppe ancestry" and the priestly caste groups, like Brahmins, that are, in their words, the "traditional custodians of literature composed in early Sanskrit" (Narasimhan et al. 2019:12).[190] We can, thus, expect further reverberation from this and upcoming genomic research. In this sense, as Oikkonen (2017) elaborates, the multiple connections between humans that can be engendered through different temporal and spatial frames of DNA analysis can lead to flexible but also ambiguous appropriations of group-level

[189] See Oikkonen (2017:139–142) for a queer critique of linear reproductive temporality in population genetics.
[190] The sampling procedures in this paper, too, could deserve several problematizations, similar to what we have seen in the previous sections. For instance, Brahmins from the South of India (framed in this paper as "Catholic Brahmins") were not included in their assertion of genetic linkage between Steppe ancestry and Brahmins.

genetic belonging. Therein, precisely, lies the high political appeal of population genetics knowledge.

However, we can also expect that the conflict-domesticating efforts of the "unity in a pan-Indian shared ancestry" rhetoric of prominent geneticists like Reich will limit the transformative power of the mobilization of biohistorical arguments by anti-caste activists. The discursive space of the biological-national family, after all, has not been prone to impulses toward progressive or social justice-oriented sociohistorical transformations—at least not beyond its anti-colonial affordance. One could question, in this scenario, the potentials but also the double binds and further limitations of the mobilization of bioessentializing (including racializing and geneticizing) arguments with the goal of social justice.[191] How these knowledge articulations will unfold and be mobilized is yet to be seen.

In concluding this section, I am drawn to Sommer's (2016:11) elaborations on how "the insights into prehistory should open up future prospects". In her examinations of scientific approaches to biology and history, she observes that biologically founded pasts "might be used to enforce or undermine current privileges" (ibid.:18–19). Therefore, and especially in a national context in which social and cultural cohesion is so intrinsically interlocked with historical social inequalities, any scientific articulation on human diversity, past and present, might have important implications for political mobilizations about the inequalities that are intertangled with the difference categories that scientists work with. The political resonances and reappropriations of such DNA knowledges may be multiple (Oikkonen 2017; B. Subramaniam 2019). Whether population genetics can contribute to overcoming the inequalities attached to the difference categories they mobilize—and essentially reinforce—is contingent not only on the technologies that compose practices of knowledge-making. The political affordance of population genetics is also situatedly contingent on the political factors underlying and permeating the research of these scientists who, ever more by themselves in their monodisciplinary tower, reflect too shortsightedly upon the entanglements of science and politics.

5.4. Final remarks

> She has discovered that she can't hold concepts or ideas in rigid boundaries […]. Rigidity means death. Only by remaining flexible is she able to stretch the psyche horizontally and

[191] On a critique of what he calls "nativist" arguments in current progressive political mobilizations in India, see: Basu 2020:205.

> vertically. La mestiza constantly has to shift out of habitual formations; from convergent thinking, analytical reasoning that tends to use rationality to move toward a single goal (a Western mode), to divergent thinking, characterized by movement away from set patterns and goals and toward a more whole perspective, one that includes rather than excludes.
>
> The new mestiza copes by developing a tolerance for contradictions, a tolerance for ambiguity.
>
> Gloria Anzaldúa, *Borderlands / La Frontera: The New Mestiza* (1987:79)

In this chapter, I have explored some contradictions, tensions, and political reverberances in molecular studies of human diversity in India and its origins. By situating the history and presence of Aryan theories in the population genetics of India, I have brought to the fore Karve's research and other lines of intellectual entanglement between Germany and India. We have seen how the AMT was articulated by German orientalist scholarship and how it had a multiple discursive valency both in India and Germany. The AMT debate in India has also been entangled with long-standing discussions on the origins of caste and languages in the subcontinent.

This chapter has resituated Karve in a genealogy of this field of inquiry and shown how her work still plays a key role in current molecular research. We have seen that her work in this field, being an interpretation of linguistic, cultural, religious/mythological, and racial anthropological data and however shaped by her own sociopolitical standpoint, formulated a biohistorical model on the origins of diversity in India. Her critical response to the AMT and anthropometric research led her to formulate a biohistorical theory that argued different *jatis* had different migratory origins; these insights are condensed in her *Hindu Society: An Interpretation* (1968a), which—despite her modest disclaimer of the book's interpretative character—has been taken as a main source for theoretical modelling on the origins of caste diversity by a current generation of biological anthropologists and population geneticists. Specifically, her take on the differentiated origins of *jatis* has been taken on as justification to stabilize this level of human grouping category as the unit of analysis to be sampled and compared for producing knowledge on human genetic difference in India. Thereby, Karve's biohistorical model provides discursive stabilization for a fundamental issue in population genetics, namely: how to define and operationalize "populations".

In analyzing the practices and discussions of population geneticists investigating the origins of human diversity in India, I have examined how the racial legacy of this line of inquiry has left a mark in research today. We have seen different knots that tie current population genetics

research to this difficult legacy, as observed also by other scholars (e.g., Reardon 2005; M'charek 2005; Sur and Sur 2008; Benjamin 2009; Wailoo, Nelson, and Lee 2012; Lipphardt 2012, 2014; Sommer 2016; Oikkonen 2017; Kowal and Llamas 2019; B. Subramaniam 2019). In a nutshell, the tie between population genetics and racial frameworks can be perceived in the use of racialized difference categories or in the employment of theories with under-analyzed assumptions that associate ancestry, heredity, geography, *Volk*, culture, language, and biological markers—the Aryan versus Dravidian binary model being one of these theories. In addition, we have also noted that while the AMT has been intensively discussed in India, re-racializing readings of it have been re-injected in this discursive field also through the work of Global North-based geneticists, like Bamshad and Reich.

Furthermore, I have pointed at different ontological implications of the entanglement between genetics research and its racial legacy. We have seen, in a nutshell: how the genetic focus implicate conceptualizations of heritage and belonging that overvalue biology and neglect social and cultural factors; how the sampling practices of scientists are premised upon—and concomitantly fabricate—caste endogamy, excluding individuals with an inter-caste or inter-ethnic background (and thus underpinning their political invisibilization); how the pan-Indian scale argumentative ambition and the nationalization of new ancestral categories (ANI and ASI) tie together nationality and biology, with important exclusions of minoritized groups and in connivence with Hindu nationalist discourses, flattening diversities and domesticating status quo-defying conflicts with liberatory potential. Thus, looking through the prism of co-production, we can see that in this field of research, like in all scientific fields, there are several layers of questionable—but left largely unquestioned—assumptions that are built into the theories, methods, and practices of these scientists, with consequences to the knowledge outcomes that, once taken up, might further shape society and politics. Particularly in the case of genetic research about human difference and variation in India, given its racial legacy and its ontological implications, the knowledge produced can contribute to reinforcing the biologization and racialization of notions of human difference and diversity.

In this sense, the entanglement between racial knowledge and genetics research here can also be conceptualized as a tight interlocking. With the goal of imagining how this tie could be unlocked, I have shed light onto how different scientists in this field consider the political affordances of their work, but we have seen that their considerations are premised on a limited, positivistic understanding of the relation between science and politics. Not only in Reich's (2018a) writings about the fall of the Aryan invasion theory but also among almost all the

scientists I interviewed in India, from anthropologists and archaeologists to geneticists, there was a general lament about the "politicization" of scientific knowledge about these issues: These scientists complained about how ancestry and ancient migration research in India is often politically taken up—and sometimes "distorted"—by the media and activists, in ways that infect this field of research with politics. In this sense, these scientists see the political sphere as a contaminating threat or, at best, a cause for troubling headache on the way of their objective scientific research and output. Furthermore, when they are forced to reflect about possible political impacts of their research, their reflection falls short in considering many possible detriment political implications. Specifically in the case of Reich and Thangaraj's collaboration, we have seen that their effort to forge an ancestral category that would be, in Reich's view, as politically unthreatening as possible vis-à-vis a sense of national (Hindu) religiosity ended up enabling an easier Hindu nationalistic appropriation of their research, while making it more difficult to be used to leverage status quo-defying arguments that would address historical caste-based inequalities and corroborating with the exclusion of non-Hindus from the national picture. Thus, these scientists lack a sustained engagement with the multifaceted ways in which their science and the social world in which that knowledge is embedded co-constitute each other. As a result, they can only insufficiently envision, reflect upon, and respond to the political implications of their research. In other words, their positivistic understanding of science severely comprises their well-intentioned efforts (when existent) of reflecting upon the consequences of their work. In this context, as different STS scholars have pointed out (e.g., Reardon 2007; B. Subramaniam 2014), the troubles of the racial legacy in sciences of human difference will hardly be solved by relegating the responsibility for the effects of scientific knowledge to the political world as if the realm of science were in isolation from politics.

This is not to simply suggest that these molecular scientists are individually to be blamed for all political outcomes of the knowledge they produce. But what I would stress here is that their understanding of science as unentangled from politics falls short in apprehending not only the weight of political, cultural, and social forces in the formation of the categories of difference that they mobilize—as if such human difference was primarily biologically constituted (based on the assumption that *jatis* are endogamous groups). These population geneticists' positivistic view of their science also falls short in understanding the extent of their worlding impact, especially given the extremely pronounced and multiple political discursive valency of the knowledge they put in motion. This discursive valency is particularly heightened in India,

where pressing social inequalities are heavily structured by belonging to the difference categories used by population genetics research. We have seen that, among others, anti-caste and Dalit activists have mobilized population genetics knowledge to sustain important political claims, while Hindu nationalists mobilize certain genetic arguments for disparate claims. In this sense, similar to what critical studies of race have observed regarding race's "polyvalent mobility" (see Chapter 2), knowledge about genetic ancestry and difference can also be featured in multiple political mobilizations (Kowal and Llamas 2019; Oikkonen 2017). It is precisely due to genetic research's technology-contingent variability of analytical techniques and temporal-spatial framings, which results in polyvalent discursive affordances, that this field of knowledge can have such diffuse ontological power (Oikkonen 2017). In this sense, the potential political weight of this knowledge exacerbates not only the weight of these knowledge-makers' responsibility but also the need of fostering their *response-ability* as their ability to situationally respond to the mobilizations of the knowledge they set in motion (Barad 2007; Haraway 2008; Reardon et al. 2015). Therefore, in thinking of ways in which molecular scientists of human difference could be both more accountable and responsive vis-à-vis the political conditions and reverberances of their work, I build upon STS scholars (ibid.) to highlight the importance of attuning to the realm of the social and political inequalities. As I continue to discuss in the next chapter, categories of human difference like caste and ethnicity are tied to, and often co-shaped by, social and political inequalities. Taking this into consideration can undergird more careful research designs and foster these scientists' response-ability to the possible political impact of their knowledge.

Moreover, to achieve such an analytical bridging between inequality and diversity, research projects with a genetic focus might also need to transgress disciplinary boundaries. In thinking about the problem of the racial legacy in different sciences of variation and their political impact, Reardon (2005) and Banu Subramaniam (2014, 2019) convincingly argued about the importance of interdisciplinarity. The disciplinary divisions that run along the lines of the bifurcation between nature and culture, or between natural and social orders—with biological scientists focused on the first, while social scientists and humanists attend to the latter—results that, in Reardon's (2008:374) words, "biological laboratories become sites where new techniques for distinguishing between human beings form without any attendant sociological or humanistic analysis," contributing in essential ways to the perpetuation of the troubles of race-ism in science (see also Kowal, Radin, and Reardon 2013). In addition, in thinking about the new genetic turn in the AMT discussions, Banu Subramaniam (2019:163) problematizes

how these "debates assume that there is only one correct history and that we can access it" and concludes:

> We need interdisciplinarity analyses to explore the complexities of human migrations using all data and lines of evidence (genetic, linguistic, anthropological, sociological, philosophical, archaeological, and historical) available to us. After all, genetic histories may not correspond with linguistic or archaeological histories. Languages may diffuse differently and leave different marks on history than genes do. (B. Subramaniam 2019:163)

In this sense, interdisciplinarity in such research would mean breaking from "the addiction to the 'gene' as the core explanandum" (Fuentes 2021:5). This could allow room for a re- or co-consideration of sociocultural factors in relation to questions of heritage and belonging, also beyond their relevance to the biological. This re-orientation could also imply, thinking with Haraway (1988, 1997) and Sandra Harding (2015), an understanding of scientific robustness not as relying solely on statistical formula and molecular technology but, instead, on a sum of interdisciplinary perspectives and standpoints; a science that, instead of ambitioning the control of grand narratives and large-scale totalizing assertions, is more modest in the claims about what it witnesses and transparent about uncertainties and ambiguities. Especially given how this field of knowledge is contingent upon—and reinforces—categories of difference that inform identity formations, queer feminist theorist Gloria Anzaldúa's epigraph above reminds us of the importance of acknowledging the implications of human classifications and the "classificatory violence" that resonates with the colonial past (Schramm, Krause, and Valley 2019:251). Anzaldúa also inspires us to recognize the benefits of cultivating categorical openness, in a way that resists the Western urge to apprehend, reduce, domesticate, and order human diversity into rigid, discrete categories, thus allowing space for new identity formations and for life that transgresses classificatory borders.

This commendation for interdisciplinarity is in tension with the trend of the increasing genomicization of the research on human diversity in India, where other, non-biology centered disciplines with an interest both in origins questions and molecular methods, like anthropology and archaeology, have lost centrality in scientific discussions around these topics. Also due to the increasing precariousness of the material conditions of these two disciplines, it would be hard to be confidently optimistic about the prospects for anthropology in this scientific scenario in India. As we have seen, prefix-less anthropologists, who, like Malhotra, are now deemed "old-school", are a rare find and feel left out in scientific gatherings about human genetics, although their insisting contribution to academic debates could possibly challenge DNA-

focused definitions of human difference and ancestry. Thus, I would suggest that further discussions on the interdisciplinarity—and internationality—of this field could be enriched by further attention to global geopolitics of science, especially regarding the unequal access to technology. As I will expand in the next chapter, paying attention to these unequal technological and infrastructural conditions is particularly important given that genetics research is highly conditioned on specific (and costly) material assemblages.

In the next chapter, I continue to examine possible affordances of molecular knowledge on human diversity and variation in India at the same time as I focus on the question of international structural inequalities in science. Thereby, I turn from population genetics to biological anthropology: I examine the practices of research on skin color variation in a molecular anthropology lab in Pune. I also visit a controversy involving Karve and a European scholar (Louis Dumont) to think further about North-South dynamics in disciplinary knowledge and the limits to scientific sovereignty in a post-colonial intellectual space.

Chapter 6. Skin color variation and a molecular anthropology lab: Global inequalities in the sciences of human diversity and post-colonial scientific sovereignty

6.1. Introduction

Skin color is a human physical trait with heavily loaded meaning. Not only it marks a difference that is tightly attributed to conceptions of race, but, as such, it has also filled the scientific imagination in grasping human diversity in South Asia at least since colonial and orientalist scholarship. Skin color was one of the main, if not the main, physical markers attributed to mark the differences between Aryans and Dravidians: the first were said to have light-skin tones, while the latter were supposed to have darker skin tones. This skin color variation-based theory of ancestral differentiations has taken popular root in imaginations of difference in India and plays a significant role in social differentiations and inequalities. For a long time, it has also been an object of scientific and, more specifically, anthropological inquiry, also in Karve's work. Even currently, following Karve's tradition of biological anthropology—and moved by the questions about the origins of castes and ethnicities—, biological anthropologists in Pune also research skin color variation.

In this chapter, I ask: How is skin color variation researched by anthropologists in India and with what goals and implications? How does it relate to this legacy of racial frameworks, and to what extent is it different from it? And what does the current research on skin color variation in Pune tell us about Germany-India—and North-South—entanglements in science and its politics? To explore these questions, I draw from my ethnography among the anthropologists in Pune University's "Molecular Anthropology Lab", where DNA research on skin color variation among castes and tribes of Maharashtra was conducted. I examine the research practices of these scientists in the lab, with special attention to how materiality relates to them and their knowledge practices. Continuing a topic explored in the previous two chapters (particularly Chapter 5), I discuss the structural inequalities and politics of science at play in such research. Thereby, I consider these Indian scientists' relations vis-à-vis Global North scientists, as well as the case of Karve's encounter with a gatekeeping criticism by a European scholar, in order to reflect about scientific dependencies and sovereignty.

This chapter's following section (Section 6.2) situates the Pune University's anthropological research project on skin color variation; I discuss these Pune anthropology professors'

motivations in their molecular research endeavors and contextualize their research project vis-à-vis Karve's writings as well as the renewed interest of population geneticists in the question of skin color. Then, in Section 6.3, I look at practices of sampling ethnic and caste groups for this research and explore how "caste" enters—and is present in—the space of the Lab. In Section 6.4, I narrate an instance of failure in this research project and reflect about the material—including technological and financial—conditions that led, ultimately, to the Lab's ceasing of operations by 2020. Following the analysis of the unsuccessful attempts to replicate DNA in the Lab due to material constraints, Section 6.5 examines such instance of "failed enactment" in relation to the unequal distribution of technological and material resources across scientific locations and disciplines. This brings me to discuss the question of scientific sovereignty in post-colonial Indian anthropology. Then, to further think about North-South entanglements, material inequalities, and power asymmetries in science, Section 6.6 makes a detour from skin color research today back to Karve's time to think with the case of a demolishing critique she received by the famous French sociologist of India, Louis Dumont (1911–1998). Making efforts to gatekeep the sociology and social anthropology of India according to his standards, Dumont questioned the objectivity and syncretic efforts of Karve's first internationally acknowledged and nationally acclaimed social anthropological book. Finally, Section 6.7 concludes this chapter by thinking about international entanglements in scientific knowledge production and how they are structured by global material inequalities, which also condition (and limit) the making and adaptation of knowledge. Thereby, I also reflect upon the racial background of this field of research, as well as on its racializing effects. Thinking with the idiom of co-production, I argue that biological anthropological research on human variation can further profit from closer attention to how human variation is also shaped by sociopolitical inequalities. I conclude with the suggestion that such sociopolitical inequalities, especially those structured by racism and casteism, need to be paid attention to as factors that shape human variation if biological anthropologists want to avoid the racializing and bioessentializing effects of the knowledge they produce.

6.2. Genetic research on skin color variation in India today and molecular anthropology

In the Indian public discourse, skin color difference has played an important role in perceptions of caste ancestry differences and often undergirds casteist discrimination. While some anthropometric measurements like nose and head shapes used by anthropologists from Risley

to Karve are perhaps less visible to the naked eye, we have seen that Karve also wrote about skin and eye color variation, associating these differences with the question of the origins of diversity in the subcontinent (e.g., Karve 1933). Following the popularization of such orientalist and racial anthropological knowledge on Aryan ancestry and physical differences in India, skin color occupies the main racial marker in the public imagination of the articulation of Aryan versus Dravidian ancestry with caste and ethnicity, configuring the pervasive skin colorism in India today (see Mishra 2015). According to Basu (2020:58), although lighter skin pigmentation "may be traced back to a multitude of 'foreign' sources in time: Indo-Greeks, Arabs, Bactrians, Turks, Mongoloids, Huns, Parthians, and Europeans", it is often into the ancestral figure of the Aryan that all this range of possible light-skin ancestries is ultimately "distilled". Thereby, racial ideas became entangled with caste and ethnicity mainly via the attribution of skin color difference both to an ancestral origin and to present-day caste status: upper-caste individuals were believed to have lighter skin due to the Aryanness of their blood, "and therefore those lightest-skinned groups are higher up in the caste system", while darker skin tones were associated both with a non-Indo-European or Dravidian ancestry and with social groups categorized in modern/colonial-state parlance as tribes, untouchables, and lower castes (B. Subramaniam 2019:149). At the same time, as we have seen in the previous chapter, the attribution of Aryanness to upper-caste individuals stressed their relative closeness to Europeans, which, in the context of the British colonial strategy of "divide and conquer", provided justification for the recruitment of upper-caste Indians into the colonial administration (Cohn 1997; Channa 2003; B. Subramaniam 2019). For example, Karve's father owned his high-ranking position in a British colonial enterprise to the fact that he was "quite tall and [had] light-grey colored eyes, fair complexion" and "pretended to be Anglo-Indian", as a Karve family member put it.[192] As Banu Subramaniam (2019:150) summarizes,

> [i]n a cultural system where skin color has long been strongly correlated with social privilege and remains a durable marker of beauty, desirability, intellect, and social status, these debates [about skin color, caste status, and ancestry] were not trivial, and they continue to shape the hierarchical and social stratification of caste.

It is, thus, not surprising that the politically loaded question of skin color variation is a recurrent theme in diversity research in India. Geneticist Thangaraj, for instance, has co-authored a paper with a team of researchers based in Estonia which argued that a genetic component that is partly (27%) responsible for lighter skin is shared by means of descent in both South Asians and Europeans (Basu Mallick et al. 2013). In my visit to one of the paper's co-authors, Gyaneshwer

[192] Interview with Anand Karve, Pune, 16 Feb 2019.

Chaubey, who relocated from Estonia to the Banaras Hindu University in Northern India, members of his research team confirmed their interest in continuing to research on the topic. In sum, skin color still animates molecular research in India.

Biological anthropologists in Pune, too, have researched the question of skin color variation. Their molecular research has been made possible through the setting of the Pune University's "Molecular Anthropology Lab", short hereafter: the Lab. The Lab occupies a small, perhaps 20sqm room in the Pune University's Ambedkar building, more precisely in its basement, next to the osteology laboratory and across the entrance of the Irawati Karve Museum of Anthropology. It is separated from its neighboring rooms by a heavy, vacuum-sealed door, which I found difficult to operate at first but, in the several months of my visits to the Lab, got used to opening.

One of the supervisors of the skin color variation research in the Lab is Manjari Jonnalaggada, an anthropologist who obtained her MA and PhD degrees at Pune University. I met her for first time in the private liberal arts college where she now teaches and where I visited her biological anthropology classes over a semester. Very different from the publicly funded institutions like the Deccan College or the Pune University, that private college had well-maintained facilities and a profile of students whose clothes looked in line with its expensive tuition fees. As Jonnalaggada and I sat in a bright hallway filled with students dressed in fashionable Indian handloom garments who were playing ping-pong or sitting on beanbags, we talked about our research projects. Discussing the influence of Irawati Karve in Indian anthropology, Jonnalaggada shared that she, like many other anthropologists formed under Karve's legacy in Maharashtra, was inspired by Karve's holistic anthropological approach. Since her MA research, Jonnalaggada tried to make sense of social and cultural factors to understand skin color variation in India. For her—and given that, according to her, higher caste individuals often have lighter skin—, this meant that she looked at caste differences in relation to the evolutionary framework, guided by the question: how do social factors affect biology? Jonnalaggada talked fast and enthusiastically. However, when I naïvely asked her "Why skin color?" the anthropologist at first reacted with surprise at her own unpreparedness to answer, but then, stumbling over her words, justified her choice of topic by stressing its global historical and geopolitical relevance: "wars were fought over skin color!"[193]

[193] Interview with Manjari Jonnalaggada, Pune, 30 Oct 2018.

Weeks later, after having spent several days at the Molecular Anthropology Lab, I shared with Jonnalaggada my own initial surprise regarding the Lab's complexity of experiments and instruments: a polymerase chain reaction (PCR) machine, a gel electrophoresis apparatus, several pipettors, a dark box on top of a UV transilluminator device with an in-built camera to photograph the gel experiment, and so on—this technological scenario was much different than the rooms that I, as a trained social scientist/sociocultural anthropologist, had thought anthropology could occupy! She was amused with my ignorant astonishment and replied that "yes, molecular anthropology is a natural science and fills all criteria of being replicable!" She said she lamented that most people imagine anthropologists as being "out in the field talking to exotic people", whereas a biological anthropologist actually spends a lot of time in a lab.

Hence, for this biological/molecular anthropologist, too, stressing the technological equippedness and the (hard-)scientific methodological rigor of her research practice seemed to be important. Not only is this in line with the scientific authority discourses that sustain the neighboring discipline of population genetics, but it is also rooted in the technological premise of "molecular anthropology". After all, "molecular anthropology", as the term was coined in 1962 in the Wenner-Gren Foundation sponsored conference "Classification and Human Evolution", was meant to be different from other anthropologies simply due to its methods: "molecular" merely implied the application of biochemical technologies to classically anthropological questions; as Jonathan Marks (2002:131) observes: "it was technology that was driving this new field".

In the following, I will look into how this skin color variation research has operationalized its samplings and how "caste" comes into the Lab.

6.3. Sampling and caste in (and outside) the lab

As different biological anthropologists in Pune explained to me,[194] in molecular studies of skin color variation in India, researchers also follow Karve's biohistorical model of caste and tribal differentiations. This means that, like Reich and other population geneticists working on India, these researchers undertake their sampling according to endogamous groups—*jatis* or tribes. In the case of the skin color research in the Molecular Anthropology Lab, Jonnalaggada chose a relatively isolated place in Western Maharashtra, which, according to her, would exclude

[194] Interview with Manjari Jonnalaggada, Pune, 30 Oct 2018; Interview with Shantanu Ozarkar, Pune, 27 Mar 2019.

other possible external factors, to study skin pigmentation variation among different social groups living there.

But in the practice of collecting samples, caste identifications were not always straightforward, as Jonnalaggada admitted. Specifically, one caste group was somewhat less rigid and thus volatile to political changes: the Kunbi Marathas. As we have seen in Chapter 2, Karve grouped in her own work both Kunbis (said to be traditionally peasants) and Marathas (traditionally landowners) into one bigger caste group "Marathas", which then accounted for almost half of the population living in the territory she drew to be Maharashtra (Karve and Dandekar 1951). However, the identification as "Kunbi" or in the bigger grouping "Maratha" accompanied shifting political situations. Jonnalaggada narrated that a farmer went from, in her first fieldwork trip, negating he was a "Kunbi" and stressing he was a "Maratha", to, a field trip later, identifying himself easily as "Kunbi" and claiming that "Kunbis" and all "Marathas" are the same: he was, after all, a "Kunbi-Maratha", he said. What changed in the time between the two field trips was that "Kunbi-Marathas" were categorized by the state as "Other Backward Classes" (OBC) and, thereby, listed within the affirmative action quota policies. More recently, Marathas have also pushed for recognition of all Marathas under the affirmative action-passible label of OBC. A special commission has studied and recommended this recognition application, for which Karve's writings on Marathas were taken as a main source to settle this debate—as we have seen in Chapter 2, Karve argued for grouping Kunbis and Marathas together.[195] In sum, these shifting political scenarios, according to Jonnalaggada, must have influenced that shift of subjects' self-identification that she observed in her field. This case might also complicate the assumptions of other population geneticists of India regarding the historical rigidity of caste categorizations.

Apart from this caste category, nevertheless, the other caste and tribal groups were sampled by Jonnalaggada and her research partners with more categorical ease. Besides collecting blood samples for DNA, the researchers also used a device to measure the skin pigmentation, i.e., "melanin index", in the inner upper arm—a body part that, according to her, is less influenced by exposure to the sun.[196] A questionnaire to apprehend the sampled individual's time of exposure to the sun and use of whitening and other cosmetic products was also applied. Another

[195] While the commission has recommended the inclusion of Marathas as OBC, juridical impediments that followed have blocked the Maharashtrian state's decision to grant Marathas this status. For an overview of discussions around inclusion or not of Marathas and Kunbis under affirmative action labels, see e.g.: Kulkarni 2020.
[196] Informed consent was also part of the research protocol.

method built into questionnaire was meant to cover the family mono-caste/tribal pedigree. Like most genetic researchers following Karve's model that is premised on *jati* and tribal endogamy, these biological anthropologists excluded individuals with an inter-caste or inter-ethnic background. In this sense, their research also corroborates with a picture of discrete mono-caste-bounded groups, which are then correlated with skin color differences.

As I learnt from the young researchers that worked in the Lab, the Lab's tall freezer contained 576 DNA samples of "six communities". Interestingly, as I asked them "which communities" these were, the otherwise quick-witted team of young researchers took some time to reconstruct the list. This was because, in the daily practices of the Lab, they were used to referring to the handled samples by their two-letter acronym: DB, KB, KT, BT, WT, KM. They were less familiar with all the full names: Deshastha Brahmin, Kokanastha Brahmin, Konkana Tribe, Bhil Tribe, Warli Tribe, and Kunbi Maratha. Such contraction of populational categories into acronyms is a common practice among population genetics research and consistent not only with the ANI-ASI case but also, for instance, with the language of the often-used Human Genome Diversity Cell Line Panel's database (e.g., Basu et al. 2016:1596). While such abbreviations probably have practical reasons, I argue that they also have a distancing—de-personalizing and de-politicizing—effect: In a political context in which sentiments evoked by difference categories are often far from subtle, and within an educational space that aims at post-caste equity, avoiding possibly unsettling "caste talk" is part of the established institutional social etiquette, although this is partly broken in special political occasions (as we have seen in Chapter 3). Jonnalagadda, too, recognized that problematizing caste in academic environments can be difficult. She listed three reasons for this silence around caste: sometimes caste is so naturalized that it is not perceived; in other situations, upper-caste intellectuals might not want to talk about it because of their own discomfort vis-à-vis their privileged implication in the long history of caste inequalities and segregation; or progressive scholars might avoid the topic due to the perception that evoking "caste" contributes to its social reiteration.[197] All these reasons might be especially prevalent from the point of view of upper caste researchers like Jonnalagadda herself, Karve, and other biological anthropology lecturers in Pune—an example of the pattern of correlation between formal education level and caste that could be generalized to many science departments in India (Sur 2011; A. Subramaniam 2019; Thomas 2020). In any case, these reasons corroborate to a setting of what I would call "caste aphasia".

[197] Interview with Manjari Jonnalaggada, Pune, 30 Oct 2018. On how caste has been neglected in Indian historiography of science, see: Sur 2011.

This silence around caste-ism prevails, but is sometimes broken, in the social space of Pune University and other educational and scientific institutions in India.

But the ubiquity of caste in Indian social spaces made it enter the social space of the Lab also through other means. This happened, for instance: when one of the researchers talked about their new "Maratha caste certificate", which they had downloaded in the Lab computer, with the hope that by the time of their new job application that category would have been included in an affirmative action list; when another young researcher complained about their teachers' misinformed assertions about tribal populations; when they shared their anxiety about their parents' wish to arrange a marriage to someone of the same caste in their home village. Thus, especially within a research project that is exactly about biological differences among castes and tribes, obliterating caste/tribal categories via their abbreviation can grant the researchers some easiness as they handle those acronymized samples in the everyday lab practice.[198]

In the next section, I will describe the practices of DNA analyzes within the Lab—and which analytical processes had to be outsourced due to the Lab's constraints.

6.4. Failing enactment

On a fresh January afternoon in 2019, after another biological anthropology class in the osteology room, as usual I went to the Molecular Anthropology Lab. On this day, the team of three researchers was seemingly agitated. They proudly showed me the new PCR machine that had just arrived, bought thanks to funding gathered by Jonnalagadda in her privately financed college: the new machine was one that, unlike the one they had been working with in the past year, could run different programs and more samples simultaneously, which would speed up the lengthy "experiments", as they called the different procedures and analyses done at the Lab. The brand-new machine had already been running for three hours when I arrived. Rohin[199] wanted to test the ideal temperature for the replication of the DNA sequence his MA thesis focused on: the lysosomal trafficking regulator (LYST) gene. This protein coding gene, as they had explained to me, is said to play a role in skin pigmentation. The student-researcher wanted to analyze the correlation between this gene and the melanin indices of 66 sampled individuals with the "community" label "DB" [Deshastha Brahmin caste]. Soon after I arrived, Rohin

[198] In formulating this thought I was also inspired by Thimothy Pachirat's (2013) ethnographic theorization on how, albeit in a very different context, the partial invisibilization of an ethically compromised object contributes to the functioning of an industrial production setting.
[199] Pseudonym.

retired from our conversation and concentrated on preparing the gel onto which the amplified DNA samples, once out of the PCR machine, were carefully loaded, one by one with a pipetting instrument. He, very focused and carefully, used a pipettor to inject a fluorescent-blue staining chemical (a cancerogenic substance, as I was alerted) in the DNA samples and into in the gel. He then set the agarose gel electrophoresis procedure to run, which would take an hour. While it ran, Rohin killed time at the Lab's computer. He started watching clips by Charles Chaplin, and—thinking about how one of the team members seemed to admire India's prime-minister Modi—I suggested we watch Chaplin's "The Great Dictator". All four of us laughed a lot throughout the movie.

By 5PM, Rahul stopped the movie as soon as the timer beeped, which signaled that the gel experiment was done. The mood in the cramped little room was suddenly apprehensive and focused. We all did something to prepare the next step of the experiment, which consisted of taking a high-definition picture (with use of the small DIY-dark box adapted on top of the UV transilluminator) of the gel ladder where the amplified and concentrated blue-stained DNA should have become visible. After the camera took the picture, we all gathered around the Lab computer, where the digital image would be shown. While the picture slowly loaded and our eyes were glued on the screen, the youngest researcher repeated in nervous apprehension: "ahe, ahe, ahe, ahe!", Marathi for "it is!", over and over.

Once the picture appeared they all fell silent and looked intrigued, then outspokenly disappointed by what they saw. I just saw different rows of almost imperceptible blue stripes, distributed horizontally, on a light-orange background. Madhur,[200] who oversaw the Lab, tried out different color saturation and contrast settings with use of a simple image software; in a black-and-white setting the stripes looked white, the background dark grey. They explained to me that only in one or maybe three samples out of ten different PCR temperature settings were the pictures clear enough, i.e., only in these three was the white stripe (which accounts for replicated DNA material) thick enough to be sent out for a possibly successful next analytical step: DNA sequencing, which had to be outsourced and was timely and financially very costly.

Madhur put his hand over his mouth and they stared at the picture, again in silence, for a long while. They called the anthropology professor and Lab supervisor and discussed the results over the phone for a what felt like a very long minute. Afterwards, they chatted quietly about what the next steps would be: they would repeat the procedure on the next day, using higher

[200] Pseudonym.

DNA quantity, and hopefully they would get a better result. At the end of that day, they looked tired and disappointed. The bike ride Madhur gave me home that evening was silent, except for the bustling sounds of Pune's rush hour.

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The scene above was one of many days I spent at the Lab, and one of the many other situations of failed enactments of DNA visualization these researchers encountered. As Madhur, the young researcher in charge of the Lab, explained to me in our first encounter, finding and setting up the right procedures for successful DNA experiments was a laborious process, which had taken several months. When it did work and one could see the batches of amplified DNA in a high-contrast digital picture, it was like "a miraculous thing!", as I was told with enthusiasm by him (who otherwise made very clear to his colleagues that he did not believe in other miraculous, "superstitious stuff" they chatted about, like astrology).

In this scene of failed enactment, the Lab researchers were especially apprehensive, since the amplification experiments that the MA thesis of one of them depended upon had been failing repeatedly. The apprehension increased with subsequent failed experiments in the next month, and they started to fear a reason for this failure could be related to the material constraints of the Lab. By the last week of February 2019, the count was eight successfully amplified and visualized DNA samples out of 68 attempted ones.

On one of the last February workdays, they found out a possible reason for the failure. On that day, the nervous anticipation for the results of the lengthy experiments was increased by the vociferous news channels that one of the researchers streamed, with speeches of Modi and other Indian politicians feverously going on loop on the "successful" bombings of alleged terror camps in Pakistan. The DNA amplification procedure, in turn, was again unsuccessful: only four out of twelve amplified samples turned out to be "clearly visible" in the photograph. The researcher at the computer tried out different contrast and saturation settings, but none improved the visual outcome. They called the anthropology professor and Lab supervisor, who came down to the Lab this time to investigate possible reasons for the failure. He opened the fridge where different chemical components were stored and checked for their expiration date. This was a rather bitter eureka moment: the taq polymerose substance, a basic ingredient for the PCR technique, was then discovered to have been expired. After a hasty discussion in Marathi with the Lab team, the professor asserted to me, while leaving the Lab: "You see, this

is what happens when we have no money—we are using old ones; this substance is very expensive!"

One year later, the Lab ceased its operations. In the following section, I discuss the closing of the lab and these instances of failure in its research against the backdrop of a discussion on scientific sovereignty in genomic research.

6.5. Closing: (im)possible post-colonial sovereignty?

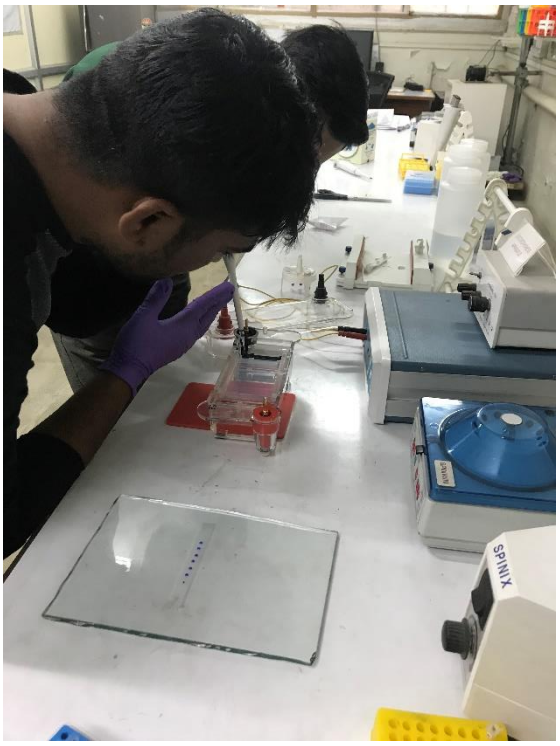
What does this (re)occurrence of failure due to material constraints tell us about this molecular anthropological research? Instances of failing—and adapting experiments to make them somehow "work"—have been long debated since now classical lab-focused STS scholarship that emphasized the social construction and adaptability of natural sciences (Knorr-Cetina 1983:120; see also Latour and Woolgar 1979). In our small Lab case too, the researchers managed to make something work out. They continued to insist on adapting their experiment and reframing their objects to work around their constraints, including the restraint implied by the expired essential chemical components. Rohin's MA thesis, after he switched to another caste group (which had happened to have more successful DNA amplification results), was written and successfully defended. However, one year later, during my cut-short fieldwork in early 2020, the Pune University professor who oversaw the Lab shared with me with some resigned desolation that the Lab had to cease operations. The financial and material constraints of the Lab not only increased the recurrence of failing experiments but it also, ultimately, led to the termination of this molecular anthropological research.

The acknowledgment that the Lab research must close caused particular soreness to the Pune University biological anthropology professor, since he had been personally very invested in setting up the Lab years before. As Shantanu Ozarkar told me in an interview,[201] he used leftover funds squeezed out of a Werner-Gren scholarship that financed his doctoral research on mtDNA of Adivasis in Maharashtra to set up this "Lab of his own", to use a phrase articulated by Ruha Benjamin (2009) in her writings on post-colonial genomic sovereignty. He did much of this infrastructural arrangement work on his own, with very limited funds. This was perceptible in the improvised window sealings (with what looked like inexpensive duct tape) or the second-hand look of the freezer where the valuable and fragile DNA samples were deposited.

[201] Interview with Shantanu Ozarkar, Pune, 27 Mar 2019.

In sum, we can say that the Lab was modest, even improvised, and had technological conditions that were much beneath other, much more generously financed Labs in non-educational biomedical research institutes, including one in Pune that students and I once visited as part of a class excursion (which much impressed the same MA student who was conducting his research at the molecular anthropology Lab) as well as the ones I visited in other Indian cities, like the CCMB in Hyderabad and the NIBMG in Kalyani (Chapter 5). As mentioned in the previous chapter, these inequalities of public funding for science cut apart non-educational research facilities and university-based research projects.

This can be perceived in the material conditions of these different institutions: while the research at the CCMB and the NMGB benefited from their relatively well-funded infrastructure, the Pune University anthropology department as well as the Deccan College have struggled not only to finance research but to keep their infrastructure well-maintained. Built in the pomposity of the late 19th century Anglo-Indian neo-gothic architecture, the main building of the Deccan College showed severe signs of deterioration and infrastructural precarity throughout the years I visited it. While funds for restoration have long been promised, a former director declared in an interview that the Deccan College could pay its staff thanks to resources obtained by renting out its campus as a location for film shootings, a practice also common in the Pune University campus (Balani 2004; Rashid 2014). It is amidst these difficult material conditions that scientists in both institutions in Pune have conducted their research and tried to maintain their laboratories.



Figures 20 and 21: View of the main room of the Molecular Anthropology Lab (Pune University) and student-researchers operating the pipettor with DNA material. Photos taken by me.

In this sense, one way of looking at this story of material hardship and failure in the Molecular Anthropology Lab would be by focusing instead on the successes of necessary adaptations. The improvisational work in Indian university laboratories was also the theme of recent scholarship on the concept of *jugaad*, an Indian word with a possible Portuguese root ("*jogar*") that stands for playful makeshifts and innovative workarounds.[202] Most notably, Pankaj Sekhsaria (2018) thought with *jugaad* to interpret his ethnography of another laboratory in the Pune University, in the physics department, where the research depended upon several adaptations and DYI-production of instruments. The innovation potential of *jugaad* has also been a matter of intellectual interest to media and business scholars (Prabhu and Jain 2015; Rai 2019; Ananthram and Chan 2019). We could thus also understand the Lab in our case as one

[202] There is a vast scholarship on frugal technological adaptations in different national emerging contexts, where equivalents of *jugaad* are present, like *jiejian chuangxin* in China, *jua kali* in Kenya, and *gambiarra* in Brazil (Ananthram and Chan 2019:2). For an analysis of *gambiarra* in relation to geopolitics of knowledge in a context of underfunded scientific research, see: Reis-Castro 2021.

that, throughout several years, has functioned thanks to *jugaad*-esque efforts of local adaptations.

However, having considered this *jugaad* scholarship's optimistic focus on creativity amidst difficult conditions, and still resisting the double bind between denouncing structural constraints *or* praising creative agency, I must call attention to the global inequalities in the distribution of technological and other material goods that are essential for this kind of scientific research. I chose this focus in concluding this chapter also because such global inequality aspect is often not encompassed in Global North-based ethnographies of STS, which, for instance in accounts of population genetics research, might leave the impression that one can take for granted the access to costly technologies—even though, in reality, many lab scientists across the world could only dream to afford them.

How can we then grasp the conditionalities and implications of this material constraint for the overall anthropology research in Pune, in particular molecular anthropology, and (how) are they connected to global inequalities in science? Before the closing of the Lab, these constraints also meant that the research of that Lab was contingent on externalizing key analytical steps. This took two forms: outsourcing and transnational collaborations. As for the first, I have briefly mentioned that the sequencing of post-amplification DNA had to be commissioned to other research facilities in Pune. These private facilities were equipped with DNA sequencers and "super-computers" with sequencing software. This outsourcing step is very costly, both financially and timely: the university Lab often had to wait up to three months for the sequenced data, a wait that often tied the Lab's main researcher to an idle limbo. As for the second, similar to Indian population geneticists like Thangaraj who collaborated with Global North-based geneticists like Reich (as we have seen in Chapter 5), these molecular anthropology researchers in Pune were contingent on collaborating with better equipped researchers in the Global North if they wanted to succeed in elaborating publishable research results. As Ozarkar explained, if the mtDNA doctoral research he was proud to have been able to accomplish was once interesting for publication, the current push for the genome-wide scale, headed by well-equipped labs in the Global North (like Reich's lab in Harvard), has made his just-finished research obsolete and definitely uninteresting for top-notch journals.[203] Jonnalagadda confessed to me that she was quite happy about the prospect of collaborating with a team of researchers from a lab in Toronto (Canada). This collaboration eventually led to the publication

[203] Interview with Shantanu Ozarkar, Pune, 27 Mar 2019.

of their population genetics article *Novel Insights on Demographic History of Tribal and Caste Groups from West Maharashtra (India) using Genome-wide Data* (Debortoli et al. 2020). But this bi-national collaboration was not necessarily symmetrical. Perhaps as a sign of the status hierarchy between expensive technology-owning analysts and data providers, the list of authors in that publication is quite telling: three Toronto-based researchers were the first three authors; Jonnalagadda was listed eighth and last author, Ozarkar the sixth (see Debortoli et al. 2020).

The Pune-Toronto partnership was key for the financial and technical enactment of the genomic data contained in the DNA samples collected by the Indian scientists and stored in that old freezer in the Pune university basement. This genomic enactment would have never been possible within the materially constrained Pune Lab, but it also depended on the Indian DNA samples stored in that Lab and collected by the Pune researchers. Thus, the relationship between these two research teams is marked by a mutual co-dependence, but also by inequality. If we assume that the order in the authors list in that paper (Debortoli et al. 2020) is grounded on the perceived importance of their contribution to the research, the unequal geographical distribution of this order confirms an aspect of the asymmetry that marks a pattern of intellectual division of labor within North-South scientific partnerships: the extraction of "raw" data receives less value than the further, indeed value-adding enactments on that data via the use of more expensive technology. In other words, the collection, storage, and sequencing of DNA samples in India seems to be less valuable than then the high-tech analysis of genomic data in Canada. Thus, as this case shows, inequalities in the distribution of molecular-scientific technology actively shape the production of knowledge in this field. Expanding on the understanding of co-production between science and social order, we can see with this case that science is entangled with global material inequalities, in multiple, co-constituent ways.

Finally, in thinking about the closing of the Lab, we can then reflect on the questions of scientific sovereignty and post-coloniality. As Benjamin (2009) put it, efforts to build "a lab of one's own" could be seen as a step towards post-colonial sovereignty in the field of genomic research. In the case of Pune, those biological anthropologists and anthropology students did build and inhabit "a Lab of their own". Agreeing with what Pollock (2019) observed regarding the educational and intellectual legacy of a materially failed pharmaceutical research facility in South Africa, I see that this anthropological Lab in Pune, too, did the work of training several students and researchers in the skills of "molecular anthropology". Some of them are now lecturers or researchers in other projects. At least before the emergence of genomic-wide research, the research at that Lab also bore other publications throughout its functioning years

(Jonnalagadda, Norton et al. 2016; Jonnalagadda, Bharti et al. 2016; Jonnalagadda et al. 2017). Thus, the Lab left a knowledge legacy that lives beyond the closing of its material space.

On the other hand, what we have also seen is that these Pune-based researchers, to fulfill their reasonable aspirations of peer recognition through publications in internationally circulating journals, have been contingent on asymmetric partnerships with Global North-based lab scientists.[204] This dependency has been especially aggravated in the past few years in face of the current "post-genomic condition" (Reardon 2017). While India's legal prohibition of the export of DNA samples can be seen as an impulse guided by a post-colonial desire for genome-scientific sovereignty (Benjamin 2009; Reardon 2017), what we see in the practice of genomic sciences and their publications is that India-based researchers, from Thanagaraj (Chapter 5) to Ozarkar and Jonnalagadda, have been materially—technologically and financially—not as sovereign over the knowledges extracted from the samples that were collected and stored in India. As we have seen in the previous chapter, this dependency on collaborations with the North for genome-wide research was observable even in the case of Thangaraj's well-established research center, the CCMB in Hyderabad, which has been granted an exponentially better funding than molecular labs in universities.[205] But despite this unequal landscape of public funding of scientific research within India, these Indian researchers—non-teaching population geneticists and university-based anthropologists alike—often engage in asymmetric transnational collaborations. Their aspiration to enact publishable genomic knowledge has been contingent on financially and technologically privileged scientists in the Global North. As we have seen in the previous chapter, well-funded Global North scientists like Reich can therefore take the leading role in the interpretation and articulation of that genomic knowledge, even pushing forward their specific theoretical assumptions—sometimes against the opinion of their less powerful collaborators.

In the following section, I turn back to Karve to think about an interrelated aspect of North-South dependencies in science. In this short digression, I will visit a controversy involving a destructive criticism that one of Karve's social anthropological books received from the Paris-based orientalist/sociologist Louis Dumont.

[204] Here my observations go again in the direction of Pollock's (2019:131) conclusion on the failed lab in South Africa: "research with limited global prestige is what remains palatable for funding in Africa".
[205] As Sekhsaria (2019:45) explains, the central government in India has allocated a larger chunk of research funds for research centers with laboratories (like CCMB and NIBMG), while universities have been left with scraps for research, resulting also in a brain drain between the two types of institutions.

6.6. North-South scientific entanglements and asymmetries: (re)thinking with Karve

The knowledge produced by Karve is intrinsically tied to the transnational entanglements that constituted her scientific trajectory and knowledge-making practices. In considering the knowledge adaptations that Karve undertook, there is a tension between, on one hand, adapting social sciences to study India-related themes, and, on the other, being trained in—and wanting to remain a validated member of—an international scientific network, which in Karve's case included many anthropologists trained in the German racial school. Therefore, while Karve strove to comply with international standards, she also adapted knowledge to respond to Indian social realities and intellectual traditions. At times, this came at the cost of critique by peers based in the Global North, including by some who had a major influence in the international standards in the field of sociology and anthropology of India. One such influential scholar was the famous French sociologist Dumont. Dumont employed decisive and impactful critiques towards Karve's transdisciplinary gestures. In the following, I analyze his criticism of Karve in greater detail, as it alludes to North-South dynamics, scholarly asymmetries, and peer validation.

As we have seen in Chapter 2, Karve devoted two of her main academic anthropological books to the study of kinship and caste in India (Karve 1953, 1961). Both books combine different methods and draw from years of field research, which, in the case of Karve and most social scientists working at Indian universities at that time, was fragmentary also due to budget constraints.[206] The first book, *Kinship Organisation of India,* presents a mix of approaches that are typical of Karve's take on anthropology, combining philological, linguistic, and sociocultural anthropological analyses. This syncretic approach contributed to the book's wide readership accomplishment: *Kinship Organisation of India* granted her initial recognition in the international anthropology community and it is often listed in Indian anthropology and sociology syllabi across India today.

However, despite receiving some very positive reviews from the international community (Hutton 1954; Useem 1957), "the reputation of [Karve's] book never quite recovered from the demolition job performed by Dumont and [David] Pocock", two European sociologists/anthropologists studying India (Sundar 2008:396). The critique was especially

[206] On budgetary constraints in anthropology and sociology in India until 1970 and how this limited the scale of research projects, see: Madan 1981; Saberwal 1983.

overwhelming due not only to the prominent role that the journal in which it was published, *Contributions to Indian Sociology*, would play but also the status of the French sociologist Dumont, whose work on the caste system would grant him great epistemic authority in the field some years later (see Dumont 1966b). As Shiv Visvanathan (2006:246) puts it, if Max Müller haunts Indology and the ghost of Herbert Risley still stalks anthropology, "then Dumont is the spectre that haunts Indian sociology."

Dumont's[207] critique of Karve's *Kinship Organisation of India* not only tackles the methodological correctness of the book, it also casts doubt on the author's scientific objectivity *per se*. This is achieved with a strikingly dismissive tone that, beyond the patronizing introduction of the book's author as "a Brahman lady from the Marathi speaking country" (Dumont and Pocock 1957:44, emphasis mine), contains assertions like "the book is *highly personal*", "*highly subjective*", "the particular *bias* of our author", and "falls short of *modern* requirements" (ibid.). The review strongly criticizes Karve's transdisciplinary adaptations and syncretic gestures, noting with irritation "that many passages [of the book] show a shift from sociological to historico-cultural, and even racial, considerations" (ibid.:45).

A central point in Dumont's critique was his aversion to Karve's use of ancient texts for the interpretation of anthropological or sociological data. For the reviewer, Karve's combination of what he calls "sociology and historical culturology" renders her approach incompatible with "proper" sociology's and social anthropology's focus on present-day evidence. Dumont speculates that Karve's turn to the analysis of ancient texts was because, so he argued, Karve thought it was not necessary for her to do long-term fieldworks, which could be explained by her "self-assurance rooted in birthright" [*sic*]—i.e., her nationality would have granted her a sense of knowledge about India that made her opt for not doing long-term fieldwork in all regions covered by the book (Dumont and Pocock 1957:44). While it can be said that Karve did not undertake year-long ethnographic fieldworks in all the regions covered by the book (also due to its inevitably ambitious national scale), dismissing the book on these grounds would not just overlook Karve's empirical efforts which—even if fragmented—took place over the course of several years but it would also be a too simple dismissal of the role of the book's synoptic approach. Ironically, the shortcomings of Karve's all-India scale could also be applied to Dumont's later work, who has been criticized for his ambitious theoretical generalizations about Indian society (Sundar 2008:369–397). Further, given that Karve's fragmentation of

[207] None of the articles in the first issue of *Contributions to Indian Sociology* (edited by Dumont and Pocock) was individually signed, but, according to T. N. Madan (2011:226), the review of Karve was written by Dumont.

field trips was due to a lack of budgetary resources and childcare responsibilities, we can ask to what extent Dumont's critique is inconsiderate to gendered conditions as well as to North-South inequalities in research funding.

Further, Dumont's critique labels Karve's scholarship of a religious sort, in contrast to "modern". In the following quote, he suggests that Karve's turn to ancient Sanskrit texts would not be a social scientific but a "Hindu method" of inquiry:

> texts will not answer all the sorts of questions a trained anthropology studies, and therefore such information as they contain is best read critically in the light of analysis of present-day happenings. At least this is *the proper anthropological attitude*, as opposed to the philological. […] the book actually opens with a chapter dealing with the [Sanskrit] Epics. Then, in the second chapter, she turns to the present, while still occasionally referring the reader to the past for understanding. Whatever the merits of the first chapter in itself, the procedure is rather strange. Is this historical method, or even, one is inevitably tempted to ask, *hindu, Brahmanical method*? (Dumont and Pocock 1957:47, emphasis mine).

Here I highlight three main aspects in which this review of Karve's *Kinship Organisation*, read from the vantage point of today, is insightful regarding North-South dynamics in science. First, the fact that one or two European experts could exercise such an impactful and internationally reaching critique over a nationally renowned Indian scholar is particularly noteworthy. This is exacerbated by contrast to the national significance and acclaim of the book: in fact, *Kinship organisation in India* has been taken up by important works of later generations of social scientists of India (e.g., Uberoi 1994). The reviewers' impact alludes to the epistemically powerful positions that scholars based in the centers of the North—even unintentionally—might take up in a scientific discipline, with possibly gatekeeping outcomes vis-à-vis scholars located outside these centers.[208]

Second, a crucial point in Dumont's critique of Karve is the dismissal of her syncretic or transdisciplinary knowledge adaptions, especially her way of reading anthropological data in light of historical or mythological texts. While the classical Indological equation of the present with the past could be problematized in different ways (see Sundar 2008:387), Dumont's reluctance in acknowledging possible advantages of Karve's philological and historical approach in favor of what he terms "the proper anthropological attitude" constricts valuable contributions and insights from the many Indian scholars working with Indian literary

[208] See Fredua-Mensah (2016) for a discussion on the concept of intellectual gatekeeping.

traditions. Dumont's critique also missed out the more nuanced of Karve's views on this issue, which were laid out by her in the affirmation:

> I myself started my enquiry as a field-worker and turned to the written records only when I could not understand some of the data I had collected and found that the written literature helped me to understand my field-notes. Words which I had taken down without understanding their full significance became clear when I found them in the context of a story or in a poem. Usages which had appeared strange to my urban upbringing could be placed in their proper setting and perspective when found recorded. […]. *A people's literature has a peculiar relation to their social institutions.* In some kind of literature the social institutions are idealised, in in another they are ridiculed; in a third the literature is starkly realistic. All the time a particular type of evaluation of social institutions is found in literature and I found this interrelation of the written or oral literature and the actual social institutions as lived by people a fascinating study in idealization, rationalization, self-castigation, self-criticism, suggestion and imitation on the part of a society. *The cultural lag between the literary norm and the actual conduct is itself a study of enormous value and for such complicated cultures as that of India as essential as field studies*. (Karve 1965:23, emphasis mine)

In addition, commenting on why she added a summary of the Mahabharata epic in the appendix of the book's second edition, Karve reasserted the importance of historicity to the study of the present, possibly in response to Dumont:

> I found that the average non-Indian anthropologist knew very little of Indian literary traditions and sometimes did not care for them either. *To him this appears as a useless, nostalgic dipping into a vanished past. I assure him that that past lives with us even today vividly*, obstinately and sometimes obtrusively and must be known by everyone interested in the present. (Karve 1965:24, emphasis mine)[209]

Finally, the third and related aspect in Dumont's critique worth discussing in closer detail is the argument that Karve's book was not scientific or modern enough. Dumont's mobilization of such claims did not only happen in his critique of Karve, but also of other Indian social scientists—sometimes in generalizing ways (V. Das 2018). Revisiting the debate that ensued in the 1960s between Dumont and another Indian sociologist and Karve contemporary—A. K. Saran (1922–2003)—, Veena Das notes that Dumont asserted that the distanced Western view was the only possible authentic reader of Indian society—a position that, in the logic of his argument, could never be occupied by what he called "the educated Hindu" (Dumont 1971 quoted in V. Das 2018:28). Dumont's position was critically commented on by Saran, who pointed out that an external, Western view of Indian society was not necessarily more objective,

[209] From today's perspective, this debate on the interaction between Indology and social sciences might also be walking towards its obsoletism not only because of the increased porousness and diversity of themes and approaches in social and textual sciences (Michaels 2020:359), but also at least since the literary turn in anthropology.

but simply an interpretation of one culture through the categories of another culture (Saran 1962 quoted in V. Das 2018:30-31). In response, Dumont associated Saran's view to a sort of nationalistic defensiveness, saying that it derived from "Neo-Hindu 'provincial' and backward feelings" (Dumont 1966a quoted in V. Das 2018:31-33).[210] Analyzing Dumont's rhetoric, Veena Das concludes:

> For the Western anthropologist, it is a part of modern enlightenment values to comprehend the values of other cultures intellectually. […]. For the Indian anthropologist, however, there is no possibility of participation in the demystification of the 'universalist', 'objectified' categories of Western sociology by showing traces of an alien culture in the making of these categories. Thus the possibility of transcending his own ideology through an intellectual appropriation of other values is open to the Western anthropologist, but the Indian anthropologist has no legitimate way of applying the same method to the ideology of his own culture. The knowledge categories of non-Western cultures are simply unanchored beliefs, while Western categories have the status of scientific and objective truths. (V. Das 2018:32–33)

In Dumont's own words, "if there were no 'external view', no comparison, no objectivity, then there be as many 'sociologies' as there are different civilisations" (Dumont 1966a quoted in V. Das 2018:33). As Veena Das points out, Dumont's insistence on a universalistic character for sociology excludes non-Westerners from the possibility of producing accurate, objective scientific knowledge about the societies they live in or, in fact, about any society.

Reviewing this debate between Dumont and Saran, Indian anthropologist T. N. Madan (1966 quoted in Lardinois 2017:346.) noted that "[t]he Indian sociologist has thus been a victim of history (the colonial situation) and of positivism (this notion of a science of human societies consisting of universally valid laws)". In terms of knowledge geopolitics, Dumont's formulations pose a trap to social scientists from India and, more generally, the Global South. Through his efforts of disciplinary standardization—which were mediated by positivistic arguments of universality and objectivity—, Dumont's critical engagement with international aspiring Indian sociologists-anthropologists in fact left an indelible negative mark on Karve's social anthropological work, even if his critique were motivated by his efforts to *contribute to Indian sociology*—as the title of the journal founded by him suggested.

[210] To be sure, Saran's scholarship's appropriation by, or confluence with, Hindu supremacy-inclined intellectual circles might be entailed in Dumont's "visionary warning" (Lardinois 2017:356) when he wrote: "Progressive Indians should be particularly alert against the dangers of a fake or 'Hindu' sociology developing as a weapon of obscurantism and reaction." (Dumont 1966 quoted in Lardinois 2017:346). However, as he read Saran's critique as a plaidoyer for the impossibility of inter-cultural comparability, Dumont even went as far as to literally compare Saran's view to Adolf Hitler's cultural-racial segregationism (Dumont 1966 quoted in V. Das 2018:31–33).

6.7. Final remarks

Skin color is a physical marker that has been entangled with notions of race and, in India, also with racial theories that aimed at explaining caste and ethnic diversity and its origins. When I decided to study the research on skin color variation done in a molecular anthropology lab in Pune, I was guided by the question of how these anthropologists have continued such racial legacy and/or how they have changed the racial frameworks that have animated such line of inquiry. In my observations and conversations in the lab, my ears and eyes remained opened to spot how elements of the social and political realms are present in the lab: therefore my mentions of how Modi's politics were pervasive in the lab soundscape as well as my attention to how caste appeared in the lab—not only in the strategies to abbreviate the caste names in the samples but also in the way that caste-based affirmative action played a role in sampling already in the DNA collection phase. More importantly, in paying attention to the practices and materialities in the Lab, my gaze shifted to the difficult constraints and structural conditions, as well as the creative workarounds, that these biological anthropologists dealt with. Further, thinking about structural conditions and inequalities in geopolitics of science brought me to examine the case of the harsh critique received by Karve for her efforts in adapting knowledge in a transdisciplinary manner. Oblivious to the gendered and financial constraints that led Karve's fieldwork to be fragmentary, Dumont's critique of Karve also pointed at her inability to comply with the expected disciplinary and methodological standards in anthropological field research.

Reflecting about this conjuncture, we have seen how the post-colonial scientific sovereignty of these anthropologists in India can be questioned both from a material as well as a discursive sphere. The poor structural conditions of this molecular anthropology lab resulted in its closing and brought its researchers, similar to population geneticists based in India (see Chapter 5), to engage in asymmetric collaborations with much better equipped scientists in the Global North. The issue can be further complicated when we think not only that Karve was entangled with the physical and racial anthropological tradition of her training in Germany, but also that she, like any other scientist with any international aspirations, was subjected to international peer validation, which also molded her knowledge-making agency. Oriented by an idea of universal objectivity, Dumont's demolishing critique reminds us of the constraints that transdisciplinary and syncretic knowledge adaptations can face. Such peer critique can be especially taming when the validating peers are members of central nodes of knowledge production/circulation, which are usually located in the Global North. As also discussed in the previous chapter

(Chapter 5), the power asymmetries that derive from such global material inequalities in science crucially co-shape knowledge outcomes. These difficult entanglements are thus key to understanding knowledge production and circulation as well as the limits of knowledge adaptations.

In this sense, the question of scientific sovereignty could be expanded to reflect about not only the means of production but also the *content* of this molecular anthropological research. Here, the coloniality of the questions and framings of this research comes to the fore. The analyzed research in the Lab still lingers on a legacy of an inquiry that is imprinted by orientalist and racial anthropology that thrived in colonial times, flourished with particular racial undertones in Germany, and has been carried, also by Karve and through post-colonial times, to today's research questions about human variation. As we have seen also in the previous chapter, such knowledge legacy is often implied in research questions about the origins of modern-colonial categorizations of current social groups (like "caste" and "tribe") and ancestral groups like Aryans and Dravidians. More, by corroborating with endogamy-based definitions of caste and ethnicity, this epidermic pigmentation variation research might also reinvigorate biologized perceptions of differences among social groups. In addition, especially when such skin color variation research aims at proving the hypothesis of a differentiated biological ancestry among different social groups, reviving the legacy of racial anthropology and Aryan migration debates, its results seem to corroborate essentially biologized views of caste and ethnic diversity.

But could molecular anthropology research in India, nevertheless, break free from such racial and colonial legacies? Can research about biological variation, and more specifically about such a loaded attribute like skin color (Jablonski 2021), be disentangled from the racial and "eugenic scripts" of past research in this field (B. Subramaniam 2014)? How could this research subvert such scripts and, perhaps, help to prevent the relapse of those "wars that have been fought over skin color", as a biological anthropologist in Pune put it?

If we are to ponder about how such biological anthropological research could be otherwise and break free from its historical and present entanglement with biologically essentializing, racializing implications, it is worth thinking with the idiom of co-production. The sphere of the sociopolitical is both one that co-shapes human variation as well as one that needs to be reflected upon as these scientists examine the implications of their studies. The realm of the sociopolitical is relevant for questions of biological diversity because it influences those very

evolutionary processes that genetic research examines. As biological anthropologist Fuentes (2021) explained in a recent critical examination of his subdiscipline, racism actively shapes processes of biological differentiation. In this sense, Fuentes summarizes, "[l]eaving 'racism' out and just focusing on 'race' reinforces racist positioning, confuses the discourse in the academy and in the public […], and does a disservice to what we know about human variation and the structures that shape it" (ibid.:7). Similarly, we can expect a comparable implication of leaving casteism and ethnic discrimination out of the picture in studies on biological markers of caste and ethnic diversity. Casteism, too, might count as one of the "social factors that affect biology", as Pune biological anthropologist Jonnalaggada had mentioned in an interview to me but not elaborated in the papers she co-authored (e.g., Jonnalaggada et al. 2017; Debortoli et al. 2020). Along these lines, we could ask, for instance: In a cultural context where a physical trait like skin color influences perceptions of beauty, marital desirability, status, and group-belonging (B. Subramaniam 2019), what is missed by, and what are the effects of, studying skin color variation among castes and ethnicities without addressing casteism and ethnicity-based discrimination? Thus, in addition to being factually relevant for biological differentiations and evolutionary processes, the realm of social and political inequalities needs to be seriously considered so that can one start to grasp, evaluate, and better respond to the possible political affordances of one's own research on human diversity. In other words, attuning to the relationship between sociopolitical inequalities and biological differences is important to reflect upon, and calibrate, one's research in relation both to the political underpinnings of a research object and to the possible political affordances of the knowledge outcomes. As discussed in the previous chapter, bridging the realms of the sociopolitical and the biological might have to include inter- and transdiciplinarily efforts along with sustained reflections on the co-productive dynamic between science, society, and politics.

Furthermore, when we zoom in biological anthropology as it is practiced today in Pune, there, too, lies potential for more sustained reflections over the political implications of one's research on human variation.[211] In particular, we have also seen that, among biological anthropologists in Pune, despite their attention to political and social questions regarding human variation and certain sensitivity towards the sociopolitical flexibility of caste categories, it remains to be

[211] For a recent discussion on biological anthropology's responsibility regarding the issue of racism, see the *American Journal of Physical Anthropology*'s issue "Race Reconciled II" opened by Jennifer Raff and Connie Mulligan's (2021) editorial. Writing in this issue, Fuentes (2021) deposits a lot of hope on biological anthropology's ability to think about human variation in more integrative and engaged ways, but the author, too,—perhaps due to his US focus—says nothing about the relative financial and other material constraints anthropologists might face vis-à-vis other DNA-centered sciences.

further thought whether and how research on skin color variation could in fact contribute to overcoming negative social effects of that perceived human difference, and how that research could prevent the re-naturalization of such a historically loaded physical marker onto notions of caste and ethnicity. In this sense, while my initial interest in this chapter's topic has been animated by the question of how anthropology could still challenge the racializing rigidization of human difference amidst the genomicizing trend in this field of inquiry (as we have seen in the previous chapter), in concluding I am reminded of my own discipline's unexplored potentials in reflecting over the technoscientific and sociopolitical co-production of human difference and its categorizations (Schramm and Beaudevin 2019). This reinstates the calls for further engagement with the matters of co-production and for further dialogues on this issue, among different fields of knowledge. Such dialogues on the pitfalls of classifications could be enhanced even among the different subdisciplines under the increasingly diversified umbrella of anthropology.

Chapter 7. Conclusion

7.1. "All that is you"

Although Irawati Karve undertook a PhD in *Anthropologie* in Berlin, this Indian anthropologist wrote very little about her connections with German sciences or German history. In the following, I examine in closer detail her *All that is you* (Karve 1992), a short essay that is especially telling regarding the matters of responsibility and entanglement with the troubling political context of Nazi Germany. Written in 1963 and published after her death,[212] the essay poetically narrates her philosophical confrontation with her conscience following the report on the trial of Nazi officer Adolf Eichmann. Eichmann's trial was of critical historical significance because it was not just one person but in fact "history", explains Hannah Arendt (2022 [1963]:17), "stood in the center of trial". Karve writes:

> One evening I was at a scenic point looking at the sun set into the mountain range. The vast frozen waves of rocks below, the iridescent cloud waves above, and here between them, me. "All this is you," my heart was filled with joy, thrilled by this spiritual oneness with the world and the setting sun. And to add to all this delight, a verse from the Upanishads rushed in to help: "Oh sun, ruler of life, giver of life, show me not your harsh but your gentle light, the man in those rays, that is me." I savored these old lines over and over, I was drunk on this sense of oneness with the universe.
>
> Back in Pune, I was browsing the newspaper as I did every day. There was news of the Eichmann trial in Israel. I had known of course that the Nazis had tortured and killed millions of innocent men, women, children. But I still could not bear to read this account of the atrocities committed by one single man. I thought of my friends who had lost their lives in this holocaust, and of other friends who had escaped and been saved but whose lives were ruined, meaningless. Hatred welled up in me, hatred against their murderers. And then came the thought: "They are also you." I felt as though I had received an electric shock. No, no. Never. How can those for whom I feel nothing but hatred and contempt be I? It is impossible. I brushed away this revolting cockroach that was trying to cling to me. I silenced my conscience. (Karve 1992:216)

Then, the essay describes a lecture Karve gave about crime and society, in which she explains to her students that "human tendencies are the same everywhere" and that the "social environment" is, "along with other factors, responsible for crime" (ibid.:217). She seems to be surprised at the implications of her own reconsiderations on the biological essentializations of

[212] First written in Marathi and published in her book *गंगाजल* (*Gangajal*) in 1972, the story was translated by Jai Nimbkar to English and reprinted in 1992. In the following quotes of the essay, I have adapted the text according to a translation revision by Urmilla Deshpande.

criminal behavior (as it had been commonly theorized in German racial hygienist thinking). She writes:

> The period over, the students had dispersed. But my thoughts went on. If it is true that criminals have all the normal tendencies of ordinary people, then it must mean that under special circumstances, any person can commit a crime. You can perhaps find one person among thousands of people who says, "I will keep my values intact even at the cost of my life," and one in a million who, when actually put to the test, will behave accordingly. When you consider crime, immorality, and crookedness as expressions of ordinary human nature, then criminality becomes merely a reminder of the extremes that are possible in human nature. Does crime present to us, then, another undiscovered self?
>
> My mind recoiled in alarm. (ibid.:218)

In this sense, if criminal behavior cannot be essentialized into the inheritable biology of certain people or groups of people (or races, as the prevailing racial theories read at the KWI-A had alleged)[213] and is, instead, determined by environmental factors, Karve was suddenly "alarmed" by the implication of this theoretical shift, namely: that every human has possibly a criminal potential in their nature. Karve's shift possibly also reflects the argument constructed in Eichmann's defense: that he was an ordinary man who "had never had any inclination to kill anybody" and that his role in managing the genocide of the Jewish people "was an accident and that almost anybody could have taken [his] place" (Arendt 2022[1963]:277).

Then, Karve's essay goes on to remark that the countries that won World War I share responsibility for the resentment that led to the ascension of Hitler, which further leads her to ask if the whole world did not have a share in this responsibility. This questioning takes Karve to a "grief-stricken" state while realizing a "monstruous truth"; she writes: "My mind was pointing the finger at me, saying, 'All that is you!'" (ibid.:220). Commenting on one's bond to others in a society, she ties the theme of shared responsibility to a reflection on the Hindu philosophical concept of *atma*(*n*), which means both breath and the essential self in universal existence.[214] Continuing the dialogue she has with herself throughout the essay, she concludes:

> "Why are you talking of the people and events in other countries?" my mind mocked. "Why don't you come closer to home?"
>
> "Do you remember what you said when innocent people got killed in the struggle for freedom?"

[213] On anthropometry-based racial approaches to the study of criminal behavior, see: Sekula 1986.

[214] In the Upanishads, the Vedic Sanskrit texts that Karve mentions in the opening of the story, *atma* denotes "the ultimate essence of the universe" as well as the vital breath in each human being (Grimes 1996:69). *Atma* also conveys a sense of "the immutable, essential self that constitutes the ultimate reality of all beings" (King 1999:54).

I remembered. "When a country is at war, these things occasionally happen."

"Is it possible for you to have nothing to do with those who are corrupt, who have made their money by crooked means?"

"No," I admitted.

"You believe that all castes, all religions should live together in harmony. But there are those who twist a situation, make strident propaganda, and inflame young people's feelings. Are such people among your acquaintances?"

I said yes, and asked, annoyed, "What must I do then? Go and live in the jungle? Or kill myself?"

"You can pretend to be neutral only if you do one or the other. *Even if you associate with such people only as far as absolutely necessary, you still share in their misdeeds. You know that this kind of propaganda was being made continuously against the Jews. The atmosphere here is not that tense yet, but there is no guarantee that what happened in Germany will not happen here.* Wasn't Gandhi murdered as a result of a similar hate-campaign? And was not his murder used as an excuse to set fire to thousands of homes in Maharashtra? Aren't insignificant reasons the excuse for horrific caste riots all over India?"

I was saying "Yes, yes," but this was not the end of it yet. *"What effort have you made to destroy these seeds of hate?* Haven't you lived in this same society by following the policy of saving your own skin? *Then what is the point of saying that you share none of the responsibility for the crime in the world, in your own society? All of it is you.* Remember what Yadnyavalkya said?"

With a heavy heart, I recited the lines then: "Thus atma is completely outside, and in the same way it is totally inside. While you still have the feeling of duality, those who are outside you are 'others,' strangers. But really it is atma that pervades all. Atma is full of knowledge; atma is knowledge."

Can awareness and knowledge ever be comforting? I was coming full circle in the well of knowledge. Painfully I said, "Yes, yes. My young granddaughter is I, the dog who wags his tail and looks at me with expressive eyes is I, the cuckoo that flies swiftly across the blue sky is I, the glorious evening is I, Eichmann, Stalin, Hitler, those who murder, bum houses, start riots, and those who bum in the burning houses, who die in the pits are also I. Yes, it is all I."

My confession was complete. And at the moment of knowing, I was reduced to ashes. (Karve 1992:221-222, emphasis mine)

In this essay, Karve ruminates about her, and any person's, entanglements with—and responsibility vis-à-vis—the political life of the world they find themselves in. I am concluding this thesis by thinking with *All that is you* to reconsider how looking at knowledge and power through the prism of entanglement might affect our perspectives not only on agency and causality in history but also on scientific ethics and responsibility.

Eichmann's case was a milestone in reflections about agency, responsibility, and responsibilization within totalitarian political structures, in this case National Socialism.

Thinking with Arendt's (2022 [1963]) famous meditations on the trial, Haraway writes about Eichmann:

> here was someone who […] *could not entangle,* could not track the lies of living and dying, could not cultivate response-ability, could not make present to itself what it is doing, could not live in consequences or with consequence. […] the world did not matter for Eichmann. (Haraway 2016:36, emphasis mine)

Haraway (2016:36) talks of "immateriality, inconsequentiality" as a synonym to what Arendt termed "thoughtlessness" in Eichmann. It is surely not a coincidence that just recently, in the mid- and late 2010s, Haraway and so many others have revisited Arendt's *Report on the banality of evil* (2022 [1963]) to grasp the bitter changing tide of the politics of the world we live in. I read *All that is you* for the first time out loud in 2019 in the company of one of the editors of the book where its English translation was published, Maxine Berntsen, a former student of Karve and US émigré in India.[215] After my reading, we both reflected about how deeply the essay resonates with us: she in difficult confrontation with the Trumpist turn in US politics and its supporters among her family, me in a similar situation vis-à-vis gloomy politics in Brazil and ignorant of the suicidal fate that close friends—in their final attempt to disentangle from this world—would take. I still struggle with the difficult questions: What does it mean today to be entangled with—and thus be a co-constitutive part of—a polity where so many banalize, look away from, or even approve the evil? What do we make from being immersed and deeply implicated in a society where values and practices seem to shift from inclusion to exclusion, altruism to selfishness, entanglement to disentanglement? Particularly, what does it mean to be a social scientist, or anthropologist, who produces knowledge in such a society? Or, for example, today in India—where, like in most places, anthropology research depends on public funding—, how does one surpass, or navigate, being entangled with a chauvinist regime that suffocates critique?[216] How do we go about our entanglements to such polities ethically?

Karve's evocation of radical entanglement through *atma* opposes, if we think in Haraway's (2016:36) terms, Eichmann's contained capacity to entangle and his "inability to think" through the consequences and materializations that would follow from his agency, which lead to

[215] Berntsen studied Marathi with Karve when Karve was a guest professor in Pennsylvania. Karve called her "my American daughter".

[216] This is a question that resonates with many Indian anthropologists whom I have talked to; I am thankful for Nandini Sundar and Subhadra Channa for our sustained conversations on this. I was also inspired by Sundar's (2018) lecture *Academic Freedom in India* and our discussion on how this issue can be raised in the German context—where neo-right-wing impulses are shaping the intellectual landscape also via public funding. This is not to suggest, however, that private funding as an alternative to public funding would solve the issues of these political entanglements. The implication of private education and research in capitalist schemes has troubles of its own.

genocide. In *All that is you*, Karve processes her own implicatedness in this transcendental web of relations visualized through the concept of *atma*. But thinking about Karve's relational implications to knowledge as *atma* raises many questions. By transcending individuality and bringing entanglement and sharedness to the fore, how do we tackle the issue of responsibility? How can we—especially we scholars/scientists—reconcile *atma*, or our deep entanglements with/in the world, and the matters of individual responsibility? How can responsibility be differentially and fairly shared, or how could we reconceive it? How can we be responsive to these entanglements?

To better approach and circumscribe these questions, it is worth noting that one could interpret Karve's *All that is you* in at least two concurrent ways—each with one different implication for the question of responsibility. The first would problematize the mobilization of *atma* to think about responsibility of actual crimes: if we are all responsible, then the moral individual matter gets diluted and, as a result, justice—with its necessity of individual responsibilization—is virtually unattainable. This interpretation would approximate Karve's position with that of Eichmann's defense, which argued that "where all, or almost all, are guilty, nobody is" (Arendt 2022 [1963]:277). Also in this view, Karve's "confession" approximates that of a Christian theology where confessing one's sins leads to redemption: "the moment of knowing" in which she is "reduced to ashes" could symbolize the expurgation of her guilt, a self-immolating absolving relief of her responsibility. But a second interpretation would question if, or to what extent, Karve sought to redeem herself. Practices of confession in Hinduism might account for both intended and unintended effects of one's being in the world (and not one's "sins" in a Judeo-Christian theological sense) and do not easily lead to redemption (the final liberation, or *moksha*, being much harder to achieve). In this sense, instead of diluting the weight of responsibility, Karve's *All that is you* can be understood as an acknowledgement and multiplication of it: she and everyone carry this weight. Responsibilization is here put in a universal and ethical realm, not moral or accusatory. She asks herself what she could have done to stop the seeds of hate, bringing the question of responsibility to the sphere of potentiality, and not actuality of committed crimes (the latter being the object of law enforcement).[217] While the first interpretation sketched here is more concerned with the realm of moral and legal judgment (which follows rather rigid and normative stances and is obviously important, the more so in this specific historical

[217] For a discussion of potentiality versus actuality in Eichmann's trial, see Arendt (2022[1963]:271–278).

circumstance), the second one concerns the realm of ethics (which relates to the issue of collective well-being).[218]

Here I will follow the second interpretation, for one of the contributions of this thesis has not been to think *morally* with Karve's case or to accuse her of possible wrongdoings, but to draw ethical and political lessons from it for those who engage with the sciences of human diversity and are implicated in their racist histories. Hence, we can frame the questions in this conclusion as: How can we, as anthropologists and other scientists who deal with human diversity, go about our research and the troubling political and historical contexts of the knowledge we articulate, ethically and responsibly? In the following, I summarize the entanglements trac(k)ed in this thesis (Section 7.2) and I take up this interrogation to reflect over, and point at open questions in, decolonizing anthropology and research on diversity and inequality (Section 7.3). As an outlook (Section 7.4), I point at how the value and material potentialities of justice could offer an orientation to decolonial scientific research on diversity and inequality; then, I discuss response-ability and entanglements in science and politics.

7.2 Trac(k)ed Entanglements

This thesis tracked and traced different sorts of entanglements pertaining the production of knowledge on human diversity: spatial and historical entanglements (connecting different places in India and Germany and its colonies since the nineteenth century), the entanglement between diversity and inequality, as well as the entanglement between scientific, material, political, and ethical dimensions.

As for the first sort, the entangling spatial and historical elements were followed in different aspects of Karve's physical/biological anthropology and legacy. Through the material semiotic and historico-ethnographic approach followed in this thesis, I have retraced Karve's scientific trajectory as well as the trajectory of different materials that played a role in the scientific research undertook by her and by other anthropologists and geneticists who have built upon her work. Thereby, I strove to understand the relational outcomes of the interplay of different actors and objects in situated practices of knowledge-making and teaching/learning. These included books, anthropometry manuals, measuring instruments as well as human remains (comprising human skulls and other bones and DNA samples). Analyzing these knowledge

[218] The admittedly simplified distinction between moral and ethics here follows the discussion outlined by Puig de la Bellacasa (2017).

practices and the circulation of scientific objects through a topological perspective (M'charek 2014; M'charek, Schramm, and Skinner 2014) has revealed a picture where different histories and places are entangled.

The main entanglements trac(k)ed in this thesis occur on transnational routes and across colonial and post-colonial times, connecting India and Germany and its colonies. We have seen how the research at the Kaiser Wilhelm Institute of Anthropology, Human Heredity, and Eugenics (KWI-A) was grounded in Eugen Fischer's Mendelian application of racial physical anthropology to colonial subjects in Namibia. Besides having co-productive implications in the German parliament's discussions on imperial policies of racial purity, the scientific and political resonance of Fischer's colonial research brought his career to the position of founding director and main supervisor at the KWI-A in Berlin. We have seen how Karve was trained in the KWI-A and how her doctoral research comprised the anthropometric analysis of a series of skulls, many of whom obtained in contexts of German colonial usurpation. We have also seen how racial knowledge connections between Germany and India precede Karve and her KWI-A-trained Indian contemporaries Sarkar and Biswas, not only dating back to early anthropological and Orientalist/romanticist explorations on the Aryan race question by German scholars but also building upon British colonial racial anthropological large-scale studies on the questions of the Aryan ancestry and the origins of caste.

While much of the racial and eugenicist knowledge produced at the KWI-A was tied to imperialist politics with genocidal consequences after 1933, different objects of the racial knowledge produced in Berlin circulated to different places and across many decades. Staying with Karve and her locations, we have seen how this has happened through anthropometry-related books and instruments she brought with her from Europe and in particular the Rudolf Martin's anthropometry manual. This manual was later translated in India by students of Biswas and is still used today in anthropology classes in Pune. Furthermore, by following how the knowledge articulated by Karve is taken up today, we have seen that the ghosts of German imperialism also reappear in unexpected places, like in the population genetics research led by Harvard-based David Reich. Reich's research on what he would like to call "Aryan invasion" is grounded on a perspective of populational takeovers and on Karve's racial anthropology-motivated definition of caste as endogamous group; thereby, it also collates with the German nationalistic archaeology that co-shaped National Socialist ideologies about the so-called Aryan race. In sum, through a topological perspective, we have seen that different places and (hi)stories of (post-)colonialisms and knowledge-making on human difference are folded

together in these connections, drawing a picture of the transnationalization and historical persistence of racial ideas, theories, and methods—in many mutations and materializations. By examining the circulation of racial knowledge through a postcolonial perspective, this thesis has not only shown how the coloniality of racializing knowledge has been transnationalized. It has also shown how such colonial past is present today.

A key theoretical-methodological contribution of this thesis has been to add the dimension of historicity to phenomenological and ethnographic approaches to the study of science. Past, present, and future are entangled in crucial ways. Building up on other scholars (e.g., M'charek 2014; Braun 2014), I have indicated that attending to time and the past in materials and practices of knowledge-making is key to understand the present and visualize how science could be otherwise in the future. Following the technological materials that play a role in such scenes of knowledge-making brought to light the different ways in which racial theories and methods travel through time and space and make themselves present, in vivid and ghostly ways. We have seen situations in which racial knowledge has entered the scene in anthropology classrooms today, often creating friction and tense affects. This awkward presence of race speaks for the mismatch between current (post-racial) discursive-theoretical articulations on human difference and the (racial) knowledge embedded in those material objects. As we have seen in Chapter 4, racial categories, concepts, and theories might come to the fore as those knowledge objects are handled—in the case of measurement instruments—or read and cited—in the case of books. The relations enacted through the use of anthropometric books and instruments are to produce knowledge that can be racial taxonomizing (in the work of Karve) or metric-biologizing (in the nutrition research in Pune today). Both effects of the use of anthropometry—racial-typologizing and metric-biologizing—have in common that they put forward biologically essentialist knowledge while they obscure political, social, and cultural dimensions of the problems studied. Among the problems researched with anthropometry we have seen for instance the origins of caste differentiations (in the case of Karve) or hunger (in the case of today's growth and nutrition research in Pune). As a result of the continuous use of anthropometry, the pressing problem of hunger is only diagnosed, enacted through measurements on bodies, while this problem's social and economic roots, for example, are not grasped by these anthropologists in Pune. Further, rooted in Karve's racial anthropological conceptualization of caste as an endogamous group, scientists explain caste differentiations mainly through their biological differences (for instance of skin color, while social and cultural aspects of such differentiations are obscured); it is also based on Karve's biohistorical model

of caste that these scientists curate their samples in a way that excludes individuals whose family background do not fit in the picture of caste endogamy or whose genetic make-up seems to be too outstanding from the "normal". In sum, the genealogy traced in this thesis provided a topological matrix to better understand the biologically essentializing effects of such research: these effects can be situated in the aftermath of the colonial contexts of the racial theories and methods that—through their material manifestations in instruments and books (including books by Karve)—play a role in scientific practices today.

Importantly, the knowledge entanglements traced here are entanglements that matter. In other words, this thesis has highlighted those knowledge entanglements with world-making effects—especially in relation to racialization. We have seen in Chapter 2 how Karve's articulation of racial theories and methods to study human diversity in India commented, and gave leverage to, different political processes, from the partition of British India (with her conference paper arguing that Muslims were a racially—also culturally—inferior group in South Asia) to the creation of the state of Maharashtra (with her several anthropometry-based enactments of Marathas and other Marathi-speaking caste groups as racially distinct vis-à-vis other Indians). In Chapters 5 and 6, we have explored the different implications of the genetics research that rely on Karve's conceptualization of caste as an endogamous group; one of the effects of such knowledge articulations is the invisibilization of inter-caste individuals and the reification of caste differentiations, which in turn have manifold implications. In a nutshell, we have seen how racial theories and methods have been adapted, reworked, and applied to the study of human diversity in India, racializing those human difference categories. The main historical argument of this thesis is that Karve's trajectory with her training in Berlin as well as her knowledge practices, articulations, and legacy have composed an important vector in this web of racializing knowledge entanglements in/between Germany and India.

In addition, the material semiotic examination of Karve's knowledge articulations revealed a further insight regarding the arrested post-racial impulse in her work in post-colonial India. As we have seen in Chapter 2, while Karve, toward the last decades of her life, embraced multiculturalism and discursively adapted her writings and speech vis-à-vis international concerns over the discriminatory effects of racial knowledge, she continued to do physical-biological anthropological research in part with the same methods and instruments that she was trained in in Berlin. This speaks again for the mismatch between, on the one hand, an impulse for discursive-theoretical change and, on the other, the continued use of methods and technology that are grounded on theoretical assumptions from an earlier (and, in this case,

European colonial) context. Here, it was racial knowledge from late nineteenth and early twentieth century Europe that shaped the design of these methods and technology. Also in this sense, this thesis has thus reinforced the argument for a closer engagement with histor(icit)y in anthropological and critical studies of science, technology, and society.

This mismatch between discursive-theoretical change and continued use of methods and technology also delivers insights about different sorts of entanglements in science and politics. As we have seen throughout this thesis, this attempted purifying separation not only between method and theory but also between science and politics has played a key role in the persistence of scientific methodological practices with a racial background and/or racializing effect. This has become evident not only in the persistent use of anthropometry (Chapter 4), but also in the ways that human geneticists—including KWI-A researchers and leading population geneticists today like Reich—attempt(ed) to circumvent sustained considerations about the ethical and political implications of their work. This demonstrates the shortcomings of neatly separating the ethical, technological, ontological, and epistemological realms (see, e.g., Barad 2007). It also demonstrates the importance of thinking further about co-production and entanglements in science/politics/society, also calling for the need for new ethical and philosophical orientations in the research on human diversity—especially when the categories of difference that such research enacts/mobilizes are entangled with contexts of historical social inequity and injustice, as I will discuss in the next section.

The arrested post-racial impulse in Karve also speaks for material constraints: in part, she—and many other anthropologists in Pune today—continued to work with anthropometric instruments, for example, because these have been available (among other reasons, as discussed in Chapter 4), whereas newer molecular technology did not fit in her/their budget and was not comprised in her/their training. Thus, the financial conditionality aspect of this parallels to how today anthropology departments in India can hardly afford to do molecular research, as we have seen in Chapter 6 in the example of the small molecular anthropology lab that was closed due to lack of resources. While access to new technology does not necessarily mean a discursive change—for, as we have seen in Chapters 5 and 6, new technology often also unlocks older research questions, like new genomic technology led to a renewed interest on Aryan migration and the origins of caste—, this thesis has reinforced that attuning to technology and the inequalities of access to it is important to comprehend the dynamics of (post-)racial knowledge adaptations, changes, and continuities. Thus, the realm of the material—including funding, infrastructure, and technology—is an important conditionality to

practices of scientific knowledge-making and plays a key role in how knowledge is made and remade, as well as in how research on human diversity could possibly be decolonized.

In this sense, this thesis showed the global inequity that (infra)structurally conditions scientific research on human diversity in different stances: from Karve's (and many other Indian anthropologists') training in Germany to the technological and financial inequalities in the field of genetics research. As we have seen in Chapters 4, 5, and 6, these inequalities condition international scientific cooperation in a way that Indian scientists often rely on expensive (anthropometric and genomic) technologies that are in the hands of manufacturers or scientists based in the Global North. Despite their wish to scientific sovereignty, many Indian scientists in the fields of molecular anthropology or population genetics research are caught up in these international collaborations where power, due to these material inequalities, is not symmetrically distributed. This picture of unequal and transnational scientific entanglements has parallels to the case of Karve. We have seen that the prominence of her career in India was dependent upon her doctoral training and degree obtained in Germany. In addition, we have discussed the issue of scientific sovereignty thinking with how Karve's main social and cultural anthropological book, although well-received in India for its innovative and holistic approach, received a demolishing critique by a gatekeeping European sociologist of India, the French orientalist Louis Dumont, who questioned Karve's objectivity.

I argue that addressing these issues pertaining to global inequity in science does matter for discussions on the decolonization of sciences, including anthropology. While most of decolonizing knowledge discussions have centered on epistemology, addressing the material conditionalities of research on a global level is important to advance this debate. Shedding light on these technological and material inequalities and dependencies complicates the post-colonial promise of, and impulse towards, scientific sovereignty; it can also illuminate further explorations on the possibilities of decolonizing sciences in the Global South.

7.3. Decolonizing anthropology and research on diversity and inequality

This thesis has tracked entanglements that demonstrate the coloniality of racial sciences. We have seen how the racialization of categories of difference has travelled through knowledge circulations to post-colonial times and places, persisting within them. What lessons can the case of Karve and her legacy teach us if we want to decolonize anthropology and the sciences of human diversity? In other words, what are the take-aways from the (hi)stories of knowledge entanglements described here, especially if we want to tackle—and ultimately overcome—the

colonial and racial legacies in knowledge production about humans and their diversity? How can the ghosts of race be finally laid at rest? As we have seen, what was hurriedly hidden in the ground might resurface, and hasty erasures, like the conceptual erasure of race, might continue to haunt us if we do not attend to them. More, the elephant of categorizations and classifications in the ethnographic room (Schramm and Beaudevin 2019) can hardly be ignored especially when the need to deal with racism has become increasingly urgent.

This thesis supports the view that human diversity can be better understood if research also attends to inequalities that shape human existence and social relations. Difference and inequality are entangled in fundamental ways. In other words, the argument drawn here reinforces the longstanding critical efforts in reconciling the division not only of nature and culture, but also of the biological, social, and cultural realms in the research on the diversity of the human (e.g., Haraway 1991, 1992, 2012, 2016; B. Subramaniam 2013, 2014). Importantly, this has also been currently debated within anthropology (e.g., Franklin 2003; Ingold and Pálsson 2013) including by scholars with biological anthropological training (Fuentes 2021; Cabana et al. 2022). As we have seen in Chapter 3, splitting the human into these different compartments creates crucial frictions among the corresponding subdisciplinary divisions of anthropology. Reapproximating the clear-cut subdisciplinary divisions in anthropology—for instance through inter- and trans(sub)disciplinary collaborations—would benefit a further move away from biological or cultural essentializing enactments of the human.

We have also seen in Chapter 3 that the tensions between social-cultural and biological anthropologists run parallel to the tension between studying caste and at the same time engaging with anti-caste-ism. In the Pune University anthropology department, these tensions come to the surface in the concurrent commemorations of Karve and Ambedkar. On two ends of a hierarchical caste-based social scheme, Ambedkar and Karve were two Maharashtrian intellectuals who never met. Despite writing on similar issues and despite their historical coexistence and geographical proximity, they also never engaged with each other and had different approaches to studying caste.[219] Reconciling the subdisciplinary divisions in anthropology could also evoke putting Ambedkar and Karve in dialogue. While Ambedkar's abolitionist views on caste were clearly much more progressive than Karve's and are still inspiring for anti-caste-ism struggles, Karve's work today can be relevant for progressive politics, and is most remembered, due to her takes on gender inequity and women's issues as

[219] In her writings, Karve only briefly mentions Ambedkar once (Karve 1961a:144–145).

well as due to her philosophical and cultural insights from ancient texts. Perhaps the best example for Karve's critical actuality is the ongoing readership success of her *Yuganta* (2017 [1969]), a book that comments on the Sanskrit epic Mahabharata under the light of social and gender relations in India. Especially in the current context of Hindu nationalism mainstreaming (where Hinduism-related writings have been rearticulated in dogmatic evocations), Karve's nuanced and critical interpretation of these texts offer solid counterpoints to their chauvinistic appropriations. A portion of Karve's work, particularly in the last decades of her life, offers insightful sources to discuss women's issues (Karve 1966, 2017), to criticize the beef ban and advocate for secularity of the state (Karve 1960a), to advocate for a humanist education and universal education rights (Karve 1960a, 1968c), to sustain multiculturalism (Karve 1963), among other possible progressive mobilizations.

In addition, the sketched friction between Karve and Ambedkar—and in the Pune University anthropology department—is not just one due to subdisciplinary orientation, but also due to a differentiated conceptual-political orientation: while the first, especially towards the end of her life, was strongly oriented by the concept and value of diversity, the second was oriented by the value of equality and thus strongly focused on the problem of inequality in society. In Chapters 3, 4, 5 and 6, I pointed at the need to build an analytical bridge between "diversity" and "inequality": these two concepts are differently paid attention to in different fields—the first relatively more used in biology and anthropology, especially in its biological and, traditionally, cultural sub-ramifications; the second in sociology and economics and with a value-based orientation towards the principle of equality. "Diversity" and "inequality" provide two different conceptual lenses, each enacting specific problematizations and objectivizations of social reality (Barros 2018). Ambedkar was more worried about social and economic (caste-based) inequalities than Karve, who focused on cultural, biological, and linguistic diversity and worried about national cohesion, even though she also looked at gender issues through the lenses of inequality (Karve 1966).

Further, especially when we grasp the legacy of racism in science, the call to reapproximate social and cultural issues, including through the concept of inequality, to the study of human biological diversity is especially relevant for studies of human variation that usually understands difference from a strictly biological perspective. Speaking from anthropology, particularly biological anthropology, one can say that attending to inequality is key to better understand human differences—even biological, as for instance racism and casteism, too, shape bodies. As discussed in Chapters 4 and 6, historical and structural inequalities connected

to racist, ethnic, and casteist discrimination often also co-constitute biological differences based on these categories, including differences that are enacted from bodies like skin color or malnutrition.

Attending to inequalities can provide a way to disentangle from the colonial roots of anthropology's turn to human diversity. Biologically essentializing understandings of human diversity that came to be categorized as caste and race have emerged in colonial contexts, and this thesis has pointed at many political complications resulting from such essentializations in India. Hence, I argue that decolonizing anthropology necessarily involves sustained efforts to break free from such ossifying and essentializing enactments—including racializing categorizations—of human bodies and groups of humans. Resisting essentializing comprehensions of human diversity and paying attention to the realm of the political and social in the co-constitution of such bodily diversity is a key step towards decolonial anthropological futures.

7.4. Justice and response-ability in science–politics entanglements

In thinking about how anthropology and the other sciences addressed in this thesis could be otherwise, one could start by asking: *Cui bono*? What for—and for whom—does the study of human differences and their origins matter? What is the purpose of studying human variation? And how can possible answers to these questions be sensitive to a context where human diversity is inevitably tied to political concerns over social injustice? I finish this thesis by gesturing towards the value of justice as a possible orientation for knowledge-making that is committed to enabling both more equitable and diverse futures.

Justice has been a central object of concern in discussions about ethics and knowledge production among decolonial and feminist STS scholars (e.g., Mamo and Fishman 2013; Santos 2014; Pollock and Subramaniam 2016; Savransky 2017). As Jenny Reardon, Jacob Metcalf, Martha Kenney, and Karen Barad put it, in conversation with Arendt and Derrida:

> Justice calls us to think about what might be, at the same time that it compels us to account for and respond to what has gone before. Rather than presuming a world already made, justice imagines a world in the making between past and future […]. It asks us not to stand back and observe the world as it is, but to response-ably make it. (Reardon et al. 2015:29)

In addition, given that political mobilizations of genetic truth claims are likely to continue, agreeing with Pollock, M'charek, and their co-authors (Pollock et al. 2021:2) in their statement

that "[t]he time is ripe for the elaboration of empirically grounded justice-oriented engagement with race as an object of biomedicine that is not contained within the lab", I would extend this observation to the case of caste and ethnicity in biological research. Thus, as conversations about DNA research in other contexts have been pushed by the principle of justice—and of accountability or even solidarity vis-à-vis those who donate their bodily materials for research—,[220] there is enormous potential in discussing how the design of human diversity research can be reshaped by having the principle of justice as an orientation. As biological anthropologists and STS scholars have recently discussed, one way to anchor a research design in justice would be to conduct research in close collaboration with members of the studied groups or donors of bodily materials especially when these groups are historically marginalized.[221] This could also imply not only addressing the question of inclusion in research but also advancing the discussion on scientific sovereignty not simply in terms of sovereignty of (post-colonial) scientists but in terms of the data sovereignty of those whose bodies and lives are researched (Tsosie et al. 2021). Such a move towards inclusion and knowledge sovereignty would also resonate with the call of Roma and Sinti activists in Germany who, like they did in that public meeting about the archaeological findings in the grounds of the KWI-A in Berlin, have urged: "no research about us without us".

In summary, in research contexts marked by exclusion and inequality, justice can serve as a guide: it would allow taking steps towards the inclusion and knowledge sovereignty of those groups whose difference correlates with inequalities. It can also foster the generation of knowledge that enables more just futures. Therefore, grounding anthropological research, including biological anthropological research, in social justice can lead to progressive and decolonial political outcomes. After all, decolonization primarily concerns global justice and repair.

To conclude, I revisit the interrogations articulated in the beginning of this chapter. In *All that is you*, Karve asked "What effort have you made to destroy these seeds of hate? […] Then what is the point of saying that you share none of the responsibility for the crime in the world, in your own society?"; and at the end: "All of it is you" (Karve 1992:221–222). Further thinking

[220] This insight draws from discussions in the panel "Inclusion and Its Consequences: The Politics of Diversity and Recognition in Health Data Projects" organized by Janet K. Shim and Sandra Soo-Jin Lee at the 2021 Annual Meeting of the Society for Social Studies of Science (Toronto, October 9, 2021).

[221] See e.g.: Bolnick, Smith, and Fuentes 2019; Smith and Bolnick 2019; R. Smith 2021. For an experimental collaborative approach in social and cultural anthropology, see e.g.: Alonso Bejarano et al. 2019. On inclusion and collaboration as means to decolonize research methodologies, see also: L. Smith (2012).

with Karve, we can ask: What can we make of our responsibility as anthropologists and scientists in our web of troubling histories and in troubling current times?

In thinking through entanglements (Barad 2007; Haraway 2016), the weight of responsibility on scientists for the worlding effects of the knowledge they produce is at the same time heavier and all-pervasive. As scientists, and particularly as anthropologists, we are implicated in webs of difficult legacies. Seeing knowledge-making in its entangled ways—and as a relational outcome of different, human and nonhuman, actors—also implies that a scientist's agency is constrained to several conditionalities. At the same time, the knowledges we put in motion might have impacts that we cannot always control or even be aware of. All of this makes evident that both the historical and the potentially worlding implications of the knowledges we build upon, produce, and circulate easily transgress the realm of one's intentions.

But the weight of responsibility as well as the complex and circumscribed view of a scientist's agency should not be paralyzing. They should also not mean one should give up ethical concerns regarding the effects of the knowledge one puts out in the world—as if the fact that the afterlives of that knowledge are beyond the knowledge-maker's control should liberate us from any responsibility. On the contrary: Thinking about knowledge entanglements should foster more care in scientifically attuning to the world and it can enable more ethically oriented ways of conceiving responsibility.

Drawing from feminist STS scholars (Barad 2007; Haraway 2008, 2016; Puig de la Bellacasa 2017), we can think of responsibility not as the management of guilt but as a *response-ability*: the ability to situationally—ethically and politically—respond to the mobilizations of the knowledge we set in motion. The framework of response-ability re-conceptualizes ethics as "situated, relational, and open-ended" (Reardon et al. 2015:12). Response-ability "requires cultivating practices of response. These practices are developed and done with others […] in a process of ongoing exchange" (ibid.). In this sense, the responsive ethics cultivated by the orientation of response-ability distances from a search for standardized universal ethical principles and, instead, gives room for situated dialogues and collaboration in scientific research.

Thinking of response-ability can be especially productive for anthropology and other sciences that deal with human diversity: Especially in contexts in which historical social inequalities are so tied to categories of difference, research on human diversity can be more carefully done if one is attentive—and responsive—to the realm of situated political and social inequalities.

Having in mind the co-productive dynamics between science, politics, and society, and, in particular, considering the ontological implications of research on human diversity, we can think of justice and response-ability as an ethical and scientific orientation that allows the construction of worlds with more equity. This orientation also substantiates conceiving diversity in science and establishing the inclusion of, and collaboration with, historically marginalized groups in the situated construction of objective knowledge (see Harding 2015). In this way, response-ability can also become the ability of not just reacting to injustices but of manufacturing knowledge that enables more just worlds.

Further, the prism of entanglements can also foster reflections about our sciences' histories and imaginations of how they could be otherwise. Attending to the multifold historicity of the actors and objects in knowledge-making practices allows us to pay more attention to troubling legacies in the genealogies of knowledge we draw from and build upon. This prism enables us to better spot unintentionally repeating patterns and to imagine how to break free from them.

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Although this conclusion has provided more questions than answers, in response to the final interrogation in Karve's *All that is you*—"Can awareness and knowledge ever be comforting?"—, I remain with the hope that knowledge can ultimately be comforting—even if unsettling. Perhaps both affects, comfort and unsettlement, are an integral part of knowing—or at least of any knowledge that helps us navigate the contradictions that always accompany difficult and stimulating questions. I finish this thesis with the hope that the knowledge about the different entanglements traced and tracked here can help anthropologists unsettle—and delink from the path of—racializing colonial legacies and take new directions towards decolonial horizons.

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Appendix 1. List of interviews

List of semi-structured interviews ordered by date (conversations are not listed):

Pooran Chand Joshi (anthropologist), New Delhi, 5 Sept 2017.

Dhruv Naira (historian), New Delhi, 6 Sept 2017.

Surinder Singh Jodhka (sociologist), New Delhi, 6 Sept 2017.

Nandini Sundar (anthropologist), New Delhi, 6 Sept 2017.

Padmanabh Samarendra (historian), New Delhi, 8 Sept 2017.

Subhadra Channa (anthropologist), New Delhi, 9 Sept 2017.

Subhash R. Walimbe and Veena Mushrif-Tripathy (anthropologist/archaeologist), Pune, 13 Sept 2017.

Ramchandra Keshav Mutatkar (anthropologist), Pune, 13 Sept 2017.

Jai Nimbkar (Karve family member), Phaltan, 15 Sept 2017.

Shaunak Kulkarni (anthropologist), Pune, 19 Sept 2017.

B. V. Bhanu (anthropologist), Pune, 20 Sept 2017.

Pramod Prabhakar Joglekar (archaelogist), Pune, 21 Nov 2018.

Maxine Bersten (Karve family member), Hyderabad, 27 Nov 2018.

R. Srivatsan (anthropologist), Hyderabad, 28 Nov 2018.

Nisha Sawant (anthropologist/archaelogist), Pune, 30 Nov 2018.

Barun Mukhopadhyay (anthropologist), Kolkata, 28 Jan 2019.

Anand Karve (Karve family member), Pune, 16 Feb 2019.

Kailash Chandra Malhotra (anthropologist), Pune, 23 Feb 2019.

Kumarasamy Thangaraj (geneticist), Hyderabad, 12 Mar 2019.

Gyaneshwer Chaubey (geneticist), Varanasi, 09 Mar 2019.

Mohan Reddy (anthropologist), Hyderabad, 12 Mar 2019.

Kailash Chandra Malhotra (anthropologist), Noida, 18 Mar 2019.

Katragadda Paddaya (archaeologist), Pune, 20 Mar 2019

Narendra Bokhare (anthropologist/curator), Pune, 25 Mar 2019.

Shantanu Ozarkar (anthropologist), Pune, 27 Mar 2019.

Madhukar B. Mandke (anthropologist), Pune, 28 Mar 2019.